



APR 21 2011

David Wissing
Ready Roast Nut Company, LLC
425 S Pine Street
Madera, CA 93637

**Re: Notice of Preliminary Decision - Authority to Construct
Project Number: C-1110052**

Dear Mr. Wissing:

Enclosed for your review and comment is the District's analysis of Ready Roast Nut Company, LLC's application for an Authority to Construct for a Propylene Oxide (PPO) fumigation operation consisting of two fumigation chambers served by a shared wet scrubber and one post-fumigation off-gassing warehouse, at 2805 Falcon Drive in Madera.

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 Mr. Sajjad Ahmad of Permit Services at (559) 230-5903.

Sincerely,

David Warner
Director of Permit Services

DW:sa

Enclosures

Sayed Sadredin
Executive Director/Air Pollution Control Officer

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APR 21 2011

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-1110052

Dear Mr. Tollstrup:

Enclosed for your review and comment is the District's analysis of Ready Roast Nut Company, LLC's application for an Authority to Construct for a Propylene Oxide (PPO) fumigation operation consisting of two fumigation chambers served by a shared wet scrubber and one post-fumigation off-gassing warehouse, at 2805 Falcon Drive in Madera.

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David Warner
Director of Permit Services

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Enclosure

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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 Ready Roast Nut Company, LLC for a Propylene Oxide (PPO) fumigation operation consisting of two fumigation chambers served by a shared wet scrubber and one post-fumigation off-gassing warehouse, at 2805 Falcon Drive in Madera.

The analysis of the regulatory basis for this proposed action, Project #C-1110052, is available for public inspection 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.**

III. PROJECT LOCATION

The project is located at 2805 Falcon Drive in Madera, California. The District has verified that 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

Nuts (almonds, walnuts, pistachios) are loaded into bins which are subsequently placed in fumigation chambers. The chamber is evacuated and fumigation gas is injected for the purpose of killing salmonella bacteria and other pests. The gas is diffused throughout the chamber by the use of circulation fans. After a predetermined time period, the air from the chamber is vented through a scrubber. After sampling determines the chamber air is below the safety threshold for the fumigant, the doors are opened and the bins are removed for further processing in an off-gassing area. The nuts are stored and allowed to off-gas for a period of time until the fumigant concentration remaining in the nuts reaches a pre-determined level.

Fumigation Cycle

Because of the high vaporization temperature of PPO (95 °F boiling point), the chambers will be heated to approximately 105 °F by circulating hot water through coils inside of the chamber prior to PPO injection. After a four to six hour period, the fumigation chamber will be exhausted through an aqueous scrubber (3% sulfuric acid solution). The scrubber solution reacts very rapidly with the PPO to form propylene glycol.

Post Fumigation "Off-Gassing" Area

After the PPO fumigation treatment, the nutmeats are quarantined in an off-gassing area for a period of approximately two day, after which they are shipped to customers. The off-gassing area is a source of fugitive VOC emissions.

V. EQUIPMENT LISTING

- C-8166-1-0: PROPYLENE OXIDE FUMIGATION OPERATION CONSISTING OF ONE 3,328.5 CUBIC FOOT FUMIGATION CHAMBER (27.5' L X 11' W X 11' H) SERVED BY A WET SCRUBBER (SHARED WITH PERMIT C-8166-2)
- C-8166-2-0: PROPYLENE OXIDE FUMIGATION OPERATION CONSISTING OF ONE 3,328.5 CUBIC FOOT FUMIGATION CHAMBER (27.5' L X 11' W X 11' H) SERVED BY A WET SCRUBBER (SHARED WITH PERMIT C-8166-1)
- C-8166-3-0: PROPYLENE OXIDE FUMIGATION OFF-GASSING OPERATION CONSISTING OF ONE 6,270 SQUARE FOOT POST-FUMIGATION OFF-GASSING WAREHOUSE

VI. EMISSION CONTROL TECHNOLOGY EVALUATION

Propylene Oxide (C_3H_6O) is highly volatile and forms various VOC compounds when emitted in the atmosphere. PPO is very soluble in water and other solvents; therefore, aqueous scrubbing is an effective control technology. Incineration or carbon absorption is a technologically feasible control technique in removing PPO from an air stream. However, these options have not been achieved in practice or shown to be consistently cost effective for all PPO fumigation operations.

C-8166-1-0 and -2-0 Fumigation Chambers:

An aqueous scrubber is used to control the PPO emissions from each of the fumigation chambers. PPO remaining in the chamber is vented through the scrubber, which contains an aqueous 3% sulfuric acid solution. The scrubber converts the PPO emissions to propylene glycol, an inert liquid, with a minimum control efficiency of 98%.

C-8166-3-0 Off-gas Operation:

Off-gassing of the nuts will occur inside of an enclosed warehouse. No emission control technology is used for the off-gassing operation.

VII. CALCULATIONS

A. Assumptions

- PPO in gaseous form is 100% VOC
- VOC is the only air contaminant emitted from the fumigation operation
- The scrubber will control 98% of the PPO emissions from the fumigation chamber (per applicant)
- Fumigation chambers are tightly sealed and assumed that there is no leakage
- The Molecular Weight of PPO is 58.08 lb/mol
- Each 3,328.5 ft³ chamber can fumigate 44,000 lb-nutmeats/cycle (22 ton-nutmeats/cycle) (per applicant)
- Each chamber can fumigate a maximum of 3 cycles per day (per applicant)
- The maximum daily throughput is 132,000 lb-nutmeats/day (66 ton-nutmeats/day) for each fumigation chamber (per applicant)
- The maximum yearly throughput of nutmeats is 25,000,000 lb-nutmeats/year (12,500 ton/year) for both fumigation chambers (per applicant)
- The maximum amount of PPO injected in each chamber shall not exceed 260 lb/cycle (or 260 lb/cycle x 3 cycles/day = 780 lb/day) (per applicant)
- The maximum amount of PPO injected in both chambers shall not exceed 148,200 lb/year (or 260 lb/cycle x 570 cycles/year = 148,200 lb/year) (per applicant)
- The off-gassing exhaust fan maximum flowrate = 6,200 cfm (per applicant)

B. Emission Factors

C-8166-1-0 and C-8166-2-0 Fumigation Chambers:

The ABC Laboratories performed a study titled "*Residues of Propylene Oxide, Propylene Chlorohydrin, and Propylene Bromohydrin in Nutmeats Following Fumigation with Propylene Oxide*" as part of an analysis for the EPA for the purpose of quantifying the residual PPO concentrations (on a weight basis) in various nutmeats after fumigation treatment (see the application review for project N-1011361). Based on this study, the amount of PPO that is retained in the nuts after removal from the fumigation chamber is calculated by the following standard exponential decay equation:

$$P(T) = (A) e^{-k(T)}$$

Where P (T) is the concentration retained in the nuts as a function of time (T), A is the initial concentration, k is a reaction equilibrium constant and T is time (in days).

Experimental data were obtained for a fumigation chamber charged with 2.4 oz-PPO/ft³, and the residual nutmeat PPO concentration equation was developed for two storage temperatures: 25 °C (77 °F) and 35 °C (95 °F). Since off gassing occurs more rapidly at higher temperatures, the 35 °C equation is used to estimate the PPO Residual concentration. Thus:

$$P(T) = 3,071.4 \times e^{-0.282 \times T} \quad \text{----- (1)}$$

Where:

P (T) = The residual PPO concentration in nutmeats, as a function of time, in parts per million by weight (ppmw), i.e. lb-PPO/10⁶ lb-nutmeats

T = Time after fumigation treatment, in days

During the experiments to derive this equation, the fumigation chamber was charged with 2.4 oz-PPO/ft³, which works out to 499.3 lb-PPO/cycle¹ for a 3,328.5 ft³ chamber. However, the applicant has only proposed to use a maximum charge rate of 260 lb-PPO/cycle, which works out to 1.25 oz-PPO/ft³ for a 3,328.5 ft³ chamber².

Therefore, the constant A = 3,071.4 in the previous time decay equation (1), which represents the initial PPO concentration in the nutmeats at 0 days (i.e. immediately after removal from the fumigation chamber), will be adjusted for the reduced PPO charge rate proposed by the applicant for each chamber. Thus:

$$A = 3,071.4 \times (260 \text{ lb-PPO /cycle} + 499.3 \text{ lb-PPO/cycle}) = 1,599.4$$

Thus:

$$P(T) = 1,599.4 \times e^{-0.282 \times T} \text{ lb-PPO/10}^6 \text{ lb-nutmeats}$$

¹ 2.4 oz-PPO/ft³ x 3,328.5 ft³/cycle x 1 lb/16 oz = 499.3 lb-PPO/cycle.

² 260 lb-PPO/cycle x 1 cycle/3,328.5 ft³ x 16 oz/1 lb = 1.25 oz-PPO/ft³.

C-8166-3-0 (Post Fumigation Off-Gassing Operation):

As is typical with processes involving exponential decay, the rate of decay decreases with time, and it is assumed that the largest PPO off gassing rate occurs from day 0 to day 1. To calculate this value the amount of PPO remaining in the nutmeat at the end of day one is subtracted from the amount of PPO remaining in the nutmeat when the nuts are removed from the fumigation chamber (day 0).

$$\begin{aligned} P(0) - P(1) &= 1,599.4 \times e^{-0.282(0)} \text{ (lb-PPO retained at day-0 / } 10^6 \text{ lb-nutmeats)} - \\ &\quad 1,599.4 \times e^{-0.282(1)} \text{ (lb-PPO retained at day-1 / } 10^6 \text{ lb-nutmeats)} \\ &= 393.0 \text{ lb-PPO emitted/} 10^6 \text{ lb-nutmeats} \end{aligned}$$

C. Potential to Emit (PE)

1. Pre-Project Potential to Emit (PE1)

Since these are new emissions units, PE1 = 0 for each unit.

2. Post Project Potential to Emit (PE2)

C-8166-1-0 and -2-0 Fumigation Chambers:

Daily PE2:

VOC emissions from the use of 260 lb-PPO/cycle as a fumigant is determined as follows:

$$\text{PE2 (lb-VOC/cycle)} = (\text{PPO usage} - \text{PPO absorbed by nutmeats}) \times (1 - \text{CE}_{\text{Scrubber}})$$

PPO absorbed by nutmeats will be calculated as follows:

$$P(T) = 1,599.4 \times e^{-0.282 \times T} \text{ lb-PPO absorbed/} 10^6 \text{ lb-nutmeats}$$

T represents the time, in days, and T = 0 represent when nutmeats are at the end of the fumigation cycle, about to be removed from the fumigation chamber.

$$\begin{aligned} P(0) &= 1,599.4 \times e^{-0.282 \times 0} \text{ lb-PPO absorbed/} 10^6 \text{ lb-nutmeats} \\ &= 1,599.4 \text{ lb-PPO absorbed /} 10^6 \text{ lb-nutmeats} \times 44,000 \text{ lb-nutmeats/cycle} \\ &= 70.4 \text{ lb-PPO absorbed/cycle} \end{aligned}$$

The applicant is proposing to perform a maximum of 3 cycles (44,000 lbs nuts each) per day. Therefore, the daily VOC emissions can be calculated as follows:

$$\begin{aligned} \text{Daily PE2} &= (\text{PPO usage} - \text{PPO absorbed by nutmeats}) \times (1 - \text{CE}_{\text{Scrubber}}) \times 3 \text{ cycles/day} \\ &= (260 \text{ lb-PPO used/cycle} - 70.4 \text{ lb-PPO absorbed/cycle}) \times (1 - 0.98) \times 3 \\ &\quad \text{cycles/day} \end{aligned}$$

$$\text{Daily PE2} = 11.4 \text{ lb-VOC/day (for each chamber)}$$

Annual PE2:

The VOC emissions from the use of PPO as a fumigant can be determined as follows:

$$PE = (\text{PPO usage} - \text{PPO absorbed by nutmeats}) \times (1 - CE_{\text{Scrubber}})$$

As shown below, the amount of PPO absorbed by the nutmeats fumigated in each chamber is 70.4 pounds for every 260 pounds of PPO used per cycle. At the maximum capacity of each chamber and proposed annual amount of product, approximately 570 cycles per year will be conducted. Therefore, the annual PE2 can be calculated as follows:

$$\begin{aligned} \text{Annual PE2} &= (\text{PPO usage} - \text{PPO absorbed}) \times (1 - CE_{\text{Scrubber}}) \times 570 \text{ cycles/year} \\ &= (260 \text{ lb-PPO used/cycle} - 70.4 \text{ lb-PPO absorbed/cycle}) \times (1 - 0.98) \times 570 \\ &\quad \text{cycles/year} \end{aligned}$$

Annual PE2 = 2,161 lb-VOC/year (combined for both chambers)

C-8166-3-0 (Post Fumigation Off-Gassing Operation):

Based on the maximum of 44,000 pounds of nuts per cycle and 3 cycles per day annually, the daily PE2 combined for two chambers is calculated as follows:

$$\text{Daily PE2} = 393.0 \text{ (lb-PPO emitted}/10^6 \text{ lb-nutmeats)} \times 44,000 \text{ (lb-nutmeats/cycle)} \times 3 \text{ (cycles/day)} \times 2 \text{ chambers}$$

Daily PE2 = 103.8 lb-VOC/day

Given that the applicant is proposing to fumigate a maximum of 25,000,000 pounds of nuts annually, the annual PE2 is calculated as follows:

$$\text{Annual PE2} = 393.0 \text{ (lb-PPO emitted}/10^6 \text{ lb-nutmeats)} \times 25,000,000 \text{ lb-nutmeats/year}$$

Annual PE2 = 9,825 lb-VOC/year

The following table summarized the daily and annual Potential to Emit for this project.

VOC PE2 (lbs/yr)		
Permit Unit	Daily PE (lb/day)	Annual PE (lb/yr)
C-8166-1-0	11.4	2,161
C-8166-2-0	11.4	
C-8166-3-0	103.8	9,825
TOTAL	126.6	11,986

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.

Since this is a new facility, there are no valid ATCs, PTOs, or ERCs at the Stationary Source; therefore, the SSPE1 will be 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 ATCs or PTOs, except for emissions units proposed to be shut down as part of the Stationary Project, at the Stationary Source and the quantity of Emission Reduction Credits (ERCs) 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.

Based on annual PE2 calculations in section VII.C.2 above, SSPE2 is summarized in the table below:

SSPE2 (lbs/yr)					
Permit Unit	NO_x	SO_x	PM₁₀	CO	VOC
C-8166-1-0	0	0	0	0	2,161
C-8166-2-0	0	0	0	0	
C-8166-3-0	0	0	0	0	9,825
TOTAL	0	0	0	0	11,986

5. Major Source Determination

Pursuant to Section 3.23 of District Rule 2201, a Major Source is a stationary source with post-project emissions or a Post Project Stationary Source Potential to Emit (SSPE2), equal to or exceeding one or more of the following threshold values. However, Section 3.23.2 states, "for the purposes of determining major source status, the SSPE2 shall not include 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."

Major Source Determination (lb/year)					
	NO_x	SO_x	PM₁₀	CO	VOC
Pre-Project SSPE (SSPE1)	0	0	0	0	0
Post Project SSPE (SSPE2)	0	0	0	0	11,986
Major Source Threshold	20,000	140,000	140,000	200,000	20,000
Major Source?	No	No	No	No	No

As seen in the table above, the facility is not an existing Major Source and also is not becoming a Major Source as a result of this project.

6. Baseline Emissions (BE)

The BE calculation (in lbs/year) is performed pollutant-by-pollutant for each unit within the project, to calculate the QNEC and if applicable, to determine the amount of offsets required.

Pursuant to Section 3.7 of District Rule 2201, BE = Pre-project Potential to Emit for:

- Any unit located at a non-Major Source,
- Any Highly-Utilized Emissions Unit, located at a Major Source,
- Any Fully-Offset Emissions Unit, located at a Major Source, or
- Any Clean Emissions Unit, located at a Major Source.

otherwise,

BE = Historic Actual Emissions (HAE), calculated pursuant to Section 3.22 of District Rule 2201.

Since these are new emissions units, BE = PE1 = 0 for all pollutants.

7. SB 288 Major Modification

SB 288 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 pollutant; therefore, the project does not constitute an SB 288 Major Modification.

8. Federal Major Modification

As discussed in Section VII.C.5 above, the facility is not a Major Source for NO_x, SO_x, PM₁₀ and VOC emissions; therefore, the project does not constitute a Federal Major Modification for NO_x, SO_x, PM₁₀ and VOC emissions.

9. Quarterly Net Emissions Change (QNEC)

The QNEC is calculated to complete the District's PAS emissions profile screen. The QNEC is calculated by dividing the annual Increase in Potential Emissions (IPE) by 4 calendar quarters per year, as shown in the following table:

C-8166-1-0 and -2-0:

As calculated in Section VII.C.2 above, the combined Annual PE2 for both fumigation chambers is 2,161 lb-VOC/year. For the purpose of calculating QNEC for each chamber individually, this combined PE will be split in half for each chamber. Thus:

Annual PE2 for each chamber = 2,161 lb-VOC/year ÷ 2 chambers = 1,081 lb-VOC/year

QNEC				
Pollutant	PE1 (lb/yr)	PE2 (lb/yr)	IPE = PE2 - PE1 (lb/yr)	QNEC = IPE/4 (lb/qtr)
NO _x	0	0	0	0
SO _x	0	0	0	0
PM ₁₀	0	0	0	0
CO	0	0	0	0
VOC	0	1,081	1,081	270

C-8166-3-0:

QNEC				
Pollutant	PE1 (lb/yr)	PE2 (lb/yr)	IPE = PE2 - PE1 (lb/yr)	QNEC = IPE/4 (lb/qtr)
NO _x	0	0	0	0
SO _x	0	0	0	0
PM ₁₀	0	0	0	0
CO	0	0	0	0
VOC	0	9,825	9,825	2,456.25

VIII. COMPLIANCE

District 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 an SB-288 Major Modification or a Federal Major Modification, as defined in this rule.

*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 discussed in Section I above, there are three new emissions units associated with this project, each with a PE > 2 lb/day; therefore, BACT for VOC is triggered as summarized below.

BACT Applicability					
Pollutant	C-8166-1-0 Fumigation (lb/day)	C-8166-2-0 Fumigation (lb/day)	C-8166-3-0 Fumigation (lb/day)	BACT Trigger Levels (lb/day)	BACT Required?
NO _x	0	0	0	> 2.0	No
SO _x	0	0	0	> 2.0	No
PM ₁₀	0	0	0	> 2.0	No
CO	0	0	0	> 2.0 and SSPE2 > 200,000 lb/yr	No
VOC	11.4	11.4	103.8	> 2.0	Yes

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. SB-288 Major Modification

As discussed in Section VII.C.7 above, this project does not constitute a SB 288 and Federal Major Modification; therefore BACT is not triggered for any pollutant.

2. BACT Guideline

C-8166-1 and -2-0:

BACT Guideline 5.2.8, 1st quarter 2011, applies to a fumigation chamber using propylene oxide as a fumigant (See Appendix A).

Ready Roast is proposing two propylene oxide fumigation chambers with daily emissions greater than 2 lbs/day. Therefore, BACT Guideline 5.2.8 applies to each of these propylene oxide fumigation operations.

C-8166-3-0:

BACT Guideline 5.2.9, 1st quarter 2011, applies to an off-gassing process for propylene oxide fumigation (See Appendix A).

Ready Roast is proposing a propylene oxide off-gassing chamber with daily emissions greater than 2 lb/day. Therefore, BACT Guideline 5.2.9 applies to this propylene oxide off-gassing operation.

3. Top-Down BACT Analysis

Per District Policy APR 1305, Section IX, "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 for source categories or classes covered in the BACT Clearinghouse, relevant information under each of the following steps may be simply cited from the Clearinghouse without further analysis."

C-8166-1 and -2-0:

Pursuant to the BACT guideline 5.2.8, 1st quarter 2011, and the Top-Down BACT analysis, both of which appear in Appendix A of this report, BACT is satisfied with:

VOC: 98% control efficient wet scrubber

The applicant is proposing BACT by using a wet scrubber shared between both fumigation chambers with a minimum control efficiency of 98%. The scrubber liquor is a 3% sulfuric acid solution that reacts with the PPO to form liquid propylene glycol.

Therefore, BACT is satisfied for this unit and the following conditions will be listed on the proposed ATC to ensure compliance with the scrubber efficiency:

- Propylene oxide (PPO) shall be the only fumigant used in this fumigation chamber unless otherwise approved by the District. [District Rule 2201]
- All fumigant shall be vented only to the scrubber shared between permits C-8166-1 and C-8166-2. [District Rule 2201]
- The control efficiency of the scrubber serving this fumigation operation shall be at least 98% for volatile organic compound (VOC) emissions from propylene oxide. [District Rule 2201]
- The scrubber liquid pH shall not exceed 2.0 during all fumigation chamber venting. [District Rule 2201]

C-8166-3-0:

Pursuant to the BACT guideline 5.2.9, 1st quarter 2011, and the Top-Down BACT analysis, both of which appear in Appendix A of this report, there are no control technologies that have been determined to be achieved in practice for this class and category of operation. The technologically feasible control technologies listed below have been determined to not be cost effective.

- 98% control efficient equipment (wet scrubber or other equivalent method)
- 95% control efficient equipment (carbon adsorption or other equivalent method)
- 80% control efficient equipment (refrigerated vapor condenser or other equivalent method)

Therefore, BACT for the off gas warehouse is not required for this project.

B. Offsets

1. Offset Applicability

Pursuant to Section 4.5.3, offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the Post Project Stationary Source Potential to Emit (SSPE2) equals to or exceeds the offset threshold levels in Table 4-1 or Rule 2201.

The following table compares the post-project facility-wide annual emissions in order to determine if offsets will be required for this project.

Offset Determination (lb/year)					
	NO _x	SO _x	PM ₁₀	CO	VOC
Post Project SSPE (SSPE2)	0	0	0	0	11,986
Offset Threshold	20,000	54,750	29,200	200,000	20,000
Offsets triggered?	No	No	No	No	No

2. Quantity of Offsets Required

As seen above, the SSPE2 is not greater than the offset thresholds for all the pollutants; therefore offset calculations are not necessary and offsets will not be required for this project.

C. Public Notification

1. Applicability

Public noticing is required for:

- a. New Major Sources, Federal Major Modifications, and SB288 Major Modifications,
- b. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
- c. Any project which results in the offset thresholds being surpassed, and/or
- d. Any project with an SSPE of greater than 20,000 lb/year for any pollutant.

a. New Major Sources, Federal Major Modifications, and SB288 Major Modifications

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. PE > 100 lb/day

C-8166-3-0 (Off-gassing Operation):

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	0	100 lb/day	No
SO _x	0	100 lb/day	No
PM ₁₀	0	100 lb/day	No
CO	0	100 lb/day	No
VOC	103.8	100 lb/day	Yes

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

c. 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	0	20,000 lb/year	No
SO _x	0	0	54,750 lb/year	No
PM ₁₀	0	0	29,200 lb/year	No
CO	0	0	200,000 lb/year	No
VOC	0	11,986	20,000 lb/year	No

As detailed above, there were no thresholds surpassed with this project; therefore public noticing is not required for offset purposes.

d. 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	0	0	0	20,000 lb/year	No
SO _x	0	0	0	20,000 lb/year	No
PM ₁₀	0	0	0	20,000 lb/year	No
CO	0	0	0	20,000 lb/year	No
VOC	11,986	0	11,986	20,000 lb/year	No

As demonstrated above, the SSIPEs for all pollutants were less than 20,000 lb/year; therefore public noticing for SSIPE purposes is not required.

2. Public Notice Action

As discussed above, public noticing is required for this project for VOC emissions in excess of 100 lb/day for permit unit C-8166-3-0 (off-gassing operation). 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. DELs are also required to enforce the applicability of BACT.

C-8166-1-0 and -2-0 (Fumigation Operation):

- The amount of fumigant used in this chamber shall not exceed 260 lb-PPO/cycle. [District Rule 2201]
- VOC emissions from the exhaust of the scrubber, when serving this fumigation chamber, shall not exceed 11.4 lb/day, equivalent to the maximum use of 780 lb-PPO fumigant/day. [District Rule 2201]
- VOC emissions from the exhaust of the scrubber, when serving both fumigation chambers (permit units C-8166-1 and -2), shall not exceed 2,161 lb/year, equivalent to the maximum use of 148,200 lb-PPO fumigant/year. [District Rule 2201]
- The amount of nuts fumigated in this chamber shall not exceed 66 ton in any one day (equivalent to 22 ton nutmeats/cycle and 3 cycles/day). [District Rule 2201]
- The amount of nuts fumigated in both chambers (permit unit C-8166-1 and -2) shall not exceed 12,500 ton/year. [District Rule 2201]

C-8166-3-0 (Off-gassing Operation):

- The amount of fumigant used in any of the fumigation chambers (permit units C-8166-1 or -2) shall not exceed 260 lb-PPO/cycle. [District Rule 2201]
- The amount of fumigated nuts transferred to this warehouse from the fumigation chambers (C-8166-1 or -2) shall not exceed 132 ton in any one day. [District Rule 2201]
- The amount of fumigated nuts stored in this warehouse for off-gassing shall not exceed 12,500 ton in one calendar year. [District Rule 2201]

- VOC (PPO) emissions from this operation shall not exceed 103.8 lb in any one day. [District Rule 2201]

E. Compliance Assurance

C-8166-1-0 and -2-0 (Fumigation Operation):

A shared wet scrubber will serve both fumigation chambers. The following conditions will be included on the ATCs to ensure that the fumigation chambers and wet scrubber are properly maintained and operated such that the minimum VOC control efficiency is maintained at 98%.

- Propylene oxide (PPO) shall be the only fumigant used in this fumigation chamber unless otherwise approved by the District. [District Rule 2201]
- During fumigation operations, the chamber shall be tightly sealed or shall maintain negative pressure sufficient to prevent fumigant leakage. [District Rule 2201]
- All fumigant shall be vented only to the scrubber shared between permits C-8166-1 and C-8166-2. [District Rule 2201]
- The scrubber shall be adjusted and maintained to achieve optimum control efficiency according to manufacturer's recommendations. [District Rule 2201]
- The scrubber liquid pH shall not exceed 2.0 during all fumigation chamber venting. [District Rule 2201]

C-8166-3-0:

Off-gassing of the nuts occurs inside of an enclosed warehouse with ventilation fans. The off-gassing warehouse is not served by any control devices. The following condition will be included on the ATC to ensure that the VOC emissions are minimized.

- All off-gassing for the propylene oxide (PPO) fumigation operation shall be conducted inside the enclosed off-gas warehouse with exhaust fan operating and doors closed when not transferring nuts to and from the warehouse. [District Rule 2201]

1. Source Testing

Per District Policy APR-1705 (10/9/97), Source Testing Frequency, there are no source testing requirements for PPO fumigation operation. There are no specific local, state or federal testing requirements for this class and category of operation. Several source tests in the past on similar operations have demonstrated that the scrubber consistently operates with a control efficiency exceeding 99%. Therefore, source testing to verify VOC emissions from this operation will not be required for this project.

2. Monitoring

No monitoring is required to show compliance with Rule 2201.

3. Recordkeeping

The following condition will be added to the permit to verify compliance with the recordkeeping requirements:

C-8166-1-0 and C-8166-2-0 (PPO Fumigation Chambers):

- The permittee shall maintain a record of the daily and cumulative annual (for the calendar year) usage of propylene oxide, and all scrubber pH measurements made. [District Rules 1070 and 2201]
- Records of the amount of nuts (in pounds) fumigated shall be maintained and updated daily. [District Rules 1070 and 2201]
- {3246} All records shall be maintained and retained on-site for a period of at least 5 years and shall be made available for District inspection upon request. [District Rule 1070]

C-8166-3-0:

- Records of the amount of nuts (in pounds) transferred to the post-fumigation off-gassing warehouse shall be maintained and updated daily. [District Rules 1070 and 2201]
- {3246} All records shall be maintained and retained on-site for a period of at least 5 years and shall be made available for District inspection upon request. [District Rule 1070]

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 ambient air quality standard (AAQS). The Technical Services Division of the SJVAPCD conducted the required analysis. Refer to Appendix C of this document for the AAQA summary sheet.

However, the Technical Services did not perform an Ambient Air Quality Analysis since EPA does not have a significance threshold for VOCs. Therefore, according to the Technical Services Memo for this project (Appendix C), the emissions from the proposed equipment will not cause or contribute significantly to a violation of the State and National AAQS.

District Rule 2520 Federally Mandated Operating Permits

Since this facility's potential emissions do not exceed any major source thresholds of Rule 2201, this facility is not a major source, and Rule 2520 does not apply.

District 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. As long as the equipment is properly maintained and operated, compliance with visible emissions limits is expected under normal operating conditions. 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]

District Rule 4102 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.

An HRA is not required for a project with a total facility prioritization score of less than one. According to the Technical Services Memo for this project (Appendix C), the total facility prioritization score including this project was greater than one. Therefore, a health risk assessment was required to determine the short-term acute and long-term chronic exposure from this project.

The cancer risk for this project is shown below and in Appendix C:

RMR Summary					
Categories	PPO Fumigation Operation (Unit 1-0)	PPO Fumigation Operation (Unit 2-0)	Off Gassing Operation (Unit 3-0)	Project Totals	Facility Totals
Prioritization Score	0.27	0.27	2.47	>1.0	>1.0
Acute Hazard Index	1.95E-2	1.92E-2	5.81E-2	9.67E-2	0.97
Chronic Hazard Index	1.32E-3	1.37E-3	1.29E-2	1.56E-2	0.02
Maximum Individual Cancer Risk (10⁻⁶)	0.194	0.201	1.96	2.29	2.29
T-BACT Required?	No	No	Yes*		
Special Permit Conditions?	Yes	Yes	Yes		

* T-BACT is required for this unit because of emissions of Propylene Oxide which is a VOC. In accordance with District Policy, BACT for this unit will be considered to be T-BACT.

Discussion of T-BACT

BACT for toxic emission control (T-BACT) is required if the cancer risk exceeds one in one million. As demonstrated above, T-BACT is required for off-gassing operation only, permit unit C-8166-3-0, because the HRA indicates that the risk is above the District's thresholds for triggering T-BACT requirements.

T-BACT would be satisfied with BACT for VOC emissions for off-gassing operation. However, as concluded in the BACT analysis for off gassing operation (see Appendix A), there is no cost effective technologically feasible control option for off-gassing operation. In addition, no achieve-in-practice technology is available for off-gassing operation. Therefore, an off-gassing operation not served by any control technology satisfies the BACT, and hence T-BACT, requirements for VOC emissions from this operation.

To ensure that human health risks will not exceed District allowable levels; the following permit conditions will be included on all three ATCs with this project:

- 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]

Rule 4201 Particulate Matter Concentration

Section 3.1 prohibits discharge of dust, fumes, or total particulate matter into the atmosphere from any single source operation in excess of 0.1 grain per dry standard cubic foot. Particulate matter emissions are not expected from a properly maintained and operated fumigation operation; therefore, compliance with this rule is expected.

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.

Greenhouse Gas (GHG) Significance Determination

It is determined that no other agency has or will prepare an environmental review document for the project. Thus, the District is the Lead Agency for this project.

As stated in Section VII.A of this document, this project involves with VOC (PPO) emissions. Since VOC (PPO) is not designated as GHG, the District's engineering evaluation (this document) demonstrates that the project would not result in an increase in project specific GHG emissions. The District therefore concludes that the project would have a less than cumulatively significant impact on global climate change.

District CEQA Findings

The District is the Lead Agency for this project because there is no other agency with broader statutory authority over this project. The District's engineering evaluation of the project (this document) demonstrates that compliance with District rules and permit conditions would reduce Stationary Source emissions from the project to levels below the District's significance thresholds for criteria pollutants. The District has determined that no additional findings are required (CEQA Guidelines §15096(h)).

IX. RECOMMENDATION

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period, issue Authorities to Construct C-8166-1-0, -2-0, and -3-0 subject to the permit conditions on the attached draft Authorities to Construct in Appendix D.

X. BILLING INFORMATION

Permit Number	Fee Schedule	Fee Description	Annual Fee
C-8166-1-0	3020-01-A	8.5 hp (includes scrubber fan)	\$87
C-8166-2-0	3020-01-A	1 hp	\$87
C-8166-3-0	3020-01-A	2 hp	\$87

Appendices

- A: BACT Guideline & Analysis
- B: Cost Data for Off Gassing Scrubbing
- C: HRA Summary
- D: Draft ATCs

Appendix A

BACT Guideline and Top-Down BACT Analysis

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 5.2.8*

Last Update: 12/9/2002

Propylene Oxide Fumigation - Fumigation Chamber

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	98% Control Efficiency (Wet Scrubber, flare, or equal)		

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. Economic analysis to demonstrate cost effectiveness 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 - Permit Specific BACT Determinations on Next Page(s)**

Top Down BACT Analysis for the PPO Fumigation Chamber

C-8166-1-0 and -2-0:

Propylene Oxide (C₃H₆O) is highly volatile and forms various VOC compounds when emitted in the atmosphere. PPO is very soluble with water and other solvents; therefore, aqueous scrubbing is an effective control technology. As with most VOC's, incineration or carbon absorption is a control technique in removing PPO from an air stream. However, these options are expensive and have not commonly been achieved in practice for all fumigation operations.

1. BACT Analysis for VOC Emissions:

a. Step 1 - Identify all control technologies

SJVAPCD BACT Clearinghouse guideline 5.2.8, 1st quarter 2011, identifies achieved in practice BACT for propylene oxide fumigation chambers as the following:

- 98% Control Efficiency (Wet Scrubber, flare or equal)

No technologically feasible alternatives or control alternatives identified as alternate basic equipment for this class and category of source are listed.

b. Step 2 - Eliminate technologically infeasible options

There are no technologically infeasible options to eliminate from step 1.

c. Step 3 - Rank remaining options by control effectiveness

No ranking needs to be done because the applicant has proposed the achieved in practice option.

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed the only control achieved in practice in the ranking list from Step 3. Therefore, per SJVUAPCD BACT policy, the cost effectiveness analysis is not required.

e. Step 5 - Select BACT

BACT for VOC emissions from a PPO fumigation chamber is the use of control device with a minimum control efficiency of 98%. Ready Roast is proposing to control the VOC emissions from the fumigation chambers with a wet scrubber with a minimum control efficiency of 98%. Therefore, BACT for VOC emissions is satisfied for this operation.

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 5.2.9*

Last Update: 7/1/2002

Propylene Oxide Fumigation - Off-gassing Process**

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC		1. 98% Control Efficiency (Wet Scrubber, or equal) 2. 95% Control Efficiency (Carbon Adsorption, or equal) 3. 80% control efficiency (Refrigerated vapor condenser, or equal)	

** This operation does not include the initial fumigation operation in the chamber which is covered by Determination 5.2.8.

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. Economic analysis to demonstrate cost effectiveness 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 - Permit Specific BACT Determinations on Next Page(s)**

Top Down BACT Analysis for the PPO Off Gas Warehouse

C-8166-3-0:

Propylene Oxide (C₃H₆O) is highly volatile and forms various VOC compounds when emitted in the atmosphere. PPO is very soluble with water and other solvents; therefore, aqueous scrubbing is an effective control technology. As with most VOC's, incineration or carbon absorption is a control technique in removing PPO from an air stream. However, these options are expensive and have not commonly been achieved in practice for all fumigation operations.

1. BACT Analysis for VOC Emissions:

a. Step 1 - Identify all control technologies

SJVAPCD BACT Clearinghouse guideline 5.2.9, 1st quarter 2011, does not identify any achieved in practice BACT for propylene oxide fumigation chambers

The technologically feasible alternatives or control alternatives identified as alternate basic equipment for this class and category of source are listed as the following:

- 98% Control Efficiency (Wet Scrubber, or equal).
- 95% Control Efficiency (Carbon adsorption, or equal).
- 80% Control Efficiency (Refrigerated vapor condenser, or equal).

b. Step 2 - Eliminate technologically infeasible options

There are no technologically infeasible options to eliminate from step 1.

c. Step 3 - Rank remaining options by control effectiveness

The remaining control technologies are ranked by control effectiveness as follows:

- 98% Control Efficiency (Wet Scrubber, or equal).
- 95% Control Efficiency (Carbon adsorption, or equal).
- 80% Control Efficiency (Refrigerated vapor condenser, or equal).

d. Step 4 - Cost Effectiveness Analysis

1. Aqueous Chemical Scrubber

a. Capital Equipment Cost

On June 18, 2004, a cost effectiveness analysis was performed for a propylene oxide off-gassing chamber for Hughson Nut Company under project N-1041005. For that project, a capital equipment cost estimate of \$400,000 was received from Industrial Design and

Construction for a scrubber capable of handling a minimum airflow rate of 14,000 cfm and delivering at least 98% control efficiency for PPO emissions.

Industrial Fumigation Systems, Inc. has confirmed (see Appendix B) that the capital costs have increased for this equipment and estimated that at an airflow rate of 5,900 cfm, the capital costs would be around \$719,000. Therefore, a capital equipment cost of \$700,000 will be conservatively assumed. Thus:

Capital Cost = \$700,000

Pursuant to the District BACT Policy section X. (Revised 05/14/08), the annual cost of installing and maintaining the scrubber will be calculated as follows. The capital cost will be spread over the expected life of the scrubber which is estimated at 10 years and using the capital recovery equation (Equation 1). A 10% interest rate is assumed in the equation and the assumption will be made that the equation has no salvage value at the end of the ten-year cycle.

$$\text{Equation 1: } A = [P * i(i+1)^n]/[(i+1)^n - 1]$$

Where: A = Annual Cost
P = Present Value
I = Interest Rate (10%)
N = Equipment Life (10 years)

$$\begin{aligned} \text{Thus: } A &= [\$700,000 * 0.1 * (1.1)^{10}]/[(1.1)^{10} - 1] \\ &= \$113,922 \end{aligned}$$

b. VOC Emission Reduction

Assuming that 100% of the VOC emissions are captured and sent to the carbon adsorption system and that the system controls those VOC emissions with an efficiency of 98%, the amount of VOC emissions reduced can be calculated as follows:

$$\begin{aligned} \text{VOC Reduction} &= \text{Uncontrolled VOC PE (lb/year)} \times \text{Capture (\%)} \times \text{CE (\%)} \\ &= 9,825 \text{ lb-VOC/year} \times 1 \times 0.98 \end{aligned}$$

$$\text{VOC Reduction} = 9,629 \text{ lb-VOC/year}$$

c. Cost of VOC Emission Reduction

$$\begin{aligned} \text{Cost of reduction} &= (\$113,922) + [(9,629 \text{ lb-VOC/year}) \times (1 \text{ ton}/2,000 \text{ lb})] \\ &= \$23,662/\text{ton} \end{aligned}$$

Thus the capital equipment cost alone for VOC reduction utilizing a wet scrubber would be greater than the cost effectiveness threshold for VOCs of \$17,500/ton. Therefore the scrubber control system is not cost effective.

2. Carbon Adsorption

Carbon adsorption occurs when air containing VOC's is blown through a carbon unit and the VOC's are adsorbed onto the surface of the cracks in the activated carbon particles.

Annual Costs:

As shown below, the cost of purchasing the carbon for the carbon adsorption system that would need to be installed on this coating operation is enough to exceed the cost effectiveness threshold for VOC emissions; therefore, the capital cost of the carbon adsorption system and any addition annual operation and maintenance costs were not included in the total annualized costs.

Since carbon can adsorb 20% of its weight in VOC's, and the control efficiency of carbon adsorption is 95%, the total amount of carbon required per year can be determined as follows:

$$\text{Carbon required} = 9,825 \text{ lb-VOC/yr} \times 0.95 \times 1 \text{ lb-Carbon}/0.2 \text{ lb-VOC} = 46,669 \text{ lb-Carbon/yr}$$

Assuming a 2009 price for carbon of \$1.92/lb⁽¹⁾

Adjusting for inflation*, \$1.92 (2009 dollars) = \$1.98 (2010 dollars)

*(US Bureau of Labor Statistics, <http://data.bls.gov/cgi-bin/cpicalc.pl>).

$$\text{Cost of carbon} = 46,669 \text{ lb-Carbon/yr} \times \$1.98/\text{lb} = \$92,405/\text{yr}$$

VOC removal

For calculation of the amount of VOCs removed from the warehouse with a carbon absorber, 100% VOC capture and 95% control is assumed. The VOCs removed annually are as follows:

$$\text{Controlled VOC} = \text{Uncontrolled VOC PE (lb/year)} \times \text{CE (\%)}$$

$$\text{Controlled VOC} = 9,825 \text{ lb/year} \times 0.95$$

$$\text{Controlled VOC} = 9,334 \text{ lb/year}$$

$$\text{Tons/yr} = 9,334 \text{ lb/yr}/2000 \text{ lb/ton} = 4.67 \text{ tons/yr}$$

⁽¹⁾ The cost estimate taken from project S-1093389, provided on 5/21/09 by Tom Morrical of Siemens Water Technology (formerly U.S. Filter), (916) 316-1935, was \$1.92/lb for technically appropriate carbon.

$$\begin{aligned}\text{Cost per ton} &= \$92,405/4.67 \text{ tons/yr} \\ &= \$19,787/\text{ton}\end{aligned}$$

This exceeds the cost effectiveness threshold for VOCs of \$17,500/ton. Therefore the scrubber control system is not cost effective.

3. Refrigerated Vapor Condenser

The cost of the electricity required to operate a refrigerated vapor condenser unit alone will be adequate to cause this technology to be not cost effective per District BACT policy. This partial cost estimate does not include the capital cost of purchasing the refrigerated vapor condenser unit or any additional operational and maintenance costs.

Annual Costs:

The estimated electric power requirement to operate a refrigerated vapor condenser ranges from 1 kW-hr/1,000 gal to 1.5 kW-hr/1,000 gal (0.0075 to 0.011 kW-hr per cubic foot) of inlet waste gas⁽²⁾. Therefore, assuming, as a conservative estimate, an electric power requirement of 0.0075 kW-hr/ft³, the annual electrical cost alone for a refrigerated vapor condenser system appropriate for this type of operation can be determined as follows:

$$\begin{aligned}\text{Electrical Cost} &= 6,200 \text{ ft}^3/\text{min} \times 60 \text{ min/hr} \times 24 \text{ hr/day} \times 365 \text{ days/yr} \\ &\quad \times 0.0075 \text{ kW-hr/ft}^3 \times \$0.1088/\text{kW-hr}^{(3)} \\ &= \$2.66 \times 10^6/\text{yr}\end{aligned}$$

VOC removal

For calculation of the amount of VOCs removed from the warehouse with a vapor condenser, 100% VOC capture and 80% control is assumed. The VOCs removed annually are as follows:

$$\begin{aligned}\text{Controlled VOC} &= \text{Uncontrolled VOC PE (lb/year)} \times \text{CE (\%)} \\ \text{Controlled VOC} &= 9,825 \text{ lb/year} \times 0.80\end{aligned}$$

$$\text{Controlled VOC} = 12,281 \text{ lb/year}$$

$$\text{Tons/yr} = 12,281 \text{ lb/yr}/2000 \text{ lb/ton} = 6.14 \text{ tons/yr}$$

$$\begin{aligned}\text{Annualized cost} &= \$2.66 \times 10^6/6.14 \text{ tons/yr} \\ &= \$433,081/\text{ton}\end{aligned}$$

² Vataavuk, William M. Estimating Costs of Air Pollution Control Equipment. Michigan: Lewis, 1991. Page 177.

³ The electricity price used is based on the average California industrial electricity price from January 2010 as published by the US Energy Information Administration in their latest monthly report. See http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_b.html

This exceeds the cost effectiveness threshold for VOCs of \$17,500/ton. Therefore, the vapor condenser control system is not cost effective.

e. Step 5 - Select BACT

No control technologies have been determined to be achieved in practice for a PPO off-gassing operation. The three technologically feasible control technologies above were determined to not be cost effective for a PPO off-gassing operation. Therefore, an off-gassing operation not served by any control technologies satisfies the BACT requirements for VOC emissions.

Appendix B

Cost Data for Off Gassing Scrubbing

Kathy Parker

From: Dave Williams [Dwilliams2@bak.rr.com]
Sent: Tuesday, January 04, 2011 11:16 AM
To: Kathy Parker
Subject: off gas scrubber

Industrial Fumigation Systems, Inc.

17417 Kranenburg Ave. Bakersfield, CA. 93314 - ph 661-589-9575 fax 661-589-6650

1-04-11

Insight Environmental
C/O Kathy Parker

Subject PPO

Kathy,

As per your request we have tried to figure out the cost of scrubbing the off gas room for Ready Roast Nut located in Madera, CA.

Unfortunately we have not designed or built a system this large in any of our systems and all I can do is guess.

Our standard system scrubs at a rate of about 750 cfm

The off gas room has an exhaust fan approaching 5,900 + cfm or almost 7.86 times as big.

We know the cost of the 750 cfm unit is approximately \$ 91,500.00

We know that scrubbing is a function of holding time in the towers and pumping of acid water mix over packing material,

so if you divide the \$ 91,500 by 750 cfm and multiply it by 5,900 cfm the cost should be in the neighborhood of \$ 719,000.00 +-

Operating costs would be substantially higher, bigger pumps and acid waste disposal problems. This is a huge cost and most of my clients would not put in a PPO system if this were required.

Hope this helps explain our feelings about the scrubbing of the off gas room.

Dave Williams - CEO of Industrial Fumigation Systems, Inc.

Appendix C
HRA Summary

San Joaquin Valley Air Pollution Control District Risk Management Review

To: Sajjad Ahmad, AQE – Permit Services
 From: Jennifer Hart, AQS – Technical Services
 Date: March 8, 2011
 Facility Name: Ready Roast Nut Company LLC
 Location: 2805 Falcon Dr, Madera
 Application #(s): C-8166-1-0, 2-0, 3-0
 Project #: C-1110052

A. RMR SUMMARY

RMR Summary					
Categories	PPO Fumigation Operation (Unit 1-0)	PPO Fumigation Operation (Unit 2-0)	Off Gassing Operation (Unit 2-0)	Project Totals	Facility Totals
Prioritization Score	0.27	0.27	2.47	>1.0	>1.0
Acute Hazard Index	1.95E-2	1.92E-2	5.81E-2	9.67E-2	0.97
Chronic Hazard Index	1.32E-3	1.37E-3	1.29E-2	1.56E-2	0.02
Maximum Individual Cancer Risk (10⁻⁶)	0.194	0.201	1.96	2.29	2.29
T-BACT Required?	No	No	Yes*		
Special Permit Conditions?	Yes	Yes	Yes		

Proposed Permit Conditions

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

Units # 1-0, 2-0, 3-0

1. 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]

***T-BACT is required for this unit because of emissions of Propylene Oxide which is a VOC. In accordance with District policy, BACT for this unit will be considered to be T-BACT.**

B. RMR REPORT

I. Project Description

Technical Services received a request on February 24, 2011, to perform an Ambient Air Quality Analysis and a Risk Management Review for a proposed installation of a propylene oxide (PPO) gas fumigation and off-gassing operation. The fumigation operation consists of two chambers.

II. Analysis

Technical Services performed a prioritization using the District's HEARTs database. Since the total facility prioritization score was greater than one, a refined health risk assessment was required. The propylene oxide emissions were provided by the engineer and were input into the HEARTs database. The AERMOD model was used, with the parameters outlined below and concatenated meteorological data from Madera to determine the maximum dispersion factors at the nearest business receptors. These dispersion factors were input into the Hot Spots Analysis and Reporting Program (HARP) risk assessment module to calculate the chronic and acute hazard indices and the carcinogenic risk for the project. I tried running the project using uniform polar receptors, but it failed the cancer risk. I used Bing to map out the locations of the sources and receptors and ran the model. A map is provided.

The following parameters were used for the review:

Analysis Parameters Unit 1-0, Unit 2-0			
Source Type	Point	Location Type	Rural
Stack Height (m)	6.1	Closest Receptor (m)	304.8
Stack Diameter. (m)	0.46	Type of Receptor	Business
Stack Exit Velocity (m/s)	33.35	VOC Emission Rate (lb/hr)	0.48
Stack Exit Temp. (°K)	298.15	VOC Emission Rate (lb/yr)	1,080.5

Analysis Parameters Unit 3-0			
Source Type	Point	Location Type	Rural
Stack Height (m)	9.14	Closest Receptor (m)	304.8
Stack Diameter. (m)	0.46	Type of Receptor	Business
Stack Exit Velocity (m/s)	17.82	VOC Emission Rate (lb/hr)	4.33
Stack Exit Temp. (°K)	298.15	VOC Emission Rate (lb/yr)	9,825

Technical Services did not perform an Ambient Air Quality Analysis since EPA does not have a significance threshold for VOCs.

III. Conclusion

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

The acute and chronic indices for all units are below 1.0. The cancer risk associated with units 1-0 & 2-0 is less than one in a million. The cancer risk for unit 3-0 is greater than 1.0 in a million, but less than 10 in a million. **In accordance with the District's Risk Management Policy, the project is approved with Toxic Best Available Control Technology (T-BACT) required for unit 3-0 due to VOC emission. Unit 1-0 & 2-0 do not require 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 this 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.

IV. Attachments

- A. RMR request from the project engineer
- B. Additional information from the applicant/project engineer
- C. Facility toxic emissions summary
- D. Prioritization score
- E. Bing Map
- F. HARP Risk Report

Appendix D

Draft ATCs

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT
DRAFT

PERMIT NO: C-8166-1-0

LEGAL OWNER OR OPERATOR: READY ROAST NUT COMPANY LLC
MAILING ADDRESS: 425 S PINE STREET
MADERA, CA 93637

LOCATION: 2805 FALCON DRIVE
MADERA, CA

EQUIPMENT DESCRIPTION:
PROPYLENE OXIDE FUMIGATION OPERATION CONSISTING OF ONE 3,328.5 CUBIC FOOT FUMIGATION CHAMBER (27.5' L X 11' W X 11' H) SERVED BY A WET SCRUBBER (SHARED WITH PERMIT C-8166-2)

CONDITIONS

1. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
2. {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]
3. Propylene oxide (PPO) shall be the only fumigant used in this fumigation chamber unless otherwise approved by the District. [District Rule 2201]
4. All fumigant shall be vented only to the scrubber shared between permits C-8166-1 and C-8166-2. [District Rule 2201]
5. During fumigation operations, the chamber shall be tightly sealed or shall maintain negative pressure sufficient to prevent fumigant leakage. [District Rule 2201]
6. The control efficiency of the scrubber serving this fumigation operation shall be at least 98% for volatile organic compound (VOC) emissions from propylene oxide. [District Rule 2201]
7. The scrubber shall be adjusted and maintained to achieve optimum control efficiency according to manufacturer's recommendations. [District Rule 2201]
8. The scrubber liquid pH shall not exceed 2.0 during all fumigation chamber venting. [District Rule 2201]
9. 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]

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

DAVID WARNER, Director of Permit Services

C-8166-1-0; Apr 14 2011 11:07AM - AHMADS : Joint Inspection NOT Required

10. The amount of fumigant used in this chamber shall not exceed 260 lb-PPO/cycle. [District Rule 2201]
11. VOC emissions from the exhaust of the scrubber, when serving this fumigation chamber, shall not exceed 11.4 lb/day, equivalent to the maximum use of 780 lb-PPO fumigant/day. [District Rule 2201]
12. VOC emissions from the exhaust of the scrubber, when serving both fumigation chambers (permit units C-8166-1 and -2), shall not exceed 2,161 lb/year, equivalent to the maximum use of 148,200 lb-PPO fumigant/year. [District Rule 2201]
13. The amount of nuts fumigated in this chamber shall not exceed 66 ton in any one day (equivalent to 22 ton nutmeats/cycle and 3 cycles/day). [District Rule 2201]
14. The amount of nuts fumigated in both chambers (permit unit C-8166-1 and -2) shall not exceed 12,500 ton/year. [District Rule 2201]
15. The permittee shall maintain a record of the daily and cumulative annual (for the calendar year) usage of propylene oxide, and all scrubber pH measurements made. [District Rules 1070 and 2201]
16. Records of the amount of nuts (in pounds) fumigated shall be maintained and updated daily. [District Rules 1070 and 2201]
17. {3246} All records shall be maintained and retained on-site for a period of at least 5 years and shall be made available for District inspection upon request. [District Rule 1070]

DRAFT

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT
DRAFT

PERMIT NO: C-8166-2-0

LEGAL OWNER OR OPERATOR: READY ROAST NUT COMPANY LLC
MAILING ADDRESS: 425 S PINE STREET
MADERA, CA 93637

LOCATION: 2805 FALCON DRIVE
MADERA, CA

EQUIPMENT DESCRIPTION:
PROPYLENE OXIDE FUMIGATION OPERATION CONSISTING OF ONE 3,328.5 CUBIC FOOT FUMIGATION CHAMBER (27.5' L X 11' W X 11' H) SERVED BY A WET SCRUBBER (SHARED WITH PERMIT C-8166-1)

CONDITIONS

1. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
2. {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]
3. Propylene oxide (PPO) shall be the only fumigant used in this fumigation chamber unless otherwise approved by the District. [District Rule 2201]
4. All fumigant shall be vented only to the scrubber shared between permits C-8166-1 and C-8166-2. [District Rule 2201]
5. During fumigation operations, the chamber shall be tightly sealed or shall maintain negative pressure sufficient to prevent fumigant leakage. [District Rule 2201]
6. The control efficiency of the scrubber serving this fumigation operation shall be at least 98% for volatile organic compound (VOC) emissions from propylene oxide. [District Rule 2201]
7. The scrubber shall be adjusted and maintained to achieve optimum control efficiency according to manufacturer's recommendations. [District Rule 2201]
8. The scrubber liquid pH shall not exceed 2.0 during all fumigation chamber venting. [District Rule 2201]
9. 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]

CONDITIONS CONTINUE ON NEXT PAGE

YOU **MUST** NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5960 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-8166-2-0 : Apr 14 2011 11:22AM - AHMADS : Joint Inspection NOT Required

10. The amount of fumigant used in this chamber shall not exceed 260 lb-PPO/cycle. [District Rule 2201]
11. VOC emissions from the exhaust of the scrubber, when serving this fumigation chamber, shall not exceed 11.4 lb/day, equivalent to the maximum use of 780 lb-PPO fumigant/day. [District Rule 2201]
12. VOC emissions from the exhaust of the scrubber, when serving both fumigation chambers (permit units C-8166-1 and -2), shall not exceed 2,161 lb/year, equivalent to the maximum use of 148,200 lb-PPO fumigant/year. [District Rule 2201]
13. The amount of nuts fumigated in this chamber shall not exceed 66 ton in any one day (equivalent to 22 ton nutmeats/cycle and 3 cycles/day). [District Rule 2201]
14. The amount of nuts fumigated in both chambers (permit unit C-8166-1 and -2) shall not exceed 12,500 ton/year. [District Rule 2201]
15. The permittee shall maintain a record of the daily and cumulative annual (for the calendar year) usage of propylene oxide, and all scrubber pH measurements made. [District Rules 1070 and 2201]
16. Records of the amount of nuts (in pounds) fumigated shall be maintained and updated daily. [District Rules 1070 and 2201]
17. {3246} All records shall be maintained and retained on-site for a period of at least 5 years and shall be made available for District inspection upon request. [District Rule 1070]

DRAFT

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

ISSUANCE DATE: DRAFT
DRAFT

PERMIT NO: C-8166-3-0

LEGAL OWNER OR OPERATOR: READY ROAST NUT COMPANY LLC
MAILING ADDRESS: 425 S PINE STREET
MADERA, CA 93637

LOCATION: 2805 FALCON DRIVE
MADERA, CA

EQUIPMENT DESCRIPTION:

PROPYLENE OXIDE FUMIGATION OFF-GASSING OPERATION CONSISTING OF ONE 6,270 SQUARE FOOT POST-FUMIGATION OFF-GASSING WAREHOUSE

CONDITIONS

1. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
2. {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]
3. All off-gassing for the propylene oxide (PPO) fumigation operation shall be conducted inside the enclosed off-gas warehouse with exhaust fan operating and doors closed when not transferring nuts to and from the warehouse. [District Rule 2201]
4. 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]
5. The amount of fumigant used in any of the fumigation chambers (permit units C-8166-1 or -2) shall not exceed 260 lb-PPO/cycle. [District Rule 2201]
6. The amount of fumigated nuts transferred to this warehouse from the fumigation chambers (C-8166-1 or -2) shall not exceed 132 ton in any one day. [District Rule 2201]
7. The amount of fumigated nuts stored in this warehouse for off-gassing shall not exceed 12,500 ton in one calendar year. [District Rule 2201]
8. VOC (PPO) emissions from this operation shall not exceed 103.8 lb in any one day. [District Rule 2201]

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

DAVID WARNER, Director of Permit Services

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9. Records of the amount of nuts (in pounds) transferred to the post-fumigation off-gassing warehouse shall be maintained and updated daily. [District Rules 1070 and 2201]
10. {3246} All records shall be maintained and retained on-site for a period of at least 5 years and shall be made available for District inspection upon request. [District Rule 1070]

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