DEC 3 0 2010

Lawrence Sambado
A. Sambado & Son Inc
8077 N. Tully Road
Linden, CA 95236

Re: Notice of Preliminary Decision - Authority to Construct
Project Number: N-1103540

Dear Mr. Sambado:

Enclosed for your review and comment is the District's analysis of A. Sambado & Son Inc's application for an Authority to Construct for methyl bromide or propylene oxide fumigation and off-gassing operations, at 16461 E. Comstock Road, Linden, California.

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. Jagmeet Kahlon of Permit Services at (209) 557-6452.

Sincerely,

[Signature]
David Warner
Director of Permit Services

DW/JK:dg

Enclosures
DEC 30 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: N-1103540

Dear Mr. Tollstrup:

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Sincerely,

[Signature]
David Warner
Director of Permit Services

DW/JK:dg

Enclosure
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 A. Sambado & Son Inc for methyl bromide or propylene oxide fumigation and off-gassing operations, at 16461 E. Comstock Road, Linden, California.

The analysis of the regulatory basis for this proposed action, Project #N-1103540, 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, 4800 ENTERPRISE WAY, MODESTO, CA 95356-8718.
I. PROPOSAL

The applicant has proposed to fumigate in-shell walnuts, walnut meats, and other similar commodities using propylene oxide (PPO) or methyl bromide (MeBr) fumigants. The fumigation operation will be conducted in a 3,286 cubic foot steel chamber with internal dimensions of 52 feet length, 7.9 feet width and 8 feet height. This chamber will be equipped with a packed bed scrubber, which is expected to reduce at least 98% of the PPO. The PPO fumigated product will be retained in the chamber (under vacuum) for two days to off-gas any residual PPO from the nutmeats. The off-gassed PPO will be vented through the scrubber. The technically feasible options to reduce MeBr emissions are found to be cost prohibitive at this point.

II. APPLICABLE RULES

Rule 2201  New and Modified Stationary Source Review Rule (12/18/08)
Rule 2520  Federally Mandated Operating Permits (6/21/01)
Rule 4101  Visible Emissions (2/17/05)
Rule 4102  Nuisance (12/17/92)
California Health & Safety Code 41700  Health Risk Assessment
California Health & Safety Code 42301.6  School Notice
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

This facility is located at 16461 E. Comstock Road, Linden, California. There is no K-12 school within 1,000 feet of this address. Therefore, school notice is not required under the California Health & Safety Code 42301.6.

IV. PROCESS DESCRIPTION

This facility will fumigate either in-shell walnuts or walnut meats to kill salmonella bacteria and/or vertebrate and invertebrate pests.

First, the product will be placed in small boxes. These boxes will be loaded on pellets. The pellets will be loaded into the chamber. The chamber will be drawn down to 27" of mercury column using a 50 hp vacuum pump. PPO/MeBr is injected to the chamber to fumigate the product.

PPO Cycle:
Because of the high vaporization temperature of PPO (boiling point is 95 °F), the chamber will be heated to approximately 105°F by circulating hot water through coils inside the chamber prior to the PPO injection. Then, 154 pounds of PPO is injected into the chamber. Nitrogen gas will also be injected in the chamber to form a blanket over the fumigant. The vacuum pressure drops to about 6" of mercury column at this point. After holding fumigant for four to six hour period, the fumigation chamber will be vented through two 20 foot packed column scrubber system that uses 3% sulfuric acid solution. PPO reacts with the scrubber solution rapidly and forms propylene glycol, a non-hazardous solution. The exhaust from the scrubber will be vented into the atmosphere.

MeBr Cycle:
Once the MeBr is injected into the chamber a fan circulates the fumigant within the sealed chamber and assures sufficient contact with the product. After four to six hour period, the spent fumigant will be vented through the stack. The fumigant dissipated within 2 hours, leaving no trace on the nuts.

Off-Gassing:
Upon completing PPO fumigation cycle, the fumigated product will be left in the chamber under vacuum at 3" of mercury column and 125 °F for two days. The vacuum pump and scrubber will be operated at the end of two day period before taking the product out of the chamber. The pump and scrubber system will be operated until the PPO concentration reduces below 2 ppmv in the chamber. Per MSDS for PPO, OSHA and ACGIH standard over 8-hour period are 100 ppmv and 2 ppmv respectively. The requirements of OSHA, ACGIH, and the direction on the product labeling for “end-users” are expected to be followed by the applicant.
The boiling point of MeBr is 40.3°F. It is expected that the fumigant will dissipate immediately from the nut meats after fumigation. 100% of the MeBr used is assumed to be emitted during the fumigation.

V. EQUIPMENT LISTING

METHYL BROMIDE FUMIGATION, PROPYLENE OXIDE FUMIGATION, AND PROPYLENE OXIDE OFF-GASSING OPERATION CONDUCTED INSIDE AN INDUSTRIAL FUMIGATION SYSTEMS 3,286 CUBIC FEET (INTERNAL DIMENSIONS APPROX. 52' X 7.9' X 8') STEEL CHAMBER VENTED TO AN INDUSTRIAL FUMIGATION SYSTEM PACKED-BED SCRUBBER SYSTEM THAT REDUCES PROPYLENE OXIDE EMISSIONS

VI. EMISSION CONTROL TECHNOLOGY EVALUATION

MeBr Cycle
The chamber will not be equipped with an add-on emission control device to reduce MeBr emissions into the atmosphere.

PPO Cycle:
The chamber will be vented to a scrubber system that utilizes 3% sulfuric acid solution. PPO reacts quickly with the solution to form propylene glycol, which is a non-toxic, stable liquid. The scrubber is expected to reduce at least 98% of the PPO.

Off-Gassing Cycle:
Upon completing PPO fumigation, the product will be retained in the chamber. The vacuum pump and scrubber will be operated at the end of two day period before taking the product out of the chamber. The pump and scrubber system is required to be operated until the PPO concentration reduces below 2 ppmv in the chamber.

VII. CALCULATIONS

A. Assumptions

MeBr Cycle:
- MeBr in gaseous form is 100% VOC.
- VOC is the only air contaminant emitted from the proposed fumigation as well as off-gassing operations.
- Fumigation chamber will be operated under negative pressure. Therefore, it is assumed that there would not be any fumigant leakage from this chamber.
Valves, flanges or other pipe connectors operate in a leak-free condition. Therefore, it is assumed that there would not be any fumigant leakage from these components.

100% of the MeBr used in the chamber will be emitted to the atmosphere.

The maximum MeBr injection rate would be 2.5 lb/1,000 ft³. (The applicant)

The maximum number of fumigation cycles would be: 2 cycles/day and 550 cycles/yr.

The vacuum pump and scrubber will be operated until the MeBr concentration reduces below 5 ppmv in the chamber. The potential fugitive emissions would be 0.0 lb/day \[\left(5.0 \text{ ft}^3 \cdot \text{PPO}/10^6 \text{ ft}^3\text{-chamber}\right)(94.95 \text{ lb-PPO/lb-mol})(3,286 \text{ ft}^3 \text{ chamber/cycle})(2 \text{ cycle/day})/(379.5 \text{ ft}^3 \cdot \text{PPO/lb-mol})\].

Other assumptions will be stated, as they are made.

PPO Cycle:

PPO in gaseous form is 100% VOC.

VOC is the only air contaminant emitted from the proposed fumigation or off-gassing operations.

The scrubber is expected to control at least 98% of PPO.

Fumigation chamber will be operated under negative pressure. Therefore, it is assumed that there would not be any fumigant leakage from this chamber.

Valves, flanges or other pipe connectors operate in a leak-free condition. Therefore, it is assumed that there would not be any fumigant leakage from these components.

The maximum PPO injection rate would be 0.75 oz/ft³. (The applicant)

The maximum number of fumigation cycles would be: 1 cycle/day and 182 cycles/yr (365 days/yr ÷ 2 days/cycle for off-gassing) for the proposed PPO fumigation operation.

The vacuum pump and scrubber will be operated until the PPO concentration reduces below 2 ppmv in the chamber. The potential fugitive emissions would be 0.0 lb/day \[\left(2.0 \text{ ft}^3 \cdot \text{PPO}/10^6 \text{ ft}^3\text{-chamber}\right)(58.08 \text{ lb-PPO/lb-mol})(3,286 \text{ ft}^3 \text{ chamber/cycle})(1 \text{ cycle/day})/(379.5 \text{ ft}^3 \cdot \text{PPO/lb-mol})\].

Other assumptions will be stated, as they are made.

Off-Gassing Cycle:

The fumigation chamber shall be retained under negative pressure (about 3" of mercury column) and 125°F during off-gassing operation.

The vacuum pump and scrubber will be operated at the end of two day period before taking the product out of the chamber. The pump and scrubber system is required to be operated until the PPO concentration reduces below 2 ppmv in the chamber. The potential fugitive emissions would be 0.0 lb/day \[\left(2.0 \text{ ft}^3 \cdot \text{PPO}/10^6 \text{ ft}^3\text{-chamber}\right)(58.08 \text{ lb-PPO/lb-mol})(3,286 \text{ ft}^3 \text{ chamber/cycle})(1 \text{ cycle/day})/(379.5 \text{ ft}^3 \cdot \text{PPO/lb-mol})\].
• Other assumptions will be stated, as they are made.

B. Emission Factors

1. Pre-Project Emission Factors (EF1)

The proposed fumigation chamber is a new emission unit. Therefore, pre-project emission factor does not exist at this point.

2. Post-Project Emission Factors (EF2)

MeBr Cycle:
VOC emissions will be equal to the amount of MeBr used in this chamber. There is no separate emission factor established for this operation.

PPO Cycle:
VOC emissions will be determined using PPO use, capture efficiency, and scrubber system control efficiency. There is no separate emission factor established for this operation.

Off-Gassing Cycle:
PPO that is absorbed and retained in the nutmeats after removal from the fumigation chamber off gasses according to a standard, exponential decay equation of the form \( P = (A)e^{-(k)(t)} \), where A and k are constants and T is time. See discussion in section VII.C.2 of this document for more details.

C. Potential to Emit (PE)

1. Pre-Project Potential to Emit (PE1)

The proposed fumigation chamber is a new emission unit. Thus, PE1 is zero for PPO and MeBr fumigation operations.

2. Post Project Potential to Emit (PE2)

MeBr Cycle:
\[
PE2 = (2.5 \text{ lb}/1,000 \text{ ft}^3/\text{cycle})(3,286 \text{ ft}^3/\text{lb-VOC/lb-MeBr})(2 \text{ cycles/day}) = 16.4 \text{ lb/day}
\]

\[
PE2 = (2.5 \text{ lb}/1,000 \text{ ft}^3/\text{cycle})(3,286 \text{ ft}^3/\text{lb-VOC/lb-MeBr})(550 \text{ cycles/yr}) = 4,518 \text{ lb/yr}
\]

PPO Cycle:
\[
PE2 = (\text{PPO}_{i} \text{ lb} - \text{PPO}_{a} \text{ lb})(1 - \text{CE})
\]
Where,
\[ PPO_i = \text{PPO injected, lbs/day} \]
\[ = 0.75 \text{ oz/ft}^3 \times 3,286 \text{ ft}^3/\text{cycle} \times \frac{1}{16\text{oz}} \]
\[ = 154 \text{ lb/cycle} \]
\[ = 154 \text{ lb/cycle} \times 1 \text{ cycle/day} \]
\[ = 154.0 \text{ lb/day} \]
\[ CE = \text{control efficiency of the scrubber, 0.98} \]
\[ PPO_a = \text{PPO absorbed, lbs/day} \]
\[ = (959.8 \times 0.282 \times 0) \text{ lb-PPO/10}^6 \text{ lb-meats})(57,600 \text{ lb-meats/cycle}) \]
\[ = 55.3 \text{ lb/day} \]

\[ PE_2 = (154.0 \text{ lb/day} - 55.3 \text{ lb/day})(1 - 0.98) \]
\[ = 2.0 \text{ lb/day} \]

\[ PE_2 = (154.0 \text{ lb/day} - 55.3 \text{ lb/day})(1 - 0.98)(182 \text{ cycles})(\text{day/1 cycle}) \]
\[ = 359 \text{ lb/year} \]

Off-Gassing:
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. Experimental data were obtained and a 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 will be used to estimate the PPO "Off-Gassing" emissions.

\[ P(T) = 3,071.4 \times e^{-0.282 \times T} (1) \]
Where:

\[ P(T) = P \text{ as a function of time is the residual PPO concentration in nutmeat in parts per million by weight (ppmw – i.e. lb-PPO/10}^6 \text{ lb-nutmeats)} \]

\[ T = \text{Time after fumigation treatment, in days} \]

However, in the experiment used to derive this equation, the fumigation chamber was charged with 2.4 oz-PPO/ft^3. The applicant has proposed to charge the proposed chamber with 0.75 oz-PPO/ft^3.

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 completing the fumigation process), will be
adjusted for the reduced PPO charge rate proposed by the applicant. Therefore,

\[
A = 3,071.4 \times (0.75 \text{ oz-PPO/ft}^3 \div 2.4 \text{ oz-PPO/ft}^3) = 959.8
\]

\[
P(T) = 959.8e^{-0.282T} \text{ lb-PPO/10}^6 \text{ lb-nutmeats}
\]

Generally, largest PPO off-gassing rate occurs from day 0 to day 1. Using a maximum of 57,600 lb-walnut meats/cycle, 1 cycles/day, and 182 cycles/yr, the emissions would be:

\[
P(0) - P(1) = (959.8e^{-0.282 \times 0} - 959.8e^{-0.282 \times 1}) \text{ lb-PPO/10}^6 \text{ lb-nutmeats}
\]

\[
= 235.8 \text{ lb-PPO/10}^6 \text{ lb-nutmeats}
\]

\[
PE2 = (235.8 \text{ lb-PPO/10}^6 \text{ lb-nutmeats})(57,600 \text{ lb-nutmeats/cycle})(1 \text{ cycle/day})
\]

\[
= 13.6 \text{ lb-VOC/day}
\]

Similarly, the emissions between day 1 and day 2 for the product fumigated on day 1 would be:

\[
P(1) - P(2) = (959.8e^{-0.282 \times 1} - 959.8e^{-0.282 \times 2}) \text{ lb-PPO/10}^6 \text{ lb-nutmeats}
\]

\[
= 177.9 \text{ lb-PPO/10}^6 \text{ lb-nutmeats}
\]

\[
PE2 = (177.9 \text{ lb-PPO/10}^6 \text{ lb-nutmeats})(57,600 \text{ lb-nutmeats/cycle})(1 \text{ cycle/day})
\]

\[
= 10.2 \text{ lb-VOC/day}
\]

Per applicant, the fumigated product remains in the chamber for two days before being shipped to the customer. The pump and scrubber system will be operated until the PPO concentration reduces below 2 ppmv in the chamber. Using the scrubber efficiency of at least 98%, the potential emissions would be:

\[
=[|P(0) - P(1)| + |P(1) - P(2)|](1 - 0.98)
\]

\[
= [13.6 \text{ lb/day} + 10.2 \text{ lb/day}](1 - 0.98)
\]

\[
= 0.5 \text{ lb/day}
\]

The worst-case annual emissions would be 91 pounds per year (0.5 lb/day \times 182 days/yr).

Summary:

\[
PE2_{MoBr} = 16.4 \text{ lb-VOC/day}
\]

\[
= 4,518 \text{ lb-VOC/yr}
\]

Page - 7
\[
\text{PE}_{2\text{PPO}} = \text{PE}_{2\text{PPO, Fumigation}} + \text{PE}_{2\text{PPO, Off-Gassing}}
\]
\[
= 2.0 \text{ lb-VOC/day} + 0.5 \text{ lb-VOC/day}
\]
\[
= 2.5 \text{ lb-VOC/day}
\]

\[
\text{PE}_{2\text{PPO}} = \text{PE}_{2\text{PPO, Fumigation}} + \text{PE}_{2\text{PPO, Off-Gassing}}
\]
\[
= 359 \text{ lb-VOC/yr} + 91 \text{ lb/yr}
\]
\[
= 450 \text{ lb-VOC/yr}
\]

3. Quarterly Emissions Changes

This calculation is required for application's emission profile, which is used for the District's internal tracking purposes. This facility operates under a facility-wide limit of 49,999 lb-VOC/yr. This limit stays same after this project. Therefore, quarterly emissions change would be zero.

4. Adjusted Increase in Permitted Emissions (AIPE)

AIPE is used to determine if BACT is required for emission units that are being modified. The proposed operations are new source operation. Therefore, AIPE calculations are not necessary.

D. Facility Emissions

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

Pursuant to Section 4.9 of District Rule 2201, SSPE1 is the Potential to Emit 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 (ERCs) which have been banked since September 19, 1991 for Actual Emissions Reductions (AERs) that have occurred at the source, and which have not been used on-site. VOC emissions from the entire stationary source are limited to 49,999 lb/year.

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<th>Permit</th>
<th>VOC (lb/year)</th>
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2. Post-Project Stationary Source Potential to Emit (SSPE2)

Pursuant to Section 4.10 of District Rule 2201, the Post-Project Stationary Source Potential to Emit (SSPE2) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site. The applicant has proposed to retain the existing facility-wide VOC limit of 49,999 lb/year.

<table>
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<td>Yes</td>
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3. Stationary Source Increase in Potential Emissions (SSIPE)

It is District Practice to define the SSIPE as the difference of SSPE2 and SSPE1. SSPE2 is equal to SSPE1. Therefore, SSIPE is equal to zero.

4. SB-288 Major Modification

The purpose of Major Modification calculations is to determine the following:

A. If Best Available Control Technology (BACT) is triggered for a new or modified emission unit that results in a Major Modification (District Rule 2201, §4.1.3); and

B. If a public notification is triggered (District Rule 2201, §5.4.1).

This facility is a Major Source for VOCs. To determine if a project triggers a Major Modification, Net Emissions Increase (NEI) is calculated for VOC, and is compared with the Major Modification threshold for this pollutant, which is 50,000 lb/yr.
NEI can be calculated as the sum of the difference of post-project potential emissions (PE2) and historical emissions (HE) for the emissions unit involved in this project.

\[
\text{NEI} = (\text{PE2} - \text{HE}) \\
= (4,518 - 0) \\
= 4,518 \text{ lb-VOC/yr}
\]

Since the NEI is less than 50,000 lb/yr, the project will not trigger an SB 288 Major Modification.

5. Federal Major Modification

The purpose of Federal Major Modification calculations is to determine the following:

A. If a Rule-compliance project qualifies for District Rule 2201's Best Available Control Technology (BACT) and offset exemptions (District Rule 2201, §4.2.3.5); and

B. If an Alternate Siting analysis must be performed (District Rule 2201, §4.15.1); and

C. If the applicant must provide certification that all California stationary sources owned, operated, or controlled by the applicant that are subject to emission limits are in compliance with those limits or are on a schedule for compliance with all applicable emission limits and standards; and

D. If a public notification is triggered. (District Rule 2201, §5.4.1).

This facility is a Major Source for VOC emissions. In order to determine whether a Major Modification can be triggered, the Net Emissions Increase (NEI) is calculated and is compared with the Major Modification threshold limit of 0 lb-VOC/year.

NEI can be calculated as the sum of the difference of the project actual emissions (PAE) and the baseline actual emissions (BAE) for the emissions units involved in this project.

\[
\text{NEI} = (\text{PAE} - \text{BAE}) \\
= (\text{PE2} - \text{BAE}) \\
= (4,518 - 0) \text{ lb-VOC/yr} \\
= 4,518 \text{ lb-VOC/yr}
\]
NEI is greater than 0 lb-VOC/yr. Therefore, the proposed project is a Federal Major Modification for VOCs.

VIII. COMPLIANCE

Rule 2201 New and Modified Stationary Source Review Rule

1. Best Available Control Technology (BACT)

BACT requirements shall be triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis. Unless exempted pursuant to Section 4.2, BACT shall be required for the following actions:

- Any new emissions unit or relocation from one Stationary Source to another of an existing emissions unit with a Potential to Emit (PE2) exceeding 2.0 pounds in any one day;
- Modifications to an existing emissions unit with a valid Permit to Operate resulting in an Adjusted Increase in Permitted Emissions (AIPE) exceeding 2.0 pounds in any one day;
- Any new or modified emissions unit, in a stationary source project, which results in a Major Modification, as defined in this rule.

MeBr Cycle:
Per section VII.C.2 of this document, PE2 is greater than 2.0 lb/day for VOCs. Thus, BACT is triggered on PE2 basis.

BACT guideline 5.4.12 is referenced to determine the BACT for MeBr fumigation operation. This guideline lists minimize use of fumigant (i.e. use no more than product specifications recommend), and air tight fumigation as achieved-in-practice control. This guideline also have the following technologically feasible options: 1.) 99% control using chemical scrubbing, 2.) 98% control using thermal or catalytic reduction, 3.) 95% control using carbon adsorption, 4.) 81% control using carbon adsorption with on-site re-activation using chemical scrubber, and 5.) 80% control using condensation refrigeration system. The technologically feasible options are evaluated in Appendix II of this document, and none of them was found to be cost-effective at this time.

The applicant proposes to use recommended dose of MeBr for fumigating different commodities in an air tight chamber. Thus, BACT requirements are satisfied. The following condition will be placed in the permit:
• MeBr injection rate shall not be more than the recommended product specification in treating schedules established by the USDA-APHIS or established in import/export document. The MeBr injection rate and the associated document showing the injection rate shall be kept on file for each commodity fumigated in this chamber. [District Rule 2201]

PPO Cycle:
Per section VII.C.2 of this document, PE2 is not greater than 2.0 lb/day for VOCs. Thus, BACT is not triggered on PE2 basis. However, the project results in a Federal Major Modification and therefore, this operation triggers the BACT.

BACT Guideline 5.2.8 requires achieving at least 98% control using wet scrubber, flare or equal. There are no technologically feasible options in this guideline.

The applicant has proposed to vent the PPO to the scrubber, which is expected to achieve at least 98% control efficiency. Thus, BACT requirements are satisfied. Please refer to Appendix II for detailed Top-Down BACT Analysis. The following condition will be placed in the permit:

• The scrubber shall be operated in a manner to reduce at least 98% VOC from PPO use. [District Rule 2201]

Off-Gassing Cycle:
Per section VII.C.2 of this document, PE2 is not greater than 2.0 lb/day for VOCs. Thus, BACT is not triggered on PE2 basis. However, the project results in a Federal Major Modification and therefore, this operation triggers a BACT.

BACT guideline 5.2.9 is referenced to determine the BACT requirements for PPO fumigation off-gassing emissions. This guideline does not list any achieved-in-practice technologies. However, there are three technologically feasible options: 1.) 98% control efficiency using wet scrubber, flare or equal, 2.) 95% control efficiency using carbon adsorption or equal, 3.) 80% control efficiency using refrigerated vapor condenser, or equal.

PPO fumigated product will be left in the chamber. The chamber will be maintained at negative 3" of mercury column and 125°F for two days. The vacuum pump and scrubber will be operated at the end of two day period before taking the product out of the chamber to reduce PPO concentration to 2 ppmv (or less). The scrubber system is proposed to achieve at least 98% control efficiency.
The applicant has proposed to use most stringent technologically feasible control option for this operation. Therefore, BACT requirements are satisfied. Please refer to Appendix II for detailed Top-Down BACT Analysis. The following condition will be placed in the permit:

- The scrubber shall be operated in a manner to reduce at least 98% VOC from PPO use. [District Rule 2201]

2. Offsets

This facility's total VOCs are above the offset threshold of 20,000 pounds per year. Therefore, offset calculations are required for this project.

Section 4.7.1 states that for pollutants with SSPE1 greater than the emission offset threshold levels, emission offsets shall be provided for all increases in Stationary Source emissions, calculated as the differences of post-project Potential to Emit (PE2) and the Baseline Emissions (BE) of all new and modified emissions units, plus all increases in Cargo Carrier emissions. Thus,

$$EOQ = \Sigma(PE2 - BE) + ICCE,$$

where

- PE2 = Post-Project Potential to Emit (lb/yr)
- BE = Baseline Emissions (lb/yr)
- ICCE = Increase in Cargo Carrier emissions (lb/yr)

There is no increase in Cargo Carrier emissions from this project. Thus,

$$EOQ = \Sigma(PE2 - BE)$$

This facility has four MeBr fumigation chambers operating under N-717-1, '-2, '-4 and '-5. These chambers are determined to be Clean Emission Units since they meet the achieved-in-practice BACT, which is, to minimize use of fumigant (i.e. use no more than product specifications recommend) and airtight fumigation. Thus, BE is set equal to PE1.

$$EOQ = \Sigma(PE2 - PE1)$$

VOC emissions from the entire stationary source are limited to 49,999 pounds per year. Therefore,

$$EOQ = (PE2_{SLC} - PE1_{SLC})$$

= 49,999 lb-VOC/yr - 49,999 lb-VOC/yr

= 0 lb-VOC/yr

Therefore, no offsets are required for this project.
3. Public Notification

District Rule 2201, section 5.4, requires a public notification for the affected pollutants from the following types of projects:

- New Major Sources
- Major Modifications (SB-288 or Federal Major Modification)
- New emission units with a PE > 100 lb/day of any one pollutant
- Modifications with SSPE1 below an Offset threshold and SSPE2 above an Offset threshold on a pollutant-by-pollutant basis
- New stationary sources with SSPE2 exceeding Offset thresholds
- Any permitting action with a SSiPE exceeding 20,000 lb/yr for any one pollutant

The proposed project is a Federal Major Modification. Therefore, 30-day public notice is required for this project.

4. Daily Emission Limits (DELs)

Daily Emissions Limitations (DELs) and other enforceable conditions are required by Section 3.17 to restrict a unit's maximum daily emissions.

MeBr Cycle:
- While using MeBr, the VOC emissions shall not exceed any of the following limits: 16.4 lb/day and 4,518 lb/year, equivalent to the use of 16.4 lb-MeBr/day and 4,518 lb-MeBr/year. [District Rule 2201]

PPO Cycle:

Off-Gassing Cycle:
- While using PPO, the VOC emissions, including off-gassing shall not exceed any of the following limits: 2.5 lb/day and 450 lb/year, equivalent to the use of 154.0 lb-PPO/day and 28,028 lb-PPO/year. [District Rule 2201]

5. Compliance Assurance

Source Testing
MeBr Cycle:
The DEL for MeBr cycle is derived using a mass balance method (injection rate = emission rate). Therefore, source testing is not required.

PPO Cycle:
The DEL for PPO cycle is derived using the proposed 98% control efficiency for the packed-bed scrubber. To ensure that the DELs are correctly established, the scrubber control efficiency must be verified. Therefore, the
applicant is required to conduct a one-time source test to verify the control efficiency. The acceptable scrubber liquid pH range is required to be established during initial source testing. The acceptable scrubber liquid pH range shall be that for which compliance with the scrubber's minimum control efficiency is demonstrated, and this pH range shall be placed on the Permit to Operate.

Off-Gassing Cycle:
The DEL for PPO cycle is derived using the proposed 98% control efficiency for the packed-bed scrubber. The scrubber efficiency will be verified under PPO cycle (above). Therefore, separate testing is not considered for this operation.

The District policy APR-1705 (10/9/97), Source Testing Frequency, is referenced to determine if there are any periodic testing requirements for PPO fumigation or off-gassing operations served by a wet scrubber to control VOC emissions. No requirements were found in this policy. Therefore, no periodic testing is established.

Monitoring
Scrubber liquor's pH is required to be determined after each PPO fumigation/off-gassing operation.

Recordkeeping
The permittee is required to keep records of the date, commodity being fumigated, recommended fumigant use (in case of MeBr fumigant use), chamber temperature (in case of PPO fumigant use), chamber pressure after injecting fumigant and inert gas, pH of scrubber solution (in case of PPO fumigant use), fumigation/off-gassing cycle start time, fumigation/off-gassing cycle end time, fumigant concentration, ppmv, in the chamber after fumigation/off-gassing cycle, amount of the fumigant used in pounds and the total amount of the fumigant used up to date. In addition, the scrubber inspection and maintenance records are also required. All these records are required to be kept on site for a period of at least five years.

Reporting
Source testing report is required to be submitted within 60 days after conducting the test.

Compliance is expected with this Rule.

Rule 2520  Federally Mandated Operating Permits

This facility is a becoming a new Major Source under Rule 2201 (12/18/08), which became in effect on June 10, 2010. The facility does not have a Title V
permit at this point. The District is expected to notify new Major Source facilities, as to when, they should apply for their Title V permit. Therefore, no permit condition is added in the permit to enforce the requirements of this Rule.

**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. The following condition will be listed on the proposed ATC to ensure compliance:

- 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]

Compliance is expected with this Rule.

**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 that the equipment is well maintained. The following condition will be listed on the proposed ATC to ensure compliance:

- 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 performs an analysis to determine the possible impact to the nearest resident or worksite. Risk management review is summarized in the following table:

<table>
<thead>
<tr>
<th>Categories</th>
<th>Unit 6-0</th>
<th>Project Totals</th>
<th>Facility Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prioritization Score</td>
<td>0.63</td>
<td>0.63</td>
<td>10</td>
</tr>
<tr>
<td>Acute Hazard Index</td>
<td>0.26</td>
<td>0.26</td>
<td>0.78</td>
</tr>
<tr>
<td>Chronic Hazard Index</td>
<td>0.12</td>
<td>0.12</td>
<td>0.27</td>
</tr>
<tr>
<td>Maximum Individual Cancer Risk $(10^{-6})$</td>
<td>0.28</td>
<td>0.28</td>
<td>0.28</td>
</tr>
<tr>
<td>T-BACT Required?</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Conditions Required?</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The chronic and acute indices are below 1.0, and the cancer risk is less than 1.0 in a million. Therefore, in accordance with the District's Risk Management Policy, this project is approved without T-BACT.

Compliance is expected with this Rule.

**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 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.

The proposed project includes fumigation of in-shell walnuts or walnut meats. This operation does not result in carbon dioxide (CO₂). Therefore, the proposed project is assumed to have no significant impact on the 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
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
Issuance of Authority to Construct N-717-6-0 is recommended after addressing comments from the public, the California Air Resources Board (CARB), and the applicant.

X. BILLING INFORMATION

<table>
<thead>
<tr>
<th>Permit #</th>
<th>Fee Schedule</th>
<th>Fee Description</th>
<th>Previous Fee Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-717-6-0</td>
<td>3020-01-A</td>
<td>61.5 hp, electric motors</td>
<td>None</td>
</tr>
</tbody>
</table>

Appendices
Appendix I: Draft Authority to Construct
Appendix II: Top-Down BACT Analysis and BACT Guidelines
Appendix I
Draft Authority to Construct
San Joaquin Valley Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: N-717-6-0

LEGAL OWNER OR OPERATOR: A. SAMBADO & SON, INC.
MAILING ADDRESS: 8077 N TULLY RD
LINDEN, CA 95236

LOCATION: 16461 E COMSTOCK RD
LINDEN, CA 95236

EQUIPMENT DESCRIPTION:
METHYL BROMIDE FUMIGATION, PROPYLENE OXIDE FUMIGATION, AND PROPYLENE OXIDE OFF-GASSING OPERATION CONDUCTED INSIDE AN INDUSTRIAL FUMIGATION SYSTEMS 3,286 CUBIC FEET (INTERNAL DIMENSIONS APPROX. 52' X 7.9' X 8') STEEL CHAMBER VENTED TO AN INDUSTRIAL FUMIGATION SYSTEM PACKED-BED SCRUBBER SYSTEM THAT REDUCES PROPYLENE OXIDE EMISSIONS

CONDITIONS

1. (1407) All equipment shall be maintained in good operating condition and shall be operated in a manner to minimize emissions of air contaminants into the atmosphere. [District Rule 2201]
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. (98) No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. Methyl bromide (MeBr) and propylene oxide (PPO) shall be the only fumigants used in this chamber. [District Rule 2201]
5. This chamber shall be equipped with a pressure differential gauge to measure the vacuum pressure, a thermocouple to measure the temperature, and a permanent port to measure fumigant concentration inside the chamber. [District Rule 2201]
6. There shall be no emissions of MeBr or PPO from valves, flanges, connectors, or duct work. The permittee shall use United States Department of Agriculture-Animal and Plant Health Inspection Service (USDA-APHIS) approved analyzers to ensure compliance with this condition. [District Rule 2201]
7. The chamber shall be retained under negative pressure all times during the fumigation and off-gassing cycles. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (209) 557-6400 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
Northern Regional Office • 4800 Enterprise Way • Modesto, CA 95356-8718 • (209) 557-6400 • Fax (209) 557-6475

DRAFT
8. The scrubber sprays and/or nozzles shall be inspected at a frequency recommended by the scrubber manufacturer, or at least once every six months, whichever is more stringent. [District Rule 2201]

9. The scrubber shall be operated in a manner to reduce at least 98% VOC from PPO use. [District Rule 2201]

10. While using PPO, the VOC emissions, including off-gassing shall not exceed any of the following limits: 2.5 lb/day and 450 lb/year, equivalent to the use of 154.0 lb-PPO/day and 28,028 lb-PPO/year. [District Rule 2201]

11. The product fumigated with PPO shall be retained in this chamber for at least 24 hours to collect residual PPO from the product. During this period, the chamber shall be maintained under negative pressure and at or above a temperature of 125°F. [District Rule 2201]

12. The scrubber shall be in operation while venting PPO from this chamber during the PPO fumigation and off-gassing operations. The scrubber shall be operated until the PPO concentration in the chamber drops to or below 2 ppmv. PPO concentration in the chamber shall be measured using gas detection tubes (such as Draeger brand or District approved equivalent). Should the applicant decide to use different methodology, the methodology must be approved by the District prior to its use. [District Rule 2201]

13. MeBr injection rate shall not be more than the recommended product specification in treating schedules established by the USDA-APHIS or established in import/export document. The MeBr injection rate and the associated document showing the injection rate shall be kept on file for each commodity fumigated in this chamber. [District Rule 2201]

14. While using MeBr, the VOC emissions shall not exceed any of the following limits: 16.4 lb/day and 4,518 lb/year, equivalent to the use of 16.4 lb-MeBr/day and 4,518 lb-MeBr/year. [District Rule 2201]

15. The chamber shall be vented to the atmosphere until the MeBr concentration in the chamber drops to or below 5 ppmv. MeBr concentration in the chamber shall be measured using gas detection tubes (Draeger brand or District approved equivalent) or USDA-APHIS approved analyzers. Should the applicant decide to use different methodology, the methodology must be approved by the District prior to its use. [District Rule 2201]

16. Source testing to demonstrate compliance with the scrubber’s minimum control efficiency requirement shall be conducted within 60 days of initial startup. [District Rule 2201]

17. The acceptable scrubber liquid pH range shall be established during initial source testing. The acceptable scrubber liquid pH range shall be that for which compliance with the scrubber’s minimum control efficiency is demonstrated, and this pH range shall be placed on the Permit to Operate. [District Rule 2201]

18. (1557) Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

19. (33) Sampling facilities for source testing shall be provided in accordance with the provisions of Rule 1081 (Source Sampling). [District Rule 1081]

20. Source testing to measure the scrubber’s control efficiency shall be conducted using the following test methods: EPA Method 2, 2A, or 2D for flow rate and Method 25, 25A, 25B, or 25D for measuring total gaseous organic concentrations at the inlet and outlet of the control device. Should it be determined that another set of test methods is more appropriate for use in demonstrating compliance with the minimum control efficiency requirements, such test methods shall be approved by the District prior to initial source testing. [District Rule 1081]

21. (110) The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]

22. The following records shall be maintained for PPO fumigation operation: 1.) date, 2.) name of the commodity fumigated, 3.) chamber pressure (negative), in inches of mercury column after injecting the fumigant and other inert gas, 4.) pH of the scrubber solution, 5.) chamber temperature in °F, 6.) fumigation cycle start time, 7.) fumigation cycle end time including chamber air washes, 8.) concentration in the chamber, ppmv after completing chamber air washes, 9.) amount of the fumigant used in pounds, and 10.) total amount of the fumigant used up to date. [District Rule 2201]

23. The following records shall be maintained for the PPO off-gassing operation: 1.) date, 2.) name of the commodity fumigated, 3.) chamber pressure (negative) in inches of mercury column, 4.) pH of the scrubber solution, 5.) chamber temperature in °F, 6.) off-gassing cycle start time, 7.) off-gassing cycle end time including chamber air washes, 8.) concentration in the chamber, ppmv, after completing chamber air washes. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE
24. The following records shall be maintained for MeBr fumigation operation: 1.) date, 2.) name of the commodity fumigated, 3.) recommended fumigant use from USDA-APHIS or import/export document, 4.) chamber pressure (negative), in inches of mercury column after injecting the fumigant and other inert gas, 5.) fumigation cycle start time, 6.) fumigation cycle end time including chamber air washes, 7.) concentration in the chamber, ppmv after completing chamber air washes, 8.) amount of the fumigant used in pounds, and 9.) total amount of the fumigant used up to date. [District Rule 2201]

25. The permittee shall maintain records of the scrubber maintenance, inspections and repair. The records shall include: 1.) date of inspection, 2.) name of the components inspected, 3.) corrective action taken, and 4.) identification of the individual performing the inspection and the company affiliation. [District Rule 2201]

26. The facility-wide VOC emissions shall not exceed 49,999 pounds based on a 12 consecutive month rolling total. [District Rule 2201]

27. The permittee shall keep records of the facility-wide annual VOC emissions. [District Rule 2201]

28. (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]
Appendix II
Top-Down BACT Analysis and BACT Guidelines
Commodity Methyl Bromide Fumigation Chamber

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Achieved in Practice or contained in the SIP</th>
<th>Technologically Feasible</th>
<th>Alternate Basic Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOC</td>
<td>Minimize use of fumigant (i.e. use no more than product specifications recommend), and airtight fumigation</td>
<td>1. 99% control (chemical scrubbing)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. 98% control (thermal or catalytic reduction)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. 95% control (carbon adsorption)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. 81% control (carbon adsorption with onsite re-activation using chemical scrubber)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. 80% control (condensation refrigeration system)</td>
<td></td>
</tr>
</tbody>
</table>

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)*
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

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Achieved in Practice or contained in the SIP</th>
<th>Technologically Feasible</th>
<th>Alternate Basic Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOC</td>
<td>98% Control Efficiency (Wet Scrubber, flare, or equal)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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)
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**

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

** 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

Methyl Bromide Fumigation
BACT Guideline 5.4.12 lists the following achieved-in-practice and technological feasible option:

Step 1: Identify All Possible Control Technologies

Achieved in Practice or contained in SIP:
Minimize the use of fumigant (i.e. use no more than product specification recommend); and air-tight fumigation chamber

Technologically Feasible:
Option 1: 99% control (chemical scrubbing)
Option 2: 98% control (thermal or catalytic reduction)
Option 3: 95% control (carbon adsorption)
Option 4: 81% control (carbon adsorption with on-site re-activation using chemical scrubber)
Option 5: 80% control (condensation refrigeration system)

Step 2: Eliminate Technologically Infeasible Options

Option 2: 98% control using thermal or catalytic reduction is not technologically feasible

Thermal incineration of methyl bromide produces toxic gas hydrogen bromide. The incineration process must be followed with a chemical scrubber to treat this toxic gas. Furthermore, installing such an incineration apparatus would result in significant increases in collateral emissions (mainly NOx). Therefore, this technologically is removed from further analysis.

Catalytic incineration of methyl bromide will foul the catalyst. Furthermore, installing such an incineration apparatus would result in significant increases in collateral emissions (mainly NOx). Therefore, this technologically is removed from further analysis.

Step 3: Rank Remaining Control Technologies by Control Effectiveness

1. Chemical scrubber (99% control)
2. Carbon adsorption (95% control)
3. Carbon bed and scrubber system (81% control)
4. Condensation refrigeration system (80% control)
Step 4: Cost Effectiveness Analysis

Option 1: Chemical Scrubber
The packed bed scrubber for propylene oxide fumigation is designed to handle 11,600 cfm. Therefore, it is assumed, that the packed bed scrubber for methyl bromide can also be designed to handle at least 11,600 cfm.

Per EPA’s fact sheet (http://www.epa.gov/ttn/cat/cdir1/fpack.pdf), cost of a packed-bed/packed-tower scrubber varies from $11 to $55 per scfm (expressed in 2002 dollars). Using $11 per scfm, the capital cost of a packed-bed/packed-tower scrubber for this installation would be $127,600. The applicant has provided a detailed cost quote to prepare the site to install emissions control equipment; therefore, these costs are included here. The cost quote include site preparation work, building pad, concrete, steel building and accessories, painting, electrical, plumbing, permit fees, etc. The total cost is estimated to be $133,201. Therefore, the total capital cost would be $260,801 ($127,600 + $133,201). This capital cost is annualized over 10 years assuming 10% interest to determine the annual cost.

\[
\frac{0.1 (1 + 0.1)^{10}}{(0.1+1)^{10} - 1} \times \frac{260,801}{\text{year}} = \frac{42,444}{\text{year}}
\]

The applicant states that an operator will spend at least one hour per treatment to inspect and maintain the equipment. The operator cost would be $25/hour. Thus, the operation and maintenance costs would be $13,750/year (550 fumigation cycles/yr × 1 hr-inspection and maintenance/fumigation cycle × $25/hour).

The total annual cost to purchase, install, operate, and maintain the scrubber system would be:

\[
\text{Total Cost} = $42,444/\text{year} + $13,750/\text{year} = $56,194/\text{year}
\]

The proposed chamber may emit 4,518 lb-VOC/year. The control efficiency of the system is assumed to be 99%. Thus,

\[
\text{VOC Reductions} = 4,518 \text{ lb-VOC/year} \times 0.99
\]
\[
= 4,473 \text{ lb-VOC/year or 2.24 tons-VOC/year}
\]

\[
\text{Cost of Reductions} = ($56,194/\text{year}) + (2.24 \text{ tons-VOC/yr})
\]
\[
= $25,087/\text{ton}
\]

The cost of emission reductions without including on-going costs on scrubber solution, electrical use, and scrubber waste disposal is greater than the $17,500/ton cost effectiveness threshold per District BACT policy. Therefore, it is concluded that this option is not cost effective at this time.

Appendix II - II
Option 2: Carbon Adsorption

Met-Pro Environmental Air Solutions quoted a carbon adsorption system for $151,270 for this installation. The applicant has provided a detailed cost quote to prepare the site to install emissions control equipment; therefore, these costs are included here. The cost quote include site preparation work, building pad, concrete, steel building and accessories, painting, electrical, plumbing, permit fees, etc. The total cost is estimated to be $133,201. Therefore, the total capital cost would be $284,471 ($151,270 + $133,201). This capital cost is annualized over 10 years assuming 10% interest to determine the annual cost.

\[
\frac{284,471 \left( 0.1 \left(1 + 0.1 \right)^{10} \right)}{\left( 0.1 + 1 \right)^{10} - 1} = \frac{46,296}{\text{year}}
\]

The applicant states that an operator will spend at least one hour per treatment to inspect and maintain the equipment. The operator cost would be $25/hour. Thus, the operation and maintenance costs would be $13,750/year (550 fumigation cycles/yr \times 1 \text{ hr inspection and maintenance/fumigation cycle} \times \$25/\text{hour}).

The total annual cost to purchase, install, operate, and maintain the carbon adsorption system would be:

\[
\text{Total Cost} = 46,296/\text{year} + 13,750/\text{year} = 60,046/\text{year}
\]

The proposed chamber may emit 4,518 lb-VOC/year. The control efficiency of the system is assumed to be 95%. Thus,

\[
\text{VOC Reductions} = 4,518 \text{ lb-VOC/year} \times 0.95 = 4,292 \text{ lb-VOC/year or 2.15 tons-VOC/year}
\]

\[
\text{Cost of Reductions} = (60,046/\text{year}) + (2.15 \text{ tons-VOC/yr}) = 27,928/\text{ton}
\]

The cost of emission reductions without including on-going carbon replacement cost, electrical use, and spent carbon disposal is greater than the $17,500/ton cost effectiveness threshold per District BACT policy. Therefore, it is concluded that this option is not cost effective at this time.

Option 3: Carbon Bed with Scrubber System

On November 11, 2010, Value Recovery, Inc has quoted carbon bed with scrubber system for $123,133. The applicant has provided a detailed cost quote to prepare the site to install emissions control equipment; therefore, these costs are included here. The cost quote include site preparation work, building pad, concrete, steel building and accessories, painting, electrical, plumbing, permit fees, etc. The total cost is estimated to be $133,201. Therefore, the total capital cost would be $256,334 ($123,133 + $133,201).
This capital cost is annualized over 10 years assuming 10% interest to determine the annual cost.

\[ \frac{0.1(1 + 0.1)^{10}}{(0.1 + 1)^{10} - 1} \times \$41,717 = \$258,334 \text{ year} \]

The annual operating cost for this system (not including operator regular inspection and maintenance costs) would be $16,999/year.

The applicant states that an operator will spend at least one hour per treatment to inspect and maintain the equipment. The operator cost would be $25/hour. Thus, the operation and maintenance costs would be $13,750/year (550 fumigation cycles/yr × 1 hr-inspection and maintenance/fumigation cycle × $25/hour).

The total annual cost to purchase, install, operate, and maintain the carbon adsorption with scrubber system would be:

\[ \text{Total Cost} = \$41,717/\text{year} + \$16,999/\text{year} + \$13,750/\text{year} = \$72,466/\text{year} \]

The proposed chamber may emit 4,518 lb-VOC/year. The guaranteed control efficiency of the system is 90%. Thus,

\[ \text{VOC Reductions} = 4,518 \text{ lb-VOC/year} \times 0.90 \]
\[ = 4,066 \text{ lb-VOC/year or 2.03 tons-VOC/year} \]

\[ \text{Cost of Reductions} = (\$72,466/\text{year}) + (2.03 \text{ tons-VOC/yr}) \]
\[ = \$35,698/\text{ton} \]

The cost of emission reductions is greater than the $17,500/ton cost effectiveness threshold per District BACT policy. Therefore, it is concluded that this option is not cost effective at this time.

**Option 4: Condensation Refrigeration System**

The cost of the electricity required to operate a refrigerated vapor condenser system 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.

The estimated electric power 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\(^1\). Therefore, using 0.0075 kW-hr/ft\(^3\), 0.13/kW-hr, and the annual electric cost would be:

\(^1\) Estimating Cost of Air Pollution Control, William M. Vatavuk, Page 177, ISBN 0-87371-142-4

Appendix II - IV
Electrical Cost = \( (0.0075 \text{ kW-hr/ft}^3) (11,600 \text{ ft}^3/\text{min}) (60 \text{ min/hr}) (3 \text{ hr/day}) (550 \text{ cycles/yr}) (\text{day/2 cycles}) (\$0.13/\text{kW-hr}) \)
\[= \$559,845/\text{yr} \]

The proposed chamber may emit 4,518 lb-VOC/year. The system is expected to achieve at least 80% reduction. Thus,

VOC Reductions = \( 4,518 \text{ lb-VOC/yr} \times 0.80 \)
\[= 3,614 \text{ lb-VOC/yr or 1.81 tons-VOC/yr} \]

Cost of Reductions = \( (\$559,845/\text{yr}) + (1.81 \text{ tons/yr}) \)
\[= \$309,306/\text{ton} \]

The cost of electricity alone for VOC reductions using a refrigerated vapor condenser system is greater than the $17,500/ton cost effectiveness threshold. Therefore, this system is not cost-effective and is removed from consideration at this time.

**Step 5: Select BACT**

None of the technologically feasible control technologies are cost effective. Therefore, a VOC emission limitation shall be considered BACT for this application.

**PPO Fumigation Operation**

**Step 1: Identify All Possible Control Technologies**

BACT Guideline 5.2.8 lists the following achieved-in-practice controls:

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

There is no technologically feasible or alternate basic equipment listed in this guideline.

**Step 2: Eliminate Technologically Infeasible Options**

There is no technologically infeasible option.

**Step 3: Rank Remaining Control Technologies by Control Effectiveness**

1. 98% control efficiency (wet scrubber, flare or equal) – achieved-in-practice

**Step 4: Cost Effectiveness Analysis**

There is no technology feasible option listed in Step 3. Thus, no further discussion is necessary.
Step 5: Select BACT

BACT to control VOC emissions is to use emissions control device with a minimum control efficiency of 98%.

The facility has proposed to achieve at least 98% control using wet scrubber. Thus, this proposal meets the District BACT requirements.

**PPO Off-gassing Operation**

Step 1: Identify All Possible Control Technologies

BACT Guideline 5.2.9 lists the following controls:

**Achieved-in-Practice**
None.

**Technologically Feasible**
1. 98% Control efficiency (wet Scrubber, flare or equal)
2. 95% Control efficiency (carbon Adsorption, or equal)
3. 80% Control efficiency (refrigerated vapor condenser, or equal)

Step 2: Eliminate Technologically Infeasible Options

There is no technologically infeasible option.

Step 3: Rank Remaining Control Technologies by Control Effectiveness

1. 98% Control efficiency (wet Scrubber, flare or equal)
2. 95% Control efficiency (carbon Adsorption, or equal)
3. 80% Control efficiency (refrigerated vapor condenser, or equal)

Step 4: Cost Effectiveness Analysis

The applicant has proposed to use a scrubber to achieve at least 98% control efficiency. This is the most stringent technologically feasible control for this operation. Therefore, the cost-effectiveness analysis for the other options (Item 2 and 3 in Step 3) is not required.

Step 5: Select BACT

BACT to control VOC emissions is to use emissions control device with a minimum control efficiency of 98%.

The facility has proposed to use scrubber to achieve at least 98% control efficiency. Thus, this proposal meets the District BACT requirements.