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DATE:	**FEBRUARY 24, 2004**
HOW TO NAME FILE:	**SECTOR-AUTHOR-DATE**

METHYL BROMIDE CRITICAL USE NOMINATION FOR POST HARVEST USE ON DRY CURED PORK PRODUCTS

FOR ADMINISTRATIVE PURPOSES ONLY: **DATE RECEIVED BY OZONE SECRETARIAT:** YEAR: CUN:

NOMINATING PARTY:	The United States of America (U.S.)
BRIEF DESCRIPTIVE TITLE OF NOMINATION:	Methyl Bromide Critical Use Nomination for Post Harvest Use on Dry Cured Pork Products

NOMINATING PARTY CONTACT DETAILS

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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

CONTACT OR EXPERT(S) FOR FURTHER TECHNICAL DETAILS

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

List all paper and electronic documents submitted by the Nominating Party to the Ozone Secretariat

1. PAPER DOCUMENTS: Title of Paper Documents and Appendices	Number of Pages	Date Sent to Ozone Secretariat

2. ELECTRONIC COPIES OF ALL PAPER DOCUMENTS: Title of Electronic Files	Size of File (kb)	Date Sent to Ozone Secretariat

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PART A: SUMMARY

1. NOMINATING PARTY

The United States of America

2. DESCRIPTIVE TITLE OF NOMINATION

Methyl Bromide Critical Use Nomination For Post Harvest Use on Dry Cured Pork Products

3. SITUATION OF NOMINATED METHYL BROMIDE USE

Curing is a method of preserving meat that prevents harmful micro-organisms from developing. Two curing methods have been developed – wet (or brine) curing and dry curing. In wet curing, the curing ingredients were mixed with boiling water to form "pickling" brine. In dry curing, the ingredients were simply rubbed into the meat several times over the period of the cure. This nomination is for dry cured pork products such as dry cured ham, dry cured country ham, hard salami, pepperoni, and sausage. Other types of preserved pork products are not included in this request.

Dry Curing Pork in the United States

Dry cured country hams are traditional in the southern part of the United States. Historically, this process was calendar based – beginning in the winter months and ending the following autumn. Pigs would be slaughtered and the ham curing process always started during the winter months. The cold winter temperatures would keep the meat cool enough to slow the growth of bacteria that would spoil the ham. Each ham was covered with a salt and sugar cure at least twice and stacked for the winter. In the spring, the ham was washed free of the salt and sugar cure, placed in a woven bag, and left to hang for the summer and into the fall. By late fall, the ham reached peak flavor and was ready for consumption.

Modern commercial production now uses environmentally controlled conditions that mimic the historical process and allows the manufacture of a consistently high quality product year round. Some processors, however, still chose to produce their cured meats in the traditional manner. The time required to cure hams vary from about 20 to more than 120 days. Key parameters in the curing process are temperature and relative humidity, both of which are controlled by air flow. In addition to curing, smoking may occur.

Curing facilities may be up to 2-3 stories in height and typically have curing rooms that use either wood or stainless steel racks to hang the hams. The curing rooms can hold up to 4000 hams.

Pest Pressure

It is common for producers of dry cured pork products to experience pest pressure from insects such as the ham skipper, the red legged ham beetle, and mites. These insects infest and feed on

meat as it cures and ages. Environmental conditions such as rain, temperature, and humidity in and around the curing facility influence the level of pest pressure. In general, higher temperature and humidity levels result in higher the pest pressure.

Steps in the Curing Process

Step 1 (Winter Room) -- Ham is typically salted and sugared using a dry rub method on Day 1 and Day 15. The temperature is approximately 38 degrees Fahrenheit with low humidity. Sometime between days 42 - 50, the salt and sugar are scraped and rubbed off of the ham.

In this room, the high salt content is sufficient to keep insect pest pressure to a minimum.

Step 2 (Spring Room) -- After being removed from the winter room, the hams are wrapped in cotton netting and placed in the spring room for only 10 -15 days. The temperature is approximately 50 - 55 degrees Fahrenheit at 50% humidity. The humidity is very important at this stage and it is monitored closely. Most hams are equalized in the spring room. Equalization is a process whereby the salt cure penetrates from the surface of the ham, through the skin, and to the inner portion of the ham.

There are no insect problems here due to the low temperature and the limited amount of time that the hams are in this room.

Step 3 (Summer or Aging Room) – Hams are next moved to the summer (or aging room) for up to 120 days. The temperature is maintained between 80 - 90 degrees Fahrenheit at 55% humidity. These conditions are very important to develop an intense, concentrated flavor and aroma.

As the ham ages, the moisture content of the ham will decrease, the salt content increases, and the chances of bacterial action become limited. If desired, smoking of the hams may occur here, or in a separate "smoke house".

Since the temperature and humidity are higher in this room, conditions are ideal for pest pressure. It is at this stage that the application of methyl bromide is necessary.

4. METHYL BROMIDE NOMINATED

TABLE 4.1: METHYL BROMIDE NOMINATED

YEAR	NOMINATION AMOUNT (KG)	NOMINATION VOLUME (1,000 M^3)
2006	**169,246**	**7043**

5. BRIEF SUMMARY OF THE NEED FOR METHYL BROMIDE AS A CRITICAL USE

The U.S. nomination is only for those facilities where the use of alternatives is not suitable. In U.S. pork processing plants that produce dry-cured pork products there are several factors that make the potential alternatives to methyl bromide unsuitable. These include:

- Pest control efficacy of alternatives: the efficacy of alternatives may not be comparable to methyl bromide, making these alternatives technically and/or economically infeasible.
- Geographic distribution of the facilities: Facilities included in this nomination are located in the southern U.S. where mild temperatures and high relative humidity result in key pest pressures that are moderate to severe. These ambient conditions require that pests be killed rather than merely driven out of the facility only to re-infest the facility after fumigation.
- Age and type of facility: older food processing facilities, especially those constructed of wood, experience more frequent and severe pest infestations that must be controlled by fumigation. In the United States it is usual for dry-cured processed pork to be produced in traditional facilities. These facilities are usually constructed of wood and many are decades old, if not older. Many newer facilities are constructed using the older facilities as models.
- Constraints of the alternatives: some types of commodities (e.g., those containing high levels of fats and oils) prevent the use of heat as an alternative because of its effect on the final product (e.g., rancidity). All of the pork products are relatively high fat products so rancidity would be a problem. In addition, using heat will alter the character of the final product, producing, for example, a cooked pork product rather than a dry-cured pork product with the attendant flavor differences. Further, the corrosive nature of phosphine on certain metals prevents its use in mechanical and electrical areas of the facilities.
- Transition to newly available alternatives: Sulfuryl fluoride recently received a Federal registration for certain commodities and structures, such as cereal mills. State registrations have not yet been issued, which limits the adoption of this alternative even for labeled products. At present, pork and pork products are not included among the legal uses of sulfuryl fluoride so this chemical is not an option for these facilities.
- Delay in plant operations: e.g., the use of some methyl bromide alternatives can add a delay to production by requiring additional time to complete the fumigation process. Production delays can result in significant economic impacts to the processors.

It is common for producers of cured pork products to experience pest pressure from insects such as the ham skipper, the red legged ham beetle, dermestid beetles, and mites. These insects infest and feed on meat as it cures and ages. Environmental conditions (temperature and humidity) in and around the facility strongly influence the level of pest pressure. Under favorable ambient conditions, such as those seen in silo curing, pest pressure increases and a regular fumigation schedule is recommended. In the U.S., the Food and Drug Administration (FDA) regulates the maximum levels of live or dead insects or insect parts that may be present in stored food products. Food commodities that exceed maximum limits allowed are considered adulterated by FDA and thus unfit for human consumption. There are currently no alternatives registered for use on hams in the U.S. that would provide the same level of pest control.

TABLE A.1: EXECUTIVE SUMMARY

	National Country Ham Association	*American Association of Meat Processors*	*Nahunta Pork Center*
AMOUNT OF NOMINATION			
2006 Kilograms	823	168,283	141
Application Rate (kg/1000 m^3)	25	24	20
Volume (1000 m^3)	32	7,004	7
AMOUNT OF APPLICANTS REQUEST			
2005 KILOGRAMS	1,922	168,283	145
APPLICATION RATE (KG/1000 M3)	25	24	20
VOLUME (1000 M3)	76	7,004	7
2006 KILOGRAMS	1,922	168,283	145
APPLICATION RATE (KG/1000 M3)	25	24	20
VOLUME (1000 M3)	76	7,004	7
ECONOMICS			
Marginal Strategy	No information was provided.	No information was provided.	No information was provided.
Time Lost			
Loss per 1000 m^3			
Loss per kg MB (US$/kg)			
Loss as % of Gross Revenue (%)			
Loss as % of Net Revenue (%)			

6. METHYL BROMIDE CONSUMPTION FOR PAST 5 YEARS AND AMOUNT REQUIRED IN THE YEAR(S) NOMINATED:

TABLE 6.1: METHYL BROMIDE CONSUMPTION FOR THE PAST 5 YEARS AND THE AMOUNT REQUIRED IN THE YEAR(S) NOMINATED

	Historical Use						Requested Use	
For each year specify:	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2005**	**2006**
Amount of MB (kg)	1,159	1,309	1,291	972	1,659	1,528	170,350	170,350
Volume Treated 1000 m³	50	53	52	41	48	43	7,087	7,087
Formulation of MB	Information not provided						Information not provided	
Dosage Rate (kg/1000 m³)	31	30	32	29	38	35	25	25
Actual (A) or Estimate (E)	Information not provided						Information not provided	

7. LOCATION OF THE FACILITIES WHERE THE PROPOSED CRITICAL USE OF METHYL BROMIDE WILL TAKE PLACE:

There more than 1,650 pork production facilities in the United States. Of these, approximately 850 facilities require the use of methyl bromide to fumigate dry cured pork products.

The specific name and physical address of each facility was not requested in the forms filled out by the applicants in the United States. However, general location information for the following facilities is known:

- Kentucky (Cadiz, Greenville)
- Missouri (California)
- North Carolina (Boone, Goldsboro, Smithfield, Wayne County)
- Virginia (Surry)
- Tennessee (Various locations)
- South Carolina (Various locations).

TABLE A.2 2005 SECTOR REQUEST*

2005 (Sector) Request		*National Country Ham Association*	*American Association of Meat Processors*	*Nahunta Pork Center*
Applicant Request for 2005	**KILOGRAMS**	1,922	168,283	145
	APPLICATION RATE (KG/1000 M3)	25	24	20
	VOLUME (1000 M3)	76	7,004	7

* See Appendix A for complete description of how the nominated amount was calculated.

TABLE A.3 2006 SECTOR NOMINATION

2006 (Sector) Nomination		*National Country Ham Association*	*American Association of Meat Processors*	*Nahunta Pork Center*
Applicant Request for 2006	**KILOGRAMS**	1,922	168,283	145
	APPLICATION RATE (KG/1000 M3)	25	24	20
	VOLUME (1000 M3)	76	7,004	7
CUE Nominated for 2006	**KILOGRAMS**	823	168,283	141
	APPLICATION RATE (KG/1000 M3)	25	24	20
	VOLUME (1000 M3)	32	7,004	7

2006 Sector Nomination Totals	Overall Reduction	**1%**
	Total 2006 U.S. Sector Nominated Kilograms (kg)	**169,246**

* See Appendix A for complete description of how the nominated amount was calculated.

PART B: SITUATION CHARACTERISTICS AND METHYL BROMIDE USE

8. KEY PESTS FOR WHICH METHYL BROMIDE IS REQUESTED:

TABLE 8.1: KEY PESTS FOR METHYL BROMIDE REQUEST

NO.	GENUS AND SPECIES FOR WHICH THE USE OF METHYL BROMIDE IS CRITICAL	COMMON NAME	SPECIFIC REASON WHY METHYL BROMIDE IS NEEDED
1	*Necrobia rufipes* – common pest	Red Legged Ham Beetle	The adults feed on the cured meat. The larvae burrow into the meat and/or fat. The larvae are commonly referred to as a "Ham Bore.r"
2	*Piophila casei* – common pest	Cheese/Ham Skipper	The Skippers are larval stages of small flies and they burrow into the cured meat.
3	*Dermestes* spp-common pests	Dermested beetles	
4	Mite species -- common pest	Ham Mites	The mites feed on the surface of the cured meat.

TABLE B.1: CHARACTERISTIC OF SECTOR

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Raw Material In	X	X	X	X	X	X	X	X	X	X	X	X
Fumigation Schedule (MB)	X	X	X	X	X	X	X	X	X	X	X	X
Retail Target Market Window	X	X	X	X	X	X	X	X	X	X	X	X

Raw pork product material can come into a curing facility in any month of the year.

The Methyl Bromide fumigation schedule will vary depending on several factors such as:

1. Type of pork product - Bone-in products have a higher probability of pest infestation since the pests are attracted to the bone, and they typically age for longer periods of time.

2. Type of structure/facility - Typically, older curing facilities have a higher probability of pest infestations, which could be attributed to the lack of air tightness of the facility. A majority of the newer facilities have lower pest pressure due to increased air tightness. Additionally, silo facilities, those that are two to three stories in height, have a higher probability of insect infestations when compared to a single story facility.

A single curing and ham storage operation can typically process 10,307,878 kilograms (11,362.5 U.S. tons) of pork products each year. The curing facilities are fumigated with methyl bromide when pests are detected in the product or the smokehouses. This fumigation typically occurs

about three to five times during a typical year. During this process, the smokehouse, typically small building (e.g. four stories), is covered with tarp and fumigated while full of hams.

3. Type of curing - Curing can be achieved by either temperature controlled room curing, or by ambient curing. Ambient curing, which involves uncontrolled environmental conditions, typically requires a regular fumigation schedule due to consistently high levels of pest infestations.

4. Location/climate of structure/facility - These curing facilities are located in southeastern states, where the temperature and humidity are higher for longer periods of time throughout the year. Therefore, there is a greater opportunity for pests to be active for longer periods of time. As the pest pressure increases, so does the need to fumigate with methyl bromide

The retail target market window varies, but there are higher demands for cured pork products around holidays such as Thanksgiving, Christmas, and Easter.

9. Summary of the Circumstances in which Methyl Bromide is Currently Being Used

Table 9.1(a.): Dry Cured Pork Products

Methyl Bromide Dosage (g/m^3)	Exposure Time (*hours*)	Temp. (^oC)	Number of Fumigations per Year	Proportion of Product Treated at this Dose	Fixed (F), mobile (M) or Stack (S)
32	Varies	Varies w/ facility, but typically in excess of 27 degrees C (80 degrees F)	Varies from 2-8 fumigations per year. 3-5 times per year common	Up to 100% in some facilities.	Fixed

Table 9.1(b.): Fixed Facilities

Type of Construction and Approximate Age in Years	Vol (m^3) or Range	Number of Facilities (e.g. 5 silos)	Gastightness Estimate*
More than 850 curing facilities use methyl bromide. The age of the facilities vary.	Varies	Ranges from 1 story to silo facilities.	Varies

10. List Alternative Techniques that are being Used to Control Key Target Pest Species in this Sector

Currently, no alternative techniques are being used.

PART C: TECHNICAL VALIDATION

11. SUMMARIZE THE ALTERNATIVE(S) TESTED STARTING WITH THE MOST PROMISING ALTERNATIVE(S):

The applicants have not provided test data on methyl bromide alternatives.

12. SUMMARIZE TECHNICAL REASONS, IF ANY, FOR EACH ALTERNATIVE NOT BEING FEASIBLE OR AVAILABLE FOR YOUR CIRCUMSTANCES (*For economic constraints, see Question 15*):

TABLE 12.1. SUMMARY OF TECHNICAL REASON FOR EACH ALTERNATIVE NOT BEING FEASIBLE OR AVAILABLE

NO.	METHYL BROMIDE ALTERNATIVE	TECHNICAL REASON (IF ANY) FOR THE ALTERNATIVE NOT BEING FEASIBLE	ESTIMATED MONTH/YEAR WHEN THE TECHNICAL CONSTRAINT COULD BE SOLVED
1	Phosphine alone & in combination	See **1 below	The applicants did not provide any information on this topic.
2	Propylene oxide	Not registered for this use in the U.S.	
3	Contact insecticides	None registered for this use in the U.S.	
4	Irradiation	See **4 below	
5	Sulfuryl fluoride	Not registered for this use. Sulfuryl fluoride adsorbs to proteins, so anticipated residues would likely be high.	

Further details on why an alternative was not technically feasible:

****1 – Phosphine alone and in combination** would disrupt the ham curing process. The process of fumigation and aeration with the application of methyl bromide requires approximately 24 hours. The process of fumigation and aeration with phosphine requires 4 – 5 days. The addition of 3 – 4 days in the fumigation process would delay all production cycles. The time difference can become significant when multiple 'lots' are cycling through the stages of the production process. A delay in a lot cycling out of the summer/aging room could lead to a back-up in a lot cycling out of the spring room to the summer/aging room.

Additionally, adoption of phosphine fumigation would require a substantial capital investment for fumigation chambers or gas-tight bins. In addition, corrosion problems (e.g. corrosion of copper alloys, electrical wiring, equipment, and lights) associated with phosphine fumigation for cured pork products would limit the long-term usefulness of this fumigant. The corrosion problems and development of resistance in target pests could be reduced by using low phosphine-high carbon dioxide-high temperature combination treatments, but adopting this method would require a high degree of technical skills which is not widely available. This fumigation method requires that the concentrations of carbon dioxide and phosphine and temperature be constantly monitored and adjusted, that the gases be uniformly distributed, that unexposed pockets do not occur, and that the analytical equipment used for these determinations be properly maintained, calibrated, and properly installed. Methyl bromide appears to be the only treatment that consistently provides the high degree of insect and mite control required in cured pork products which depend on rapid fumigation methods.

Several stored grain insects have already developed resistance to phosphine (Bell, 2000), and it is likely that resistance will continue to develop in other stored commodity pests, making its use a short-term solution.

****4 - Irradiation** does not readily kill exposed insects, but rather prevents further feeding and

reproduction. Although unable to feed or reproduce, the surviving insects would still create phytosanitary problems and the high doses required to kill exposed insects may affect product quality. Consumer acceptance of irradiated food would hinder the adoption of this method.

PART D: EMISSION CONTROL

13. HOW HAS THIS SECTOR REDUCED THE USE AND EMISSIONS OF METHYL BROMIDE IN THE SITUATION OF THE NOMINATION?

No information on how this sector has reduced the use and emission of methyl bromide was provided by the applicants.

PART E: ECONOMIC ASSESSMENT

14. COSTS OF ALTERNATIVES COMPARED TO METHYL BROMIDE OVER 3-YEAR PERIOD

(Provide an analysis of how these costs were estimated as a separate attachment):

No alternatives are currently registered for use on cured pork products in the U.S. therefore no economic analysis was conducted

TABLE 14.1 COSTS OF ALTERNATIVES COMPARED TO METHYL BROMIDE OVER A 3-YEAR PERIOD

No information was provided by the applicants.

15. SUMMARIZE ECONOMIC REASONS, IF ANY, FOR EACH ALTERNATIVE NOT BEING FEASIBLE OR AVAILABLE FOR YOUR CIRCUMSTANCES

TABLE 15.1. SUMMARY OF ECONOMIC REASONS FOR EACH ALTERNATIVE NOT BEING FEASIBLE OR AVAILABLE

No information was provided by the applicants.

MEASURES OF ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES

TABLE E.1: ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES

No information was provided by the applicants.

PART F: FUTURE PLANS

16. Provide a Detailed Plan Describing how the Use and Emissions of Methyl Bromide will be Minimized in the Future for the Nominated Use.

The U.S. wants to note that our usage rate is among the lowest in the world in requested sectors and represents efforts of both the government and the user community over many years to reduce use rates and emissions. We will continue to work with the user community in each sector to identify further opportunities to reduce methyl bromide use and emissions.

17. Provide a Detailed Plan Describing what Actions will be Undertaken to Rapidly Develop and Deploy Alternatives for this Use:

No alternatives have been researched.

18. Additional Comments

No additional comments were provided by the applicants.

19. Citations

Bell, C.H. 2000. Fumigation in the 21st Century. Crop Protection, 19:563-69.

APPENDIX A. 2006 Methyl Bromide Usage Numerical Index (BUNI).

Methyl Bromide Critical Use Exemption Process **Date:** 2/26/2004 **Average Volume in the US:** not available

2006 Methyl Bromide Usage Numerical Index (BUNI) **Sector:** HAM **% of Average Volume Requested:** not available

2006 Amount of Request				2001 & 2002 Average Use			Quarantine and Pre-Shipment	Regional Volume	
HAM ASSOCIATION	Kilograms (kgs)	Volume ($1000m^3$)	Use Rate ($kg/1000m^3$)	Kilograms (kgs)	Volume ($1000m^3$)	Use Rate ($kg/1000m^3$)		2001 & 2002 Average	% of Volume
NATIONAL COUNTRY HAM ASSOCIATION	1,922	76	25	1,430	38	37	0%	not available	not available
NAHUNTA PORK CENTER	145	7	20	163	7	23	0%	not available	not available
AMERICAN ASSOCIATION OF MEAT PROCESSORS	168,283	7,004	24	N/A	N/A	N/A	0%	not available	not available
TOTAL OR AVERAGE	170,350	7,087	23.15	1,593	45	30.36	0%	not available	not available

2006 Nomination Options	Subtractions from Requested Amounts (kgs)					Combined Impacts Adjustment (kgs)		MOST LIKELY IMPACT VALUE			
HAM ASSOCIATION	2006 Request	(-) Double Counting	(-) Growth or 2002 CUE Comparison	(-) Use Rate Difference	(-) QPS	HIGH	LOW	Amount (kgs)	Volume ($1000m^3$)	Use Rate ($kg/1000m^3$)	% Reduction
NATIONAL COUNTRY HAM ASSOCIATION	1,922	155	945	-	-	823	823	823	32	25	57%
NAHUNTA PORK CENTER	145	-	4	-	-	141	141	141	7	20	3%
AMERICAN ASSOCIATION OF MEAT PROCESSORS	168,283	-	-	-	-	168,283	168,283	168,283	7,004	24	0%
Nomination Amount	170,350	170,196	169,246	169,246	169,246	169,246	169,246	169,246	7,043	24	1%
% Reduction from Initial Request	0%	0%	1%	1%	1%	1%	1%	1%	1%		

Adjustments to Requested Amounts	Use Rate ($kg/1000m^3$)		(%) Key Pest Distribution		(%) Adopt New Fumigants		(%) Combined Impacts		Time, Quality, or Product Loss	Marginal Strategy
HAM ASSOCIATION	2006	Low	High	Low	High	Low	HIGH	LOW		
NATIONAL COUNTRY HAM ASSOCIATION	25	25	100	100	0	0	100%	100%		None
NAHUNTA PORK CENTER	20	20	100	100	0	0	100%	100%		None
AMERICAN ASSOCIATION OF MEAT PROCESSORS	24	24	100	100	0	0	100%	100%		None

Other Considerations	Dichotomous Variables (Y/N)			Other Issues			Economic Analysis			
HAM ASSOCIATION	Currently Use Alternatives?	Research / Transition Plans	Pest-free Market Requirement	Change from Prior CUE Request (+/-)	Verified Historic MeBr Use / State	Frequency of Treatment /Yr	Loss per 1000 m^3 (US$/1000m)	Loss per Kg of MeBr (US$/kg)	Loss as a % of Gross Revenue	Loss as a % of Net Operating Revenue
NATIONAL COUNTRY HAM ASSOCIATION	?	?	Yes	0	No	4x / year				
NAHUNTA PORK CENTER	?	?	Yes	0	No	4x / year				
AMERICAN ASSOCIATION OF MEAT PROCESSORS	?	?	Yes	0	No	4x / year				

Notes * Wayco Ham Co. and Ozark Country Hams are both a part of the National Country Ham Association, their volume is a part of double counting.

Conversion Units: 1 Pound = 0.453592 Kilograms 1,000 cu ft = 0.02831685 1,000 cubic meters

Footnotes for Appendix A:

Values may not sum exactly due to rounding.

1. **Average Volume in the U.S.** – Average Volume in the U.S. is the average of 2001 and 2002 total volume fumigated with methyl bromide in the U.S. in this sector (when available).
2. **% of Average Volume Requested** - Percent (%) of Average Volume Requested is the total volume in the sector's request divided by the Average Volume in the U.S. (when available).
3. **2006 Amount of Request** – The 2006 amount of request is the actual amount requested by applicants given in total pounds active ingredient of methyl bromide, total volume of methyl bromide use, and application rate in pounds active ingredient of methyl bromide per thousand cubic feet. U.S. units of measure were used to describe the initial request and then were converted to metric units to calculate the amount of the U.S. nomination.
4. **2001 & 2002 Average Use** – The 2001 & 2002 Average Use is the average of the 2001 and 2002 historical usage figures provided by the applicants given in kilograms active ingredient of methyl bromide, total volume of methyl bromide use, and application rate in kilograms active ingredient of methyl bromide per thousand cubic meters. Adjustments are made when necessary due in part to unavailable 2002 estimates in which case only the 2001 average use figure is used.
5. **Quarantine and Pre-Shipment** – Quarantine and pre-shipment (QPS) is the percentage (%) of the applicant's requested amount subject to QPS treatments.
6. **Regional Volume, 2001 & 2002 Average Volume** – Regional Volume, 2001 & 2002 Average Volume is the 2001 and 2002 average estimate of volume of methyl bromide used within the defined region (when available).
7. **Regional Volume, Requested Volume %** - Regional Volume, Requested Volume % is the volume in the applicant's request divided by the total volume fumigated with methyl bromide in the sector in the region covered by the request.
8. **2006 Nomination Options** – 2006 Nomination Options are the options of the inclusion of various factors used to adjust the initial applicant request into the nomination figure.
9. **Subtractions from Requested Amounts** – Subtractions from Requested Amounts are the elements that were subtracted from the initial request amount.
    10. **Subtractions from Requested Amounts, 2006 Request** – Subtractions from Requested Amounts, 2006 Request is the starting point for all calculations. This is the amount of the applicant request in kilograms.
    11. **Subtractions from Requested Amounts, Double Counting** - Subtractions from Requested Amounts, Double Counting is the estimate measured in kilograms in situations where an applicant has made a request for a CUE with an individual application while a consortium has also made a request for a CUE on their behalf in the consortium application. In these cases the double counting is removed from the consortium application and the individual application takes precedence.
    12. **Subtractions from Requested Amounts, Growth or 2002 CUE Comparison** - Subtractions from Requested Amounts, Growth or 2002 CUE Comparison is the greatest reduction of the estimate measured in kilograms of either the difference in the amount of methyl bromide requested by the applicant that is greater than that historically used or treated at a higher use rate or the difference in the 2006 request from an applicant's 2002 CUE application compared with the 2006 request from the applicant's 2003 CUE application.
    13. **Subtractions from Requested Amounts, QPS** - Subtractions from Requested Amounts, QPS is the estimate measured in kilograms of the request subject to QPS treatments. This subtraction estimate is calculated as the 2006 Request minus Double Counting, minus Growth or 2002 CUE Comparison then multiplied by the percentage subject to QPS treatments. *Subtraction from Requested Amounts, QPS = (2006 Request – Double Counting – Growth)*(QPS %)*
    14. **Subtraction from Requested Amounts, Use Rate Difference** – Subtractions from requested amounts, use rate difference is the estimate measured in kilograms of the lower of the historic use rate or the requested use rate. The subtraction estimate is calculated as the 2006 Request minus Double Counting, minus Growth or 2002 CUE Comparison, minus the QPS amount, if applicable, minus the difference between the requested use rate and the lowest use rate applied to the remaining hectares.
15. **Adjustments to Requested Amounts** – Adjustments to requested amounts were factors that reduced to total amount of methyl bromide requested by factoring in the specific situations were the applicant could use alternatives to methyl bromide. These are calculated as proportions of the total request. We have tried

to make the adjustment to the requested amounts in the most appropriate category when the adjustment could fall into more than one category.

16. **Use Rate kg/ 1000 m^3 2006** – Use rate in pounds per thousand cubic feet, 2006, is the use rate requested by the applicant as derived from the total volume to be fumigated divided by the total amount (in pounds) of methyl bromide requested.
17. **Use Rate kg/ 1000 m^3 low** – Use rate in pounds per thousand cubic feet, low, is the lowest historic use rate reported by the applicant. The use rate selected for determining the amount to nominate is the lower of this rate or the 2006 use rate (above).
18. **(%) Key Pest Impacts** - Percent (%) of the requested area with moderate to severe pest problems. Key pests are those that are not adequately controlled by MB alternatives. For structures/ food facilities and commodities, key pests are assumed to infest 100% of the volume for the specific uses requested in that 100% of the problem must be eradicated.
19. **Adopt New Fumigants (%)** – Adopt new fumigants (%) is the percent (%) of the requested volume where we expect alternatives could be adopted to replace methyl bromide during the year of the CUE request.
20. **Combined Impacts (%)** - Total combined impacts are the percent (%) of the requested area where alternatives cannot be used due to key pest, regulatory, and new fumigants. In each case the total area impacted is the conjoined area that is impacted by any individual impact. The effects were assumed to be independently distributed unless contrary evidence was available (e.g., affects are known to be mutually exclusive).

21. **Qualifying Volume** - Qualifying volume (1000 cubic meters) is calculated by multiplying the adjusted volume by the combined impacts.
22. **CUE Nominated amount** - CUE nominated amount is calculated by multiplying the qualifying volume by the use rate.
23. **Percent Reduction** - Percent reduction from initial request is the percentage of the initial request that did not qualify for the CUE nomination.
24. **Sum of CUE Nominations in Sector** - Self-explanatory.
25. **Total U.S. Sector Nomination** - Total U.S. sector nomination is the most likely estimate of the amount needed in that sector.
26. **Dichotomous Variables** – dichotomous variables are those which take one of two values, for example, 0 or 1, yes or no. These variables were used to categorize the uses during the preparation of the nomination.
    27. **Currently Use Alternatives** – Currently use alternatives is 'yes' if the applicant uses alternatives for some portion of pesticide use on the crop for which an application to use methyl bromide is made.
    28. **Research/ Transition Plans** – Research/ Transition Plans is 'yes' when the applicant has indicated that there is research underway to test alternatives or if applicant has a plan to transition to alternatives.
    29. **Pest-free Market. Required** - This variable is a 'yes' when the product must be pest-free in order to be sold either because of U.S. sanitary requirements or because of consumer acceptance.
30. **Other Issues**.- Other issues is a short reminder of other elements of an application that were checked
    31. **Change from Prior CUE Request**- This variable takes a '+' if the current request is larger than the previous request, a '0' if the current request is equal to the previous request, and a '-' if the current request is smaller that the previous request. If the applicant has not previously applied the word 'new' appears in this column.
    32. **Verified Historic Use/ State**- This item indicates whether the amounts requested by administrative area have been compared to records of historic use in that area.
    33. **Frequency of Treatment** – This indicates how often methyl bromide is applied in the sector. Frequency varies from multiple times per year to once in several decades.
34. **Economic Analysis** – provides summary economic information for the applications.
    35. **Loss per 1000 m^3** – This measures the total loss per 1000 m^3 of fumigation when a specific alternative is used in place of methyl bromide. Loss comprises both the monetized value of yield loss (relative to yields obtained with methyl bromide) and any additional costs incurred through use of the alternative, such as longer time spent in the fumigation chamber. It is measured in current U.S. dollars.
    36. **Loss per Kilogram of Methyl Bromide** – This measures the total loss per kilogram of methyl bromide when it is replaced with an alternative. Loss comprises both the monetized value of yield loss (relative to yields obtained with methyl bromide) and any additional costs incurred through use of the alternative. It is measured in current U.S. dollars.

37. **Loss as a % of Gross revenue** – This measures the loss as a proportion of gross (total) revenue. Loss comprises both the monetized value of yield loss (relative to yields obtained with methyl bromide) and any additional costs incurred through use of the alternative. It is measured in current U.S. dollars.
38. **Loss as a % of Net Operating Revenue** -This measures loss as a proportion of total revenue minus operating costs. Loss comprises both the monetized value of yield loss (relative to yields obtained with methyl bromide) and any additional costs incurred through use of the alternative. It is measured in current U.S. dollars. This item is also called net cash returns.

39. **Quality/ Time/ Market Window/Yield Loss (%)** – When this measure is available it measures the sum of losses including quality losses, non-productive time, missed market windows and other yield losses when using the marginal strategy.
40. **Marginal Strategy** -This is the strategy that a particular methyl bromide user would use if not permitted to use methyl bromide.

APPENDIX C. SUMMARY OF NEW APPLICANTS

A number of new groups applied for methyl bromide for 2005 during this application cycle, as shown in the table below. Although in most cases they represent additional amounts for sectors that were already well-characterized sectors, in a few cases they comprised new sectors. Examples of the former include significant additional country (cured, uncooked) ham production; some additional request for tobacco transplant trays, and very minor amounts for pepper and eggplant production in lieu of tomato production in Michigan.

For the latter, there are two large requests: cut flower and foliage production in Florida and California ('Ornamentals') and a group of structures and process foods that we have termed 'Post-Harvest NPMA' which includes processed (generally wheat-based foods), spices and herbs, cocoa, dried milk, cheeses and small amounts of other commodities. There was also a small amount requested for field-grown tobacco.

The details of the case that there are no alternatives which are both technically and economically feasible are presented in the appropriate sector chapters, as are the requested amounts, suitably adjusted to ensure that no double-counting, growth, etc. were included and that the amount was only sufficient to cover situations (key pests, regulatory requirements, etc.) where alternatives could not be used.

The amount requested by new applicants is approximately 2.5% of the 1991 U.S. baseline, or about 1,400,000 pounds of methyl bromide, divided 40% for pre-plant uses and 60% for post-harvest needs.

The methodology for deriving the nominated amount used estimates that would result in the lowest amount of methyl bromide requested from the range produced by the analysis to ensure that adequate amounts of methyl bromide were available for critical needs. We are requesting additional methyl bromide in the amount of about 500,000 Kg, or 2% or the 1991 U.S. baseline, to provide for the additional critical needs in the pre-plant and post-harvest sector.

Applicant Name	2005 U.S. CUE Nomination (lbs)
California Cut Flower Commission	400,000
National Country Ham Association	1,172
Wayco Ham Company	39
California Date Commission	5,319
National Pest Management Association	319,369
Michigan Pepper Growers	20,904
Michigan Eggplant Growers	6,968
Burley & Dark Tobacco Growers USA - Transplant Trays	2,254
Burley & Dark Tobacco Growers USA - Field Grown	28,980
Virginia Tobacco Growers - Transplant Trays	941
Michigan Herbaceous Perennials	4,200

Ozark Country Hams	240
Nahunta Pork Center	248
American Association of Meat Processors	296,800
Total lbs	**1,087,434**
Total kgs	**493,252**