

Australia's Critical Uses of Methyl Bromide

Introduction

This document has been prepared in response to Montreal Protocol decisions that request Australia to submit a national management strategy that describes how Australia will continue to progress its phase out of critical uses of methyl bromide.

Paragraph 3 of Decision Ex.I/4 of the Montreal Protocol decided:

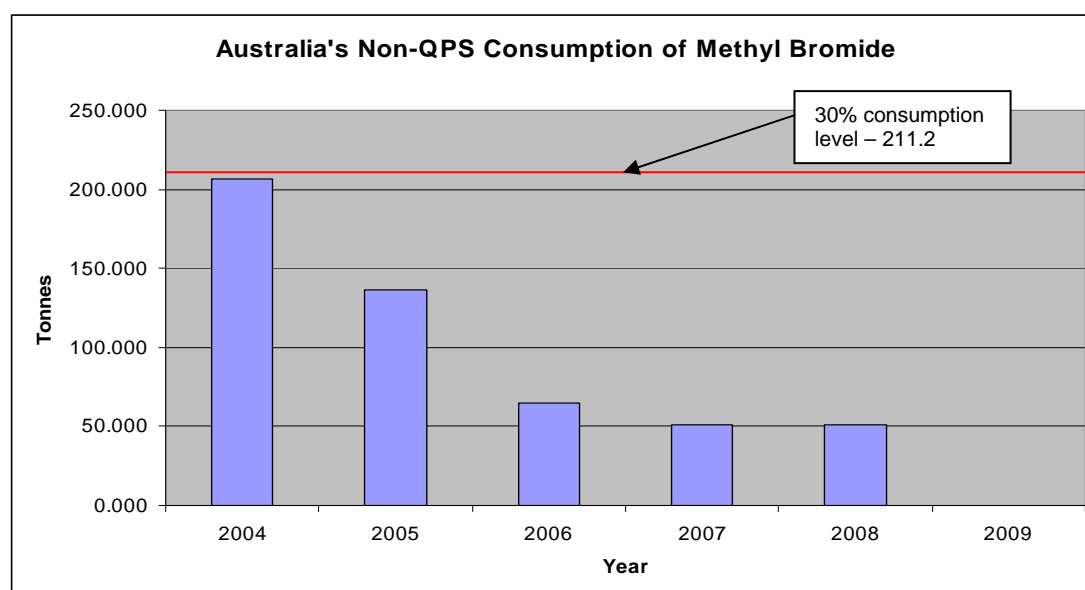
“To request each Party that makes a critical use nomination after 2005 to submit a national management strategy for phase-out of critical uses of methyl bromide to the Ozone Secretariat before 1 February 2006.”

In 2005 Australia had eight critical use exemptions for methyl bromide for four industries:

- the strawberry runner grower industry
- the cut flower industry
- the almond industry *and*
- the rice industry.

Applications submitted in 2006, for 2007 and 2008 critical use exemptions, have reduced to just three uses, the rice industry, cut flower industry and strawberry runner growers. As all other uses are planned to cease within 2005 and 2006, this strategy will detail the mechanisms that have been put in place by these industries to ensure that an orderly transition to methyl bromide alternatives can be achieved as soon as possible.

The strategy will also outline our approach for dealing with any proposed new critical use nominations of methyl bromide.



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¹ Proposed methyl bromide amounts (10.425 metric tonnes in 2007 and 51.1 metric tonnes in 2008) indicative only and have not been approved by the Meeting of the Parties to the Montreal Protocol.

Future methyl bromide critical uses

Australia's imports of methyl bromide for critical use exemptions after 2004 will gradually reduce, with the aim of zero imports by 2010 or earlier. This is consistent with current strategies being employed by Australia's existing critical use exemption holders to identify and transition to alternatives before 2010.

However, Australia is aware that certain industries in a small number of locations are having trouble identifying appropriate alternatives to methyl bromide, and are currently fumigating with methyl bromide purchased prior to 2005 to continue their business activities until such time as they can identify a suitable alternative. To date these industries, which include some turf growers (where methyl bromide is used for soil fumigation) and some flourmills (where methyl bromide is used as a post-harvest treatment), have not applied for a critical use exemption.

Australia may make future applications for methyl bromide critical use exemptions, however these applications would only be made on an increasingly exceptional basis. In addition to the application being consistent with all Montreal Protocol requirements for a critical use exemption, Australia would only forward nominations to the Montreal Protocol if the application was consistent with the following guiding principles.

Principles

Australia should continue to consider applications for critical use exemptions only where the lack of methyl bromide will result in a significant market disruption and it can be scientifically demonstrated that there is no technically or economically feasible alternative to match the circumstances of that applicant.

Amounts of methyl bromide for existing critical use exemption holders should continue to decrease as individual users make the transition to alternatives.

Australia will only consider submitting a new critical use exemption for methyl bromide where:

- the use complies with all the criteria for a critical use exemption under the Montreal Protocol *and*
- a critical use nomination had not been submitted previously because the applicant had been using methyl bromide purchased prior to 2005.

New uses of methyl bromide – even if they may reach the methyl bromide critical use exemption requirements – will ordinarily not be considered for a critical use nomination.

Current regulations for the supply and use of methyl bromide

With the exemptions to the phase out of methyl bromide restricted to critical uses, quarantine and pre-shipment and feedstock uses, regulations have been introduced under the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* (the Act) to ensure that methyl bromide imported into Australia is only sold and used for approved purposes.

The *Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995* (the regulations) which came into force on 1 January 2005, introduced record keeping and/or reporting obligations for anyone selling and using methyl bromide. The regulations make it an offence to illegally supply or use of methyl bromide.

These regulations provide a comprehensive system for managing methyl bromide in Australia. They ensure that methyl bromide that is imported for non-quarantine and pre-shipment (non-QPS) uses is used for that authorised purpose. The extensive reporting procedures put in place ensure that if methyl bromide that is imported for quarantine and pre-shipment (QPS) is used for another purpose, then this can be detected and appropriate action taken.

In relation to *supplying* methyl bromide:

- Individual growers, who are part of a critical use exemption, nominate a supplier from whom they will purchase methyl bromide for that year. This list of growers, their addresses, nominated suppliers and maximum allocated quantities is specified in the *Exemption List for Non-QPS Applications of Methyl Bromide* in the regulations. This list cannot be changed without changing the regulations.
- A person may *only sell* non-QPS methyl bromide to growers who have nominated that person as a supplier as per the *Exemption List for Non-QPS Applications of Methyl Bromide*. It is an offence for a supplier to sell non-QPS methyl bromide to anyone who hasn't nominated him or her as a supplier, or to sell the grower more than his or her allocated quantity in an exemption year.
- Purchasers and suppliers must complete a record of the sale, which must be kept for five years. Amongst other things, the record includes:
 - o how much methyl bromide has been sold and its intended use (eg a critical use exemption)
 - o a signed declaration from the purchaser that they understand and will abide by the restrictions and obligations relating to the use of the methyl bromide *and*
 - o a signed declaration from the supplier that they understand and will abide by the restrictions and obligations relating to the supply of methyl bromide.
- Suppliers of methyl bromide must report to the Australian Government at the end of each quarter the details of every sale of methyl bromide.
- Anyone who purchases methyl bromide in 2005 must report to the Australian Government any stockpile they possessed immediately prior to their first purchase in 2005.

In relation to *using* methyl bromide:

- Anyone who uses methyl bromide must keep a record of the details of every use. The records must be kept for 5 years.
- Individual growers who have a critical use exemption must report bi-annually the details of every use of methyl bromide under their exemption. If a contracted fumigator performs the treatments, the contractor must sign the report verifying the details are correct.

Anyone who supplies or uses methyl bromide may be audited and must make their records and stockpiles available to inspectors appointed under the Act.

Any breach of these provisions may result in a penalty of up to \$1100 for an individual and up to \$5500 for a corporation, for each offence. All offences are strict liability, meaning that the prosecution is not required to prove that the accused committed the offence intentionally, recklessly or negligently, but that the accused may show that they made a reasonable mistake of fact in committing the action.

Supply chain arrangements have been included in the regulations to ensure that approved critical use exemption amounts only reach growers covered by those exemptions. The supply chain – from importer to farmer – was established through a ‘bottom up’ nomination process:

1. Industry groups granted a critical use exemption provide a list of individual growers covered by the exemption and their maximum allocation of methyl bromide for the exemption year.
2. The individual growers nominate the supplier(s) from whom they will purchase their non-QPS quota during the exemption year. If more than one supplier is nominated, the grower allocates the percentage of their amount they will purchase from each nominated supplier.
3. Nominated suppliers confirm they will supply those growers and nominate from whom they intend to purchase those quantities of non-QPS methyl bromide from. The next level of nominated suppliers, in turn, nominates their respective supplier(s) and the process continues up the supply chain until an importer is nominated.
4. The nominated importers confirm that they will supply non-QPS methyl bromide to those suppliers, or directly to growers where applicable.
5. Once the full supply chain has been identified, the regulations are amended to provide for the publishing of two lists:
 - The *Exemption List of Non-QPS Applications of Methyl Bromide*, which lists the exemption categories, the individual growers covered by each category, their address, nominated supplier(s) and maximum non-QPS quota.
 - The *Intermediate Supplier List for Non-QPS Applications of Methyl Bromide*, which lists nominated suppliers and their ‘intermediate suppliers’, where a nominated supplier has nominated a supplier that is not an importer to sell them non-QPS methyl bromide.
6. The conditions of the nominated importer’s licences, which are granted under the Act, are then amended to specify who they may sell non-QPS methyl bromide to and in what amounts during the exemption year. The regulations provide that importers must comply with their import licence as to whom they may sell non-QPS stocks of methyl bromide.

As noted above, under the regulations it is an offence for a supplier to sell non-QPS methyl bromide to anyone who has not nominated them as their supplier. Under the Act it is an offence for an importer to breach a condition of their licence.

The reporting aspects of the regulations by suppliers and critical use exemption holders allow the Australian Government to monitor compliance with the supply chain by suppliers.

Through monitoring sales and use of methyl bromide and the introduction of strict liability penalties as a deterrent for non-compliance, the Australian Government is able to ensure that non-QPS quantities imported into Australia are only sold to approved persons. Further, mandatory reporting of available stockpiles enables the Australian Government to take these amounts into consideration when allocating methyl bromide quantities for critical uses in future years. This ensures that existing stockpiles of methyl bromide are used before further quantities are approved.

The Australian Government recognises that demand may decrease between the time exemptions are granted and when the methyl bromide is used. The government will reduce allocations where a lower demand is demonstrated, notwithstanding the greater quantity approved by the parties to the Montreal Protocol. As an example, trials of barrier films are being conducted in the strawberry runner industry through 2005 and 2006. Allocations to growers may be reduced in 2007 if the barrier films prove technically and economically feasible. Alternative fumigants may also start to be available in 2007 following field trials and registration processes.

Planned phase-out for Australia's existing critical uses of methyl bromide

Strawberry runner growers

Strawberry runner growers use methyl bromide as a soil fumigant. This minimises the risk of pest infestations and disease because methyl bromide creates a partially sterile soil matrix. Pests, weeds and pathogens in the soil are reduced to a very low level. Without this treatment, pest, weed and disease infestations can cause significant production and quality losses in fruit production.

The strawberry runner industry supplies planting material to fruit growers across Australia. Soil fumigation with methyl bromide is an important part of an overall industry strategy which is designed to maintain the health status of runners.

Current consumption levels

Australia currently has 37.5MT of methyl bromide exempted available for growing strawberry runners in Queensland, Victoria and Tasmania in 2006. It is likely that not all of this amount will be allocated or used as the specific circumstances of some growers has allowed adoption of alternatives, despite the technical and economic difficulties experienced more generally in the industry.

Why is its use considered essential?

Methyl bromide is used to fumigate soil prior to planting strawberry runners to minimise risks of infestation of pests, pathogens and weeds. This results in a healthier, more vigorous product, and minimises the risk that strawberry runner plants transfer soil diseases and pests to other fruit growing regions in Australia. Methyl bromide is not mandated as a fumigant, but it is the only fumigant that is currently proven to provide an adequate level of protection.

At this stage, while strawberry runner growers have identified a number of possible alternatives to the use of methyl bromide, some technical application problems are yet to be overcome and are the subject of current research. Continued access to methyl bromide will be necessary while the strawberry runner industry continues to investigate, research and develop alternatives to the use of methyl bromide to resolve these problems.

What actions have methyl bromide users undertaken to minimise emissions?

Two activities were commissioned at the end of 2004 to investigate new technologies that could result in reduced methyl bromide application and emission rates:

- (1) testing virtually impermeable films (VIF), including the feasibility of gluing technologies for sealing films, and fumigating soil at a reduced rate of methyl bromide (200kg/ha) *and*
- (2) a technical and economic evaluation of replacing part of the strawberry runner production system with soil-less systems.

The Australian Government is continuing to encourage the strawberry runner industry to examine non-chemical alternatives to the use of methyl bromide. This has included seeking information from the United Kingdom on mist bed propagation. This production system is soil free, precluding the need for soil fumigation. At this stage investigations are still very preliminary, but in the longer term could fully negate the need for any soil fumigation.

The Australian Government is continuing to encourage runner growers to investigate the feasibility of using barrier film technologies to reduce methyl bromide application rates for runner production.

Research on VIF commenced in the first quarter 2005 with first data on gluing technology available from mid 2005. Further trials will be conducted in 2006. Assuming that technical and economic feasibility can be established, commercial use of VIF would be expected to commence in mid-2007.

Australia has conducted preliminary trials with VIF. Early data from these trials indicate that VIF has not reduced methyl bromide emissions in comparison to low-density polyethylene (LDPE) sheeting, with a cost of up to five to six times that of LDPE sheeting.

Demonstrating technical and economic feasibility for VIF will require the Australian industry to overcome some barriers that currently prevent widespread adoption of this technology. Long supply lines and low demand (both currently and potentially) make this technology relatively expensive in comparison to the more traditional low-density polyethylene (LDPE) film. Low demand restricts the availability of this technology in the configuration required for Australian application rigs. Consultations with importers have also indicated that the amounts that could be imported economically would far exceed the amount for Australian strawberry runner growers, with a significant risk that large amounts of stock would not be able to be sold.

What alternatives are planned?

Australia is engaged in a national programme to identify alternative soil treatments to methyl bromide. This programme has tested more than 20 alternatives to methyl bromide. These include telone, telone C35, chloropicrin, metham sodium, and dazomet which are all currently available as soil fumigants in Australia. A number of non-fumigant treatments (bio-fumigants, steam, hot water and solarisation) have also been tested. Australian research programmes will also continue to investigate possible new soil fumigants, as permits allow, including methyl iodide and ethanedinitrile (cyanogen).

Research to date shows that telone C 35, methyl iodide and ethanedinitrile are considered to be the most likely to be a feasible alternative in the short term. However all require further trials and/or registration before they can be considered real alternatives.

Telone C 35 (a 1,3 dichloropropene/chloropicrin mixture) has been identified and registered as an effective soil fumigant for the fruit industry, but more work is required before it can be adopted by the strawberry runner industry.

This alternative has shown some application difficulties in that high levels of chloropicrin are providing variable results for planting. This is because of problems in

weed control and the associated unknown economic effects of additional measures to suppress weeds in fields for runner production. Also, three trials have demonstrated its capacity to cause phytotoxicity in strawberry runners, due to the higher elevations and colder temperatures required for runner production. The industry is coordinating its field trials closely with the product manufacturer. As a result, the manufacturer is making amendments to the current telone C-35 in regards to longer plant-back times. These amendments must go through the approval mechanism of the national agency responsible for registration of such products, the Australian Pesticides and Veterinary Medicines Authority (APVMA).

Methyl iodide and ethanedinitrile have been identified as treatments which require further research and development in Australia. Both are considered to have potentially the same spectrum of efficacy as methyl bromide on target weeds, nematodes and pathogens. Methyl iodide is at an advanced stage of development in USA, Australian research is therefore seeking to establish its efficacy in Australian conditions. Ethanedinitrile is under development with commercial scale trials being planned.

Provided that the technical problems associated with these new alternatives can be overcome, alternatives to methyl bromide are expected to become increasingly available from 2007.

These possible alternatives, after being developed, must be registered with the APVMA before they can be commercially adopted. The APVMA registers and regulates the manufacture and supply of all pesticides and veterinary medicines used in Australia, up to the point of wholesale sale.

Before being registered for sale, products must go through an extensive risk assessment process. Companies must provide the APVMA with information about the product to allow independent evaluators to determine whether it is effective and safe for people, animals and the environment, and not a trade risk. The evaluation is a rigorous process that is applied to all pesticides without exception – including methyl bromide alternatives. Registration can normally be expected to take at least 12 to 18 months.

What are the identified risks to implementation?

There are two major risks to early implementation of methyl bromide alternatives.

Firstly, in kind alternatives to methyl bromide are not established to be technically and economically feasible.

Strawberry runner growers are undertaking significant actions to both minimise current methyl bromide consumption, and to identify effective and efficient alternatives. There is a risk, however, that these chemical alternatives to methyl bromide will not be established to be technically and economically feasible.

Should this occur, Australia anticipates two courses of action. Firstly, critical use exemptions may continue to be sought until technically feasible alternatives become available or, secondly, strawberry runner growers could consider moving to alternative production methods such as soil-less production.

Due to the infrastructure changes required for moving to an alternative production method, this is not preferred, but would be considered should other alternatives not prove successful.

Secondly, the scale of trials will be dependent on the amounts of funds available.

The Australian Government will expect the industry to continue to invest funds into trialling methyl bromide alternatives. In turn the Australian Government will consider all applications for funding assistance. The Australian Government does, however, recognise that there is a limit to the amount of annual funding that can be economically provided.

Applicants will also be expected to continue to seek additional funds from other sources to ensure that they have adequate resources to move away from methyl bromide.

The Australian Government, state governments and the strawberry industries to date have invested considerable resources in identifying and trialling methyl bromide alternatives, as the resources required to conduct trials is generally beyond the capacity of any individual producer.

Will strawberry runner growers be seeking continuing critical use exemptions?

The leading alternative for strawberry runner production in Australia is telone C 35. Current research indicates that there are still some problems associated with the adoption of this alternative that may delay the final phase-out of methyl bromide for the strawberry runner industry. Recent uses of telone C 35 in some parts of Australia have demonstrated phytotoxicity problems and reduced yield. Australia is continuing to work with the manufacturer and the industry to conduct trials on plant-back times to determine appropriate use guidelines that avoid phytotoxicity problems for Australian soils.

Strawberry runner growers expect to continue to request methyl bromide for critical uses until technical problems are resolved and technically and economically feasible alternatives become commercially available. However, as methyl bromide for this particular application becomes more difficult to obtain, many growers have indicated that they are currently moving to telone C 35 because of its more secure supply status, notwithstanding the potential economic impact, and technical application difficulties.

Additional regulatory and reporting requirements introduced by the Australian Government, and increasing information required to secure critical use exemptions have also increased the risk associated with continued methyl bromide use. As a result, the amount of methyl bromide allocated for strawberry runner growers under Australian regulations will continue to reduce, even though the total amount of the nomination may remain constant.

Rice growers

Rice growers use methyl bromide as a fumigant to control pests in the bulk packaging of rice. Methyl bromide is used solely for the purpose of fumigating packaged rice food products. Packages can range in size from 500g plastic bags to woven polypropylene bulk rice packages. Methyl bromide is used to kill all life stages of insects that may be harboured in the finished rice products.

The Australian Rice Growers Cooperative (ARGC) packages rice in either plastic or woven polypropylene. Each of these packaging systems is perforated to assist fumigation after packaging and to ensure that the rice packet can be more efficiently and safely stacked.

Rice is fumigated at the final point in the processing chain to protect against rice infestation that can occur both prior to, and after milling. Rice infestation can occur at several stages through the production/supply process. Australian rice growers do undertake several internationally recognised standard procedures that are designed to minimise insect infestation, and therefore the need for methyl bromide at the end of production process.

Prior to milling, paddy rice must be aerated to reduce its moisture content. This is an essential process that must be done to prepare the paddy rice for milling. This is also an important process in preventing and minimising any infestation as the reduction in moisture content reduces its attraction to insects. However, the aeration process involves blowing large amounts of air through paddy rice. This process precludes fumigation at this stage as the gas-tightness that would be required to conduct a successful fumigation is inconsistent with the need to move large volumes of air for the drying process. The rice may become exposed to some insects at this stage.

Fumigation of finished rice food products with methyl bromide at the final stage in the supply chain provides the best assurance of supplying insect free rice-food products to consumers, and provides an effective mechanism to ensure the integrity of the final rice product.

Why its use is considered essential

Insect infestation of rice can occur at any stage prior to milling - during on-farm operations, during transport to storage and production facilities as well as during storage of paddy rice for drying prior to milling. Pre-mill insect control agents and strategies form a key component of ARGC's pest management programme. However rice remains open to reinfestation both prior to milling and later in the production chain. Reinfestation is controlled with further insect control strategies and agents.

The Australian rice growing industry has been actively investigating a wide variety of chemical and non-chemical alternatives to replace methyl bromide. To date, Australia's rice growers have not identified an alternative that can be used as a final 'clean up' fumigation of packaged rice products that ensures that no pests are in the final product. Methyl bromide's capacity to permeate through the types of packaging used by Australia's rice-growing industry is critical in preserving the integrity of the product.

What actions have methyl bromide users undertaken to minimise emissions?

The Australian rice growing industry has adopted several processes and procedures that minimise the emission of methyl bromide to the atmosphere. In addition, the ARGC is continuing to conduct studies to investigate whether lower application rates of methyl bromide can still provide an adequate protection for rice products. Lower application rates would result in reduced atmospheric emissions of methyl bromide.

The Cooperative is also proposing to install by 2007 methyl bromide scrubbing systems to recapture and destroy methyl bromide after it has been used to fumigate finished rice products. This technology has the potential to significantly reduce emissions of methyl bromide into the atmosphere.

The Australian Government is continuing to work with the ARGC to encourage further investigation of new alternatives of methyl bromide and the development of new infrastructure that will facilitate reductions in methyl bromide consumption by this industry.

Australian rice growers are also continuing to investigate alternatives to the use of methyl bromide for the final packaged rice fumigation. Once these alternatives are demonstrated to be successful, methyl bromide will be replaced.

What alternatives are planned?

The ARGC has examined a variety of alternative fumigants for use at several stages during rice production. Australia has trialled fumigation of paddy rice with phosphine prior to milling, but successful fumigation with these fumigants cannot be achieved in the majority of paddy rice storage facilities due to the age of the facilities (some up to 50 years old) and consequent lack of gas-tightness. The temperature extremes experienced during these trials also meant that structures expanded excessively, further decreasing gas-tightness. Existing paddy rice storage containers are not designed for fumigation processes. Trials of phosphine for use on paddy rice are expected to be conducted again in early 2006.

Ethyl formate and phosphine are considered to be the most likely alternatives to methyl bromide. However both have a number technical or infrastructure issues that must be resolved before their full commercial use can be considered. Vapormate is another possible alternative, however trials to date have not been successful on the full range of applications.

Ethyl formate is considered to be a possible alternative for methyl bromide for fumigating packaged rice. Ethyl formate trials are being extended to bulk packaging of rice. This trial is aimed at providing information on the likelihood of adopting liquid ethyl formate as the fumigant for bulk rice.

Further to this, CSIRO will be conducting gaseous ethyl formate trials on consumer packs of rice. This trial is yet to be finalised however, it is expected to replicate a tarp-fumigation similar to the methods currently used by ARGC for methyl bromide.

While ethyl formate is considered to be a promising alternative, challenges in terms of the flammability of this alternative must be overcome before it can be adopted. Ethyl formate cannot currently be used in conjunction with the current highly mechanised packing system because of the high risk of explosion.

Phosphine is also being considered as an alternative to fumigating rice immediately before it is packaged, however, infrastructure for the required intermediate storage system is yet to be put in place. Deployment of this infrastructure has been delayed because of extended drought conditions over the previous three to four years reducing rice yield and profit – and consequently capital – available for investment in this system. Extensive rainfall across much of Australia's rice growing region in late 2005

may advance trials of phosphine and, if successful, the capital investment required for the introduction of this intermediate storage system.

Vapormate (a low concentration ethyl formate product) has also been examined for use as a methyl bromide replacement in fumigating bulk rice bags. Trials conducted to date have been successful for some rice products, but vapormate has not been effective for some other applications, including bulk bags of broken rice. The Australian Government will continue to encourage Australia's rice growers to use alternatives where they are effective.

What are the identified risks to implementation?

There are two main risks to implementation. Firstly, no alternatives to the use of methyl bromide may be identified as being technically feasible. Australian rice growers will continue to test and assess chemical alternatives to methyl bromide for efficacy against target pests in packaged products.

Secondly, alternatives for the use of methyl bromide may not be registered for use on rice prior to the end of 2006, when already approved critical use exemptions for rice expires. Should this occur, critical use exemptions of methyl bromide may be sought until such time as identified alternatives are registered.

Continuing critical use exemptions – will rice growers continue to seek them?

Australian rice growers are seeking to reduce the impact of their methyl bromide use in several ways. Australian rice growers are trialling recovery and recapture technology to minimise atmospheric emissions of methyl bromide. The industry is also seeking to minimise its methyl bromide consumption through continuing to investigate the options for reducing methyl bromide application rates while maintaining effectiveness.

ARGC is also looking to invest in new infrastructure to permit it to use established methyl bromide alternatives (such as phosphine) prior to packaging and transport. This new infrastructure will further reduce the requirement for methyl bromide for rice.

Finally, ARGC is continuing to assess both chemical and non chemical alternatives to replace methyl bromide completely. This is an extensive, ongoing process and will require comprehensive testing to ensure product integrity is maintained.

While every effort will be made to reduce and eliminate the use of methyl bromide as rapidly as practicable, the Australian Government anticipates that critical use exemptions will continue to be required until technically and economically feasible alternatives are commercially available.

Flowers in Protected Environments

Flowers grown in protected environments such as greenhouses in certain circumstances are also seeking a critical use exemption to use methyl bromide. Similar to strawberry runner growers, flower growers also use methyl bromide as a soil fumigant to minimise the risk of pest, weed and disease infestations and to create a partially sterile soil matrix.

Growing flowers in protected environments allows growers to force plants to flower much faster and increase productivity by forcing several flowerings each year. Soil fumigation is an important part of ensuring plant health in these high productivity cropping systems.

Current consumption levels

Flower growers in the Australian state of Victoria currently use less than 7 tonnes of methyl bromide for soil fumigation. For 2007 and 2008, this is expected to reduce to at least 6.17 and 6.15 tonnes respectively. It is likely that actual consumption for these years will be less than the maximum amount of the nominated exemption. This is because the specific circumstances of some growers have allowed them to adopt alternatives. As individual circumstances permit growers to adopt alternatives, that grower's allocation is lost to the industry, meaning that actual consumption in 2007 and 2008 may be significantly lower than currently forecast.

Why is its use considered essential?

In contrast to the strawberry runner growers, flower growers have identified a technically and economically feasible alternative to methyl bromide. Telone C35 is considered to give control of weeds and diseases that is approximately equivalent to methyl bromide.

Methyl bromide is still considered essential because some flower growers do not have the necessary infrastructure to allow the use of Telone C35. Application rigs for this alternative require a newer style of greenhouse with removable ends to permit the entry of the application rig for shank injection.

Telone C35 can also be applied as an "in-line" formulation that is consistent with the existing infrastructure of older style greenhouses. This particular formulation is not currently registered for use in Australia.

Until an in-line formulation of Telone C35 is registered, some flower growers have no technically or economically feasible alternative to methyl bromide.

What actions have methyl bromide users undertaken to minimise emissions?

To date, actions being undertaken by flower growers have been focussed on searching for in-kind alternatives to methyl bromide. Activities for reducing emissions have been centred on ensuring that methyl bromide fumigations are conducted effectively. This is intended to decrease the frequency of methyl bromide fumigation, by conducting fumigation only when necessary and increasing the period between fumigations.

Some growers are also staggering crops so that the most sensitive species are grown in freshly fumigated soil, whereas hardier species are planted later in the production cycle, further increasing the time required between fumigations.

Virtually impenetrable films are now also being used in many instances to reduce methyl bromide emissions from glasshouses by up to 90%.

The industry has also undertaken trials to investigate the effectiveness of using VIF in conjunction with a reduced rate of methyl bromide (350kg/ha) to obtain equivalent

disease control to the standard MB treatment. In this trial weed control was compromised and would require development of an effective supplementary herbicide program before it could be adopted.

The Australian Government is continuing to encourage flower growers that are still using methyl bromide to continue to investigate alternative technologies, chemical and non-chemical alternatives to methyl bromide so as to encourage the industry to phase-out its use of methyl bromide as soon as possible.

What alternatives are planned?

Australian flower growers have previously conducted research that demonstrates that there are technically and economically feasible alternatives available, however the formulations needed for use in the protected flowers industry are not yet registered for use in protected floriculture.

Flower growers have identified two key alternatives to methyl bromide:

- Telone C35: repeated trials have shown that this alternative has equivalent efficacy to methyl bromide. However, Telone C35 is only registered for injected shank application that is unsuited to the style of greenhouse most common in Victoria. Dow Agrosiences have expressed interest in developing an in-line formulation compatible with Victorian glass houses, but the registration process has not yet commenced. Trials of an in-line formulation of Telone C35 in the United States and South Australia have demonstrated that this method could feasibly be developed as a viable alternative in glasshouse soil disinfestation *and*
- Methyl iodide: repeated trials have also shown that methyl iodide is as effective as methyl bromide in fumigating soil for flower production. Methyl iodide is not currently registered for use in Australia. While registration of shank injected methyl iodide is likely in 2006, a hot gas or in-line formulation suitable for glasshouse applications is under early development and could not be expected before at least 2008.

As with all agricultural and veterinary chemicals, new formulations and applications of both Telone C35 and methyl iodide must be registered by the Australian Pesticides and Veterinary Medicines Authority (APVMA) before they can commercially be adopted. Registration can normally be expected to take at least 12 to 18 months.

What are the identified risks to implementation?

Australia does not foresee any significant risks to the adoption of methyl bromide alternatives in protected floriculture. This is largely because alternatives to the use of methyl bromide have already been identified and demonstrated to be feasible.

Should in-line formulations of both methyl iodide and Telone C35 both be registered for use by 2008, it would be expected that these alternatives will completely replace the use of methyl bromide after 2008.

The main risk that has been identified as a barrier to adoption is that the investment required for progressing the registration process may not be pursued by the fumigant suppliers.

To address this risk, the Australian Government will continue to encourage flower growers to work with fumigant suppliers to progress the registration of these alternatives as quickly as possible. By ensuring that the floriculture and fumigant supply industries work together, potential hurdles that may delay adoption can be identified and addressed as early as possible.

Users of methyl bromide will be expected to continue to seek additional funds from other sources to ensure that they have adequate resources to move away from methyl bromide.

Will flower growers be seeking continuing critical use exemptions?

The leading alternative for flower growers is Telone C35. This is already registered for shank injection, but this would require significant infrastructure changes before it could be adopted for use in the particular glasshouses that are used in Victoria. At least one in-line formulation of Telone C35 or methyl iodide is expected to become available by the end of 2008.

It is not expected that flower growers will continue to seek methyl bromide after the current nomination. The alternatives that are currently being developed along with the possible development of new infrastructure that could facilitate the use of existing alternatives over the next few years are all likely to mean that methyl bromide will not be required beyond the current nomination.

The Australian Government along with flower producers will continue to monitor progress of the industry in adopting alternatives. Should there be any major changes to the implementation plans of the industry, this may require consideration of further nominations.

CONCLUSION

Australia is committed to phasing out its use of methyl bromide in accordance with its existing obligations under the Montreal Protocol. In doing this Australia is working with all industries that currently use methyl bromide to assist them identify, develop and transition to new alternatives.

In addition, the Australian Government is also developing a comprehensive strategy for all uses of methyl bromide in Australia – including quarantine and pre-shipment and feedstock uses – to assess the best way that Australia can minimise the impact that its existing methyl bromide use has on the atmosphere.
