NOMINATING PARTY: THE UNITED STATES OF AMERICA

FILE NAME: USA CUN11 SOIL **ORNAMENTALS** Open Field

BRIEF DESCRIPTIVE TITLE OF NOMINATION:
Methyl Bromide Critical Use Nomination for Preplant Soil Use for Ornamentals Grown in Open Fields (Submitted in 2009 for 2011 Use Season)

CROP NAME: Ornamentals Open Field

QUANTITY OF METHYL BROMIDE REQUESTED:

TABLE 1: QUANTITY OF METHYL BROMIDE REQUESTED IN EACH YEAR OF NOMINATION

Year	NOMINATION AMOUNT
2011	**70,178 kilograms**

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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. ■ ***Yes*** ☐ *No*

______________________ ______________________ ______________

Signature Name Date

Title: ____

(Details on this page are 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.

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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 CUN11 SOIL ORNAMENTALS Open Field	20	
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 CUN11 SOIL ORNAMENTALS Open Field		

* Identical to paper documents

METHYL BROMIDE CRITICAL USE RENOMINATION FOR PREPLANT SOIL USE (OPEN FIELD OR PROTECTED ENVIRONMENT)

ORNAMENTALS

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

This renomination is for methyl bromide for the production of ornamentals. The ornamental sector consists of cut flowers, cut greens, and bulbs in California; floriculture in Florida; and hybrid anemones and ranunculus in New York. All data comes from the applicants' requests unless otherwise cited.

California
Ornamental growers in California have a demonstrated critical need for methyl bromide in 2011. Alternatives are not available due to regulatory constraints. Iodomethane is not currently registered in California, and its future registration status is uncertain. Furthermore, many alternative fumigant regimens contain 1,3-dichloropropene and/or chloropicrin; these active ingredients are severely restricted by California state and local laws which effectively prevent their use as methyl bromide alternatives for ornamental cultivation. Restrictions on chloropicrin also means the lowest formulation of methyl bromide used in California is 67:33 (methyl bromide: chloropicrin), as rates of chloropicrin higher than 225 kg/ha are prevented by law and lower rates are ineffective for pest control.

Florida
Iodomethane is now a registered pesticide in Florida. Research results indicate that it is as efficacious as methyl bromide, facilitating a transition away from methyl bromide. However, few long-term trials have been conducted and serious concerns have been raised about application techniques and species-specific interactions. For instance, there have been no iodomethane trials to treat permanent post-rows using the "hot gas" method, which currently uses methyl bromide and chloropicrin (98:2 ratio), and is a common management practice for Florida ornamental growers. Until more studies have been done to address these concerns, there is a critical need for methyl bromide in 2011 as part of a multi-year transition to alternatives.

New York
The applicant in New York has a demonstrated critical needed for methyl bromide in the 2011 growing season, as many of the alternatives registered for open fields do not have a label allowing greenhouse usage, such as Telone (1,3-dichloropropene and chloropicrin) and Vapam (metam sodium). Furthermore, iodomethane is not registered in New York, and the possibility of its registration in the future is unknown. Steam sterilization appears to be the best pest control option; however, there is a lack of research and thus efficacy data on methyl bromide alternatives for ornamental growers using enclosures. Therefore, methyl bromide is a critical component of a multiyear transition process.

2. REASONS WHY ALTERNATIVES TO METHYL BROMIDE ARE NOT FEASIBLE

The adoption of alternatives to methyl bromide by the ornamentals sector is constrained by regulatory prohibitions, yield losses, and higher costs. Many of these restrictions vary by state. Additionally, some constraints apply to the entire ornamentals industry. A single grower may grow dozens of types of species and cultivars, each of which may experience different pest pressures. For example, a 2008 study in Florida found a significant difference between the pests of two cultivars of Delphinium and their pest loads (Rosskopf et al 2008). These differences may result in varying cultivar and species reactions to pest control measures, impacting an alternative's ability to control the entire pest spectrum.

California

In addition to federal regulations, the California Department of Pesticide Regulation (DPR) has implemented severe restrictions for soil fumigants, including larger buffer zone requirements and township caps, which limit the amount of each fumigant can be applied within a 36-mile area (Segawa et al 2005). If these restrictions were not in place, the best methyl bromide alternative for ornamental growers in California would be 1,3-D plus chloropicrin followed by metam sodium (James Gerik, personal communication). A recent study found that this fumigant combination was at least as efficacious as methyl bromide (Klose et al 2008). The state buffer and township cap regulations currently prevent the use of this alternative. Moreover, another recent study found that the most effective alternative treatments contain chloropicrin (Gerik et al 2002). However, any pesticide combinations including either 1,3-D or chloropicrin are subject to prohibitory regulations and cannot be considered currently available alternatives despite any proven efficacy.

Some alternatives that appear effective in research trials are not currently registered, including acrolein, DMDS, and iodomethane (Rosskopf et al 2007b). The future registration status of these products and other alternatives is unknown.

Florida

Iodomethane is now fully registered in Florida and recent research results showed it is at least as effective as methyl bromide for pest control in Florida ornamentals (Rosskopf et al 2006, Rosskopf et al 2007a, Rosskopf et al 2007b, Kokalis-Burelle et al 2006). However, no studies have been conducted on the same fields for more than two years, so long-term efficacy and application issues have yet to be fully identified and understood. Moreover, efficacy has varied between the species and cultivars tested in research trials; it is impossible to predict how each of the many species and cultivars of ornamentals would respond to iodomethane. Additionally, research is needed on the compatibility of iodomethane with 'hot gas' fumigant application currently used for methyl bromide; it is a common management method for ornamental growers.

The majority of methyl bromide alternatives research for ornamentals has been conducted in California (Rosskopf et al 2005). More studies are needed in order to understand the climate-specific constraints faced by Florida ornamental growers.

New York

The critical use nomination for the 2011 growing season is entirely in greenhouse production, which has unique constraints for pest control options compared to open field production. Many fumigant alternatives currently registered do not have a label for use in greenhouses, including 1,3-D and metam sodium. Iodomethane is not registered for any uses in New York and its future registration status is unknown.

Moreover, very little research is conducted on the efficacy of methyl bromide alternatives in greenhouses. As such, efficacy data obtained from field trials is not translatable into predicting how even the same cultivar or species would perform in greenhouse conditions.

Steam sterilization appears to be the best currently available alternative to methyl bromide for greenhouse production. While no regulations prevent the adoption of steam, the small size of the grower's operation necessitates that the margin of error for research testing is very small. Methyl bromide is therefore critical in the 2011 growing season to a multi-year transition.

For a more comprehensive list of methyl bromide alternatives and why they are not feasible for use in the ornamental sector due to technical and regulatory constraints, please see Appendix C.

3. IS THE USE COVERED BY A CERTIFICIATION STANDARD?

Methyl bromide is not used to meet a certification standard for ornamental production.

4. IF PART OF THE CROP AREA IS TREATED WITH METHYL BROMIDE, INDICATE THE REASON WHY METHYL BROMIDE IS NOT USED IN THE OTHER AREA, AND IDENTIFY WHAT ALTERNATIVE STRATEGIES ARE USED TO CONTROL THE TARGET PATHOGENS AND WEEDS WITHOUT METHYL BROMIDE THERE.

Methyl bromide is only being requested for ornamental crop acreage with demonstrated critical need and is not being requested for acreage that has had success with alternatives, such as caladiums in Florida.

Enclosures
Some ornamental growers using greenhouses have had success controlling pests with substrates. Crops successfully grown in soilless media include roses, gerbera, lilies, and tulips. However, even substrates are fumigated after multiple cropping seasons to control diseases such as *Pythium* and continue using the substrate, which must be reused in order for the cropping system to be cost effective. Certain crops actually experience yield or quality gains when grown in substrates, such as roses; however, for most crops there is not such a gain to offset the increased costs associated with substrate production. Soilless media systems also require altered watering and fertilization management practices, which may incur additional costs. Ultimately, the use of

substrates requires greenhouses with benches, as opposed to growing crops in enclosures with open bottoms to the soil.

Steam sterilization has been adopted by some shade house and greenhouse growers to produce lilies. While steam is considered effective in controlling pests, there are many costs required to set up a steaming system within an existing enclosure structure. The cost of fuel required to heat soil beds uniformly also impacts the feasibility of steam sterilization. Some growers who attempted transitioning to steam sterilization switched back to fumigation due to application issues and additional costs.

Open Field
The U.S. does not have information about the proportion of ornamental or floriculture crops using alternatives to methyl bromide. It can be presumed that acreage not requesting methyl bromide has either transitioned to an alternative pesticide or does not have the same cropping practices or pest pressure as the applicants with critical use requests. For example, Easter lily growers in California now use 1,3-D and metam sodium applied sequentially instead of methyl bromide. However, these crops allow fallow periods between crops of more than 10 years, which is not feasible for other specialty growers due to limited land resources.

5. WOULD IT BE FEASIBLE TO EXPAND THE USE OF THESE METHODS TO COVER AT LEAST PART OF THE CROP THAT HAS REQUESTED USE OF METHYL BROMIDE? WHAT CHANGES WOULD BE NECESSARY TO ENABLE THIS?

No, it is not currently feasible to expand the use of alternative pest control measures to address the demonstrated critical needs of the ornamentals sector requesting methyl bromide for the 2011 growing season. Regulatory, technical, and economic barriers prevent their adoption and generally vary by state. Research to find efficacious, safe, and cost effective alternatives is ongoing.

California
State and local regulations would have to change in order for fumigants such as 1,3-D and chloropicrin to be adopted as methyl bromide alternatives. Other fumigants currently being tested may prove effective in research trials but lack registration in the state of California, such as iodomethane (Rosskopf et al 2007a). Furthermore, some fumigants considered effective in research trials for use in California lack both federal and state registration, including dimethyl disulfide and acrolein (Gerik and Wong 2008).

Florida
Research is needed in order to determine the long-term efficacy and cost issues associated with iodomethane adoption as a methyl bromide alternative. More research is also needed on nonfumigant alternatives. Critical use of methyl bromide could be further reduced by changing the label to allow concentrations lower than 98:2 (methyl bromide: chloropicrin) to be applied using the ‘hot gas’ method, which is a common management practice. Concentrations as low as 50:50 (methyl bromide: chloropicrin) have been found to achieved comparable control of nematodes and nutsedge as with the 98:2 formula (Noling et al 2001).

New York

Some fumigant alternatives available for open field ornamental growing are not registered for greenhouse use and as such cannot be used barring a change in their registration status. Research is needed to address the efficacy and cost issues associated with steam sterilization.

6. SUMMARY OF RECENT RESEARCH

CALIFORNIA

Rosskopf, EN; JS Gerik, NK Burelle, G Church, R McSorley. 2007. Status of methyl bromide alternatives for ornamental crop production in Florida and California. American Phytopathological Society Annual Meeting.

Midas 50:50 and 33:67 (iodomethane:chloropicrin) provided the best pest control in California.

FLORIDA

Rosskopf, Erin and Nancy Kokalis-Burelle. 2008. Area-wide demonstration of chemical alternatives to methyl bromide for Florida ornamentals. Proceedings of the Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions. http://mbao.org/2008/028Rosskopf.pdf

No significant difference between methyl bromide and iodomethane efficacy was observed in terms of weeds per acre, rogues per acre, labor hours, and number of root-knot nematodes per 100cc of soil.

7. ECONOMIC FEASIBILITY OF ALTERNATIVES

Please note that in this study 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 for an enterprise, is gross revenue minus the sum of operating and fixed costs. Net income is smaller than the net revenue measured in this study, often substantially so. We did not include fixed costs because they are difficult to measure and verify.

TABLE 2: CALIFORNIA CUT FLOWERS - CALLA LILY & RANUNCULUS - ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES

California Cut Flowers – Calla Lily & Bulbs	METHYL BROMIDE	1,3-D + Pic	Dazomet	Metam Sodium
YIELD LOSS (%)	0	25	25	20
YIELD PER HECTARE	55,937	41,952	41,952	44,749
* PRICE PER UNIT (U.S.$)	2.59	2.59	2.59	2.59
= GROSS REVENUE PER HECTARE (U.S.$)	145,107	108,830	108,830	116,086
- OPERATING COSTS PER HECTARE (U.S.$)	160,030	160,030	160,030	160,030
= NET OPERATING REVENUE PER HECTARE (U.S.$)	-14,923	-51,200	-51,200	-43,945
1. LOSS PER HECTARE (U.S.$)	0	36,277	36,277	29,021
2. LOSS PER KILOGRAM OF METHYL BROMIDE (U.S.$)	0	137	137	110
3. LOSS AS A PERCENTAGE OF GROSS REVENUE (%)	0	25	25	20
4. LOSS AS A PERCENTAGE OF NET OPERATING REVENUE (%)	0	-243	-243	-194

TABLE 3: NEW YORK ANEMONES - ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES *

NEW YORK CUT FLOWERS – ANEMONES	METHYL BROMIDE	STEAM	STEAM	STEAM
YIELD LOSS (%)	0	0	10	20
YIELD PER HECTARE	247,105	247,105	222,395	197,684
* PRICE PER UNIT (U.S.$)	3.75	3.75	3.75	3.75
= GROSS REVENUE PER HECTARE (U.S.$)	926,644	926,644	833,980	741,315
- OPERATING COSTS PER HECTARE (U.S.$)	34,595	115,781	115,781	115,781
= NET OPERATING REVENUE PER HECTARE (U.S.$)	892,050	810,863	718,199	625,534
1. LOSS PER HECTARE (U.S.$)	0	81,186	173,851	266,515
2. LOSS PER KILOGRAM OF METHYL BROMIDE (U.S.$)	0	110,86	237.38	364
3. LOSS AS A PERCENTAGE OF GROSS REVENUE (%)	0	8.8	18.8	29
4. LOSS AS A PERCENTAGE OF NET OPERATING REVENUE (%)	0	9.1	19.5	30

* Due to a lack of research on steam sterilization as a methyl bromide alternative for pre-plant fumigation for ornamentals in enclosures, yield loss estimates do not exist. Scenarios were therefore calculated with 0%, 10%, and 20% yield loss estimates.

TABLE 4: FLORIDA CUT FLOWERS - LILIES - ECONOMIC IMPACTS OF METHYL BROMIDE ALTERNATIVES

Florida Cut Flowers - Lilies	METHYL BROMIDE	IODOMETHANE + PIC (98:2)
YIELD LOSS (%)	0	0
YIELD PER HECTARE	31,135	31,135
* PRICE PER UNIT (U.S.$)	10	10
= GROSS REVENUE PER HECTARE (U.S.$)	311,353	311,353
- OPERATING COSTS PER HECTARE (U.S.$)	262,715	262,715
= NET OPERATING REVENUE PER HECTARE (U.S.$)	48,638	46,908
1. LOSS PER HECTARE (U.S.$)	0	1,730
2. LOSS PER KILOGRAM OF METHYL BROMIDE (U.S.$)	0	4
3. LOSS AS A PERCENTAGE OF GROSS REVENUE (%)	0	1
4. LOSS AS A PERCENTAGE OF NET OPERATING REVENUE (%)	0	4

Summary of Economic Feasibility

The economic analysis evaluated methyl bromide alternative control scenarios for cut flower production for California, New York, and Florida by comparing the economic outcomes of methyl bromide oriented production systems to those using alternatives. However, due to the fact that there are over 100 species of ornamentals grown in all regions of the country, the data from these examples are used to derive a proxy estimate for the entire industry. A major factor that affected this economic analysis as compared to the past economic analyses was the availability of iodomethane (registered in 2008) in Florida, but not in California and New York for use in ornamentals.

The economic factors that most influence the feasibility of methyl bromide alternatives for fresh cut flower production are: (1) yield losses, referring to reductions in the quantity produced, (2) increased production costs, which may be due to the higher-cost of using an alternative, additional pest control requirements, and/or resulting shifts in other production or harvesting practices, and (3) missed market windows due to plant back time restrictions, which also affect the quantity and price received for the goods.

The economic reviewers analyzed crop budgets for pre-plant sectors to determine the likely economic impact if methyl bromide were unavailable. Various measures were used to quantify the impacts, including the following:

(1) Loss per Hectare. For crops, this measure is closely tied to income. It is relatively easy to measure, but may be difficult to interpret in isolation.

(2) Loss per Kilogram of Methyl Bromide. This measure indicates the nominal marginal value of methyl bromide to crop production.

(3) Loss as a Percentage of Gross Revenue. This measure has the advantage that gross revenues are usually easy to measure, at least over some unit, e.g., a hectare of land or a storage operation. However, high value commodities or crops may provide high revenues but may also entail high

costs. Losses of even a small percentage of gross revenues could have important impacts on the profitability of the activity.

(4) Loss as a Percentage of Net Operating Revenue. We define net cash revenues as gross revenues minus operating costs. This is a very good indicator as to the direct losses of income that may be suffered by the owners or operators of an enterprise. However, operating costs can often be difficult to measure and verify.

These measures represent different ways to assess the economic feasibility of methyl bromide alternatives for methyl bromide users, who are producers in this case. Because producers (suppliers) represent an integral part of any definition of a market, we interpret the threshold of significant market disruption to be met if there is a significant impact on commodity suppliers using methyl bromide. The economic measures provide the basis for making that determination.

Several methodological approaches will help interpret the findings. Economic estimates were first calculated in pounds and acres and then converted to kilograms and hectares. Costs for alternatives are based on market prices for the control products multiplied by the number of pounds of active ingredient that would be applied. Baseline costs were based on the average number of annual applications necessary to treat cut flowers with methyl bromide.

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 study. Fixed costs were not included because they are difficult to measure and verify.

Loss per hectare measures the value of methyl bromide based on changes in operating costs and/or changes in yield. Loss expressed as a percentage of the gross revenue is based on the ratio of the revenue loss to the gross revenue, likewise for the loss as a percentage of net revenue. Yield loss estimates were based on data from the CUE applications and U.S. EPA data, as well as expert opinion.

Regulatory constraints

California restricts total use of 1,3-d, at the local level (township cap). Nematodes and weeds and pathogens are key pests in Florida and California bulb grower and are controlled with methyl bromide. Chloropicrin is not as effective in controlling weeds as methyl bromide. Using chloropicrin adds to production costs through increased chemical, weeding and labor costs.

Tables 2 though 4 provide a summary of the estimated economic losses. A measure of net revenue loss may not be completely accurate partly because some nurseries are publicly owned and seedling prices or production costs are subsidized. Indirect losses arising from shifts in the production cycle were not quantified. Changes in production costs arise due to differences between the costs of methyl bromide and the alternatives, shifts in the production cycle (increasing the frequency of fumigation or lengthening the fallow period) and additional expenses such as supplementary irrigation. These costs vary across regions.

As shown in Table 2, the alternatives to methyl bromide for California cut flower production impose significant economic impacts on the growers. Similarly, for New York anemones growers, steam sterilization as an alternative to methyl bromide results in substantial economic impacts (Table 3). However, in Florida where iodomethane is available for use in ornamentals, economic impacts of using iodomethane as an alternative to methyl bromide are small.

8. RESULTANT CHANGES TO REQUESTED EXEMPTION QUANTITIES

The USG has applied an aggressive transition rate which is reflected in the nomination amount and detailed in Table 5.

TABLE 5: NOMINATION AMOUNT

2011 Methyl Bromide Usage Newer Numerical Index (BUNNI)

Transition Use Reduction Description Spreadsheet

SECTOR		ORNAMENTALS			
		California Cut Flower Commission	New York Ornamentals	Florida Cut Flowers	Sector Total / Average
Quantity Requested for 2010:	Amount (kgs)	67,946	272	24,281	92,499
Quantity Recommended by MBTOC/TEAP for 2010 :	Amount (kgs)	57,963	74	24,281	82,318
Quantity Approved by Parties for 2010:	Amount (kgs)	57,963	74	24,281	82,318
	Area (ha)	290	0	121	411
	Rate	200	200	201	200
Transition from 2010 Baseline Adjusted Value	Percentage (%)	-15%	-73%	-70%	-37%
Quantity Required for 2011 Nomination:	Amount (kgs)	**57,963**	**74**	**12,141**	**70,178**
	Area (ha)	**290**	**0**	**61**	**351**
	Rate	**200**	**200**	**200**	**200**

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Rosskopf, EN; JS Gerik, NK Burelle, G Church, R McSorley. 2007b. Status of methyl bromide alternatives for ornamental crop production in Florida and California. American Phytopathological Society Annual Meeting.

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APPENDIX A: ORNAMENTAL SPECIES GROWN

The incredibly large and constantly changing number of species and cultivars grown in the ornamentals sector means that compiling a complete list of species and acreage grown is not possible. There are hundreds of types of cut flower, foliage, and bulb crops grown each year and often several species are grown in the same field simultaneously. However, the U.S. has tried to describe the major crops below. Additional information is not available from public or private sources.

California

APPENDIX B -TABLE 1: CALIFORNIA ORNAMENTALS - PRODUCTION OF MAJOR SPECIES

SPECIES	# FLOWER BUNCHES IN 2003
Alstroemeria	892,789
Carnations	1,694,870
Delphinium	3,617,186
Gladiolus	Data not released
Gerbera	62,638,650
Iris	5,823,242
Lilium	6,247,027
Chrysanthemums	1,273,742
Pompons	6,350,127
Roses	7,360,729
Snapdragons	2,976,219

APPENDIX B - TABLE 2: CALIFORNIA ORNAMENTALS - PARTIAL LISTING AND ESTIMATE OF CUT FLOWER AND FOLIAGE AREA PRODUCED IN CALIFORNIA IN 2002

CROP	AREA (USUALLY FIELD) - HA	AREA (USUALLY GREENHOUSE) - HA
Alstroemeria	8	5
Antirrhinum (snapdragon)	126	17
Aster		6
Calla lily	16	
Carnation	30	2
Chrysanthemum	88	28
Delphinium	22	
Eucalyptus	54	
Gerbera		21
Gypsophila	55	
Iris (Dutch)	18	
Larkspur	6	
Lilium	32	21
Limonium spp.	13	
Lisianthus	13	
Protea	190	
Rose	41	12
Stock (*Matthiola*)	26	
Wax flower	317	
Other	791	6
Greenhouse misc.	70	28
Field misc.	303	
Cut greens misc.	389	

Crop	Area (usually field) - ha	Area (usually greenhouse) - HA
Total	2609	145 ha

[1] Total does not add due to rounding.

Florida

The only three cut flower species identified by the Florida Agricultural Statistics Service are gladioli, lilies and snapdragon. These are assumed to have the highest acreage and they have been identified by the applicant as using methyl bromide.

Appendix B Table 3. Florida Ornamentals - Crop Production for Certain Cut Flower Species[2]

	2001		2002		2003	
Crop	# of producers	Quantity sold (1000 spikes)[1]	# of producers	Quantity sold (1000 spikes)[1]	# of producers	Quantity sold (1000 spikes)
Gladioli	4	40,331	4	49,581	4	39,444
Snapdragons	5	6,806	4	4,415	4	4,757
Lilies	4	3,031	3	2,257	-	-

[1] Quantity of lilies sold 1000 stems.
[2] This table only includes data for growers with sales over $100,000.

New York

The nomination is for methyl bromide critical use in New York is for hybrid anemones and ranunculus grown in greenhouses.

APPENDIX B: KEY TARGET PESTS

The ornamentals industry is complex; therefore, the following list is not comprehensive but is intended to demonstrate the large number of pests affecting ornamental production and creating a critical need for methyl bromide in the U.S. for the 2011 growing season.

APPENDIX B TABLE 1. KEY PESTS

Region where methyl bromide use is requested	**Key disease(s) and weed(s) to species and, if known, to level of race**	**Specific reasons why methyl bromide needed** (e.g. Effective herbicide available, but not registered for this crop; mandatory requirement to meet certification for disease tolerance; no host resistance for a specific race**)**
A: California Cut Flowers, Cut Greens and Perennials	*Verticillium* spp., *Fusarium* spp., *Pythium* spp., *Meloidogyne* spp., Nutsedge (*Cyperus* spp.), *Malva* spp., *Poa* spp., and previous crop propagules. Specific pest problems vary by individual crop and variety.	The diversity and complexity of the industry, makes it difficult to control all root pathogens and weeds with currently available pest control methods. Some methyl bromide alternatives used for other sectors are not feasible for floriculture due to high costs, difficulty timing applications to allow intercropping, and regulatory restrictions including township caps and buffer zone requirements.
B: Florida Floriculture	Soilborne diseases, weeds, and nematodes including *Fusarium* spp., *Rhizoctonia* spp., *Phytoplithora*, Stromatinia, *Pythium* spp., *Erwinia*, and most soil nematodes e.g. *Meliodogyne* spp., and previous crop propagules. Specific pest problems vary by individual crop and variety.	These diseases are common, abundant, and spread via water, exacerbated by Florida's regions of tropical and sub-tropical climates. Due to the complexity of the ornamentals sector, alternative pest control measures have not been found for all species but research efforts are ongoing. Iodomethane is now registered; however, other methyl bromide alternatives preliminarily considered effective, such as dimethyl disulfide, are not currently registered for use.
C. New York Anemones	Soil borne diseases and pests, including *Rhizoctonia*, *Pythium*, *Thielaviopsis*, nematodes, symphylids, and the Anthracnose fungus *Colletotrichum*	Infected corms from previous cropping cycles must also be controlled. Iodomethane is not registered, and other alternatives may be cost prohibitive or do not control the entire pest spectrum. Several methyl bromide alternatives considered effective and registered for open field use do not have labels for greenhouse use.

APPENDIX C: STATUS OF METHYL BROMIDE ALTERNATIVES

APPENDIX C TABLE 1. REASON FOR ALTERNATIVES N OT BEING FEASIBLE

NAME OF ALTERNATIVE	TECHNICAL AND REGULATORY* REASONS FOR THE ALTERNATIVE NOT BEING FEASIBLE OR AVAILABLE
1,3-Dichloropropene (1,3-D)	*Technical* Controls nematodes but will not provide adequate control of diseases and weeds at label rates. *Regulatory* Buffer zones limit its use and township caps in Florida and California further restrict its use in those states. Mandated plant-back times can be 1 to 2 weeks longer with 1,3-D than with other fumigants. 1,3-D is not registered for use in greenhouses.
Chloropicrin	*Technical* Weed control is poorer than with methyl bromide Control of the entire pest spectrum cannot be achieved with lower use rates, but there are concerns about phytotoxicity to nearby plantings if greater than 2% chloropicrin is used in a fumigant combination *Regulatory* There is concern over the real or perceived public exposure to higher rates of chloropicrin, especially in highly populated urban areas, due to increased worker exposure, offsite movement, and smells.
Metam sodium	*Technical* Efficacy data is inconsistent, depending on soil type, moisture content, and temperature. *Regulatory* Metam sodium is not registered for use in greenhouses.
Iodomethane	*Technical* More research needs to be done to understand application and long-term efficacy issues. *Regulatory* Iodomethane is not registered for use in California or New York. Large buffer zones may also prevent widespread adoption.
1,3-D + chloropicrin	*Technical* This alternative does not control the entire pest spectrum. *Regulatory* In California, 1,3-D + chloropicrin is considered one of tthe best currently available alternatives, if label application rates were increased Township caps and buffer zones that exist for the individual chemicals also apply for the combination.
Metam sodium + chloropicrin	*Technical* This combination does not adequately control nematodes and weeds, and performance is inconsistent. *Regulatory* Restrictions and concerns existing for the individual chemicals also apply for the combination.
1,3-D + metam sodium	*Technical* Efficacy data is inconsistent. *Regulatory* Restrictions for the individual chemicals also apply for the combinations.

NAME OF ALTERNATIVE	TECHNICAL AND REGULATORY* REASONS FOR THE ALTERNATIVE NOT BEING FEASIBLE OR AVAILABLE
1,3-D + chloropicrin + metam sodium	*Technical* Weed control is incomplete. *Regulatory* In California, 1,3-D + chloropicrin is considered the best currently available alternative, if use restrictions, such as township caps, were removed. Restrictions existing for the individual chemicals also apply for the combinations.
1,3-D + chloropicrin + herbicides	*Technical* None. *Regulatory* Restrictions existing for the individual chemicals also apply for combinations.
Dazomet	*Technical:* Dazomet does not control the entire pest spectrum unless in combination with 1,3-D, chloropicrin, and/or herbicides. *Regulatory:* Restrictions on 1,3-D and chloropicrin prevent the use of Dazomet as a methyl bromide alternative.
Metam sodium + crop rotation	*Technical* Treatment does not control the entire pest spectrum. *Regulatory* Restrictions existing for metam sodium also apply to its use in combination with other pest control measures.
Steam	*Technical* Steam sterilization is not feasible in open field production due to the need to remove the steam piping after application in order to accommodate cultural management practices. In greenhouses, steam has been successfully used in previous decades as a pest control method. *Regulatory* None.
Biological control agents	*Technical* No biological controls have been developed to cover all of the pests. *Regulatory* None.
Crop rotation	*Technical:* Previous crops' bulbs and corms often contaminate the following crop as volunteer weeds or reservoirs for pathogens. *Regulatory* None.
Herbicides	*Technical:* Crop damage may occur from contact with certain herbicides or in the following crop if soil residues remain. *Regulatory* Restrictions for registered pesticides vary depending on the active ingredient(s) and individual product labels.

NAME OF ALTERNATIVE	TECHNICAL AND REGULATORY* REASONS FOR THE ALTERNATIVE NOT BEING FEASIBLE OR AVAILABLE
Biofumigation	*Technica:l* Biofumigation is still largely in the experimental stages. Specific brassicas as well as specific years yield variable amounts of activity. While this alternative may provide some control, the control of all target pests is not sufficient. *Regulatory:* None.
Substrates	*Technical:* The use of substrates is only technically feasible in greenhouses using benches, *Regulatory* None.
Dimethyl disulfide (DMDS)	*Technical:* Studies are currently being conducted to test the efficacy of DMDS in ornamentals under an Experimental Use Permit. *Regulatory:* DMDS is not currently registered, and its future registration status is not known.
Acrolein	*Technical:* Studies are currently being conducted to determine the efficacy of acrolein for ornamentals. *Regulatory:* Acrolein is currently only registered as an aquatic herbicide and cannot be used on soil for this use. Its future registration status is unknown.
Propargyl bromide	*Technical:* More research is needed to understand its efficacy as a methyl bromide alternative. *Regulatory:* This alternative is not currently registered and its future regulatory status is unknown.
Sodium azide	*Technical:* More research is needed to understand its efficacy. *Regulatory:* This alternative is not currently registered and its future regulatory status is unknown.
Muscador albus Strain QST 20779	*Technical:* No commercially available formulation. *Regulatory:* None.
Ethane dinitrile (Cyanogen)	*Technical:* Considered a viable alternative in Australia, no studies have been conducted in the U.S. comparing efficacy with methyl bromide and other alternatives. *Regulatory:* This product is not currently registered in the U.S. and its future registration status is unknown.
Acidic electrolyzed oxidizing (EO) water	*Technical:* EO water only controls foliar fungal diseases in greenhouse ornamentals. No research has been conducted on this product as a pre-plant pesticide in at least 6 years. *Regulatory:* There is no commercial development or planned registration of this product currently.

NAME OF ALTERNATIVE	TECHNICAL AND REGULATORY* REASONS FOR THE ALTERNATIVE NOT BEING FEASIBLE OR AVAILABLE
Solarization	*Technical:* Efficacy data is inconsistent between research trials. Regional subclimates with significant cloud cover or cooler annual temperatures will not receive enough degrees for solarization to be a feasible pest control option. *Regulatory:* None.
Furfural	*Technical:* It does not control the entire pest spectrum. *Regulatory:* Furfural has a federal registration for ornamentals and non-food commodities for greenhouse soil use only. However, it does not have state registrations currently, and its future registration status is unknown..

Regulatory reasons include local restrictions (e.g. occupational health and safety, local environmental regulations) and lack of registration.