

**MONTREAL PROTOCOL  
ON SUBSTANCES THAT DEplete  
THE OZONE LAYER**



**UNEP**

**REPORT OF THE  
TECHNOLOGY AND ECONOMIC ASSESSMENT PANEL**

**OCTOBER 2005**

**EVALUATIONS OF 2005 CRITICAL USE NOMINATIONS FOR METHYL  
BROMIDE AND RELATED MATTERS**

**FINAL REPORT**



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On Substances that Deplete the Ozone Layer**

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UNEP Technology and Economic Assessment Panel

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METHYL BROMIDE AND RELATED MATTERS**

The text of this report is composed in Times New Roman.

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Reproduction: UNON Nairobi

Date: October 2005

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**ISBN: 92-807-2732-X**

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## **Acknowledgement**

The Technology and Economic Assessment Panel and its Methyl Bromide Technical Options Committee acknowledges with thanks the outstanding contributions from all of the individuals and organisations who provided support to Panel and Committee cochairs and members. The opinions expressed are those of the Panel and the Committee and do not necessarily reflect the reviews of any sponsoring or supporting organisation.

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## Glossary of Acronyms

1,3-D	1,3-dichloropropene
A5	Article 5(1) Party
CUE	Critical Use Exemption
CUN	Critical Use Nomination
EC	European Commission
EMOP	Extraordinary Meeting of the Parties
EPA	Environmental Protection Agency
EPPO	European Plant Protection Organisation
IPM	Integrated Pest Management
LBP	Low Permeability Barrier Film
MB	Methyl bromide
MBTOC	Methyl Bromide Technical Options Committee
MITC	Methyl isothiocyanate
MOP	Meeting of the Parties
MS	Metham sodium
Pic	Chloropicrin
QPS	Quarantine and Pre-shipment
SF	Sulfuryl fluoride
TEAP	Technology and Economics Assessment Panel
US	United States of America
VIF	Virtually Impermeable Film

## **1. Scope of this report**

This 2005 final report provides MBTOC/TEAP final evaluations on CUNs submitted by Parties in 2005, in accordance with the timetable set out in the Annex I referred to by Decision XVI/4. It includes evaluation of one CUN submitted in 2004, which was held over until 2005 for evaluation at the request of the nominating Party.

Additionally, this report contains a chapter on registration status of chemical alternatives to methyl bromide (MB) and of MB reregistration, addressing Decisions Ex. I/4(9,i) and Ex. I/4(9,j), and a work plan for MBTOC for 2006 as required under the Annex 1 referred to in Decision XVI/4. The work plan includes suggested changes to the standard presumptions used by MBTOC/TEAP in evaluations of CUNs.



## 2. Critical Use Nominations for Methyl Bromide

### 2.1 Introduction to MBTOC Evaluation of Critical Use Exemptions

#### 2.1.1 Mandate

Under Article 2H of the Montreal Protocol the production and consumption (defined as production plus imports minus exports) of methyl bromide is to be phased out in Parties not operating under Article 5(1) of the Protocol, by 1 January 2005. However, the Parties agreed to a provision enabling exemptions for those uses of methyl bromide that qualify as critical. Parties established criteria, under Decision IX/6 of the Protocol, which all such uses need to meet in order to be granted an exemption. The Decision IX/6 states:

1. *To apply the following criteria and procedure in assessing a critical methyl bromide use for the purposes of control measures in Article 2 of the Protocol:*
  - (a) *That a use of methyl bromide should qualify as “critical” only if the nominating Party determines that:*
    - (i) *The specific use is critical because the lack of availability of methyl bromide for that use would result in a significant market disruption; and*
    - (ii) *There are no technically and economically feasible alternatives or substitutes available to the user that are acceptable from the standpoint of environment and health and are suitable to the crops and circumstances of the nomination;*
  - (b) *That production and consumption, if any, of methyl bromide for critical uses should be permitted only if:*
    - (i) *All technically and economically feasible steps have been taken to minimise the critical use and any associated emission of methyl bromide;*
    - (ii) *Methyl bromide is not available in sufficient quantity and quality from existing stocks of banked or recycled methyl bromide, also bearing in mind the developing countries’ need for methyl bromide;*
    - (iii) *It is demonstrated that an appropriate effort is being made to evaluate, commercialise and secure national regulatory approval of alternatives and substitutes, taking into consideration the circumstances of the particular nomination and the special needs of Article 5 Parties, including lack of financial and expert resources, institutional capacity, and information. Non-Article 5 Parties must demonstrate that research programmes are in place to develop and deploy alternatives and substitutes. Article 5 Parties must demonstrate that feasible alternatives shall be adopted as soon as they are confirmed as suitable to the Party’s specific conditions and/or that they have applied to the Multilateral Fund or other*

*sources for assistance in identifying, evaluating, adapting and demonstrating such options;*

2. *To request the Technology and Economic Assessment Panel to review nominations and make recommendations based on the criteria established in paragraphs 1 (a) (ii) and 1 (b) of the present decision;*
3. *That the present decision will apply to Parties operating under Article 5 and Parties not so operating only after the phase-out date applicable to those Parties.*

Para. 2 of Decision IX/6 does not assign TEAP the responsibility for determining the existence of “significant market disruption” specified in paragraph 1(a)(i). TEAP assigned its Methyl Bromide Technical Options Committee (MBTOC) to determine whether there are *no technically and economically feasible alternatives or substitutes available to the user that are acceptable from the standpoint of environment and health and are suitable to the crops and circumstances of the nomination*, and to address the criteria listed in Decision IX/6 1(b).

All reviews of CUNs made in 2005 are to be in accordance with the ‘Annex I’ referred to in Decision XVI/4. This annex also sets out the schedule for the annual review of critical use nominations. In addition to the criteria for the evaluation provided in Decision IX/6, the Parties have given further guidance for the review of CUNs in Annex 1 of 16 MOP meeting report. Inter alia, this requires that TEAP and MBTOC provide a clear description of why any part of a nomination is not recommended, including references to the relevant studies used as the basis for such a decision. Para. 32 emphasises that exemptions must fully comply with Decision IX/6 and other relevant decisions, and are intended to be limited to the levels needed for critical use exemptions. These are considered as temporary derogations from the phaseout of methyl bromide in that they are to apply only until there are technically and economically feasible alternatives that otherwise meet the criteria in Decision IX/6, and that MBTOC should take a precise and transparent approach to the application of the criteria, having regard, especially, to paragraphs 4 and 20 of Annex I.

Paragraphs 4 and 20 read:

4. *Although the burden of proof remains with the Party to justify a request for a critical-use exemption, MBTOC will provide in its report a clear explanation of its operation with respect to the process of making determinations for its recommendations, and clearly state the approach, assumptions and reasoning used in the evaluation of the critical-use nominations. When cuts or denials are proposed, the description should include citations and also indicate where alternatives are technically and economically feasible in circumstances similar to those in the nomination, as described in decision Ex.1/5, paragraph 8.*
20. *In line with paragraph 4 above, in any case in which a Party makes a nomination which relies on the economic criteria of decision IX/6, MBTOC should, in its report, explicitly state the central basis for the Party’s economic*

*argument and explicitly explain how it addressed that factor, and, in cases in which MBTOC recommends a cut; MBTOC should also provide an explanation of its economic feasibility.*

## **2.2 Evaluations of CUNs – 2005 round for 2006 and 2007 exemptions**

MBTOC met 11-15 April 2005 in Buenos Aires, Argentina and for a second time in Melbourne, Australia, from 29 August to 2 September, 2005. These meetings were held as required by the time schedule for considerations of CUNs given in Annex I referred to in Decision XVI/4.

MBTOC made an initial assessment of the 62 new or additional critical use nominations for 2006 and 27 nominations for 2007, totalling 324.68 and 8088.32 metric tonnes respectively. Of the 89 new or supplementary CUNs considered during its April 2005 meeting in Buenos Aires, MBTOC was unable to assess 26 nominations. Some of the larger and more complex nominations were in this category. It did not recommend two nominations. MBTOC submitted questions relating to those nominations classified as 'unable to assess' in Buenos Aires that would assist their further evaluation during its September 2005 meeting in Melbourne. Two Parties made arrangements to meet with MBTOC during the Melbourne meeting for discussions with regard to their outstanding CUNs, in accordance with paragraph 8 of Annex 1 referred to in Decision XVI/4.

In paragraph 20 of Annex 1 referred to in Decision XVI/4, Parties, inter alia, specifically requested that MBTOC explicitly state the central basis for the Party's economic argument relating to CUNs. Table 4 provides this information for each CUN. MBTOC has sometimes suggested quantities of MB for 2006 or 2007 different from that nominated. Grounds used for these changes are given in detail after the relevant CUNs in Table 4. The adjustments follow the standard presumptions given in Tables 1 and 2, unless indicated otherwise.

In general, CUNs resulted mainly from the following issues: regulatory restrictions on alternatives, scale up of alternatives, and economic issues. For the most part technical alternatives exist, but often at a less developed state than methyl bromide. MBTOC has been unable to identify alternatives, or has inadequate information for the following applications: fresh high-moisture dates, some seeds when rapid turn around is required for immediate planting, cheese stores, dry cure ham treatment, and unmovable historical artefacts especially where fungi are of concern. The Parties are requested to consider focusing some research on these applications to identify and, where required, register effective alternatives.

Further to the normal Disclosure of Interest required under the TEAP/TOC terms of reference, MBTOC members made an additional disclosure relating specifically to their level of national, regional or enterprise involvement in the CUN process. This was required to ensure that those with a high level of involvement and interest in developing a particular nomination did not bias the process of evaluation through participation in the

detailed review. Some MBTOC members were disqualified from review of specific nominations as a result of this process.

A soil subcommittee in MBTOC considered the nominations relating to the use of MB for soil fumigation, while a post-harvest subcommittee considered the nominations relating to the use of MB for fumigation of commodities, structures and objects. Drafts arising from the subcommittees were considered in plenary. This report and decisions of the committee were by consensus, except for one particular issue on which agreement was not reached. A minority evaluation on this issue, relating to some portions of US CUNs for 2007 for cucurbits, eggplant, peppers, strawberry fruit and tomatoes, has been included below (Sect. 2.4.2).

As part of internal process of MBTOC, check-list style evaluation forms were generated to allow the Committee to assess the large number of nominations efficiently and equitably. These evaluation forms include the questions asked in the Handbook on Critical Use Exemptions for Methyl Bromide and relevant sections of guidance of the Parties, in particular, Decision IX/6. All nominations were treated similarly, independent of the size of the exemption requested. Specific circumstances of each nomination were taken into account.

The CUEs approved by 1EMOP and 16MOP for 2005 were used as the baseline data when considering CUNs for 2006. For those nominations relating to 2007 use the baseline was the most recent approval arising from 2EMOP, 1EMOP and/or 16MOP.

### **2.3 Critical Use Nominations Review**

In considering the CUNs submitted in 2005, MBTOC applied the standards contained in Annex I of 16MOP. In particular MBTOC sought to provide consistent treatment of CUNs within and between Parties while at the same time taking local circumstances into consideration for specific crops and situations, and to provide transparency in its processes and conclusions.

#### *2.3.1 Consideration of alternatives*

In considering alternatives to methyl bromide, MBTOC used the guidance given in Annex I where 'alternatives' were defined as any practice or treatment that can be used in place of methyl bromide. 'Existing alternatives' are those alternatives in present or past use in some regions; and 'potential alternatives' are those alternatives in the process of investigation or development. MBTOC also used information on the suitability of alternatives for a nomination by considering the commercial adoption of alternatives in regions nominating for CUNs. Also, adoption in regions with similar climatic zone and cropping practices was used as an indication of the feasibility (technical and economic) of an alternative in a particular region. For example, 1,3-dichloropropene/chloropicrin (1,3-D/Pic), metham sodium alone or in combination with Pic, dazomet, substrates and the use of resistant varieties (for solanaceous crops, melons and cucurbits) have been adopted to replace MB for several crops and in several regions where MB was once used.

MBTOC is ‘unable to assess’ nominations that do not explain why these major alternatives are unsuitable for the circumstances of a nomination.

In evaluating the CUNs for soil treatments, MBTOC assumed that a technically feasible alternative to MB would need to provide sufficient pest and weed control for continued production of that crop to existing market standards. For commodity and structural applications, it was assumed that a technically feasible alternative would provide disinfestation to a level that met the objectives of a MB treatment, e.g. meeting infestation standards in finished product from a mill. Technically feasible alternatives do not necessarily provide superior pest control results than are achieved in practice by MB.

### *2.3.2 Period of nominations*

CUNs in this report relate to CUEs sought for 2006 and 2007. No nominations in this particular round were submitted for longer periods.

One Party, in bilateral consultations with MBTOC, emphasised the need for CUEs for 2007 from this round in order to be able to complete their regulatory processes for allocations in that year. It also stated that the allocation process for MB use under a CUE allowed adjustment of the allocated quantity downwards as a result of developments in availability of alternatives subsequent to approval of particular amounts for a CUE by the Parties.

### *2.3.3 Plans to develop, register and deploy alternatives*

To qualify for a CUE, Decision IX/6 in part states that Parties must demonstrate that “...an appropriate effort is being made to evaluate, commercialise and secure national regulatory approval of alternatives and substitutes, taking into consideration the circumstances of the particular nomination...” and “...must demonstrate that research programmes are in place to develop and deploy alternatives and substitutes...”

In many nominations in the 2005 round, as in previous rounds, plans to identify alternatives were often not adequate and future plans to phase out MB were not given. As with the 2004 round, MBTOC did not use lack of phaseout plans as a basis to ‘not recommend’ a nomination.

Decision Ex. I/4 requires Parties that make “a critical-use nomination after 2005 to submit a national management strategy for phase-out of critical uses of methyl bromide to the Ozone Secretariat before 1 February 2006”. MBTOC awaits these reports. In this round of nominations, some Parties identified alternatives and reduced their nominations to allow for phase-in of alternatives. MBTOC did not reduce a Party’s requested amount for phase-in of alternatives without technical and economic evaluation and suitable justification.

MB is a mature technology and a considerable knowledge base exists for its use. On the other hand, many alternatives need continued efforts for correct and efficacious use and adaptation to local commercial circumstances. MBTOC incurred difficulties in assessing

nominations when there were insufficient published studies on alternatives, proven effective in other regions, conducted under local conditions. This leads to difficulties in true comparison of the feasibility of alternatives as the newer alternatives and their application may not be fully developed, may not have achieved economies of scale, and may have fewer years of documented pest control success. Some latitude is needed in evaluating the feasibility of alternatives to take this problem into account.

#### *2.3.4 Standard presumptions used in assessment of nominated quantities.*

The tables below (Tables 1,2) are explicit statements of standard presumptions applied by MBTOC/TEAP in assessing this round of CUNs, and both the 2004 and 2005 round of CUNs, where continued methyl bromide use is sought. Previous statements of these presumptions have been given in TEAP reports of October 2003, June 2004 and October 2004.

Proposed changes to these standard presumptions with supporting documentation are being provided in conformity with para. 2 of Annex 1 referred to in Decision XVI/ 4 for consideration at the 17MOP. The proposed changes are given in summary in the work plan for MBTOC for 2006 (Section 4.5).

The rates and practices adopted by MBTOC are, in general, conservative. For soil treatments, the dosage levels of methyl bromide given in these presumptions exceed that required in good agricultural practice in all but exceptional circumstances, particularly when used in conjunction with low gas permeability barrier films (LBF), such as various VIF and metallised barrier films (e.g. CANSLIT). To assist the adoption of lower dosage rates, researchers and extension specialists need to continue to build grower confidence in the effectiveness of lower dosage levels and optimise the methods for application of low permeability barrier films in the field. Practical permeabilities for low permeability barrier films are reported by suppliers and offer opportunities for different films with differing permeabilities and handling characteristics to suit particular applications whilst adequate retention of fumigant to permit lowered MB dosages.

Table 1. Standard presumptions used in assessment of CUNs – soil treatments.

	<b>Comment</b>	<b>CUN adjustment</b>	<b>Exceptions</b>
<b>1. Dosage rates</b>	Maximum guideline rates for MB:Pic 98:2 – 45 g/m <sup>2</sup> (cold, heavy soils) or 35 g/m <sup>2</sup> (sandy soils), both with barrier films (VIF or equivalent); for MB/Pic 67:33 - 20g MB/m <sup>2</sup> , under barrier films. Exceptionally, where VIF or equivalent is not feasible, maximum guideline rates for MB:Pic 98:2 – 60 g/m <sup>2</sup> . All rates on a 'per treated hectare' basis.	Amount adjusted to maximum guideline rates. Maximum rates set dependent on formulation and soil type and film availability.	Higher rates accepted if specified under national legislation or where the Party had justified otherwise.
<b>2. Barrier films</b>	All treatments to be carried out under low permeability barrier film (e.g. VIF)	Nomination reduced proportionately to conform to barrier film use.	Where barrier film prohibited or restricted by legislative or regulatory reasons
<b>3. MB/Pic Formulation: Pathogen control</b>	Unless otherwise specified, MB/Pic 50:50 (or similar) was considered to be the standard effective formulation for pathogen control, as a transitional strategy to replace MB/Pic 98:2.	Nominated amount adjusted for use with MB/Pic 50:50 (or similar).	Where MB/Pic 50:50 is not registered, or chloropicrin (Pic) is not registered
<b>4. MB/Pic Formulation: Weeds/nutgrass control</b>	Unless otherwise specified, MB/Pic 67:33 (or similar) was used as the standard effective formulation for control of resistant (tolerant) weeds, as a transitional strategy to replace MB/Pic 98:2.	Nominated amount adjusted for use with MB/Pic 67:33 (or similar).	Where chloropicrin or chloropicrin-containing mixtures are not registered
<b>5. Strip vs. Broadacre</b>	Fumigation with MB and mixtures to be carried out under strip	Where rates were shown in broadacre hectares, the CUN was adjusted to the MB rate relative to strip treatment (i.e. treated area). If not specified, the area under strip treatment was considered to represent 67% of the total area.	Where strip treatment was not feasible e.g. some protected cultivation or open field production of high health propagative material

Table 2. Standard presumptions used in assessment of CUNs – post-harvest treatments

	<b>Comment</b>	<b>CUN Adjustment</b>	<b>Exception</b>
<b>Dosage rate - structural</b>	20 g/m <sup>3</sup>	Nominations using higher dosage rates were reduced proportionally	Where approved label rates require higher dosage rate or where substantiated by the Party
<b>Dosage rate – commodities</b>	EPPO standard for bulk commodities as given in MBTOC (1994, 1998)	Nominations using higher dosage rates were reduced proportionally	Where approved label rates require higher dosage rates or where substantiated by the Party

### 2.3.5 Low permeability barrier films

Decision IX/6 states in part that critical uses should be permitted only if ‘all technically and economically feasible steps have been taken to minimise the critical use and any associated emission of methyl bromide’. In its evaluations, MBTOC assessed CUNs where possible for reductions in MB application rates and deployment of MB emission reduction technologies, such as use of low permeability barrier films, including VIF, or other appropriate sealing and emission control techniques.

Technical discussion on barrier films is given in MBTOC 2002 Assessment Report (MBTOC 2002). Results of some field experiments and demonstrations with low permeability barrier films are discussed in Section 2.3.6. The observations under field conditions with low permeability films, including VIF, support use of reduced dosages of methyl bromide compared with those used under normal polyethylene sheeting, without loss of effectiveness.

### 2.3.6 Adjustments for standard dosage rates

MBTOC assessed CUNs for appropriate MB application rates and deployment of MB emission reduction technologies, such as use of low permeability barrier films or appropriate sealing techniques.

Decision IX/6 requires that critical uses should be permitted only if ‘all technically and economically feasible steps have been taken to minimise the critical use and any associated emission of methyl bromide’. Decision Ex.II/1 also mentions emission minimization techniques, requesting Parties “...to ensure, wherever methyl bromide is authorized for critical-use exemptions, the use of emission minimization techniques such as virtually impermeable films, barrier film technologies, deep shank injection and/or other techniques that promote environmental protection, whenever technically and economically feasible.”

One key transitional strategy has been the adoption of MB:Pic formulations with lower concentrations of methyl bromide (e.g. MB:Pic 50:50 or less). These formulations are considered to be equally as effective in controlling soilborne pathogens as formulations containing higher quantities of methyl bromide (e.g. 98:2, 67:33) (e. g. Porter et al 1997; Melgarejo et al 2000; Lopez-Aranda et al 2003). Formulations containing high proportions of chloropicrin in mixtures with methyl bromide have been adopted widely by non-Article 5 countries to meet Montreal Protocol restrictions where such formulations are registered or otherwise permitted. Their use can be achieved with application machinery which allows co-injection of methyl bromide and chloropicrin or by use of premixed formulations.

In the soils sector, some CUNs still involve the use of MB with low or high density polyethylene sheeting (tarping). This process is known to lead to high rates of emission of MB in the absence of specific measures such as deep injection. MB use and emission rates can be reduced substantially through use of less pervious tarping (MBTOC, 2002), such as low permeability barrier films (LBF). Low permeability barrier films (e.g. VIF or equivalent), allows increased retention of MB, extended effective exposure periods for the pests, and effective reduced MB application rates compared with use of conventional sheeting. It has been long recognised that the use of low permeability barrier films coupled with reduced dosages effectively reduces methyl bromide emissions (e.g. Wang et al. 1997). Recent advancements in the cost and technical performance of barrier films have extended their suitability for use with methyl bromide and also some of the alternatives. The key advantage is that they allow for a substantial reduction in dosage rate of methyl bromide compared with the minimum effective rate under polyethylene film. Typically the reduction in effective methyl bromide dosage can be 25 – 50%, for both 98% methyl bromide and methyl bromide/chloropicrin formulations.

Table 3 reviews the relative effectiveness of different rates and formulations of methyl bromide under barrier films compared to standard commercial treatments under polyethylene. The references shown represent studies from 1998 to 2004 where barrier films (e.g. VIF) were compared to the standard MB/Pic using standard polyethylene film. The trials were conducted under a wide range of situations, but consistently show improved performance (reduced dosage and thus emissions) under barrier film without loss of effectiveness. The equivalent effectiveness of different dosages of MB under the barrier films compared to MB/Pic standard polyethylene treatment from Table 3 is plotted in Figure 1. It shows the scatter about the line of 100% relative effectiveness as expected from field data from biological/agricultural systems.

The use of low permeability barrier films, meeting VIF specifications is compulsory in the 25 member countries of the European Union (EC Regulation 2037/2000). The State of California in the US, however, prohibits the use of VIF (California Code of Regulations Title 3 Section 6450(e)) over concerns of possible worker exposure to MB when the film is removed or when seedlings are planted, and altered flux rates of MB in practice.

In 2003 (TEAP 2003), MBTOC/TEAP evaluations of CUNs used conservative maximum allowable dosage rates for use with standard films and barrier films. Since then, high levels of success have been demonstrated in many countries at lower rates of methyl bromide with barrier films. For this reason, new guidelines for reduced effective dosage rates with barrier films and standard films are being proposed in this TEAP report of October 2005 for consideration by the Parties at the 17MOP, as required by the Decision XIV/2.



Spain	Moncada	Strawb. Fruit	VIF - Not Spec	60	98:2	600												1998 No major pathogens but Fusarium buried 10cm&30cm.	Cebolla et al 1999
				54	98:2	600													
France	Douville	Strawb. Fruit	VIF - Not Spec	65	Not Spec	800			99									Inoculum not specified	Fritsch 1998
NZ	Havelock North	Strawb. Fruit	VIF - Not Spec	83	67:33	500												Phytophthora present	Horner 1999
USA	Florida	Pepper	VIF Plastopil	69	67:33	392												Nutgrass present	Gilreath et al 2005
			VIF Plastopil	69	67:33	392							78						
			VIF Vikase	69	67:33	392													
			VIF Vikase	69	67:33	392													
USA	Florida	Strawb Fruit, Cantaloupe	Barrier - Pliant, Metallised		98:2 67:33	Trials on 18 Commercial Farms between 2000-2004; no increase in disease or weeds when rates reduced up to 50% under VIF wrt. polyethylene											Nutgrass and pathogens present	Noling and Gilreath 2004	
USA	California	Strawb. Fruit	VIF - Not Spec	72	67:33	336												Inoculum not specified	Ajwa et al 2004
				80	67:33	392													
USA	Florida	Tomato	VIF - Not Spec	31	67:33	392												Nutgrass and rootknot nematodes	Hamill et al 2004
USA	California	Strawb. Fruit	VIF - Not Spec	75	67:33	392													
				83	67:33	392													
				65	67:33	392												Watsonville, high pathogen pressure	Ajwa et al 2003
USA	Florida	Tomato	VIF - Not Spec		67:33	392	"No significant reduction in yield"												Noling et al 2001
USA	California	Strawb. Fruit	VIF - Not Spec	45	67:33	364													
<b>Unweighted averages (relative % yield)</b>				66			94	99	93	93		102		103	108	104	91		

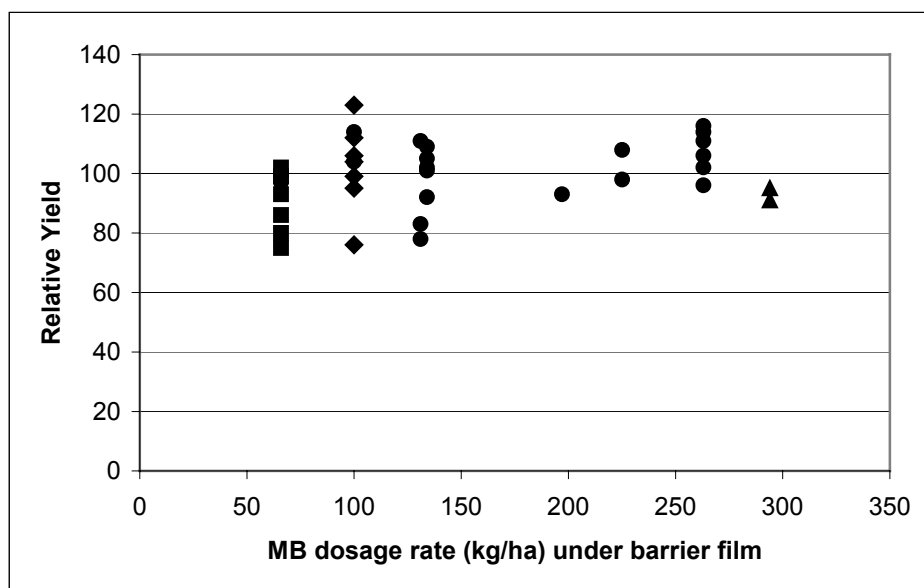


Figure 1. Relative yield of crops (strawberries, tomatoes, peppers, cantaloupes) grown under barrier films with different MB/Pic formulations compared to the standard commercial treatment using standard polyethylene from trials between 1998 and 2004 (▲ MB/Pic 98:2; ● MB/Pic 67:33; ◆ MB/Pic 50:50; ■ MB/Pic 33:67). Data from Table 3.

As in the evaluations in previous years, MBTOC reduced quantities of MB in particular nominations to a standard rate per treated area. MBTOC considers the maximum MB application rate for 98% MB to be either 350 kg/ha (warm sandy soils) or 450 kg/ha (heavier cool soils), in conjunction with low barrier permeability films (e.g., VIF or equivalent), combined with extended exposure periods, as effective in most circumstances when well applied. In cases where use of high chloropicrin-containing mixtures (approximately MB:Pic/67:33 or 50:50) were feasible, maximum dosage rates of 200kg/ha (260 kg/ha for moderate to severe nutgrass regions) have been previously used by MBTOC to assess nominations. As a consequence of new studies with low permeability barrier films, reviewed in Table 3, new maximum guideline standards of 175 kg MB/ha where nutgrass is the key pest and 150 kg/ha for pathogens are regarded as reasonable and are being proposed as revised standard presumptions.

The indicative rates used by MBTOC were maximum guideline rates, for the purpose of calculation only. MBTOC recognises that the actual rate appropriate for a specific use may vary with local circumstances, soil conditions and the target pest situation. Some nominations were based on rates lower than these indicative rates.

Quantities in CUNs were recalculated to conform to these specifications, including use of low permeability barrier films (e.g. VIF or equivalent). Reductions were not made if the

Party provided a substantive argument otherwise (e.g. unusually tolerant pests) or there were regulatory requirements to use specific rates.

In applications where broadacre or 'flat fume' coverage occurs (e.g. some plant nurseries, nematode control in protected floriculture and vegetables, ginger production), MBTOC acknowledged that though films and glues are available for most situations, sealing may be difficult with barrier films under some particular conditions, and that further work or trials may be required in some situations to determine acceptable materials.

In structures, it is feasible to reduce MB use and emissions by the use of improved sealing techniques, with monitoring to ensure only the minimum effective dosage is used, and longer exposure periods. The average dosage rates now quoted in the CUNs, typically around 20 g/m<sup>3</sup> for mills and similar structures, are reasonable.

In commodities, methyl bromide dosage rates vary with commodity temperature and by commodity sorption rates. Accordingly, MBTOC uses the dosage rates published by the European Plant Protection Organization (EPPO) and found in annexes to the MBTOC Assessment Reports published in 1995, 1998 and 2002. Parties are encouraged to use the lowest possible dosage rate appropriate for the circumstances and as allowed by the label.

### *2.3.7 Rate of adoption of alternatives*

MBTOC recognizes that time is needed to effect phase-in of alternatives and accepts this as a reasonable technical argument for lack of availability to the end user sensu Decision IX/6.

Some CUNs in the 2006 round argued that time was required to allow the relevant industry to transition to available alternatives. Some CUNs showed a reduction in nominated quantity requested from that of the preceding year, reflecting progressive adoption of alternatives; while others had the same or similar quantities of MB nominated to the preceding CUNs. In some cases alternatives at varying stages of readiness for adoption were identified in the CUN and in others they were identified by MBTOC.

There is limited guidance and data available on what is a reasonable rate of transition to existing and available alternatives, though para. 35 of Annex I referred to in Decision XVI/4 states that "In situations where MBTOC recommends a nomination on grounds that it is necessary to have a period for adoption of alternatives, the basis for calculating the time period must be explained fully in the TEAP report and take fully into account the information provided by the nominating Party, the supplier, the distributor or the manufacturer. Relevant factors for such a calculation include the number of enterprises that need to transition, e.g., the number of fumigation and pest control companies, estimated training time assuming full effort, opportunities for importing alternative equipment and expertise if not available locally, and costs involved." Improved guidance from the Parties, giving expected rates of adoption of alternatives following registration, would assist MBTOC in evaluation of CUNs in future.

### *2.3.8 Fulfilment of Decision IX/6*

Decision XVI/2 directed MBTOC to indicate whether all CUNs fully met the requirements of Decision IX/6. When the requirements of Decision IX/6 were met, MBTOC recommended the full amount of the request. Where some of the conditions were not fully met, MBTOC recommended a decreased amount, depending on its technical and economic evaluation. MBTOC reduced a nomination when a technical alternative was considered effective or when the Party had failed to show that it was not effective. Where the criteria of Decision IX/6 were not satisfied to a substantial extent, MBTOC did not recommend the nomination. In this round of CUNs, MBTOC considered answers submitted by Parties in response to questions previously sent, and which explained why the nominations had been placed in the 'unable to assess' category.

There is one section of Decision IX/6 that MBTOC did not evaluate, and one MBTOC evaluated less stringently. These are use of stockpiles (para. 1 (b) (ii)) and the need for the Party to conduct sufficient research on alternatives (para. 1 (b) (iii) in part)). MBTOC or the Ozone Secretariat has not collected data on level of stocks or stockpiles present in various countries and Parties did not provide such data for individual nominations. Thus, MBTOC did not use that element in its evaluation. MBTOC also found some applicants did not, themselves, conduct sufficient research to fully meet Decision IX/6. Sometimes a Party reviewed and reported on similar or pertinent research in other countries or situations. MBTOC also found, in far fewer instances, and generally only where the applicant was a small operator, no research was conducted, possibly reflecting inability on the part of the applicant to do so because of cost. In those instances, MBTOC relied more heavily on its own knowledge of the research and on developments and usages in related crops or situations, and evaluated this section of the Decision less stringently.

### *2.3.9 Sustainable Alternatives*

In most CUNs, the most currently appropriate alternatives are chemical fumigant alternatives, which themselves, like MB, have issues related to their long term suitability for use. MBTOC urges Parties to consider the long term sustainability of treatments adopted as alternatives to MB, to continue to adopt chemical and non-chemical alternatives for the short to medium term and to develop sustainable IPM or non-chemical approaches for the longer term.

### *2.3.10 Frequency*

In the CUN round for 2005, reductions in MB for both preplant soil and postharvest use could be achieved in some nominations, where effective alternatives were identified, by reducing the frequency of MB. In some countries, present regulations already restrict the frequency of use of MB (e.g. to every second year) on similar crops and circumstances to those nominated by other Parties. MBTOC suggests that in these and other instances MB

only be required every 2, 3 or 4 years and suggests that Parties further consider reductions where appropriate. Alternation of control measures may also help provide or extend user confidence and experience in alternatives. New control measures may also be good agricultural practice, reducing risk of development of tolerance and providing control of a wider spectrum of pests.

## **2.4 Final evaluations of CUNs submitted in 2005**

### *2.4.1 Details of evaluations*

MBTOC/TEAP reassessed the 26 CUNs and placed in the 'unable to assess' category in the interim report published in May 2005 (TEAP 2005). In most cases, additional information was received by MBTOC to contribute to their reassessment. MBTOC reassessed these CUNs on the basis of the original application and further information provided, taking into account the pertinent decisions.

Additionally MBTOC reassessed two CUNs that had been evaluated as 'not recommended' in the May report of TEAP (TEAP 2005) and one CUN, initially for 130 tonnes, that had been made in 2004 for 2006, but had not been evaluated previously at request of the nominating Party.

An additional total of 404.12 tonnes of MB has been recommended and 98.145 not recommended for 2006 use, and a total of 7466.10 tonnes of MB has been recommended and 685.487 not recommended for 2007 use.

Evaluations of each CUN, and of the nominations placed in the unable to assess category are given in detail in Table 4. Table 4 also includes all evaluations of CUNs made in the interim report on the 2005 round of nominations. No changes were made to these evaluations where the outcome had been a recommendation. Thus only CUNs that received an 'unable to assess' or 'not recommended' evaluation in TEAP (2005) have had revised evaluations.

### *2.4.2 Minority evaluation*

MBTOC did not reach a consensus on several nominations for cucurbits, eggplant, pepper, strawberry fruit and tomato submitted by the US for 2007, particularly relating to some parts of Florida and southeastern states. When critical use nominations were reviewed at the MBTOC meeting in August 2005, 25 members voted to recommend these CUNs (with reduced doses of MB), while 3 members voted to classify the CUNs as 'unable to assess' pending further examination and clarification.

The 16<sup>th</sup> Meeting of the Parties provided new working procedures for MBTOC (Annex I of Decision XVI/4)<sup>1</sup>. Annex I states, inter alia, that *“Exemptions must comply fully with Decision IX/6 and other relevant decisions, and are intended to be limited to the levels needed for critical use exemptions, temporary derogations from the phase-out of methyl bromide in that they are to apply only until there are technically and economically feasible alternatives that otherwise meet the criteria in Decision IX/6. MBTOC should take a precise and transparent approach to the application of the criteria...”* (para. 32), and that *“MBTOC should categorize the nomination as ‘unable to assess’ if there is insufficient information to make an assessment...”* (para. 10).

The minority held that further assessment by MBTOC is needed in order to determine which parts (i.e. areas) of the CUNs comply with Decision IX/6. Until further assessment occurs, the minority group believes that MBTOC is not in a position to calculate or ‘recommend’ to the Parties an appropriate tonnage that complies with Decision IX/6. The CUNs should therefore be classified as ‘unable to assess’, pending further clarification and assessment, in accordance with Annex I procedures.

Scientific studies conducted over a number of years in the US and other countries have demonstrated that certain alternatives provide statistically similar crop yields compared to methyl bromide, when applied using appropriate or improved application methods (refer to TEAP Progress Report (May 2005) and reference list (Section 5.2) for examples). This applies in many situations of high pest pressure from nematodes and fungal pathogens and low to moderate nutsedge pressure<sup>2</sup>. While the CUNs cited high yield losses, high yield losses are not supported by a body of studies, particularly those using improved application methods. Commercial use of alternatives on farms has also shown that alternatives provide similar yields to MB when they are applied in an appropriate manner.

Alternatives are available for parts of the CUN area. Annex I of Decision XVI/4 says *“understanding of the concept of ‘availability’ shall be primarily guided by the alternative’s market presence in sufficient quantities and accessibility, taking into account, among other things, regulatory constraints”* (para. 18). Alternatives are used by some growers who have the same circumstances as MB users, and sell their products to the same markets as MB users. Further clarification is needed to quantify the areas that could adopt alternatives prior to, and during, 2007. Areas requiring further assessment include sites of low nutsedge pressure on karst topography, and areas of moderate pest pressure, for example. More information therefore needs to be examined from the applicant and other sources before MBTOC can determine which parts of the CUNs comply with Decision IX/6. In addition, MBTOC needs to calculate a feasible rate of adoption of alternatives using the factors listed by the Parties in paragraph 35 of Annex I<sup>3</sup>. The minority group therefore concluded that the five CUNs should be classified as

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<sup>1</sup> ‘Working Procedures of the Methyl Bromide Technical Options Committee relating to the evaluation of nominations for critical uses of methyl bromide’ UNEP/OzL.Pro.16/17. Annex I, pp.74 – 79.

<sup>2</sup> Recent studies indicate that certain alternatives may also address high nutsedge pressure, and this matter requires further examination.

<sup>3</sup> Paragraph 35 of Annex I of Decision XVI/4 says:

‘unable to assess’, pending further information and assessment, in accordance with Annex I Procedures <sup>(1)</sup>.

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*“ In situations where MBTOC recommends a nomination on grounds that it is necessary to have a period for adoption of alternatives, the basis for calculating the time period must be explained fully in the TEAP report and take fully into account the information provided by the nominating Party, the supplier, the distributor or the manufacturer. Relevant factors for such a calculation include the number of enterprises that need to transition, e.g., the number of fumigation and pest control companies, estimated training time assuming full effort, opportunities for importing alternative equipment and expertise if not available locally, and costs involved.”*

Table 4. Final evaluations of new or supplemental CUNs submitted in 2005 for 2006 or 2007

Symbol ‘\*’ in column 9 denotes a new or changed evaluation subsequent to TEAP May 2005 report

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect III Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
Australia	Rice (consumer packs)	6.15	6.15	6.15		6.15		5.13 *	MBTOC recommends 5.13 tonnes of MB for packaged rice in Australia for 2007. Although the Party has reduced its dosage rate for rice in the past few years, MBTOC further reduced the Party's nomination to conform to a dosage rate of 20 g/m <sup>3</sup> . This is a conservative interpretation of the EPPO standard for rice. Rice is methyl bromide fumigated before marketing to ensure Sitophilus eggs (which might otherwise survive processing) will be killed before the rice is received by the customer.	No economic data on alternatives given
Australia	Strawberry runners	35.75	30	7.5		35.75		35.75 *	MBTOC recommends 35.75 tonnes to be approved for this nomination. The CUN states that MB is required to meet industry certification standards (disease tolerance levels), but this is not mandatory. The CUN states that plug plants are a technically feasible alternative but that the costs associated with this technology are regarded as too high. New trials are presently being conducted. A possible key alternative, 1,3-D/Pic, has been phytotoxic to runners in certain circumstances due to the heavy, wet and cold soil conditions and recent trials to improve control with herbicides have been unsuccessful. High winds and cool conditions have previously prevented adoption of LPF barrier films. Trials to reduce dosage of MB 50:50 in conjunction with new LPF barrier films are being conducted. The Party states that these trials will be completed by mid 2007. Dosage rates of 250kg/ha MB used for this crop are above MBTOC standards, however the Party has verified that this is necessary to meet certification for disease and weed control in heavy soil types.	CUN states data is not yet available to enable an economic evaluation of alternatives.
Belgium	Antique structures and furniture	0.319			0.199		0.199		MBTOC recommends a CUE of 0.199 tonnes for these uses in 2006. This application is for the treatment of unmovable historical antiques and antique furniture. The Party has reduced the applicant's request in consideration of the partial availability of alternatives. Corrodible metal components and church location disallows the use of phosphine. SF is not registered.	CUN states nitrogen is not economic. Cost is 7.4 times cost of methyl bromide.

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
Belgium	Artefacts and structures	0.59			0.307		0.307		MBTOC recommends a CUE of 0.307 tonnes for this use in 2006. Metal components and church location disallow the use of phosphine. Additionally this application is for treatment of wood boring insects which requires a higher than usual dosage of MB.	CUN states phosphine and contact insecticides costs less but heat costs more than three times more than MB treatment, because of energy costs.
Belgium	Asparagus	0.63			0.225		0.225		MBTOC recommends that a CUE of 0.225 tonnes be approved in 2006 for this use. The MB requested is to be restricted to a small part of the total production (seedbeds and open fields) with recalcitrant pest problems, not controllable by other means. Alternatives are already in use where applicable (99.7 % of the cropping area). The nomination aims only where no alternatives are available because of technical and economical reasons. The need for high plant health of planting material is recognised, and at present MB is appropriate for this specific use (cool conditions, high pathogen incidence). The area is characterized by soil grown asparagus with high disease pressure, small size farms and high input from family capital. MBTOC suggests that the Party take steps to help these remaining growers to phase out use of MB by using the available alternatives.	CUN provides a net revenue analysis showing decreased net revenue relative to methyl bromide if alternatives are used in situations where they are not suitable. CUN notes potential yield, quality, and market prices reductions when there are multiple or recalcitrant pest problems.
Belgium	Berry fruit				0.621		0.621		MBTOC recommends that a CUE of 0.621 tonnes be approved in 2006 for this use. The MB requested is for treatment of Perennial Crop Replant Disorder in all berry fruit in open fields, except strawberries. The Party states that fumigants are used to establish new plantings once every 5 years, and that the key alternatives, metham sodium and 1,3-D, are used on approximately 20% of the crops, but that growers need MB to ensure that pathogens do not build up in soils. Only 8.3% of plantings are treated annually and MBTOC acknowledges that disease control is difficult as a key alternative, chloropicrin, is not registered yet with these alternatives. MB/Pic mixtures are registered, although further adoption may be limited because Party is concerned about crop damage to adjacent crops. MBTOC acknowledges the efforts made by the Member State to restrict MB use further by using strip fumigation and MB/Pic mixtures.	CUN provides a net revenue analysis showing decreased net revenue relative to methyl bromide if alternatives are used in situations where they are not suitable. CUN notes potential yield, quality, and market prices reductions when there are multiple or recalcitrant pest problems.

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
Belgium	Chicory	0.18			0.18		0.18		MBTOC recommends that a CUE of 0.180 tonnes be approved in 2006 for this use. Alternatives are already in use where applicable (99.7 % of the cropping area). The nomination aims only where alternatives are not available because of technical and economical reasons. The area is characterized by soil grown chicory with high disease pressure, small size farms and high input from family capital. . MBTOC suggests the Party take steps to help these remaining growers to phase out use of MB by using the available alternatives particularly substrates.	CUN notes high cost to convert to soilless systems. Except for steam, alternative soil treatments are less costly than methyl bromide. CUN states that in certain circumstances technical necessity leads to use of more costly methyl bromide.
Belgium	Churches, monuments and ships' quarters	0.15			0.059		0.059		MBTOC recommends a CUE of 0.059 t be approved for this use. The Party reduced this year's nomination to 30% of its request for 2005 by reducing dosage and in consideration of the potential to adopt alternatives. The applicant has conducted research on alternatives for this use finding that metal components disallows use of phosphine, inert gases were unsuccessful in some locations and that there was a risk to the antiques if heat was used in combination with MB in an attempt to reduce dosage. Good gastightness was reported with plans for further improvement. Sulfuryl fluoride is not registered for this use.	No economic data on alternatives given.
Belgium	Chrysanthemums	1.12			0.72		0.0 *		MBTOC does not recommend this nomination. The CUN is for 7% of the crop, when both root knot nematodes and fungal pathogens (primarily Verticillium) are found in mobile or fixed greenhouses in small-scale operations. The CUN is for contingency purposes and did not substantiate the infeasibility of alternatives for the specific circumstances. Alternatives are used for this crop in similar circumstances, notably cold, wet soils in small greenhouses. Steam, for example, has been adopted on more than 900 ha chrysanthemums in the region (LEI 2004) and is technically and economically feasible in the specific circumstances of this nomination (Runia 2005c, IKAT 1992, Runia 2000). The use of steam may be impacted by regulatory requirements for certification of the equipment after it is moved from one location to another. The CUN concluded that certain chemical alternatives (e.g. MS + 1,3-D or other nematicide) are also economically feasible.	CUN provides a net revenue analysis showing decreased net revenue relative to methyl bromide if alternatives are used in situations where they are not suitable. CUN notes potential yield, quality, and market price reductions when there are multiple or recalcitrant pest problems.

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
Belgium	Cucumber	0.61			0.545		0.545		MBTOC recommends that a CUE of 0.545 tonnes be approved in 2006 for this use. Alternatives are already in use where applicable. The nomination is only for uses where, according to the nomination, alternatives are not available because of technical and economic reasons. The area is characterised by soil grown cucumber with high disease pressure, small size farms and high input from family capital. MBTOC suggests that the Party take steps to help these remaining growers to phase out use of MB by using the available alternatives particularly substrates and grafting.	CUN provides a net revenue analysis showing decreased net revenue relative to methyl bromide if alternatives are used in situations where they are not suitable. CUN notes potential yield, quality, and market prices reductions when there are multiple or recalcitrant pest problems.
Belgium	Cut flowers	4			1.956		1.956		MBTOC recommends 1.956 tonnes for this nomination. The critical use is required because of restriction imposed by small farm size and mixed number of crops, and restrictions on alternative use because of cool soil temperatures and extended plant back times. MBTOC appreciates the additional information sent by the Party as it helps clarify the nature of this nomination. For future nominations, the Party is encouraged to collect and submit statistical information regarding technical and economical validation of alternatives for the critical uses involved in this nomination.	CUN provides a net revenue analysis showing decreased net revenue relative to methyl bromide if alternatives are used in situations where they are not suitable. CUN notes potential yield, quality, and market prices reductions when there are multiple or recalcitrant pest problems.
Belgium	Electronic equipment	0.1			0.035		0.035		MBTOC recommends a CUE of 0.035 tonnes for this use in 2006. Phosphine cannot be used in this situation and SF not registered. The Party reduced the applicant's request to ensure minimal emissions and uses the MBTOC standard dosage rate.	No economic data on alternatives given.
Belgium	Empty silo	0.05			0.043		0.043		MBTOC recommends a CUE of 0.043 tonnes for this use in 2006. The Party reduced the applicant's request to eliminate structures of poor gastightness. Contact pesticides, heat, cold, and heat plus MB are already in use. SF is not registered. Phosphine cannot be used in many facilities since they include corrodible equipment. Applicant has reduced MB use to very low levels and low frequency of fumigation	Energy costs for heat treatment are higher. Costs of IPM with pheromone trapping and spray treatment are greater than costs of methyl bromide.

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
Belgium	Endive				1.65		1.65		MBTOC recommends that a CUE of 1.65 tonnes be approved in 2006 for this use. The nominated quantity amount is less than the quantity used in 2003 (2.08 tonnes). Alternatives are already in use (98.1% of the cropping area. The nomination is only for uses where, according to the nomination, alternatives are not available because of economic reasons. The endive area is characterized by soil grown crops grown in areas with high disease pressure, small size farms and high input from family capital. MBTOC suggests that the Party take steps to help these remaining growers to phase out use of MB.	CUN provides a net revenue analysis showing decreased net revenue relative to methyl bromide if alternatives are used in situations where they are not suitable. CUN notes potential yield, quality, and market prices reductions when there are multiple or recalcitrant pest problems.
Belgium	Flour mill				0.072		0.072		MBTOC recommends a CUE of 0.072 tonnes for this use in 2006. The applicant has reduced dosage, emissions and minimises MB use by using it during times of high ambient temperature. This applicant has reduced MB use and frequency to a very low level.	CUN reports heat will cost 2.63 times more than methyl bromide
Belgium	Flour mills				4.17		4.17		MBTOC recommends a CUE of 4.17 tonnes for this use in 2006. Party has reduced dosage to MBTOC standard for structural treatments and in consideration of use of alternatives and frequency of fumigation, and reduced the applicant's request in consideration of those mills that need improvement in gastightness. Party has taken measures to ensure good gastightness through mill improvements in some mills. SF not registered.	CUN reports phosphine will cost 50% more, heat will cost 6.5 times more and modified atmosphere will cost 10 times than methyl bromide. Sulfuryl fluoride treatment is more costly than methyl bromide.
Belgium	Food premises	0.3	0.3		0.03		0.03		MBTOC recommends a CUE of 0.030 tonnes for this use for 2006. This CUN relates to fumigation of 21 premises. Applicant has reduced MB use to very low levels and low frequency of fumigation.	No economic data on alternatives given.

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
Belgium	Food processing premises	0.03			0.03		0.03		MBTOC recommends a CUE of 0.030 tonnes for this use for 2006. Applicant has reduced MB use to very low levels and low frequency of fumigation.	CUN reports IPM will cost more than 3 times and sprays will cost 3 times more than MB; energy costs too high for heat treatment
Belgium	Food storage (dry) structure	0.12			0.12		0.12		MBTOC recommends a CUE of 0.120 tonnes for this use in 2006. The applicant has reduced MB use and frequency of fumigation to a very low level.	IPM alone will cost 3.7 times more than MB. Spray insecticides 3 times cost of methyl bromide.
Belgium	Leek & onion seeds	0.66			0.155		0.155		MBTOC recommends that a CUE of 0.155 tonnes be approved in 2006 for this use. Alternatives are already in use where applicable (99.7 % of the cropping area). The nomination is only for uses where, according to the nomination, alternatives are not available because of technical and economic reasons. The CUN is characterized by leek and onion seed crops grown in soils with high disease pressure, small size farms and high input from family capital. MBTOC suggests that the Party take steps to help the remaining growers to phase out use of MB by using the available alternatives, particularly substrates.	CUN notes alternative chemical treatments are less costly than methyl bromide but in cases of combined pest pressure, their technical performance is not assured. CUN states steam is not cost effective.

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
Belgium	Lettuce	25.19			22.425		0.0 *		MBTOC does not recommend this nomination. The CUN is for heavy butterhead lettuce grown in soils with high disease pressure. The nomination covers about 2% of the heavy butterhead lettuce crop area, where alternatives are considered infeasible because of technical, economic and regulatory constraints, such as the presence of both nematodes and soilborne fungi, cold, wet conditions, small size farms and high input from family capital. The nomination did not provide data that substantiated the infeasibility of alternatives. Alternatives (e.g. dazomet applied uniformly, effective methods of steaming) are available and are used for this crop in the same conditions in this geographical region (Runia 2005ab). The CUN also provided supporting evidence of the viability of steam, and noted that steam provides other commercial advantages that are able to offset the higher cost, such as a longer growing period which can permit an additional crop per year. The use of steam is impacted by regulatory requirements for certification of the equipment after it is moved from one location to another.	CUN provides a net revenue analysis showing decreased net revenue relative to methyl bromide if alternatives are used in situations where they are not suitable. CUN notes potential yield, quality, and market price reductions when there are multiple or recalcitrant pest problems.
Belgium	Mills				0.2		0.2		MBTOC recommends a CUE of 0.2 tonnes for this use in 2006. The Party has reduced dosage to MBTOC standard for structural treatments and reduced the applicant's request in consideration of those mills that need improvement in gastightness, use of alternatives and frequency of fumigation. Party has taken measures to ensure good gastightness through mill improvements in some mills. SF not registered.	IPM alone will cost 3.7 times more than MB
Belgium	Nursery	0.9			0.384		0.384 *		MBTOC recommends 0.384 tonnes for this nomination in 2006. This nomination is for production of 'clean' planting material. Economical infeasibility of producing the crops involved in this nomination in substrates or as "plug plants" has not been substantiated by the Member State. In spite of this lack of information there is a need to produce nursery stock that meets stringent disease-free standards. Failure to meet these standards poses a risk of encountering substantial losses. MBTOC urges the Party to provide a better technical and economic assessment of the alternatives above.	CUN provides cost data for soil fumigation with methyl bromide and alternative chemicals and steam. No yield or price data were reported. CUN states the economic consequences of nursery stock that is not healthy and free of pathogens are dramatic loss of yield and revenue

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
Belgium	Old buildings				0.306		0.306		MBTOC recommends a CUE of 0.306 tonnes for this use in 2006. The Party reduced the applicant's request to ensure emissions controls were improved and to take into consideration use of MBTOC standard dosage rates and current available alternatives. Applicant notes that MB use is restricted to incidents where IPM has failed. SF is not registered.	CUN reports high energy costs for heat or cold treatment. Phosphine marginally lower cost but presents technical problem.
Belgium	Old buildings				0.282		0.282		MBTOC recommends a CUE of 0.282 tonnes for this use in 2006. MB use is restricted to where IPM has failed. Phosphine cannot be used because of risk of damage to old materials. SF is not registered.	No economic data on alternatives given
Belgium	Pepper & egg plant	3			1.35		1.35		MBTOC recommends that a CUE of 1.35 tonnes be approved in 2006 for this use. This recommendation is made on the basis of economic issues. Most production of this crop does not rely on methyl bromide. The remaining production of eggplant and pepper using methyl bromide is characterised by cropping in soils with high disease pressure, with small size farms and high input from family capital. MBTOC suggests that the Party help these remaining growers to transition out of MB use, using the available alternatives and, particularly, substrates.	CUN provides a net revenue analysis showing decreased net revenue relative to methyl bromide if alternatives are used in situations where they are not suitable. CUN notes potential yield, quality, and market prices reductions when there are multiple or recalcitrant pest problems.
Belgium	Strawberry runners	3.4			0.9		0.9		MBTOC recommends a CUE of 0.9 tonnes be approved for this use in 2006. The Party is requested to provide a copy of the Flemish certification handbook for strawberry runners. The nomination is based on the grounds that registered alternatives are not suitable for the specific pest combinations and conditions. The Party states that alternatives are used whenever feasible. MBTOC notes with concern that the Party states that in the last 10 years in Belgium there has been no research on soil fumigation and MB alternatives for strawberry runner production. The Party states that plug plants are currently not used, and that possibly in the future there will be a place for plug plants. MBTOC recognises the substantial MB reductions made in this sector recently, from 4.0 tonnes in 1998 to 0.9 tonnes in current nomination.	CUN provides cost data for soil fumigation with methyl bromide and alternative chemicals and steam. No yield or price data were reported. CUN states the economic consequences of nursery stock that is not healthy and free of pathogens are dramatic loss of yield and revenue

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Belgium	Tomato (protected)	5.7			4.5		4.5		MBTOC recommends that a CUE of 4.5 tonnes be approved in 2006 for this use. This is similar to the amount of MB used in 2003 (4.6 tonnes). This recommendation is made on the basis of economic issues. Alternatives are already in use where applicable, predominantly soilless culture on 72% of the cropping area. The nomination is only for uses where, according to the nomination, alternatives are not available because of economic constraints. The production is characterised by growing in soils with high disease pressure, with small size farms and high input from family capital. MBTOC suggests that the Party help these remaining growers to transition out of MB use using the available alternatives, particularly substrates and grafting.	CUN provides a net revenue analysis showing decreased net revenue relative to methyl bromide if alternatives are used in situations where they are not suitable. CUN notes potential yield, quality, and market prices reductions when there are multiple or recalcitrant pest problems.
Belgium	Tree nursery	0.23			0.155		0.155		MBTOC recommends that a CUE of 0.155 tonnes be approved for 2006 for this use. Clean propagative material is recognised as important in the reduction of need for fumigation of production fields. Party is requesting 155 kg to treat 0.5 ha (1% of the tree nursery production area). This is a reduction of 33% from the amount approved for 2005. Dosage rates are consistent with MBTOC's guideline standards. MBTOC notes that, according to the Party (EC), lack of technical and economically feasible alternatives has not been validated and efforts to find, register and deploy alternatives have been insufficient.	CUN provides cost data for soil fumigation with methyl bromide and alternative chemicals and steam. No yield or price data were reported. CUN states the economic consequences of nursery stock that is not healthy and free of pathogens are dramatic loss of yield and revenue
Belgium	Woodworking premises	0.3			0.101		0.101		MBTOC recommends a CUE of 0.101 tonnes for this use in 2006. The Party has reduced the applicant's requested amount to use MB standard dosage rate and availability of alternatives. The amount nominated is already reduced to one third of the 2005 CUE.	CUN reports IPM and pheromone trapping will cost over 3 times and spray treatment will cost over twice the cost of methyl bromide

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Canada	Flour mills	(a)	27.8	7.0		30.167		30.167	MBTOC recommends a CUE of 30.167 tonnes for this use in 2007. The Party has reduced its MB use over 2006 levels. Considerable research has allowed for a shift to heat treatments where possible. IPM improvements and full site heat trials are on going. MBTOC standard dosage is used. SF is not registered.	Research submitted indicates that heat is likely to be 2-6 times more expensive than MB treatment
Canada	Strawberry runners (PEI)	(a)		8.666(b)		7.995		7.995	MBTOC recommends a CUE of 7.995 tonnes for this use in 2007. This nomination is for strawberry runners for which national regulatory controls are in place in both the nominating Party and the Parties that receive shipment of this material. The Party has determined that the usage covered by this CUN does not fall under QPS. MBTOC acknowledges that the ban of 1,3-D in the nominated region is a significant impediment to the Party in the transition away from MB. The Party is urged to consider use of reduced rates of MB with barrier films as a transition strategy.	CUN provided no economic data. CUN based on technical feasibility reasons.
Canada	Strawberry runners (Quebec)	(a)				1.826		1.826	MBTOC recommends a CUE of 1.826 tonnes for this use in 2007. This nomination is for strawberry runners for which national regulatory controls are in place in both the nominating Party and the Parties that receive shipment of this material. The Party has determined that the usage covered by this CUN does not fall under QPS. The Party is urged to consider use of reduced rates of MB with barrier films as a transition strategy.	CUN provided no economic data. CUN based on technical feasibility reasons.
Germany	Artefacts	0.25			0.1		0.1		MBTOC recommends a CUE of 0.1 tonnes for this use (control of fungi in immovable historical artefacts) in 2006. MBTOC does not know of any technically effective alternatives for this use under the particular circumstances.	No economic data on alternatives given

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Germany	Mills and Processors	45			19.35		19.35		MBTOC recommends a CUE of 19.35 tonnes for this use in 2006. The Party reduced the applicant's requested amount to take into consideration that SF is newly registered, balanced by the consideration that there is no MRL for fluorine. This application is only for MB use when neither heat nor phosphine can be used.	SF costs for mills treatment are insufficiently known and heat treatment in large mills costs more and must be done more frequently for same level of control of MB.
Greece	Dried fruit	4.28			3.081		3.081 *		MBTOC recommends 3.081 tonnes of MB for dried figs and raisins for Greece for 2006. National legislation requires treatment by MB for figs and raisins when harvested, but treatment during storage is conducted with phosphine. MB fumigation is required at harvest to treat large volumes of figs and raisins quickly before holiday season marketing.	CUN reports direct costs of phosphine are lower than methyl bromide, but treatment takes much longer resulting in downtime or need for more chamber capacity. Party also reports installation and operating costs of cold treatment are high compared to methyl bromide.
Greece	Cucurbits	30			19.2		19.2		MBTOC recommends that a CUE of 19.2 tonnes be approved in 2006 for this use. Alternatives are already in use where applicable (89.5 % of the cropping area). The nomination aims only where no alternatives are available because of economical reasons. The area is characterized by high disease pressure, small size farms and high input from family capital. MBTOC suggests that the Party take steps to help these remaining growers to phase out use of MB by using the available alternatives particularly chemicals, substrates and grafting.	CUN reports costs of chemical and non-chemical alternatives for methyl bromide. Partial budget analysis shows that chemical alternatives result in gross margin (net revenue) decreases of 50 percent or more compared to methyl bromide.

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Greece	Cut flowers	14		14	6		6 *		MBTOC recommends a CUE of 6 tonnes for this use in 2006. The nomination is for treatment of fungi and nematodes in three flower types, carnations (mostly open field), roses and gypsophila. Requested amounts have been significantly reduced from 14 to 6 tonnes from the previous year. The Party did not fully substantiate the technical and economical infeasibility of alternatives, but MBTOC acknowledges that chloropicrin and mixtures thereof are not registered in Greece for cut flower production, limiting the range of alternatives available. The Party states that although substrates are technically feasible they are economically infeasible. Research conducted in Greece has identified substrates as economically feasible for some flower types (Graffiadellis et al., 2000, Savvas and Passam 2002).	CUN reports 30% yield loss with metham sodium or dazomet compared to methyl bromide. Party reports these alternatives will result in net revenue decreases of 16 to 27 percent compared to methyl bromide. Soilless production is in use for 25 percent of rose production. Initial cost of establishing soilless systems is a major constraint on further adoption.
Greece	Mills and Processors	23			16		15.445		MBTOC recommends a CUE of 15.445 tonnes for this use in 2006. The minimum label dosage rate in Greece is higher than the MBTOC standard dosage rate for fumigation of structures. No dosage adjustments are proposed, but the Party may wish to instruct fumigators to use the minimum dosage rates in the range given on the label to minimise emissions and MB usage. It is suggested that the Party continue research and development on heat treatments combined with IPM improvements as a priority.	CUN reports that phosphine costs 3 times more than MB treatment
Greece	Rice and legumes				2.355		2.355		MBTOC recommends a CUE of 2.355 tonnes of MB for packaged rice and legumes for 2006. The sector is in transition to the alternatives phosphine and vacuum packaging. The MB recommended is for the remaining product that will not be able to switch to alternatives by 2006. The Party uses the EPP0 standard dosage rates.	High capitol costs for modified atmosphere packaging equipment. Recent decreased cost of MB in comparison with phosphine. Lengthy time in phosphine treatment delays shipment.

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Greece	Tomatoes	156			73.6		73.6		MBTOC recommends a CUE of 73.6 tonnes for this use in 2006. The Party states the nomination is restricted to where alternatives are not available because of economic reasons. Alternatives are already in use on 53-63 % of the cropping area. The area relating to the nomination is characterised by high disease pressure, with small size farms and high input from family capital. MBTOC suggests that the Party takes steps to help these remaining growers to phase out use of MB using the available alternatives, particularly 1,3 D+ Pic, substrates and grafting.	CUN reports costs of chemical and non-chemical alternatives for methyl bromide. Partial budget analysis shows that chemical alternatives result in gross margin (net revenue) decreases of 45 percent or more compared to methyl bromide.
Ireland	Mills				0.888		0.888		MBTOC recommends a CUE of 0.888 tonnes for this use in 2006. The Party reduced the applicant's request to adjust to MBTOC standard dosage rates. Full scale heat treatment trials are underway. Difficulty in achieving good pest control results with alternatives in larger mills has been observed.	CUN notes sulfuryl fluoride will be at least 2.5 times cost of methyl bromide. No accurate cost of heat available. Losses from additional downtime when alternatives are used.
Italy	Mills and Processors	160			130 (c)		65 *		MBTOC recommends a CUE of 65 tonnes of MB for this use for 2006. The Party reduced its original nomination by 50% to account for and encourage adoption of the newly registered fumigant sulfuryl fluoride. The Party provided location and number of facilities and their volumes, frequency of fumigation and historical use data. The Party uses MBTOC standard dosage rate of 20/gm3 MB for structures.	Party deferred assessment.
Japan	Chestnuts	7.1	6.5		0.3	6.5	0.3	6.5	MBTOC recommends a supplemental CUE of 0.3 tonnes for this use in 2006 and a CUE of 6.5 tonnes for this use in 2007. MBTOC does not know of any alternatives for disinfestation of fresh chestnuts in shell. Japan is encouraged to continue research into alternatives.	No economic data on alternatives given

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Japan	Cucumber	88.3	87.6		1.2	72.4	1.2	72.4	MBTOC recommends a supplemental CUE of 1.2 tonnes for 2006 and a CUE of 72.4 tonnes for 2007 for this use. The supplemental CUN for 2006 is for areas of crop that did not apply in the previous nomination round. This is based on the recognition that both the cropping system and pathogen (Kyuri Green Mottle Mosaic Virus) targeted by methyl bromide are unique. Methyl bromide use permits multiple cropping within a year while managing risk of disease carryover. Several potential alternatives have been trialled, but have not performed adequately. Basic practices have been in place for many years, with farmers using low technology systems, including applying MB from small canisters. The latter system has been superseded in many developed countries on grounds of safety and efficacy. MBTOC acknowledges the effort to transition growers to use VIF. However, in spite of rates conforming with MBTOC guidelines, MBTOC urges the Party to consider further reductions in dosage rates, together with a more rapid transition to barrier films, as a transitional strategy while alternatives are developed.	CUN reports no economic data on alternatives. CUN states hydroponic systems are not economically feasible.

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Japan	Ginger - field	119.4	119.4			112.2		109.701 *	<p>MBTOC recommends a reduced CUE of 109.701 tonnes for this use for 2007. This CUN was reevaluated at request of the Party. The reduction is based on a decrease in effective dose by 25% due to the uptake of low permeability barrier films (LPF) on 9% of the nominated area by 2007. The nomination is for control of Pythium spp. (Pythium ultimum var. ultimum, Pythium zingiberium). MB (99.5%) is applied using small cans. The Party states that chloropicrin is registered in Japan and that application equipment is available for use on farms with small or large production areas. However, the Party claims that the plantback time for chloropicrin is 40 days which could disrupt crop scheduling and result in delays in planting and lower yields compared to MB treatment. In addition, the proximity of residential areas limits the use of chloropicrin in some areas.</p> <p>According to the Party, metalaxyl does not control Pythium efficiently as resistant strains to this fungicide have been reported. Party states that metalaxyl is effective for 20 days and is restricted by regulations to only 3 applications during the 200 day growing cycle. Therefore, this fungicide is not widely used on ginger to control Pythium. The Party reported that the pathogen is soil borne and the rhizomes used are pathogen free. They are raised in fumigated fields and then dipped in fungicide solution (Captan wettable powder). Strip treatment cannot be used because the large root systems grow into the infested non-fumigated soils between beds. MBTOC considers other alternatives may provide effective control of Pythium: chemical control with granules, powders or drenches (fenaminosulf, etridiazole, propamocarb, hymexazol, metalaxyl for non resistant fungi, furalaxyl), cultural practices (soil drainage, sowing date, organic amendments (Smith et al 1988)) and that there is scope for using Pic on flat areas that are not in close proximity to residential areas. There also appears to be scope for further reduction in MB amount by adoption of MB/Pic mixtures in flat areas where mechanisation can be used. Also, LPF films are technically feasible and available and can be used for at least part of this nomination with associated reduced dosage rate and control of emissions. MBTOC notes that the use of LPF films (VIF) have been widely adopted as required under mandatory regulation in Europe and sealing and laying problems of older type films have been overcome. In Japan, VIF are used for fumigation in some vegetables crops (cucurbits and pepper) (adoption up to 1.7 %) at the same rates as standard films (200 to 400 kg/ha). At present, VIFs are not used for fumigating soils for ginger. The rate of MB used varies between 250 and 300 kg/ha according to the region.</p>	CUN estimates higher costs and lower yield with Chloropicrin. Dazomet has lower cost than methyl bromide but also lower estimated yield. Estimated reduction in net revenue with alternatives is -22 to -30 percent.

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Japan	Ginger - protected	22.9	22.9			14.8		14.471 *	<p>MBTOC recommends a reduced CUE of 14.471 tonnes for this use for 2007. This CUN was reevaluated at request of the Party. The reduction is based on a decrease in effective dose by 25% due to the uptake of low permeability barrier films (LPF) on 9% of the nominated area by 2007. The nomination is for control of Pythium spp. (Pythium ultimum var. ultimum, Pythium zingiberium). MB (99.5%) is applied using small cans. The Party states that chloropicrin is registered in Japan and that application equipment is available for use on farms with small or large production areas. However, the Party claims that the plantback time for chloropicrin is 40 days which could disrupt crop scheduling and result in delays in planting and lower yields compared to MB treatment. In addition, the proximity of residential areas limits the use of chloropicrin. According to the Party, metalaxyl does not control Pythium efficiently, as resistant strains to this fungicide have been reported. Party states that metalaxyl is effective for 20 days and is restricted by regulation to only 3 applications during the 200 day growing cycle. Therefore, this fungicide is not widely used on ginger to control Pythium. The Party reported that the pathogen is soil borne and the rhizomes used are pathogen free. They are raised in fumigated fields and then dipped in fungicide solution (Captan wettable powder). Strip treatment cannot be used because the large root systems grow into the infested non-fumigated soils between beds. MBTOC considers other alternatives may provide effective control of Pythium: chemical control with granules, powders or drenches (fenaminosulf, etridiazole, propamocarb, hymexazol, metalaxyl for non resistant strains, furalaxyl), cultural practices (soil drainage, sowing date, organic amendments (Smith et al 1988)) and that there is scope for using Pic on flat areas that are not in close proximity to residential areas. There also appears to be scope for further reduction in MB amount by adoption of MB/Pic mixtures in flat areas where mechanisation can be used. Also, LPF films are technically feasible and available and can be used for at least part of this nomination with associated reduced dosage rate and control of emissions. MBTOC notes that the use of LPF films (VIF) have been widely adopted as required under mandatory regulation in Europe and sealing and laying problems of older type films have been overcome. In Japan, VIF are used for fumigation in some vegetables crops (cucurbits and pepper) (adoption up to 1.7 %) at the same rates as standard films (200 to 400 kg/ha). At present, VIFs are not used for fumigating soils for ginger. The rate of MB used varies between 250 and 300 kg/ha according to the region.</p>	CUN estimates higher costs and lower yield with Chloropicrin. Dazomet has lower cost than methyl bromide but also lower estimated yield. Estimated reduction in net revenue with alternatives is -22 to -30 percent.

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Japan	Melon	194.1	171.6		32.3	182.2	32.3	182.2	MBTOC recommends a supplemental CUE for 32.3 tonnes for 2006 and a CUE of 182.2 tonnes for 2007 for this use. The supplemental CUN for 2006 is for areas of crop that did not apply in the previous nomination round. This is based on the recognition that both the cropping system and pathogens (Melon necrotic spot virus and Cucumber green mottle mosaic virus) targeted by methyl bromide are unique. Methyl bromide use permits multiple cropping within a year while managing risk of disease carryover. Several potential alternatives have been trialled, but have not performed adequately. Basic practices have been in place for many years, with farmers using low technology systems, including applying MB from small canisters. The latter system has been superseded in many developed countries and grounds of safety and efficacy. MBTOC also acknowledges the effort to transition growers to use VIF. However, in spite of rates conforming with guideline standards, MBTOC urges the Party to consider further reductions in dosage rates, together with a more rapid transition to VIF or equivalent films, as a transitional strategy while alternatives are developed.	Technical reasons for CUN citing particular virus situation. No economic data on methyl bromide alternatives.

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Japan	Peppers (green and hot)	187.2	112.3	74.9	13.5	169.4	13.5	156.7	<p>MBTOC recommends that a supplementary CUE for 13.5 tonnes for 2006 and a reduced CUE of 156.7 tonnes for 2007. The nomination is based on the stated need to control a particular virus of peppers. Pepper mild mottle tobamovirus is transmitted by mechanical inoculation, grafting and contact between plants and by seeds, and can survive in crop debris, especially in fumigated soils. The problem appears to exist because of continuous cropping with peppers and is controlled in other countries by appropriate crop rotation, better crop sanitation and use of pathogen free seeds. The virus has been reported in many countries. In spite of the high severity of this virus in most of these countries, MB has never been used or requested for its control. MBTOC recognises the unique farming system used for peppers in Japan in place for many years. MB treatment is apparently essential to economic health of these growers. MBTOC notes that the cultural practices adopted for pepper production in Japan result in need for MB for this virus and that no other country is using MB to control this virus. The Party is urged to demonstrate progress in developing strategies to eradicate the pathogen, particularly from the crop debris. VIF technology is currently being introduced. The Party claims that the minimum rate of adoption of VIF is 5% per year and is achievable, although a higher rate may be possible. Based on the Party statement, MBTOC sees that by 2007, 15% of the growers will be adopting VIF at a dosage of 200 kg/ha for those currently using high rates of 400 kg/ha. A 7.5 % reduction of the nomination for 2007 is thus recommended.</p>	Technical reasons for CUN citing particular virus situation. No economic data on methyl bromide alternatives.

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Japan	Watermelon	129.0	60.9		38	94.2	38	94.2	MBTOC recommends a supplemental CUE of 38 tonnes for 2006 and a CUE of 94.2 tonnes for 2007 for this use. The supplemental CUN for 2006 is for areas of crop that did not apply in the previous nomination round. This is based on the recognition that both the cropping system and pathogen (Cucumber green mottle mosaic virus) targeted by methyl bromide are unique. Methyl bromide use permits multiple cropping within a year while managing risk of disease carryover. Several potential alternatives have been trialled, but have not performed adequately. Basic practices have been in place for many years, with farmers are using low technology systems, including applying MB from small canisters. The latter system has been superseded in many developed countries on grounds of safety and efficacy. MBTOC acknowledges the effort to transition growers to use VIF. However, in spite of rates conforming with standards, MBTOC urges the Party to consider further reductions in dosage rates, together with a more rapid transition to VIF films, as a transitional strategy while alternatives are developed.	Technical reasons for CUN citing particular virus situation. No economic data on methyl bromide alternatives.
Latvia	Grains				2.502		2.502 *		MBTOC recommends a CUE of 2.502 tonnes for this use for 2006. This sector is characterized by older, traditional grain silos lacking sealing and modern circulation systems, making the use of alternatives difficult. The amount recommended by the Party (EC) resulted from a calculation that reduced frequency of fumigation and dosage rate to a low rate. The Party is encouraged to ensure technical efficacy of fumigations through the selection of appropriate dosage rates.	CUN reports phosphine costs twice as much, and the additional costs for improved ventilation equipment to allow use of phosphine would be prohibitive.

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Malta	Cucumber				0.127		0.127		MBTOC recommends a CUE of 0.127 tonnes of MB in 2006 for this use. MBTOC recognises that farmers in Malta intend to transition to alternatives as suggested by the Party by 2007 (dazomet, metham sodium and solarisation) and that any stocks of methyl bromide would be used for any remaining critical uses.	The CUN reports one set of economic information in a single CUN for cucumber, eggplant, strawberry and tomatoes. The CUN reports costs of methyl bromide treatment, steam, and solarisation. Gross and net revenues for methyl bromide, steam, and solarisation are reported. Significantly lower net revenues result from the alternatives. However, because the data are not crop specific, it is not possible to evaluate the economic feasibility of the alternatives.
Malta	Eggplant				0.17		0.17		MBTOC recommends a CUE of 0.170 tonnes of MB in 2006 for this use. MBTOC recognises that farmers in Malta intend to transition to alternatives suggested by the Party by 2007 (dazomet, metham sodium and solarisation) and that any stocks of methyl bromide would be used for any remaining critical uses.	The CUN reports one set of economic information in a single CUN for cucumber, eggplant, strawberry and tomatoes. The CUN reports costs of methyl bromide treatment, steam, and solarisation. Gross and net revenues for methyl bromide, steam, and solarisation are reported. Significantly lower net revenues result from the alternatives. However, because the data are not crop specific, it is not possible to evaluate the economic feasibility of the alternatives.

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Malta	Strawberry				0.212		0.212		MBTOC recommends 0.212 tonnes for 2006 of MB in 2006 for these uses for open field and greenhouse. MBTOC recognises that farmers in Malta intend to transition to alternatives suggested by the Party by 2007 (metham sodium combined with resistant cultivars, metham sodium + short solarisation and low cost substrates) and that any stocks of methyl bromide would be used for any remaining critical uses.	The CUN reports one set of economic information in a single CUN for cucumber, eggplant, strawberry and tomatoes. The CUN reports costs of methyl bromide treatment, steam, and solarisation. Gross and net revenues for methyl bromide, steam, and solarisation are reported. Significantly lower net revenues result from the alternatives. However, because the data are not crop specific, it is not possible to evaluate the economic feasibility of the alternatives.
Malta	Tomatoes				0.594		0.594		MBTOC recommends a CUE of 0.594 tonnes of MB in 2006 for this use. MBTOC recognises that farmers in Malta intend to transition to alternatives suggested by the Party by 2000 (metham sodium combined with resistant cultivars, metham sodium + short solarisation and low cost substrates) and that any stocks of methyl bromide would be used for any remaining critical uses.	The CUN reports one set of economic information in a single CUN for cucumber, eggplant, strawberry and tomatoes. The CUN reports costs of methyl bromide treatment, steam, and solarisation. Gross and net revenues for methyl bromide, steam, and solarisation are reported. Significantly lower net revenues result from the alternatives. However, because the data are not crop specific, it is not possible to evaluate the economic feasibility of the alternatives.

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Netherlands	Strawberry runners - postharvest	0.12			0.12		0.12		MBTOC recommends a CUE of 0.120 tonnes for 2006 for this use (control of bacteria in bare root strawberry plantlets). The applicant has stated there are complete MB capture systems in place and as a result there are no MB emissions. To date control has not been achieved through alternatives. Party is encouraged to continue its research program.	No economic data on alternatives given
Poland	Coffee, cocoa beans				2.160		2.160		MBTOC recommends a CUE of 2.160 tonnes for this use (control of mites in 2006 in imported cocoa and coffee beans). MBTOC recognises that controlling mites is more difficult than other pests and the need for dockside treatment at cold temperatures further complicates treatment. The Party has reduced the applicant's request to account for lower dosage rates, and the applicant has plans to reduce their dosage rates even further. The Party is encouraged to continue their investigation and/or adoption of rapidly generated forms of phosphine gas.	No economic data given on alternatives, but CUN indicates capitol costs for fast generating phosphine machines (a technically effective alternative), and cold are too expensive.
Portugal	Cut flowers	50			8.75		8.75		MBTOC recommends that a CUE of 8.75 tonnes of MB for 2006 for this use. MBTOC appreciates the new information sent by the Party to further clarify the nature of this nomination. For any future submissions MBTOC requests that the Party more explicitly state the pests and pathogens or environmental conditions that make MB critical for the portion of the cropping area where alternatives have been difficult to adopt. MBTOC notes that, according to the Party (EC), lack of technical and economically feasible alternatives has not been validated and efforts to find, register and deploy alternatives have been insufficient.	CUN reports lower costs for dichloropropene alone and in combination with metham sodium with accompanying yield losses of 50 to 90 percent compared to methyl bromide. Steam effective but near 3 times the cost of methyl bromide. Emphasis on technical basis for CUN.
Spain	Rice				Between 22 and 50		42.065 *		MBTOC recommends 42.065 tonnes of MB for packaged rice for Spain in 2006. This sector is in transition to alternatives and facilities are under construction, but will not be completed by 2006. In correspondence subsequent to the initial CUN, the Party provided its MB nomination as a range, and also later provided the total rice volume treated by MB under vacuum and in atmospheric conditions respectively. MBTOC calculated the amount recommended using EPPO standard dosage rates (50 g/m3 under vacuum and 20 g/m3 in atmospheric conditions) under these conditions of treatment and with these product volumes.	Phosphine fumigant costs equivalent to MB, but requires longer treatment times. Modified atmosphere chambers capital costs high. Vacuum packaging treatment (technically effective alternative) increases consumer costs \$0.20/kg of rice

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UK	Cereal processing plants	(a)			8.131		8.131		MBTOC recommends a CUE of 8.131 tonnes for this use in 2006. The Party is quickly adopting heat and SF where possible, but SF is not registered for silos that are integral to the flour mills in the case of the structures within this CUN. The applicant should be encouraged to change logistics to enable emptying of silos before fumigation to allow for increased use of SF.	CUN reports that heat or SF would cost 200% more than MB treatment
UK	Cheese stores	1.6			1.248		1.248		MBTOC recommends a CUE of 1.248 tonnes this use (traditional cheese stores with cheese in situ) in 2006. MBTOC knows no alternatives for mites in cheese under these conditions. The applicant has made significant efforts in improving gastightness and is continuing a research programme.	CUN states there are no economically feasible alternatives based on lack of technically feasible alternatives. CUN presents no economic data or analysis.
UK	Cut flowers				7.56		6.05 *		MBTOC recommends a reduced CUN of 6.05 tonnes for this use for 2006. The nomination is mainly for stocks, tulips and lilies grown in ground beds under cover and affected by soilborne fungi and other pests. Major alternatives, particularly 1,3-D, chloropicrin and their combinations are not registered in the United Kingdom for this particular use (1,3-D for outdoor use only). The Party identifies alternatives such as steam and substrates as being feasible, but time is needed to increase their commercial uptake. MBTOC considers that substrates are now a standard technology for production for tulips and lilies in similar regions of the world and did not recommend MB for 20% of the nomination representing these crops (Tribulato and Noto, 2001; Van Bruggen and Duinveld, 1995; Van Os et al. 1999; Berg, 2000; Puchoo et al. 1999; Sochaki and Chojnowska, 2005; Drakes et al, 2001). MBTOC notes that whilst some of the problems described by the Party involve a soil-borne stage (e.g. thrips, Mycosphaerella), proven options exist for their efficient management and control (Powell and Lindquist, 1997; Van Driesche et al. 2004; Anon, 2001). MBTOC notes that, according to the Party (EC), lack of technical and economically feasible alternatives has not been validated and efforts to find, register and deploy alternatives have been insufficient.	CUN yield losses with alternatives dazomet and metham sodium, but no yield loss with steam. Steam alternative is reportedly too costly compared to methyl bromide. The CUN presents a partial budget analysis showing dazomet results in a 95 percent decrease in Gross Margin (net revenue) compared to methyl bromide.

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UK	Dried commodities (rice, fruits and nuts) Whitworths	2.4			1.256		1.256		MBTOC recommends a CUE of 1.256 tonnes for this use in 2006. The Party indicated that VIF in stack fumigation and chambers are used to reduce emissions. The applicant is encouraged to assess how changed marketing logistics will allow a higher percentage to be treated with phosphine thereby reducing MB use. MBTOC also notes that SF is not approved for these commodities.	CUN presents no economic information on methyl bromide or alternatives. The Party's response to EC notes discussed economic costs of phosphine.
UK	Herbs and spices	0.035			0.037		0.037		MBTOC recommends a CUE of 0.037 tonnes for this use in 2006. The Party has reduced the applicant's request to encourage adoption of alternatives and IPM. MBTOC suggests that improvements in IPM practices, together with pest management prior to import be continued so as to reduce the need for MB for this nomination.	CUN states that phosphine or CO2 would cost 5 times and irradiation would cost 7 times the cost of MB treatment, CUN notes losses would result from additional downtime when alternatives are used.
UK	Mills (NABIM)	(a)			10.195		10.195		MBTOC recommends a CUE of 10.195 tonnes for this use in 2006. The Party has reduced the applicant's request by 60 percent to encourage faster adoption of alternatives. Given the difficulties identified in the adoption of alternatives, specifically heat, in large mills, no further reductions are suggested.	CUN reports heat will cost 2.5 times more than MB and although costs of SF are unclear at this time, it is estimated to cost 2.5 - 6 times the MB treatment costs.
UK	Mills and Processors (biscuits)	2.525			1.787		1.787		MBTOC recommends a CUE of 1.787 tonnes for this use in 2006. The Party has reduced the application to account for potential to use alternatives. The applicant has also made improvements in facility gastightness, reduced dosage rates to MBTOC standards and upgraded IPM practices to enable decreased fumigation frequency. The applicant also has an active research programme. SF is not registered for this purpose.	CUN states that SF would cost 200-300% more and heat would cost 200-400% than MB treatment.
UK	Structures (herbs and spices)	3.0			1.872		1.872		MBTOC recommends a CUE of 1.872 tonnes for this use in 2006. The Party has reduced the nomination to account for the potential to continue adoption of heat treatment. SF is not registered for this purpose.	CUN states heat or SF treatment would cost 200% more than MB treatment.

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UK	Structures, processors and storage (Whitworths)	1.1			0.880		0.880		MBTOC recommends a CUE of 0.880 tonnes for this use in 2006. The Party is encouraged to develop industry standards for efficacy of heat treatments sufficient to comply with UK food safety legislation and to continue to develop alternatives such as appropriate packaging and phosphine treatment.	CUN reports no economic data on alternatives. Party's response to EC states costs for SF would be up to 5 times the costs of methyl bromide.

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USA	Cucurbits - field	1187.8	747.839			598.927		592.891 *	<p>MBTOC recommends a reduced CUE of 592.891 tonnes for this use for 2007. This represents 26.261 tonnes for Michigan, 364.359 tonnes for the SE, 201.330 tonnes for Georgia and 0.941 tonnes for research. A minority of MBTOC evaluated the parts of this CUN relating to Georgia and SE as 'unable to assess' (see Section 2.4.2). The Party's nomination was adjusted to account for 5% of the nominated area using barrier films and MB:Pic (50:50) at 175 kgMB/ha when treating areas with moderate to severe nutsedge and 150 kg/ha for pathogen control.</p> <p>In Michigan, the key pests are <i>Phytophthora capsici</i> and <i>Fusarium oxysporum</i>. The Party states that 1,3-D/chloropicrin may be an effective alternative, but growers will miss the optimal market window due to longer plant back times. According to the Party, this treatment cannot be applied in autumn when soils are warm because of climatic conditions and damage by deer and other animals to plastic mulches and irrigation tapes.</p> <p>In SE and Georgia, the key pest is mainly nutsedge and some root knot nematodes and fungal pathogens. 1,3-Dichloropropene + chloropicrin + herbicides (trifluralin, napropamide, halosulfuron and S-metolachlor) are the most promising alternatives. Karst topography limits the use of alternatives which includes 1,3-D on 8% of the growing acreage. The Party states that metham sodium or metham potassium are promising alternatives but still do not provide consistent control and require further trials, which are underway. Other studies however, have demonstrated the efficacy of metham sodium + chloropicrin in areas with low to moderate nutsedge pressure for cucurbits and similar crops in the region (Locascio et al 2000; Nelson et al 2002, Gilreath et al 2005). MBTOC anticipates that there will be adoption of this alternative to replace methyl bromide in karst areas with low nutsedge infestation by 2007. In addition, the Party states that trials are underway to investigate lower MB/Pic formulations such as 50:50 as there are no regulatory restrictions to the use of these formulations.</p> <p>The Party states that LPF barrier films are still not being widely adopted on a commercial scale due to lack of availability, cost and technical problems with laying the films. Versions of metallised films are being widely tested by several researchers and growers and show promise. MBTOC believes that LPF barrier films are technically and economically viable for this nomination. All of the technical problems reported by the Party appear to have been solved in European countries where the use of VIF barrier films is mandatory.</p>	<p>CUN states next best alternative in all regions is 1,3-D with chloropicrin with expected yield losses of 6 percent in Michigan and 29 percent in Southeastern States and Georgia. CUN states 1,3-D with chloropicrin is considered technically feasible in Michigan. However, CUN noted that for Michigan in addition to the yield loss, delayed planting and harvest with the alternatives results lower average price received from missed market windows and negative net revenue. In remaining regions yield losses significantly reduce net revenues. CUN notes other regions may also experience lower prices because of missed market windows.</p>

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USA	Cucurbits – field (continued)								Grower scale trials have demonstrated the success of a 50% reduction in rate with LPF film (Gilreath and Santos 2004, 2005). In fields with moderate to heavy nutsedge pressure, Santos and Gilreath (2005) have shown that the standard MB/Pic 67:33 at a rate of 350 kg/ha can be reduced by 25 % (to 175 kg/ha MB) under LPF film with equivalent yields and nutsedge control. In the past year, there has been substantial commercial adoption of LPF film in the southeast of USA (Bruno Rimini Ltd, pers. comm.). MBTOC has recommended a reduction in the nomination as shown above to account for decreased dosage rates in areas with low disease pressure from nutgrass in anticipation of the likely increased implementation of emission control technologies, including adoption of LPF barrier films, by 2007.	
USA	Dried beans				7.07		7.07 *		MBTOC recommends a supplemental request for a CUE of 7.07 tonnes for this use in 2006. A nomination for this use was included with other dry commodities in the 2003 round of CUNs for 2005 use, but was omitted from the 2004 round for 2006 use. Beans are produced in high quantity and short time in California. Between 60-90% of black eye beans are consumed at New Year festival (January), yet they are harvested in October and November. Use of phosphine would require longer fumigation times, but treatment facilities are currently inadequate to handle the high volumes harvested in the short time between harvest and need to market for the holiday. With the next harvest the bean sector will begin trials of cylinderized phosphine and the newly registered sulfuryl fluoride.	No economic data on alternatives given.

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USA	Dried fruit and nuts (walnuts, pistachios, dried fruit and dates and dried beans)	89.166	80.649			91.299		78.983 *	MBTOC recommends a CUE of 78.983 tonnes for these uses for 2007. This recommended amount comprises 45.401 tonnes for walnuts; 18.234 tonnes for dried fruit; 3.016 tonnes for dates; 5.262 tonnes for pistachios and 7.070 tonnes for beans (garbanzos and black eye beans). The amounts of methyl bromide requested for this sector by the Party are the same amounts of methyl bromide used in 2001-2002. MBTOC reduced the amount nominated for walnuts to utilize a dosage rate of 48 g/m <sup>3</sup> used in 2006 by the Party, instead of the 61 g/m <sup>3</sup> requested for 2007, in the absence of data justifying the need for an increased dosage rate. Phosphine is the commonly used fumigant for pistachios. There has been considerable adoption of gaseous phosphine by the largest Californian processor to reduce the treatment time for pistachios. Fumigation with phosphine takes longer than fumigation with MB and the Party has indicated a need for MB when quick turn around is demanded and when that demand cannot be satisfied by available phosphine-treated pistachios. Beans and walnuts are produced in high quantity and short time in California. Between 60-90% of black eye beans are consumed at New Year festival (January), yet they are harvested in October and November. Use of phosphine would require longer fumigation times, but treatment facilities are currently inadequate to handle the high volumes harvested in the short time between harvest and need to market for the holiday. With the next harvest the bean sector will begin trials of cylinderized phosphine and the newly registered sulfuryl fluoride. MBTOC has ascertained that the dates referred to in the CUN are freshly harvested dry dates. Phosphine is not registered for use on this product and sulfuryl fluoride has only been recently been registered for this sector. The Party stated that further adoption of alternatives by 2007 will be taken into consideration during its allocation public rulemaking process.	Economic data on alternatives given for walnuts, pistachio and dried fruit other than dates. Phosphine fumigant costs 10-30% higher but problem is phosphine takes longer to accomplish and its use would not allow sellers to reach December holiday export market window since product is harvested in autumn. CUN states walnuts, pistachio, and dried fruit all experience substantial additional downtime and subsequent lost revenues if phosphine is used.

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USA	Dry commodities/ structures (cocoa beans)	61.519	46.139	15.38		64.082		64.082 *	MBTOC recommends a CUE of 64.082 tonnes for this use for 2007. This nomination has been taken out of the NPMA food processing facilities CUN and has been dealt with separately. The amount of MB nominated for cocoa beans represents an increase for 2007 over 2006, based on forecasted increase in cocoa bean imports. MBTOC's recommendation is based on cocoa beans being fumigated once on import and once again immediately before shipment to chocolate manufacturers and that cocoa bean warehouses comply with the warehouse quality control program of the Cocoa Merchants. The Party uses MBTOC's standard dosage rate or 20g/m3 MB for structures. Under the circumstances of cocoa bean storage in the US phosphine cannot currently be used because of label restrictions on entry to the warehouse during fumigations and because phosphine requires unacceptably longer fumigation times at the temperatures experienced in the warehouses. Sulfuryl fluoride has only been recently been registered for this sector. The Party stated that further adoption of alternatives by 2007 will be taken into consideration during its allocation public rulemaking process.	No data on costs of alternatives. CUN notes additional fumigation time needed with phosphine, and costs of retrofitting facilities for heat treatment.
USA	Dry commodities/ structures (processed foods, herbs and spices, dried milk and cheese processing facilities) NPMA	83.344	56.253	27.091		83.238		82.771 *	MBTOC recommends a CUE of 82.771 tonnes for these uses for 2007. The original CUN also included cocoa beans, but these are dealt with separately. MBTOC recommends 74.884 tonnes for food processing facilities, 4.891 tonnes for spice and herb processing facilities and 2.996 tonnes for cheese processing facilities. MBTOC does not recommend the 0.467 tonnes nominated for the dry commodity sector of this CUN (the 'other' category) because the technically effective alternatives of ethylene oxide gas, irradiation, phosphine and propylene oxide are registered and in broad commercial use for this purpose. These commodities can be treated at contract fumigation or irradiation facilities. The Party's nomination already uses MBTOC standard dosage rates. The Party has made some progress adapting heat and other fumigants in this sector. Sulfuryl fluoride has only recently been registered for this sector. The Party reduced their applicant's nomination by about 20% over 2006 levels to take into consideration adoption of alternatives. The Party stated that further adoption of alternatives by 2007 will be taken into consideration during its allocation public rulemaking process.	No data on costs of alternatives. CUN notes additional fumigation time needed with phosphine, and costs of retrofitting facilities for heat treatment.

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USA	Dry cure pork products (building and product)	67.907			40.854 (c)	40.854		18.998 *	MBTOC recommends 18.998 tonnes of MB for US dry cure pork products composed of 18.144 tonnes for American Association of Meat Processors; 0.709 tonnes for National Country Ham Association; and 0.145 tonnes for Nahunta Country Pork Center. This traditional and regionally important food product is produced by loosely organized small processors. Consequently, the Party has been unable to provide historical MB use data. MBTOC's discussions with MB distributors indicate the likely use of MB in this sector is about 18.144 tonnes (40,000 lbs) but the National Country Ham Association and Nahunta Pork Center were able to give specific information on product volumes and dosage rates. Consequently MBTOC was able to recommend specific amounts for those organizations. MBTOC is unable to assess the additional 21.856 tonnes requested, pending submission of specific information of the amount of MB used and required by the Party for dry cure pork. MBTOC has not identified any alternatives for this specific and specialised use, where fumigations of structures are conducted in the presence of curing hams. The nomination did not indicate any research to develop alternatives. The Party is requested to gather use data to support this nomination and to adjust the quantity nominated for any unused allocations from previous CUEs. MBTOC has concerns over the lack of emission controls in this use.	No economic data on alternatives given.

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USA	Eggplant - field	76.721	81.253	20.933		96.48		85.363 *	<p>MBTOC recommends a reduced CUE of 85.363 tonnes for 2007 for this use. Recommendations comprise 3.799 tonnes for Michigan, 58.824 tonnes for Florida, 22.307 tonnes for Georgia and 0.433 tonnes for research. A minority of MBTOC evaluated the parts of this CUN relating to Georgia and Florida as 'unable to assess' (see Section 2.4.2). The Parties nomination for Georgia and Florida was adjusted to account for 5% of the nominated area using barrier films and MB:Pic (50:50) at 175 kgMB/ha when treating areas with moderate to severe nutsedge. The nominated quantity for Florida was also reduced to conform with standard dosages of 260 and 200 kgMB/ha with chloropicrin for high/moderate and low nutsedge regions respectively. In Michigan, the key pest is Phytophthora capsici. The Party shows that 1,3-D/chloropicrin is an effective alternative, but that growers will miss the optimal market window due to longer plant back times (28 days) with this alternative. According to the Party, this treatment cannot be applied in autumn because of the bad climatic conditions and damage by deer and other animals to the plastic mulch and irrigation tape.</p> <p>In Florida and Georgia, the key pests are nutsedge, root knot nematodes and some fungal pathogens. Southern blight, pythium damping off and verticillium wilt are also managed with MB. Karst topography limits the use of alternatives containing 1,3-D on 48% of the growing acreage. The Party states that metham sodium or metham potassium are promising alternatives but still do not provide consistent control under the circumstances of the nomination and require further trialling. In addition, the Party states that trials are underway to investigate lower MB/Pic formulations, such as 50:50, as there are no regulatory restrictions to the use of these formulations. The Party shows that 1,3-D/Pic in combination with herbicides is a possible effective alternative for non-karst areas with pathogen and nutsedge pressure (Cortright and Hausbeck, 2004) and that metham combined with Pic is effective for low to moderate nutsedge pressure in similar crops and regions (e.g. Ajwa et al 2003, 2004, McMillan and Bryan 1998, Johnson and Webster 2001, Gilreath et al 2005 bc). MBTOC acknowledges that longer plant back times for 1,3-D and metham may cause loss by missing market windows in Georgia and Florida but considers uptake of these alternatives is possible for a proportion of future nominations. MBTOC also considers that metham combined with Pic is a possible effective alternative for karst areas and urges the Party to continue further studies.</p>	CUN states next best alternative in all regions is 1,3-D with chloropicrin with expected yield losses of 6 percent in Michigan and 29 percent in Georgia and Florida. CUN states 1,3-D with chloropicrin is considered technically feasible in Michigan. However, CUN noted that for Michigan in addition to the yield loss, delayed planting and harvest with the alternatives results lower average price received from missed market windows and negative net revenue. In Florida and Georgia yield losses significantly reduce net revenues. CUN notes Florida and Georgia producers may also experience lower prices because of missed market windows.

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USA	Eggplant – field (continued)								The Party states that LPF films are still not being widely adopted on a commercial scale due to lack of availability, cost and technical problems with laying the films. Versions of metallised LPF barrier films are being tested by several researchers and growers and show promise. MBTOC believes that LPF barrier films are technically and economically viable for this nomination. All of the technical problems reported by the Party appear to have been solved in European countries where the use of VIF barrier film is mandatory. Grower scale trials have demonstrated the success of a 50% reduction in rate with LPF barrier film (Gilreath and Santos 2004, 2005). In fields with moderate to heavy nutsedge pressure, Santos and Gilreath (2005) have shown that the standard MB/Pic 67:33 at a rate of 350 kg/ha can be reduced by 25-50% (to 175 kg/ha MB or less) under LPF barrier film with equivalent yields and nutsedge control. Recently there has been substantial commercial adoption of LPF barrier film in the southeast of USA (Bruno Rimini Ltd). MBTOC has recommended a reduction in the nomination as shown above to account for decreased dosage rates in areas with low disease pressure from nutgrass in anticipation of the likely increased implementation of emission control technologies, including adoption of LPF barrier films by 2007.	

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USA	Forest nursery seedlings	192.515	157.694			152.629		122.032 *	<p>MBTOC recommends a reduced CUE of 122.032 tonnes be approved for this use for 2007. Regions B (22.279 t) and E (9.637 t) are recommended without change, but amounts have been adjusted in regions A (61.88 t), C (1.820 t), D (8.58 t), F (8.736 t), G (5.98 t) and H (3.12 t) to conform with MBTOC guidelines with use of MB/Pic mixtures (i.e. 67:33 – 260 kg/ ha for control of nutgrass and 200 kg/ha for pests and pathogens other than nutgrass), which the Party indicates is an effective formulation. The CUN is based on economic infeasibility of using substrates and the lack of effective alternatives for control of nutsedge and a range of fungal pathogens. It covers certified seedling production in 7 forest nursery regions and one region in Michigan growing herbaceous perennials. Certification requires that seedlings must be pest/pathogen free. The Party states that all regions use broadacre fumigation, but with different mixtures and rates of MB/Pic. MBTOC recognizes that the key pest is nutsedge. Research is ongoing to determine if Pic with metham, 1,3-D and /or herbicides can provide acceptable control of moderate to severe levels of nutsedge. To date, metham sodium and chloropicrin in combination showed promising results, but when used without plastic sheeting caused severe crop injury. The Party acknowledged that this treatment (and others) when covered with plastic films, particularly LPF barrier films, may provide an effective technical alternative and avoid crop injury. MBTOC considers new films and glues are available for broadacre tarping under most conditions, however the Party will need time to trial and scale up this alternative. Although no further reductions have been made by MBTOC to the nomination, the Party is urged to consider adoption of LPF barrier films to reduce dosage rates in regions where their use is permitted. Broadacre use of LPF barrier films exists in other regions worldwide. MBTOC also considers glyphosate can be used as a pretreatment to reduce pressure from nutgrass and 1,3-D/Pic + metham sodium (or glyphosate) should be further evaluated for control of nutsedge as results in trials have been promising (Culpepper and Langston, 2004). The nomination states that containerised plants are not economically feasible for regions A through G. MBTOC considers substrates to be an effective technical alternative for most forest nurseries, however understands that present costs (\$US0.12 vs. \$0.04 per seedling) make this practice economically infeasible at the present time.</p>	<p>Alternatives have 3-5% decrease in yield and higher costs resulting in estimated decreases in net revenue that varied from 6 percent to 42 percent with the next best alternative. CUN states numerical analysis does not include additional impact of quality losses and indirect yield losses resulting from lengthening the production cycle.</p>

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USA	Mills and Processors	483	394.843	111.139		401.889		401.889 *	MBTOC recommends an amount of 401.889 tonnes for 2007 for the US mills and food processors. MBTOC recommends 274.650 tonnes for flour mills; 64.150 tonnes for rice mills; 39.275 tonnes for pet food establishments, and 23.814 tonnes for bakeries. The recommended amount includes an increase for bakery sector where a company owning several large facilities suffered equipment and structural damage and pest control failure as a result of failure of heat treatment specific to the design of the facilities. The Party's nomination already uses MBTOC standard dosage rate of 20g/m3 MB for structures. The Party has made some progress adopting and adapting heat, sulfuryl fluoride (where registered), and other fumigants in this sector. The Party reduced their applicant's nomination by 15% over 2006 levels to take into consideration adoption of alternatives. Further adoption of alternatives by 2007 will be taken into consideration by the Party during its allocation public rulemaking process.	The CUN reports heat will cost 1.5 times and sulfuryl fluoride costs 1.3 times the cost of MB treatment. Heat treatment is reported to result in lost operating days and thus lower throughput and gross revenues.

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
USA	Nursery stock - fruit trees, raspberries, roses	45.800	64.528			31.014		28.275 *	MBTOC recommends 28.275 tonnes for this nomination for 2007, including 2.100 tonnes for roses, 16.279 tonnes for fruit and nut trees, 1.506 tonnes for research and a reduced amount from 10.952 to 8.39 tonnes for the raspberry nursery portion of this nomination. MBTOC has reduced the amount nominated for raspberry to conform with MBTOC's standard rate of 200 kg/ha and to allow for adoption of the alternative 1,3-D on 10% of the area in Washington state. For raspberry nurseries the nomination is for certified propagative material that is not shipped outside the geographical border where it was produced. A large proportion, i.e. 60, 99 and 92% for raspberries, roses, and fruit and nut industries respectively, have been exempted under QPS criteria. Certification is mandatory for California and is voluntary in Washington. The crop has no value if it is not certified. MBTOC acknowledges the difficulty in protecting raspberry roots to 1.5m depths. MBTOC acknowledges that MB/Pic formulations 67:33 and 50:50 were used in other countries and urges the Party to consider these alternatives as a transition strategy to reduce MB dosage in the absence of effective alternatives. Further validation of their effectiveness is sought in future nominations. MBTOC has identified studies (McKenry, 1999) which indicate that 1,3-D at high rates (greater than 390 kg/ha) can be effective at controlling pests and killing old perennial roots up to 1.5m deep. Although, these high rates are not allowed by regulation in California, it appears that the high rates would be allowed in Washington. MBTOC has reduced the amount of methyl bromide requested by raspberry nurseries to account for implementation of use of 1,3-D on 10% of the nominated area. In California, the standards require the propagative material to be "commercially clean" and only list methyl bromide or 1,3-D (Telone II) as preplant soil disinfestation treatments to meet this standard. In Washington, the tolerance is 0.1% incidence for nematodes and "practically free" for disease. MBTOC urges the Party to consider LPF barrier films to reduce dosage rates in regions where restrictions permit their use. Broadacre use of LPF barrier films exists in other regions worldwide.	CUN cites lack of technically feasible alternatives. CUN notes most economic losses cannot be quantified. CUN notes certification requirements that would result in yield losses of up to 100 percent if nursery stock cannot be certified as pest free and subsequent economic consequences. CUN notes potential increase in pesticide use and potential lower yields of fruits and nuts from plants and trees placed in production.

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
USA	Orchard replant	706.176	527.6	300.4		405.4		405.4 *	MBTOC recommends 405.4 tonnes for this nomination which includes 1.66 tonnes for research. The CUN is for 3 situations: Orchard/vineyard replant disorder of unknown aetiology; heavy soils or soils which cannot be dried to a sufficient depth to effectively use the reduced rates of 1,3-D now allowed in California; and areas in which Township caps prevent the use of 1,3-D in some areas. Regulatory restraints (maximum labeled rate) prevent the use of 1,3-D at the rates needed for effective kill of old roots and the associated pathogens in deeper soil layers for heavier (fine-textured) soils. Regulatory restraints further prevent the use of LPF barrier films with methyl bromide in California. MBTOC acknowledges that MB/Pic formulations as low as 50:50 were used in other countries and urges the Party to consider these alternatives as a transition strategy to reduce MB dosage in the absence of effective alternatives. Further validation of their effectiveness is sought in any future nominations. MBTOC notes that the nominated amount is a 24% reduction from the amount approved by the Parties for 2006 and a 43% reduction from the amount approved by the Parties for 2005.	CUN cites lack of technically feasible alternatives. CUN notes most economic losses cannot be quantified and lists factors that contribute to losses including delayed planting, tree loss, additional use of herbicides, yield losses of fruit or nuts.

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
USA	Ornamentals	154			162.817 (c)	149.965		137.835	<p>MBTOC recommends a reduced CUE of 137.835 tonnes in total for this nomination, being 75.145 tonnes for California and a reduced CUE of 58.63 tonnes for Florida, and 4.06 tonnes for associated research. MBTOC recognises the effort made by the Party in submitting more complete information; this is essential in understanding the specific circumstances of the complex and diverse US ornamental industry, particularly the fact that uses have now been disaggregated by region. 52% of this nomination is for California and corresponds to areas impacted by regulatory issues (township caps). There are no available in-kind alternatives for these areas. 48% of the nomination is for Florida. Of this, 40% is impacted by karst topography, denying use of 1,3-D and is recommended by MBTOC on the basis of lack of feasible alternatives. It is suggested that the dosage for this part of the nomination be reduced from 350 to 200 kg/ha in line with MBTOC presumptions for MB:Pic 67:33, but the remainder of the Florida nomination (60%) exceptionally be left at the high rate for treatment of soils of very high organic matter content. There is scope for reduction of the MB used using barrier films, provided the fumigation sheets can be joined satisfactorily. The Party states that the alternatives are not economically feasible because the decline in yields in all nominated regions leads to a substantial reduction in net revenue. This is based on the assumption that the quoted reduction in yields is technically realistic.</p>	<p>CUN reports yield losses of 20-25 percent with alternatives. Operating costs were assumed same as with methyl bromide. CUN reports substantial decreases in gross and net revenues. Negative net revenues predicted for calla lilies and bulbs in California and for caladiums in Florida.</p>

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
USA	Peppers - field	1094.782	806.877	694.497		1151.751		1106.753 *	<p>MBTOC recommends a reduced CUE of 1106.753 tonnes for 2007 for this use, being 11.325 tonnes for Michigan, 0 tonnes for California, 65.099 tonnes for the Southeast, 176.100 tonnes for Georgia, 851.385 tonnes for Florida and 2.844 tonnes for research. A minority of MBTOC evaluated the parts of this CUN relating to Georgia, the Southeast and Florida as 'unable to assess' (see Section 2.4.2). The Party's nomination was reduced on 5% of the nominated area in Florida, Georgia and the South East Region to account for the use of dosage rates of MB of 175 kg/ha for nutsedge in combination with low permeability barrier films and further for Florida to conform with dosages of 260 and 200 kgMB/ha with chloropicrin for high/moderate and low nutsedge regions respectively. MBTOC acknowledges the reduction by the Party of the nominated quantity of approx 7- 9 % for uptake of alternatives by 2007. In Michigan, the key pest is <i>Phytophthora capsici</i>. The Party states that 1,3-D/chloropicrin may be an effective alternative but growers will miss the optimal market window due to longer plant back times. According to the Party, this treatment cannot be applied in autumn because of climatic conditions and damage by deer and other animals to plastic mulches and irrigation tapes. In addition, a fall application of alternatives is not feasible because, over the autumn and winter months, deer and other animals damage the plastic and irrigation tape. In California the key pest is <i>Phytophthora capsici</i>. Township caps affect the adoption of alternatives utilizing 1,3-dichloropropene. The Party states that 1,3-D is difficult to use on hillsides. According to 2003 data from the California Dept. of Pesticide Registration, metham sodium is used (alone or with other treatments) on nearly as many acres as methyl bromide and therefore is considered a viable alternative for hillsides and in areas affected by township caps (CDPR 2003, Ajwa et al 2003, 2004, Gilreath et al. 2003b, 2005b, Johnson and Webster 2001). In Florida and Georgia the key pests are yellow and purple nutsedge, <i>Phytophthora capsici</i> and root knot nematode. Karst topography limits the use of alternatives have 1,3-D as a component, though they are the best alternatives for these pests on 40% of the growing acreage. The Party states that 1,3-D/Pic along with either herbicides (e.g. clomazone and metolachlor) or followed by Pic or metham sodium application may be the best alternative outside karst areas. Also metham sodium or metham potassium are promising alternatives but still do not provide consistent control under the circumstances of the nomination and require further trials, which are underway.</p>	<p>CUN states next best alternative in all regions is 1,3-D with chloropicrin with expected yield losses of 6 percent in California and Michigan and 29 percent in other regions. CUN states 1,3-D with chloropicrin is considered technically feasible in California and Michigan. CUN noted that for California the distribution of yield loss across individual growers and the yield risk associated with alternatives was not accounted for the numerical economic assessment. Numerical assessment showed 14 percent decrease in net revenue. In Michigan delayed planting and harvest with the alternatives results lower average price received from missed market windows and negative net revenue.</p>

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
USA	Peppers – field (continued)								Other studies however, have demonstrated the efficacy of metham sodium + chloropicrin in areas with low to moderate nutsedge pressure in pepper and similar crops and the regions of the nomination . (Gilreath et al 2003b, 2005b). MBTOC anticipates that there will be adoption of this alternative to replace methyl bromide in karst areas with low nutsedge infestation by 2008. In addition, the Party states that trials are underway to investigate lower MB/Pic formulations, such as 50:50 MB/Pic, as there are no regulatory restrictions to the use of these formulations. The Party states that LPF films are still not being widely adopted on a commercial scale due to lack of availability, cost and technical problems with laying the films. Versions of metallised LPF films are being tested by several researchers and growers and show promise. MBTOC believes that LPF films are technically and economically viable for this nomination. All of the technical problems reported by the Party appear to have been solved in European countries where the use of LPF film is mandatory. Grower scale trials have repeatedly demonstrated the success of a 50% reduction in rate with LPF film (Gilreath and Santos, 2005). In fields with moderate to heavy nutsedge pressure, Santos and Gilreath (2005) have shown that the standard MB/Pic 67:33 at a rate of 350 kg/Ha can be reduced by 25 -50 % (to 175 kg/ha MB) under LPF film with equivalent yields and nutsedge control. In the past year, there has been substantial commercial adoption of LPF film in the southeast (Bruno Rimini Ltd). MBTOC applied a reduction of 5% in the nomination for Florida, Georgia and the South East Region to account for decreased dosage rates of 175 kg/ha in anticipation of the likely increased implementation of emission control technologies, including adoption of LPF barrier films by 2007.	In remaining regions yield losses significantly reduce net revenues.

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
USA	Strawberry fruit – field	2052.846	1523.180	397.597		1733.901		1476.019 *	MBTOC recommends a CUE of 1476.019 tonnes for this use, comprising 1077.88 tonnes for California, 147.531 tonnes for Eastern states, 248.231 tonnes for Florida and 2.377 tonnes for research. A minority of MBTOC evaluated the parts of this CUN relating to the Eastern states and Florida as ‘unable to assess’ (see Section 2.4.2). The nomination for California was reduced by 190 tonnes to account for uptake of the key alternatives. A further reduction of 11.405 and 1.814 tonnes was applied to conform to MBTOC’s maximum guideline rates for strip of 260 kg/ha for high nutgrass. Quantities were adjusted for 175 kg/ha for 5% of the nomination for uptake of LPF barrier film. In California, the nomination is based on the grounds that township caps limit further adoption of 1,3-D, and hilly terrain prevents the use of drip-applied alternatives. In the case of township caps, alternatives that do not contain 1,3-D (such as Pic, Pic EC and Pic + metham applied sequentially) are technically feasible in at least part of this area (Ajwa et al 2002, 2003, 2004, Haar et al. 2001, Nelson et al. 2001a,b). As for the nomination in 2006, MBTOC applied the same reduction of 190 tonnes to account for uptake of these alternatives. MBTOC acknowledges that there are regulatory constraints on use of VIF in California at present, so the nomination was not adjusted for uptake of LPF films. In Eastern US, the nomination is based on moderate to severe pest pressure ( <i>Meloidogyne spp.</i> , <i>Pythium</i> , <i>Rhizoctonia</i> , <i>Phytophthora cactorum</i> , <i>Cyperus esculentus</i> , <i>C. rotundus</i> , <i>Lolium spp.</i> ) affecting 30-40% of the crop area, and small farm buffer zones on 40% of the crop area which affects use of 1,3-D formulations. MBTOC considers that alternatives are available for some part of the buffer zones which are not subject to heavy nutsedge pest pressure (e.g. Pic formulations, metham + Pic), and the Party says there is potential for adoption on about 10% of the buffer zone area and this will be pursued by some growers and extension personnel. MBTOC has accordingly reduced the nomination by 6.629 tonnes for adoption of these alternatives and a further 10.057 tonnes to conform with MBTOC’s standard guideline rates of 200 kg/ha for use with strip fumigation and low nutgrass pressures and 1.521 tonnes to allow for adoption of LPF barrier films on 5% of the nominated area.	CUN reports costs of alternatives for three next best alternatives for California, Florida, and Eastern United States. 1,3-D with chloropicrin is reported to reduce yield by 14 percent. Resulting lower production leads to lower net revenue. Planting and harvesting delays with alternatives are reported to lead to lower average prices received in all regions, but is only shown in the revenue analysis for California.

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
USA	Strawberry fruit – field (continued)								For Florida, the Party states that at moderate to severe pest pressure (primarily nutsedge on 30-40% of area), protocols for commercial application of alternatives have not been sufficiently developed to be implemented for the 2007 season. MBTOC considers that a transition strategy of using MB/Pic mixtures with lower MB (i.e.. MB/Pic 50:50) can be used for karst areas with low nutgrass. MBTOC acknowledges the restriction imposed by karst topography on availability of one alternative, 1,3-D, but considers that other alternatives (Pic EC, metham + Pic) are potentially suitable for use in karst areas with low nutgrass pressure (Fennimore et al. 2003, Gilreath et al 2003a, Nelson et al 2002, USDA 2003, Ajwa et al 2003, 2004) and urges the Party to consider further evaluation and adoption of these alternatives, including in combination with low permeability barrier films (Gilreath 2005a). No reduction was made for these alternatives. MBTOC reduced the balance of the nomination by 45.745 tonnes to conform with MBTOC's standard guideline rates of 260 or 200 kg/ha for use with strip fumigation with or without high nutsedge pressure and 3.761 tonnes to allow for adoption of LPF barrier films on 5% of the nominated area.	

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
USA	Strawberry runners	54.988	56.291			4.483		4.483	MBTOC recommends a CUE of 4.483 tonnes for this use, comprising 2.654 tonnes for southeastern states, 1.375 tonnes for California, and an associated research amount of 0.454 tonnes for 2007. A high proportion, 94% of runner production covered by this CUN has been exempted by the Party from critical use nomination under QPS. In future nominations, a copy of the certification requirements is requested from the Party. In the Southeastern states the nomination is based on the grounds that MB is needed to meet the strict requirements for producing pest free nursery stock. For California, the nomination says that the state mandatory certification program has strict requirements for control of disease and nematodes, which amount to near complete control of the key pests. MBTOC recognizes the need to produce planting stock of high health status to minimise spread of diseases and pests. The Party states that key alternatives are 1,3-D/Pic, 1,3-D/Pic + metham, and 1,3-D + metham, and that dazomet + Pic or 1,3-D is also a possible alternative. The Party notes that these chemicals, in addition to other strategies, such as use of high density tarps, may ultimately reduce or replace MB. Technical data provided with the submission indicates that several alternatives (e.g. metham + Pic) provide effective disease control but further trials are required to validate disease tolerance. The CUN section for California stated that research trials on metham sodium incorporated with a tractor-mounted tillovator provides good results but most growers do not have this equipment. Iodomethane is in the registration process. Party states that substrates/plug plants are currently being produced and sold in the southeast and to a very limited extent in California, but would require expensive retooling of the industry and additional pest control measures. Formulations of 67:33 MB:Pic are applied broadcast under HDPE in many cases, at 350 kg/ha in southeastern states and 263 kg/ha in California. Use of VIF is restricted in California, but low permeability barrier films (VIF or equivalent) could potentially be adopted in southeastern states with associated reduction of dosage.	CUN identifies 1,3-D with chloropicrin as the next best alternative with a 10-percent yield loss in California and the Southeastern States. Operating costs with 1,3-D plus chloropicrin are marginally higher in the Southeast and marginally lower in California. In both regions the alternative is predicted to result in a 46-percent decrease in net revenues.

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USA	Tomato - field	2876.046	2222.934	627.552		2334.047		2065.246 *	<p>MBTOC recommends a reduced CUE of 2065.246 tonnes for 2007 for this use, being 10.204 tonnes for Michigan and 2049.541 tonnes for the Southeast, and 5.501 tonnes for research. The Californian nomination is not recommended. A minority of MBTOC evaluated the parts of this CUN relating to the Southeast as 'unable to assess' (see Section 2.4.2). The Party's nomination was reduced to account for the use of MBTOC's standard dosage rates on the karst, low nutgrass portion of the Florida nomination and a further reduction (150 kg/ha for pathogens and 175kg/ha of MB for nutsedge) on 5% of the nomination for uptake of low permeability barrier films in Florida and Michigan. MBTOC acknowledges the reduction by the Party on the nomination to account for approx 8% uptake of alternatives by 2007. In Michigan, the key pests are Phytophthora capsici and Fusarium spp. The Party states that 1,3-D/chloropicrin may be an effective alternative, but growers will miss the optimal market window due to longer plant back times. According to the Party, this treatment cannot be applied in autumn because of climatic conditions and damage by deer and other animals to plastic mulches and irrigation tapes. In California the key pests are Fusarium, Verticillium, nematodes and Pythium. Township caps affect the adoption of alternatives utilizing 1,3-dichloropropene (1,3-D). The Party states that 1,3-D is difficult to use on hillsides. According to 2003 data from the Californian Department of Pesticide Regulation, metham sodium is used on nearly as many acres as methyl bromide and therefore MS and its combinations with other treatments are considered a viable alternative for hillsides and in areas affected by township caps (CDPR 2003, Ajwa et al 2003, 2004, Gilreath et al 2005b, Johnson and Webster 2001). In the southeast, the key pests are nutsedge, Fusarium, nematodes and Phytophthora. From the BUNI information MBTOC has calculated that 4968 ha of tomato in karst areas have low key pest (nutsedge) pressure. In these circumstances, MBTOC considers a maximum dosage rate of 200kg/ha as sufficient to control pathogens and adjusted the nomination accordingly. The Party states that metham sodium or metham potassium are promising alternatives, but still do not provide consistent control under the circumstances of the nomination and require further trials, which are underway. Other studies however, have demonstrated the efficacy of metham sodium + chloropicrin in areas with low to moderate nutsedge pressure in tomatoes and similar crops in the regions of the nomination (Locascio et al 2000, Nelson et al 2002, Gilreath et al 2005). MBTOC anticipates that there will be adoption of this alternative to replace methyl bromide in karst areas with low nutsedge infestation by 2008.</p>	<p>CUN reports yield losses with alternatives ranging from 17 to 22 percent. Net revenue declines reported for all regions. Missed market windows cited in Michigan and Southeastern States. California estimate of gross and net revenue losses do not account for distribution of yield loss across individual growers and yield risk with alternatives.</p>

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
USA	Tomato – field (continued)								The Party states that LPF barrier films are still not being widely adopted on a commercial scale due to lack of availability, cost and technical problems with laying the films. Recent trials however have shown excellent results with new semipermeable barrier films (metallised films) and substantial commercial adoption on farms in Florida (>3000acres) (Bruno Rimini Ltd). MBTOC believes that LPF barrier films are technically and economically viable for this nomination. All of the technical problems reported by the Party have been solved in European countries where the use of LPF films is mandatory. Grower scale trials have repeatedly demonstrated the success of a 50% reduction in rate with LPF films (Gilreath and Santos, 2004, 2005). In fields with moderate to heavy nutsedge pressure, Santos and Gilreath (2005) have shown that the standard MB/Pic 67:33 at a rate of 350 kg/ha can be reduced by at least 25 % (to 175 kg/ha MB) under LPF film with equivalent yields and nutsedge control. MBTOC recommends a reduction in the nomination to account for decreased dosage rates in areas with moderate to severe nutgrass pressure at 175 kg/ha, and for low nutsedge and areas with pathogens at 150 kg/ha, in anticipation of the likely increased implementation of emission control technologies, including adoption of LPF barrier films by 2007.	

Party	Industry	Total CUEs for 2005 as approved by 1EMOP and 16MOP	Approved for 2006 by 16 MOP under Sect IIA Dec. XVI/2	Approved (interim) for 2006 by 16 MOP under Sect 111 Dec. XVI/2	Nominated in 2005 for 2006	Nominated in 2005 for 2007	Recommended by MBTOC for 2006	Recommended by MBTOC for 2007	MBTOC comments	Economic reasoning provided by the Party
USA	Turfgrass	206.827	131.6			78.04		78.04	MBTOC recommends a CUE of 78.040 tonnes in 2007 for this use, including 1.9 tonnes for associated research. The Party has reduced the amount requested to 59% from that recommended by MBTOC in 2006. All of this nomination is for production of certified propagative material. MBTOC recognises the importance of producing clean propagative material. Historically the industry has used a rate of 500 kg/ha, but has recently reduced the rate to 300 kg/ha of 98:2 MB. Trials with mixtures of MB with chloropicrin indicate inconclusive results in pest and pathogen control. MBTOC suggests that further rate reductions can be achieved with the use of low permeability barrier films (VIF or equivalent) and the use of 67:33 or 50:50 MB/Pic formulations. Further validation of their effectiveness is sought in future nominations. Although dazomet is used effectively in other countries for this use, it has not yet proven effective in trials in USA (Unruh et al. 2002). Trial use of this product with barrier films is suggested. New fumigant alternatives, sodium and potassium azide, iodomethane have shown excellent weed control (Unruh et al 2002). These chemicals at present lack registration.	CUN is for turf production intended to be sold as certified sod. CUN identifies dazomet as next best alternative to methyl bromide and states quality losses with dazomet would exclude much of production from certified market leading to substantial losses in gross and net revenue. CUN states price for non-certified sod is 75 percent lower than price for certified sod.

*Footnotes:*

*All quantities given in metric tonnes, unless otherwise stated.*

- \* *Evaluation revised since TEAP May 2005 Report (TEAP 2005)*
- (a) *No specific CUE quantity approved for this use. Quantity approved included with other uses.*
- (b) *CUE includes exemptions for both Quebec and PEI growing regions*
- (c) *Categorised as 'unable-to-assess' in the TEAP Report of October 2004.*



### 3. Registration and Reregistration of Alternatives

#### 3.1 Registration status of soil alternatives

This report on the registration and reregistration status of in-kind methyl bromide alternatives is provided in conformity with Decisions Ex. I/4(9,i) and Ex. I/4(9,j). An interim report on this topic was provided in TEAP (2005).

MBTOC has initiated a comprehensive Status of Methyl Bromide and its Alternatives Report. The reporting format was drafted and piloted in one country. It was presented to MBTOC at the Melbourne meeting and will be revised according to comments received by MBTOC members. The report endeavours to provide for both soil fumigation and post harvest uses the following information by country, by crop/site and by chemical:

- Active ingredient and trade name identification;
- Formulation specifications (% of active ingredient, % of inert ingredients, % of other active ingredients in the product);
- Application rates, and
- Current label restrictions on the use of the product that could limit the extent to which it could be used as an alternative to methyl bromide, where these restrictions are significantly greater than restrictions for methyl bromide (e.g. some labels state that some pesticides are required to have large buffers around occupied structures, prohibition against greenhouses use, restrictions on use in areas where groundwater could be contaminated, long plant back restrictions, prohibition on use of the product in mixtures, personal protective equipment requirements for mixers, loaders and applicators that are significantly greater than restrictions for methyl bromide, etc.).

MBTOC intends to have these revised spreadsheets sent out to Parties by November 2005 and could have a final report within one year depending on the responsiveness of the Parties.

MBTOC recognizes that registration is a dynamic process. Thus, some information may be out of date. MBTOC reports information as provided by the Parties or other reliable sources. MBTOC does not speculate on dates registration action may be completed. In the interim the following information that is currently available is provided here.

Table 5 presents available data on the registration status of leading chemical alternatives for the control of soilborne pests and diseases. It indicates that metham sodium and dazomet are widely registered, and 1,3-dichloropropene (1,3-D) and chloropicrin are also registered in a number of countries. Sodium tetrathiocarbonate (Enzone) is registered in only a few countries. Registration of mixtures of fumigants (particularly 1,3-D + pic) is increasing. In addition to the countries listed in Table 5, 1,3-D/Pic has been registered in Article 5(1) countries such as Chile, Costa Rica, Cuba and Morocco, and registration is being sought in countries such as Jordan, Argentina and China (Carrera *et al.* 2004). In

some countries fumigants must be registered as a mixture if they are to be applied simultaneously; while in other countries fumigants can be simultaneously applied (co-applied) without the need for additional registration.

The US EPA has recently registered several products for the control of weeds, including *Cyperus* spp. These include halosulfuron methyl (Sanda) for use in fruiting vegetables and cucurbits, trifloxysulfuron sodium (Envoke) for tomato (Norton, 2004) and S-metolachlor for tomatoes. The US EPA also recently registered fosthiazate for tomatoes.

For the following soil fumigants registration applications have been submitted and are currently under review: iodomethane in USA (for peppers, tomatoes, strawberries and ornamentals) and dazomet in USA (for strawberries and tomatoes). Soil fumigants under consideration are: furfural in USA (for greenhouse-grown cut flowers, greens, transplants and propagative material), sodium azide in USA (for turf and golf courses), mixture of 1,3-D/chloropicrin in Italy, chloropicrin in France, dazomet in Hungary, cyanogen ('ethane dinitrile') in Australia, and dimethyldisulphide (DMDS) in France. Japan cancelled its methyl bromide registrations in 2004 while retaining its CUE registrations for MB on melons, watermelons, cucumbers, green peppers, hot peppers, ginger and for the control of the chestnut weevil.

Biological control products normally require registration but are not listed in Table 5 because they are not normally considered as MB alternatives due to their narrow spectrum of activity, although they can play a useful role as adjuncts to alternatives such as fumigants, steam or substrates. It should be noted that many non-chemical treatments do not require registration under the European Union's legislation on pesticide products; this applies to treatments such as steam, heat, substrates, grafted plants, resistant varieties and other cultural practices (Smeets, 2004). Many other countries also do not require non-chemical treatments to be registered. However, non-chemical treatments may face other difficulties such as requiring other regulatory approval and because commercial companies have less incentive to market products that are not protected by patent-like property rights.

*Table 5. Registration status of chemical soil alternatives*

This table is compiled from databases on registration and available alternatives submitted by Parties to the Ozone Secretariat (European Commission, 2005a), and information provided in critical use nominations. Local conditions of use and requirements may render a registered fumigant unavailable for specific crops or locations, although registered in general.

Country	Fumigant products							Non-fumigant products		
	13D	Daz	MIT C	Pic	Enz	13D+ pic	13D+ MIT	Nem	Fun	Her
Australia	R	R	R	R		R		R	R	R
Belgium	R	R	R	R				R	R	R
Canada (a)	R (b)	R	R			R	R			
France	R	R	R		R			R	R	R
Greece	R	R	R	R (d)	R			R	R	R
Ireland	R	R	R	R						
Italy	R	R	R	R				R	R	R
Japan	R	R	R	R		R	R	R	R	R

Country	Fumigant products							Non-fumigant products		
	13D	Daz	MIT C	Pic	Enz	13D+ pic	13D+ MIT	Nem	Fun	Her
Poland		R	R					R	R	R
Portugal	R	R	R			R (d)		R	R	R
Spain	R	R	R	R	R	R (d)		R	R	R
UK	R	R	R	R				R	R	R
USA	R (b)	R (c)	R	R		R		R	R	R (e)

NB. In some cases the fumigants are registered for specific crops, while in other cases they are registered for soil fumigation in general. (a) Registration information relates to strawberry runners only. (b) not permitted in some areas. (c) registered for non-food crops. (d) provisional at present pending finalisation of re-registration of fumigants in the EU. (e) for certain types of weeds only.

R	registered
13D	1,3-dichloropropene
Daz	dazomet
Met	metham sodium and/or metham potassium
Pic	chloropicrin
Enz	sodium tetrathiocarbonate (Enzone)
MITC	methyl isothiocyanate
Nem	various nematicide products, e.g. oxamyl
Fun	various fungicide products – normally specific to certain groups of fungi
Her	various herbicides – normally specific to certain types of weeds.

### 3.2 Registration status of postharvest and structural alternatives

Table 6 (below) presents available data on the registration status of leading chemical alternatives for the control of stored product pests in commodities and/or structures. Phosphine (solid formulations) is registered in many countries. Registration of gaseous forms of phosphine (cylinderised) and sulfuryl fluoride is increasing. The US EPA recently registered a gaseous form of phosphine (Ecofume). Some countries registered sulfuryl fluoride (SF) a number of years ago for non-food structures such as historic buildings in some European countries, or domestic dwellings (replacing a large volume of MB) in the USA. More recently sulfuryl fluoride formulations developed for certain commodities or empty mills have been registered in USA and parts of Europe. The US EPA recently registered sulfuryl fluoride for food processing sites (July 2005). The federal registration must now be reviewed by individual state authorities as part of the registration process. Sulfuryl fluoride is reported to be in the registration process in France, Benelux and Spain (Lange, 2004), and in Canada.

Apparently MITC is registered in Canada for flour mills, according to a list of registered alternatives submitted by Canada to the Ozone Secretariat recently. Iodomethane has recently been registered in Japan for broad-spectrum insect control on imported timber (UNEP, 2004). Japan has also registered in 2004 a mixture of MITC and sulfuryl fluoride dissolved in liquid carbon dioxide (Ecotwin).

**Table 6. Registration status of postharvest alternatives**

The table was compiled from databases on registration and available alternatives submitted by Parties to the Ozone Secretariat (European Commission, 2005b), information provided in critical use nominations, and other sources.

Country	Fumigant products							
	EF	HCN	IM	MITC	PH3 solid	PH3 gas	PPO	SF
Australia	R				R	R		
Austria		R (b)			R			R (a)
Belgium					R			
Canada				R	R	R		
Denmark					R	R		
France		R (id)			R			
Germany					R	R		R (a b e)
Greece					R			
Ireland					R			
Italy					R			R (b)
Japan		R	R	R	R			R
Poland					R			
Spain		R			R			
Sweden					R			R (a)
Switzerland		R			R			R (b)
UK					R			R (b)
USA					R	R	R (f)	R (a b c)

(a) non-food structures, e.g. historic buildings. (b) empty food structures e.g. mills. (c) dried fruits, tree nuts, cereal grains. (d) aircraft. . (e) dried fruit: (f) nutmeats, cocoa, spices; PPO mixed with CO2 is registered for stored nuts

R	registered
EF	ethyl formate
HCN	hydrogen cyanide, calcium or sodium cyanides
IM	iodomethane
MITC	methyl isothiocyanate
PH3 solid	phosphine (solid formulations)
PH3 gas	gaseous phosphine in carbon dioxide or nitrogen (cylinders)
PPO	propylene oxide
SF	sulfuryl fluoride

### **3.3 Reregistration of MB and alternatives**

In the United States and European Union, a number of soil fumigants are undergoing reregistration. Metham sodium and chloropicrin, as well as MB, are going through re-registration in the US at present, and decisions are scheduled to be completed in 2007. To date, 1,3-D is the only soil fumigant that has completed the re-registration process in the USA. The US EPA is utilizing a cluster approach in conducting its re-registration assessments on soil fumigants (metham sodium, iodomethane, chloropicrin, 1,3-D, dazomet and MB). This cluster approach aims (a) to ensure a level playing field by evaluating the soil fumigant alternatives concurrently and consistently and (b) to ensure that risk management decisions do not result in risk/benefit tradeoffs that neither improve safety nor help agriculture.

In the European Union, MB is being evaluated for re-registration as part of the EC's general review of pesticides (active ingredients). The reviews include scientific assessments of safety and environmental data submitted by applicants. Under the EC Plant Protection Products Directive (91/414/EC) a dossier on MB is being reviewed and a decision is due to be taken by the end of 2008 at the latest for pesticide uses that are regulated under this Directive. Under the Biocides Directive (98/8/EC) MB has been "identified" which means that biocidal products containing MB can only be placed on the EU market until 1 September 2006 at the latest, according to Article 4(2) of Regulation 2032/2003 (Arash, pers. comm. 2005). A review of MB's toxicity and environmental effects is provided in IPCS/WHO (1995).

Most postharvest fumigants (active ingredients), except for sulfuryl fluoride, are undergoing re-registration in the European Union and the US. Phosphine is the only post harvest fumigant that has completed re-registration in the USA (1998).



## **4. MBTOC Work plan for 2006**

### **4.1 Introduction**

The Parties, at their Sixteenth Meeting, decided to adopt the elements related to procedures and terms of reference of the Methyl Bromide Technical Options Committee (MBTOC) related to the evaluation of nominations for critical uses of methyl bromide as set out in Annex I to the report of the Sixteenth Meeting of the Parties (16MOP) (decision XVI/4).

Paragraph 15 of Annex I to the report of 16MOP states that annual work plan should be drawn up by MBTOC (supported by the Ozone Secretariat) in consultation with TEAP and that MBTOC should submit it to the Meeting of the Parties each year.

In accordance with paragraph 15 of Annex I to the report of 16MOP, MBTOC has prepared its 2006 work plan in consultation with TEAP and with support of the Ozone Secretariat. The work plan is contained in Section 4.4 of the current document for consideration by the Parties at their Sixteenth Meeting.

### **4.2 Summary report of the activities carried out in 2005**

One of the elements specified in paragraph 15 of Annex I to the report of 16MOP is the summary report of MBTOC activities over the previous year (paragraph 15(h)). In accordance with this requirement, the summary report is provided in section III of the current document.

### **4.3 Allocation of the Funds under Decision XVI/5**

The Parties, at their Sixteenth Meeting, decided to provide additional financial support to MBTOC in recognition of the heavy workload of the MBTOC in assessing nominations for critical use exemptions (decision XVI/5). Section 4.6 of the current document provides a detailed report on how the budget for implementing decision XVI/5 has been allocated to MBTOC. The report on allocation of the funds was prepared in pursuance of the fundamental principle adopted by the Parties of ensuring transparency in the process of assessing critical use nominations.

### **4.4 MBTOC Workplan for 2006 - Details**

Paragraph 1 of Annex I to the report of 16 MOP provides the schedule for the MBTOC assessment of critical-use exemptions. In accordance with the schedule, MBTOC envisages its activities as set out in Table 7 below. The elements of the work plan as

specified under paragraph 15 of Annex I to the report of 16MOP have been incorporated. The schedule of the work to be carried out by the together with activities on the 2006 assessment and MBTOC composition is also included. The list of current membership of MBTOC is contained in Annex II to the current document.

The work plan also includes an indicative budget which proposes to considerably increase funding. Improved funding for non-A5 MBTOC members is strongly recommended; most non-A5 members do not have funding to attend meetings. As the workload and number of meetings resulting from the CUN process have increased, the financial burden on individual members and/or their research institutions has become unsustainable. In addition, the requirement for MBTOC reports to more clearly and completely reference the reasons for decision making under the circumstances of particular nominations strengthens the need for field trips to affected regions, for reports summarizing particularly complex issues, and to cover the costs of obtaining reference documents.

*Table 7. MBTOC work plan and indicative budget*

Tasks and actions	Indicative budget needs where applicable	Indicative completion date	Dates of meetings
<i>Assessment of the CUNs</i>			
1. Parties submit their nominations for critical-use exemptions to the Secretariat	-	24 January 2006	
2. The nominations are forwarded to MBTOC co-chairs for distribution to the subgroups of appointed members	-	7 February 2006	
3. Initial summarization of the nominations	US\$ 30,000		
4. Nominations in full are assessed by the subgroups of appointed members. The initial findings of the subgroups, and any requests for additional information are forwarded to the MBTOC co-chairs for clearance	Funds for assistance in technical analysis, report preparation and reference docs (throughout the process as necessary): US\$ 20,000	28 February 2006	
5. MBTOC co-chairs forward the cleared advice on initial findings and may request additional information on to the nominating Party concerned and consult with the Party on the possible presumption therein	-	7 March 2006	
6. Nominating Party develops and submits its response to the MBTOC co-chairs	-	28 March 2006	
7. MBTOC Meeting No 1 to assess nominations, including any additional information provided by the nominating Party prior to the MBTOC meeting under action 5 and any additional information provided by nominating Party through pre-arranged teleconference, or through meetings with national experts, in accordance with paragraph 3.4 of the terms of reference of TEAP	Funds for travel of 10 non-A5 members and co-chairs: US\$ 50,000.	11 April 2006	3 – 8 April 2006 Zagreb or Dubrovnik, Croatia
8. MBTOC advises the nominating Party of any outstanding information regarding the		25 April 2006	

<b>Tasks and actions</b>	<b>Indicative budget needs where applicable</b>	<b>Indicative completion date</b>	<b>Dates of meetings</b>
information requested under action 5 for those critical-use nominations where it was unable to assess the nomination			
9. MBTOC provides its draft recommendations on the CUNs to TEAP		3 May 2006	
10. Field missions by selected MBTOC members to some key sites where methyl bromide is used as per nominations.	Funds for travel: US\$ 20,000	Prior to May 2005	
11. TEAP Meeting: To assess the MBTOC report on critical-use nominations and submits the finalised interim report on recommendations and findings to the Secretariat.	Funds for travel of 2 non-A5 co-chairs: US\$ 10,000	[10] May 2006	April 24 – 28 2006 Beijing
12. The Secretariat posts the finalised report on its web site and circulates it to the Parties	-	[31] May 2006	
13. OEWG Bilateral Discussions: Nominating Party has the opportunity to consult with MBTOC on a bilateral basis in conjunction with the Open-ended Working Group meetings	Funds for travel of 2 non-A5 co-chairs: US\$ 10,000	early July 2006	Likely late June early July
14. The nominating Party submits further clarification for the critical-use nomination in the “unable to assess” category or if requested to do so by the Open-ended Working Group, and provides additional information should it wish to appeal against a critical-use nomination recommendation by MBTOC/TEAP	-	early August 2006	
15. MBTOC Meeting No 2: <ul style="list-style-type: none"> <li>reassess only those critical-use nominations in the “unable to assess” category, those where additional information has been submitted by the nominating Party and any critical-use nominations for which additional information has been requested by the Open-ended Working Group</li> <li>finalise the report, including notice of any proposed new standard presumptions to be applied by MBTOC</li> <li>conduct any bilateral consultations requested by Parties</li> <li>draft work plan and budget for MBTOC for 2007</li> </ul>	Funds for travel of 10 non-A5 members and co-chairs: US\$ 50,000. Meeting costs: \$US 6000.	late August 2006	28 August – 2 September 2006, Yokohama, Japan
16. MBTOC draft final report considered by TEAP, finalised and made available to Parties through the Secretariat	-	10 October 2006	
17. Eighteenth Meeting of the Parties	Funds for travel of 2 non-A5 co-chairs: US\$ 10,000	November 2006	Likely late November to early December
<b>Total budget:</b>	<b>US\$206,000</b>		
<i>MBTOC 2006 assessment</i>			
18. Outline preparation and tasking of inputs (off line). Identify chapter editors and member contributors to chapters		15 November 2005	
19. Preparation and review of the inputs to the MBTOC assessment report: <ul style="list-style-type: none"> <li>Methyl bromide production and consumption</li> <li>Emission control and transitional strategies for MB phaseout</li> </ul>	Assessment will add an additional 2 days to the MBTOC meeting	April 2006	3 – 11 April 2006 Zagreb or Dubrovnik, Croatia

Tasks and actions	Indicative budget needs where applicable	Indicative completion date	Dates of meetings
<ul style="list-style-type: none"> <li>Assessment of alternatives for soil treatment</li> <li>Assessment of alternatives for postharvest and structural treatment</li> <li>QPS issues and alternatives</li> <li>Adoption of alternatives in A5 countries</li> <li>Discuss initial drafts of Assessment report, identify areas where additional work is required</li> </ul>			
20. Compilation of the draft report and review of it at the second MBTOC meeting	Assessment will add an additional 2 days to MBTOC meeting	late August 2006	28 August – 5 September 2006, Yokohama, Japan
21. Comments and corrections to the draft and circulation of the semi-final draft among the MBTOC members		1 October 2006	
22. Chapter authors meet to finalise draft Assessment Report		In conjunction with 18MOP	
23. MBTOC to submit the final report to TEAP		15 December 2006	
24. TEAP to submit the synthesis report of TEAP and final reports of all its TOCs to the Secretariat		31 December 2006	
25. The Secretariat posts the finalized reports on its web site and circulates it to the Parties		31 January 2007	
<i>Composition of MBTOC</i>			
26. At the MBTOC meeting on the assessment of nominations, MBTOC will also update the list of members and their expertise and decide on missing expertise. The list and missing expertise to be submitted to the Secretariat.		3 April 2006	
27. The Secretariat will post on its website the list of members and their expertise and update the webpage on 'experts required for TEAP and its TOCs'.		14 April 2006	

#### 4.5 Summary Report of the Activities Carried out by MBTOC in 2005

- Initial summarization of the CUNs (establishing the database by the Secretariat) – split in two parts (i) the CUNs for ExMOP2 and (ii) CUNs for 25OEWG.
- Preparation of questions for Parties.
- First meeting of MBTOC on the assessment of the CUNs – Buenos Aires, 11-15 April 2005. Interim recommendations and report prepared for the Parties. Welcomed new members from Brazil and USA and departure of two delegates from USA.
- Site visits by 12 MBTOC members – 5 day tour of Florida and Georgia horticulture (eg. strawberries, tomatoes, peppers, cucurbits) and forestry nurseries to review alternatives research and industry issues with these alternatives. Progress report drafting for four weeks after the April meeting.
- TEAP meeting – Lindau, 25-29 April 2005.

- Issuance of the interim report for consideration by the OEWG as part of TEAP report and final report on the CUNs for decision by 2EMOP.
- 25OEWG (Montreal, 27-30 June 2005). Bilateral meetings with Australia, Japan, Latvia, Spain, USA, US Food Processing and Agriculture Industry members, and ExMOP2 (Montreal, 1 July 2005). Revised Handbook on Critical Use Nominations tabled for discussion.
- Welcomed new MBTOC members as nominated by Brazil, China, Italy, Israel, Japan, Lebanon and USA. Resignation of MBTOC members from Germany (1), USA (2).
- Updated Matrix of MB alternatives for soils uses from recent MBTOC documents.
- Second meeting of MBTOC, Melbourne, 29 August-2 Sept 2005. Bilaterals with Australia (including Australian food processing industry members), and USA. Site visits Australian field agriculture and grain processing. Presentation of the preliminary data from the metaanalysis team.
- Drafted new suggested standard presumptions for in-field agriculture uses of MB and concerning low permeability films.
- Drafted MB alternatives registration report and MB re-registration report for soils and post-harvest uses. Reporting format prepared for distribution to Parties by Secretariat.
- Short initial comments received from MBTOC member regarding MB treatment of fresh dates. Full report incomplete; funds needed for travel and research from a UN implementing agency.
- Preparation of standardized format for Parties to use when reporting back to MBTOC.

#### **4.6 Allocation of the Funds provided under Decision XVI/5**

Under decision XVI/5, Parties decided to provide MBTOC with financial assistance on an exceptional basis for 2005, to cover the costs of expert assistance to MBTOC for the maximum sum of \$68,300, and travel for a non-Article 5(1) co-chair to three meetings related to critical use nominations to the maximum sum of \$15,000.

The funds were allocated as follows:

Decision XVI/5(1): \$15,000: Travel costs for a non-Article 5(1) co-chair US\$15,000.

Decision XVI/5(2): \$68,300: Conducting the initial analysis and preparation of the reports on the assessment of critical use nominations (US\$2,500); reference data base, metaanalysis database and model preparation for the metaanalysis of soils alternatives US\$ 54,000.

Balance of \$14,300 applied to the combined MBTOC meeting in Buenos Aires and site visit in Florida (decision XVI/5(5a)): Six non-Article 5 members funded at the cost of \$20,787.65.

Travel and DSA for non-Article 5(1) experts in the MBTOC meetings related to assessment of critical use nominations (decision XVI/5(4)): Three non-Article 5(1)

members funded at the cost of US\$9,281. Total travel costs for non-Article 5(1) members: \$30,068.65.  
Shortfall: \$15,768.75.

The actual certified expenditure against the allocations will only become available after the closing of 2005 accounts in March 2006. This is a provisional report of information that has already been recorded in the UN integrated management information system (IMIS).

#### **4.7 Management and Personnel Issues**

It is a key need that MBTOC's current transitional management status be completed through the confirmation of an appropriate number of co-chairs, and that the co-chairs designate and accept responsibility to achieve the functions and work plan milestones. Co-chairs will need sufficient funding to ensure their attendance at meetings and to ensure they can fairly share and accomplish MBTOC's heavy workload in a timely manner.

Annex II lists MBTOC members, country, work affiliation and expertise. MBTOC members represent an impressive scope and depth of experience and ability; MBTOC has members from twenty-seven countries. More than new members, MBTOC needs to have its members funded to attend meetings, and able to commit to contributing to the work of MBTOC outside of the meetings. Most members have been appointed by Parties, yet it is a constant struggle for many members to obtain sufficient funding to attend all MBTOC meetings, and even more so to be funded to spend the time necessary to accomplish the heavy workload.

The response of the Parties to MBTOC's indicative budget will, more than anything, clarify MBTOC's membership needs. Without funding to attend meetings this year, many current non-A5 MBTOC members will be unable to attend. If there is to be no change in the funding situation, MBTOC may need to replace up to 30% of its members; the loss of that many experienced members would threaten both the best completion of CUN decisions and the excellence of the Assessment report.

MBTOC continues to search for well-qualified members with expertise in:

- Chemical and non-chemical control of weeds, nematodes and plant diseases,
- Practical experience in alternatives fumigation and heat treatment of food processing facilities,
- Practical experience in chemical and non-chemical control of commodity pests, quarantine and non-quarantine,
- Agricultural economics, including in post-harvest applications,
- Wood disinfection specialists,
- Alternatives practitioners,
- Technology cooperation,
- Agricultural extension,

Recapture and recycling,  
Regulatory processes and registration.

#### **4.8 Proposed changes to standard presumptions**

Standard presumptions used in the current (2005) and previous rounds of CUNs have included a standard dosage of 200 kgMB/ha applied as a mixture with chloropicrin (67:33). It is proposed that commencing with CUNs for 2007 use, this presumption be altered to be a standard rate of 150 kgMB/ha for pathogen control and 175 kgMB/ha where nutgrass must be controlled, both applied as 50:50 MB:Pic mixtures under LPF films (e.g. VIF or equivalent).

Supporting data for the methyl bromide component and dosage is given in Section 2.3.6 above.

## ANNEX I

### **Annex I to the Report of the Sixteenth Meeting of the Parties to the Montreal Protocol (Prague, 22–26 November 2004), paragraph 15.**

(Decision XVI/4. Review of the working procedures and terms of reference of the Methyl Bromide Technical Options Committee)

“15. An annual work plan will enhance the transparency of, and insight in, the operations of MBTOC.

Such a plan should indicate, among other things:

- (a) Key events for a given year;
- (b) Envisaged meeting dates of MBTOC, including the stage in the nomination and evaluation process to which the respective meetings relate;
- (c) Tasks to be accomplished at each meeting, including appropriate delegation of such tasks;
- (d) Timing of interim and final reports;
- (e) Clear references to the timelines relating to nominations;
- (f) Information related to financial needs, while noting that financial considerations would still be reviewed solely in the context of the review of the Secretariat’s budget;
- (g) Changes in the composition of MBTOC, pursuant to the criteria for selection;
- (h) Summary report of MBTOC activities over the previous year, including matters that MBTOC did not manage to complete, the reasons for this and plans to address these unfinished matters;
- (i) Matrix with existing and needed skills and expertise; and
- (j) Any new or revised standards or presumptions that MBTOC seeks to apply in its future assessment of critical-use nominations, for approval by the Meeting of the Parties. ”

## ANNEX II

### Current membership of the Methyl Bromide Technical Options Committee

Names	Gender	Affiliation	Expertise	Length of service	Country	Article 5 status
Co-Chairs						
<b>1. Jonathan Banks</b>	<b>M</b>	<b>Consultant</b>	<b>Consultant, postharvest, particularly controlled atmospheres, phosphine, recapture (PhD)</b>	<b>a</b>	<b>Australia</b>	<b>Non-A5</b>
<b>2. Nahum Marban Mendoza</b>	<b>M</b>	<b>Universidad Autonoma Chapingo (Academia)</b>	<b>Researcher, soils alternatives, particularly nematode problems (PhD, Prof.)</b>	<b>c</b>	<b>Mexico</b>	<b>A5</b>
Members						
<b>3. Alessandro Amadio</b>	<b>M</b>	<b>UNIDO</b>	<b>International Agency, grafting technologies. (PhD)</b>		<b>Italy</b>	<b>Non A5</b>
<b>4. Marten Barel</b>	<b>M</b>	<b>Consultant</b>	<b>Fumigator, particularly steam, MB and alternatives use</b>	<b>d</b>	<b>Netherlands</b>	<b>Non-A5</b>
<b>5. Chris Bell</b>	<b>M</b>	<b>Central Science Laboratory (Government research)</b>	<b>Postharvest technologies, particularly phosphine (PhD)</b>	<b>b</b>	<b>UK</b>	<b>Non-A5</b>
<b>6. Antonio Bello</b>	<b>M</b>	<b>Centro de Ciencias Medioambientales (Government research)</b>	<b>Non-chemical alternatives (PhD, Prof)</b>	<b>a</b>	<b>Spain</b>	<b>Non-A5</b>
<b>7. Mohamed Besri</b>	<b>M</b>	<b>Institut Agronomique et Vétérinaire Hassan II (Academia)</b>	<b>Researcher. Plant Pathology, particularly. ecology of soilborne pathogens and MB and alts in A5s (PhD, Prof)</b>	<b>b</b>	<b>Morocco</b>	<b>A5</b>
<b>8. Cao Aocheng</b>	<b>M</b>	<b>Chinese Academy of Agricultural Sciences (Government research)</b>	<b>Researcher, soil alternatives, particularly in China context (PhD)</b>	<b>c</b>	<b>China</b>	<b>A5</b>

9. Peter Caulkins	M	Environmental Protection Agency	Regulatory and registration of methyl bromide and alternatives. Soil disinfestation (PhD)	d	United States	Non-A-5
10. Fabio Chaverri	M	IRET-Universidad Nacional (Academia)	Researcher and consultant, MB alts., particularly soil disinfestation, incl. solarisation.	c	Costa Rica	A5
11. Ricardo Deang	M	Consultant	Regulatory and registration (PhD)	b	Philippines	A5
12. Patrick Ducom	M	Ministère de l'Agriculture (Government research)	Postharvest alternatives	b	France	Non-A5
13 Abraham Gamliel	M	ARO Volcani Centre	Soils alternatives, solarisation, engineering, fumigant movement	d	Israel	Non-A5
14. Saad Hafez	M	University of Idaho (Academia)	Soils alternatives, nematologist (PhD, Prof)	c	US	Non-A5
15. Darka Hamel	F	Department of Environment	Regulatory and registration. Post-harvest fumigation	d	Croatia	A5
16 George Lazarovits	M	Agriculture & Agri-food Canada (Government research)	Researcher, Plant pathology particularly beneficials and soil amendments (PhD)	c	Canada	Non-A5
17. Michelle Marcotte	F	Consultant, Marcotte Consulting LLC	Consultant, particularly food safety, food processing and irradiation. MBTOC	a	Canada	Non-A5
18. Carlos Medeiros	M	Embrapa (Government Research)	Soils alternatives	d	Brazil	A5
19. Cecilia Mercado	F	UNEP DTIE CAP (International organization)	Implementing agency issues	b	ThailandPhilippines	A5
20. Melanie Miller	F	Consultant	Consultant in MB alternatives use (PhD)	a	Belgium	Non-A5
21. Andrea Minuto	M	Agroinnova Universita Torino (Academia)	Researcher, MB alts, soilless culture and	d	Italy	Non-A5

22. Takashi Misumi	M	MAFF (Government research)	alternatives in soils (PhD) QPS and stored product entomology, fumigation	d	Japan	Non-A5
23. Mokhtarud-Din Bin Husain	M	Department of Agriculture (Government research)	Postharvest, including timber treatment and QPS	c	Malaysia	A5
24. Kazufumi Nishi	M	Nat Institute of Vegetables and Tea Science (Government research)	Nonchemical alts, particularly heat systems for soils (PhD)	d	Japan	Non-A5
25. David Okioga	M	Ministry of Environment and Natural Resources (Government regulatory)	Postharvest and QPS MB alts (PhD)	a	Kenya	A5
26. Marta Pizano de Marquez	F	Hortitecna Ltda (consultant)	Consultant, MB alts, particularly cut flower production	b	Colombia	A5
27. Ian Porter	M	Department of Primary Industries (Government research)	Researcher, soils alternatives, IPM, particularly strawberry and ornamentals (PhD). MBTOC Convenor	b	Australia	Non-A5
28. Christoph Reichmuth	M	BBAGermany (Government research)	Researcher, MB alts in postharvest/structures, artefacts, especially inert atmospheres (PhD, Prof)	b	Germany	Non-A5
29. Ariane Saade	F	Ministry of Economy and Trade (Government regulatory)	Trade and economics	d	Lebanon	A5
30. John Sansone	M	SCC Products (Fumigator)	Fumigator, trainer, particular expertise in structures and new processes	a	US	Non-A5
31. Jim Schaub	M	United States Department of Agriculture (Government regulatory)	Agricultural economist (PhD)	c	US	Non-A5
32. Sally Schneider	F	United States Department of Agriculture (Government research)	Researcher in soils alts, particularly replant problems and propagative material (PhD)	c	US	Non-A5
33. JL( Stappies) Staphorst	M	Agricultural Research Council Plant Protection Research Institute	Soil microbiologist particularly root disease	b	South Africa	A5

		(Government research)	biocontrol methods (PhD)			
34. Akio Tateya	M	Syngenta Japan KK	Application of MB and alts, particularly in Japan	a	Japan	Non-A5
35. Robert Taylor	M	Associate - Natural Resources Institute (Government research)	Postharvest technology, specifically A5 uses	a	UK	Non-A5
36. Alejandro Valeiro	M	Department of Agriculture (Government research)	Introduction/use of soils alts, including tobacco	c	Argentina	A5
37. Ken Vick	M	United States Department of Agriculture (Government research)	Research in MB alternatives, incl. QPS (PhD)	a	US	Non-A5
38. Nick Vink	M	University of Stellenbosch (Academia)	Agricultural economics (PhD, Prof)	c	South Africa	A5
39. Jim Wells	M	Consultant, Environmental Solutions Group LLC	Registration and regulatory - MB and alts.	a	US	Non-A5
40. Chris Watson	M	IGROX Ltd (Fumigator)	MB and alternatives, particularly structures and commodities inc. bulk and container in transit treatments.	b	UK	Non-A5
Totals	41					
	M =33 F =7			a = 10 b = 10 c = 11 d = 9		A5=15 Non-A5=25

a - >10 years  
b - 5-10 years  
c - 2-5 years  
d - <2 years

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