San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

JUL 13 2010

Sam Kingston
Bolthouse Farms Inc.- Coalinga
7200 East Brundage Lane
Bakersfield, CA 93307

Re: Notice of Preliminary Decision - Authority to Construct
Project Number: C-1095284

Dear Mr. Kingston:

Enclosed for your review and comment is the District's analysis of Bolthouse Farms Inc.- Coalinga's application for an Authority to Construct for a stationary 600 bhp Volvo Tier 2 certified diesel-fired IC engine powering an agricultural irrigation well pump, at Township 21S, Range 16E in Coalinga, Ca.

The notice of preliminary decision for this project will be published approximately three days from the date of this letter. Please submit your written comments on this project within the 30-day public comment period which begins on the date of publication of the public notice.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact Ms. Gurpreet Brar of Permit Services at (559) 230-5926.

Sincerely,

David Warner
Director of Permit Services

DW:gb

Enclosures

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
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www.valleyair.org www.healthyairliving.com

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

JUL 13 2010

Mike Tollstrup, Chief
Project Assessment Branch
Stationary Source Division
California Air Resources Board
PO Box 2815
Sacramento, CA 95812-2815

Re: Notice of Preliminary Decision - Authority to Construct
Project Number: C-1095284

Dear Mr. Tollstrup:

Enclosed for your review and comment is the District's analysis of Bolthouse Farms Inc.-Coalinga's application for an Authority to Construct for a stationary 600 bhp Volvo Tier 2 certified diesel-fired IC engine powering an agricultural irrigation well pump, at Township 21S, Range 16E in Coalinga, Ca.

The notice of preliminary decision for this project will be published approximately three days from the date of this letter. Please submit your written comments on this project within the 30-day public comment period which begins on the date of publication of the public notice.

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Fresno Bee
Fresno Bee

**NOTICE OF PRELIMINARY DECISION
FOR THE PROPOSED ISSUANCE OF
AN AUTHORITY TO CONSTRUCT**

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Unified Air Pollution Control District solicits public comment on the proposed issuance of Authority to Construct to Bolthouse Farms Inc.- Coalinga for a stationary 600 bhp Volvo Tier 2 certified diesel-fired IC engine powering an agricultural irrigation well pump, at Township 21S, Range 16E in Coalinga, Ca.

The analysis of the regulatory basis for this proposed action, Project #C-1095284, is available for public at http://www.valleyair.org/notices/public_notices_idx.htm and the District office at the address below. Written comments on this project must be submitted within 30 days of the publication date of this notice to **DAVID WARNER, DIRECTOR OF PERMIT SERVICES, SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT, 1990 EAST GETTYSBURG AVENUE, FRESNO, CA 93726.**

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

Facility Name:	Bolthouse Farms Inc.- Coalinga	Date:	January 7, 2010
Mailing Address:	7200 East Brundage Lane Bakersfield, CA 93307	Engineer:	Gurpreet Brar
		Lead Engineer:	Martin Keast
Contact Person:	Sam Kingston		
Telephone:	(661) 366-7209 x1448		
ATC Application #:	C-7892-1-0		
ATC Project #:	C-1095284		
Deemed Complete:	December 9, 2009		

I. PROPOSAL

Bolthouse Farms Inc. has requested an Authority to Construct (ATC) permit for a stationary 600 bhp Volvo Tier 2 certified diesel-fired IC engine powering an agricultural irrigation well pump that was installed in January, 2005. Since Tier 2 certification is the latest certification for diesel engine of this size in 2005, the engine met achieved-in-practice BACT at that time. Therefore, BACT for this engine will be limited to type of controls that can be applied to the specific equipment that was already installed pursuant to District policy FYI-98.

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)
Public Resources Code 21000-21177: California Environmental Quality Act (CEQA)
California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387: CEQA Guidelines

III. PROJECT LOCATION

The equipment will be located within Township 21S, Range 16E in Coalinga, 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.

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 will power an agricultural irrigation well pump.

V. EQUIPMENT LISTING

C-7892-1-0: 600 BHP VOLVO MODEL TAD1642VE SERIAL NO 2016003499 TIER 2 DIESEL-FIRED IC ENGINE POWERING AN AGRICULTURAL IRRIGATION WELL PUMP (ENG #276)

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.

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

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
- 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%
- The new engine can potentially operate 5,200 hours/year (per RMR).

B. Emission Factors

1. Pre-Project Emission Factors (EF1)

Since this is a new emissions unit, EF1 = 0 for all pollutants.

2. Post Project Emission Factors (EF2)

EF2 for New Engines		
Pollutant	EF2 (g/bhp-hr)	Source
NO_x	3.845	Tier 2 Level
SO_x	0.0051	Ultra-Low Sulfur Fuel
PM_{10}	0.097	Tier 2 Level
CO	1.12	Tier 2 Level
VOC	0.26	Tier 2 Level

C. Calculations

1. Pre-Project Potential to Emit (PE1)

For new emissions unit, PE1 = 0 for all pollutants.

2. Post Project Potential to Emit (PE2)

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) × 5,200 hrs/year × lb/453.6 g

PE2 for Engine (ATC #C-7892-1-0)				
Pollutant	Engine Load (bhp)	EF2 (g/bhp-hr)	PE2 (lb/day)	PE2 (lb/year)
NO_x	600	3.845	122.1	26,447
SO_x		0.0051	0.2	35
PM_{10}		0.097	3.1	667
CO		1.12	35.6	7,704
VOC		0.26	8.3	1,788

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.

There are no existing units at the facility; therefore SSPE1 is equal to zero.

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.

SSPE2					
Permit Unit	NO_x (lb/yr)	SO_x (lb/yr)	PM_{10} (lb/yr)	CO (lb/yr)	VOC (lb/yr)
C-7892-1-0	26,447	35	667	7,704	1,788
SSPE2 Total	**26,447**	**35**	**667**	**7,704**	**1,788**

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	26,447	35	667	7,704	1,788
Major Source Threshold	**50,000**	**140,000**	**140,000**	**200,000**	**50,000**
Major Source	No	No	No	No	No

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

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.*"

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.

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 E.

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 25,000 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, CO, and VOC. BACT is triggered for NO_x, and VOC since the PEs are greater than 2 lbs/day. BACT is not triggered for CO since the SSPE2 for CO 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 D, 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 D), BACT has been satisfied with the following until the electrical utility company can install an electrical line connection to a proposed electric motor to power the agricultural irrigation pump:

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

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

New Major Sources are new facilities, which are also Major Sources. As shown in Section VII.C.5 above, the SSPE2 is not greater than the Major Source threshold for any pollutant. Therefore, 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

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	122.1	100 lb/day	Yes
SO_X	0.2	100 lb/day	No
PM_{10}	3.1	100 lb/day	No
CO	35.6	100 lb/day	No
VOC	8.3	100 lb/day	No

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

d. Offset Threshold

The following table compares the SSPE1 with the SSPE2 in order to determine if any offset thresholds have been surpassed with this project.

Offset Threshold				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?
NO_X	0	26,447	20,000 lb/year	Yes
SO_X	0	35	54,750 lb/year	No
PM_{10}	0	667	29,200 lb/year	No
CO	0	7,704	200,000 lb/year	No
VOC	0	1,788	20,000 lb/year	No

As detailed above, there are offset thresholds surpassed with this project; therefore public noticing is required for offset purposes.

e. SSIPE > 20,000 lb/year

Public notification is required for any permitting action that results in a Stationary Source Increase in Permitted Emissions (SSIPE) of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSIPE is calculated as the Post Project Stationary Source Potential to Emit (SSPE2) minus the Pre-Project Stationary Source Potential to Emit (SSPE1), i.e. SSIPE = SSPE2 – SSPE1. The values for SSPE2 and SSPE1 are calculated according to Rule 2201, Sections 4.9 and 4.10, respectively. The SSIPE is compared to the SSIPE Public Notice thresholds in the following table:

Stationary Source Increase in Permitted Emissions [SSIPE] – Public Notice					
Pollutant	SSPE2 (lb/year)	SSPE1 (lb/year)	SSIPE (lb/year)	SSIPE Public Notice Threshold	Public Notice Required?
NO_x	26,447	0	26,447	20,000 lb/year	Yes
SO_x	35	0	35	20,000 lb/year	No
PM_{10}	667	0	667	20,000 lb/year	No
CO	7,704	0	7,704	20,000 lb/year	No
VOC	1,788	0	1,788	20,000 lb/year	No

As demonstrated above, the SSIPE for NOx emissions is greater than 20,000 lb/year; therefore public noticing for SSIPE purposes is required.

2. Public Notice Action

As discussed above, public noticing is required for this project for surpassing offset thresholds, SSIPE greater than 20,000 lb/year and PE greater than 100 lb/day for NO_x emissions. 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 ATC:

- Emissions from this unit shall not exceed any of the following limits: 3.845 g-NO_x/bhp-hr, 0.26 g-VOC/bhp-hr, or 1.12 g-CO/bhp-hr. [District Rules 2201, 4702, and 17 CCR 93115]

- PM_{10} emissions shall not exceed 0.097 g/bhp-hr based on US EPA certification using ISO 8178 test procedure. [District Rules 2201, 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, 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

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.

As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for NO_x, SO_x, PM_{10} and CO.

The criteria modeling runs indicate the emissions from the project will not cause or significantly contribute to a violation of a State or National AAQS.

Rule 2520 Federally Mandated Operating Permits

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

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. PM10 and VOC are the criteria pollutants that surrogate the Hazardous Air Pollutants at the source. The combined PM10 and VOC emissions for this source are less than 25 tons/year; therefore the HAPs are also less than 25 tons per year, thus it is not a major HAP source. Since the proposed engine is not located within major HAP source, 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 (C-7892-1-0)			
Acute Hazard Index	Chronic Hazard Index	Cancer Risk	T-BACT Required for each engine?
N/A	N/A	9.84 in a million	Yes – PM_{10}

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 10 in a million). As outlined by the HRA Summary in Appendix A of this report, the emissions increases for this project was determined to be less than significant.

Discussion of T-BACT

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 the engine since the HRA indicates that the cancer risk for the engine exceeds one in one million.

T-BACT is satisfied with BACT for PM_{10} (see Appendix D), which is the latest available certified engine at the time of installation. The applicant has proposed the latest available certified engine (Tier 2); therefore, compliance with the District's Risk Management Policy is expected.

Therefore, the following conditions will be listed on the ATC to ensure compliance:

1. Modified {1901} The PM10 emissions rate shall not exceed 0.097 g/hp-hr based on US EPA certification using ISO 8178 test procedure. [District Rule 2201]
2. {1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102] N
3. Operation of the engine shall not exceed 5,200 hours per year.

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:

$$\text{PM Conc.} = 0.097\ \text{g-PM}_{10}/\text{bhp-hr} \times 1\ \text{g-PM}/0.96\ \text{g-PM}_{10} \times 1\ \text{bhp-hr}/2{,}542.5\ \text{Btu} \times 1{,}000{,}000\ \text{Btu}/9{,}051\ \text{dscf} \times 0.35\ \text{Btu}_{out}/1\ \text{Btu}_{in} \times 15.43\ \text{gr/g}$$

$$\text{PM Conc.} = 0.02\ \text{gr-PM/dscf}$$

Since 0.02 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 ATC 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.

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 does 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 ATC:

- 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).

The proposed engine is EPA certified Tier 2 and it 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).

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 engine in this project is certified compression-ignited engine not retrofitted with exhaust control and is 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 engine in this project is certified compression-ignited engine not retrofitted with exhaust control and is 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 engine in this project is certified compression-ignited engine not retrofitted with exhaust control and is 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)

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.

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The San Joaquin Valley Unified Air Pollution Control District (District) adopted its *Environmental Review Guidelines* (ERG) in 2001.

The basic purposes of CEQA are to:

- Inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities.
- Identify the ways that environmental damage can be avoided or significantly reduced.
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

The District performed an Engineering Evaluation (this document) for the proposed project and determined that the activity will occur at an existing facility and the project involves negligible expansion of the existing use. Furthermore, the District determined that the activity will not have a significant effect on the environment. The District finds that the activity is categorically exempt from the provisions of CEQA pursuant to CEQA Guideline § 15031 (Existing Facilities), and finds that the project is exempt per the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment (CEQA Guidelines §15061(b)(3)).

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period, issue ATC C-7892-1-0 subject to the permit conditions on the attached draft ATC in Appendix B.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
C-7892-1-0	3020-10-D	600 bhp IC engine	$479.00

Appendices

A: HRA and AAQA Summary
B: Draft ATC
C: Certification EFs
D: BACT/TBACT Analyses
E: QNEC

APPENDIX A

HRA and AAQA Summary

San Joaquin Valley Air Pollution Control District
Risk Management Review
Revised

To:	Gurpreet Brar – Permit Services
From:	Cheryl Lawler – Technical Services
Date:	July 8, 2010
Facility Name:	Bolthouse Farms Inc.
Location:	TS-20S, R-16E, Coalinga
Application #(s):	C-7892-1-0
Project #:	C-1095284

A. RMR SUMMARY

RMR Summary			
Categories	**Ag Diesel ICE (Unit 1-0)**	**Project Totals**	**Facility Totals**
Prioritization Score	N/A[1]	>1	>1
Acute Hazard Index	N/A[2]	N/A	N/A
Chronic Hazard Index	N/A[2]	N/A	N/A
Maximum Individual Cancer Risk	**9.84E-06**[3]	9.84E-06[3]	9.84E-06[3]
T-BACT Required?	**Yes – PM10**		
Special Permit Conditions?	**Yes**		

1 Prioritization for this unit was not conducted since it has been determined that all diesel-fired IC engines will result in prioritization scores greater than 1.0.
2 Acute and Chronic Hazard Indices were not calculated since there is no risk factor or the risk factor is so low that it has been determined to be insignificant for these types of units.
3 The Maximum Individual Cancer Risk has almost reached its facilitywide total limit of 10.0E-06.

Proposed Permit Conditions

To ensure that human health risks will not exceed District allowable levels; the following permit conditions must be included for:

Unit #1-0

1. The PM10 emissions rate shall not exceed **0.097** g/hp-hr based on US EPA certification using ISO 8178 test procedure. [District Rule 2201]
2. The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102] N
3. Operation of the engine shall not exceed **5,200** hours per year.

B. RMR REPORT

I. Project Description

Technical Services received a request on July 1, 2010, to re-run a Risk Management Review (RMR) and Ambient Air Quality Analysis (AAQA) for a 600 bhp agricultural diesel IC engine powering an irrigation pump. The RMR and AAQA are being re-run because of revised stack parameters and emission rates supplied by the processing engineer.

II. Analysis

Technical Services performed a screening level health risk assessment using the District's Diesel Exhaust Risk Screening spreadsheet.

The following parameters were used for the review:

Analysis Parameters						
Unit #	**bhp-hr**	**PM_{10} g/hp-hr**	**Receptor (m)**	**Quad**	**Hours/Year**	**Load%**
1-0	600	0.097	804.67	2	5200	100
Location Type		Rural	**Receptor Type**		Residence	

Technical Services also performed modeling for criteria pollutants CO, NOx, SOx, and PM_{10}; as well as the RMR. The emission rates used for criteria pollutant modeling were 1.48 lb/hr CO, 5.09 lb/hr NOx, 0.008 lb/hr SOx, and 0.13 lb/hr PM_{10}. The engineer supplied the maximum fuel rate for the IC engine used during the analysis.

The results from the Criteria Pollutant Modeling are as follows:

Criteria Pollutant Modeling Results*
Values are in $\mu g/m^3$

Diesel ICE	1 Hour	3 Hours	8 Hours	24 Hours	Annual
CO	Pass	X	Pass	X	X
NO_x	Pass	X	X	X	Pass
SO_x	Pass	Pass	X	Pass	Pass
PM_{10}	X	X	X	Pass[1]	Pass[1]

*Results were taken from the attached PSD spreadsheets.
[1]The criteria pollutants are below EPA's level of significance as found in 40 CFR Part 51.165 (b)(2).

III. Conclusion

The criteria modeling runs indicate the emissions from the proposed equipment will not cause or significantly contribute to a violation of a State or National AAQS.

The cancer risk associated with the operation of the proposed diesel IC engine is **9.84E-06**, which is greater than the 1 in a million threshold. In accordance with the District's Risk Management Policy, the engine is approved **with** Toxic Best Available Control Technology (T-BACT).

To ensure that human health risks will not exceed District allowable levels; the permit conditions listed on Page 1 of this report must be included for the proposed unit.

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

APPENDIX B

Draft ATC

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: C-7892-1-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: BOLTHOUSE FARMS-MOUREN 18-1 SC
MAILING ADDRESS: 7200 E BRUNDAGE LN
BAKERSFIELD, CA 93307

LOCATION: TOWNSHIP 21S / RANGE 16E
COALINGA, CA

EQUIPMENT DESCRIPTION:
600 BHP VOLVO MODEL TAD1642VE SERIAL NO 2016003499 TIER 2 DIESEL-FIRED IC ENGINE POWERING AN AGRICULTURAL IRRIGATION WELL PUMP (ENG #276)

CONDITIONS

1. This engine shall be replaced with an electric motor by January 1, 2012. [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. {3403} This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rule 4702 and 17 CCR 93115]
7. The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
8. Operation of this engine shall not exceed 5,200 hours per year. [District Rule 2201]
9. Emissions from this IC engine shall not exceed any of the following limits: 3.845 g-NOx/bhp-hr, 1.12 g-CO/bhp-hr, or 0.26 g-VOC/bhp-hr. [District Rule 2201 and 13 CCR 2423 and 17 CCR 93115]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services
C-7892-1-0 : Jul 12 2010 1:37PM – BRARG : Joint Inspection NOT Required

10. Emissions from this IC engine shall not exceed 0.097 g-PM10/bhp-hr based on USEPA certification using ISO 8178 test procedure. [District Rules 2201 and 4102 and 13 CCR 2423 and 17 CCR 93115]
11. {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]
12. {3405} This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702]
13. {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]
14. 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]
15. {4051} The permittee shall record the total time the engine operates, in hours per calendar year. [District Rule 2201]
16. {3475} 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 and 17 CCR 93115]

APPENDIX C

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 D

BACT Guideline and BACT Analysis

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 NO_x and VOC 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

Cost Effectiveness Analysis: Electrification

As demonstrated in the cost analysis below, electrification for any engine 50 – 1,000 bhp is cost effective. Therefore, electrification is cost effective for the proposed 662 bhp diesel fired IC engine.

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 662 bhp diesel fired IC engine.

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 662 bhp diesel fired IC engine.

Cost Effectiveness Analysis: SCR

As demonstrated in the cost analysis below, a SCR for any engine 50 – 1,000 bhp is not cost effective. Therefore, SCR is not cost effective for the proposed 662 bhp diesel fired IC engine.

Cost Effectiveness Analysis: Latest Available Certified Compression-Ignited Engine

Per District BACT Policy, a cost effectiveness analysis is not required for AIP controls.

V. Step 5 - Select BACT

Since electrification is the most effective control alternative, is shown in Step 4 as cost effective, the applicant proposes to install an electric motor and has applied for the necessary electrical line connection with the electric utility company. However, the electric utility company has not provided a definite schedule as to when the electrical line extension will be installed. Therefore, the District will allow two years (until 1/1/2012) electrical line for an electrical pump engine.

Therefore, in the interim, the Achieved In Practice (AIP) control in Step 4 (latest available certified compression-ignited engine) is considered BACT for this class and category of source until the utility company installs an electrical line extension to power the proposed electric motor. The applicant has proposed the latest certification, 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 cost effective for the proposed 600 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 600 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 600 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 600 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

Since electrification,which is the most effective control alternative, is shown in Step 4 as cost effective, the applicant proposes to install an electric motor and has applied for the necessary electrical line connection with the electric utility company. However, the electric utility company has not provided a definite schedule as to when the electrical line extension will be installed.

Therefore, in the interim, the Achieved In Practice (AIP) control in Step 4 (latest available certified compression-ignited engine) is considered BACT for this class and category of source until the utility company installs an electrical line extension to power the proposed electric motor. The applicant has proposed the latest certification, therefore, BACT is satisfied.

Irrigation Pump Alternate Basic Equipment (ABE) Cost Analysis: Electric vs Diesel

Assumptions:

Irrigation pumps operate at an annual average of 65% load.		
Line Extension Distance (per applicant):	**2,700**	ft
Operating Schedule (per applicant):	**5,200**	hr/year
Electric Rate [1]:	**0.15522**	$/kW-hr
Diesel Fuel Cost:	**$3.00**	$/gal
Brake Specific Fuel Consumption (diesel engines)[2]:	7,264	Btu/bhp-hr
Power Line Extension Cost:	40	$/ft
Capital recovery factor (10%, 10 yrs):	0.163	
Electric rates increase by 1.5%/yr over 10 yrs:	1.06	
453.6 g/lb x 2,000 lb/ton:	907,200	g/ton

1 kW = 1.34 hp

Power Rating (bhp)	Diesel Engine Purchase Cost[3]
50	$6,000
100	$9,000
110	$10,000
200	$17,600
250	$25,500
300	$34,000
400	$37,700
500	$38,600
600	$54,000

District Standard EF's (g/bhp-hr)[3]					
Category	NOx	VOC	SOx	PM10	CO
Industry Standard EFs, Tier 2 for 50-100 hp:	5.2	0	0	0	0
Industry Standard EFs, Tier 2 for 101-174 hp:	3.6			0	
Industry Standard EFs, Tier 2 for 175-751 hp:				0	0
Industry Standard EFs, Tier 2 for >751 hp:	4.7				

Electrification Cost Effectiveness Summary

bhp	MCET[4] ($/year)	Diesel Engine ($/year)	Diesel Fuel ($/year)	Electric Rate ($/year)	Project Cost to Electrify[6] ($/year)	Line Extension ($/year)	Misc. Costs[7] ($/year)	Customer Charges[8] ($/year)	Cost Difference (ABE - Diesel) ($/year)	Is Electrification Cost Effective?
50	**$36,512**	$978	$41,357	$31,924	$2,445	$17,604	$600	$791	**$11,029**	**YES**
101	**$73,755**	$1,467	$83,541	$64,487	$4,939	$17,604	$1,212	$791	**$4,025**	**YES**
110	**$56,075**	$1,630	$90,986	$70,234	$8,558	$17,604	$2,100	$791	**$6,670**	**YES**
200	**$101,954**	$2,869	$165,428	$127,697	$9,780	$17,604	$2,400	$791	**-$10,025**	**YES**
250	**$127,442**	$4,157	$206,785	$159,622	$12,225	$17,604	$3,000	$791	**-$17,700**	**YES**
300	**$152,931**	$5,542	$248,142	$191,546	$14,670	$17,604	$3,600	$791	**-$25,473**	**YES**
400	**$203,907**	$6,145	$330,857	$255,395	$19,560	$17,604	$4,800	$791	**-$38,852**	**YES**
500	**$254,884**	$6,292	$413,571	$319,244	$24,450	$17,604	$6,000	$791	**-$51,774**	**YES**
600	**$305,861**	$8,802	$496,285	$383,092	$29,340	$17,604	$7,200	$791	**-$67,060**	**YES**

[1]Taken from PG&E website listed below for large Ag (35 hp+), high use (1500 hr/yr+), rate schedule 'AG-5B & AG-5E', summer peak rate, effective May 1, 2008 to present; does not include daily customer charges

http://www.pge.com/nots/rates/tariffs/LgAgCurrent.xls

[2]Based on thermodynamic conversion factor of 2,542.5 Btu/bhp-hr and diesel engine efficiency of 35%: 2,542.4/0.35 = 7,264

[3]The NOx, VOC and PM10 EFs are Tier 3 levels. The NOx EF is 95% of the NOx+HC EF, per Carl Moyer protocol. The VOC and CO EFs are from AP-42, Table 3.3-1, 10/96 (for diesel engines less than 600 hp). The SOx EF is based on very low S fuel since that kind of fuel is AIP.

[4]Multi-Pollutant Cost Effectiveness Threshold. Assumes BACT is triggered for NOx, VOC, and PM10. Reductions are difference between District stnd diesel emissions and zero (no power plant emissions), i.e. 100% emissions reduction due to electrification.

[5]Per ERIP: Includes capital engine cost, misc. material, tax, and installation.

[6]Per ERIP: Includes variable speed drive (VSD) motor, r/v starter, head shaft, misc. equip., tax, and labor (Approx $300/hp)

'Property tax, insurance, and administrative charges (Typically 4% of total capital investment; From OAQPS Control Cost Manual, 4th Edition, January 1990)

[8]From PG&E, includes one-time meter charge of $441 and ongoing meter charges of $1.97/day

Irrigation Pump Alternate Basic Equipment (ABE) Cost Analysis: Electric vs Diesel (PM10 only)

Assumptions:

Irrigation pumps operate at an annual average of 65% load.		
Line Extension Distance:	2,700	ft
Operating Schedule:	5,200	hr/year
Electric Rate [1]:	0.15522	$/kW-hr
Diesel Fuel Cost:	$3.00	$/gal
Brake Specific Fuel Consumption (diesel engines)[2]:	7,264	Btu/bhp-hr
Power Line Extension Cost:	40	$/ft
Capital recovery factor (10%, 10 yrs):	0.163	
Electric rates increase by 1.5%/yr over 10 yrs:	1.06	
453.6 g/lb x 2,000 lb/ton:	907,200	g/ton
1 kW = 1.34 hp		

Power Rating (bhp)	Diesel Engine Purchase Cost[3]
50	$6,000
100	$9,000
150	$14,700
200	$17,600
250	$25,500
300	$25,700
400	$37,700
500	$38,600
600	$54,000

District Standard EF's (g/bhp-hr)					
Category	NOx	VOC	SOx	PM10	CO
EFs, Tier 3 for 50-100 hp:				0.3	
EFs, Tier 3 for 101-174 hp:				0.22	
EFs, Tier 3 for 175+ hp:				0.149	

Electrification Cost Effectiveness Summary

bhp	**PM10 Reductions[4] (ton/year)**	Diesel Engine[5] ($/year)	Diesel Fuel ($/year)	Electric Rate ($/year)	Project Cost to Electrify[6] ($/year)	Line Extension ($/year)	Misc. Costs[7] ($/year)	Customer Charges[8] ($/year)	**Cost Alt Basic ($/ton)**	**Is Electrification Cost Effective?**
50	**0.09**	$978	$26,882	$31,924	$2,445	$17,604	$600	$791	**$296,633**	**NO**
100	**0.17**	$1,467	$53,764	$63,849	$4,939	$17,604	$1,212	$791	**$192,858**	**NO**
150	**0.19**	$2,396	$80,646	$95,773	$8,558	$17,604	$2,100	$791	**$220,895**	**NO**
200	**0.17**	$2,869	$107,528	$127,697	$9,780	$17,604	$2,400	$791	**$280,281**	**NO**
250	**0.21**	$4,157	$134,411	$159,622	$12,225	$17,604	$3,000	$791	**$256,071**	**NO**
300	**0.26**	$4,189	$161,293	$191,546	$14,670	$17,604	$3,600	$791	**$244,829**	**NO**
400	**0.34**	$6,145	$215,057	$255,395	$19,560	$17,604	$4,800	$791	**$225,242**	**NO**
500	**0.43**	$6,292	$268,821	$319,244	$24,450	$17,604	$6,000	$791	**$217,727**	**NO**
600	**0.51**	$8,802	$322,585	$383,092	$29,340	$17,604	$7,200	$791	**$208,105**	**NO**

[1]Taken from PG&E website listed below for large Ag (35 hp+), high use (1500 hr/yr+), rate schedule 'AG-5B & AG-5E', summer peak rate, effective May 1, 2008 to present; does not include daily customer charges

http://www.pge.com/nots/rates/tariffs/LgAgCurrent.xls

[2]Based on thermodynamic conversion factor of 2,542.5 Btu/bhp-hr and diesel engine efficiency of 35%: 2,542.4/0.35 = 7,264

[4]Reductions are difference between District stnd diesel emissions and zero (no power plant emissions), i.e. 100% emissions reduction due to electrification.

[5]Per ERIP: Includes capital engine cost, misc. material, tax, and installation.

[6]Per ERIP: Includes variable speed drive (VSD) motor, r/v starter, head shaft, misc. equip., tax, and labor (Approx

[7]Property tax, insurance, and administrative charges (Typically 4% of total capital investment; From OAQPS Control Cost Manual, 4th Edition, January 1990)

[8]From PG&E, includes one-time meter charge of $441 and ongoing meter charges of $1.97/day

Irrigation Pump Alternate Basic Equipment (ABE) Cost Analysis: NG vs Diesel

Assumptions:

Irrigation pumps operate at an annual average of 65% load.

Op Schedule (hr/year):	5,200	hrs/year
NG fuel cost[1]:	11.00	$/1,000 scf
Diesel Fuel Cost:	2.10	$/gal
NG Distribution Line Extension Distance:	600	feet
NG Distribution Line Cost[2]:	800	$/foot
NG HHV:	0.001	scf/Btu
Capital recovery factor (10%, 10 yrs):	0.163	
453.6 g/lb x 2,000 lb/ton:	907,200	g/ton
Diesel Brake Specific Fuel Consumption[3]:	7,500	Btu/bhp-hr
NG Brake Specific Fuel Consumption[3]:	10,100	Btu/bhp-hr

Engine Rating (bhp)	Diesel[6] ($)	NG Engine[7] ($)	3-way Cat ($)[8]
50	$6,000	$14,000	$15,000
100	$9,000	$22,500	$15,000
150	$14,700	$25,000	$15,000
200	$17,600	$38,900	$15,000
250	$25,500	$50,200	$15,000
300	$25,700	$55,100	$15,000
400	$37,700	$64,800	$15,000
500	$38,600	$78,800	$15,000
600	$54,000	$98,200	$15,000

NG EF's (g/bhp-hr)[4]				
NOx	VOC	SOx	PM10	CO
1.1	1.04	0.01	0.063	2.92

District Standard EF's (g/bhp-hr)[5]					
Category	NOx	VOC	SOx	PM10	CO
Industry Standard EFs, Tier 2 for 50-100 hp:	5.2	0	0.0051	0.3	3.7
Industry Standard EFs, Tier 2 for 101-174 hp:	3.6			0.22	
Industry Standard EFs, Tier 2 for 175-751 hp:				0.149	2.6
Industry Standard EFs, Tier 2 for >751 hp:	4.7				

NG Cost Effectiveness Summary

bhp	**MCET ($/year)**	Diesel Engine Purchase ($/year)	Diesel Fuel ($/year)	NG Engine ($/year)	3-way Cat ($/year)	NG Fuel ($/year)	NG Line Cost ($/year)	**Cost Difference (ABE - Diesel) ($/year)**	**Is NG Cost Effective?**
50	**$15,852**	$978	$19,429	$2,282	$2,445	$18,776	$78,240	**$81,336**	**NO**
101	**$17,204**	$1,467	$39,246	$3,668	$2,445	$37,927	$78,240	**$81,567**	**NO**
175	**-$28,920**	$2,396	$68,001	$4,075	$2,445	$65,716	$78,240	**$80,079**	**NO**
200	**-$33,051**	$2,869	$77,715	$6,341	$2,445	$75,104	$78,240	**$81,545**	**NO**
250	**-$41,314**	$4,157	$97,144	$8,183	$2,445	$93,880	$78,240	**$81,446**	**NO**
300	**-$49,577**	$4,189	$116,573	$8,981	$2,445	$112,655	$78,240	**$81,560**	**NO**
400	**-$66,103**	$6,145	$155,431	$10,562	$2,445	$150,207	$78,240	**$79,879**	**NO**
500	**-$82,628**	$6,292	$194,288	$12,844	$2,445	$187,759	$78,240	**$80,708**	**NO**
600	**-$99,154**	$8,802	$233,146	$16,007	$2,445	$225,311	$78,240	**$80,054**	**NO**

[1] http://tonto.eia.doe.gov/dnav/ng/ng_sum_lsum_dcu_SCA_m.htm

[2] Gary Weins at PG&E said that project to run a line 50-100 ft from a main line will be $20,000 to $80,000.

[3] CAPCOA Portable IC Engine Tech. Ref. Document, 5/95.

[4] The NOx, CO, VOC EF's are 4702 req's, achievable via 3-way catalyst. The SOx EF is based on PUC regulated NG.

[5] The NOx and PM10 EFs are Tier 3 levels. Note, the NOx Tier 3 level is actually for NOx+HC (conservatively used solely for NOx here). The CO EFs are from AP-42, Table 3.3-1, 10/96 (for diesel engines less than 600 hp). The SOx EF is based on very low S fuel since that kind of

[6] Per ERIP: Includes capital engine cost, misc. material, tax, and installation.

[7] Per Cummins, includes purchase, misc. equip. and tax.

[8] Per Ceasar Balman (Engine Control Systems), turnkey cost about $3,000; needs replacing every 2 yrs (total $15,000 over 10 yrs)

Brian Clements 5/5/06

Irrigation Pump Alternate Basic Equipment (ABE) Cost Analysis: LPG vs Diesel

bhp	**MCET[4] ($/year)**	Diesel Engine Purchase ($/year)	Diesel Fuel[1] ($/year)	LPG Engine ($/year)	3-way Cat ($/year)	LPG Fuel[1] ($/year)	**Cost Difference (ABE - Diesel) ($/year)**	**Is LPG Cost Effective?**
50	**$5,616**	$978	$32,381	$2,282	$2,445	$45,077	**$16,445**	**NO**
100	**$11,233**	$1,467	$64,763	$3,668	$2,445	$90,154	**$30,037**	**NO**
150	**$16,849**	$2,396	$97,144	$4,075	$2,445	$135,232	**$42,211**	**NO**
200	**$22,465**	$2,869	$129,526	$6,341	$2,445	$180,309	**$56,700**	**NO**
250	**$28,082**	$4,157	$161,907	$8,183	$2,445	$225,386	**$69,950**	**NO**
300	**$33,698**	$4,189	$194,288	$8,981	$2,445	$270,463	**$83,412**	**NO**
400	**$44,931**	$6,145	$259,051	$10,562	$2,445	$360,618	**$108,429**	**NO**
500	**$56,163**	$6,292	$323,814	$12,844	$2,445	$450,772	**$135,956**	**NO**
600	**$67,396**	$8,802	$388,577	$16,007	$2,445	$540,927	**$162,000**	**NO**

Assumptions:

District Standard EF's - Tier 3 (g/bhp-hr)[3]				
NOx	VOC	SOx	PM10	CO
2.85	0.15	0.0051	0.149	3.03

Agricultural Diesel Fuel Cost ($/gal):	$3.50
Diesel Brake Specific Fuel Consumption[7] (Btu/bhp-hr):	7,500
Spark-Ignited BSFC[7] (Btu/bhp-hr):	10,100
Capital recovery factor (10%, 10 yrs):	0.163
LPG fuel cost[8] ($/gal):	$2.39
Op Schedule (hr/year):	**5,200**

NG EF's (g/bhp-hr)[5]				
NOx	VOC	SOx	PM10	CO
1.275	1.232	0.01	0.1	17.242

Engine Rating (bhp)	Diesel Engine[2] ($)	LPG Engine[6] ($)	3-way Cat ($)[9]
50	$6,000	$14,000	$15,000
100	$9,000	$22,500	$15,000
150	$14,700	$25,000	$15,000
200	$17,600	$38,900	$15,000
250	$25,500	$50,200	$15,000
300	$25,700	$55,100	$15,000
400	$37,700	$64,800	$15,000
500	$38,600	$78,800	$15,000
600	$54,000	$98,200	$15,000

[1]Takes into account that irrigation pumps typically operate at an annual average of 65% load.

[2]Per ERIP: Includes capital engine cost, misc. material, tax, and installation.

[3]The NOx, VOC and PM10 EFs are Tier 3 levels. The VOC and CO EFs are from AP-42, Table 3.3-1, 10/96 (for diesel engines less than 600 hp). The SOx EF is based on very low S fuel since that kind of fuel is AIP.

[4]The emissions reductions used for the MCET are based on the difference between District stnd diesel emissions (Tier 3) and required District Rule 4702 spark-ignited engine emission levels. Assumes BACT is triggered for NOx, VOC, and PM10.

[5]Minimum 4702 requirements for NOx, VOC, CO for rich-burn ag engines (would have 3-way catalyst)

[6]Per Cummins, includes purchase, misc. equip. and tax.

[7]CAPCOA Portable IC Engine Tech. Ref. Document, 5/95.

[8]Per Red Triangle Oil (559-485-4320), local propane supplier on 9/23/08

[9]Per Ceasar Balman (Engine Control Systems), turnkey cost about $3,000; replacment every 2 yrs (total $15,000 over 10 yrs)

Other Notes:

LPG HHV (Btu/gal): 90,500 (from AP-42, A-6, 9/85)

453.6 g/lb x 2,000 lb/ton = 907,200 g/ton

Brian Clements 5/5/06

Irrigation Pump Alternate Basic Equipment (ABE) Cost Analysis: NG vs Diesel (PM10)

Assumptions:

Irrigation pumps operate at an annual average of 65% load.

Op Schedule (hr/year):	5,200	hrs/year
NG fuel cost[1]:	13.00	$/1,000 scf
Diesel Fuel Cost:	3.00	$/gal
NG Distribution Line Extension Distance:	600	feet
NG Distribution Line Cost[2]:	667	$/foot
NG HHV:	0.001	scf/Btu
Capital recovery factor (10%, 10 yrs):	0.163	
453.6 g/lb x 2,000 lb/ton:	907,200	g/ton
Diesel Brake Specific Fuel Consumption[3]:	7,500	Btu/bhp-hr
NG Brake Specific Fuel Consumption[3]:	10,100	Btu/bhp-hr

Engine Rating (bhp)	Diesel[6] ($)	NG Engine[7] ($)	3-way Cat ($)[8]
50	$6,000	$14,000	$15,000
100	$9,000	$22,500	$15,000
150	$14,700	$25,000	$15,000
200	$17,600	$38,900	$15,000
250	$25,500	$50,200	$15,000
300	$25,700	$55,100	$15,000
400	$37,700	$64,800	$15,000
500	$38,600	$78,800	$15,000
600	$54,000	$98,200	$15,000

NG EF's (g/bhp-hr)[4]				
NOx	VOC	SOx	PM10	CO
			0.07	

District Standard EF's (g/bhp-hr)					
Category	NOx	VOC	SOx	PM10	CO
EFs, Tier 3 for 50-100 hp:				0.3	
EFs, Tier 3 for 101-174 hp:				0.22	
EFs, Tier 3 for 175+ hp:				0.149	

NG Cost Effectiveness Summary

bhp	**PM10 Reductions (ton/year)**	Diesel Engine Purchase ($/year)	Diesel Fuel ($/year)	NG Engine ($/year)	3-way Cat ($/year)	NG Fuel ($/year)	NG Line Cost ($/year)	**CE Alt Basic ($/ton)**	**Is NG Cost Effective?**
50	**0.07**	$978	$27,755	$2,282	$2,445	$22,190	$65,233	**962,054**	**NO**
100	**0.09**	$1,467	$55,511	$3,668	$2,445	$44,379	$65,233	**683,268**	**NO**
150	**0.13**	$2,396	$83,266	$4,075	$2,445	$66,569	$65,233	**408,311**	**NO**
200	**0.09**	$2,869	$111,022	$6,341	$2,445	$88,759	$65,233	**539,797**	**NO**
250	**0.11**	$4,157	$138,777	$8,183	$2,445	$110,949	$65,233	**387,568**	**NO**
300	**0.14**	$4,189	$166,533	$8,981	$2,445	$133,138	$65,233	**287,642**	**NO**
400	**0.18**	$6,145	$222,044	$10,562	$2,445	$177,518	$65,233	**152,205**	**NO**
500	**0.23**	$6,292	$277,555	$12,844	$2,445	$221,897	$65,233	**82,030**	**NO**
600	**0.27**	$8,802	$333,066	$16,007	$2,445	$266,276	$65,233	**29,787**	**NO**

[1] http://tonto.eia.doe.gov/dnav/ng/ng_sum_lsum_dcu_SCA_m.htm

[2]Gary Weins at PG&E said that project to run a line 50-100 ft from a main line will be $20,000 to $80,000 (Average $667/ft).

[3]CAPCOA Portable IC Engine Tech. Ref. Document, 5/95.

[4]Natural Gas IC Engine EFs from AP-42, 3.2 (4-Stroke Rich-Burn)

[6]Per ERIP: Includes capital engine cost, misc. material, tax, and installation.

[7]Per Cummins, includes purchase, misc. equip. and tax.

[8]Per Ceasar Balman (Engine Control Systems), turnkey cost about $3,000; needs replacing every 2 yrs (total $15,000 over 10 yrs)

Brian Clements 5/5/06

Stationary Irrigation Pump Tech. Feasible Cost Analysis: Selective Catalytic Reduction

Assumptions

Industry Standard NOx EF, Tier 2 for 50-100 hp:	5.20	g/bhp-hr
Industry Standard NOx EF, Tier 2 for 101-751 hp:	3.63	g/bhp-hr
Industry Standard NOx EF, Tier 2 for >751 hp:	4.66	g/bhp-hr
Operating Schedule:	5,200	hours/year
NOx Cost Effectiveness Threshold:	24,500	$/ton
SCR NOx Reduction:	85%	
Capity Recovery Factor (10%, 2 years):	0.576	
Ag engine annual average operating load fator:	65%	

Cost Effectiveness Threshold (SCR)				
Engine Rating (bhp)	NOx Reductions (tons/year)	Cost Effectiveness Threshold ($/yr)	SCR Cost ($/yr)[1]	Cost Effective?
50	0.8	$35,023	$213,333	NO
101	1.7	$70,746	$213,333	NO
150	1.7	$73,346	$213,333	NO
200	2.3	$97,794	$213,333	NO
250	2.9	$122,243	$213,333	NO
300	3.4	$146,691	$213,333	NO
400	4.6	$195,588	$213,333	NO
500	5.7	$244,485	$373,333	NO
600	6.9	$293,382	$373,333	NO
752	11.1	$471,535	$373,333	YES
800	11.8	$501,633	$373,333	YES
900	13.3	$564,337	$373,333	YES
1,000	14.7	$627,041	$373,333	YES

[1]Capital cost is per Johson-Mathey; 25% has been added for tax and installation. This cost does not include operational costs such as the urea cost of $2.50/gal.

APPENDIX E

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 potential 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 (C-7892-1-0)		
Pollutant	PE2 (lb/year)	QNEC (lb/qtr)
NO_x	33,059	8,265
SO_x	44	11
PM_{10}	834	209
CO	9,630	2,408
VOC	2,235	559