RENOMINATION OF METHYL BROMIDE CRITICAL USE FOR POST-HARVEST USE TREATMENT OF COMMODITIES

EXECUTIVE SUMMARY

This sector includes walnut, dried fruit (prunes, raisins, figs), dates, and dried beans, all of which can be attacked by numerous insect pests. Since infestation begins in the field, methyl bromide is used to rapidly fumigate these commodities shortly after harvest, as they arrive at the processing plants, and before they are stored and/or shipped. Fumigation takes place over several weeks, during the peak production season, as the bulk of the harvest moves into the storage and shipping channels. Upon arrival from the field, each load of commodities is fumigated with methyl bromide, in preparation for shipment to national and international markets. Thus, any one load is fumigated with methyl bromide only once. These periods can be compressed when harvest occurs close to key market windows, such as holiday markets for certain types of dried fruits and nuts.

Preliminary research with sulfuryl fluoride indicates that this fumigant shows promise as a potential methyl bromide alternative for commodities. These early studies have shown that, under vacuum or atmospheric conditions, sulfuryl fluoride is effective against adult, pupal, and larval stages of insects infesting walnuts, but less effective against the egg stage. These studies, however, have all been conducted using modified, small testing chambers, and results have not been validated under commercial scale conditions. USDA/ARS researchers anticipate running comparative efficacy tests with sulfuryl fluoride and methyl bromide in 2008. Result from those studies should provide critical data regarding the feasibility of sulfuryl fluoride as a methyl bromide alternative for use on walnuts and, perhaps, other commodities. The potential use of sulfuryl fluoride for commodity fumigation is unrelated to the use of this chemical for structure fumigation. In the fist case, it is the commodities themselves that are fumigated, only once, and just before being shipped to their intended markets. In the second, it is a storage or food processing facility (i.e. a building) that is fumigated periodically, as needed.

METHYL BROMIDE CRITICAL USE RENOMINATION NOMINATION FOR STRUCTURES, COMMODITIES OR OBJECTS

NOMINATING PARTY:

The United States of America

NAME

USA CUN09 **POST HAVEST USE FOR COMMODITIES**

BRIEF DESCRIPTIVE TITLE OF NOMINATION:

Methyl Bromide Critical Use Nomination for Post Harvest Use on Commodities (Submitted in 2008 for 2010 Use Season)

QUANTITY OF METHYL BROMIDE REQUESTED IN EACH YEAR OF NOMINATION:

TABLE COVER SHEET: QUANTITY OF METHYL BROMIDE REQUESTED IN EACH YEAR OF NOMINATION

YEAR	NOMINATION AMOUNT (KILOGRAMS)
2010	**43,007**

SUMMARY OF ANY SIGNIFICANT CHANGES SINCE SUBMISSION OF PREVIOUS NOMINATIONS:

There have been no significant changes since the previous nomination.

The critical uses remain where the alternatives are not technically and economically feasible.

(Details on this page are similar to those for new nominations requested under Decision Ex. I/4(7), for posting on the Ozone Secretariat website under Decision Ex. I/4(8))

This form is to be used by holders of single-year exemptions to reapply for a subsequent year's exemption (for example, a Party holding a single-year exemption for 2005 and/or 2006 seeking further exemptions for 2007). It does not replace the format for requesting a critical-use exemption for the first time.

In assessing nominations submitted in this format, TEAP and MBTOC will also refer to the original nomination on which the Party's first-year exemption was approved, as well as any supplementary information provided by the Party in relation to that original nomination. As this earlier information is retained by MBTOC, a Party need not re-submit that earlier information.

NOMINATING PARTY CONTACT DETAILS:

Contact Person:	Hodayah Finman
Title:	Foreign Affairs Officer
Address:	Office of Environmental Policy U.S. Department of State 2201 C Street, N.W. Room 2657 Washington, D.C. 20520 U.S.A.
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Following the requirements of Decision IX/6 paragraph (a)(1) The United States of America has determined that the specific use detailed in this Critical Use Nomination is critical because the lack of availability of methyl bromide for this use would result in a significant market disruption. X Yes ☐ No

_____ _____ _____

Signature Name Date

Title: _____

CONTACT OR EXPERT(S) FOR FURTHER TECHNICAL DETAILS:

Contact/Expert Person:	Richard Keigwin
Title:	Division Director
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E-mail:	Keigwin.Richard@epa.gov

LIST OF DOCUMENTS SENT TO THE OZONE SECRETARIAT IN OFFICIAL NOMINATION PACKAGE:

1. PAPER DOCUMENTS: **Title of paper documents and appendices**	**No. of pages**	**Date sent to Ozone Secretariat**
USA CUN10 POST HARVEST: COMMODITIES		
2. ELECTRONIC COPIES OF ALL PAPER DOCUMENTS: ***Title of each electronic file (for naming convention see notes above)**	**No. of kilobytes**	**Date sent to Ozone Secretariat**
USA CUN10 POST HARVEST: COMMODITIES		

* Identical to paper documents

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Part A: SUMMARY INFORMATION

1. NOMINATING PARTY AND NAME AS PER NAMING CONVENTION, PARA 3.5.2 OF HANDBOOK:

The United States of America
USA CUN10 POST HARVEST FOR USE ON COMMODITIES

2. BRIEF DESCRIPTIVE TITLE OF NOMINATION:

Methyl Bromide Critical Use Nomination for Post Harvest Use on Commodities (Submitted in 2008 for 2010 Use Season)

3. YEAR FOR WHICH EXEMPTION SOUGHT:

TABLE COVER SHEET: QUANTITY OF METHYL BROMIDE REQUESTED IN EACH YEAR OF NOMINATION

YEAR	NOMINATION AMOUNT (KILOGRAMS)
2010	**43,007**

4. SUMMARY OF ANY SIGNIFICANT CHANGES SINCE SUBMISSION OF PREVIOUS NOMINATIONS (*e.g. changes to requested exemption quantities, successful trialling or commercialisation of alternatives, etc.*)

There have been no significant changes since the previous nomination.

Part B: TRANSITION PLANS

Provision of a National Management Strategy for Phase-out of Methyl Bromide is a requirement under Decision Ex. I/4(3) for nominations after 2005. The time schedule for this Plan is different than for CUNs. Parties may wish to submit Section 21 separately to the nomination.

5. DESCRIBE MANAGEMENT STRATEGIES THAT ARE IN PLACE OR PROPOSED TO ELIMINATE THE USE OF METHYL BROMIDE FOR THE NOMINATED CRITICAL USE, INCLUDING:

1. Measures to avoid any increase in methyl bromide consumption except for unforeseen circumstances;
2. Measures to encourage the use of alternatives through the use of expedited procedures, where possible, to develop, register and deploy technically and economically feasible alternatives;
3. Provision of information on the potential market penetration of newly deployed alternatives and alternatives which may be used in the near future, to bring forward the time when it is estimated that methyl bromide consumption for the nominated use can be reduced and/or ultimately eliminated;
4. Promotion of the implementation of measures which ensure that any emissions of methyl bromide are minimised;
5. Actions to show how the management strategy will be implemented to promote the phase-out of uses of methyl bromide as soon as technically and economically feasible alternatives are available, in particular describing the steps which the Party is taking in regard to subparagraph (b) (iii) of paragraph 1 of Decision IX/6 in respect of research programmes in non-Article 5 Parties and the adoption of alternatives by Article 5 Parties.

The U.S. submitted the National Management Strategy in accordance with the Decision IX/6.

Part C: TRANSITION ACTIONS

Responses should be consistent with information set out in the applicant's previously-approved nominations regarding their transition plans, and provide an update of progress in the implementation of those plans.

In developing recommendations on exemption nominations submitted in 2003 and 2004, the Technology and Economic Assessment Panel in some cases recommended that a Party should explore the use of particular alternatives not identified in a nomination' transition plans. Where the Party has subsequently taken steps to explore use of those alternatives, information should also be provided in this section on those steps taken.

Questions 5 - 9 should be completed where applicable to the nomination. Where a question is not applicable to the nomination, write "N/A".

6. TRIALS OF ALTERNATIVES

Where available, attach copies of trial reports. Where possible, trials should be comparative, showing performance of alternative(s) against a methyl bromide-based standard

(i) DESCRIPTION AND IMPLEMENTATION STATUS:

Sulfuryl fluoride

Past research has shown that sulfuryl fluoride can be effective against the adult, pupal, and larval stages of target insects, but less effective against the egg stage (Fields and White, 2002, Schneider *et al*., 2003). Preliminary tests with sulfuryl fluoride under vacuum have shown that this fumigant is comparable to methyl bromide in its ability to kill diapausing codling moth larvae inside walnuts (Leesch, undated). Methyl bromide fumigation of walnuts targets primarily diapausing codling moth larva because this is the most tolerant life stage that could infest the nut at harvest. While codling moth eggs have shown to be more tolerant than larvae to sulfuryl fluoride fumigation, they do not occur naturally on walnuts or almonds at the time of harvest (Wood, 1999; Zettler & Leesch, 2000; Zettler & Gill, undated). USDA/ARS researchers plan to continue testing the efficacy and practicality of using sulfuryl fluoride, relative to methyl bromide, to control post-harvest pests of nuts and dried fruit. Although sulfuryl fluoride appears to have the potential to provide effective and rapid vacuum fumigation of walnuts, similar data for dried fruit and dried beans are not currently available.

The California Date Commission in collaboration with Dow AgroSciences is currently testing sulfuryl fluoride as a methyl bromide replacement on dates. According to the Commission, preliminary results show that sulfuryl fluoride fumigation of dates, at concentrations at least twice the concentrations at which methyl bromide is used, resulted in less than adequate mortality of target insect eggs. The Commission considers that further increasing the sulfuryl fluoride concentrations until an effectiveness level is reached would make its use financially prohibitive for the industry. Final reports will be available later this year.

No efficacy data is readily available for sulfuryl fluoride on dried fruit. The California Dried Plum Board has expressed that, while sulfuryl fluoride appears to have potential as a methyl

bromide replacement, various technical and economic issues remain unresolved, and it is, therefore, too early to discuss plans for its adoption.

Sulfuryl fluoride is not registered for use on dried beans in the U.S.

Sulfuryl fluoride and propylene oxide

Wample (2006) is investigating the feasibility of using sequential or combined treatments with sulfuryl fluoride and propylene oxide (PPO) as a methyl bromide alternative for control of pest of stored products. It is anticipated that this line of research will determine if combinations of sulfuryl fluoride and PPO will be more efficacious and cost effective than methyl bromide, especially regarding the egg stage of several economically important insects that infest tree nuts and dried fruit.

Propylene Oxide

The U.S. EPA has established tolerances for propylene oxide on prunes, figs, and raisins. However, no comparative efficacy data for commodity fumigation seems to be currently available.

Vacuum

Exposure to vacuum in flexible PVC chambers ("cocoons") is being explored as a means to disinfest cowpeas, dried beans, and other legumes in storage, targeting mainly the cowpea weevil, *Callosobruchus maculatus* (Phillips *et al*., 2006).

Electromagnetic Energy

Ongoing research focusing on the technical feasibility of using radio frequency energy to control insect pests infesting in-shell walnuts is yielding promising results. Wang *et al.* (2006) have demonstrated that radio frequency treatment of walnuts can achieve 100% mortality of fifth-instar navel orangeworm larvae at an average walnut surface temperature of 60°C.

Phosphine

Most commodity operations in the U.S. currently use phosphine, alone and in combination, whenever feasible. Phosphine is suitable for fumigating commodities in storage, where fumigation time is not a factor, but it is generally too slow for treating large commodity volumes that need to be processed rapidly. Phosphine its also corrosive to certain metals, and this characteristic limits its use in some processing plants, especially those outfitted with electronic sorting and processing control equipment

(ii) OUTCOMES OF TRIALS: **(***Include any available data on outcomes from trials that are still underway. Where applicable, complete the table included at Appendix I identifying comparative disease ratings and yields with the use of methyl bromide formulations and alternatives*.)

See 6(i) above.

(iii) IMPACT ON CRITICAL USE NOMINATION/REQUIRED QUANTITIES: *(For example, provide advice on any reductions to the required quantity resulting from successful results of trials.)*

During the preparation of this nomination the USG has accounted for all identifiable means to reduce the request. Specifically, approximately 13 million kilograms of methyl bromide were requested by methyl bromide users across all sectors. USG carefully scrutinized requests and made subtractions to ensure that no growth, double counting, inappropriate use rates on a treated hectare basis was incorporated into the final request. Use when the requestor qualified under some other provision (QPS, for example) was also removed and appropriate transition given yields obtained by alternatives and the associated cost differentials, was factored in. As a result of all these changes, the USG is requesting roughly 1/3 of that amount.

Therefore, USG feels that no additional reduction in methyl bromide quantities is necessary, given the significant adjustments described above.

(iv) ACTIONS TO ADDRESS ANY DELAYS/OBSTACLES IN CONDUCTING OR FINALISING TRIALS:

The USG has the ability to authorize Experimental Use Permits (EUPs) for large scale field trials for methyl bromide alternatives. As with other activities connected with registration of a pesticide, the USG has no legal authority either to compel a registrant to seek an EUP or to require growers to participate.

As noted in our previous nomination, the USG provides a great deal of funding and other support for agricultural research, and in particular, for research into alternatives for methyl bromide. This support takes the form of direct research conducted by the Agricultural Research Service (ARS) of USDA, through grants by ARS and CSREES, by IR-4, the national USDA-funded project that facilitates research needed to support registration of pesticides for specialty crop vegetables, fruits and ornamentals, through funding of conferences such as MBAO, and through the land grant university system

7. TECHNOLOGY TRANSFER, SCALE-UP, REGULATORY APPROVAL FOR ALTERNATIVES

The USDA maintains an extensive technology transfer system, the Agricultural Extension Service. This Service is comprised of researchers at land grant universities, county extension agents, and private pest management consultants. In addition to these sources of assistance for technology transfer, there are trade organizations and grower groups, some of which are purely voluntary but most with some element of institutional compulsion, that exist to conduct research, provide marketing assistance, and to disseminate "best practices."

(i) DESCRIPTION AND IMPLEMENTATION STATUS:

Many of the USDA grants include technology transfer. Most of the recipients of grants typically accomplish this by extension education (publications, websites) and industry engagement via trade-shows and conferences. Several awardees will hold hands-on training and demonstrations.

(ii) OUTCOMES ACHIEVED TO DATE FROM TECHNOLOGY TRANSFER, SCALE-UP, REGULATORY APPROVAL:

See above.

(iii) IMPACT ON CRITICAL USE NOMINATION/REQUIRED QUANTITIES: (*For example, provide advice on any reductions to the required quantity resulting from successful progress in technology transfer, scale-up, and/or regulatory approval*.)

The USG has applied an aggressive transition rate which is reflected in the nomination amount and detailed in Appendix A.

During the preparation of this nomination the USG has accounted for all identifiable means to reduce the request. Specifically, approximately 13 million kilograms of methyl bromide were requested by methyl bromide users across all sectors. USG carefully scrutinized requests and made subtractions to ensure that no growth, double counting, inappropriate use rates on a treated hectare basis was incorporated into the final request. Use when the requestor qualified under some other provision (QPS, for example) was also removed and appropriate transition given yields obtained by alternatives and the associated cost differentials, was factored in. As a result of all these changes, the USG is requesting roughly 1/3 of that amount.

Therefore, USG feels that no additional reduction in methyl bromide quantities is necessary, given the significant adjustments described above.

(iv) ACTIONS TO ADDRESS ANY DELAYS/OBSTACLES:

The USG has the ability to authorize Experimental Use Permits (EUPs) for large scale field trials for methyl bromide alternatives. As with other activities connected with registration of a pesticide, the USG has no legal authority either to compel a registrant to seek an EUP or to require growers to participate.

No new applications for methyl bromide alternatives in post-harvest settings are pending review with EPA

As noted in our previous nomination, the USG provides a great deal of funding and other support for agricultural research, and in particular, for research into alternatives for methyl bromide. This support takes the form of direct research conducted by the Agricultural Research Service (ARS) of USDA, through grants by ARS and CSREES, by IR-4, the national USDA-funded project that facilitates research needed to support registration of pesticides for specialty crop vegetables, fruits and ornamentals, through funding of conferences such as MBAO, and through the land grant university system

8. COMMERCIAL SCALE-UP/DEPLOYMENT, MARKET PENETRATION OF ALTERNATIVES

(i) DESCRIPTION AND IMPLEMENTATION STATUS:

The issues are described in the National Management Strategy previously submitted.

(ii) IMPACT ON CRITICAL USE NOMINATION/REQUIRED QUANTITIES: (*For example, provide advice on any reductions to the required quantity resulting from successful commercial scale-up/deployment and/or market penetration*.)

The USG has applied an aggressive transition rate which is reflected in the nomination amount and detailed in Appendix A.

During the preparation of this nomination the USG has accounted for all identifiable means to reduce the request. Specifically, approximately 13 million kilograms of methyl bromide were requested by methyl bromide users across all sectors. USG carefully scrutinized requests and made subtractions to ensure that no growth, double counting, inappropriate use rates on a treated hectare basis was incorporated into the final request. Use when the requestor qualified under some other provision (QPS, for example) was also removed and appropriate transition given yields obtained by alternatives and the associated cost differentials, was factored in. As a result of all these changes, the USG is requesting roughly 1/3 of that amount.

Therefore, USG feels that no additional reduction in methyl bromide quantities is necessary, given the significant adjustments described above.

(iii) ACTIONS TO ADDRESS ANY DELAYS/OBSTACLES:

USG endeavors to identify methyl bromide alternatives to move them forward in the registration queue. However USG has no legal authority to compel registrations; it can only act on registrations requested by private entities. The timely submission of data to support a registration decision is at the sole discretion of the registrant.

No new applications for methyl bromide alternatives in post-harvest settings are pending review with EPA.

The USDA maintains an extensive technology transfer system, the Agricultural Extension Service. This Service is comprised of researchers at land grant universities and county extension agents in addition to private pest management consultants. In addition to these sources of assistance for technology transfer, there are trade organizations and grower groups, some of which are purely voluntary but most with some element of institutional compulsion, that exist to conduct research, provide marketing assistance, and to disseminate "best practices". The California Strawberry Commission is one example of such a grower group.

9. CHANGES TO TRANSITION PROGRAM

If the transition program outlined in the Party's original nomination has been changed, provide information on the nature of those changes and the reasons for them. Where the changes are significant, attach a full description of the revised transition program.

See Appendix A.

10. OTHER BROADER TRANSITION ACTIVITIES

Provide information in this section on any other transitional activities that are not addressed elsewhere. This section provides a nominating Party with the opportunity to report, where applicable, on any additional activities which it may have undertaken to encourage a transition, but need not be restricted to the circumstances and activities of the individual nomination. Without prescribing specific activities that a nominating Party should address, and noting that individual Parties are best placed to identify the most appropriate approach to achieve a swift transition in their own circumstances, such activities could include market incentives, financial support to exemption holders, labelling, product prohibitions, public awareness and information campaigns, etc.

These issues are discussed in the National Management plan for methyl bromide submitted previously.

PART D: REGISTRATION OF ALTERNATIVES

Progress in registration of a product will often be beyond the control of an individual exemption holder as the registration process may be undertaken by the manufacturer or supplier of the product. The speed with which registration applications are processed also can falls outside the exemption holder's control, resting with the nominating Party. Consequently, this section requests the nominating Party to report on any efforts it has taken to assist the registration process, but noting that the scope for expediting registration will vary from Party to Party.

11. PROGRESS IN REGISTRATION

Where the original nomination identified that an alternative's registration was pending, but it was anticipated that one would be subsequently registered, provide information on progress with its registration. Where applicable, include any efforts by the Party to "fast track" or otherwise assist the registration of the alternative.

The U.S. EPA has established tolerances for propylene oxide on prunes, figs, and raisins. However, at present, no similar MRLs have been in countries that constitute the main export market for these commodities.

Methyl bromide alternatives do have a fast track for registration in the U.S. EPA. However, before registering a new pesticide or *new use* for a registered pesticide, EPA must first ensure that the pesticide, when used according to label directions, can be used with a reasonable certainty of no harm to human health and without posing unreasonable risks to the environment. To make such determinations, EPA requires more than 100 different scientific studies and tests from applicants. Where pesticides may be used on food or feed crops, EPA also sets tolerances (maximum pesticide residue levels) for the amount of the pesticide that can legally remain in or on foods.

USG has no legal authority to compel registrations; it can only act on registrations requested by private entities. The timely submission of data to support a registration decision is at the sole discretion of the registrant.

12. DELAYS IN REGISTRATION

Where significant delays or obstacles have been encountered to the anticipated registration of an alternative, the exemption holder should identify the scope for any new/alternative efforts that could be undertaken to maintain the momentum of transition efforts, and identify a time frame for undertaking such efforts.

Methyl bromide alternatives have a fast track for registration in the U.S. EPA. However, before registering a new pesticide or *new use* for a registered pesticide, EPA must first ensure that the pesticide, when used according to label directions, can be used with a reasonable certainty of no harm to human health and without posing unreasonable risks to the environment. To make such determinations, EPA requires more than 100 different scientific studies and tests from applicants. Where pesticides may be used on food or feed crops, EPA also sets tolerances (maximum pesticide residue levels) for the amount of the pesticide that can legally remain in or on foods.

13. DEREGISTRATION OF ALTERNATIVES

Describe new regulatory constraints that limit the availability of alternatives. For example, changes in buffer zones, new township caps, new safety requirements (affecting costs and feasibility), and new environmental restrictions such as to protect ground water or other natural resources. Where a potential alternative identified in the original nomination's transition plan has subsequently been deregistered, the nominating Party would report the deregistration, including reasons for it. The nominating Party would also report on the deregistration's impact (if any) on the exemption holder's transition plan and on the proposed new or alternative efforts that will be undertaken by the exemption holder to maintain the momentum of transition efforts.

No chemicals have been de-registered. However, methyl bromide use on structures, commodities, and post harvest treatments was reregistered in the U.S. last year. The proposed mitigations for that reregistration include a fumigation management plan, treatment buffers to enhance worker safety and ventilation buffers to enhance bystander safety. The proposed buffers are based primarily on use rate, total amount of methyl bromide used, and the type and duration of aeration. The Reregistration Eligibility Decision for methyl bromide post harvest uses is available at: http://www.epa.gov/oppsrrd1/REDs/methyl_bromide_tred.pdf .

An additional complication in forecasting changes in the registration of alternatives is that under the US federal system individual states may impose restrictions above those imposed at the Federal level. Examples of these additional restrictions may include increasing buffer zones around facilities and chambers and requiring capture and destruction technology.

An additional complication in forecasting changes in the registration of alternatives is that under the US federal system individual states may impose restrictions above those imposed at the Federal level. Examples of these additional restrictions may include increasing buffer zones around facilities and chambers and requiring capture and destruction technology.

Part E: IMPLEMENTATION OF MBTOC/TEAP RECOMMENDATIONS

The Methyl Bromide Technical Options Committee and the Technology and Economic Assessment Panel may recommended that a Party explore and, where appropriate, implement alternative systems for deployment of alternatives or reduction of methyl bromide emissions.

Where the exemptions granted by a previous Meeting of the Parties included conditions (for example, where the Parties approved a reduced quantity for a nomination), the exemption holder should report on progress in exploring or implementing recommendations.

Information on any trialling or other exploration of particular alternatives identified in TEAP recommendations should be addressed in Part C.

14. USE/EMISSION MINIMISATION MEASURES

Where a condition requested the testing of an alternative or adoption of an emission or use minimisation measure, information is needed on the status of efforts to implement the recommendation. Information should also be provided on any resultant decrease in the exemption quantity arising if the recommendations have been successfully implemented. Information is required on what actions are being, or will be, undertaken to address any delays or obstacles that have prevented implementation.

The industry is committed to studying how to improve insect control with IPM strategies and sanitation and to further reduce the number of methyl bromide fumigations. They are also continuing to pursue research of heat treatments, sulfuryl fluoride, and other potential alternatives to maximize efficiency.

In addition, USDA has several grant programs that support research into overcoming obstacles that have prevented the implementation of methyl bromide alternatives. USEPA and USDA jointly fund an annual meeting on methyl bromide alternatives. At the 2006 MBAO meeting (November, Orlando, Florida) sessions were held to assess and prioritize research needs and to develop a use/emission minimization agenda for methyl bromide alternatives research. The 2007 MBAO meeting (October, San Diego, CA) further deliberations were held to discuss more specific measures. It may take several years for researchers to get funding to support these research goals.

The USG feels that no additional reduction in methyl bromide quantities is necessary, given the significant adjustments described above.

Part F: ECONOMIC FEASIBILITY

15. ECONOMIC INFEASIBILITY OF ALTERNATIVES – Methodology *(MBTOC will assess economic infeasibility based on the methodology submitted by the nominating Party. Partial budget analysis showing the operations' gross and net returns for methyl bromide and next best alternatives is a widely accepted approach. Analyses should be supported by discussions identifying which costs and revenues change and why. The following measures may be useful descriptors of the economic outcome using methyl bromide or alternatives. Parties may identify additional measures. Regardless of the methodology used, this section should explain why the calculated measures with the alternative are levels that indicate the alternative is not economically feasible. In the case of culturally significant artifacts economic assessment may not be practical.):*

The following measures or indicators may be used as a guide for providing such a description:

(a) The purchase cost per kilogram of methyl bromide and of the alternative;
(b) Gross and net revenue with and without methyl bromide, and with the next best alternative;
(c) Percentage change in gross revenues if alternatives are used;
(d) Losses per cubic meter relative to methyl bromide if alternatives are used;
(e) Losses per kilogram of methyl bromide requested if alternatives are used;
(f) Losses as a percentage of net cash revenue if alternatives are used;
(g) Percentage change in profit margin if alternatives are used.

MEASURES OF ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES

TABLE E 1. SUMMARY OF ECONOMIC REASONS FOR EACH ALTERNATIVE NOT BEING FEASIBLE OR AVAILABLE

NO.	METHYL BROMIDE ALTERNATIVE	ECONOMIC REASON (IF ANY) FOR THE ALTERNATIVE NOT BEING AVAILABLE	ESTIMATED MONTH/YEAR WHEN THE ECONOMIC CONSTRAINT COULD BE SOLVED
1	PHOSPHINE	Economic losses from additional production downtimes due to longer fumigation time and from capital expenditures required to adopt an alternative.	Economic losses due to downtime with phosphine are persistent.

Economic costs in the post-harvest uses of the commodity sector can be characterized as arising from three contributing factors. First, direct pest control costs increase in most cases because phosphine is more expensive due to increased labor time required for longer treatment time and increased number of treatments. Second, capital expenditures may be required to adopt phosphine for accelerated replacement of plant and equipment due to the corrosive nature of phosphine. Finally, additional production downtimes for the use of alternatives are unavoidable. Many facilities operate at or near full production capacity and alternatives that take longer than methyl bromide or require more frequent application can result in manufacturing slowdowns, shutdowns, and shipping delays. Slowing down production would result in additional costs to the methyl bromide users. The additional economic cost per 1000 m^3 was calculated if methyl bromide users had to replace methyl bromide with phosphine.

The four economic measures in Tables E.1 through E.3 were used to quantify the economic impacts to post-harvesting uses for commodities. The four economic measures are not independent of each other since they can be calculated from the same financial data. The measures are, however, supplementary to each other in evaluating the CUE applicant's economic viability. These measures represent different ways to assess the economic feasibility of methyl bromide alternatives for methyl bromide users.

Net revenue is calculated as gross revenue minus operating costs. This is a good measure as to the direct losses of income that may be suffered by the users. It should be noted that net revenue does not represent net income to the users. Net income, which indicates profitability of an operation of an enterprise, is gross revenue minus the sum of operating and fixed costs. Net income should be smaller than the net revenue measured in this analysis. We did not include fixed costs because it is often difficult to measure and verify.

A separate analysis was conducted for each sub-sector (described below), and in each case the least cost alternative fumigation system, based on phosphine, was found to be not economically feasible. Production downtime was estimated on average at 84 days per year and total capital expenditures for accelerated replacement of plant and equipment due to corrosive nature of phosphine was assumed to be $1,076 per 1000 m^3 with 10-years lifespan with 10% interest rate from the data provided by the CUE applicants for post-harvesting uses. The potential economic losses associated with the use of phosphine mainly originate from the cost of production delay. The estimated economic losses are shown in Tables E.1 through E.3. The estimated economic losses as a percentage of net revenue are over 100% for all the CUE applicants in the commodity sector, which results in negative net revenues with use of phosphine. The industries that use methyl bromide for commodity fumigation are, in general, subject to limited pricing power, changing market conditions, and government regulations. Companies within these industries operate in a highly competitive global marketplace characterized by high sales volume, low profit margins, and rapid turnover of inventories. In addition, companies of this type generally managed by producers' associations and therefore, making new capital investment is often difficult. The results suggest that phosphine is not economically viable as an alternative for methyl bromide.

Walnuts

The United States walnut industry operates almost entirely in California, where approximately 5,300 growers and 55 processors are located. Over the past six years, production averaged 323,000 short tons of walnuts per year on 87,820 hectares in California. The largest processor is the Diamond Cooperative facility in Stockton, California, through which 50 percent of all harvested walnuts in California pass. The other 50 independent handlers operate much smaller facilities that process the remaining 50 percent of California walnuts. The sale of walnuts to Europe accounts for one-fifth of all revenue. Both production and sales peak in the fall in anticipation of the holiday season in December. Fumigation of walnuts takes place during the entire year, but fumigation capacity is primarily a limiting factor immediately after harvest. Approximately 25 percent of walnuts are sold in the shell, and these are usually packed and shipped to European market within a couple of days of the initial fumigation treatment. The remaining 75 percent of walnuts are processed further to create a variety of packaged shelled products. These walnuts must be fumigated before they are put in long-term storage or continue

in the processing chain due to the key pests. The U.S. walnut industry already has replaced methyl bromide 70 percent with Eco2fume for in-storage fumigation. Diamond Cooperative has completely converted to using Eco2fume for in-storage fumigation.

The primary scenario for this analysis is based on the Diamond Cooperative facility for processing walnuts in the shell as the representative user using the existing phosphine capacity to treat all walnuts. Given the existing capacity of 1500 tons per day of processing walnuts in the shell, having to rely on phosphine alone would require an additional five days to treat walnuts in the shell. At the processing rate of one lot every five days with phosphine compared with 7-hour turn-around time currently achieved with methyl bromide under vacuum, the processing walnuts in the shell would be only 5 percent or fumigation chamber capacity would need to be expanded to approximately 20 times the existing capacity.

Alternatively, all the walnuts could be stored and processed. However, prices paid to growers would be reduced by the increased supply that would be forced onto the domestic market. Given that the nature of the demand for walnuts is inelastic, the impact of this supply increase is expected to result in a decrease in price to the growers. In addition to the price effect, there are increased costs from using phosphine. Additional expenditures are required to adopt phosphine for accelerated replacement of plant and electronic equipment due to the corrosive nature of phosphine. The net effect of price decreases and cost increases is shown in Table E.2.

Another scenario could represent the cost of building additional fumigation chambers, so that the same amount of commodity could be fumigated during the critical time period, and avoid commodity loss and price declines from missing key market windows. In case of the Diamond plant, it is estimated that a tank farm of ten 1-million pound capacity silos would be required to support substitution of phosphine for on-receipt fumigation of in-shell walnuts alone. The costs of these silos and fumigation chambers were not estimated due to lack of information, but the Diamond Cooperative indicates that there is no space for such a tank farm at the Diamond Cooperative facility, so an offsite location would have to be found; hence there would be the associated costs of land acquisition and development. An environmental impact study would also be required. The Diamond Cooperative estimates that at least three to five years would be required for permitting and development of an offsite fumigation facility.

Dried Fruit

California produces 99 percent of the domestic supply and 70 percent of the world's supply of dried plums. California also produces 99 percent of the domestic raisin crop, and 40 percent of world raisin production. California is responsible for nearly all of domestic fig production and 20 percent of global supply. The industry has already replaced 50% methyl bromide with phosphine in processing dried fruits.

The primary scenario for this analysis is based on the representative user using the existing phosphine capacity to treat all dried fruits. U.S. EPA reviewers estimated that having to rely on phosphine alone would require an additional 84 days to treat all dried fruits. In addition to the production loss, there are increased costs from using phosphine. Additional expenditures are required to adopt phosphine for accelerated replacement of plant and electronic equipment due to

the corrosive nature of phosphine. The net effect of production losses and cost increases is shown in Table E.3.

Dates

An economic analysis was not done for dates because there are no technically feasible alternatives for dates.

Dried Beans

An economic analysis was not done for dried beans because there are no technically feasible alternatives for dried beans.

THESE ANALYSES ASSUME ONE TREATMENT PER YEAR FOR METHYL BROMIDE AND PHOSPHINE

TABLE E 2: ANNUAL ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES FOR WALNUT

LOSS MEASURE	METHYL BROMIDE	PHOSPHINE
Total Commodity Treated (kg/1000 m³)	320,455	320,455
Average Market Price (US$/kg)	$ 1.16	$ 0.949
Gross Revenue (US$/1000 m³)	$ 370,766	$ 304,028
Operating Cost (a+b) per 1000 m³	$ 328,087	$ 328,149
a) Cost of MB or Alternative	$ 612	$ 459
b) Other Operating Costs	$ 327,475	$ 327,690
Net Revenue (US$/ha) (net of operating costs)	$ 42,680	$ (24,120)
LOSS MEASURES		
Time Lost (days)	0	84
Loss per 1000 m³ (US$/1000 m³)	$ -	$ 66,800
Loss per Kilogram MB (US$/kg)	$ -	$ 1,392
Loss as a % of Gross Revenue (%)	0%	18%
Loss as a % of Net Revenue (%)	0%	157%
Profit Margin (Net Revenue/Gross Revenue)	13.3%	-7.5%

Time lost with phosphine is assumed to result in a lower average market price for walnuts because less would be treated during peak prices, and increased supply at other times would depress off-peak prices.

TABLE E 3. ANNUAL ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES FOR DRIED FRUIT

LOSS MEASURE	METHYL BROMIDE	PHOSPHINE
Total Commodity Treated (kg/1000 m³)	88,235	63,529
Average Market Price (US$/kg)	$ 0.75	$ 0.75
Gross Revenue (US$/1000 m³)	$ 66,176	$ 47,647
Operating Cost (a+b) per 1000 m³	$ 61,741	$ 57,889
a) Cost of MB or Alternative	$ 413	$ 310
b) Other Operating Costs	$ 61,328	$ 57,579
Net Revenue (US$/ha) (net of operating costs)	$ 4,435	$ (10,242)
LOSS MEASURES		
Time Lost (days)	0	84
Loss per 1000 m³ (US$/1000 m³)	$ -	$ 14,677
Loss per Kilogram MB (US$/kg)	$ -	$ 612
Loss as a % of Gross Revenue (%)	0%	22%
Loss as a % of Net Revenue (%)	0%	331%
Profit Margin (Net Revenue/Gross Revenue)	5%	-16.8%

Time lost with phosphine is assumed to reduce the total commodity that could be treated.

Part G: CHANGES TO QUANTITY OF METHYL BROMIDE REQUESTED

This section seeks information on any changes to the Party's requested exemption quantity.

16. CHANGES IN USAGE REQUIREMENTS

Provide information on the nature of changes in usage requirements, including whether it is a change in dosage rates, the number of hectares or cubic metres to which the methyl bromide is to be applied, and/or any other relevant factors causing the changes.

The USG has applied an aggressive transition rate which is reflected in the nomination amount and detailed in Appendix A.

During the preparation of this nomination the USG has accounted for all identifiable means to reduce the request. Specifically, approximately 13 million kilograms of methyl bromide were requested by methyl bromide users across all sectors. USG carefully scrutinized requests and made subtractions to ensure that no growth, double counting, inappropriate use rates on a treated hectare basis was incorporated into the final request. Use when the requestor qualified under some other provision (QPS, for example) was also removed and appropriate transition given yields obtained by alternatives and the associated cost differentials, was factored in. As a result of all these changes, the USG is requesting roughly 1/3 of that amount.

The USG feels that no additional reduction in methyl is necessary.

17. RESULTANT CHANGES TO REQUESTED EXEMPTION QUANTITIES

TABLE G.1: RESULTANT CHANGES TO REQUESTED EXEMPTION QUANTITIES

QUANTITY REQUESTED FOR PREVIOUS NOMINATION YEAR:	58,921 kg
QUANTITY APPROVED BY PARTIES FOR PREVIOUS NOMINATION YEAR:	45,623 kg
QUANTITY REQUIRED FOR YEAR TO WHICH THIS REAPPLICATION REFERS:	43,007 kg

Part H: CITATIONS

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APPENDIX A: 2010 METHYL BROMIDE USAGE NEWER NUMERICAL INDEX EXTRACTED (BUNNI)

2010 Methyl Bromide Usage Newer Numerical Index - BUNNIE — Commodities

January 16, 2008	Region		California Bean Shippers	California Dried Plum Board	California Walnut Commission	California Date Commission	Sector Total	Notes
Dichotomous Variables	Currently Use Alternatives?		Yes	Yes	Yes	Yes		
	Pest-free Requirements?		Yes	Yes	Yes	Yes		
Other Issues	Frequency of Treatment of Product		1x per year	1x per year	1x per year	1x per year		
	Quarantine & Pre-Shipment Removed?		Yes	Yes	Yes	Yes		
Most Likely Combined Impacts (%)	Regulatory Issues (%)		0%	0%	0%	0%		
	Key Pest Distribution (%)		100%	100%	100%	100%		
	Total Combined Impacts (%)		**100%**	**100%**	**100%**	**100%**		
Most Likely Baseline Transition	(%) Able to Transition		0%	0%	0%	0%		
	Minimum # of Years Required		0	0	0	0		
	(%) Able to Transition per Year		**0%**	**0%**	**0%**	**0%**		
EPA Adjusted Use Rate (kg/1000m3)			**20**	**21**	**45**	**21**		
2010 Applicant Requested Usage	*Amount - Pounds*	*Pounds*	*16,187*	*45,000*	*250,000*	*7,637*	*318,824*	
	Volume - 1000ft³	*Pounds*	*5,560*	*30,000*	*88,333*	*5,901*	*129,794*	
	Rate (lb/1000ft³)	*Pounds*	*2.91*	*1.50*	*2.83*	*1.29*	*2*	
	Amount - Kilograms	Metric	**7,342**	**20,412**	**113,398**	**3,464**	**144,616**	
	Volume - 1000m³	Metric	157	850	2,501	167	3,675	
	Rate (kg/1000m³)	Metric	47	24	45	21	39	
EPA Preliminary Value		**kgs**	**7,070**	**18,234**	**45,401**	**3,016**	**73,721**	
EPA Baseline Adjusted Value has been adjusted for:			MBTOC Adjustments, QPS, Double Counting, Growth, Use Rate, Miscellaneous Adjustments, and Combined Impacts					
EPA Baseline Adjusted Value		kgs	1,984	15,664	23,349	2,009	43,007	
EPA Transition Amount		kgs	-	-	-	-	-	
EPA Amount of All Adjustments		**kgs**	**(5,086)**	**(2,570)**	**(22,052)**	**(1,007)**	**(30,714)**	
Most Likely Impact Value (kgs)		kgs	**1,984**	**15,664**	**23,349**	**2,009**	**43,007**	
		1000m³	**99**	**740**	**519**	**97**	**1,455**	
		Rate	**20**	**21**	**45**	**21**	**30**	
Sector Research Amount (kgs)			**-**	**2010 Total US Sector Nomination**			**43,007**	

1 Pound = 0.453592 kgs 1000 cubic feet= 0.028316847 1000 cubic meters