MONTREAL PROTOCOL

ON SUBSTANCES THAT DEPLETE

THE OZONE LAYER

UNEP

REPORT OF THE
TECHNOLOGY AND ECONOMIC ASSESSMENT PANEL

OCTOBER 2008

EVALUATIONS OF 2008 CRITICAL USE NOMINATIONS FOR METHYL BROMIDE AND RELATED MATTERS

FINAL REPORT

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Common Acronyms

1,3-D	1,3-dichloropropene
A5	Article 5 Party
CUE	Critical Use Exemption
CUN	Critical Use Nomination
DOI	Disclosure of Interest
EC	European Community
EMOP	Extraordinary Meeting of the Parties
EPA	Environmental Protection Agency
EPPO	European Plant Protection Organisation
IM	Iodomethane
IPM	Integrated Pest Management
IPPC	International Plant Protection Convention
ISPM	International Standard Phytosanitary Measure
LPBF	Low Permeability Barrier Film (including VIF films)
MB	Methyl Bromide
MBTOC	Methyl Bromide Technical Options Committee
MBTOC QSC	Methyl Bromide Technical Options Committee Quarantine, Structures and Commodities Subcommittee
MBTOC S	Methyl Bromide Technical Options Soils Subcommittee
MDI	Metered Dose Inhalers
MITC	Methyl isothiocyanate
MOP	Meeting of the Parties
MS	Metham sodium
OEWG	Open Ended Working Group
Pic	Chloropicrin
QPS	Quarantine and Pre-shipment
SF	Sulfuryl fluoride
TEAP	Technology and Economics Assessment Panel
USA	United States of America
VIF	Virtually Impermeable Film
VOC	Volatile Organic Compounds

TABLE OF CONTENTS

1. Scope of the Report

This 2008 final report provides evaluations by MBTOC of CUNs submitted for methyl bromide (MB) in 2009 and 2010 by Parties in accordance with Decision IX/6 (Annex I). CUNs were submitted to the Ozone Secretariat by the Parties, in accordance with the timetable set out in the Annex I referred to by Decision XVI/4 (Annex II of this report).

This final report also provides information from Parties on stocks (Decision Ex.1/4 (9f)), an update on registration issues affecting availability of alternatives for preplant and postharvest uses (Decision Ex. 1/4 (9i) and (9j)), partial information on actual MB consumption for critical uses (Decision XVII/9) and apparent adoption rates of alternatives, as evidenced by trend lines on reduction of MB CUNs as required under Decision XIX/9. It is noted that these trend lines do not necessarily indicate true adoption rates, but may include allowance for use of stocks and changes in procedure, such as altered MB dosage rates and/or frequency of treatment.

A revision of the standard presumptions for some preplant uses of MB, as agreed by Parties at the 19th MOP, is also shown. MBTOC has updated references to substantiate its standard presumptions for MB dosage rates (Annex III). These standard presumptions will be thoroughly reviewed and further substantiated before the next round of evaluations.

MBTOC Soils (MBTOC S) has initial responsibility for the pre-plant uses and alternatives of methyl bromide. MBTOC Quarantine, Structures and Commodities (MBTOC QSC) has initial responsibility for issues concerning methyl bromide uses and alternatives for quarantine, pre-shipment, structural and commodity treatments. Evaluations of CUNs for the two categories are reported separately below. Outcomes from deliberations by the two MBTOC subcommittees were discussed and vetted via electronic communication. Recommendations made by MBTOC S were circulated to MBTOC QSC and vice versa, as part of the process of reaching consensus within the whole committee.

2. Issues for Consideration by Parties:

At the 28th OEWG the following issues were brought forward by TEAP.

Issue No 1.

In evaluating Critical use Nominations, Decision IX/6(1)(b)(iii) instructs:

"(1)(b) *That production and consumption, if any, of methyl bromide for critical uses should be permitted only if: …*

> *(iii) It is demonstrated that an appropriate effort is being made to evaluate, commercialize 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;*"

TEAP considers that some nominations are not demonstrating appropriate effort to evaluate, commercialise and secure national regulatory approval of alternatives and substitutes, as required by Decision IX/6. In relation to this Decision, TEAP considers required effort to include:

- conduct and report on trials, and report efforts to commercialise and secure national regulatory approval within the preceding year of the nomination, as well as prior years.

TEAP suggests Parties may wish to give further guidance on this matter or ask MBTOC to clarify specific criteria that would meet the requirements of Decision IX/6 and instruct MBTOC to interpret Decision IX/6 according to these criteria, when conducting evaluations of CUNs.

Issue No 2.

Several instances have come to the notice of TEAP and MBTOC where particular treatments have been classified as QPS treatments by some Parties, but under some interpretations of Decisions VI/11, VII/5 and XI/12 may not be so.

TEAP has discussed the possible limitations to the QPS classification in its previous reports (e.g. TEAP 1999). The leaflet entitled 'Methyl Bromide: Quarantine and Preshipment Uses', copublished by UNEP and IPPC also discussed this issue (UNEP 2007).

Parties that exempt particular treatments as QPS from phase out schedules may wish to review this classification and take appropriate action (e.g. nominate for critical use, incorporate the use as part of a phase out project) if the use is found not to be a QPS treatment after review.

Issue No 3.

Technically, feasible alternatives are available for almost all the nominated uses (MBTOC 2006) and most Parties are transitioning to alternatives rapidly, often within 3 years of local availability. In many sectors complete phase out is now possible, but transition rates are slowed by specific regulatory and commercial barriers (registration and associated data gathering, commercial constraints to registration for minor uses, certification regulations, buffer zones, lack of MRLs for food commodities) and slow registration of key alternatives preventing transition. It is recognized that legitimate environmental and public health concerns contribute to regulatory limits on alternatives and are a matter of national sovereignty. In some instances, governments and registrants have not made registration of new alternatives a priority, particularly when the alternatives cost more than methyl bromide.

Like the phaseout of Essential Use Exemptions for MDIs, Parties may wish to require Action Plans that describe the steps necessary to achieve a declared final phaseout. A date-certain phaseout date would be an incentive to users and a reward for firms offering environmentally superior and the next best legal (registered and not constrained by regulation) alternatives to MB. An example of such a plan, with step wise phase out schedules for MB identified, has been developed by Japan in this round to phase out all critical uses for soil uses by 2013.

3. Critical Use Nominations for Methyl Bromide

3.1 Mandate

Under Article 2H of the Montreal Protocol the production and consumption (defined as production plus imports minus exports) of MB 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. MBTOC provides guidance to the Parties' decisions on critical use exemptions in accordance with Decisions IX/6 and Annex I of Decision XVI/4. Refer to Annexes I and II of this report for copies of these Decisions.

3.2 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 nomination. Where some of the conditions were not fully met, MBTOC did not recommend or recommended a decreased amount, or was unable to assess, depending on its technical and economic evaluation. The full text for Decision IX/6 can be found in Annex I at the end of this document. MBTOC reduced a nomination when a technical alternative was considered effective or, in a few cases, when the Party failed to show that it was not effective. In this round of CUNs, as in previous rounds, MBTOC considered all information provided by the Parties, including answers to questions requested by MBTOC, up to the date of the assessment.

MBTOC has again encountered difficulty in assessment of some nominations for methyl bromide use on soils when yield losses presented in some nominations differ markedly from those reported in a large number of studies in similar circumstances and are not substantiated by recent references.

Now that alternatives have been identified for most applications, regulations on the use of these alternatives and comparative information on the economic feasibility/infeasibility of their use compared to MB are critical to the outcomes of present and future CUNs. Without this information, further CUNs may not be assessable. In some cases, MBTOC has proposed potential research and regulatory issues to Parties that could assist the phase out of MB. In paragraph 20 of Annex 1 referred to in Decision XVI/4, Parties, inter alia, specifically requested that, in cases where a nomination relies on the economic criteria of Decision IX/6, MBTOC's report should explicitly state the central basis for the Party's economic argument relating to CUNs.

3.3 Consideration of Stocks - Decision Ex.1/4 (9f)

One criterion for granting a critical use under Decision IX/6 is that methyl bromide for the use "is not available in sufficient quantity and quality from existing stocks of banked or recycled methyl bromide" (para. 1 (b) (ii)). Parties nominating critical use exemptions are requested under decision Ex.I/4(9f) to submit an accounting

framework with the information on stocks. Since the consideration of stocks is an active area of negotiation for the Parties, MBTOC has not made an adjustment to a nomination to account for stocks held and has relied on Parties to make this adjustment.

In accordance with Decision XVIII/13(7), a summary of the data on stocks reported by the Parties in 2007 for 2006 and 2008 for 2007 has been summarized in Table 3.1 below. Parties may wish to consider this information in the light of Decision IX/6 1(b)(ii). Tables 3. 1 –3. 3 show the stock data that have been reported by the Parties in 2006, 2007 and 2008.

Efficient functioning of commerce requires a certain level of "pipeline" stocks and additional stocks to respond to emergencies. Additionally, stocks may be held on behalf of other Parties or for exempt uses (feedstock and QPS uses). The correct or optimal level of stocks for virtually every input to production is not zero.

Table 3.1. Quantities of MB (metric tonnes) 'on hand' at the beginning and end of 2005, as reported by Parties in 2007 under Decision XVI/6.

Party	Critical use exemptions authorized by MOP for 2005	Quantity of MB as reported by Parties (metric tonnes)				
		Amount on hand at start of 2005	Quantity Acquired for CUEs in 2005 (production +imports)	Amount available for use in 2005	Quantity used for CUEs in 2005	Amount on hand at the end of 2005
Australia	146.6	0	114.912	114.912	114.912	0
Canada	61.792	0	48.858	48.858	45.146	3.712
EC	4 392.812	216.198	2 435.319	2 651.517	2 530.099	121.023
Israel	1 089.306	16.358	1 072.35	1 088.708	1 088.708	0
Japan	748	0	594.995	594.995	546.861	48.134
New Zealand	50	6.9	40.5	47.4	44.58	2.81
USA(a)	9 552.879		7 613	not reported	7 170	443

(a) Additional information on stocks was reported on US EPA website, September 2006: Methyl bromide inventory held by USA companies: 2004 = 12,994 tonnes; 2005 = 9,974 tonnes.

Table 3.2 Quantities of MB 'on hand' at the beginning and end of 2006, as reported by Parties in 2007/2008 under Decision XVI/6.

Party	Critical use exemptions authorized by MOP for 2006	Quantity of MB as reported by Parties (metric tonnes)				
		Amount on hand at start of 2006	Quantity acquired for CUEs in 2006 (production + imports)	Amount available for use in 2006	Quantity used for CUEs in 2006	Amount at the end of 2006
Australia	75.1	0	55.308		55.308	0
Canada	53.897	3.713	41.969	45.682	44.114	1.568
EC	3 536.755	114.953	1 462.747	1 577.700	1 558.557	19.114
Israel	880.29	0	840.6	840.6	840.6	0
Japan	741.4	70.735	488.81	559.545	540.207	19.338
USA	8 081.753	9 974(a) 443(b)	6 924	16 898	6 425	8 170(c)

(a) Amount of pre-2005 stock on hand.
(b) Amount of stocks at the end of 2005 from production/imports specifically made for CUEs (acquired in 2005).
(c) The sum of 499 tonnes of stocks produced/imported in 2006 specifically for CUEs, plus 7,671 tonnes stocks acquired pre-2005.

Table 3.3 Quantities of MB 'on hand' at the beginning and end of 2007, as reported by Parties in 2008 under Decision XVI/6.

Party	Critical use exemptions authorized by MOP for 2007	Quantity of MB as reported by Parties (metric tonnes)				
		Amount on hand at start of 2007	Quantity Acquired for CUEs in 2007 (production +imports)	Amount available for use in 2007	Quantity used for CUEs in 2007	Amount on hand at the end of 2007
Australia	48.553	0	45.832	45.832	45.832	0
Canada	52.874	0.897	38.073	38.970	38.622	0.348
EC	689.142	31.635	484.842	516.477	508.031	8.446
Israel	966.465	0	940.675	940.675	750.225	190.45
Japan	636.172	23.417	479.290	502.707	485.113	17.594
USA	6 749	7 671(a)	4 314	11 985	4 269	6 503(b)

(a) Amount of pre-2005 stocks

(b) The sum of 45 tonnes of stocks produced/imported in 2007 specifically for CUEs, plus 6,458 tonnes stocks acquired pre-2005.

3.4. Reporting of MB Consumption for Critical Use - Decision XVII/9

Decision XVII/9(10) of the 17th MOP requests TEAP and its MBTOC to "report for 2005 and annually thereafter, for each agreed critical use category, the amount of methyl bromide nominated by a Party, the amount of the agreed critical use and either:

(a) The amount licensed, permitted or authorised; or
(b) The amount used"

Since the start of the CUN reviews in 2003, MBTOC has provided the amounts of MB nominated and agreed for each critical use (Annexes VI and VII). Not all Parties supply data under Table 2 of the accounting framework, set out on p. 65 of the Handbook on Critical Use Nominations (version 6 of December 2007). Data reported here for (a) and (b) above is thus incomplete.

Tables and figures in this report (Table 3.4, Figures 3.1 - 3.2) show the nominated MB amounts and the apparent rate of reduction in MB or adoption of alternatives achieved by Parties. It should be noted that for those countries that have pre-2005 stocks of MB that are being drawn down, the reductions in CUEs from year to year cannot be taken directly as evidence of alternative adoption since pre-2005 stocks will have been sold into the same sectors.

Table 3.4 in particular shows the amounts nominated and approved for 'Critical Use' in 2009 and 2010.

3.5 Trends in Methyl Bromide Use for CUEs since 2005

As part of the requirements of Decision XVII/9 trends in phase out by Parties are shown below. Since 2005, there has been a progressive trend by all Parties to reduce their nominations for consumption for preplant soil uses and post harvest uses, although this has occurred at different rates. Figs 3.1 and 3.2 show the trends in the reduction in amounts approved/nominated by Parties for 'Critical Use' from 2005 to 2010 for some key uses. The complete trends in phase out of MB by country, as indicated by change in CUE, are shown in Annexes V and VI.

Figure 3.1. Amounts of MB exempted for CUE uses in preplant soil industries from 2005 to 2009. Solid lines indicate the trend in CUE methyl bromide. Dashed lines indicate quantity of methyl bromide nominated by the Parties for either 2009 or 2010.

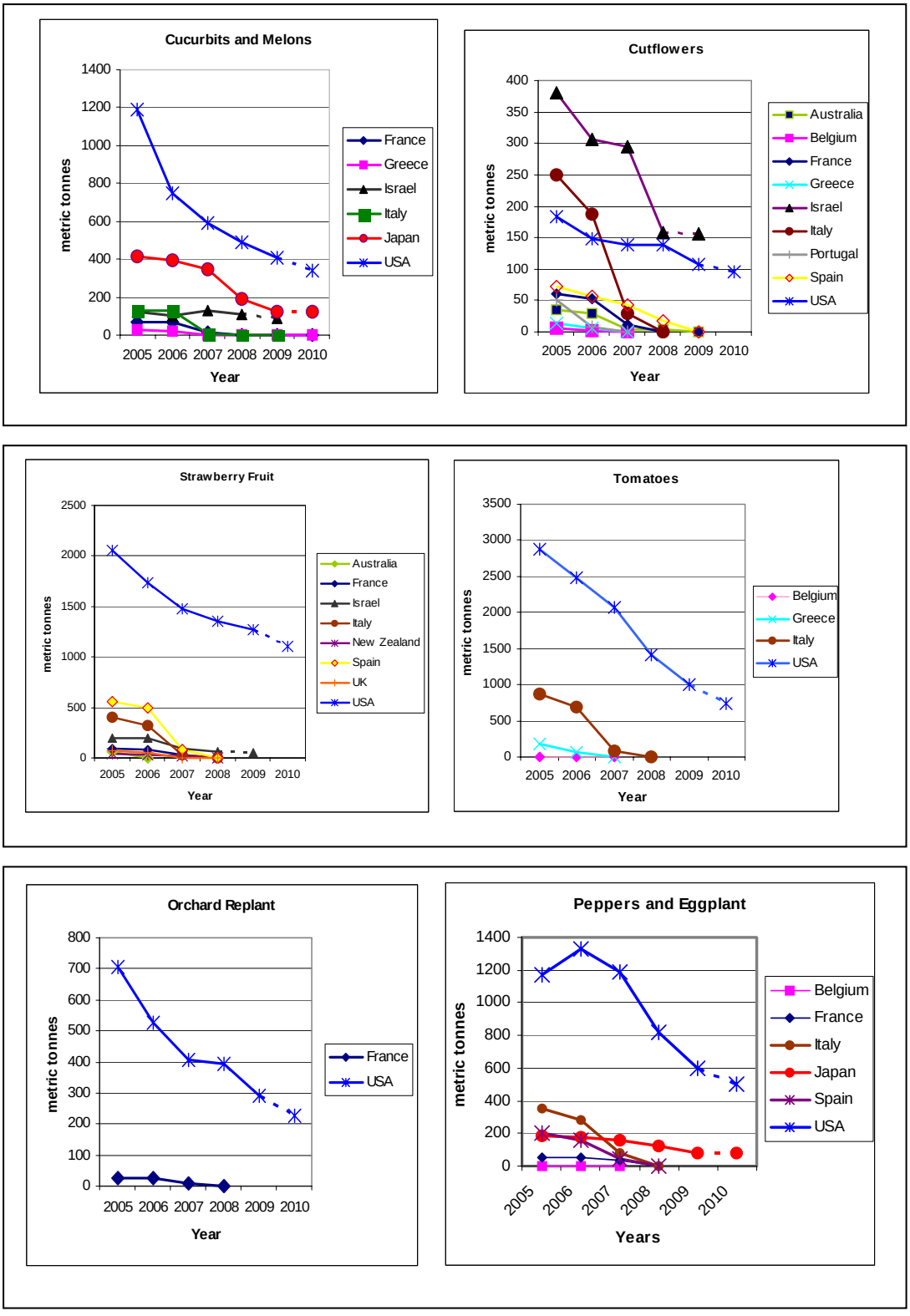


Figure 3.2. Amounts of MB exempted for CUE uses in mills and food processing facilities from 2005 to 2009. Solid lines indicate trend in CUE methyl bromide. Dashed lines indicate quantity of methyl bromide nominated by the Party for either 2009 or 2010.

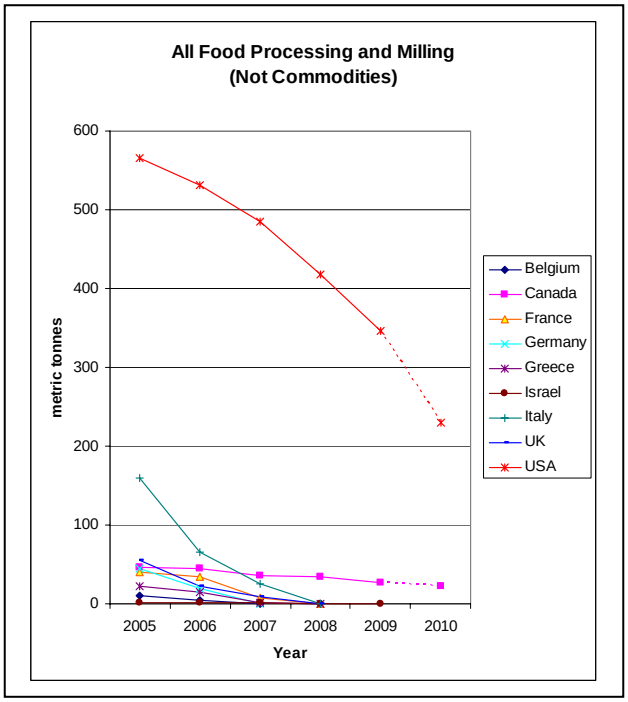


Table 3.4. Summary of Critical Use Nomination (2005 – 2010 in part) and Exemption (2005 – 2009 in part) Amounts of MB Granted by Parties under the CUN/CUE Process. (Note: A breakdown of CUN and CUE amounts by sector is given in Annex VI)

PARTY	QUANTITIES NOMINATED						QUANTITIES APPROVED					Quantities Recommended	
	2005	2006	2007	2008	2009	2010	2005 (1ExMOP and 16MOP)	2006 (16MOP+ 2ExMOP+ 17MOP)	2007 (17MOP + 18MOP)	2008 (18MOP + 19MOP)	2009 (19MOP)	2009*	2010*
Australia	206.950	81.250	52.145	52.900	38.990	37.610	146.600	75.100	48.517	48.45	37.61		36.44
Canada	61.992	53.897	46.745	42.241	39.115	30.340	61.792	53.897	52.874	36.112	34.38	4.74	30.34
European Community[1]	5754.361	4213.47	1239.873	245.00	0	0	4392.812	3536.755	689.142	245.146	0	0	0
Israel	1117.156	1081.506	1236.517	952.845	699.448	*	1089.306	880.295	966.715	860.672	0	610.554	
Japan	748.000	741.400	651.700	589.600	508.900	288.500	748.000	741.400	636.172	443.775	305.38		267.0
New Zealand	53.085	53.085	32.573	0	0	0	50.000	42.000	18.234	0	0	0	0
Switzerland	8.700	7.000	0	0	0	0	8.700	7.000	0	0	0	0	0
USA	10753.997	9386.229	7417.999	6415.153	4958.034	3399.490	9552.879	8081.753	6749.060	5355.976	4261.974		3233.456
TOTALS	**18704.241**	**15617.837**	**10677.552**	**8297.739**	**6244.187**	**3755.940**	**16050.089**	**13418.200**	**9160.714**	**6990.131**	**4,639.344**	**615.594**	**3567.236**

* Not yet available. [1] Members of the European Community having CUNs/CUEs include:
2005 – Belgium, France, Germany, Greece, Italy, Netherlands, Poland, Portugal, Spain, and the United Kingdom.
2006 – Belgium, France, Germany, Greece, Ireland, Italy, Latvia, Malta, Netherlands, Poland, Portugal, Spain, and the United Kingdom.
2007 – France, Greece, Ireland, Italy, Netherlands, Poland, Spain, and the United Kingdom
2008 – Poland, Spain

3.6 Evaluations of CUNs – 2008 round for 2009 and 2010 exemptions

MBTOC met separately in subcommittees in September to conduct further review of CUNs as requested by Parties, to update reports, discuss issues of registration of alternatives and other matters. The meetings were held as required by the time schedule for considerations of CUNs given in Annex I referred to in Decision XVI/4. Consensus decisions were made in subcommittees. Outcomes from deliberations by the two MBTOC subcommittees were discussed and vetted via electronic communication. Recommendations made by MBTOC S were circulated to MBTOC QSC and vice versa, as part of the process of reaching consensus within the whole committee.

During its first meeting of the year held in Tel Aviv, Israel (13 – 18 April, 2008) MBTOC S found information by the Parties sufficient to make recommendations for all nominations submitted. Two Parties however, the USA and Japan, requested the subcommittee to consider further or new information relating to their nominations, and this justified a second meeting, which took place in Alassio, Italy, from 31 August to 2 September, 2008. Some recommendations were changed in light of the new or additional information supplied as specified in Tables 3.5 and 4.5.

MBTOC QSC met in Chengdu, China on 21 September 2008 to consider again Critical Use Nominations for which Parties had submitted further information subsequent to the initial evaluations given in TEAP 2008 and those evaluated as unable to assess in that report. The meeting was attended by 9 of the 19 MBTOC-QSC members, including 2 UNEP-supported A5 members, and one from MBTOC-S. Several MBTOC QSC members could not attend the Chengdu meeting. Not all members of MBTOC-QSC were financed to attend a one-day meeting by the organizations that sponsor their membership. Arrangements were made for some members to contribute to the meeting by teleconference, with subsequent circulation of drafts by email.

Annex 1 of Decision XVI/4 contains a work schedule for MBTOC, which envisions two meetings per year to make CUN evaluations. The schedule further allows MBTOC to seek further information from Parties and for Parties to provide further information in response to MBTOCs interim recommendations made during the first meeting. UNEP and Party funding of MBTOC members would thus allow the committee to conduct its tasks appropriately and complete its work.

At the OEWG meeting, bilateral meetings were held with Australia, Canada, Japan and the United States. The United States met with MBTOC-S during the Alassio meeting for discussions with regard to their CUNs, and communicated with MBTOC QSC at the meeting in Chengdu, China via prearranged teleconference, both in accordance with paragraph 8 of Annex 1 of the 16th MOP.

CUNs in this report relate to CUEs sought for 2009 and 2010. No nominations in this particular round were submitted for longer periods.

Two Parties (Israel and Canada) submitted nominations for the 2009 round and four Parties (Australia, Canada, Japan, and the USA) submitted nominations for 2010. These Parties have submitted nominations in previous CUN rounds. Israel submitted a nomination for preplant soil use of MB for seed production, which had not been applied for in the 2006 and 2007, but was submitted in 2003 and 2004. The total number of

nominations has been reduced from about 58 nominations submitted by seven countries in the last round. The EC has submitted no nominations in this round for 2009 and advised that they will no longer be submitting nominations for CUEs. Japan indicated in correspondence and during the OEWG in Bangkok, Thailand, that it plans to phase out all preplant soil uses of MB by 2013.

Changes made to nominated amounts and MBTOC recommendations with respect to the interim report of May 2008 can be found in Table 3.5 and 3.6 below and are described in detail in textboxes included in Table 4.5 and 5.1.

Table 3.5. Changes occurring to nominated and recommended amounts of MB for soils preplant uses after the May 2008 interim report.

Party	CUN	Initial nomination by the Party	Interim MBTOC recommendation	Revised nomination by the Party after the 28th OEWG*	Final MBTOC recommendation
Japan	Cucumber	34.10	23.00	34.10	30.69
	Peppers	81.10	54.37	81.10	72.99
	Melons	90.80	61.00	90.80	81.72
	Watermelons	15.40	14.50	15.40	14.50
	TOTAL	**221.40**	**152.87**	**221.40**	**199.90**
United States	Cucurbits **	340.405	266.199	340.405	302.974
	Peppers	658.952	457.299	463.282	463.282
	Ornamentals	111.391	92.912	95.204	84.617
	Strawberry fruit	1191.815	998.063	1103.422	1007.477
	Tomatoes	994.582	704.715	737.584	737.584
	TOTAL	**3297.145**	**2519.188**	**2739.897**	**2595.934**

* Nominated amounts for Japan did not change

** Revised nominated amounts for US cucurbits did not change since iodomethane is not registered for this crop

Table 3.6. Changes occurring to nominated and recommended MB for postharvest uses after the May 2008 interim report (tonnes)

Party	CUN	Initial nomination by the Party	Interim MBTOC recommendation	Revised nomination by the Party after the 28th OEWG*	Final MBTOC recommendation
Australia	Rice	7.82	NR	7.82	6.65
Canada	Pasta	6.067	1.9	4.74	4.74
Canada	Flour	22.878	U	22.878	22.878
United States	Mills *	191.993	187.534	173.023	173.023
	Commodities	43.007	1.9 U, NR	19.242	19.242

* Amounts changed for USA Mills and Processors corrected errors, not re-evaluation.

MBTOC has sometimes recommended quantities of MB for 2009 or 2010 which are different from those nominated. Grounds used for these recommendations are given in detail after the relevant CUNs in Tables 5.1 and 4.5. The adjustments for preplant soils use follow the presumptions given in Tables 4.2 and 4.3.

In paragraph 20 of Annex 1 referred to in Decision XVI/4, Parties, among other things, specifically requested that MBTOC explicitly state the specific basis for the Party's economic statement relating to CUNs. Tables 5.1 and 4.5 provide this information for each CUN. This information was prepared by MBTOC economists.

In general, CUNs resulted mainly from the following issues: regulatory restrictions on alternatives, scale-up of alternatives, economic issues and, to a much smaller degree, the technical unavailability of alternatives. This was as in the previous two years of CUNs. For the most part, technical alternatives exist. Additionally, MBTOC notes that some Parties continue to struggle with the ability to adapt previously identified alternatives to their circumstances, within their definition of economic feasibility.

3.7. Critical Use Nominations Review

In considering the CUNs submitted in 2008, as previously, both MBTOC subcommittees applied the standards contained in Annex I of the final report of 16 MOP, and, where relevant, the standard presumptions given below. In particular MBTOC sought to provide consistent treatment of CUNs within and between Parties while at the same time taking local circumstances into consideration.

In evaluating the CUNs for soil treatments, MBTOC assumed that a technically feasible alternative to MB would need to provide sufficient pest and/or weed control for continued production of that crop to existing market standards.

MBTOC evaluation of CUNs for preplant soil use relating to production of strawberries, tomatoes and some other crops was assisted by information provided by a large number of published studies on MB alternatives and by a meta-analysis of over 100 potential alternatives (Porter, 2006). The published studies assisted in providing additional transparency to MBTOC evaluations, as requested by the Parties in Decision XV/4. MBTOC also used information on the suitability of alternatives for a nomination by considering the commercial adoption of alternatives in regions nominated for CUNs.

Further, 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 similar region. For example for preplant soil uses of MB, 1,3-dichloropropene/chloropicrin (1,3-D/Pic), metham sodium alone or in combination with Pic, dazomet, substrates and the use of resistant varieties and grafted plants (for solanaceous crops, melons and other cucurbits) have been adopted to replace MB for a range of crops in industries applying for CUNs and in many regions where MB was once used.

For commodity and structural applications, it was assumed that technically and economically feasible alternatives 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, while ensuring the costs were economically feasible in the context of that nomination, to the extent that could be determined.

Unless otherwise indicated, the most recent CUE approved by the Parties for a particular CUN was used as baseline for consideration of continuing nominations.

The standard presumptions, used by MBTOC to assess nominations, are given in the chapters ahead.

3.8 Disclosure of Interest

As in the past, all MBTOC members have prepared disclosure of interest forms relating specifically to their level of national, regional or enterprise involvement for the 2008 CUN process, according to a standardised format developed by TEAP. The Disclosure of Interest declarations are found in Annex VII at the end of this report. As in previous rounds, some members withdrew from a particular CUN assessment or only provided technical advice on request for those nominations where a potential conflict of interest was declared.

4. MBTOC Soils: Final Evaluations of 2008 Critical Use Nominations for Methyl Bromide

4.1 Summary of outcomes

In the 2008 round, 31 CUNs were submitted for soil uses, 12 for 2009 and 19 for 2010. Interim recommendations were made on all nominations of 697.048 tonnes for 2009 and 3318.559 tonnes for 2010. Two Parties, however, after consideration of information in its interim recommendations and information from bilateral discussions at the OEWG, requested further review of their nominations and provided further information to MBTOC-S. The United States revised total nominated amounts for soil uses from 3722.230 tonnes to 3164.982, by reducing the nominations for four sectors: tomatoes, strawberries, ornamentals and peppers. These nominations took account of the reregistration of IM in 45 States, including the recent registration in Florida. This reduced the total nominated amount by Parties for soil uses by 673.948 tonnes in 2010. Similarly, after the OEWG Japan sent new information that required a reassessment of four CUNs - cucumbers, peppers, melons and watermelons.

In its final assessment, MBTOC-S has recommended a total of 608.454 tonnes for 2009 and a revised total amount of 3297.800 tonnes for 2010. After the revised nominations or new information were received from the USA and Japan, an amount of 88.594 tonnes was not recommended for 2009 for Israel, and 187.534 tonnes not recommended for 2010 for USA and Japanese nominations.

MBTOC accepted the MB dosage rates submitted by the USA delegation and did not apply new standard presumptions for use with barrier films and MB/Pic formulations in this round for the USA nominations. Additionally, Japan submitted information to substantiate a potential rate of transition to alternatives that was considerably less than what MBTOC originally recommended. Although this does not appear to change the intention of Japan to complete phase out by 2013, MBTOC is recommending a greater transition rate as it considers alternatives are available and can be adopted for a larger portion of the nomination by 2010 than those indicated by Japan.

Table 4. 1a Summary of MBTOC S final recommendations for 2009 and 2010 by country for CUNs received in 2008 for preplant soil use of methyl bromide (tonnes)

Country	**CUE approved at MOP 19**		**CUN for 2009 and 2010**		**MBTOC-S Final Recommendation**	
	2008	**2009**	**2009**	**2010**	**2009**	**2010**
Australia		**29.790**		29.790		29.790
Canada		7.462		7.462		7.462
EC	244.146					
Israel	858.560		697.048		608.454	
Japan		299.580		283.100		261.6
USA		3851.329		3164.982*		2998.948
Total	**1102.706**	**4188.161**	**697.048**	**3485.298**	**608.454**	**3297.8**

*** The number shown is the revised nomination by USA after the 28th OEWG.**

Table 4.1b Summary of the amounts approved by Parties at 17th MOP for 2009, and MBTOC S recommendations (in square brackets) for CUE's for preplant uses of MB (tonnes) for 2009 and 2010 submitted in the 2008 round.

Country and Sector	Years	
	2009	**2010**
1. **Australia**		
1. Strawberry runners	**29.790**	**[29.790]**
2. **Canada**		
1. Strawberry runners	**7.462**	**[7.462]**
3. **Israel**		
1. Broomrape	[125.000]	----------
2. Cut flowers & bulbs protected	[85.431]	----------
3. Cut flowers open field	[34.698]	----------
4. Melon protected & open field	[87.500]	----------
5. Potato	[75.500]	----------
6. Strawberry fruit protected	[77.750]	----------
7. Strawberry runners	[28.075]	----------
8. Sweet potatoes	[95.000]	----------
TOTAL	**[608.454]**	----------
4. **Japan**		
1. Cucumber	34.300	[30.690]
2. Ginger open field	63.056	[53.400]
3. Ginger protected	8.325	[8.300]
4. Melon	91.100	[81.720]
5. Pepper green & hot	81.149	[72.990]
6. Watermelon	21.650	[14.500]
TOTAL	**299.580**	**[261.600]**
5. **USA**		
1. Curcubits	407.091	[302.974]
2. Eggplants (field)	48.691	[32.820]
3. Forestry nursery	122.060	[117.826]
4. Nurseries stock: fruits, nuts & flowers	25.326	[17.363]
5. Orchard replant	292.756	[215.800]
6. Ornamentals	107.136	[84.617]
7. Pepper (field)	548.984	[463.282]
8. Strawberry (field)	1,269.321	[1,007.477]
9. Strawberry runners	7.944	[4.690]
10. Sweet potatoes	18.144	[14.515]
11. Tomatoes (field)	1,003.876	[737.584]
TOTAL	**3,851.329**	**[2,998.948]**

4.2. Issues related to CUN Assessment for Preplant Soil Use

In general, CUNs for preplant soil use of MB resulted mainly from the following issues: regulatory restrictions on one or two specific alternatives, adoption times to implement alternatives, and economic infeasibility of some key technical alternatives, such as the use of methods which avoid the need for MB, i.e. use of grafted plants.

Key issues which assisted MB reductions and also affected the need for MB in the 2008 round were i) a new registration of iodomethane (= methyl iodide) in the USA, which

has now been extended to the state of Florida ii) regulations on key alternatives, particularly 1,3-D township caps and buffer zones on 1,3-D, metham sodium and Pic used alone or in mixtures (iii) restrictions on use of high rates of Pic (greater than 200 kg/ha (20 g/m^2)) in some counties of California, iv) lack of effective alternative controls for nutsedge, and v) lack of studies in specific sectors i.e. orchard replant, and nursery industries.

Unusually large buffer zone restrictions on fumigant alternatives, particularly limit their adoption, especially in Israel. MBTOC urges Parties to consider review of these regulations in view of the ability of barrier films to reduce dose rates of MB and alternatives and associated emissions. As in the previous round, Parties have found alternatives more difficult to adopt for propagation materials, such as strawberry runners and nurseries, however the lack or research studies provided with CUNs has also led to difficulties in assessment as these CUNs. MBTOC considers that several of these do not to fully satisfy the requirements of Decision IX/6. The impact of current reviews of VOC emissions in California may also have a major impact on MB use and the use of alternatives in California in future nominations. The registration of a key alternative, 1,3-D/Pic is uncertain in Israel. In addition to the recent registration of IM in the USA, recent permits for IM use for commercial scale trials in Australia look promising for its uptake and commercial registration in this country and all other countries apply for CUEs for preplant soil of MB (Japan, Israel), except Canada.

MBTOC also notes that a large proportion of MB has been nominated for uses where regulations or legislation prevent reductions of MB dosage. For many uses, the mandatory use of MB is specified at a high dosage for either treatment of certified propagation material or because bans are imposed on the use of barrier films which otherwise could have reduced the MB dosage rate. Also regulations on the use of alternatives are preventing their uptake for a substantial proportion of the remaining CUNs for preplant soil use. MBTOC urges the Parties to align their local policies and regulations with internationally accepted methodologies and to allow use of MB alternatives that lie within the Montreal Protocol's goals.

In this round, MBTOC has sometimes suggested quantities of MB for 2009 or 2010 different from those nominated. Grounds used for these changes are given in detail after the relevant CUNs in Table 4.5. The adjustments follow the standard presumptions given in Tables 4.2 and 4.3 below, unless indicated otherwise.

4.2.1. Registration of alternatives for preplant uses - Decision Ex I/4 (9i) and (9j)

Decision Ex. I/4 (9i) requires MBTOC "*To report annually on the status of re-registration and review of methyl bromide uses for the applications reflected in the critical-use exemptions, including any information on health effects and environmental acceptability*". Further, Decision Ex I/4 (9j) requires MBTOC "*To report annually on the status of registration of alternatives and substitutes for methyl bromide, with particular emphasis on possible regulatory actions that will increase or decrease dependence on methyl bromide*".

Reregistration Eligibility Decision (RED) documents for use of MB, Pic, MS, and dazomet for preplant soil fumigation were completed in the USA on July 15, 2008, with

a comment period allowed until 30 October. Final decisions are scheduled to be available in 2009. New safety measures such as buffer zones to protect bystanders, reduced application rates, health protection measures for workers are required in the RED. 1,3-D, which was included in the fumigant cluster for comparative purposes only, completed reregistration in the U.S. in 1998, and no further mitigation is expected at this time.

Iodomethane (IM), a major alternative to MB, has recently been registered in 45 states in the United States including Florida for field-grown ornamentals, peppers, strawberries and tomatoes. Trials with IM continue being conducted in Japan, Australia, New Zealand, Turkey, Morocco, South Africa, Israel, Costa Rica, Guatemala, Brazil, Mexico and Chile and the registration process is proceeding in most other countries applying for CUEs beside other states in the USA including Australia, Israel and Japan. To ensure that the mitigation measures for IM will be consistent with the measures being required for the other fumigants, the label requirements are presently being reexamined in the USA. 1,3-dichloropropene, may be subject to similar provisions when the soil fumigants are evaluated together again in 2013.

The EC has further reported that, "decisions are expected in 2008 for MB, metham sodium and dazomet. 1,3-D was reviewed on an earlier timetable in the EC. It will be excluded from Annex I to Directive 91/414/EEC, which lists active substances authorised for incorporation in plant protection products. Member States may grant a period of grace, which shall expire by 20 March 2009. Recognising the role of 1,3-D as an alternative to MB, and to achieve the objectives of the Montreal Protocol, this grace period may be extended by a further 18 months, pending a review to assess the concrete impact of its withdrawal on the use of MB. The manufacturer of 1,3-D has compiled a dossier of additional technical information and intends to apply for re-registration of 1,3-D under Directive 91/414 (Dow AgroSciences 2007)". (EC Management Strategy, 2008)

A number of other chemicals which may be alternatives to MB are now in the registration process in specific countries, including dimethyl disulphide (DMDS) in Europe and the USA (for cantaloupe, cucumber, squash, other cucurbits, peppers, strawberry, tomato) and ethane dinitrile (EDN) in Australia, dazomet in the USA (for strawberry and tomato), and various herbicides.

4.2.2. Update on rates of adoption of alternatives for preplant uses - Decision XIX/9

As of the 2008 round, Decision XIX/9 para. 3 requests: ' *the Technology and Economic Assessment Panel to ensure that recent findings with regard to the adoption rate of alternatives are annually updated and reported to the Parties in its first report of each year and inform the work of the Panel*'.

Technical alternatives exist for almost all uses requesting CUNs, but uptake of alternatives varies between countries, crops and the pest pressure. In general similar alternatives are being adopted by the same sectors throughout a number of countries, although the rate of adoption has varied depending on regulations on their use, differences in registration between countries and other market forces. In this round as in previous rounds of CUNs, MBTOC has recognised that time is needed to effect

phase-in of alternatives and has accepted this as a reasonable technical argument for lack of availability to the end user sensu Decision IX/6.

Where possible, data is included in this report showing actual rates of adoption in key regions which have phased out MB recently. In particular, recent adoption data from the EC Management Strategy (2008) has been included to shows rates of transition to alternatives by several sectors in the Member States (Appendix IV). In addition, past adoption rates of alternatives in many countries is presented in previous Assessment Reports (MBTOC 2007). Figures 3.1 – 3.2 in this report show the apparent reduction rates for MB use achieved by many Parties in a number of key sectors. As noted above, true reduction and adoption rates may vary from the rate of change of CUN/CUE because of factors such as use of stocks or transfer of approved MB between categories The CUN reviews presented in Table 4.5 also provide detail of some of the key alternatives that Parties have and should consider to further replace MB for the remaining uses.

For several major preplant soil uses, adoption data from other regions has shown that where industries have previously been heavily dependent on MB, e.g. strawberries, tomatoes and other vegetable crops (e.g. Australia, Italy, Spain, Belgium, Portugal, New Zealand) almost complete adoption of alternative technologies (especially those requiring similar application technologies) has been achieved in a 3 to 4 year period. For instance, a full list of adoption rates obtained within the EC is shown in Annex IV. These regions have similar pests complexes to those requesting CUNs, but may have different regulatory issues. Possible adoption rates for transition to alternatives for preplant soil uses have also been supplied recently by Japan in their National Action Plan. This plan indicates the expected rates of transition to alternatives to assist complete phase out of MB by 2013.

Further guidance from the Parties, giving expected rates of adoption of alternatives following registration, would assist MBTOC in evaluation of CUNs in future.

4.2.3. Sustainable alternatives for preplant uses

In a large proportion of CUNs, the most currently appropriate alternatives are chemical fumigant alternatives, which themselves, like MB, have issues related to their long term suitability for use. In both the EC and the USA in particular, MB and most other fumigants have been subjected to reviews that could affect future regulations over their use for preplant soil fumigation. For preplant soil uses of MB, the regulatory restrictions on 1,3-dichloropropene and chloropicrin are preventing further adoption of these products in the USA, particularly California and this is putting pressure on industries to retain MB.

MBTOC urges Parties to consider the long term sustainability of treatments adopted as alternatives to MB, to continue to adopt environmentally sustainable and safe chemical and non-chemical alternatives for the short to medium term and to develop sustainable IPM or non-chemical approaches for the longer term.

Decision IX/6 1(a)(ii) refers to alternatives that are ‘acceptable from the standpoint of environment and health’. MBTOC has consistently interpreted this to mean alternatives

that are registered or allowed by the relevant regulatory authorities in individual CUN regions, without reference to sustainability.

4.2.4. Frequency of allowed MB use for preplant uses

In the CUN round for 2008, reductions in MB for preplant (soil) uses could be achieved in some nominations, where effective alternatives were identified, by reducing the frequency of MB fumigations. Instead of all fumigation being made with MB, potential exists to reduce frequency by rotation with other methods (i.e. fumigants) in order to reduce MB use to every 2nd or 3rd year. In some production systems, MB is already used only every 3rd or 4th year as a result of uptake of alternative strategies and crop rotations.

Noting this effort, MBTOC has not automatically concluded that episodes when MB is not used mean a fully successful adoption of alternatives. There is no instruction from Parties as to how to consider renewed CUNs in the future that result from a potential need for MB in the years where reduced frequency of fumigation is to take place.

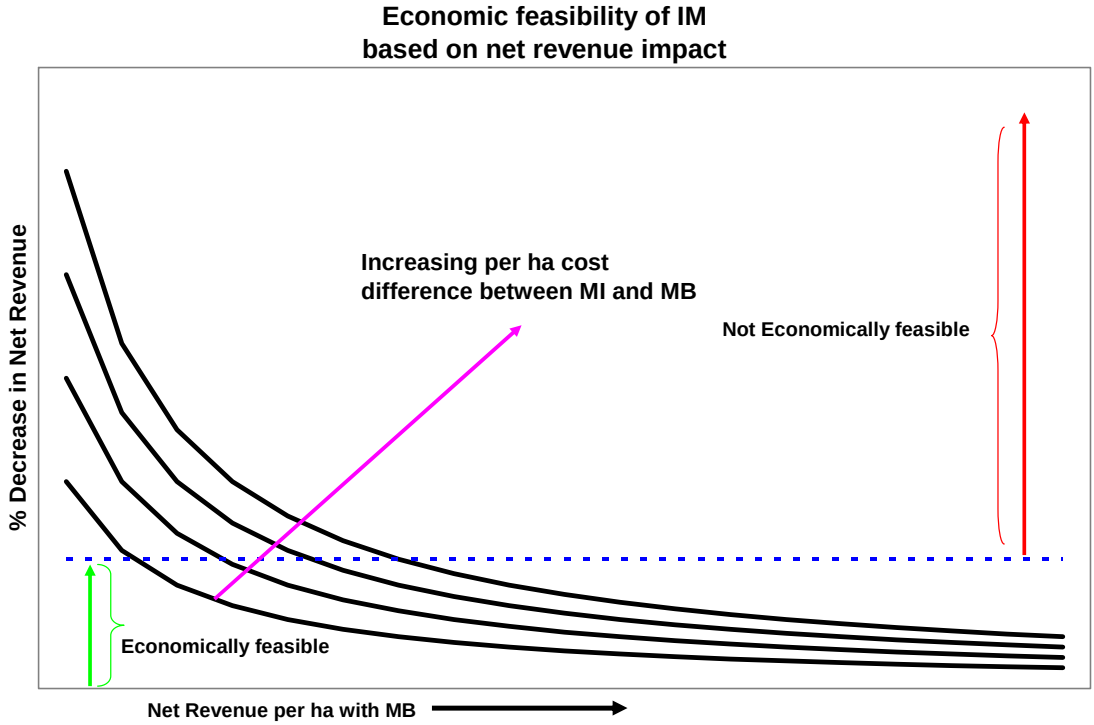
4.3. Economic feasibility of iodomethane (IM)

During the 2008 round of evaluations, IM received a federal registration in 45 states of the USA and awaits registration in just a few States, notably California. Commercial adoption of IM has begun in the USA and the registration process is underway in several other countries.

MBTOC considered the economic feasibility of IM in a partial budgeting analysis framework and determined that for many crops and locations, IM is an economically feasible alternative for preplant uses of MB. The cost for fumigant compounds is typically a relatively small share of total costs and variable production costs. It is assumed that IM will exhibit equivalent economic efficacy to MB and no other costs will change. Equivalent economic efficacy means gross revenues (yield times price) remain the same. The key measures for assessing economic feasibility become the difference in per hectare fumigant material cost between IM and MB and the impact of this cost change on net revenues per hectare.

The increased cost reduces net revenue but generally by a small percentage, reflecting the fumigants' small shares of operating costs, the small absolute cost for fumigant material, and the magnitude of net revenues per hectare seen with most crops currently using MB. After adjusting for dose rates expected to provide equivalent yields, IM/MB price ratios of 1.4 to 2.0 result in percentage changes in net revenue which can be very small (<2%) at high net revenues. At per hectare revenue incomes of $10,000, $50,000 and $100,000 the differences in variable cost for fumigant price differences between IM and MB (based on a fumigant price difference of $900/ha) are approximately 10%, 2% and 1% respectively. As the crop revenue per hectare price increases, the significance of the change in fumigant price decreases. Fig. 4.1 below illustrates this relationship through an economic model (based on 'synthetic data'):

Fig. 4.1. Economic feasibility of iodomethane (IM) based on net revenue impact



The percent decrease in net returns when adopting the more costly fumigant (IM) will generally be small, but there is a percentage change in net returns at which IM will not be considered an economically feasible alternative. However, MBTOC has not received any guidance regarding this percentage and there is no consensus on the level of economic impact that is considered the threshold between economically feasible and not economically feasible. The threshold is represented by the horizontal line above the X axis. The chart further illustrates that, (a) The impact from the increase in fumigation costs from switching to IM is less important when the crop being produced has large net returns per hectare when using MB (b) As the absolute difference in fumigation cost between IM and MB increases, the percentage decrease in net returns becomes more important (this is illustrated by moving outward from one curve to another), (c) There are some cases where IM may not be economically feasible. This can result from large absolute cost differences between IM and MB or a starting point of low net revenues so that the business cannot absorb the higher costs, and (d) Application of IM via drip application may be cheaper than application of MB via injection equipment and this would make the treatment more likely to be adopted at all net revenues.

4.4. Standard presumptions used in assessment of nominated quantities.

The tables below (Tables 4.2 and 4.3) provide the standard presumptions applied by MBTOC Soils for this round of CUNs. These standard presumptions were first proposed in the MBTOC report of October 2005 and were presented to the Parties at 17th MOP. Studies and reports to support them appear in Annex III. They were revised for some sectors after consideration by the Parties at the 19th MOP. The rates and practices adopted by MBTOC as standard presumptions are based on maximum rates

considered acceptable by published literature and actual commercial practice. Actual dosage rate of MB in MB/Pic formulations is shown in Table 4.4 below.

As in the evaluations in previous years, MBTOC considered reductions to quantities of MB in particular nominations to a standard rate per treated area where technical evidence supported its use (see Annex III). MBTOC considered the maximum MB application rate for 98% MB to be either 250 or 350 kg/ha (25 or 35 g/m^2), in conjunction with low barrier permeability films (e.g., VIF or equivalent), combined with extended exposure periods. One Party has indicated that 250 kg/ha (25g/m^2) of 98:2 were effectively used in standard commercial application, especially on sandy soils. MBTOC considers 98:2 formulations only necessary for CUE uses where other MB/Pic formulations are not registered or where regulations prescribe its use.

In cases where use of high chloropicrin-containing mixtures (approximately MB:Pic 67:33 or 50:50 or lower) are considered feasible and barrier films, maximum dosage rates of either 150 or 175 kg MB/ha (15.0 - 17.5 g/m^2) where nutsedge is the key pest and 125 or 150 kg/ha (12.5 - 15 g/m^2) for pathogens were considered for use as the maximum standard presumptions, unless there was a regulatory or technical reason indicated otherwise by the Party (see Table 4.2 below).

As a special case, MBTOC accepted a maximum rate of 200 kg/ ha (20 g/m^2) with barrier films for certified nursery production, unless regulations prescribed higher rates. However, Parties have indicated that rates of 200 kg/ha (20g/m^2) or less (Annex III) of MB: Pic 50:50 were effective with barrier films for production of 'certified' nursery material.

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.

During the bilateral meeting held in Alassio, the United States delegation indicated that they were not able to conform to dosage rates suggested by MBTOC for vegetables and strawberries at present (see Table 4.3 below) as they did not have enough trial information to confirm their use for specific circumstances. In view of the fact that the USA did not consider experiences from other countries and sectors valid for extrapolation to USA circumstances, MBTOC considers it necessary to conduct a thorough review of research and experiences available in the United States in relation to effective dosage rates of MB.

Table 4.2. Standard presumptions used in assessment of CUNs for the 2008 round – soil treatments.

	Comment	CUN adjustment	Exceptions
1. Dosage rates	Maximum guideline rates for MB:Pic 98:2 25 to 35 g/m^2 with barrier films (VIF or equivalent); for mixtures of MB/Pic 12.5 to 17.5 g MB/m^2 for pathogens and nutsedge respectively, under barrier films depending on the sector. 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.
2. Barrier films	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
3. MB/Pic Formulation: Pathogen control	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
4. MB/Pic Formulation: Weeds/nutgrass control	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
5. Strip vs. Broadacre	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, emission regulations on MB, or open field production of high health propagative material

Table 4.3. Maximum dosage rates for preplant soil use of MB by sector used in the 2008 round (standard presumptions).

Film Type	**Maximum MB Dosage Rate (g/m^2) in MB/Pic mixtures considered effective for:**			
	Strawberries and Vegetables	**Nurseries***	**Orchard Replant**	**Ornamentals**
Barrier films - Pathogens	12.5	15	15	15
Barrier films - Nutsedge	15.0	17.5	17.5	17.5
No Barrier films – Pathogens	20	20	20	20
No Barrier films - Nut sedge	26	26	26	26

* Maximum rate unless certification specifies otherwise

4.5. Adjustments for standard dosage rates using MB/Pic formulations

One key transitional strategy to reduce MB dosage 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*., 2001; Lopez-Aranda *et al*., 2003; Santos *et al*., 2007; Hamill *et al.,* 2004; Carey and Godbehere, 2004; Gilreath and Santos, 2005e; Hanson *et al.,* 2006). Where such formulations are registered or otherwise permitted, non Article 5 countries have widely adopted formulations containing high proportions of Pic in mixtures with MB to meet Montreal Protocol restrictions Their use can be achieved with similar application machinery which allows co-injection of methyl bromide and chloropicrin or by use of premixed formulations. Consistent performance has been demonstrated with both barrier and non barrier films. Parties are urged to consider even lower dosage rates of MB by modifying MB/Pic mixtures used and adoption of barrier films where regulations permit as the basis for future CUNs. This includes rates as low as 75 kg/ha (75 g/m^2) in 250 kg/ha of 30:70 or 33:67 mixtures or 100 kg/ha (10 g/m^2) of MB in 250 kg/ha of 50:50 MB/Pic mixtures in conjunction with barrier films as these have shown similar effectiveness of higher rates of MB in 67:33 MB /Pic and much higher rates of 335 to 800 kg/ha of MB 98% with standard polyethylene.

Table 4.4. Actual dosage rates applied during preplant fumigation when different rates and formulations of methyl bromide/chloropicrin mixtures are applied with and without barrier films. Rates of application reflect standard commercial applications rates.

Commercial application rates of formulation	***MB/Pic formulation (dose of MB in g/m^2)***			
	98:2	***67:33***	***50:50***	***30:70***
A. With Standard Polyethylene Films				
400	*39.2*	*26.8*	*20.0*	*12.0*
350	*34.3*	*23.5*	*17.5*	*10.5*
300	*29.4*	*20.1*	*15.0*	*9.0*
B. With Low Permeability Barrier Films (LPBF)				
250	*24.5*	*16.8*	*12.5*	*7.5*
200	*19.6*	*13.4*	***10.0******	*6.0*
175	*17.2*	*11.8*	*8.8*	*5.3*

** Note: Trials from 1996 to 2007 (Annex III) show that a dosage of 10g/m^2 (e.g. MB/Pic 50:50 at 200kg/ha with LP Barrier Films) is technically feasible for many situations and equivalent to the standard dosage of >20g/m^2 using standard films*

4.6. Use/Emission reduction technologies - Low permeability barrier films and dosage reduction

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'. 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."

As in past rounds, MBTOC assessed CUNs where possible for reductions in MB application rates and deployment of MB emission reduction technologies, such as use of LPBF, including VIF, or other appropriate sealing and emission control techniques including deep injection of MB, use of formulations with a lower proportion of MB and/ or reduced frequency of application.

The use of low permeability barrier films (i.e. VIF) or other techniques ensuring at least the same level of environmental protection is compulsory in the 27 member countries of the European Union (EC Regulation 2037/2000). In other regions, LPBF films are considered technically feasible and large adoption has occurred, e.g. Israel and SE USA. In Florida the reported use of barrier films in vegetable crops has expanded to over 50,000 acres in 07/08 (Allen, pers. comm., 2008). An exception to the use of barrier films is the State of California in the USA where a regulation currently prevents use of VIF with MB (California Code of Regulations Title 3 Section 6450(e)), but not with the alternatives. This regulation has been set over concerns of possible worker exposure to MB when the film is removed or when seedlings are planted due to altered flux rates of MB.

4.7. Use of disposable canisters of MB

One non Article 5 Party is still using small disposable canisters (i.e. 500 to 750g canisters) for application of MB for preplant soil use under plastic films under strict worker health guidelines. Canister applications have been eliminated for soil use in all other non Article 5 countries as this application is considered to be less efficient for the control of soilborne pathogens than other methods. This treatment is considered to be more dangerous to workers than injection methods, because trained contractors are not generally involved in its application. This practice is not considered as effective for pathogen control as use of MB/Pic mixtures and also can lead to high emissions of methyl bromide as the MB gas is released immediately beneath the plastic sheets. According to the Party, canisters are used because they provide small-scale farmers with an easy application method and the ability to apply targeted amounts of MB to small areas where injection machinery may be difficult to use. In this case, farmers are reported to use strict controls.

4.8. Metaanalysis update

In response to Decision XVI/5, which provided financial support to MBTOC for expert assistance with the assessment of the critical-use nominations, a statistical analysis or metaanalysis study was conducted to analyse methyl bromide alternatives for pre-plant fumigation (Porter *et al,* 2006).

This report provides the Parties with a technical overview of results from published research from 1995 till 2005. It provided the statistical best estimate of the relative effectiveness of the major chemical alternatives to methyl bromide as determined by analysis of information across a large number of studies in different regions and under different pathogen pressures. Effectiveness was assessed by comparing relative yield of the alternative to the respective methyl bromide/chloropicrin (MB/Pic) treatment. The study took account of both registered and unregistered products and concentrated on two major crops, strawberry fruit and tomatoes. Interpretation of the use of alternatives for other crops such as peppers, melons and other cucurbits, and eggplants can be made with much of the information, particularly in the case of tomatoes where the target pathogens and weeds were relevant to the outcomes for these other crops. The metaanalysis also includes a detailed assessment of the effect of alternatives for nutsedge under different inoculum level (or pest pressure) and the influence of low permeability barrier films across a range of regions and crops.

Analyses from strawberry fruit trials showed that a large number of alternatives used alone or in various combinations had mean estimated yields which were within 5% of the estimated yield of the standard MB treatment (MB/Pic 67:33). Of these, a number of alternatives and MB/Pic formulations (50:50, 30:70) led to results that were similar to MB/Pic 67:33. These included PicEC (chloropicrin, Emulsifiable Concentrate), TC35EC (Telone C35 or 1,3-dichloropropene/chloropicrin), TC35 and TC35ECMNa (TC35 EC combined with metham sodium) and IM/Pic formulations (iodomethane/chloropicrin), which are undergoing registration in several countries.

Analyses from tomato trials showed that a range of alternative treatments used alone or in various combinations had mean estimated yields which were within 5% of the estimated yield of the standard methyl bromide treatment (MB/Pic 67:33). While some of these treatments contained pebulate, a herbicide which is not commercially available anymore, most treatments did not contain this particular product. Several treatments, PicMNa (chloropicrin combined with metham sodium), 1,3D/Pic in combination with a range of herbicides and MI60 (iodomethane/chloropicrin), provided results similar to MB/Pic 67:33.

Decision XIX/9 required MBTOC to report to the 28th OEWG an explanation of *"how its uses the metaanalysis in its work and to disclose to the Parties a written explanation of any significant changes or deviations it intends to make to that methodology before it undertakes any such change or deviation"*.

In response, MBTOC has included a response in the interim report for 2008 and the following information for this final report. MBTOC uses the metaanalysis report as a guide to the relative effectiveness of many alternatives, together with many others obtained from scientific journals, conference proceedings, published reports and others, to substantiate and support its recommendations. No change to this approach has been made in this round.

In response to specific requests from the USA in 2006 and 2007, MBTOC supplied further information to support the report, including clarification of the process used in the metaanalysis and the international biometrical standards used and a full set of information detailing which alternatives had been used and from what studies. In 2008, after further requests were made during the 28th OEWG, a teleconference was organised on 8 August 2008 with the biometricians conducting the metaanalysis, MBTOC members and USA delegates to clarify questions on statistical methods used and conclusions of the study. Details of this teleconference were provided to MBTOC members and TEAP co-chairs for information. Further discussions and requests were made by the USA during the bilateral meeting held in Alassio in September 2008.

Table 4.5. Final evaluations of CUNs for preplant soil use submitted in 2008 for 2009 or 2010

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
Australia	Strawberry runners	35.750	37.500	35.750	35.750	29.790	None	-	29.790	29.790
	MBTOC comments 2008: MBTOC recommends 29.790 tonnes for this use in 2010. The key pests affecting strawberry runner production are fungi (*Phytophthora, Pythium, Rhizoctonia, Verticillium*) and weeds (*S. arvensis, Agrostis tenuis, Raphanus* spp*, Poa annua, Cyperus* spp). The CUN states that MB/Pic 50:50 at a MB dose of 25 g/m^2 is required to meet certification standards. The Parties request exceeds MBTOC's standard presumption of 20 g/m^2 but this rate is not currently registered. The Party is conducting field scale testing to confirm earlier small scale plot trials which demonstrated no reduction in efficacy at a MB rate of 12.5 g/m^2. If successful, adoption could occur in 2010. The Party states that the most promising alternative, iodomethane/chloropicrin has been demonstrated in small scale trials to compare with the efficacy to MB/Pic. Commercial scale-up trials are in progress and could lead to registration in 2009/2010. MBTOC encourages the Party to (1) expedite the registration and use of the MB/Pic 50:50 formulation with a MB rate of 12.5 g/m^2 with barrier films and (2) to expedite the registration of the iodomethane/Pic (MI/Pic), and (3) to continue the pilot testing of soilless production of the foundation generation of runners with commercial adoption possible in 2011.									
	MBTOC comments on economics 2008: The nomination was not based on economic arguments. Economic statements provided in CUN. CUN states that the Victoria Strawberry Industry Certification Authority is developing a two-year research program to investigate the feasibility of moving to soilless production of foundation generation runners, but notes that, while this may be feasible for the tens of thousands of runners for the foundation generation, it will not be feasible for the scaled up production of millions of certified runners required for the industry as a whole. Research on alternatives in this latter respect is continuing. No economic arguments or data are provided.									
Canada	Strawberry runners (PEI)	6.840	6.840	7.995	7.462	7.462	None	-	7.462	7.462
	MBTOC comments 2008: MBTOC recommends a CUE of 7.462 tonnes for 2010. The nomination states that MB/Pic 67:33 at a dose of 500 kg/ha (50 g/m^2) is required to meet the certification standards for strawberry runners, which exceeds MBTOC's standard presumption of 200 kg/ha (20 g/m^2); however the lower rate is not currently registered. PMRA requires data that demonstrates that the reduced rate is efficacious with LPBF before registering the lower rate. MBTOC notes that no progress has been made in more than three years on testing with LPBF and expects that future nominations will show reports of trials in order to satisfy the criteria of Decision IX/6. The Party has attempted to replace MB with 1,3-D, but 1,3-D was banned in January 2003 due to groundwater contamination. The permit for Chloropicrin 100 is still pending approval at PEI, even though Canada registered Pic in 2007. No studies on other potential alternative fumigants, such as Pic, DMDS, MI/Pic have taken place . MBTOC expects that future nominations will also demonstrate significant progress with key alternatives. MBTOC encourages the Party (1) to finalize the permits necessary for use of chloropicrin and dazomet, (2) implement the use of LPBF which are currently used worldwide and (3) in the absence of an effective alternative becoming available, conduct the necessary trials to support a lower application rate of MB to conform with MBTOC's standard presumption, (4) provide assessment on the suitability of soilless cultures for at least part of the production cycle.									
	MBTOC comments on economics 2008: No economic arguments or data provided									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
Israel	Broomrape	None	None	250.000	250.000	None	250.000	125.000		
	MBTOC comments 2008: MBTOC recommends 125 tonnes for 2009, which represents 50% of the requested amount . The Party has informed MBTOC, that the project for 2010 has been reduced by 50% (from 1000 ha to 500 ha). The Party reports that results of field trials with 1,3-D in sequence with metham sodium are promising and that registration is expected in 2009. If 1,3-D is registered, MBTOC anticipates that there will be uptake of this alternative and appropriate reduction in the use of MB. The nomination is eradication of broomrape and land rehabilitation of 500 ha in the Golan Heights. The recommended CUE is based on a dose of 250 kg/ha (25 g/m^2) of MB:Pic 98:2 using LPBF. MB will be used only once in this region and the treatment is expected to bring the weed population below the disease threshold allowing for adoption of other alternatives. The Party has identified some alternatives for controlling low infestations of *Orobanche* (e.g. solarization) but they are considered not adequate for controlling severe infestations of *O. aegyptiaca*. In 2007, five field trials were carried out with sulfosulfuron, imazapic, and imazomox. MBTOC acknowledges that a registration for chloropicrin is being considered in Israel and that this would possibly allow for lower dosages of MB to be used for Orobanche in the absence of other effective alternatives.									
	MBTOC comments on economics 2008: The nomination was not based on economic arguments. **Economic statements provided in CUN:** CUN argues that broomrape infestation is being aggravated by the phase out of MB, as all crop-specific registered MB alternatives have a narrower range of activity and lower crop-specific efficacy than MB. This is also true for agrotechnical means and long-term fallow cropping which in practice and in economic terms do not cope with the long-term vitality of broomrape seeds and their gradual germination mechanism. CUN also states that biological control of broomrape with either the aid of a parasitic fly or with Fusaria do not provide economic answers for the problem. No economic data are provided.									
Israel	Cut flowers-bulbs-protected	303.000	240.000	220.185	114.450	None	113.821	85 .431		
	MBTOC comments 2008: MBTOC recommends a reduced amount of 85.431 tonnes for this use in 2009.The nomination is for a variety of cut flowers produced under cover, which are mainly affected by weeds (*Cyperus* in particular), nematodes (root-knot but also ectoparasites such as *Longidorus*) and fungi. MBTOC does not consider MB essential for the control of ectoparasitic nematodes. MBTOC does not recommend the use of 1.64 t for fumigating substrates used in rose production as alternatives such as steam are efficient for this use. Overall, there is very little change from nominations submitted in previous years, particularly in 2007. Phase-out efforts are still based on transitional measures - LPBF barrier films with reduced rates. In spite of this, registration of certain alternatives, such as metham sodium and 1,3-D, has now expanded to include additional flower types. More expansion of registration is expected this year. Substrate production protocols are now available for many of the flowers presently treated with MB (Bar-Yosef *et al*, 2001; Gullino *et al*, 2003; Savvas and Passan, 2002; Urrestarazu, 2004; Urrestarazu, 2005). The recommended amount is based on a 25% transition rate applied for adoption of chemical alternatives in those species where the nomination states these are now registered. In keeping with the 2007 recommendation a further 25% transition rate has been applied to those flowers where substrate production is possible (lilium, calla lilies, gerberas and carnations outside the Ghaza area). Additionally, MBTOC has adjusted MB dosages used for carnations grown in Ghaza (from the requested 50 g/m^2 to the standard presumption of 35 g/m^2). MBTOC is aware that carnation cultivars resistant to fusarium wilt are available, commercially used and accepted by international markets (Gullino and Garibaldi, 2007)**).**									
	MBTOC comments on economics 2008: CUN argues that nutsedge causes heavy economic losses not only under outdoor conditions but in greenhouses as well, despite the fact that shade reduces its activity. No economic data are provided.									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
Israel	Cut flowers-open field	77.000	67.000	74.540	44.750	None	42.777	34.698		
	MBTOC comments 2008: MBTOC recommends a reduced amount of 34.698 tonnes for this use in 2009. Overall, there is very little change from nominations submitted in previous years, particularly in 2007. Phase-out efforts are still based on transitional measures - barrier films with reduced rates of fumigants. The nomination is for open field production of cut flowers, which are mainly affected by weeds (*Cyperus* spp in particular) and nematodes (root-knot but also ectoparasites such as Longidorus) and fungi. MBTOC does not consider MB necessary for controlling ectoparasitic nematodes. Lack of registration of key alternatives on flowers such as 1,3-D+Pic, dazomet and metham sodium, continue to be the major constraints affecting substitution of MB at this time. MB formulations with higher chloropicrin content are also not registered. In spite of this, registration of metham sodium and 1,3-D has expanded and now includes additional flower types. More expansion of registration is expected this year. In keeping with the 2007 recommendation, a 25% transition rate has been applied to the nominated amount to allow for adoption of alternatives, including chemicals and solarization, which is being adopted successfully. The reduction has not been applied to the 10.462 t requested for nurseries of geophytes where high health plant material needs to be produced, although no certification issues are involved.									
	MBTOC comments on economics 2008: CUN states that nutsedge is a major problem of the flower industry on outdoor crops and on geophytes, specifically. It causes heavy economic losses under outdoor conditions. CUN also argues that MB substitution and phase out brought about the appearance of new and minor pests e.g. the free-living nematode Longidorus spp. became a major economic problem of Aster, Solidago and Lilly. No economic data are provided.									
Israel	Melon - protected and field	125.650	99.400	105.000	87.500	None	87.500	87.500		
	MBTOC comments 2008: MBTOC recommends 87.5 tonnes for this use in 2009. Monosporascus cannonballus is the key pathogen in the Arava Valley. The requested amount at a rate of 250 kg/ha (25 g/m^2) of 98:2 MB under barrier films (LDPF) complies with MBTOC´s standard presumptions. However, MBTOC notes that 70:30 MB/PIC mixtures are registered for strawberry, potatoes, cucumber, eggplant, peppers, tomatoes, gerbera, gladiola, roses, and avocado, but not for melon. MBTOC understands that formulations with more chloropicrin (MB/Pic 67:33, 50:50) could be as effective as the currently used and urges the Party to make the necessary efforts to assess this situation under the criteria of Dec.IX/6. MBTOC notes that alternatives are already used for 100% of the fall melons grown in the Arava valley including Telodrip, metham sodium, dazomet, solarization, Formaldehyde+MS, Telopic (only in the southern Arava). The CUN is solely for the spring crop as the alternatives seem not feasible because the plant back time is short (2-4 weeks). MBTOC visited the area and was shown experiments testing a strategy based on fumigation and solarization in the summer before the fall crop, followed by sanitation with MS at the end of fall crop. The third component is repeated application of the fungicide, azoxystrobin (still not registered) as a soil drench during the spring crop. Results are promising so far. Another material tested to prevent possible accelerated degradation in soil is the application of the fungicide prochloras. The Party is requested to submit information regarding progress in future nominations. MBTOC notes that Pic and MB/Pic mixtures and the fungicide, fludioxonil, are effectively used for Monosporascus in other countries under similar conditions (e.g. Stanghelini *et al*. 2003; Martyn 2002).									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
	MBTOC comments on economics 2008: CUN concludes that presently Basamid is not feasible economically because the price of Basamid has increased, and because of waiting period constraints. Economic data provided show that the price of Basamid is lower than that of MB, but that the gross margin with Basamid 300kg and Basamid 1200 kg is negative, while for Basamid 600 kg it is significantly lower. CUN also points out that a new approach for inoculum reduction of Monosporascus was developed in the area. It consists of MS applied at lower rates at crop-end to kill off the roots of the harvested fall melons and subsequently the resting structures of Monosporascus. This practice is effective at infestation levels of up to 20% and became a routine practice applied on the harvested fall crop prior to the spring crop. It is cost effective since the rate is low (150l/ha) and the return high.									
Israel	Potato	239.000	165.000	137.500	93.750	None	75.000	75.000		
	MBTOC comments 2008: MBTOC recommends a CUE for 75 tonnes for this use in 2009. Potatoes are produced in a small cultivable area of the Sharon and in the Negev regions. The nomination is only in the Sharon (10% of total cultivated area) where tuber yield and quality are impacted by *Rhizocotnia solani, Verticillium dahliae, Streptomyces scabies* (common scab), *Spongospora subterranea* (powdery scab), *Orobanche* spp. (broomrape), *Cyperus rotundus* (purple nutsedge), and volunteer plants that carry viral diseases (PVY). The Party has made a 20% reduction with respect to the amount approved by the MOP for 2008. The dosage rate of 250 kg/ha (25 g/m^2) of MB 98:2 is in accordance with the standard presumptions for hot gas under barrier films in sandy soil. The Party identified that 300 of 15,000 ha are located in highly populated areas where winter production occurs and pathogens are high and regulatory constraints are in place for feasible alternatives such as 1,3-D + Pic (61:35) which as a result of buffer zones prohibit their use. The Party indicates that effective control alternatives are in development for the pest complexes and that they are transitioning to these. The CUN indicates that development of new injection machine is underway in the Sharon. MBTOC notes that there are effective alternatives but that their use is affected by buffer zones, which are larger than in other countries. MBTOC urges that Party to consider review of these buffers in the light of use with barrier films.									
	MBTOC comments on economics 2008: CUN argues that, because the registered alternatives do not cover the broad spectrum activity of MB, thus given the high pathogen populations of the area, their application would require the addition of complementary compounds, with self-explanatory environmental and economic implications. No economic data are provided									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
Israel	Seed Production	56.000	28.000	None	None	None	22.400	NR		
	MBTOC comments 2008: MBTOC does not recommend any MB for this use in 2009. The application is similar to the nominations presented in 2004 and 2005 for 2005 and 2006 use: same area, same constraints and almost the same requested quantity in 2009 (22.4t) as the approved quantity in 2006 (28t). No progress has been made during these last 4 years. The same experiments and results are presented. In the 2004 nomination, Israel reported the formation of a task force to draw up a new strategy for the industry. No results have been obtained by this task force. The Party states that seeds must meet certification standards but many specified pathogens which are the targets of MB fumigation are not carried on seeds (e.g. *Verticillium dahliae, Rhizoctonia, Pythium*, etc.). Due to lack of a research program, the Party has not provided an explanation for the lack of control with chemical alternatives such as chloropicrin , 1,3-D, formalin or MITC generating compounds or non chemical alternatives e.g. grafting (which is considered by the Party only for water melon but adopted in many other countries for other vegetables particularly tomato), resistant varieties and steam. In addition, soil less culture is considered by the Party to be a suitable alternative and is in use for 20% of the crop. The Party considers soilless culture economically feasible only for solanaceous crops, although no clarification is given as to why. No information is given on the acreages covered by the solanaceous crops and also on the areas fumigated from 2002 to 2007. The Party reports that the quantitative crop losses caused by soil-borne pests are not the main problem, but the seed quality is the main issue. In the nomination, no results on the seed health have been reported. The Party identifies economic constraints as the barrier to adoption of the non-chemical alternative, but no economic analysis is provided. In all other Mediterranean countries with similar climate, vegetable seeds are produced without MB. In the European countries, e.g. Holland, some seed companies are producing vegetable seeds without MB by the adoption of alternatives.								
	MBTOC comments on economics 2008: CUN argues that growing vegetable seeds requires that the seeds be completely clean, much as has been argued in the case of strawberry runners. CUN argues that this is a declining industry in Israel because of lower costs of labor in countries such as Thailand and China but does not state whether MB is used in those countries for this purpose. CUN argues that moving to soilless culture is not economically feasible. No economic data are provided									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
Israel	Strawberry fruit - protected (Sharon and Ghaza)	196.000	196.000	93.000	105.960	None	52.250 (Sharon only)	77.750 (Sharon and Gaza)		
	MBTOC comments 2008: MBTOC recommends a reduced CUE of 42.75 tonnes for Sharon and a reduced amount of 35 tonnes for Ghaza, totalling 77.75 tonnes for these uses in 2009. MBTOC has adjusted the nomination for Sharon based on information from the Party that out of the total of 380 ha, 25% (i.e. 95 ha) is grown on new land (not requiring MB) and an additional 30% (i.e. 114 ha) of the cultivated area is expected to apply MB alternatives. This leaves 171 ha for MB use totalling 42.75 t. MBTOC has adjusted the nomination to the Ghaza strip to conform with its standard presumption of 350 kg/ha (35 g/m2) used with barrier films. The key pests affecting strawberry fruit in Israel are fungi (*Rhizoctonia solani, Colletotrichum acutatum, Macrophomina phaseolina, Verticillium dahliae, Fusarium* spp.), nematodes (*Meloidogyne hapla*), and weeds (*Cyperus rotundus*, purple nutsedge). The Party states that buffer zones (250 m) restrict the use of key alternatives 1,3-D/Pic and MB/PIC 70:30. The Party confirmed that the existing buffers were 250 m for PIC,100 m for 1,3-D and 100 m for metam sodium. MBTOC urges the Party to consider whether the widespread use of LPBF might reduce the buffers on these alternatives. MBTOC would also like to see data on the technical feasibility of MI/Pic and DMDS on strawberries. MBTOC also urges the Party to consider registration of other alternatives to MB (metham sodium 1,3-D) as well as other formulations of MB/Pic (e.g. 50:50) to assist further reductions in the use of MB. The CUN states that metham sodium showed promising results in the control of *Macrophomina phaseolina*, but these trials did not lead to a registration of metham sodium on strawberries. Substrates have been used on a small area in this CUN, but the Party states that further uptake is limited by cost, and commercial scale testing are expected in 2010. Detailed economic information on the suitability of such systems is necessary. MBTOC encourages the applicant to consider evaluation and adoption of low-cost substrate systems which are used in similar circumstances in other regions, including warm climates (Mutitu *et al*. 2006; Vos and Bridge, 2006; MBTOC, 2007; Sonneveld, 2004; Lieten, 2004).									
	MBTOC comments on economics 2008: CUN states that Dazomet is not registered, and that Telone is not available because the supplier has not put it on the market. CUN provides a Table that shows that these alternatives deliver a higher net farm income than MB.									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
Israel	Strawberry runners (Sharon and Ghaza)	None	None	0.000	31.900	None	15.800 (Sharon only)	28.075 (Sharon and Gaza)		
	MBTOC comments 2008: MBTOC recommends a reduced CUE of 28.075 tonnes for this use in 2009 (12.25 t for Ghaza Strip and 15.825 t for Sharon, Israel). The key pests affecting strawberry runner production are fungi (*Rhizotonia solani, Verticillium dahliae, Fusarium, Phytophthora, Sclerotinia sclerotiorum, Macrophomina phasoeolina*), root knot nematodes and purple nutsedge. The Party stated that MB 98:2 at a rate of 500 kg/ha (50 g/m^2) with standard polyethylene films and 250 kg/ha (25 g/m^2) with barrier films are necessary to meet certification standards. The requested amount for the Ghaza region has been adjusted to MBTOC's standard presumption of 35 g/m^2 for 98:2 MB. The Party stated that 1,3-D + Pic mixture has been the leading alternative; however, adoption of this alternative is limited by the required 250 m buffer which significantly limits its use in the Sharon strawberry nursery growing area, which is heavily populated. Hot gas application method is used in the Ghaza Strip growing area because the plots are small, adjacent to houses and there are no injection tools or qualified applicators in the area. 10% of the treated area in the Ghaza strip will be tested with barrier films with a reduced application rate. MBTOC encourages faster adoption of LPBF in the Ghaza Strip. 100% of the treated area in Sharon uses barrier films (VIF).									
	MBTOC comments on economics 2008: No economic data provided									
Israel	Strawberry runners and Fruit (Ghaza only)						67.500 (Ghaza only)	refer above-		
	MBTOC comments 2008: Comments included in text boxes above as the Party consolidated the Israel and Gaza nominations.									
	MBTOC comments on economics 2008: CUN argues that the availability of MB for strawberry industry of the Ghaza strip is vital. Without MB growers will not be able to grow the crop and might lose their main source of income, which, it is argued, constitutes 'a genuine case of economic disruption'. No economic data are provided, as there are insufficient data on the use of MB alternatives in Ghaza.									

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Israel	Sweet Potatoes	None	none	None	111.500	None	95.000	95.000		
	MBTOC comments 2008: MBTOC recommends 95 tonnes for this use in 2009. Sweet potato is a new crop in Israel that is rapidly expanding in production area. The pest complexes are just being identified and studies to identify alternatives have just commenced. The applicant indicates that MB is currently the only registered chemical for sweet potato production in Israel. The Party however, also states that the expected primary registration of MB alternatives by 2008 and that adoption of these alternatives by 2009 was the basis for the reduced quantity applied for in 2009. Although not clearly stated the Party indicates that 1,3-D/Pic and 1,3-D + metham sodium were effective control alternatives, but registration of 1,3-D has been discontinued by the companies and thus these alternatives are not likely to materialize. Formalin, which is registered for control of common scab on potatoes, is being tested alone and in combination with other chemicals for scab on sweet potatoes. Once efficacy trials are completed registration for formalin will be pursued. By 2009, MB will be applied on 80 ha of nurseries and on not more than 25% of the production area, viz. 300 ha. The MB rates stated in the CUN are consistent with MBTOC's standard presumptions and barrier film use. MBTOC recommends that the Party explore the use of nematode resistant varieties of sweet potato as these are available and widely used in countries where nematodes are the primary pest problem.									
	MBTOC comments on economics 2008: Semi-commercial application of 1,3-D on a total area of 100 ha in the Central Coastal area in 2005 lead to unsatisfactory results and economic losses. Party suggests that Cadusafos is not a front-line nematicide in Israel and it cannot cope with the economic losses inflicted by root-knot nematodes in the Sharon region. CUN argues that the use of 1,3-D 200+MS 400 l/ha will increase the farmers' net margin by 53%, but 1,3-D is not yet registered.									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
Japan	Cucumber	88.300	88.800	72.400	51.450	34.300	None	-	34.100	Interim (23.00) Final 30.69
	MBTOC comments 2008: MBTOC recommends a reduced amount of 30.69 tonnes for this use in 2010. For 2010, the Party requested 34.1 t, which was similar to the amount approved by the Parties at the 19th MOP.The recommended quantity represents a 10% reduction from the nominated amount based on uptake of available alternatives, e.g. steam, soil less culture, grafting, pathogen free seeds , 1,3 D+Pic and cultural practices such as rotation, root isolation and sanitation. MBTOC's interim recommendation was 23.00 t, however at the 28th OEWG, Japan requested a review of this decision because the substantial reduction by MBTOC for adoption of alternatives could not be achieved by 2010. In response, Japan provided a comprehensive National Action Plan detailing step wise phase out by 2013 using a range of alternatives. They also provided details of an additional strategy which involves immunisation with avirulent virus strains, which the Party believes will be widely accepted in the future. MBTOC acknowledges the excellent national action plan to phase out MB by 2013, beginning with a reduction of 10 % in 2011. MBTOC, however, considers that the 10 % reduction is feasible for 2010 and has revised its interim recommendation from a 33 % reduction to a 10% reduction for 2010. The nomination is based on the need to control particular viruses of cucumber, since 2005. Globally, such viruses are not considered as soil borne pathogens but can survive in crop debris for several years. The problem mainly arises from continuous monoculture. An integrated program including cultural practices e.g. sanitation, rotation with a non-host, removal and destruction of crop debris, cleaning and sanitation of the greenhouse and the surrounded area, and pathogen free seeds has proven very effective in similar situations around the world. The Party has indicated that rotation to non-susceptible hosts such as tomatoes and strawberries is an effective way to reduce virus incidence (Matsuo and Suga, 1993). As a transition strategy, MBTOC urges the Party to increase adoption of LPBF which allow for reducing MB doses by up to 50%. MBTOC recognises the unique farming system used for cucumber in Japan which has been in place for many years. However, in many countries cucumber production has already shifted to substrates in greenhouse conditions and has become the most widely used technique for eliminating a wide array of soil borne plant pathogens. Inexpensive and simple systems (buckets, bags, etc.) are available for this kind of production and are widely used in around the world. (Leoni & Ledda, 2004; Budai, 2002; Savvas and Passam 2002; Akkaya & Ozkan, 2004; Engindeniz, 2004). The Party is encouraged to consider substrate production, which implemented correctly can produce higher yields than MB (MBTOC, 2002, 2006; Batchelor 2000, 2002; Savvas and Passam 2002). Studies conducted in Japan support soilless culture as a feasible option (Fukuda and Anami 2002, Sakuma and Suzuki 1995). MBTOC notes however that even when growing in substrates there is a critical need for a high degree of sanitation and for the use of pathogen free transplants. Large numbers of growers can be trained to use substrates systems in a short period of time as experienced in many MLF projects (UNEP/TEAP, 2004). The CUN states that the Aichi Agricultural Research Centre (2005) identified the effectiveness of KGMMV control by methyl iodide in pot tests. MBTOC encourages the Party to continue to pursue the registration of methyl iodide for soil uses (methyl iodide was registered for imported timber in Japan in 2004, under JMAFF registration No. 21407).									
	MBTOC comments on economics 2008: The Party states that the nominated amount is nearly half the nominated amount for 2009 and that it is 200 kg below the amount recommended by MBTOC and approved by MOP 19. Further key information provided by the Party is that “Technically and economically feasible alternative technology has not been developed yet.” “For economic feasibility evaluation, it is prerequisite that technically feasible alternative is existed. In fact there is no technically feasible alternative, and accordingly economic evaluation has not been carried out at all.” This CUN shares the same information as CUN for peppers and watermelon. A reference (45) compares costs of soilless systems to MB treatment of soils.									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
Japan	Ginger (Field)	119.400	119.400	109.701	84.075	63.056	None	-	53.400	53.400
	MBTOC comments 2008: MBTOC recommends 53.4 tonnes for this use in 2010. The nomination is for control of *Pythium* spp. (*Pythium ultimum var. ultimum, Pythium zingiberium*) in open field cultivated ginger fields using MB (98:2) applied from small cans. MBTOC recognized the difficulties that growers have in adopting some alternatives and the time required to introduce alternatives and new disease management strategies. The CUN states that the fungidie, cyazofamid, controls *Pythium* efficiently but application rates and methods need to be investigated in more detail. The use of fungicides specific to Oomycetes, such as phosphonates, has been tested but data as to efficacy is not provided. Reduced emission technologies such as LPBF films are now being used and should allow for much reduced dosage rates (e.g. 250 kg/ha (25g/m^2) for 98:2 with LPBF). This current nomination provides hope that alternative treatments to MB are now applicable to Japanese production systems for ginger.									
	MBTOC comments on economics 2008: Iodomethane is not registered and there are concerns about phytotoxicity. Page 5: "Unavailability of technically and economically feasible alternative technology to methyl bromide at present, but reduction and phase-out shall be targeted by combining the existing alternative techniques and developing a reduction program for each region." Economic section compared MB system with untreated, Dazomet, and Metalaxyl. Negative revenues result in the case of all alternatives.									
Japan	Ginger (protected)	22.900	22.900	14.471	11.100	8.325	None	-	8.300	8.300
	MBTOC comments 2008: MBTOC recommends 8.3 tonnes for this use in 2010. The nomination is for control of Pythium spp. (*Pythium ultimum* var. *ultimum, Pythium zingiberium*) in protected ginger fields using MB (98:2) applied from small cans. MBTOC recognized the difficulties that growers have in adopting some alternatives and the time required to introduce alternatives and new disease management strategies. The CUN states that Cyazofamid controls pythium efficiently but application rates and methods need to be investigated in more detail. The use of fungicides specific to Oomycetes, such as phosphonates, has been tested but data as to efficacy is not provided. Reduced emission technologies such as LPBF films are now being used and should allow for much reduced dosage rates (e.g. 25g/m^2 for 98:2 with LPBF). This current nomination provides hope that alternative treatments to MB are now applicable to Japanese production systems for ginger.									
	MBTOC comments on economics 2008: Iodomethane is not registered and there are concerns about phytotoxicity. Economic section compared MB system with untreated, 1,3-D-Pic, and hot water treatment. Negative revenues result from untreated and 1,3-D-Pic. Hot water results in higher gross revenue but net revenue is 25% of that for MB. This is the same finding as last year. This net revenue decrease demonstrates hot water is not economically feasible.									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
Japan	Melon	194.100	203.900	182.200	136.650	91.100	None	-	90.800	Interim (61.00) Final 81.72
	MBTOC comments 2008: MBTOC comments 2008: MBTOC recommends a reduced amount of 81.72 tonnes for this use in 2010. For 2010, the Party requested 90.80 t, which was similar to the amount approved by the Parties at the 19th MOP. The recommended quantity represents a 10% reduction from the CUN amount based on uptake of available alternatives, e.g. steam, soil less culture, grafting, pathogen free seeds, 1,3 D+Pic and cultural practices such as rotation, root isolation and sanitation. MBTOC's interim recommendation was 61.00 t, however at the 28th OEWG, Japan requested a review of this decision because the substantial reduction by MBTOC for adoption of alternatives could not be achieved by 2010. In response, Japan provided a comprehensive National Action Plan detailing step wise phase out by 2013 using a range of alternatives. They also provided details of an additional strategy which involves immunisation with avirulent virus strains, which the Party believes will be widely accepted in the future. MBTOC acknowledges the excellent National Action Plan to phase out MB by 2013, beginning with a reduction of 10 % in 2011. MBTOC, however, considers that the 10 % reduction is feasible for 2010 and has revised its interim recommendation from a 33 % reduction to a 10% reduction for 2010. The nomination is based on the need to control a particular virus of melons. Globally, this virus is not considered as a soil-borne pathogen but can survive in crop debris for several years. The problem mainly arises from continuous monoculture. An integrated program including cultural practices has been proven to be effective in many other countries. The Party has indicated that rotation to non-susceptible hosts such as tomatoes and strawberries is an effective way to reduce virus incidence (Matsuo and Suga, 1993). MBTOC urges the Party to increase adoption of LPBF which allow for reducing MB doses by up to 50%. MBTOC recognises the unique farming system used for melons in Japan which has been in place for many years. However, in many countries some melon production has already shifted to substrates in greenhouse conditions and has become the most widely used technique for eliminating a wide array of soil-borne plant pathogens. Inexpensive and simple systems (buckets, bags, etc.) are available for this kind of production and are widely used in around the world (Leoni and Ledda, 2004; Budai, 2002; Savvas and Passam 2002; Akkaya & Ozkan, 2004; Engindeniz, 2004). Substrate production, when implemented correctly can produce higher yields than MB (MBTOC, 2002, 2006; Batchelor 2000, 2002; Savvas and Passam 2002). Studies conducted in Japan support soil less culture as a feasible option (Fukuda and Anami 2002, Sakuma and Suzuki 1995). MBTOC notes however that even when growing in substrates there is a critical need for a high degree of sanitation and for the use of pathogen free transplants. Large numbers of growers can be trained to use substrates systems in a short period of time as experienced in many MLF projects (UNEP/TEAP, 2004). Resistant root stocks are now available in Japan. However, according to the party, the root stocks are not resistant to all the pathogen races. High yielding varieties resistant to the virus are Cavailable. Steam has also been found to control the virus, particularly in the upper soil layer.								
	MBTOC comments on economics 2008: Iodomethane is not registered and there are concerns about phytotoxicity that call for field trials before adoption. Some success has been achieved with resistant varieties. Economic information is brief. Shows significantly lower gross and net revenue for resistant varieties than with MB. “According to the data of Chiba Chosei district, melon resistant variety to MNSV shows only 73.8% for gross income and 30.8% for net revenue compared with those treated with MB. As mentioned above, fruits of resistant melon to MNSV are not in favor of market evaluation with poorer taste and shape. Furthermore, its yield is not necessarily competitive to the yield of product treated with methyl bromide. So melon of resistant variety is not economically feasible to replace methyl bromide treatment.” Furthermore the CUN shows that the market price of the resistant varieties is significantly lower (about 50%) than the conventional variety.								

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
Japan	Pepper (green & hot)	187.200	200.700	156.700	121.725	81.149	None	-	81.100	Interim (54.37) Final 72.99
	MBTOC comments 2008: MBTOC recommends a reduced amount of 72.99 tonnes for this use in 2010. For 2010, the Party requested 81.10 t, which was similar to the amount approved by the Parties at the 19th MOP. The recommended quantity represents a 10% reduction from the CUN amount based on uptake of available alternatives, e.g. steam, soil less culture, grafting, pathogen free seeds, 1,3 D+Pic and cultural practices such as rotation, root isolation and sanitation. MBTOC's interim recommendation was 54.37 t, however at the 28th OEWG, Japan requested a review of this decision because the substantial reduction by MBTOC for adoption of alternatives could not be achieved by 2010. In response, Japan provided a comprehensive National Action Plan detailing step wise phase out by 2013 using a range of alternatives. They also provided details of an additional strategy which involves immunisation with avirulent virus strains, which the Party believes will be widely accepted in the future. MBTOC acknowledges the excellent National Action Plan to phase out MB by 2013, beginning with a reduction of 10 % in 2011. MBTOC, however, considers that the 10 % reduction is feasible for 2010 and has revised its interim recommendation from a 33 % reduction to a 10% reduction for 2010. The nomination is based on the need to control a particular virus of peppers (PMMoV). Globally, this virus is not considered as a soil-borne pathogen but can survive in crop debris for several years. The problem mainly arises from continuous monoculture. Avoidance is the best means of control. Only seed that has been tested and determined to be free of the virus should be planted. Infected seed can be treated with heat, acid, or trisodium phosphate. In addition to using certified or treated seeds, follow rigid sanitation procedures. All workers that handle the plants, especially smokers, should wash their hands, fingernails, and forearms thoroughly with 70% alcohol or strong soap before handling plants.(Demski 1981, Watter 1984). Some cultivars are resistant to PMMoV. This virus does not affect tomato, eggplant or tobacco, which are in the same family (Solanaceae). Therefore these plants can be introduced in a crop rotation. Cultural practices, resistant varieties, biological control with attenuated virus, soil less culture, soil disinfection by hot water or steam, addition of the organic substance material (Tsuda 2006) should be included in an IPM program. This integrated program has been proven to be effective in many other countries (Demski 1981, Watter 1984, Tsuda 2006). MBTOC urges the Party to increase adoption of LPBF which allow for reducing MB doses by up to 50%. In many countries some pepper production has already shifted to substrates in greenhouse conditions and has become the most widely used technique for eliminating a wide array of soil-borne plant pathogens. Inexpensive and simple systems (buckets, bags, etc.) are available for this kind of production and are widely used in around the world (Leoni and Ledda, 2004; Budai, 2002; Savvas and Passam 2002; Akkaya & Ozkan, 2004; Engindeniz, 2004). Substrate production, when implemented correctly can produce higher yields than MB (MBTOC, 2002, 2006; Batchelor 2000, 2002; Savvas and Passam 2002). Studies conducted in Japan support soil less culture as a feasible option (Fukuda and Anami 2002, Sakuma and Suzuki 1995). Resistant root stocks are now available in Japan. However, according to the party, the root stocks are not resistant to all the pathogen races.									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend-ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
	MBTOC comments on economics 2008: The CUN states that there are no technically feasible alternatives and thus no economic evaluation was carried out. See page 9: "For economic feasibility evaluation, it is a prerequisite that technically feasible alternatives exist. In fact there is no technically feasible alternative, and accordingly economic evaluation has not been carried out at all." The CUN notes (page 4 under iii): "Technically and economically feasible alternative technology has not been developed yet. However, farmers might take into consideration the change to another crop. That is one of the reasons why the volume of methyl bromide critical use nomination for 2010 is shown less than for 2009." CUN notes on page 5 that substrates involve high costs for facility construction and difficulty mastering cultivation skill. Economic and technical potential for hydroponic cultivation of several crops is discussed in broad terms. CUN refers to Reference 45, a MAFF document on economics of soilless culture. Reference 45 compares the annualized (1/10 of capital cost for a soilless system) to a threshold limit based on the Agricultural Economics Task Force calculation of $14.4/kg of MB. Assuming 40 kg of MB at $14.4 each and converting to yen, results in a limit of 68,008 yen for any alternative to compete with MB. The annual cost for a soilless facility is 550,000 yen, meaning the AETF value placed on the MB to be replaced (68,008 yen) is far lower than the cost of the alternative soilless facility. The AETF value of $14.4 kg represents a value that A5 governments were willing to accept to phase out MB use in MLF projects. The 550,000 yen for soilless facilities is the estimated annual cost to growers in non-A5 countries to remain in production without MB. Reference 45 goes on to present a budget table comparing soilless culture with MB based production. The conclusion is that net revenue with soilless production is about 80% less than MB net revenue. If the capital cost for a soilless facility is anywhere near the assumed 5,500,000 yen, the impact on grower net revenue will be so large that the soilless alternative should be deemed not economically feasible. Note—Reference 45 conducts similar analyses for soilless production of cucumber and watermelon.									
Japan	Watermelon	129.000	98.900	94.200	32.475	21.650	None	-	15.400	Interim (14.50) Final 14.50
	MBTOC comments 2008: MBTOC comments 2008: MBTOC recommends a reduced amount of 14.50 tonnes for this use in 2010. MBTOC's interim recommendation was 14.50 t, however at the 28th OEWG, Japan requested a review of this decision because the substantial reduction by MBTOC for adoption of alternatives could not be achieved by 2010 for most sectors. In response, Japan provided a comprehensive National Action Plan detailing step wise phase out by 2013 using a range of alternatives. They also provided details of an additional strategy which involves immunisation with avirulent virus strains, which the Party believes will be widely accepted in the future. MBTOC acknowledges the excellent National Action Plan to phase out MB by 2013 and that the Party made a substantial reduction to the nomination in 2010 (29%), however MBTOC maintains that a further small reduction for uptake of alternatives (6%) is still possible by 2010. The nomination is based on the need to control a particular virus of watermelons. Globally, this virus is not considered as a soil-borne pathogen but can survive in crop debris for several years. The problem mainly arises from continuous monoculture. An integrated program including cultural practices has been proven to be effective in many other countries. The Party has indicated that rotation to non-susceptible hosts such as tomatoes and strawberries is an effective way to reduce virus incidence (Matsuo and Suga, 1993). MBTOC urges the Party to increase adoption of LPBF which allow for reducing MB doses by up to 50%. MBTOC recognises the unique farming system used for watermelons in Japan which has been in place for many years. However, in many countries some watermelon production has already shifted to substrates in greenhouse conditions and has become the most widely used technique for eliminating a wide array of soil-borne plant pathogens. Inexpensive and simple systems (buckets, bags, etc.) are available for this kind of production and are widely used in around the world (Leoni and Ledda, 2004; Budai, 2002; Savvas and Passam 2002; Akkaya & Ozkan, 2004; Engindeniz, 2004). Substrate production, when implemented correctly can produce higher yields than MB (MBTOC, 2002, 2006; Batchelor 2000, 2002; Savvas and Passam 2002). Studies conducted in Japan support soil less culture as a feasible option (Fukuda and Anami 2002, Sakuma and Suzuki 1995). MBTOC notes however that even when growing in substrates there is a critical need for a high degree of sanitation and for the use of pathogen free transplants. Large numbers of growers can be trained to use substrates systems in a short period of time as experienced in many MLF projects (UNEP/TEAP, 2004). Resistant root stocks are now available in Japan. However, according to the Party, the root stocks are not resistant to all the pathogen races. High yielding varieties resistant to CGMMV are also available. Steam has also been found to control the virus, particularly in the upper soil layer.									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
	MBTOC comments on economics 2008: Key information Page 3: "Technically and economically feasible alternative technology has not been developed yet." Page 8: "For economic feasibility evaluation, it is a prerequisite that technically feasible alternatives exist. In fact there is no technically feasible alternative, and accordingly economic evaluation has not been carried out at all." This CUN shares the same information as CUN for peppers and cucumbers. Refers readers to Reference 45 where costs of soilless systems are compared to MB system.									
United States	Curcurbits	1,187.800	747.839	592.891	486.757	407.091	None	-	340.405	Interim (266.199) Final 302.974
	MBTOC comments 2008: MBTOC recommends a reduced CUE of 302.974 tonnes for this use in 2010. After consideration of the Party's responses received since bilateral discussions at the 28th OEWG, MBTOC accepted rates nominated by the Party for use with barrier films (150 kg/ha for pathogens 175 kg/ha for nutsedge) based on the circumstances of this nomination, pending further review. From this amount,104.771 t are for Georgia cucurbits, 174.691 t for the Southeast region, 6.862 t for Maryland and Delaware, and 16.650 t for Michigan. MBTOC acknowledged the reductions made by the Party for transition to alternatives, however further reductions made in MBTOC's interim recommedation for adoption of alternatives of 25% in Maryland/Delaware, 16.98% in Southeast region, 2.44% for Georgia squash and 4.92% for Georgia melons have been maintained. No reductions were made in Michigan and Georgia Cucumber. MBTOC notes that iodomethane is not yet registered for use in these crops. The Party is urged to consider further adoption of grafting for commercial use in melon and watermelon. MBTOC urges the Party to disaggregate this nomination by major types of cucurbits comprised (melons, watermelons, cucumbers and squash) specifying the key pests in each case; submitting specific updated technical references (when pathogens are the issue); stating the limitations to the adoption of MB alternatives in each case; and indicating specific R&D efforts, in a similar way the Party has submitted, for example, the economic information in the CUN. In future nominations, MBTOC may be unable to assess the specific circumstances that prevent the use of MB alternatives in each of the crops, when separate data for each different sector is not provided. Since the key pest in the southeast and Georgia is nutsedge, in future nominations the Party is requested to provide up to date information on recent trials of fumigants and herbicides for nutsedge control for each specific crop included in the nomination in order to satify the requirements of Decision IX/6. MBTOC considers that trial data from other crops (e.g.tomato, pepper) can be considered as showing suitability of alternatives for cucurbits, and thus feasible alternatives appear to be available for both karst and non-karst areas in Georgia (Noling et al 2006; Rosskopf et al, 2005; Gilreath and Santos 2004a; Gilreath et al 2003a, 2005a; Gilreath 1999, Santos et al 2006; Chellemi et al 2004; Chellemi 2006) and can be adopted at least on areas of moderate pest pressure. The Party showed references which supported use of alternatives in combination with LDPF (Culpepper, 2006). Other studies on possible effective alternatives are available (Ristaino and Johnson, 1999, Babadost and Islam 2002, Johnston et al 2002, Driver and Lows 2003). A combination of 1,3-D or metham sodium with chloropicrin + herbicides (Trifluralin, napropamide, halosulfuron, s-metalochlor) is considered as the best alternative strategy in Florida for nutsedge control in several crops. The Party reported that research conducted at the University of Georgia examined the use of a 3 way combination of alternative fumigants, 1,3-D followed by chloropicrin followed by metham sodium and this combination was effective. Hausbeck, Lamour and others (2004) have reported many efficient management strategies to control Phytophthora on pepper, including crop rotation with non susceptible hosts (carrots, beans, onions, asparagus, soybeans, alfalfa), cultural control (water management, plant density, soil amendments, protective mulch, raised beds etc.) and the use of registered fungicides (Mefonoxan, Dimethomorph, Zoxamide + Mancozeb, Copper hydroxide+dimethomorph). MBTOC notes the use of grafting and resistant varieties are considered as alternatives for long lasting crops in many Mediterranean countries (Bello, et al., 2001).									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
	MBTOC comments on economics 2008: The nomination is based on economic arguments. **Economic statements provided in CUN.** CUN states that the next best alternative in all regions is 1,3-D with chloropicrin with expected yield losses of 6% in Michigan, Maryland and Delaware and 29% 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 in 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. The 3 way research conducted at the University of Georgia is feasible and the CUN was adjusted to reflect this reduction in southern states in areas that do not face Karst geology issues as a replacement of a MB+ Pic spring time application.									
United States	Eggplant (field)	76.721	82.167	85.363	66.018	48.691	None	-	34.732	Interim (26.149) Final 32.820
	MBTOC comments 2008: MBTOC recommends 32.820 tonnes for this use in 2010. From this amount 11.235 t is for Georgia, 18.843 t for Florida and 2.742 for Michigan. After consideration of the Party's responses received since bilateral discussions at the 28th OEWG, MBTOC accepted rates nominated by the Party for use with barrier films (150 kg/ha for pathogens 175 kg/ha for nutsedge) based on the circumstances of this nomination, pending further review. Overall the Party's request of 34.732 t represents a reduction of 29% from the amount approved by the Parties in 2009 due to a significant transition to alternatives in Florida which is acknowledged by MBTOC. MBTOC considers alternatives are still available for 14.89% of the nominated amount in Georgia. MBTOC notes that iodomethane is not yet registered for use in these crops. In Michigan, the key pests are Phytophthora capsici. MBTOC recognizes the Parties statement that 1,3-D/Pic may be an effective alternative, but growers will miss the optimal market window due to longer plant back times with this alternative. According to the Party, this treatment cannot be applied in autumn because of climatic conditions. In addition, a fall application of MB is not feasible because over the fall and winter months deer and other animals damage the plastic and irrigation tape. In Florida, the key pests are yellow and purple nutsedge, Phytophthora, nematodes, Pythium and Sclerotinia. In Georgia the key pests are yellow and purple nutsedge, Phytophthora, nematodes, southern blight, Pythium and Sclerotinia. Karst topography limits the use of alternatives which include 1,3- D that are the best alternatives for these pests on 40% of the growing acreage in Florida and 8% of the acreage in Georgia. A soil treatment recently developed by the University of Georgia is being adopted as an alternative to methyl bromide for Georgia's solanaceous spring crops, although not for the summer or fall crops. This treatment, known as UGA-3-WAY, consists of three successive soil fumigations, beginning with a 1,3-D (Telone II) application, followed by a chloropicrin application, followed by a metham application. Hausbeck and Lamour (2004) and others have reported many other efficient management strategies to control Phytophthora on pepper in Michigan including 3-4 years crop rotation with non susceptible hosts (carrots, beans, onions, asparagus, soybeans, alfalfa), cultural control (water management, plant density, soil amendments, protective mulch and raised beds) and use of registered fungicides in Michigan (Mefonoxan, Dimethomorph, Zoxamide + Mancozeb). The use of grafting is considered an alternative in many Mediterranean countries (Bello et al., 2001). It is important to note that MB is not used in other country on eggplant.									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
	MBTOC comments on economics 2008: The nomination is based on economic arguments. **Economic statements provided in CUN.**This treatment, known as UGA-3-WAY, consists of three successive soil fumigations, beginning with a1,3-D (Telone II) application, followed by a chloropicrin application, followed by a metham application. Further small plot and large-scale, on-farm research on various aspects is underway. In addition, the economics of transitioning to this alternative, including the cost and durability of films and the modification of fumigation equipment, still needs to be worked out. CUN states next best alternative in all regions is 1,3-D with chloropicrin with expected yield losses of 6% in Michigan and 29% in Georgia and Florida. CUN states 1,3-D with chloropicrin is considered technically feasible in Michigan. In Michigan, since the fall crop is dependent upon timely planting, the required waiting period would cost growers half the harvest season, thereby missing the higher market windows.									
United States	Forestry nursery	192.515	157.694	122.032	131.208	122.060	None	-	120.853	117.826
	MBTOC comments 2008: MBTOC recommends a reduced amount of 117.826 tonnes for this use in 2010, which includes 66.3 t for Southern Forest Nursery, 4.94 t for International Paper, 13.78 t for Weyerhauser (SE), 15.19 t for Weyerhauser (NW), 12.096 t for NE Forest & Conservation Nursery, and 5.52 t for Michigan Seedling Assoc. The nominated amount has been adjusted to 260 kg/ha (26 g/m2) for nutsedge control and 200 kg/ha (20g/m2) for pathogen to conform to the standard presumption for dosage rate of MB/Pic formulation under HDPE. The key pests are nutsedge, nematodes and fungi. MBTOC notes that propagative material requires a very high level of pathogen control in order to avoid their widespread distribution from the nursery to the production fields. The CUN is for nurseries with moderate or high pest pressure where alternatives are not effective. Nutsedge has no effect on certification, but the Party states that it does affect yield by 3-5%. MBTOC requests that further nominations clearly show the trend in yield loss caused by nutsedge, nematodes or fungal pathogens over the number of seasons following fumigation with MB and alternatives, and a breakdown of the economic comparisons to MB treatment. For the Northeast Forest and Conservation Nursery, 40% is for nutsedge control and 60% of the nomination for pathogens. For Michigan Seedlings 50% is for nutsedge control and 50% for pathogens. The nomination is for certified forest seedlings produced in 6 forest nursery regions. The CUN is based on economic infeasibility of use of substrates and the lack of effective alternatives for control of nutsedge and a range of fungal pathogens and nematodes. The key alternatives are 1,3-D/Pic, 1,3-D /Pic/metham sodium and metham sodium +Pic. The Party acknowledged that Pic and metham when used in conjunction with LPBF, may provide an effective technical alternative and avoid crop injury. Enebak et al. (2006) found that with LPBF, use rates of MB can be significantly reduced. The Party claims that gluing of LPBF for broadacre fumigation is not commercially available in the region, but MBTOC is aware of successful use in other countries (eg. Israel). MBTOC observed a demonstration of an effective heat welding technique used with LPBF that was initially described for use with HDPE for solarization trials in Israel (Grinstein and Hetzroni, 1991; Grinstein, 1992). MBTOC urges the Party to evaluate these technologies and provide an update in future nominations. MBTOC considers that glyphosate can be used as a pre-treatment to reduce pressure from nutsedge, however, this herbicide may cause phytotoxicity under nursery conditions. MBTOC acknowledges the initiation of large scale demonstration trials for this sector by the Party. A report from this trial on the first year of the 5 year trial, indicates that seedling counts similar to MB were achieved by several other treatments, but no indication of pathogen or weed pressure was given (Quicke et al., 2007). MBTOC is aware that iodomethane is now registered at the federal level and in 43 states, however its status as an acceptable treatment for certified forest nurseries is not yet known and an update ius required in future nominations. MBTOC requests that in future nominations, information the status of iodomethane for certified nursery use and the number of hectares of production for conifers in each state where iodomethane/pic is registered and accepted for certification be included. MBTOC encourages growers to continue evaluation of iodomethane for their crops under their conditions. MBTOC further recommends that growers use appropriate caution until they become experienced in using this material due to some isolated reports of phytotoxicity in other perennial crops (Schneider et al, 2006). Limited substrate production of these crops is economical for small niche markets. Frequency of fumigation is once in two to four years, depending on the crop. Rotation and cover crops are not fumigated. Research is on-going to reduce rates from 98:2 MB/Pic commonly used where nutsedge populations are severe to using reduced rates of 67:33 MB/Pic. This transition has already been made in 70 % of the forest nurseries in the South where nutsedge populations are not severe.									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
	MBTOC comments on economics 2008: The nomination is based on economic arguments. **Economic statements provided in CUN.** Alternatives have 3-5% decrease in yield and higher costs resulting in estimated decreases in net revenue that varied from 11 percent to 53 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 of the production cycle. While direct yield losses, in terms of seedlings/hectare, may not be large on average, intensive seedling production relies on the ability of nursery managers to meet quality, as well as yield, goals. Converting the large volume of seedlings to containerized production would require significant investment and much higher costs both at the production stage and for end users planting the seedlings. Economic issues such as increased application costs (e.g., costs associated with application of metam-sodium and a separate chloropicrin application) may have an impact on overall feasibility of these alternatives for the forest seedlings sector.									
United States	Nurseries stock (fruit, nut, flower)	45.800	64.528	28.275	51.102	25.326	None	-	17.954	17.363
	MBTOC comments 2008: MBTOC recommends a total of 17.363 tonnes for this use in 2010. This comprises 9.408 t for raspberries, 0.955 t for roses, and 7.0 t for fruit and nut trees. This nomination is for propagation materials that need to be certified as free of pests and diseases, even if certification is voluntary in this state. MBTOC accepted the rates of 191 kg/ha (19.1 g/m^2) for rose nursery and 196 kg/ha (19.6 g/m^2) for raspberry nursery, and reduces the rate to 200 kg/ha (20.0 g/m^2) for fruit and nut tree nursery to conform to MBTOC's standard presumptions. MBTOC recognises that propagative material requires a very high level of soilborne pest and pathogen control in order to avoid their wide spread distribution and notes the difficulty in protecting raspberry roots to a 1.5 m depth. MBTOC acknowledges the Party's adoption of MB/Pic formulations of 67:33 and 50:50 as is used in other countries. MBTOC acknowledges the federal registration of iodomethane for use in nurseries, but also recognizes that it is not yet registered in California and Washington.									
	MBTOC comments on economics 2008: No economic data or alternatives given									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
United States	Orchard replant	706.176	527.600	405.400	393.720	292.756	None	-	226.021	215.800
	MBTOC comments 2008: MBTOC recommends a reduced amount of 215.800 tonnes for this use in 2010. This includes reduced amounts of 150.400 t for stone fruit, 7.400 t for raisins, 21.800 t for walnuts, 18.600 t for almond and 17.600 t for wine grapes. The CUN is for orchard/vineyard replant disorder of unknown etiology; heavy soils or soils which cannot be treated to a sufficient depth to effectively use the reduced rates of 1,3-D now allowed in California. Regulatory constraints (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. Three alternatives, 1,3-D alone and 1,3-D combined with chloropicrin or metham sodium, are available technical alternatives according to the CUN for treatment in light soils. Although a two year fallow was found to be effective under Mediterranean conditions by Bello, *et al*, 2004, Schneider, *et al.* 2004 found that a four year fallow did not sufficiently eliminate the causative nematodes. Recent promising results with a one year fallow combined with non-Nemaguard rootstock have been reported by McKenry (2006). The Party confirms that MB/Pic 67:33 formulation is used for California Stone fruit, Raisin grapes and Wine grapes and now as well for Almond and Walnut. Commercial adoption of 67:33 formulation and others containing lower amounts of MB (eg 50:50) were used predominantly for orchard replant treatment in other countries before switching to alternatives. The recommended reduced amount is based on application of MBTOC's standard presumption of 200 kg/ha (20 g/m^2) for control of pests and pathogens without the use of LPBF. This represents a reduction of 10.221 tonnes or 4.5% of the nominated amount. MBTOC recognizes that regulatory restraints prevent the use of LPBF barrier films with methyl bromide in California but urges the Party to consider continued evaluation of their use to improve the performance of alternatives. MBTOC acknowledges the federal registration of iodomethane for use in orchard replant, but also recognizes that it is not yet registered in California.								
	MBTOC comments on economics 2008: The nomination was not based on economic arguments. **Economic statements provided in CUN:** In experimental plots, spot treatments (individual holes) rates of 0.2 to 0.5 kg chloropicrin per hole were at least as effective as methyl bromide. Technical issues remain with individual treatments including high labor costs. An economic analysis was not done for this sector because most of the losses cannot be quantified. Factors that contribute to losses include delayed planting, fallow, additional use of herbicides, tree loss, replant costs to replace tree losses, loss of trees replanted, yield loss of fruit or nuts, delayed achievement of full yield potential, earlier loss of productivity of whole orchard. McKenry 1999, suggests that in some cases tree losses are likely to be greater than 20 %. An economic assessment for 1,3-dichloropropene, 1,3-dichloropropene + chloropicrin, and 1,3-dichloropropene + metam-sodium, which were alternatives that were assessed as conditionally technically feasible, was made. The economic assessment of feasibility for pre-plant uses of methyl bromide, such as for orchard replant, included an evaluation of economic losses from three basic sources: (1) yield losses, referring to reductions in the quantity produced, (2) quality losses, which generally affect the price received for the goods, and (3) increased production costs, which may be due to the higher-cost of using an alternative, additional pest control requirements, and/or resulting shifts in other production or harvesting practices. In response to further MBTOC questions, the Party responded: "The lowest cost alternative to methyl bromide was 1,3-dichloropropene and ranged from a savings of US$8 to US$1,700/ha, including the cost of application. We assumed that this alternative is associated with the higher yield losses and replacement rate since it provides narrower control than when it is used in conjunction with chloropicrin or metam-sodium … Economic losses in this scenario arise primarily from higher establishment costs caused by the necessity of replacing trees that succumb to the replant disorder. Additional losses occur due to the delay in establishing the orchard and in yield losses suffered by trees that are weakened, but not killed, by the pest complex comprising the replant problem. Despite reductions in fumigation costs, economic losses over the life span of the orchards could range from US$1,600/ha in walnuts to nearly US$7,000/ha in stone fruit and represent between 15 and 93 percent of value of the orchard."								

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United States	Ornamentals	154.000	148.483	137.835	138.538	107.136	None	-	111.391 Rev. 95.204	Interim (92.912) Final 84.617
	MBTOC comments 2008: MBTOC recommends a reduced amount of 84.617 tonnes for this use in 2010. This includes 57.963 t for California, 2.299 t for Michigan, 0.074 t for New York and 24.281 t for Florida. The nomination is for a large number of species, mostly grown in the field. In Florida, the main species using MB are gladioli, lilies and snapdragon. Additional species using MB in California include calla lily, delphinium, dianthus, eustoma, freesia, helianthus, hypericum, iris, larkspur, liatris, matthiola, and ranunculus. In Michigan, flower crops needing methyl bromide are herbaceous perennials grown from seed or root divisions. A new application was submitted for production of *Anemone coronaria* cut flowers in New York. MB is needed to control diseases (e.g., *Fusarium* spp., *Pythium* spp., *Phytophthora* spp., and *Rhizoctonia* spp.), plant parasitic nematodes (e.g., root knot, root lesion, stunt and dagger), weeds (e.g. *Cyperus* spp. *Portulacca, Ambrosia* and others), and previous crop propagules. MBTOC adjusted the California portion of the nomination from 211 kg/ha (21.1 g/m^2) to standard dosage rates of 200kg/ha (20 g/m^2) with standard polyethylene films. Similarly, the Florida and New York portions of the nomination have been adjusted from 224 kg/ha (22.4 g/m^2) and 734 kg/ha (73.4 g/m^2) respectively to the standard dosage rate of 200 kg/ha (20 g/m^2). MBTOC considers alternatives available for some flower types in California, for example 1,3-D/Pic, metahm sodium and combinations (Klose et al, 2007, Klose, 2008) and has reduced the nomination by 10% for phase in of these alternatives. In Florida, iodomethane is now registered and other alternatives are available, for example 1,3-D/Pic and solarisation sometimes combined with chemicals (McSorley *et al*, 2006 ab). The Party has submitted a revised nomination which takes account of a 40% adoption rate for iodomethane in this state. In Michigan, the recommended amount includes a 15% reduction to account for uptake of iodomethane, which has been shown to be effective (i.e. Uhlig et al., 2007). Other registered and validated options include 1,3-D, Pic and MS plus a range of herbicides (Uhlig *et al*, 2007; Little *et al*, 2006). MBTOC considers alternatives are available and are in use for anemone cut flower production particularly substrates (Rea *et al*, 2008). In future nominations MBTOC requires specific information as to areas that cannot be treated with MB using injection machinery.									
	MBTOC comments on economics 2008: The nomination was not based on economic arguments. **Economic arguments provided in the CUN:** The economic analysis shows decreases in yield in California of 20% to 25% result in negative net revenues. In Florida net revenues decrease 65% to 81% because of yield losses with alternatives. In Michigan herbaceous perennials, yield losses of 25% lead to net revenue declines of 37%. Although container production may be possible in higher value cut flower crops, it is not generally feasible, especially for deeper rooted crops and on large acreage. Soilless systems are not a feasible alternative for the crops in the nomination due to high costs and the risks involved. High fuel oil costs also affect the economic feasibility of steam sterilization. In New York, there are additional costs due to a state requirement for an on-site operating engineer for high pressure steam. Generally, for most crops, there isn't an offsetting yield or quality increase to defer the costs associated with substrate production. Costs include a large increase in inputs, capital expenditures for the systems coupled with high costs of potting mix or substrates, plus the labor to move crates or install the system. Alternatives generally require more labor, which is often unavailable.									

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United States	Peppers (field)	1,094.782	1,243.542	1,106.753	756.339	548.984	None	-	658.952 Rev. 463.282	Interim (457.299) Final 463.282
	MBTOC comments 2008: MBTOC recommends 463.282 tonnes for the revised nomination submitted by the Party. After consideration of the Party's responses received since bilateral discussions at the 28th OEWG, MBTOC accepted rates nominated by the Party for use with barrier films (150 kg/ha (15 g/m2) for pathogens 175 kg/ha (17.5 g/m2) for nutsedge) based on the circumstances of this nomination, pending further review. MBTOC also accepted the Party's reductions for uptake of iodomethane. This represents 21.579 t for the SE, 75.510 t for Georgia, 359.995 t for Florida and 6.198 t for Michigan. MBTOC acknowledged the substantial reductions made by the Party in the resubmission. The revised nominated amounts reflect between 32 and 66% reduction from the amount approved by the Parties in 2007. The key pests of peppers in Michigan are *Phytophthora capsici* and in the Southeastern United States, including Florida and Georgia, nutsedge and *P. capsici*. 1,3-D/ Pic may be an effective alternative but the Party states growers will miss the optimal market window. According to the Party, this treatment cannot be applied in autumn because of climatic conditions. In Florida and Georgia the Party states that alternatives now exist for karst (iodomethane) and non-karst topography (in addition to iodomethane, alternatives include 1,3-D) .The Party has stated that metham sodium and metham potassium are promising alternatives. MBTOC also considers that alternatives are available for both karst and non-karst areas in Florida and Georgia (Noling et al 2006; Rosskopf et al, 2005; Gilreath and Santos 2004a; Gilreath et al 2003a, 2005a; Gilreath 1999, Santos et al 2006; Chellemi et al 2004; Chellemi 2006) and can be adopted at least on areas of moderate pest pressure. The Party showed references which supported use of alternatives in combination with LDPF (Culpepper, 2006). Other studies on possible effective alternatives are available (Ristaino and Johnson, 1999, Babadost and Islam 2002, Johnston et al 2002, Driver and Lows 2003). A combination of 1,3-D or metham sodium with chloropicrin + herbicides (Trifluralin, napropamide, halosulfuron, s-metalochlor) and a 3 way combination of alternative fumigants, 1,3-D followed by chloropicrin followed by metham sodium are considered alternative strategies in Florida for the nutsedge control. The Party reported that research conducted at the University of Georgia examined the use of Hausbeck and Lamour (2004) and others have reported many efficient management strategies to control Phytophthora on pepper, including crop rotation with non susceptible hosts (carrots, beans, onions, asparagus, soybeans, alfalfa), cultural control (water management, plant density, soil amendments, protective mulch, raised beds etc.) and use of registered fungicides (Mefonoxan, Dimethomorph, Zoxamide + Mancozeb, Copper hydroxide+dimethomorph). Seed treatment with Mephenoxan or metalaxyl control Phytophthora during seed germination. MBTOC notes that uptake of alternatives for this crop in regions with similar pests has occurred within 4 years or less in many countries e.g. Spain, Italy, Australia (Leoni and Leda, 2004; Spotti, 2004; Tostovrsnik et al 2005; Minuto et al, 2003). The use of grafting and resistant varieties are considered as alternatives for long lasting crops (at least 6 months) in many Mediterranean countries (Bello et al, 2001).									
	MBTOC comments on economics 2008: The nomination was based on economic arguments**. Economic arguments provided in the CUN:**CUN states next best alternative in all regions is 1,3-D with chloropicrin with expected yield losses of 6 percent in Michigan and California and 29 percent in other regions. CUN states 1,3-D with chloropicrin is considered technically feasible in Michigan. In Michigan, delayed planting and harvest with the alternatives results in lower average price (7.5%) received from missed market windows, and negative net revenue. In remaining regions yield losses significantly reduce net revenues. In southern states USG has reduced the request for MB to reflect the apparent feasibility of a 3 way combination (1,3 D followed by chloropicrin followed by metam-sodium) as a replacement for spring time application of MB and pic in the non-karst geographical areas. A transition rate was applied based on the best estimate of yield losses and feasibility associated with likely methyl bromide alternatives and use of high barrier films that could be made by USG biologists and economists.									

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United States	Strawberry (field)	2,052.846	1,730.828	1,476.019	1,349.575	1,269.321	None	-	1,191.815 Rev. 1103.422	Interim (998.063) Final 1007.477
	MBTOC comments 2008: MBTOC recommends a reduced CUE of 1007.477 tonnes for this use in 2010. The recommendation is based on new information from the Party since the interim recommendation. This comprises 856.598 t for California, 47.862 t for Eastern USA and 103.017 t for Florida. MBTOC acknowledges the substantial transition of 44.01% and 36.11% for Eastern and Florida, but maintains that further adoption of alternatives is possible for California. The Party revised its nomination for 2010 from 1,191.815 to 1,103.422 t after bilateral discussions at the 28th OEWG. After consideration of the Party's responses received since bilateral discussions at the 28th OEWG, MBTOC accepted rates nominated by the Party for use with barrier films (150 kg/ha 15 g/m2) for pathogens 175 kg/ha (17.5 g/m2) for nutsedge, based on the circumstances of this nomination, pending further review. MBTOC also accepted the Party's reductions for uptake of iodomethane. The nomination for California of 952.543 t did not change and was based on the grounds that township caps limit further adoption of 1,3-D and county regulations affect use of high rates of Pic in some counties. The Party assumed a yield loss of 14%, however data in the nomination showed that specific alternative treatments provide equal or higher yields compared to MB. Alternatives based on 1,3-D, Pic EC or shank injected with or without metham sodium have been adopted. In the areas affected by township caps, trials with alternatives that do not contain 1,3-D (such as Pic, Pic EC, Pic + metham, often with LPBF) provide yields that are statistically comparable with MB (Ajwa et al., 2002, 2003, 2004, 2005, 2006; Nelson et al., 2001ab; Shem-Tov et al., 2005, 2006ab). Pic EC provided an average 99% yield compared to MB, with low variance (TEAP, 2006; Porter, 2006). MBTOC recommend a 10% reduction for adoption of these alternatives, increased adoption of 50:50 MB/Pic instead of 67:33 and 57:43 MB/Pic formulations (based on Cal DPR data) and for full uptake of 1,3-D/Pic to township cap limits in all counties. MBTOC recognises that regulatory restrictions affect uptake of particular alternatives at effective rates (eg. 1,3-D/Pic, Pic EC and shank injected, LPBF, etc) and that full adoption of alternatives depends on regulatory issues. LPBF cannot be used with MB in California, but can be used with alternatives and may reduce the dosage rates required for effective pathogen and weed control. MBTOC acknowledge that iodomethane is not yet registered. MBTOC encourages the Party to consider regulations which allow adoption of LPBF with MB and other techniques that result in improved efficacy at lower application rates and/or reduced emissions that would result in more use of alternatives under township cap, VOC regulations and county commissioner constraints on Pic. For Eastern and Florida, the nominations are based on moderate to severe pest pressure (*Meloidogyne* spp., *Pythium* spp., *Rhizoctonia* spp., *Phytophthora cactorum, Cyperus esculentus, C. rotundus, Lolium* spp.) affecting 37% of the crop area, and small farm buffer zones on 40% of the area which affects use of 1,3-D formulations. MBTOC acknowledges that for these regions the Party revised its nomination to 47.862 t and 103.017 tonnes based on a significant adoption for uptake of iodomethane/Pic and other alternatives on both buffer and non buffer areas, including combinations of 1,3-D/ Pic and/or metham and/or herbicides, and LPBF as studies provide evidence for yields that are statistically similar to MB (Ferguson et al., 2001; Norton et al. 2002; Ajwa et al. 2003, 2004, 2005,2006; Gilreath et al. 2003bc; Sydorovich et al. 2004, 2006; Driver et al. 2005; López-Aranda et al. 2005; and studies in Porter, 2006). After further information provided by the Party, MBTOC accepted the area of use and rates of MB use supplied by the Party (ie. 160 kg/ha or 16 g/m2) pending further review.								

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	MBTOC comments on economics 2008: The nomination was not based on economic arguments. **Economic comments provided in the CUN:** CUN reports costs for three next best alternatives for California, Florida, and Eastern United States. 1,3-D with chloropicrin were reported to reduce yield by 10% to 14% resulting in lower production leading to losses in net revenue. Planting and harvesting delays with alternatives are reported to lead to lower average prices received in all regions, but are only shown in the revenue analysis for California. In the eastern U.S. strawberry production areas a transition to high barrier films should be feasible also, although possibly at a slower rate compared to Florida, primarily due to economic issues and diversity of the growing conditions. In addition, according to the California Strawberry Commission, the limitation in use of the primary alternative, 1,3-D/chloropicrin, is further limited by higher production costs due to longer production timeline for drip-applied fumigation. Economic analysis using the partial budget methodology, has shown that alternatives to methyl bromide are economically feasible in SE US, however the performance of the alternatives is not uniform throughout the region (Sydorovych, et al., 2006). The net returns of alternatives (eg. Pic) were much higher in the piedmont and coastal plain area because of the significant difference in average marketable yields.									
United States	Strawberry runners	54.988	56.291	4.483	8.838	7.944	None	-	7.381	4.690
	MBTOC comments 2008: MBTOC recommends 4.69 tonnes for California, but does not recommend amounts for the south east. The CUN comprises 4.69 tonnes for California and 2.691 tonnes for SE. The key pests affecting strawberry runners are weeds (purple and yellow nutsedge), fungi (*Rhizoctonia* and *Pythium spp* in SE, *Phytophthora*, *Verticillium in California*), nematodes (root-knot, sting in CA). The CUN is for MB use on 28 ha of 2172ha, however a large proportion of hectares are exempted under QPS. MBTOC does not recommend use of MB for North Carolina and Tennesee, as MI/Pic formulations are registered and are technically suitable (TEAP, 2006). MBTOC believes distribution of MI/Pic across 11 ha should be very rapid and training is possible within the two year period for total adoption. For California, MBTOC recommends the nomination, but expects that future nominations will show reports of trials with key over the last few years in order to satisfy the criteria of Decision IX/6. In addition, MBTOC requests that locations receiving runners be specified in the nomination. The CUN states that MB at a dosage of 26.3 g/m2 in CA and 25.5 g/m2 in SE is required to meet the certification standards for strawberry runners. The Party's request exceeds MBTOC's standard presumption of 200 kg/ha (20 g/m2) of MB which is considered effective for production of 'high health' strawberry runners using LPBF and other emission control technologies (TEAP 2005); however, California's certification requirements specify minimum amounts of MB that must be applied. Furthermore, California regulations prohibit the use of LPBF with MB. The Party indicates that key alternatives include 1,3-D + PIC followed by dazomet, PIC followed by dazomet and MI/Pic, but that these have not been sufficiently tested on a commercial scale. MBTOC encourages the Party to expedite the commercial scale testing of these alternatives as well as the registration of MI in CA and to consider changes to there certification regulations in CA.									

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	MBTOC comments on economics 2008: The nomination was not based on economic arguments. **Economic statements provided in CUN:** 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. Certification requirements for strawberry nurseries (e.g., CDFA, 2003; TDA, 1999; NCDA, 1985) associated with the requesting states are strict—zero tolerance for any damaging diseases and plant-parasitic nematodes. Since there are no markets for plants that do not meet the certification standards, losses up to 100% are possible when inadequate pest control occurs. Failure to adequately manage pests in transplants will jeopardize the viability of the transplant and fruit production industries in the U.S., as well as the viability of fruit production in countries that purchase U.S. plants (e.g., Canada, Mexico, Spain, countries in South America, and others).									
United States	Sweet Potatoes slips	None	0.000	0.000	18.144	18.144	None	-	18.144	14.515
	MBTOC comments 2008: MBTOC recommends a reduced amount of 14.515 tonnes for this use in 2010. 1,3-D, the alternative to MB, cannot be used in Dec-Jan and township caps are exceeded in Nov which is the fumigation window for slips. MBTOC recognizes the importance of producing pest free seed stock. Test of reduced rates of 1,3-D are being carried out as this is the preferred fumigant of growers. Growers also will have available a desirable nematode resistant cultivar (Bienville) that will be available in California over the next two years should be useful in managing nematode pests. Uptake of such varieties by growers and new alternatives such as non host cover crops followed by application of registered nematicides (ethoprop, aldicarb, metam sodium) is expected to reduce the quantity of MB use and thus MBTOC recommends a reduced quantity for MB for 2010.									
	MBTOC comments on economics 2008: The nomination was not based on economic arguments. No economic data on alternatives given. Factors that contribute to losses include delayed planting due to use of alternatives; fallow; additional use of herbicides; losses due to weeds, insects and diseases resulting in smaller, less attractive produce (quality loss).									

Country	Industry	Quantity approved for 2005 (1ExMOP and 16MOP	Quantity approved for 2006 (16MOP +2ExMOP+ 17MOP)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend -ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
United States	Tomatoes (field)	2,876.046	2,476.365	2,065.246	1,406.484	1,003.876	None	-	994.582 Rev. 737.584	Interim (704.715) Final 737.584
	MBTOC comments 2008: MBTOC recommends a reduced amount of 737.584 tonnes for this use in 2010. This represents 9.127 t for Michigan, 0.729 t for Maryland, 134.070 t for SE, 48.088 t for Georgia and 545.570 t for Florida. MBTOC acknowledged the reductions made by the Party. After consideration of the Party's responses received since bilateral discussions at the 28th OEWG, MBTOC accepted rates nominated by the Party for use with barrier films (150 kg/ha (15 g/m2) for pathogens 175 kg/ha (17.5 g/m2) for nutsedge) based on the circumstances of this nomination, pending further review. MBTOC also accepted the Party's substantial reductions for uptake of iodomethane. The key pest of tomatoes in the southeastern United States, including Florida and Georgia are nutsedge, nematodes and P. capsici. In Florida and Georgia, karst topography limits the use of 1,3-dichloropropene, which is considered as one of the best alternatives for these pests, on 55% of the growing acreage in Florida, 11% in Georgia and 6% of the acreage in SE. The Party stated that metham sodium and metham potassium are promising alternatives. MBTOC considers that alternatives are available for both karst and non-karst areas in SE, Florida and Georgia which can be adopted at least in areas of moderate pest pressure (Noling *et al.* 2006; Santos *et al*. 2006; Noling and Gilreath 2004; Gilreath and Santos 2004bc; Gilreath *et a*l. 2002, 2003, 2004, 2005bc, 2006; Rosskopf et al, 2005; Chellemi and Browne, 2006; McMillan and Bryan 1998, 1999, 2002; Rich and Olson 2003). The Party provided references which supported use of alternatives in combination with LPBF (Culpepper, 2006). Other studies on possible effective alternatives are available (Ristaino and Johnson (1999), Babadost and Islam (2002), Johnston *et a*l (2002), Driver and Lows (2003). A combination of 1,3-D or metham sodium with chloropicrin + herbicides (Trifluralin, Devrinol, napropamide, halosulfuron, s-metalochlor) is considered as the best alternative strategy in Florida. Hausbeck and Lamour (2004) and others have reported many efficient management strategies to control Phytophthora on vegetables, including crop rotation with non susceptible hosts (carrots, beans, onions, asparagus, soybeans, alfalfa) , cultural control (water management, plant density, soil amendments, protective mulch, raised beds etc.) and use of registered fungicides (Mefonoxan, Dimethomorph, Zoxamide + Mancozeb, Copper hydroxide+dimethomorph) and seed treatment with Mephenoxan or metalaxyl. MBTOC considers that further reductions in MB amount is possible with changes to formulations of 50:50 MB/Pic or less (e.g. to 30:70) used in combination with barrier films, however the reduction in the nominated amount was not based on use of these formulations. The use of grafting and resistant varieties are considered as alternatives in many Mediterranean countries (Bello *et al*., 2001).									
	MBTOC comments on economics 2008: The nomination was based on economic arguments. **Economic statements provided in the CUN:** CUN reports yield losses for 1,3-D with chloropicrin as the next best alternative ranging from 1.75% to 6%. Net revenue declines reported for all regions. Changes in pest control costs are less than 4 percent of total variable costs so have little impact on economic measures. Missed market window in Michigan cited as main reason. Recent research by Gilreath and Santos (2008) has demonstrated that metam sodium fumigant system resulted in reduced root galls, nutsedge stands, and an increase in tomato yield. Assuming that a herbicide is used that is as effective as pebulate, growers using a 1,3-D + chloropicrin + herbicide mixture may suffer an average of 0 to 27% yield losses (Santos et al, 2006; Chellemi *et al*., 2006). As the United States has consistently stated, our experience in that a 20% yield loss will force growers to no longer produce a crop. However, in areas of low to moderate pest pressure, information if given a reasonable time frame for the transition. The assessment of need was adjusted to account for this. In areas where karst features are not present it appears that tomato growers can use a combination of three pesticides applied sequentially (1,3-D, pic, and metam) and achieve yields that are comparable to those produced by using methyl bromide for spring crops only.									

5. MBTOC QSC: Final Evaluations of 2008 Critical Use Nominations for Methyl Bromide

MBTOC Quarantine, Structures and Commodities met September 21 and intermittently through the week, in Chengdu China, in association with the Conference on Controlled Atmosphere and Fumigation. The meeting was attended by 9 of the 19 MBTOC-QSC members and one from MBTOC-S. An additional member attended the meeting through electronic voice line.

Several MBTOC QSC members were unable to attend the Chengdu meeting. MBTOC-QSC members who did not attend the meeting were contacted by email for input and discussion. Draft evaluations were circulated to MBTOC-QSC and MBTOC-S for vetting subsequent to the meeting.

MBTOC is obligated under Decision XV I/4 Annex 16 to meet twice a year when making CUN recommendations to ensure it has full information and to allow Parties to provide information. For this meeting, email discussion was held with members who were not present to obtain consensus.

MBTOC's meeting was in association with the quadrennial meeting of the conference in Controlled Atmosphere and Fumigation in Stored Products (CAF) in Chengdu. We appreciated the assistance of CAF conference organizers in making meeting arrangements. Holding the MBTOC meeting in association with this conference allowed MBTOC members to reduce time and travel costs since several members were presenting papers at the conference.

At the meeting, MBTOC completed its further evaluation of CUNs from Australia, Canada and the United States. The CUNs re-reviewed were: Australia rice and Canada pasta manufacturing. Additionally, MBTOC completed its re-evaluation of previously 'unable to assess' CUNs for Canada flour mills, and some USA commodities. MBTOC corrected an error it made in the CUN for USA structures.

The Parties supplied additional information about the nominations following the publication of the TEAP May 2008 Progress Report, during bilateral meetings with MBTOC during the Open Ended Working Group meeting in Bangkok, Thailand and in writing following the OEWG.

5.1. Quarantine issues

Following the OEWG meeting, the International Plant Protection Convention released an updated draft ISPM 15 concerning the use of methyl bromide and heat treatments against wood pests (IPPC, 2008). Since the draft was distributed to encourage public comment, and given MBTOC's technical expertise in this field, discussion by MBTOC members resulted in comments from those members to their own Parties. The technical aspects of this draft were further discussed in China. Parties are encouraged to expand research which might lead to the approval of alternatives for MB quarantine use. MBTOC members remain open to assisting Parties with issues surrounding MB quarantine use.

5.2. Regulatory and News Update Concerning MB Alternatives for Postharvest Uses

Decision Ex. I/4 (9i) requires MBTOC "*To report annually on the status of re-registration and review of methyl bromide uses for the applications reflected in the critical-use exemptions, including any information on health effects and environmental acceptability"*. Further, Decision Ex I/4 (9j) requires MBTOC "*To report annually on the status of registration of alternatives and substitutes for methyl bromide, with particular emphasis on possible regulatory actions that will increase or decrease dependence on methyl bromide"*.

News is presented alphabetically by country. MBTOC QSC would welcome the submission of regulatory, research and other news of adoption of MB alternatives from Parties and others.

Australia - Sulphuryl fluoride fumigant is now registered in Australia for control of insects pests in a variety of situations including timber, and food handling and processing facilities, storage facilities and warehouses. Commodity storage structures containing cereal grains (including wheat and polished rice), dried fruit and nuts (tree nuts and peanuts), and baled hay and pet food may be treated at a *ct*-product of up to 1500 g h m^{-3}. Several of the situations for which sulphuryl fluoride is now registered in Australia currently use methyl bromide, usually under QPS exemption.

Full scale demonstration trials are planned with carbonyl sulphide (COS), a potential methyl bromide replacement for disinfestation of stored grain and similar commodities, under an Experimental Use Permit, as part of progress to full registration.

An updated Australian standard for general fumigation was recently published. This standard includes procedures for use of MB.

A standard for heat treatments for insect control was published in 2008 by the Australian Quarantine Inspection Service (AQIS, 2008) (http://www.daff.gov.au/__data/assets/pdf_file/0006/734424/atf-heat-treat-standard.pdf). Heat treatments can replace methyl bromide use in some circumstances, particularly for treatment of wood and wooden packing material, such as specified in ISPM 15.

Australia also has a new public, electronic database listing MB alternatives; it is available on the AQIS website.

Canada: - Canada's Pest Management Regulatory Agency (PMRA) published a note with requirements for mitigation measures to be added to site-specific fumigation management plans for the use of aluminum and magnesium phosphide. Similar site-specific plans will be required for SF use. PMRA has changed sulfuryl fluoride's registration status from experimental to permanent registration and added new pests and uses to the label. PMRA indicated an expectation to publish a decision on MRLs for fluoride residue in specific commodities by end of 2008.

China: China's government grain storage capacity ranges between 1.5 – 2 hundred million tonnes, and in addition on farm grain storage allows for an additional 2.5 – 3

hundred million tonnes. Phosphine fumigation, alone and in concert with CO_2 were the most important contributors to the phase out of the use of MB in grain stores which China has accomplished (Zhu Changguo, Chinese Cereals and Oils Association (CCOA), CAF 2008). Several researchers and managers of grain storage facilities reported at the 8th International Conference on Controlled Atmospheres and Fumigation in Stored Products, considerable uptake of the use of controlled and modified atmospheres for grain storage, sometimes as substitutes for methyl bromide treatment. At the conference, Director Zhu of CCOA indicated that in the future, China intends to direct more of its grain pest control focus on low temperature and quasi-low temperature storage as well as controlled atmosphere techniques. In addition, sulfuryl fluoride was registered for grain disinfestation in China in 2008. As a consequence of that approval there has been several commercial scale trials and some adoption, substituting for methyl bromide. Methyl bromide use on stored grain in China was discontinued in 2007.

European Union: In September, EU regulation (EU 149/2008) reduced bromide food residue tolerances and added fluorine tolerances. These changes allowed exporting countries such as the United States to reduce methyl bromide use on exported commodities. Also in 2008, the European Commission published harmonized MRL for fluoride residue arising from sulfuryl fluoride fumigation (Directive 396/2005/EC) (Official Journal of the European Union, 2008).

France: In September 2008, France began using sulfuryl fluoride on commercial scale for its fresh chestnut harvest. The use of this alternative replaces methyl bromide for the seasonal fresh chestnut crop.

New Zealand - is continuing PH3 trials for treatment of export logs and sawn timber. The use of MB is being reassessed by the NZ Environmental Risk Management Authority.

United States – The sulfuryl fluoride label currently reads, "The raw agricultural and processed food commodities that may be fumigated with Profume include: almond, barley, beech nut, dried beef, brazil nut, butternut, cashew, cheese, chestnut, chinquapin, cocoa bean postharvest, coconut, coffee bean postharvest, date (dried), eggs(dried), fig (dried), filbert, ginger roots postharvest, raisin, herbs & spices (dried) hickory nut, ham, legume vegetable (dried), macadamia nut, milk, millet, oat, other dried fruits (eg. apricots), peanut, pecan, pinenut, pistachio, pop corn, prunes (dried), rice, polished rice, rice bran, rice flour, rice hulls, sorghum, triticale, walnut, wheat, wheat bran, wheat flour, wheat germ, wheat milled byproducts, wheat shorts, wild rice. ProFume can be used to fumigate sites containing seeds of commodities listed above..."

This use of SF is currently being challenged in ongoing litigation. The litigation appears to concern differences in opinion about the safety of the allowable levels of fluoride residues resulting from sulfuryl fluoride treatment of commodities and in structures that conduct food processing. The outcome of this litigation may have future implications of the use of SF as an alternative treatment.

The US Environmental Protection Agency has reported that it anticipates publishing its response to comments and any modifications to its reregistration decisions for methyl bromide commodity treatments and methyl bromide soil treatments in January 2009.

The USA has published a proposed regulation (7 CFR Part 319) which would allow the use of a systems approach which would avoid the need for grapes from Chile to be fumigated with methyl bromide (Federal Register, Aug 27, 2008, pp 50577).

5.3. Details of evaluations

Parties have submitted ten CUNs in 2008 for the use of MB in structures and commodities with a the total MB for non-QPS post-harvest uses of 321.808 tonnes when first submitted and of 277.746 as subsequently revised by the nominating Parties.

In the 2008 round, three nominations were for 2009 for a total MB amount of 7.14 tonnes and seven were for 2010 for a total MB amount of 270.606 tonnes, after revisions by Parties.

Of nominations for 2009, MBTOC recommended 7.14 tonnes. Of the nominations for 2010, MBTOC recommended 269. 436 tonnes. MBTOC did not recommend 1.17 tones.

Table 5.1 provides the MBTOC QSC final recommendations for the CUNs submitted in 2008.

Table 5.1 Final evaluations of CUNs for commodity or structural treatments, submitted in 2008 for 2009 or 2010

Industry	Quantity approved for 2005 (ExMOP1 and MOP16	Quantity approved for 2006 (MOP 16 +ExMOP2+MOP17)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend-ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
Australia Rice	6.150	6.150	9.205	9.200	7.820	None	-	7.820	6.65
MBTOC recommends a reduced nomination of 6.65 tonnes for 2010. This is a 15% reduction of the Party's nominated amount of 7.82 tonnes. To satisfy Decision IX/6 Australia should make progress in adopting alternatives. Numerous alternatives to MB are technically and economically feasible and in use in many other countries for this product. In spite of availability, there has been no adoption of any alternatives in this sector. The Party indicates, and has supplied an economic assessment report, showing it can not afford to adopt alternatives under the current drought and resulting low rice harvests. Successive years of drought and poor harvests have left this applicant unable to make any investment or to receive bank loans. MBTOC continues to have questions about the cost input and processing assumptions that resulted in the economic conclusions. The economic assessment is based on the stated need to construct 100 new silos before phosphine can be adopted as an alternative. But the Party also indicates that a warehouse of 4,500 m2 could also be used, which MBTOC suggests would cost much less. MBTOC suggests that, especially if there is poor harvest in 2009 and 2010, that phosphine treatment could be completed in the spare tent capacity which is currently used for MB treatment. This approach would allow some adoption of phosphine in tents in the yard without the costs associated with the construction of new silos. The Party is encouraged to use different approaches to resolve the seemingly ongoing economic issues which are preventing adoption of alternatives. Australia's transition plan does not include any adoption of alternatives until such time as harvest volume of >1 million tonnes is achieved. Even if the Party were to continue to achieve harvest of >1 MT the current transition plan will still result in MB use beyond 2013.									
MBTOC comments on economics: CUN states drought has made it impossible to undertake investment in phosphine facilities. Estimated costs for up to 100 silos would be $Aus47 million. CUN states it would involve three years of transition, potentially complete in 2013. The economic analysis, based on an analysis by ACIL Tasman (2008), ably illustrates the difficulties that SunRice faces in funding these costs. However, CUN does not provide the annual cost of this capital expenditure, nor does it provide for any phasing of the construction costs. Even if borrowing or raising external capital is not feasible, the calculations of the annual cost have to be based on the amortised capital cost over the economic life of the investment CUN describes trials of alternatives, two of which, namely cold disinfestation and 'packaging alteration with oxygen scavenging' are regarded as economically infeasible. In the former case, party expects costs to exceed $Aus100 million plus an unknown cost for electricity. In the latter case, party argues that operating costs increase from $Aus34 per tonne to over $Aus119 per ton. ACIL Tasman, 2008. An Analysis of SunRice's Capacity to Invest in Phosphine Fumigation Infrastructure: in particular their ability to fund the phasing out of Methyl Bromide. Confidential report prepared for the Department of Environment, Water, Heritage and the Arts									

Industry	Quantity approved for 2005 (ExMOP1 and MOP16	Quantity approved for 2006 (MOP 16 +ExMOP2+MOP17)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend-ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
Canada Mills	47 (included mills and pasta)	34.774	30.167 (included mills only)	28.650	26.913	None	-	22.878	22.878
MBTOC recommends the nominated amount of 22.878 tonnes for treatment of particular flour mills in Canada in 2010. The amount nominated represents a 15.3% decrease over the amount granted by the Parties in 2009. In its Interim CUN report (TEAP Spring report 2008), MBTOC was unable to assess this nomination because it was unclear about the amount of MB needed per mill and because MBTOC believed that only an amount equal to or less than one fumigation per mill per year was justified. Infestation is managed, both in Canada and elsewhere, by IPM approaches and other treatments so as to avoid the need for additional fumigations. MBTOC notes, however, that sulfuryl fluoride, a key alternative treatment for this sector, is not registered for food contact in Canada. In spite of regulatory restrictions on the use of sulfuryl fluoride, the Party has an extensive commercial-scale research program to trial alternatives. The Party has since documented that the nominated amount provides for less MB than is required for one fumigation per mill, per year. The Party explained new regulatory procedures to ensure that MB use is managed through a sector-only transfer mechanism which ensures MB use is designated to the most needy mills and that alternatives are adopted in the sector. The Party may wish to review the MBTOC special review of efficacy, costs and adoption of alternatives in flour mills in the TEAP Spring Report (MBTOC, 2008).									
MBTOC comments on economics 2008: CUN states the use of alternatives and associated building modifications would add 2 to 4 percent to manufacturing costs that would be passed to Canadian consumers whose use accounts for 80% of annual shipments of milled grain products. Also stated that there is no program for government financial assistance to millers (Canadian National Millers, 2007). MBTOC notes that lack of government financial assistance programs has not been a consideration in assessments of economic feasibility. CUN did not provide detailed data on estimation of the 2%-4% cost increase. Regardless of exact amount, the CUN suggests milled grain product market relationships are such that added costs would be borne in large part by consumers. In turn, this suggests that if technical and regulatory barriers to adoption of alternatives can be overcome, the Party will have no basis to then assert economic infeasibility.									
Canada Pasta	(see Canada mills)	10.457	6.757	6.067	None	4. 74	4.74		
MBTOC recommends the Party's revised nomination of 4.74 tonnes for pasta mills in Canada for 2009. This provision is to allow partial treatment of the three pasta mills in this CUN with methyl bromide, as part of orderly transition to alternatives. MBTOC anticipates that the Party will continue its commercial scale trials of alternatives in each facility included in the pasta mill sector. MBTOC believes that continued commercial scale trials of alternatives, if successful, would replace the need for annual full site MB fumigations. If the trials are successful, the full MB amount recommended should not be required by this sector. At the same time, MBTOC acknowledges that Canada has not established maximum residue levels for fluorine resulting from sulfuryl fluoride fumigation of pasta mills and lack of MRLs makes use of sulfuryl fluoride difficult. Canada has indicated it will reduce domestic allocation based on the results of its 2008 commercial									

Industry	Quantity approved for 2005 (ExMOP1 and MOP16	Quantity approved for 2006 (MOP 16 +ExMOP2+MOP17)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend-ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
scale trials and if registration status of potential alternatives changes before 2009. Interim reports submitted concerning SF trials done late in 2007 have demonstrated some effectiveness in these facilities and trials were also conducted in 2008, but results are not yet available. It is clear that additional experience with this fumigant is required in these premises to optimise efficacy. It may be that moderate supplemental heating will be required to improve effectiveness of the SF treatments against the egg stage of pests. Heat treatments, either as full site or spot heat treatments may also be considered for these facilities as part of their IPM program (TEAP, Spring Progress Report, 2008). Heat has proven technically feasible in pasta facilities elsewhere (e.g. Italy) (Nomisma 2006).									
MBTOC comments on economics 2008: The Economic feasibility section is marked N/A. Elsewhere it is asserted that heat is roughly twice the cost of MB.									
Israel Dates	3.444	2.755	2.200	1.800	None	2.100	2.100		
MBTOC recommends a CUE of 2.1 tonnes for dates in 2009 associated with rapid treatment of fresh dates at time of harvest. This represents an increase of 0.3 tonnes over the amount of MB granted by the Parties for 2008. The increase in methyl bromide is due to projected increase in harvest of date varieties for which heat or other treatments have not yet been developed. Israel continues an active research programme to resolve technical, logistical and economic difficulties and adapt heat treatment for the non-Medjool varieties. If upcoming research on either heat or ethyl formate and carbon dioxide result in effective methods, Israel may consider reducing the amount granted in domestic allocation process.									
MBTOC comments on economics: CUN argues that heat treatment is economically feasible for Medjool dates, but that in depth feasibility studies still have to be carried out to determine the efficacy of thermal treatment on other varieties. No economic data is provided.									
Israel Flour mills	2.140	1.490	1.040	0.312	None	0.300	0.300		
MBTOC recommends a CUE of 0.3 tonnes for flour mills in 2009 as a one year transition to spot heat treatment or expanded use of phosphine. This represents a decrease of 0.012 tonnes over the amount of MB granted by the Parties for 2008. Mills in Israel are not considered suitable for full site treatments due to age and condition. Spot heat treatment has been determined to be effective for older mills in Israel. Techniques have been developed to assure its efficacy. Portable heat equipment has been purchased by a pest control operator and is in commercial use in the circumstances of this nomination. More equipment has already been ordered for import. For this reason MBTOC sees a need for one year to transition to heat. Additionally, phosphine is in use in most mills and its use could be expanded. Improvements in IPM and sanitation would improve pest control in Israel mills. MBTOC sees no reason for continued MB use in Israel flour mills after the transition to heat or phosphine is made by 2010. The Party is referred to the flour milling review report published in the 2008 MBTOC/TEAP Spring Progress Report for technical information on the conduct of spot heat treatments and recommendations to improve technical efficacy of alternatives.									

Industry	Quantity approved for 2005 (ExMOP1 and MOP16	Quantity approved for 2006 (MOP 16 +ExMOP2+MOP17)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend-ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
MBTOC comments on economics: CUN argues that the alternative used in North America and Northern Europe of heating the entire mills is not economically feasible in Israel because most of the mills are more than 20 years old, with poor structural upkeep of the mills and so thermal insulation is not possible. Furthermore, heating equipment is not available because of the small size of the market. However, the CUN argues that new spot heat techniques have become available from Canada, and that these are economically feasible. No economic data is provided.									
Japan Chestnuts	7.100	6.800	6.500	6.300	5.800	None	-	5.400	5.400
MBTOC recommends a CUE of 5.4 tonnes, the amount nominated for fresh chestnuts for 2010. This represents a 0.4 tonne decrease in MB nomination over the amount granted by the Parties for 2009. An extensive research program has resulted in the finding that methyl iodide treatment is technically effective for this use, and registration has been applied for. The registration process is progressing appropriately. Japan has set an acceptable daily intake of methyl iodide of 0.0034 mg/kg body weight. Progress has been made in improving the logistics of treatment to ensure the use of MB is minimised while awaiting registration results. MBTOC knows of no other effective alternative treatment for fresh chestnuts.									
MBTOC comments on economics: The CUN states that, for economic feasibility evaluation, it is prerequisite for economic evaluation that a technically feasible alternative exists. In fact there is no technically feasible alternative, and accordingly economic evaluation has not been carried out.									
United States Commodities	89.166	87.719	78.983	58.921	45.623	None	-	19.242	19.242
MBTOC recommends the Party's revised nomination of 19.242 tonnes for treatment of dry commodities as described by sub-sector. For walnuts, MBTOC recommends the Party's revised nomination of 5.85 tonnes. MBTOC recommends 2.009 tonnes for dates. For dried fruit, MBTOC recommends the Party's revised nomination of 9.399 tonnes; the Party reduced its nomination by 40% following the MBTOC Interim CUN report and an updated examination of sector requirements. MBTOC recommends 1.984 tonnes for dried beans. USG revised its walnut nomination in response to newly published EU regulations (EU 149/2008 as of September 2008) reducing bromide tolerances and adding fluorine tolerances. Following its assessment of the EU regulation on trade of walnuts, the USG reduced its walnut nomination by 75%. The remaining amount will allow the US to quickly transition walnut treatment to SF for its main market which is the EU. For dates, MBTOC recommends 2.009 tonnes. Since MBTOC's interim recommendation, the US has provided extensive new and significant information on this sector and on the date commodity as grown and harvested in the US. The CUN refers to treatment of California dates only. California date harvest is reported to be 99% Deglet-Nour variety of 30% moisture content, harvested fully ripe with mostly reducing sugar content. On the basis of this new information, MBTOC's is now of the understanding that the California date situation is similar to that of the North African Deglet-Nour harvest. The US has conducted sulfuryl fluoride trials on date disinfestation but the results are not yet known. Given this new understanding of the date commodity and its harvest, MBTOC encourages the Party to significantly expand its research effort to resolve the date pest and storage problem. MBTOC recommends the Partys' revised nomination of 9.399 tonnes for dried fruit, a sector that includes raisins, figs and dried plums. Although phosphine is the main fumigant for dried fruit, USG									

Industry	Quantity approved for 2005 (ExMOP1 and MOP16	Quantity approved for 2006 (MOP 16 +ExMOP2+MOP17)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend-ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
indicates that MB is needed for some fumigations before processing when cool weather would unacceptably lengthen the phosphine fumigation time. In the case of dried plum treatments, the initial processing (drying) involves exposure to temperatures (>60°C) sufficient to achieve disinfestation. The product may become infested subsequently during storage and handling. In the absence of need for very rapid disinfestations, this reinfestation (mainly of moths) should be managed by currently available systems, particularly phosphine fumigation. Controlled atmosphere storage and treatment is used by many EU countries for the same dried fruit commodities included in this CUN. Furthermore, the use of phosphine in cooler weather could be accomplished by increasing the commodity temperature in chamber fumigations before processing. Before reviewing any future dried fruit nomination, MBTOC will need a clearer understanding of the harvest-to-shipment channel for each commodity and how it impacts on fumigation requirements. USG has indicated that fumigation requirements in cool months strains phosphine fumigation capacity and is difficult to conduct due to commodity temperature problems. Therefore we will need to know processing volumes by month, available chamber capacity and bulk commodity temperature during the cool months. In addition, MBTOC will require a complete economic assessment on the costs of increasing the temperature of dried fruit since USG reports that the applicant finds the cost of heating the commodity before phosphine treatment in the cool months is unacceptable. MBTOC, however, has calculated initial estimated energy costs of 8 kw/tonne to raise the temp of bulk dried fruit by 7˚C. This initial estimation leads MBTOC to question whether the sector would indeed be economically constrained by the need to increase commodity temperature to allow the use of phosphine. Phosphine treatment of dried fruit in cooler months may require additional fumigation chamber capacity, especially given the additional time to increase temperature. If inadequate chamber capacity is a constraint, any future nomination should provide an economic analysis of the costs to provide the necessary chamber capacity. Additionally, the USG has indicated a potential problem if California regulations restricting volatile organic compound emissions impact the use of phosphine and therefore result in the need to use methyl bromide. If this were to become a factor in any future nomination, MBTOC will need considerable further information on this matter. MBTOC recommends a CUE of 1.984 tonnes for 2010 for the component of this nomination relating to pest control treatment of dried beans directly after harvest. Concerning beans, there are no alternatives immediately available for rapid disinfestation of dried beans under the circumstances of the nomination, specifically the current treatment logistics. Fumigation with phosphine, while registered and effective, requires a treatment time that is too long to meet current shipping and handling schedules; and sulfuryl fluoride lacks appropriate registration. There appears to be scope for further reduction in this component of the nomination through adoption of phosphine fumigation under revised logistics which MBTOC recommends be incorporated in any future CUN.									
MBTOC comments on economics 2008: CUN provides economic data on alternatives for walnuts and dried fruit other than dates. Phosphine fumigation costs more because it takes longer to accomplish, leading to increased labor costs, it corrodes equipment and its use means sellers do not meet December holiday export market window. CUN states walnuts and dried fruit all require substantial additional treatment time and subsequent lost revenues if phosphine is used. Net revenues for alternatives are negative. CUN states that profit margin decreases from 13.3% to –7.5% for walnuts and from 5% to -16.8% for dried fruits. An economic analysis was not done for dates. In the case of dried beans, response to MBTOC question states that cost of an additional facility would be $1.2m per unit, but annual costs were not provided.									

Industry	Quantity approved for 2005 (ExMOP1 and MOP16	Quantity approved for 2006 (MOP 16 +ExMOP2+MOP17)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend-ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
United States NPMA food processing structures (cocoa beans removed)	83.344	69.118	82.771	69.208	54.606	None	-	37.778	37.778
MBTOC recommends a CUE of 37.778 tonnes, the amount nominated for food processing facilities in 2010. This nomination represents a 30.82% decrease (excluding cocoa beans) over the amount granted by the Parties for 2009. The CUN now includes three sectors, after cocoa bean sector fully transitioned to alternatives in 2009. (1) MBTOC recommends 1.812 tonnes, the nominated amount, for cheese in storage. Cheese stores are only fumigated if USDA inspectors find mites in the cheese. If cheese stores were held at 7˚C instead of 10˚C, mites would not develop, but it is unknown what effect lowering storage temperature would have on cheese maturation and quality. MBTOC knows of no effective chemical alternative for this use, but we note that USG is conducting research on the effect of sulfuryl fluoride on mites in cheese. (2) MBTOC recommends 2.439 tonnes, the nominated amount for herb and spice processing facilities. According to the CUN, 2010 is the final year of a four year transition in herb and spice processing sector. Spot heat treatment of processing machinery with additional use of barrier methods to prevent pest escape would seem to be a good alternative for this sector. (3) MBTOC recommends 33.527 tonnes, the amount nominated for the processed food sector. This nomination represents a 45% reduction over the amount granted by the Parties for 2009. According to the CUN 2010 is the last year of a 4 year transition to alternatives in processed foods sector. This sector is expecting a registration of methoprene for use in packaging materials which will assist in achieving post-processing pest control.									
MBTOC comments on economics 2008: An economic analysis was not conducted because the CUN reports the sector did not have an alternative registered. For food-processing facilities listed in the NPMA CUN, economic feasibility of such alternatives was not assessed due to the lack of revenue information, which is necessary to quantify the economic impacts to food-processing facilities. There is a major change to this 2010 nomination from NPMA. An economic study found that sulfuryl fluoride is economically feasible for cocoa beans (Adam 2007). Therefore NPMA has not requested methyl bromide for use on cocoa beans for 2010. Sulfuryl fluoride is not always economically feasible in all food processing facilities (Adam 2007), therefore that portion of NPMA's request remains. Adam (2007) conducted a cost comparison of methyl bromide and sulfuryl fluoride in the fumigation of cocoa beans. It is an economic-engineering approach, which estimates of costs that "typical" firms would face under different scenarios (Adam 2007). Adam (2007) found that with regards to cocoa beans, if the methyl bromide and sulfuryl fluoride are the same price per pound, then a sulfuryl fluoride fumigation costs 1% less than a methyl bromide. Sulfuryl fluoride is more economical than methyl bromide for cocoa beans, primarily because less sulfuryl fluoride is needed (Adam 2007). Sulfuryl fluoride is highly dependent upon temperature, so should a facility need fumigation during cooler temperatures, it may not be the product of choice because of increased heating costs. Also sulfuryl fluoride requires higher dosages for egg kill, and in many facilities killing eggs is paramount; this also may lead to higher costs. Cheese does not have a technically and economically feasible alternative to methyl bromide at this time.									

Industry	Quantity approved for 2005 (ExMOP1 and MOP16	Quantity approved for 2006 (MOP 16 +ExMOP2+MOP17)	Quantity approved for 2007 (MOP17+ MOP18)	Quantity approved for 2008 (MOP18+ MOP19)	Quantity approved for 2009 (MOP19)	Quantity nominated for 2009 (additional or new)	MBTOC recommend-ation for 2009 (additional or new)	Quantity nominated for 2010 (new)	MBTOC recommend-ation for 2010 (new)
United States Mills and processors	483.000	461.758	401.889	348.237	291.418	None	-	173.023	173.023
MBTOC recommends 173.023 tonnes for US mills and processors in 2010. MBTOC recommended this CUN in its interim report (TEAPMay 2008 Progress Report), but the USG pointed out an arithmetical error in the report. In the final tally, MBTOC double- counted the amount recommended for rice mills, although the figure in the text box was correct. To clarify, for this sector, MBTOC recommends the following: Flour milling (144.790); Rice milling (14.511); Pet food facilities (13.722).									
MBTOC comments on economics: 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. Where sulfuryl fluoride is technically feasible it results in loss of net revenue of 57% (rice millers), but only 4% (bakeries) and 2% (pet food manufacturers and North American Millers Association). Profit margins were added to the economic assessment. Sulfuryl fluoride is highly dependent upon temperature, so should a facility need fumigation during cold temperatures, it may not be the product of choice because of the increase in costs. Also sulfuryl fluoride requires higher dosages for egg kill, but in some facilities killing eggs is paramount, again contributing to higher costs. The CUN cites a new study that compares methyl bromide structural fumigation to an alternative. This paper uses an economic-engineering approach to estimate costs that "typical" firms would incur under alternative scenarios, as opposed to specific firms and situations (Adam 2007).									
United States Cured pork	67.907	40.854	18.998	19.669	18.998	None	-	4.465	4.465
MBTOC recommends a CUE of 4.465 tonnes for specific cured (air-dried) pork products in 2010. This CUN has decreased by 14.533 tonnes over the amount granted by the Parties for 2009. The USG is in the second of a three year multi-disciplinary research program to try to find non-MB methods to control mites in this traditional cured pork product and associated storage houses. No chemical alternatives are registered for pest control in these products. Although MBTOC does not know of methods that have been published as effective for this situation. In the interest of contributing to research ideas, we can suggest: low oxygen controlled atmosphere; or dipping the hams in oil and lard at 90ºC as practised in Spain with a similar product.									
MBTOC comments on economics: No economic data given. This is a minor use and there is little economic incentive to develop alternatives.									

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7. MBTOC Work plan for 2009

7.1 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 MB 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 (and 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 2008 work plan in consultation with TEAP and with support of the Ozone Secretariat. The timelines for the work plan are contained below for consideration by the Parties at their Twentieth Meeting.

Paragraph 15 of Annex I to the report of 16MOP also specifies that a summary report of MBTOC activities over the previous year (paragraph 15(h)) should also be indicated in the MBTOC plan. In accordance with this requirement, this summary report is provided.

7.2 MBTOC Workplan for 2009 - 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 in 2009 as set out in Table 7.1 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 MBTOC on the MBTOC composition is also included. The list of current membership of MBTOC is contained in Annex VII.

The work plan also includes an indicative budget for the activities in 2009, which relate to evaluation of CUNs. Parties had indicated in the 2006 approved budget that 2006 is the last year for providing supplemental funding to MBTOC and for 2007 and 2008, no supplemental funding was provided for MBTOC. MBTOC would like to bring to the attention of the Parties that such financial assistance is needed to ensure the effective operation of MBTOC in continuing to carry out the evaluation of CUNs. In particular, provision of some funding for non-Article 5 MBTOC members to attend meetings is strongly recommended.

TEAP co-chairs authorised only two of MBTOC QSC Article 5 members and five MBTOC S Article 5 members to attend their second meetings of the year. Additionally, several non Article 5 members of MBTOC QSC were not funded by the organizations that sponsor their participation.

Annex 1 of Decision XVI/4 outlines a schedule by which two MBTOC meetings are envisioned per year to evaluate CUNs. The schedule further allows MBTOC to seek

further information from Parties and in turn for Parties to provide additional information in response to MBTOCs interim recommendations made during the first meeting. UNEP and Party funding of MBTOC members would allow the committee to conduct its tasks appropriately and complete its work.

Although most non Article 5 members are funded by their governments or other sponsors, some members (particularly in the QSC sub-committee) do not have funding to attend meetings. Some non Article 5 members presently use personal funds or funds from research programs to attend MBTOC meetings. As mentioned in the previous workplan of MBTOC as well as in the Progress Reports of TEAP, the financial burden on individual members and/or their research institutions has become increasingly unsustainable.

In 2008, MBTOC still required two 'face-to-face' meetings owing to (i) review of a large number of CUNs, (ii) more clearly and completely reference the reasons for decision making in reports, (iii) to conduct field trips to understand the circumstances of particular nominations; (iv) and time to prepare responses to specific requests by Parties.

As a result of lack of funding only local site visits were conducted in those places where MBTOC meetings took place, for example Israel. Further, it was necessary to conduct a number of important tasks off -line. This represents extra effort and difficulties and often required MBTOC members to work extensively outside regular office hours.

Table 7.1. MBTOC work plan and indicative budget: 2009

Tasks and actions	**Indicative budget needs where applicable**	**Indicative completion date**	**Dates of meetings**
Assessment of the CUNs			
1. Parties submit their nominations for critical-use exemptions to the Secretariat	-	24 January 2009	
2. The nominations are forwarded to MBTOC co-chairs for distribution to the subgroups of appointed members	-	7 February 2009	
3. Initial summarization of the nominations	-		
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			
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	-	21 February 2009	
6. Nominating Party develops and submits its response to the MBTOC co-chairs	-	7 March 2009	

Tasks and actions	Indicative budget needs where applicable	Indicative completion date	Dates of meetings
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 • Bilateral meetings	Funds for travel of 3 non-A5 QSC members: US$10,000 (Meeting Costs can be covered under the normal Ozone Secretariat budget)	March-April 2009	Tentative: Soils: Morocco (Agadir or Rabat); QSC: USA (California), Netherlands or Philippines
8. MBTOC provides its draft recommendations on the CUNs to TEAP		End of April, 2009	
9. TEAP Meeting: To assess the MBTOC report on critical-use nominations and submits the finalised interim report on recommendations and findings to the Secretariat.		End April, 2009	To be determined
10. The Secretariat posts the finalised report on its web site and circulates it to the Parties	-	May 2009	
11. 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		July 2009	Geneva, Switzerland
12. 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 OEWG, and provides additional information should it wish to appeal against a critical-use nomination recommendation by MBTOC/TEAP	-	August 2009	
13. MBTOC Meeting No 2: 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 OEWG • finalise the report, including notice of any proposed new standard presumptions to be applied by MBTOC • conduct any bilateral consultations requested by Parties • draft work plan and budget for MBTOC for 2007	Funds for travel of 3 non-A5 QSC members US $8,500 Meeting costs: $US 6000.	September 2009	Tentative: Soils: US (California); QSC: USA (California), Netherlands or Philippines
14. MBTOC draft final report considered by TEAP, finalised and made available to Parties through the Secretariat	-	End September, 2009	
15. 21st Meeting of the Parties		November, 2009	Tentative: Egypt
Total budget:	**US$ 24,500**		
Composition of MBTOC			
16. At MBTOC meetings (Alassio: August 30-September 2; Chengdu, Sept 26), MBTOC has updated the list of members and their expertise.	Updated list attached separately	…….	
17. The Secretariat provides an update on its website of this list of members and expertise required for TEAP and its TOCs'.		……	

8. Summary Report of the Activities Carried out by MBTOC in 2008

- Initial summarization of the CUNs (initial sorting and recording carried out by the Secretariat).
- Preparation of questions for Parties. Assessment of responses received.
- First meeting of MBTOC on the assessment of the CUNs - Tel Aviv, 14-18 April 2008. One non A5 member resigned and one non A5 member joined the committee. Interim recommendations and report prepared for the Parties. Bilateral meetings were held with USA.
- Site visits: MBTOC-S conducted a field trip to observe alternatives adopted by vegetable and flower growers including substrate production and alternative fumigants. MBTOC-QSC conducted a site visit to a flour mill in Tel Aviv
- TEAP meeting - Vienna, 21-25 April 2008.
- Completion of the interim report for consideration by the 28 OEWG as part of 2008 TEAP Progress Report of April 2008.
- Completion of the special review on Current Status on Efficacy, Costs and Adoption of Alternatives in Flour Mills published in Spring TEAP report.
- 28 OEWG (Bangkok, 7- 11 July 2008). Bilateral meetings with Australia, Canada, Japan and USA.
- MBTOC-S reorganization: Two non A5 members and two A5 members were retired from the committee.
- Metaanalysis biometricians in Australia held a teleconference with a large US delegation to discuss further procedural issues related to the metaanalysis.

Owing to requests by the Parties and new information submitted, the sub committees required a second meeting to review new information from Parties. To assist logistics, meetings were held in conjunction with major international conferences that were attended by many MBTOC members.

- MBTOC-S met in Alassio from 30 Aug - 2 Sept. 2008. A bilateral discussion was held with the USA.
- MBTOC-QSC met in Chengdu on 21 September, 2008 and intermittently during the week during the meeting on Controlled Atmosphere and Fumigation..
- Preparation of the final report on the CUNs for consideration by the Parties at their 20th Meeting.

ANNEX I: Decision IX/6

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).

ANNEX II: Decision XVI/4

Review of the working procedures and terms of reference of the Methyl Bromide Technical Options Committee

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

A. Working procedures of the Methyl Bromide Technical Options Committee relating to the evaluation of nominations for critical uses of methyl bromide

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

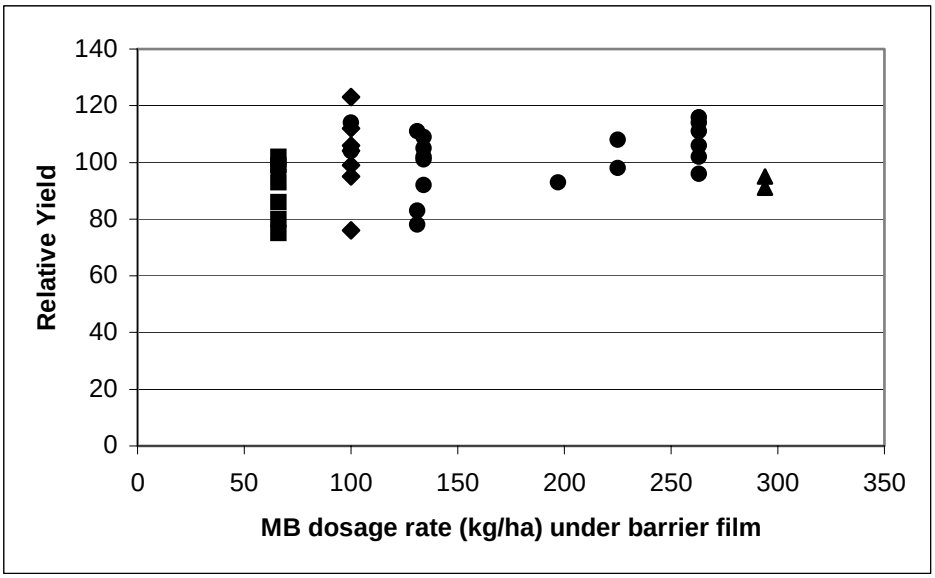
(j) Any new or revised standards or presumptions that MBTOC seeks to apply in its future assessment of critical-use nominations, for approval by the Meeting of the Parties.

ANNEX III: Relative effectiveness of MB/Pic formulations applied in combination with low permeability barrier films (LPBF) compared to the commercial standard MB/Pic formulation applied under standard low density polyethylene films (LDPF).

Country	Region	Commodity	Brand or Type of Barrier Film	Untreated	Methyl Bromide/Chloropicrin Mixtures (Product rate per treated area)												Notes	Reference
				Std film			Barrier Film – Relative yield compared to standard polyethylene												
				Yield	MB/Pic Formuln.	Product Rate	Not Spec	98:2	98:2	67:33	67:33	67:33	67:33	67:33	67:33	50:50	33:67		
						kg/ha	300	400	300	98	196	200	294	336	392	200	200		
MB Dosage rate (g/m2)								**392**	**294**	**66**	**131**	**134**	**197**	**225**	**263**	**100**	**66**		
Spain	Vinderos	Strawb. Runner	VIF - NotSpec	74	50:50	400											93	Fusarium, Phytophthora, Pythium, Rhizoctonia and Verticillium	De Cal et al 2004
	Navalmanzano			78	50:50	400											80		
Spain	Vinderos	Strawb. Runner	VIF - Not Spec	68	50:50	400										114	102	Fusarium, Cladosporium, Rhizoctonia	Melgarejo et al 2003
	Navalmanzano			34	50:50	400										76	75		
Spain	Avitorejo	Strawb. Fruit	VIF - Not Spec		50:50	400											97	2003 results	Lopez-Aranda et al 2003
	Malvinas				50:50	400											99		
Spain	Valencia	Strawb. Fruit	VIF - Not Spec	59	Not Spec	600	94											1998 Fusarium At 10cm & 30cm	Bartual et al 2002
				53	Not Spec	600	93											1999 results	
Spain	Avitorejo	Strawb. Fruit	VIF - Not Spec	80	67:33	400										112		Meloidogyne and weeds (unspec.)	Lopez-Aranda et al 2001
	Tariquejo			54	67:33	400										106			
Spain	Moguer/Cartaya	Strawb. Runner	VIF - Not Spec		50:50	392										99		Inoculum not specified	Lopez-Aranda et al 2001b
Spain	Cabeza, Nav.	Strawb. Runner	VIF - Not Spec	74	67:33	400						105, 92						1998 Two sites	Melgarejo et al 2001
	Arevalo, Nav.			84	50:50	400										104, 104		1999 results, nurseries	
	Vinaderos, Nav.			49	50:50	400										95, 123		2000 results, nurseries	
Spain	Huelva	Strawb. Fruit	VIF - Not Spec	82	67:33	400						101						1997-1998 Inoc.unspecified	Lopez-Aranda et al 2000
				72	67:33	400						102						1998-1999 Inoc. Unspecified	
				68	67:33	400						109						1999-2000 Inoc. Unspecified	

Country	Region	Commodity	Brand or Type of Barrier Film	Untreated	Methyl Bromide/Chloropicrin Mixtures (Product rate per treated area)												Notes	Reference
					Std film			Barrier Film – Relative yield compared to standard polyethylene										
				Yield	MB/Pic Formuln.	Product Rate	Not Spec	98:2	98:2	67:33	67:33	67:33	67:33	67:33	67:33	50:50	33:67	
						kg/ha	300	400	300	98	196	200	294	336	392	200	200	
MB Dosage rate (g/m2)								**392**	**294**	**66**	**131**	**134**	**197**	**225**	**263**	**100**	**66**	
Spain	Moncada	Strawb. Fruit	VIF - Not Spec	60	98:2	600			95									1998 No major pathogens but Fusarium buried 10cm&30cm.	Cebolla et al 1999
				54	98:2	600			91										
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								98				Phytophthora present	Horner 1999
USA	Florida	Pepper	VIF Plastopil	69	67:33	392					78							Nutgrass	Gilreath and Santos 2005e
			VIF Plastopil	69	67:33	392				99								Present	
			VIF Vikase	69	67:33	392					83								
			VIF Vikase	69	67:33	392				86									
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								108				Inoculum not specified	Ajwa et al 2004
				80	67:33	392									96				
USA	Florida	Tomato	VIF - Not Spec	31	67:33	392					111		93		114			Nutgrass and rootknot nematodes	Hamill et al 2004
USA	California	Strawb. Fruit	VIF - Not Spec	75	67:33	392									106				Ajwa et al 2003
				83	67:33	392									111			Watsonville, high pathogen pressure	
				65	67:33	392									102				
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									116				Duniway et al 1998
USA	Georgia	Nurseries	VIF – not spec		67:33	389	See reference												Carey and Godbehere, 2004
USA	California	Roses			67:33 98¨2	392 392	See reference												Hanson et al, 2006
USA	Florida	Pepper	VIF – not spec		67:33	392	See reference												Santos and Gilreath, 2004
USA	Florida	Pepper	VIF – not spec		67:33	392	See reference												Santos et al, 2005
USA	California	Ornamentals	VIF – not spec		67:33	392	See reference												Klose 2007, 2008
Unweighted averages (relative % yield)				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.

ANNEX IV: Methyl bromide reduction trends, based on historical rates of adoption in the EC

(EC National Management Strategy, 2008. CUNA = Critical Use Nomination Assessment; MS = Member State of the EC)

Major MB CUEs in 2006	1991 MB use estimate[2] (tonnes) (ha) (No. MSs)	2005 MB use[3] (tonnes) (ha) (No. MSs)	2008 MB quota allocation (tonnes) (ha) (No. MSs)	Short-listed existing MB alternatives[4]	Historical rates of adoption in individual MSs from Table 4.3, Annex 7.A (ha/year per MS)	Feasible adoption rates (derived from historical rates) and current status of CUEs
Tomato	> 4980 t > 7000 ha > 12 MS	733 t 2423 ha 4 MS	0 t 0 ha 0 MS	Fumigants: 1,3-D, PIC, Metham Sodium, Dazomet	up to 1193 ha/year/MS	Rate of up to 1193 + 1570 = 2763 ha/year/MS Adoption completed by end of 2007
				Grafting on resistant root stock	up to 1000 ha/year/MS	
				Substrates	up to 1570 ha/year/MS	
Strawberry fruit	~ 3420 t ~ 5200 ha (>8000 ha in yr 2000) > 12 MS	497 t 3879 ha 4 MS	0 t[5] 0 ha 0 MS	Fumigants: 1,3-D, PIC, Metham Sodium	up to 2090 ha/year/MS	Rate of up to 2090 + 80 = 2170 ha/year/MS. Adoption completed for commercial strawberry fruit production by end of 2006
				Substrates	up to 80 ha / year/MS	
				Resistant varieties	no data	

[2] Refer to Section 3 for data.

[3] MB use data from EC Accounting Framework Report. Hectares calculated on doses stated in CUNs and CUNAs. If not stated, estimated based on mean dosage of MB for this use (tomato: 300 kg/ha; strawberry runners: 300 – 470 kg/ha; strawberry fruit: 100 – 300 kg/ha; cutflowers: 200 – 500 kg/ha; peppers: 150 – 300 kg/ha; mills and food processors: 20 g/m^3)

[4] Further details and alternatives in Annex 4.C.

[5] Excluding 151 kg for research on strawberry fruit and peppers in Spain in 2008.

Major MB CUEs in 2006	1991 MB use estimate[2] (tonnes) (ha) (No. MSs)	2005 MB use[3] (tonnes) (ha) (No. MSs)	2008 MB quota allocation (tonnes) (ha) (No. MSs)	Short-listed existing MB alternatives[4]	Historical rates of adoption in individual MSs from Table 4.3, Annex 7.A (ha/year per MS)	Feasible adoption rates (derived from historical rates) and current status of CUEs
Cut flowers	~ 1610 t ~ 1,800 ha > 12 MS	259 t 855 ha 6 MS	0 t[6] 0 ha 0 MS	Fumigants: 1,3-D, PIC, Metham Sodium, Dazomet	up to 313 ha/year/MS	Rate of up to 313 + 60 + 917 = 1290 ha/year/MS Adoption completed for commercial cut flower production by end of 2007
				Substrates	up to 60 ha/year/MS	
				Steam	up to 917 ha/year/MS	
				Resistant varieties	??	
Peppers	~ 2410 t ~ 3,000 ha > 11 MS	250 t 1336 ha 3 MS	0 t[7] 0 ha 0 MS	Fumigants: 1,3-D, Metham Sodium, Dazomet	up to 667 ha/year/MS	Rate of up to 667 + 175 = 842 ha/year/MS Adoption completed for commercial pepper production by end of 2007
				Substrates	175 ha / year/MS	
Strawberry runners	~ 740 t ~ 930 ha ~ 5 MS	346 t ~ 1500 ha 4 MS	212 t 1364 ha 2 MS	Fumigants: 1,3-D, PIC, Metham Sodium	up to 94 ha/year/MS	Rate of up to 94 + ? ha/year/MS Adoption of MB alternatives slower than expected. Adoption of alternatives to be completed by end of 2008
				Plug plants	??	
Mills and	640t	150 t	0 t	Heat + IPM	up to 3,500,000 – 4,600,000	Rate of up to 3.5 to 4.6 +

[6] Excluding 25 kg for research on cut flowers in Spain in 2008..

[7] Excluding 151 kg for research on strawberry fruit and peppers in Spain in 2008.

Major MB CUEs in 2006	1991 MB use estimate[2] (tonnes) (ha) (No. MSs)	2005 MB use[3] (tonnes) (ha) (No. MSs)	2008 MB quota allocation (tonnes) (ha) (No. MSs)	Short-listed existing MB alternatives[4]	Historical rates of adoption in individual MSs from Table 4.3, Annex 7.A (ha/year per MS)	Feasible adoption rates (derived from historical rates) and current status of CUEs
food processing structures	12,800,000 m3 [8] ~ 15 MS	~7,500,000 m3 [9] 5 MS	0 m^3 0 MS	Sulfuryl fluoride (+ heat)	m^3 / year/ MS	0.2 + ?? million m^3/year/MS Adoption completed by end of 2007
				Phosphine (+ heat)	??	
				Modified atmosphere (structures)	200.000 m^3 / year	
Coffee beans	Modest use. No data	< 1.6 t <172,800 m^3 1 MS	0.5 t 54,000 m^3 1 MS	Phosphine solid formulations + heat if necessary	??	46,400 + ?? m^3/year/MS Adoption rate slower than expected. Adoption to be completed by end of 2008
				Phosphine gas generation	??	
				Vacuum-hermetic treatments, low pressure	??	
				Controlled atmosphere + heat if necessary	??	
				High pressure + CO2	46,400 m^3/year	

[8] Assuming average dosage was about 50 g/m^3 in 1991.
[9] Assuming dosage of about 20 g/m^3

ANNEX V– Part A: Trend in Preplant Soil Applications

List of nominated (2005 – 2010 in part) and exempted (2005 – 2009 in part) amounts of methyl bromide granted by Parties under the CUE process for each crop or commodity.

Party	Industry	Total CUN MB Quantities						Total CUE MB Quantities				
		2005	2006	2007	2008	2009	2010	2005	2006	2007	2008	2009
Australia	Cut Flowers – field	40.000	22.350					18.375	22.350			
Australia	Cut flowers – protected	20.000						10.425				
Australia	Cut flowers, bulbs – protected Vic	7.000	7.000	6.170	6.150			7.000	7.000	3.598	3.500	
Australia	Strawberry Fruit	90.000						67.000				
Australia	Strawberry runners	35.750	37.500	35.750	35.750	29.790	29.790	35.750	37.500	35.750	35.750	29.790
Belgium	Asparagus	0.630	0.225					0.630	0.225			
Belgium	Chicory	0.600	0.180					0.180	0.180			
Belgium	Chrysanthemums	1.800	0.720					1.120				
Belgium	Cucumber	0.610	0.545					0.610	0.545			
Belgium	Cut flowers – other	6.110	1.956					4.000	1.956			
Belgium	Cut flowers – roses	1.640										
Belgium	Endive (sep from lettuce)		1.650						1.650			
Belgium	Leek & onion seeds	1.220	0.155					0.660				
Belgium	Lettuce(& endive)	42.250	22.425					25.190				
Belgium	Nursery	Not Predictable	0.384					0.900	0.384			
Belgium	Orchard pome & berry	1.350	0.621					1.350	0.621			
Belgium	Ornamental plants	5.660						0.000				
Belgium	Pepper & egg plant	5.270	1.350					3.000	1.350			
Belgium	Strawberry runners	3.400	0.900					3.400	0.900			
Belgium	Tomato (protected)	17.170	4.500					5.700	4.500			
Belgium	Tree nursery	0.230	0.155					0.230	0.155			
Canada	Strawberry runners (PEI)	14.792	6.840	7.995	7.462	7.462	7.462	(a)14.792	6.840	7.995	7.462	7.462
Canada	Strawberry runners (Quebec)		1.826					(a)	1.826	1.826		
Canada	Strawberry runners (Ontario)									6.129		
France	Carrots	10.000	8.000	5.000				8.000	8.000	1.400		
France	Cucumber	85 revised to 60	60.000	15.000				60.000	60.000	12.500		
France	Cut-flowers	75.000	60.250	12.000				60.000	52.000	9.600		
France	Forest tree nursery	10.000	10.000	1.500				10.000	10.000	1.500		
France	Melon	10.000	10.000					7.500	6.000			
France	Nursery: orchard, raspberry	5.000	5.000	2.000				5.000	5.000	2.000		
France	Orchard replant	25.000	25.000	7.500				25.000	25.000	7.000		
France	Pepper	Incl in.tomato cun	27.500	6.000					27.500	6.000		

Party	Industry	Total CUN MB Quantities						Total CUE MB Quantities				
		2005	2006	2007	2008	2009	2010	2005	2006	2007	2008	2009
France	Strawberry fruit	90.000	86.000	34.000				90.000	86.000			
France	Strawberry runners	40.000	4.000	35.000				40.000	40.000	28.000		
France	Tomato (and eggplant for 2005 only)	150(all solanaceous)	60.500	33.250				125.000	48.400			
France	Eggplant		27.500	33.250					48.400			
Greece	Cucurbits	30.000	19.200					30.000	19.200			
Greece	Cut flowers	14.000	6.000					14.000	6.000			
Greece	Tomatoes	180.000	73.600					156.000	73.600			
Israel	Broomrape			250.000	250.000	125.000				250.000	250.000	125.000
Israel	Cucumber - protected new 2007			18.750						25.000	18.750	
Israel	Cut flowers – open field	77.000	67.000	80.755	53.345	42.777		77.000	67.000	74.540	44.750	34.698
Israel	Cut flowers – protected	303.000	303.000	321.330	163.400	113.821		303.000	240.000	220.185	114.450	85.431
Israel	Fruit tree nurseries	50.000	45.000	10.000				50.000	45.000	7.500		
Israel	Melon – protected & field	148.000	142.000	140.000	87.500	87.500		125.650	99.400	105.000	87.500	87.500
Israel	Potato	239.000	231.000	137.500	93.750	75.000		239.000	165.000	137.500	93.750	75.000
Israel	Seed production	56.000	50.000			22.400		56.000	28.000			NR
Israel	Strawberries – fruit	196.000	196.000	176.200	64.125	52.250		196.000	196.000	93.000	105.960	42.750
Israel	Strawberry runners	35.000	35.000		20	15.800		35.000	35.000	28.000	31.900	15.825
Israel	Strawberry runners and fruit Ghaza				87.875	67.500						47.250
Israel	Tomatoes			90.000						22.750		
Israel	Sweet potato					95.000					111.500	95.000
Italy	Cut flowers (protected)	250.000	250.000	30.000				250.000	187.000	30.000		
Italy	Eggplant (protected)	280.000	200.000	15.000				194.000	156.000			
Italy	Melon (protected)	180.000	135.000	10.000				131.000	131.000	10.000		
Italy	Pepper (protected)	220.000	160.000	67.000				160.000	130.000	67.000		
Italy	Strawberry Fruit (Protected)	510.000	400.000	35.000				407.000	320.000			
Italy	Strawberry Runners	100.000	120.000	35.000				120.000	120.000	35.000		
Italy	Tomato (protected)	1300.000	1030.000	418.000				871.000	697.000	80.000		
Japan	Cucumber	88.300	88.800	72.400	68.600	61.400	34.100	88.300	88.800	72.4	51.450	34.300
Japan	Ginger – field	119.400	119.400	112.200	112.100	102.200	53.400	119.400	119.400	109.701	84.075	63.056
Japan	Ginger – protected	22.900	22.900	14.800	14.800	12.900	8.300	22.900	22.900	14.471	11.100	8.325
Japan	Melon	194.100	203.900	182.200	182.200	168.000	90.800	194.100	203.900	182.2	136.650	91.100
Japan	Peppers (green and hot)	189.900	200.700	169.400	162.300	134.400	81.100	187.200	200.700	156.700	121.725	81.149
Japan	Watermelon	126.300	96.200	94.200	43.300	23.700	15.400	129.000	98.900	94.2	32.475	21.650
Malta	Cucumber		0.096						0.127			
Malta	Eggplant		0.128						0.170			
Malta	Strawberry		0.160						0.212			
Malta	Tomatoes		0.475						0.594			

Party	Industry	Total CUN MB Quantities						Total CUE MB Quantities				
		2005	2006	2007	2008	2009	2010	2005	2006	2007	2008	2009
New Zealand	Nursery material	1.085	1.085						0.000			
New Zealand	Strawberry fruit	42.000	42.000	24.780				42.000	34.000	12.000		
New Zealand	Strawberry runners	10.000	10.000	5.720				8.000	8.000	6.234		
Poland	Strawberry Runners	40.000	40.000	25.000	12.000			40.000	40.000	24.500		
Portugal	Cut flowers	130.000	8.750					50.000	8.750			
Spain	Cut Flowers – Cadiz	53.000	53.000	35.000				53.000	42.000			
Spain	Cut Flowers – Catalonia	20.000	18.600	12.840	17.000 (+Andalucia)			20.000	15.000	43.490 (+Andalucia)		
Spain	Pepper	200.000	155.000	45.000				200.000	155.000	45.000		
Spain	Strawberry Fruit	556.000	499.290	80.000				556.000	499.290	0.0796		
Spain	Strawberry Runners	230.000	230.000	230.000	215.000			230.000	230.000	230.000		
UK	Cut flowers		7.560						6.050			
UK	Ornamental tree nursery	12.000	6.000					6.000	6.000			
UK	Strawberry (& raspberry in 2005)	80.000	63.600					68.000	54.500			
UK	Raspberry nursery		4.400						4.400			
USA	Chrys. Cuttings/roses	29.412						29.412	0.000			
USA	Cucurbits – field	1187.800	747.839	598.927	588.949	411.765	340.405	1187.800	747.839	592.891	486.757	407.091
USA	Eggplant – field	76.761	101.245	96.480	79.546	62.789	34.732	76.721	82.167	85.363	66.018	48.691
USA	Forest nursery seedlings	192.515	157.694	152.629	133.140	125.758	120.853	192.515	157.694	122.032	131.208	122.060
USA	Ginger	9.200						9.200	0.000			
USA	Orchard replant	706.176	827.994	405.415	405.666	314.007	226.021	706.176	527.600	405.400	393.720	292.756
USA	Ornamentals	210.949	162.817	149.965	138.538	137.776	95.204	154.000	148.483	137.835	138.538	107.136
USA	Nursery stock - fruit trees, raspberries, roses	45.789	64.528	12.684	51.102	25.326	17.954	45.800	64.528	28.275	51.102	25.326
USA	Peppers – field	1094.782	1498.530	1151.751	919.006	783.821	463.282	1094.782	1243.542	1106.753	756.339	548.984
USA	Strawberry fruit – field	2468.873	1918.400	1733.901	1604.669	1336.754	1103.422	2052.846	1730.828	1476.019	1349.575	1269.321
USA	Strawberry runners	54.988	56.291	4.483	8.838	8.837	7.381	54.988	56.291	4.483	8.838	7.944
USA	Tomato – field	2876.046	2844.985	2334.047	1840.100	1245.249	994.582	737.584	2476.365	2065.246	1406.484	1003.876
USA	Turfgrass	352.194	131.600	78.040	52.189	0			131.600	78.04	0	
USA	Sweet potato	224.528			18.144	18.144	18.144				18.144	18.144

ANNEX VI– Part B: Post-harvest Structural and Commodity Applications

List of nominated (2005 – 2010 in part) and exempted (2005 – 2009 in part) amounts of methyl bromide granted by Parties under the CUE process for each structural or commodity treatment.

Party	Industry	Total CUN MB Quantities						Total CUE MB Quantities				
		2005	2006	2007	2008	2009	2010	2005	2006	2007	2008	2009
Australia	Almonds	1.900	2.100					1.900	2.100			
Australia	Rice consumer packs	12.300	12.300	10.225	9.200 +1.8	9.200	7.820	6.150	6.150	9.205	9.200	7.820
Belgium	Artefacts and structures	0.600	0.307					0.590	0.307			
Belgium	Antique structure & furniture	0.750	0.199					0.319	0.199			
Belgium	Churches, monuments and ships' quarters	0.150	0.059					0.150	0.059			
Belgium	Electronic equipment	0.100	0.035					0.100	0.035			
Belgium	Empty silo	0.050	0.043					0.050	0.043			
Belgium	Flour mill see mills below	0.125	0.072					See mills below	0.072			
Belgium	Flour mills	10.000	4.170					9.515	4.170			
Belgium	Mills	0.200	0.200					0.200	0.200			
Belgium	Food processing facilities	0.300	0.300					0.300	0.300			
Belgium	Food Processing premises	0.030	0.030					0.030	0.030			
Belgium	Food storage (dry) structure	0.120	0.120					0.120	0.000			
Belgium	Old buildings	7.000	0 .306					1.150	0.306			
Belgium	Old buildings and objects	0.450	0.282					0.000	0.282			
Belgium	Woodworking premises	0.300	0.101					0.300	0.101			
Canada	Flour mills	47.200	34.774	30.167	28.650	26.913	22.878	(a)47	34.774	30.167	28.650	26.913
Canada	Pasta manufacturing facilities	(a)	10.457	6.757	6.067	4.740		(a)	10.457	6.757	6.067	
Canada	Commodities					0.068						
France	Seeds sold by PLAN-SPG company	0.135	0.135	0.100				0.135	0.135	0.096		
France	Mills	55.000	40.000	8.000				40.000	35.000	8.000		
France	Rice consumer packs	2.000	2.000					2.000	2.000			
France	Chestnuts	2.000	2.000	1.800				2.000	2.000	1.800		
Germany	Artefacts	0.250	0.100					0.250	0.100			
Germany	Mills and Processors	45.000	19.350					45.000	19.350			
Greece	Dried fruit	4.280	3.081	0.900				4.280	3.081	0.45		
Greece	Mills and Processors	23.000	16.000	1.340				23.000	15.445	1.340		
Greece	Rice and legumes		2.355						2.355			
Ireland	Mills		0.888	0.611					0.888			
Israel	Artefacts	0.650	0.650	0.600				0.650	0.650			
Israel	Dates (post harvest)	3.444	3.444	2.200	1.800	2.100		3.444	2.755	2.200	1.800	

Party	Industry	Total CUN MB Quantities						Total CUE MB Quantities				
		2005	2006	2007	2008	2009	2010	2005	2006	2007	2008	2009
Israel	Flour mills (machinery & storage)	2.140	1.490	1.490	0.800	0.300		2.140	1.490	1.040	0.312	
Israel	Furniture– imported	1.422	1.422	2.042				1.422	0.000			
Italy	Artefacts	5.500	5.500	5.000				5.225	0.000	5.000		
Italy	Mills and Processors	160.000	130.000	25.000				160.000	65.000	25.000		
Japan	Chestnuts	7.100	6.500	6.500	6.300	5.800	5.400	7.100	6.800	6.500	6.300	5.800
Latvia	Grains		2.502						2.502			
Netherlands	Strawberry runners post harvest		0.120	0.120		0.120			0	0.120		
Poland	Medicinal herbs & dried mushrooms as dry commodities	4.000	3.560	1.800	0.500			4.100	3.560	1.800	1.800	
Poland	Coffee, cocoa beans	(a)	2.160	2.000	0.500				2.160	1.420	1.420	
Spain	Rice		50.000						42.065			
Switzerland	Mills & Processors	8.700	7.000					8.700	7.000			
UK	Aircraft			0.165						0.165		
UK	Mills and Processors	47.130	10.195	4.509				47.130	10.195	4.509		
UK	Cereal processing plants		8.131	3.480				(a)	8.131	3.480		
UK	Cheese stores	1.640	1.248	1.248				1.640	1.248	1.248		
UK	Dried commodities (rice, fruits and nuts) Whitworths	2.400	1.256					2.400	1.256			
UK	Herbs and spices	0.035	0.037	0.030				0.035	0.037			
UK	Mills and Processors (biscuits)	2.525	1.787	0.479				2.525	1.787			
UK	Spices structural equip.	1.728						1.728	0.000	0.479		
UK	Spices stored	0.030						0.030	0.000			
UK	Structures buildings (herbs and spices)	3.000	1.872	0.908				3.000	1.872	0.908		
UK	Structures, processors and storage (Whitworths)	1.100	0.880	0.257				1.100	0.880	0.257		
UK	Tobacco equipment	0.523						0.050				
UK	Woven baskets	0.770						0.770				
USA	Dried fruit and nuts (walnuts, pistachios, dried fruit and dates and dried beans)	89.166	87.719	91.299	67.699	58.912	19.242	89.166	87.719	78.983	58.921	45.623
USA	Dry commodities/ structures (cocoa beans)	61.519	61.519	64.028	52.256	51.002		61.519	55.367	64.082	53.188	
USA	Dry commodities/ structures (processed foods, herbs and spices, dried milk and cheese processing facilities) NPMA	83.344	83.344	85.801	72.693	66.777	37.778	83.344	69.118	82.771	69.208	54.606
USA	Smokehouse hams (Dry cure pork products) (building and product)	136.304	135.742	40.854	19.669	19.699	4.465	67.907	81.708	18.998	19.699	18.998
USA	Mills and Processors	536.328	505.982	401.889	362.952	291.418	173.023	483.000	461.758	401.889	348.237	291.418

ANNEX VII: Disclosure and Members of MBTOC Committees

Committee contact details and Disclosure of Interest
To assure public confidence in the objectivity and competence of TEAP, TOC, and TSB members who guide the Montreal Protocol, Parties to the Protocol have asked that each member to disclose proprietary, financial, and other interests. TEAP members have published such information for several years in the TEAP annual report.

As a result, Decision XVIII/19 was issued during the 18th Meeting of Parties to the Montreal Protocol held in New Delhi, India from 28 October to 3 November 2006. All MBTOC members are presently required to complete a disclosure of interest form and these are presented in summarized form below.

A – MBTOC Soil subcommittee Members - September 2008

Names	Gender	Affiliation	Expertise	Length of service	Country	Article 5 status
Co-Chairs						
1. Mohamed Besri	M	Institut Agronomique et Vétérinaire Hassan II (Academia)	Professor, researcher, particularly on MB and alternatives in A5 (PhD)	B	Morocco	A5
2. Marta Pizano	F	Consultant	Consultant, MB alts, particularly cut flower production	B	Colombia	A5
3. Ian Porter	M	Department of Primary Industries (Government research)	Researcher, soils MB use and alts, particularly fungal pathogens and IPM (PhD)	A	Australia	Non-A5
Members						
4. Antonio Bello	M	Centro de Ciencias Medioambientales (Government research)	Non-chemical alternatives (PhD, Prof.)	A	Spain	Non-A5
5. Aocheng Cao	M	Chinese Academy of Agricultural Sciences (Government research)	Researcher, soil alternatives, particularly in China (A5) context (PhD)	B	China	A5
6. Peter Caulkins	M	Associate Director, Special Review & Reregistration Division US EPA	Registration of alternatives, regulatory issues (PhD)	C	USA	Non A-5
7. Abraham Gamliel	M	Agricultural Research Organization, The Volcani Center, (Government Research)	Alternatives for soils, horticulture (PhD)	C	Israel	Non-A5

Names	Gender	Affiliation	Expertise	Length of service	Country	Article 5 status
Co-Chairs						
8. George Lazarovits	M	Agriculture & Agri-food Canada (Government research)	Researcher, non chemical control of soilborne pathogens (PhD)	C	Canada	Non-A5
9 Andrea Minuto	M	Centro Regionale di Sperimentazione ed Assistenza Agricola CERSAA (CCIAA Savona) Albenga	Researcher, MB and alternatives in soils (PhD)	C	Italy	Non-A5
10 Ariane Saade	F	Tolken Lebanon	Economics and trade	C	Lebanon	A5
11. James D. Schaub	M	United States Department of Agriculture (Government regulatory)	Agricultural economist (PhD)	B	USA	Non-A5
12. Sally Schneider	F	United States Department of Agriculture (Government research)	Researcher in soils alts, particularly replant problems and propagative material nurseries (PhD)	B	USA	Non-A5
13. JL Staphorst	M	Plant Protection Research Institute (Parastatal research)	Expert Soil Microbiologist (DSc)	A	South Africa	A5
14. Akio Tateya	M	Syngenta Japan K.K.	Application of MB and alts, particularly in Japan	A	Japan	Non-A5
15 Alejandro Valeiro	M	Instituto Nacional de Tecnología Agropecuaria (Government research)	Introduction/use of soils alts, including tobacco	B	Argentina	A5
16. Nick Vink	M	University of Stellenbosch (Academia)	Agricultural economics (PhD, Prof.)	C	South Africa	A5
17 Janny Vos	F	CABI, The Netherlands	Plant Pathologist-IPM	D	Holland	
18. Jim Wells	M	Environmental Solutions Group, LLC (Consultant)	Registration and regulatory - MB and alternatives, soil uses	A	USA	Non-A5
Totals	M =14 F =4		A= 5 B= 6 C = 6 D= 1			A5=7 Non-A5=11

A - >10 years
B – 5-10
C – 2-5
D - <2 year

Article 5 countries: 7 (39 %)
Non Article (countries): 11 (61 %)

Co-chairs

Professor Mohamed Besri **Article 5 co-chair**
Department of Plant Pathology
Institut Agronomique et Vétérinaire Hassan II
Rabat
MOROCCO

Prof. Mohamed Besri, is a full time Professor of Plant Pathology and Integrated Disease Management at the Hassan II Institute of Agronomy and Veterinary Medicine, Rabat, Morocco (HII IAVM). The HII IAVM has an interest in the topics of the Montreal Protocol because it houses specialists in Soil-borne Plant Pathogens and MLF projects (strawberries, bananas, cut flowers). It advises the Ministry of Agriculture on all aspects of alternatives to Methyl Bromide. Prof. Besri has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs . Prof. Besri works occasionally as a consultant to UNEP on matters related to the Montreal Protocol. Neither Prof. Besri's spouse, business partner or dependant children, work for or consult for any organization which has an interest in the topics of the Montreal Protocol, nor do any of them have any proprietary interest in alternatives or substitutes to ODSs, nor do any of them own stock in companies producing ODS or alternatives or substitutes to ODSs or consult for organizations seeking to phaseout ODSs. Costs associated to travel, communication, and others related to participation in the TEAP, MBTOC, and relevant Montreal Protocol meetings, are paid by UNEP's Ozone Secretariat.

Ms. Marta Pizano **Article 5 co-chair**
Consultant
Bogotá
COLOMBIA

Ms. Marta Pizano is a consultant on methyl bromide alternatives, particularly for cut flower production, and has actively promoted methyl bromide alternatives among growers in many countries. She is a regular consultant for the Montreal Protocol Multilateral Fund (MLF) and its implementing agencies. In this capacity, she has contributed to MB phase-out programs in nearly twenty Article 5 countries around the world, assisting growers with the adoption of sustainable alternatives and the implementation of IPM programs. She is a frequent speaker at national and international methyl bromide conferences and has authored numerous articles and publications on alternatives to this fumigant. She has been a member of MBTOC since 1998 and a co-chair since 2005. Neither Ms Pizano nor her husband or their children own stock or have proprietary interest in companies producing ODS or their alternatives or substitutes. Costs associated to travel, communication, and others related to participation in the TEAP, MBTOC, and relevant Montreal Protocol meetings, are paid by UNEP's Ozone Secretariat.

Dr. Ian Porter
Consultant
Victoria, AUSTRALIA

Dr Ian Porter is the Principal Research scientist in Plant Pathology with the Victorian Department of Primary Industries (DPI) but presently conducts MBTOC work on leave from his organisation. DPI has an interest in developing sustainable control measures for plant pathogens and biosecurity. He is a member of a number of National Committees regulating ODS, has led the Australian research program on methyl bromide alternatives for soils and has 28 years

experience in researching sustainable methods for soil disinfestation of plant pathogens with over 200 research publications. He has been a member of MBTOC since 1997, Soils sub committee chair since 2001 and MBTOC Co-chair since 2005. Neither, Dr. Ian Porter, his wife or children have any proprietary interest in alternatives or substitutes to ODSs, nor own stock in companies producing ODS or alternatives or substitutes to ODSs. Dr Porter is presently assisting National research agencies in Australia develop national priorities for IPM and soil health. He has conducted projects for UNEP and UNIDO in developing programmes to assist China, Mexico and CEIT countries to replace methyl bromide. The Victorian DPI has in the past made in-kind contributions to attend MBTOC and UNEP meetings, but provides no present support. The Australian Federal Government Research Funds and funds obtained through the Ozone Secretariat have provided funds to support travel and expenses for past MBTOC activities.

Members of record

Dr. Antonio Bello
Consejo Superior de Investigaciones Científicas
Madrid
SPAIN

Dr. Antonio Bello Pérez is a full time Research Professor at the Centre for Environmental Sciences in the Consejo Superior de Investigaciones Científicas, Madrid, Spain. The institute has an interest in the topics of the Montreal Protocol because of the environmental impact of methyl bromide. Dr Bello Pérez has no proprietary interest alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consult for organizations seeking to phaseout ODSs. He works occasionally as a consultant for UNEP, Implementing Agencies and Governments, on matters related to the Montreal Protocol. Travel to MBTOC meetings is paid by his institution, which in turn receives contributions for this travel from national projects.

Prof. Cao Aocheng **Article 5 Member**
Institute for Plant Protection
Chinese Academy for Agricultural Sciences
Beijing
CHINA

Dr. Aocheng Cao is a Research Professor at the Institute of Plant Protection, Chinese Academy of Agricultural Sciences focusing on research in pesticide sciences. The Chinese Academy of Agricultural Sciences, a non-profit organization, is interested in the topics of the Montreal Protocol because soil pathogens and nematodes are important pests in China and alternatives to methyl bromide are urgently needed. Dr Cao has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or their alternatives or substitutes and does not consult for organizations seeking to phase-out ODSs. His spouse also works for the Chinese Academy of Agricultural Sciences, which has an interest in the topics of the Montreal Protocol as it conducts research on pest control, but has no proprietary interest in alternatives or substitutes to ODSs, nor does she own stock in companies producing ODS or their alternatives or substitutes or perform consultancy for organizations seeking to phase out ODSs. Expenses related to Dr Cao's attendance to MBTOC meetings are paid by UNEP.

Dr. Peter Caulkins
Associate Director
Special Review & Reregistration Division EPA
Washington D. C.
UNITED STATES

Dr Peter Caulkins is the Associate Director in the Special Review and Reregistration Division in the Office of Pesticide Programs in the U.S.EPA. The U.S. EPA has sole authority for the regulation of all pesticide use in the U.S. and therefore has a strong interest in the Montreal Protocol's phase-out of methyl bromide. Neither Dr Caulkins nor his wife or their son have any proprietary interests in ODSs or their alternatives, own no stock in either ODS companies or companies providing alternatives and do not do any consulting for organizations seeking to phase-out ODSs. Travel to MBTOC meetings is paid for by EPA.

Ms. Ariane Elmas **Article 5 member**
Tokten Lebanon, UNDP
LEBANON

Ms. Ariane Elmas was formerly the project manager of a "Trade and Environment" project funded by UNEP, managed by UNDP and implemented by the Ministry of Environment in Lebanon. This project published a report on the effects of trade liberalization in Lebanon with special focus on products where methyl bromide is used and includes an annual profitability analysis and a cost benefit analysis comparing the Methyl Bromide alternatives used for each crop. Ms. Elmas, is an economist and is currently the Project Manager at the UNDP in Lebanon. The UNDP has an interest in the topics of the Montreal Protocol because it is one of its implementing agencies and as such manages the MB phase out project implemented in Lebanon under the coordination of the Ministry of the Environment. Neither Ms Elmas, nor her spouse or their dependant children have any proprietary interest in alternatives or substitutes to ODSs, own stock in companies producing ODS or their alternatives or substitutes or consult for organizations seeking to phaseout ODSs. Expenses related to Ms Elmas' attendance to MBTOC meetings is paid by UNEP.

Dr. Abraham Gamliel
Agricultural Research Organization,
The Volcani Center,
Bet Dagan
ISRAEL

Dr Abraham Gamliel is a full time senior researcher on methods and technologies for pest control and pesticide application at the Ministry of Agriculture, Agricultural Research Organization, Volcani Center, Bet Dagan, Israel .He is also an adjunct professor at the Hebrew University of Jerusalem, Faculty of Agriculture, Rehovot, Israel. ARO Volcani Center has an interest in the topics of the Montreal Protocol because it is the research and development institute for solving the farmer's problem and for developing environmentally safe crop production. Dr Gamliel has no proprietary interest alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs, and does not consult for organizations seeking to phaseout ODSs. He works occasionally as a consultant for the Government, on matters related to the Montreal Protocol. Neither his spouse nor their children work for or consult for organizations having an interest in the topics of the Montreal Protocol nor do they have a proprietary interest in alternatives or substitutes to ODS, own stock in companies producing ODS or their alternatives or substitutes. Dr Gamliel's travel expenses to attend MBTOC meetings are paid by the Ministry of Agriculture of Israel.

Dr. George Lazarovits
Agriculture & Agri-food Canada
London, Ontario
CANADA, N5V 4T3.

Dr. George Lazarovits is a research scientist at the Southern Crop Protection and Food Research Center of Agriculture and Agrifood Canada (AAFC). He is employed as a fulltime research scientist to investigate aspects of plant pathology involved with management of soilborne plant pathogens. AAFC has an interest in the topics of the Montreal Protocol because Canada has a vested interest in eliminating ozone- depleting substances such as methyl bromide, which are still being used by Canadian growers and Industries. AAFC, in collaboration with Environment Canada, is charged with overseeing the phase-out of ozone depleting products. Dr. Lazarovits has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or those manufacturing alternatives or substitutes to ODSs and does not act as consultant for organizations seeking to phase-out ODSs, other than non profit government agencies charged with enforcing the regulations of the Montreal Protocol. He is involved in advising as a consultant to Environment Canada (EC) on matters related to the Montreal Protocol, including evaluation of critical use nominations submitted to them by Canadian growers or Industries seeking exemptions for use of MB under CUE. Such nominations, if approved by EC, are eventually adjudicated by members of MBTOC. Dr. Lazarovits' spouse has no involvement whatsoever with any issues or has any interest in the topics of the Montreal Protocol or any proprietary interest in alternatives or substitutes to ODSs. She does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consult for organizations seeking to phase-out ODSs. They have no dependent children living with them and their children have no involvement in any businesses dealing with issues that are in any way related to the Montreal Protocol. Travel to MBTOC meetings is paid for by AACF, and occasionally Environment Canada, from A Base budgets

Dr. Andrea Minuto
Centro Regionale di Sperimentazione ed Assistenza Agricola CERSAA
(CCIAA Savona)
Regione Rollo n° 98 17031
Albenga (SV)
ITALY

Dr Andrea Minuto is a full time employee at the CERSAA experimental station in Italy. CERSAA has an interest in the topics of pest and disease control including soil disinfestation because of the activities carried out in the frame of regional and national programmes of technology transfer to growers including soilborne pests and diseases management issues. Dr. Minuto has no proprietary interest in alternatives or substitutes to ODSs, and does not own stock in companies producing ODS or their alternatives or substitutes. He does consulting (as CERSAA) for organizations seeking to phaseout ODSs and also works occasionally as a consultant for Implementing Agencies and Governments on matters related to the Montreal Protocol. His spouse does not work or consul for organizations which have an interest in the topics of the Montreal Protocol or organizations seeking phase-out of ODS, nor does she have any proprietary interest in alternatives or substitutes to ODSs, or own stock in companies producing ODS or their alternatives or substitutes. Travel to MBTOC meetings is paid by Italian Ministry of Environment, Territory and Sea.

Dr. James D. Schaub
Office of the Chief Economist
U.S. Department of Agriculture
Washington
UNITED STATES

Dr. James D. Schaub is an economist and Director of the Office of Risk Assessment and Cost-benefit Analysis, Office of the Chief Economist, United States Department of Agriculture (USDA). Dr. Schaub is employed full time within the Office of the Chief Economist, USDA in Washington D.C. The USDA has an interest in the topics of the Montreal Protocol because of its interest in environmentally sound agricultural production systems and the protection stored commodities. Further, USDA is responsible for protection of animal and plant health from quarantine pests. Dr. Schaub has no proprietary interests in alternatives or substitute ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consult for organizations seeking to phase out ODSs. He does not work as a consultant to any organization on matters related to the Montreal Protocol. Neither his spouse nor dependant children living at same home work for or consult for any organization which has an interest in the topics of the Montreal Protocol, nor do any of them have any proprietary interest in alternatives or substitutes to ODSs, nor do any of them own stock in companies producing ODS or alternatives or substitutes to ODSs or consult for organizations seeking to phaseout ODSs. Travel to MBTOC meetings is paid by Office of the Chief Economist, USDA.

Dr. Sally Schneider
National Program Leader – Horticulture, Pathogens & Germplasm
USDA ARS
Beltsville, Maryland
UNITED STATES

Dr. Sally Schneider is a National Program Leader at the United States Department of Agriculture. Dr. Schneider is a full time National Program Leader for Horticulture, Pathogens, and Germplasm at the Agricultural Research Service, Beltsville, Maryland, U.S.A. The Agricultural Research Service has an interest in the topics of the Montreal Protocol because they are the in-house research agency for the U.S. Department of Agriculture. Dr. Schneider has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consult for organizations seeking to phaseout ODSs. Dr. Schneider does not work, occasionally or otherwise, as a consultant to UN, UNEP, MLF, Implementing Agencies, Governments, companies, etc. on matters related to the Montreal Protocol. Dr. Schneider does not have a spouse, business partner, social partner, or dependant children living in same home. Travel to MBTOC meetings is paid by United States Department of Agriculture.

Dr. JL (Stappies) Staphorst **Article 5 member**
Recently retired senior soil microbiologist from the Plant Protection Research Institute (PPRI)
Agriculture Research Council (ARC)
Pretoria
SOUTH AFRICA

Dr. Staphorst is presently an advisor to the Plant Pathology and Microbiology Division of the Institute in Pretoria, South Africa. The Plant Protection Research Institute has an interest in the topics of the Montreal Protocol because it houses the specialist Soil-borne Plant Diseases Unit and forms part of the Public Support Services Division that advises the Department of Agriculture on all aspects of plant diseases, pests and pesticides. Dr Staphorst has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does no consulting for organizations seeking to phaseout ODSs. Dr Staphorst works occasionally as a consultant to UNEP on matters related to the Montreal Protocol. His spouse has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does no consulting for organizations seeking to phaseout ODSs. Travel to MBTOC meetings is paid by UNEP with logistical support from the Plant Protection Research Institute.

Mr. Akio Tateya
Technical Adviser
Syngenta Japan K.K.
Tokyo
JAPAN

Mr. Akio Tateya is a Technical Adviser at Syngenta Japan K.K. a pesticide producing company, which does not produce substitutes to methyl bromide. He also a technical adviser for the Japan Fumigation Technology Association, a non-profit body that is financially supported by the Japanese Government and companies producing methyl bromide and its substitutes. He conducts work for Syngenta Japan K.K. on a contract basis for a consultancy fee; he acts as a nominal member and adviser of the Japan Fumigation Technology Association, for which he is not paid. He is also a member of the Japanese delegation attending the Meeting of the Parties and Open-ended Working Groups, acting as technical adviser on matters related to the Protocol. He has been occasionally asked to attend panels or meetings at the Ministry of Agriculture, Forestry and Fisheries. He has no proprietary or any other kind of interest in alternatives or substitutes to ODS, nor does he own any stocks in companies producing either ODS or their alternatives or substitutes and does not work for any organization seeking to phase-out ODS. His spouse and children do not work for organizations with an interest in the Montreal Protocol. Travel expenses to enable attendance to MBTOC meetings and other meetings related to the Montreal Protocol are paid by the Japan Fumigation Technology Association. He receives no funding from the Japanese Government.

Mr. Alejandro Valeiro **Article 5 member**
National Project Coordinator
National Institute for Agriculture and Technology (INTA)
Tucumán
ARGENTINA

Mr. Alejandro Valeiro is the National Coordinator of the PROZONO Project (MLF/UNDP project ARG/02/G61) at the National Institute for Agricultural Technology (INTA) of Argentina, based at the Famaillá INTA´s Experimental Station in Tucumán Province, Argentina. The INTA has an interest in the topics of the Montreal Protocol because it is the national counterpart for implementing MLF methyl bromide phase-out projects, which are coordinated by the National Ozone Unit. Mr Valeiro has no proprietary interest on alternatives or substitutes to ODSs, does not own stock in companies producing ODS or their alternatives or substitutes and does not perform permanent consulting for organizations seeking to phaseout ODSs. He works occasionally as a consultant to the MLF, Implementing Agencies, on matters related to the Montreal Protocol. Mr Valeiro's spouse consults for UNDP, which has an interest in the topics of the Montreal Protocol because it implements MLF projects in Argentina. Neither Mr Valeiro, nor his spouse or dependant children have proprietary interest in ODS or their alternatives or substitutes, and do not own stock in companies producing ODS alternatives or substitutes to ODSs. Travel to MBTOC meetings is paid by UNEP.

Prof Nick Vink **Article 5 member**
University of Stellenbosch
Department of Agricultural Economics
SOUTH AFRICA

Dr. Nick Vink is Chair of the Department of Agricultural Economics at the University of Stellenbosch, South Africa. He is a full time Professor at the University of Stellenbosch. The University has no interest in the topics of the Montreal Protocol. Dr Vink has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consult for organizations seeking to phaseout ODSs. He does not work as a consultant to any organisation on matters related to the Montreal Protocol. Neither his spouse or dependant children work for or consult for any organization which has an interest in the topics of the Montreal Protocol, nor do they have any proprietary interest in alternatives or substitutes to ODSs, or own stock in companies producing ODS or their alternatives or substitutes. Travel to MBTOC meetings is paid by UNEP.

Dr. Janny Vos
CABI, Kastanjelaan 5
3833 AN Leusden
THE NETHERLANDS

Dr. Janny Vos, MBTOC-Soil Member is a senior IPM specialist at CAB International (CABI). Dr Vos is a full time senior manager at the CABI Netherlands office. CABI has an interest in the topics of the Montreal Protocol because it fits with CABI's mission to improve people's lives worldwide and focus on solving problems in agriculture and environment. Dr. Vos has no proprietary interest alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does no consulting for organizations seeking to phaseout ODSs. Dr. Vos works occasionally as a consultant to EC on matters related to the Montreal Protocol. Travel to MBTOC meetings is paid by the Netherlands government.

Mr James Wells
President
Environmental Solutions Group, LLC
Sacramento, California
UNITED STATES

James Wells is the President of Environmental Solutions Group, LLC (ESG), a regulatory consulting firm in Sacramento, California. He was invited to join MBTOC in 1993 primarily because of his experience in pesticide regulatory programs, especially with methyl bromide and methyl bromide alternatives. He worked for the State of California pesticide regulatory program for 27 years and was the Director of the California Department of Pesticide Regulation from 1991 to 1999. Mr. Wells has no proprietary interest in alternatives or substitutes to ODSs and does not own stock in companies producing ODS or alternatives or substitutes to ODSs. He does not consult for organizations seeking to phaseout ODSs. However, ESG consults with several agricultural organizations seeking Critical Use Exemptions for the use of methyl bromide. These organizations are; the California Strawberry Commission (CSC), the California Strawberry Nursery Association (CSNA), the Garden Rose Council (GRC) and the California Association of Garden and Nursery Centers (CANGC). Together with his staff he prepares and submits CUEs for the CSNA, GRC and CANGC to the USEPA. His spouse works for the California Department of Justice, which has no interest in the topics of the Montreal Protocol. She has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consult with organizations seeking to phaseout ODSs. Travel to MBTOC meetings is paid by ESG.

B – MBTOC Quarantine, Structures and Commodities Subcommittee

MBTOC QSC SUBCOMMITTEE					
Names	**Gender**	**Affiliation**	**Expertise**	**Length of service**	**Country**
Co-Chairs					
1. Michelle Marcotte	F	Consultant	Consultant, particularly food processing, regulations, structural and commodity treatments and irradiation	A	Canada Non-A5
Members					
2. Jonathan Banks (Co-Chair Quarantine Task Force)	M	Consultant	Consultant, postharvest, particularly non-chemical and gas technologies (fumigants, CA) and QPS uses of MB. Entomologist (PhD)	A	Australia Non-A5
3. Chris Bell	M	Consultant, formerly Central Science Laboratory (Government research)	Postharvest technologies, particularly fumigants, phosphine; sulfuryl fluoride, controlled atmospheres and heat' (PhD)	A	UK Non-A5
4. Fred Bergwerff	M	Eco2, Netherlands	Fumigator, specialist in non-MB systems, including heat.	D	Netherlands Non-A5
5. Kathy Dalip	F	CARI	Research entomologist (Ph D)	D	Belize A5
6. Ricardo Deang	M	Consultant	Regulatory and registration. Entomologist (PhD)	A	Philippines A5
7. Patrick Ducom	M	Ministère de l'Agriculture (Government research)	Postharvest and structural alternatives	A	France Non-A5
8. Ken Glassey	M	MAFF, New Zealand	Forester, government advisor on MB alternatives in forest products and QPS treatments	D	New Zealand Non-A5
9. Alfredo Gonzalez	M	Fumigator	Phosphine, QPS and non-QPS treatments. Structures, commodities.	D	Philippines A5

MBTOC QSC SUBCOMMITTEE					
Names	**Gender**	**Affiliation**	**Expertise**	**Length of service**	**Country**
10. Darka Hamel	F	Institute for Plant Protection in Agriculture and Forestry (Government)	Postharvest and structural treatments, regulations	C	Croatia CEIT
11. Takashi Misumi	M	MAFF (Government research)	QPS expert	D	Japan Non-A5
12. David Okioga	M	Ministry of Environment and Natural Resources (Government regulatory)	Postharvest and QPS MB alternatives (PhD)	A	Kenya A5
13. Christoph Reichmuth	M	JKLGermany (Government research)	Director Institute for Ecochemistry, Plant Analysis and Stored Product Protection (PhD)	B	Germany Non-A5
14. Jordi Riudavets	M	IRTA-Department of Plant Protection. (Government Research)	IPM for stored products and horticultural crops (PhD)	C	Spain Non-A5
15. John Sansone	M	SCC Products (Fumigator)	Fumigator, particular expertise in structures	A	USA Non-A5
16. Robert Taylor	M	Consultant	Postharvest technology, specifically A5 uses	A	UK Non-A5
17. Ken Vick	M	United States Department of Agriculture (Government research)	Research in MB alternatives, incl. QPS. Entomologist (PhD)	A	USA Non-A5
18. Chris Watson	M	IGROX Ltd (Fumigator)	Practical use of MB and alternatives including the use of phosphine, Sulfuryl Fluoride,CO2 and Heat Treatments for commodities(inc timber) and structures	A	UK Non-A5
19. Eduardo Willink	M	Ministry of Agriculture	Quarantine entomologist (Ph D)	D	Argentina A5
Totals	M =16 F =3		A= 8 B= 3 C = 2 D= 6		CEIT & A5=7 Non-A5=12

A - >10 years
B – 5-10
C – 2-5
D - <2 year

Co-chair

Ms Michelle Marcotte MBTOC Co-Chair Quarantine, Structures and Commodities
Marcotte Consulting Inc.
(Marcotte Consulting Inc is a Canadian corporation; its President, Michelle Marcotte, is located at:
10104 East Franklin Ave.
Glenn Dale, Maryland USA 20769

Ms Michelle Marcotte was a member of the 1992 Methyl Bromide Assessment and subsequently a member of the Methyl Bromide Technical Options Committee between 1992 and 2005; she was confirmed as Co-Chair in 2005. Until 1993 she worked for MDS Nordion, a supplier of radiation processing equipment which is an alternative to the use of methyl bromide in some commodity and quarantine situations. Since then, Ms Marcotte, through Marcotte Consulting, has provided consulting services to governments and agri-food companies in eight countries on agri-environmental issues, food technology, regulatory affairs and radiation processing. Marcotte Consulting has an interest in the topics of the Montreal Protocol because of its long time market development work in food irradiation, an alternative to some methyl bromide uses, and because of its interest in food processing, food safety and trade. In the field of methyl bromide alternatives, Ms Marcotte has published case studies for pest control in food processing, for stored commodities, for alternatives for quarantine and for greenhouse use. She is a member of the Canada Industry-Government Methyl Bromide Working Group and the Canada-USA Methyl Bromide Working Group; both organizations work to achieve phase out of methyl bromide in the agri-food sector. Marcotte has consulted to companies, industry associations, the International Atomic Energy Agency and USAID on irradiation as a methyl bromide alternative in food processing, quarantine and trade. She has also prepared consulting reports summarizing research in methyl bromide alternatives and case studies on food processing for US Environmental Protection Agency. Ms Marcotte has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs. Ms Marcotte's spouse works for United States Department of Agriculture managing research in methyl bromide alternatives and is a member of MBTOC. He does not have proprietary interest in alternatives or substitutes to ODS and does not own stock in companies producing ODS or alternatives or substitutes to ODSs. Marcotte receives a consulting contract from Government of Canada, Environment Canada, a Party to the Montreal Protocol that is committed to the phase out of methyl bromide. Ms Marcotte pays for travel to TEAP, MBTOC and Montreal Protocol meetings out of consultancy funds provided by the Canadian government, Environment Canada, to support her work on MBTOC.

Members

Dr Jonathan Banks, Co-Chair Quarantine Task Force
10 Beltana Road
Pialligo
Canberra ACT
AUSTRALIA

Dr. Jonathan Banks, Chair of TEAP's QPS Task Force, is a private consultant. He was a member of the 1992 Methyl Bromide Assessment and from 1993 to 1998 and 2001 to 2005 co-chaired the Methyl Bromide TOC. He worked as a Research Scientist with the Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) from1972 to 1999 on

grain storage technologies, including use of improved use of fumigants. He is coinventor of carbonyl sulfide, an alternative fumigant to methyl bromide in some applications. Patent rights have been assigned to his employer, CSIRO. Dr Banks has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs. He has stock in Brambles Ltd, a company that *inter alia* leases wooden pallets for freight. The pallets may or may not be treated with methyl bromide or alternatives. His spouse is co-owner of their commercial organic apple orchard. She has no financial interests relating to ozone-depleting substances. He has served on some national committees concerned with ODS and their control, and within the last 4 years has received contracts from UNEP, and other institutions and public companies related to methyl bromide alternatives and grain storage technology--including training in fumigation (methyl bromide and alternatives) and fumigation technology and recapture systems for methyl bromide. In 2005 and 2006 he received some support from UNEP for TEAP and MBTOC activities. Other funding for his MBTOC activities has been through grants or contracts from the Department of Environment and Heritage, Australia or from personal contributions.

Dr Chris Bell
Consultant, Formerly Central Science Library
Sand Hutton
York Y041 ILZ
UNITED KINGDOM

Dr. Christopher Hugh Bell, is a Fellow at the Central Science Laboratory (CSL), Department of Environment, Food and Rural Affairs, at York, UK, where he led research into fumigation technology, including studies on methyl bromide and potential alternatives which were sponsored by UK government agencies and private companies, until his retirement in 2004. He is also a Regional Editor for the Journal of Stored Products Research for Europe and Africa, an Elsevier journal publishing original research addressing problems encountered in the storage of durable commodities. Dr. Bell has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs, and does not represent organizations seeking to phase out ODSs. He works occasionally as a consultant to governments and companies on matters related to methyl bromide use or replacement, or the Montreal Protocol. Travel and subsistence to attend MBTOC meetings has been paid by the UK Department of Environment, Food and Rural Affairs (DEFRA), or by UNEP.

Fred Bergweff
CEO
EcO2 BV
James Wattstraat 6,
3281 NK
Numansdorp, The Netherlands

Mr Fred Bergwerff is the General Manager for ECO2 B.V., a company that provides disinfestation services through controlled atmospheres technology and equipment, and related consulting services. He is employed in a full time capacity with responsibilities for joint-venture partnerships, technical assistance, training and promotion of good practices in the structural, commodity, quarantine and port disinfestation industries, particularly specialising in QPS and ISPM-15 treatments. ECO2 does not have a commercial relationship with any fumigant or pesticide manufacturers/registrants. ECO2 has been involved in research trials on MB alternatives and has assisted companies to adopt MB alternatives for structures, stored commodities and pre-shipment and quarantine treatments. ECO2 has an interest in the topics of the Montreal Protocol because of its expertise in disinfestation and pest control, particularly

non-chemical treatments. Other than controlled atmospheres and the company ECO2 BV, Mr Bergwerff and his business partners in ECO2 have no proprietary interest in ODS or other alternatives to ODS, and do not own stock in companies that manufacture ODS or other alternatives to ODS. He carries out consulting work for organizations and companies that are seeking to phaseout ODS. Mr Bergwerff's wife owns shares in ECO2, has no proprietary interest in ODS or other alternatives to ODS, and does not own stock in companies manufacturing ODS or other alternatives to ODS. Travel to MBTOC meetings is paid by ECO2, which receives no contribution for this travel from any other company or organisation.

Dr Kathy M. Dalip **Article 5 member**

Entomologist
CARDI Belize
Central Farm, Western Highway
Cayo District
Belize, Central America
Mailing address: P.O. Box 2. Belmopan City
Belize

Dr. Kathy M Dalip is an Entomologist at the Caribbean Agriculture Research and Development Institute (CARDI), which has headquarters in Trinidad and offices in twelve member countries. Kathy works full-time at the CARDI Belize Unit, Central Farm, Western Highway, Cayo District, Belize, Central America. Between 2000 and 2005, Kathy was stationed at the CARDI Jamaica Unit where she was a member of the Jamaica Methyl Bromide Working Group. Her work at CARDI is focused in the areas of integrated pest management (IPM) and organic agriculture. Hence, her emphasis is on finding non-chemical pest control options to improve production and economic feasibility for farmers. Kathy has no proprietary interest alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and has not done consulting for organizations seeking to phaseout ODSs. Travel to MBTOC meetings is paid by for by the Ozone Secretariat of UNEP.

Dr Ricardo T Deang **Article 5 member**

4 Istanbul Street
Merville Park
Parañaque, Metro Manila
THE PHILIPPINES

Dr Ricardo Deang is a retired Deputy Administrator for Pesticides of the Fertilizer and Pesticide Authority (FPA) – a government regulatory office for fertilizers and pesticides – since April 1996. He was responsible for registration, restriction, and banning of pesticides when imminent hazards are posed; and certification of pesticide applicators and fumigators. FPA has an interest in the topics of the Montreal Protocol because the Philippines is a signatory to the Montreal Protocol and the office restricts/monitors methyl bromide importation and use. Prior to this position Mr. Deang worked as a research entomologist on biological control. Currently Mr Deang is Chairman of the Board of a consultancy firm, Management and Executive Network, Inc. He has no proprietary interest on alternatives or substitute to ODSs, does not own stock in companies producing ODSs or alternatives or substitutes to ODSs and does not engage in consulting for organizations seeking to phase out ODSs. His wife and their children have no proprietary interest on alternatives or substitutes to ODSs, do not own stock in companies producing ODSs or alternatives or substitutes to ODSs and do not engage in consulting for organizations seeking to phase out ODSs. They have no interest in the topics of the Montreal Protocol. Travel to MBTOC meetings is paid by UNEP.

Dr. Patrick Ducom
Ministère de l'Agriculture
LNDS - QUALIS
71, avenue Edouard Bourleau - BP 71
33883 VILLENAVE D'ORNON CEDEX

Jacques François Patrick Ducom, Agronomy Engineer, is a long standing MBTOC member and head of the Laboratoire National Denrées Stockées (LNDS), Plant Protection Service, Ministry of Agriculture, France. Dr Ducom is a full time researcher in fumigation LNDS. He works occasionally as a consultant for Implementing Agencies of the Multilateral Fund on matters related to the Montreal Protocol. Dr Ducom has no proprietary interest on alternatives or substitute to ODSs, does not own stock in companies producing ODSs or alternatives or substitutes to ODSs and does not engage in consulting for organizations seeking to phase out ODSs. Travel to MBTOC meetings is paid from the LNDS budget

Mr Kenneth Glassey
Senior Advisor Operational Standards Biosecurity New Zealand
Ministry of Agriculture and Forestry
Pastoral House, 24 The Terrace
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Wellington, New Zealand

Mr Kenneth Logan Glassey is a Senior Biosecurity Adviser at the Ministry of Agriculture and Forestry (MAF). Ken Glassey is a full time adviser on Phytosanitary Treatments and Treatment Operators at the Ministry of Agriculture and Forestry Head Office, Wellington, New Zealand. MAF has an interest in the topics of the Montreal Protocol because quarantine and preshipment treatments uses a significant amount of methyl bromide (218 tonnes in 2004). Current responsibilities cover researching, developing and reviewing New Zealand's import standards including operational standards such as treatments for imported commodities. This also involves monitoring quality and adequacy, initiating remedial action as necessary, and the provision of advice on the practical application and implications of such standards. Mr Glassey has been involved in QPS inspection and treatments for 20 years with particular expertise with forest produce, and worked in forest management for 11 years prior to that. Mr Glassey has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consult for organizations seeking to phaseout ODSs. He does not work as a consultant to implementing agencies on matters related to the Montreal Protocol. Mr Glassey's partner living in same home does not work for or consults for any organization which has an interest in the topics of the Montreal Protocol. She has no proprietary interest alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consult for organizations seeking to phaseout ODSs. Travel to TEAP/TOC/TSB meetings is paid by MAF.

Mr Alfredo T. Gonzalez **Article 5 Member**
President
Pestcon Pest Management and General Services
33 Evening News, West Triangle
Quezon City
THE PHILIPPINES

Mr Gonzalez is president of Pestcon Pest Management and General Services, a company with an interest in the Montreal Protocol because it uses methyl bromide in the for Quarantine and pre-shipment treatments as well as ISPM 15 treatments for wood packaging materials. Mr Gonzalez, has no proprietary interest in alternatives or substitutes to ODSs, and does not own stock in companies producing ODS or alternatives or substitutes to ODSs. Presently he is the general consultant for the implementation of the Methyl Bromide Phase-out program in the Philippines for the Government of his country, under the Department of Natural Resources-Philippine Ozone Desk (DENR-POD) in cooperation with the Fertilizer and Pesticide Authority (FPA), which is directly related to the Montreal Protocol. Neither Mr Gonzalez's wife or their children have any proprietary interest in alternatives or substitutes in ODSs. Expenses related to Mr Gonzalez's attendance to MBTOC meetings are paid by UNEP.

Dr Darka Hamel **Article 5 member**
Institute for Plant Protection in Agriculture and Forestry of Republic Croatia
Rim 98, 10000 Zagreb
CROATIA

Dr. Darka Hamel is an entomologist responsible the protection of stored products. Dr Hamel is a full time executive manager at the Institute for Plant Protection in Agriculture and Forestry of the Republic Croatia (PPI). The PPI has an interest in the topics of the Montreal Protocol because companies using methyl bromide for treatment in accordance with ISPM 15 are authorized to do so in accordance with the PPI recommendation. Dr. Hamel has no proprietary interest alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consulting for organizations seeking to phaseout ODSs. Dr. Hamel works occasionally as a consultant to the Croatian Ministry of Agriculture, Fisheries and Rural Development or the Ministry for Environmental Protection and Physical Planning regarding legislation on matters related to the Montreal Protocol. Travel to MBTOC meetings is paid by UNEP.

Mr Takashi Misumi
Ministry of Agriculture, Forestry and Fisheries MAFF, Japan
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Yokohama, 231-0801
JAPAN

Mr. Takashi Misumi, member of MBTOC since 2005 is a senior researcher at the Yokohama Plant Protection Station (YPPS). Mr. Misumi is a full time Researcher at the Quarantine Disinfestation Technology Section, Research Division of YPPS. He has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consult for organizations seeking to phaseout ODSs. Neither his spouse nor their children work for organizations with has an interest in the topics of the Montreal Protocol. Expenses related to the attendance of MBTOC meetings are paid by International department of MAFF.

Dr David M Okioga **Article 5 member**
Coordinator, Kenya Ozone Office, National Environment Management Office
Ministry of the Environment and National Resources
PO Box 67839
Nairobi
KENYA

Dr. David Okioga is a founding member of MBTOC, joining in 1992. He was MBTOC co-chair between 1997 and 2002. Dr Okioga was the Director, National Plant Quarantine Services of Kenya for sixteen years. He also served as the Coordinator in Agricultural Botany under the Kenya Agricultural Research Institute, Secretary to the Ministry of Agriculture on Plant Breeder's Rights, Member of the National Agricultural Research Centre, National Horticultural Research Centre, National Potato Research Centre, and the National Committee for the National Genebank. Dr. Okioga has undertaken a number of contracts from the African Unity (then Organization of the African Unity), FAO and UNEP. Some of these consultancies were related to crop protection, where methyl bromide was considered as the chemical of choice for soil fumigation, whereas others were on strengthening the Montreal Protocol policies on ODS phase out in the African region (including methyl bromide). In 1995, Dr. Okioga was appointed Coordinator, of the National Ozone Unit (NOU) of Kenya by the Ministry of Environment and Natural Resources, Kenya, in consultation with UNDP, a post that he still holds at present. Dr. Okioga's main responsibility is strengthening the government of Kenya in meeting the requirements of the Montreal Protocol and in phasing out of ODS in the country.Dr. Okioga has no proprietary interests in alternatives for ODS and does not consult for companies seeking to phase out ODS. Travel and expenses related to his attendance to MBTOC meetings are paid by UNEP.

Dr. Jordi Ruidavets
IRTACrop Protection
Carretera a Cabrils Km. 2
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SPAIN

Dr. Jordi Riudavets is a Researcher at the Institute for Agrifood Research and Technology (IRTA) of Spain. He is a full time entomologist at the Crop Protection Division, with experience in the development and transfer of integrated pest management (IPM) programs for stored products and horticultural crops. The IRTA has an interest in the topics of the Montreal Protocol because is a state-owned company of the Catalan Government, and its activities are concerned with scientific research and technology transfer in the areas of agriculture,

aquaculture and the agrifood industry. Dr. Riudavets has no proprietary interest alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consult for organizations seeking to phaseout ODSs. He occasionally works as a consultant to the Spanish Government, food companies, pest control companies and private companies with interest in matters related to the Montreal Protocol. Travel to MBTOC meetings is paid by the Spanish Ministry of the Environment.

Prof. Dr. Christoph Reichmuth
Federal Biological Research Centre for Agriculture and Forestry
Institute for Stored product Protection
Koenigin-Luise-St.19
D-14195 Berlin
GERMANY

Prof. Dr. Christoph Reichmuth is chemist and responsible for stored product protection. Dr Reichmuth is a full time director of the Institute for Stored Product Protection of the Federal Biological Research Centre for Agriculture and Forestry in Berlin, Germany, of the German Ministry for Nutrition, Agriculture and Consumer Protection, Germany.
The Federal Ministry for Nutrition, Agriculture and Consumer Protection together with the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety has a pronounced interest to replace methyl bromide as quickly as possible, due to the strongly expressed political interest and public opinion in Germany. Dr Reichmuth has no proprietary interest, patent for production of phosphine from magnesium phosphide in a generator with the company Degesch Detia, Germany, patent for the treatment of stored products and organic materials (wood) with inert atmospheres with the company Buse, Germany, patent for pheromone traps for Lepidopteran pests with the Max-Planck-Society, Germany, at present there are no royalties paid from the patents to Dr Reichmuth. He gave and gives advice to private companies in Germany to obtain critical use exemptions for methyl bromide in helping to understand the English forms of UNEP/TEAP, he works occasionally as a consultant to UNIDO, supporting projects or parties to replace methyl bromide. Travel to MBTOC meetings or related meetings concerning the phaseout of methyl bromide are paid by the German Ministry for Nutrition, Agriculture and Consumer Protection or by the German Ministry for the Environment, Nature Conservation and Nuclear Safety.

Mr John Sansone
SCC Products
2641 W. Woodland
Anaheim, CA 92801
UNITE D STATES

Mr John Sansone is the President and General Manager for SCC Products. He is employed in a full time capacity with responsibilities for sales, training, stewardship and as a consultant for end users in the residential, commodity, quarantine and port fumigation industries. SCC Products has a commercial relationship with several fumigant/pesticide manufacturers/registrants, some of which offer products which are considered alternatives to MB. SCC Products has been involved in research trials in the food processing and stored commodities sectors. The firm was instrumental in the transition to alternatives for the residential fumigation marketplace and currently is transitioning alternatives into the commodity fumigation market. It is also involved in the implementation of recapture equipment for commodity fumigation companies in California. SCC Products has an interest in the topics of the Montreal Protocol because of its relationship and expertise in many fumigation areas. Mr Sansone has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not

consult for organizations seeking to phaseout ODSs. He does not work as a consultant to the UN, UNEP, MLF, Implementing Agencies, Governments, companies, etc. on matters related to the Montreal Protocol. Mr Sansone has no relatives or business partners that work for or consult for any organization with an interest in the topics of the Montreal Protocol nor does he have relatives or business partner having a proprietary interests in alternatives or substitutes to ODSs, or who own stock in companies producing ODS or alternatives or substitutes to ODSs or consult for organizations seeking to phaseout ODSs. Travel to MBTOC meetings is paid by SCC Products, which receives no contribution for this travel from anyone.

Mr. Robert Taylor
Consultant
27 Lancet Lane
Loose, Maidstone, Kent ME15 9SA
UNITED KINGDOM

Mr Robert Taylor retired from the Natural Resources Institute (NRI) of the United Kingdom in 2001. The NRI was a government establishment involved in biological/agricultural research, development and training, primarily in relation to developing countries. In recent years the NRI has become part of the University of Greenwich. Crop protection in both the pre- and post-harvest stages has always been a major feature of NRI's research and development programmes. Pest management, including the use of fumigants, has always features strongly in such programmes. Mr Taylor has no proprietary interest in alternatives or substitutes to methyl bromide and does not own stock in companies consulting for organizations seeking to phase out the chemical. He works occasionally as a consultant to UN agencies including UNIDO and UNEP on matters relating to the Montreal Protocol. Mr Taylor has no relatives or business partners who work or consult for organizations which have an interest in the topics of the Montreal Protocol, nor does he have relatives or business partners having proprietary interests in alternatives or substitutes to methyl bromide, or who own stock in companies producing alternatives or substitutes to methyl bromide, or who consult for companies seeking to phase out methyl bromide. Travel and subsistence for MBTOC meetings is paid for by the UK government and most recently by the Department for the Environment Farming and Rural Affairs and UNEP.

Dr Ken Vick
Department of Agriculture
Agricultural Research Service/ National Program Staff
5601 Sunnyside Ave
Beltsville MD 20705 – 5139
UNITED STATES

Dr Kenneth W. Vick is a Senior National Program Leader for methyl bromide alternatives research at the Agricultural Research Service (ARS), United States Department of Agriculture (USDA). As National Program Leader he helps lead the almost $20 million ARS research program to develop alternatives to the use of methyl bromide for soil and post-harvest applications. ARS has an interest in the topics of the Montreal Protocol because it was assigned lead responsibility for developing alternatives as the primary research arm of the USDA and because it was deemed to be of high priority by the United States Government. Dr Vick has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consult for any organization. His spouse, a MBTOC co-chair, consults for governments, NGOs and companies that have an interest in the phase out of methyl bromide because they are Parties to the Protocol or because they are investigating or developing food irradiation a methyl bromide alternative for some

commodities and in some quarantine situation. She has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does consult for organizations seeking to phaseout ODSs. Dr Vick's travel to MBTOC and Montreal Protocol meetings is paid by the USDA Agriculture Research Service.

Mr Chris Watson
IGROX Ltd
White Hall, Worlingworth
Woolbridge, Suffolk, IP13 7HW
UNITED KINGDOM

Mr.Christopher Russell Watson is a MBTOC member since 1992. He works for Igrox Ltd in the UK as Chairman a part-time position since he is presently semi-retired. Mr Watson has been involved in the fumigation industry using both methyl bromide and other fumigants for 40 years. Together with his wife he formed Igrox Ltd in 1976, which is now one of the largest fumigation and pest control servicing companies in the UK. For the past 20 years he has been involved in working closely with government agencies in the UK to develop safe and efficient fumigation practices and procedures. Igrox Ltd has an interest in the topics of the Montreal Protocol because it supplies services and products that are alternatives to methyl bromide, as well as continuing to provide services using methyl bromide in situations where it is still necessary. Mr Watson owns stock in Igrox Ltd, and occasionally carries out consultancy work for agencies seeking to phase out ODS's which have included the UK government agencies as well as private companies. His spouse doesn't not own stocks in Igrox Ltd and has no proprietary interests in alternatives or substitutes for ODS's and does not consult for companies seeking to phase out ODS's. Travel to MBTOC meetings was subsidised by Igrox Ltd and the British Pest Control Association until 2005. Presently, Mr Watson covers travel expenses from his own personal funds with some assistance from the UK Government(DEFRA)

Mr Eduardo Willink **Article 5 member**
Estación Experimental Agroindustrial Obispo Colombrés
William Cross 3150, Las Talitas,
4101 Tucumán
ARGENTINA

Mr Eduardo Willink is Director of Special Disciplines and Head of the Agricultural Zoology Department of the Estación Experimental Agroindustrial Obispo Colombrés Tucumán, Argentina. He is a full time researcher in entomology who leads a team of researchers working on quarantine treatments, systems approach and pest host status, and is a member of the Technical Panel on Phytosanitary Treatments within IPPC, FAO. The organization has an interest in the topics of the Montreal Protocol because its mission is to resolve regional agro industrial problems with the least impact on the environment. Mr Willink has no proprietary interest in alternatives or substitutes to ODSs, does not own stock in companies producing ODS or alternatives or substitutes to ODSs and does not consulting for organizations seeking to phaseout ODSs. Neither his spouse or dependant children work for or consult for organizations with an interest in the topics of the Montreal Protocol, nor do they have any proprietary interest in alternatives or substitutes to ODSs, own stock in companies producing ODS or their alternatives or substitutes or consult for organizations seeking to phaseout ODSs. Travel to TOC is paid by UNEP.