Ministry for Primary Industries
Manatū Ahu Matua

REVIEW OF PUBLIC SUBMISSIONS ON:

DRAFT IMPORT HEALTH STANDARD FOR VEHICLES, MACHINERY AND TYRES

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Approved for general release

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Executive Summary

The New Zealand (NZ) Ministry for Primary Industries (MPI) consulted with stakeholders and interested parties from the 25th September 2015 to the 30th November 2015 on the draft import health standard (IHS) for Vehicles, Machinery and Tyres, the associated Guidance Document and a Risk Management Proposal. Consultation was in accordance with Section 23 of the Biosecurity Act (1993) and MPI's consultation policy.

This document provides responses to the 2015 consultation responses received and explains MPI's current position with the importation of vehicles, machinery and equipment (including tyres). From 2015 through 2017, MPI has further developed these documents as required to discuss management of the changing risk profile associated with imported vehicles, machinery and equipment.

The IHS outcome remains that MPI requires all vehicles, machinery and equipment (including tyres) are clean and free of biosecurity contaminants and regulated pests (the concept of clean and free being set to specified threshold levels in the IHS). The IHS and the Guidance Document are aligned to ensure the requirements specified in the IHS are supported by practical, useful (pictorial and written) guidance and recommendations.

Given the number of substantial and minor changes that have been made to the draft version of the IHS, Guidance Document and a Risk Management Proposal from 2015 through 2017, MPI considers it appropriate to re-consult with interested parties once again on these draft revised documents. Consultation will occur on these document from 4th of December 2017 until the 29th of January 2018. Please refer to the revised 2017 versions of the IHS, Guidance Document and Risk Management Proposal for further information.

Major changes included in the 2015 draft version of the IHS

As of the original consultation in 2015, MPI provided:

- A revised IHS and Guidance Document formatted into the new MPI Requirements & Guidance format to improve layout, consistency and to clarify legal requirements. Minor modifications to formatting have occurred progressively but formatting remains consistent with previous versions of the draft IHS and MPI's current standards. In addition, information was moved from the Guidance Document into the IHS as mandatory requirements including a table that held thresholds for biosecurity contaminants and regulated pests.
- Amended requirements for management of used agricultural, forestry and horticultural vehicles and machinery in the country of origin before shipping to NZ where these are cleaned or treated before being shipped to NZ.
- Amended requirements for management of used vehicles in Japan before being shipped to NZ as break-bulk (non-containerised), commercial consignments through an MPI-approved system.
- Amended requirements for management of the Brown Marmorated Stink Bug (BMSB) in the United States of America (USA) before importation into NZ. Vehicles, machinery and equipment must be clean, and must also treated by fumigation or heating on a 12 monthly basis before being shipped to NZ.

Additional changes made by MPI in 2017

MPI has further strengthened import requirements for vehicles, machinery and equipment in the 2017 draft version of the IHS. MPI now proposes the following amendments under Part 3: *Additional requirements for specified types of Vehicles, Machinery and Equipment, and specified regulated pests,* and these proposed changes are as follows:

- Part 3.1: Agricultural, forestry and horticultural equipment and steel cables (including such items imported for parts) must be actively cleaned or treated before being shipped to NZ, and in addition, cleaning or treatment must be confirmed by being accompanied by certification. MPI will verify compliance by checking the condition of imported items with what is certified.
- Part 3.4: This has been modified to hold "Requirements for Specific Regulated Pests" that are associated with imported vehicles, machinery and equipment.
    - Under Part 3.4.1, importation of all used cars and trucks from Japan has been further defined for the management of Asian Gypsy Moth – AGM (*Lymantria dispar*). MPI now specifies that all used cars and trucks from Japan must be managed through an MPI-approved system in Japan before being shipped to NZ. Used cars and trucks from Japan include all units that are shipped as either break-bulk or containerised cargo and include all units shipped as either commercial or private consignments.
    - Under Part 3.4.2, management of BMSB on vehicles, machinery and equipment will be expanded from only being required for imported items from the USA to imported risk items from other countries that have been identified as being a BMSB risk to NZ. The list of countries will be specified in Schedule 3 (as attached to the IHS) and it will be subject to modification as required. At this stage, it is anticipated that approximately 12 European countries will be added when the revised IHS is implemented (expected by the 30th of April 2018).

MPI will manage BMSB from identified Northern hemisphere countries from the 1st of September through the 30th of April of any year as this period has been identified scientifically as the critical period of export risk to NZ. Management of imported items from the USA will also be aligned with the Northern Hemisphere risk period (from the 1st of September to 30th of April of any year) from being required on a 12 monthly basis in accordance with the scientific evidence of risk.

Rationale behind the additional changes proposed by MPI in 2017

The reasons for the 2017 changes to the draft version of the IHS are as follows:

- Part 3.1: Despite the current IHS requiring agricultural, forestry and horticultural equipment and steel cables to be clean (internally and externally) or treated, MPI commonly intercepts such items at the NZ border that are non-compliant and can be significantly dirty. MPI is concerned that some importers would continue to bring in non-compliant agricultural, forestry and horticultural equipment or steel cables without having been cleaned or treated appropriately. With the addition of the requirement for certification, MPI considers that importers will have a greater compulsion to be more compliant. This also gives MPI the enhanced ability to monitor compliance of the importer and the associated exporter/certifying organisation for ongoing compliance.
- Part 3.4 is primarily focused on management of imported items that have the likelihood of being infested by high-risk invasive species such as AGM and BMSB that have been regularly intercepted in vehicles and machinery from Japan and the USA, and needs to manage these imports appropriately. The establishment of high-risk pests associated with these pathways could be extremely damaging to NZ's agriculture, the environment, forestry and horticulture and could result in an extremely costly response and eradication programme conducted by MPI and industry partners.
    - Part 3.4.1 primarily relates to the management of AGM (other biosecurity pests and regulated contaminants will also be managed) associated with imported used vehicles from Japan. MPI will now require that all used cars and trucks (excluding non-standard items) must be managed by being processed through an MPI-approved system in Japan before export to NZ. Importers may apply to MPI for non-standard vehicles (such as specialised trucks or other specialist vehicles) to be managed through an MPI-approved system but such systems are intended primarily to deal with cars and trucks that are driven on roads.
    - Part 3.4.2 primarily relates to the management of BMSB (other biosecurity pests and regulated contaminants will also be managed) associated with vehicles, machinery and equipment from the USA and for a range of European countries where BMSB is already, or is becoming a significant pest. Management of BMSB will be through a range of options that will be conducted in the countries of origin and provided for importers. Options mainly include obtaining imported items from pest free areas, pest free places of production, management through MPI-approved systems, and/or fumigation or heat treatment and subsequent post-management protection before export of such items to NZ. Limited treatment of containerised items on arrival in NZ will also be available.

Introduction

MPI received 21 submissions on the 2015 draft version of the IHS and GD from the following stakeholders:

1	Mr Robert Costabile	Marine Power International Pty Ltd
2	Mr Frank Willet	Autohub.
3	ATJ	Autoterminal Japan Ltd.
4	Mr Nigel Grindall	Automotive Technologies Limited.
5	Ms Lee Osborn	Bugsout
6	Ms Rosemarie Dawson	Customs Brokers and Freight Forwarders Federation.
7	Ms Philippa Rawlinson	Federated Farmers of NZ.
8	Mr David Rhodes	Forestry Owners Association.
9	Mr Richard Palmer	Horticulture NZ.
10	Mr Kit Wilkerson	Imported Motor Vehicle Industry Association (Inc.).
11	Mr Peter Webb	Independent Verification Services.
12	Mr Euan Philpott	JEVIC.
13	Ms Emily Jackson	Kenter Logistics NZ Ltd.
14	Dr Barry O'Neil	(Kiwifruit Vine Health) Kiwifruit Industry.
15	Mr Mike Brough	McCulloch Limited.
16	Mr David Crawford	Motor Industry Association of NZ (Inc.).
17	Mr Brian Heppenstall	Nutripharm.
18	Mr Roger Gilbertson	Pipfruit NZ.
19	Mr Andrew Wong	Swire Shipping.
20	Mr Masahiro Yaku	Toyofuji Shipping Co Limited.
21	Mr Wayne Bray	Value Tyres Wellington.

Note: A late submission by Edwin Massey, Biosecurity Manager - NZ Winegrowers requested that they were advised of MPI's decision regarding any changes during consultation. NZ Winegrowers were part of the Horticultural Industry Group and believes that changes to BMSB management on the imported vehicle pathway should be made with caution, and for the right reasons while using the best available scientific evidence.

MPI will provide a copy of each submission as Appendix One to this document. Where respondents mention agreement with MPI or provide support for MPI's position on specific points, there is no direct acknowledgement. In general, MPI appreciates the time and trouble respondents have gone to with regard to providing comments on the draft IHS, associated Guidance Document and Risk Management Proposal.

MPI has modified the 2017 version of the draft IHS to clarify expectations and include points based on relevant comments and requirements received during consultation. MPI has also amended grammatical errors and other fixed inconsistencies as raised in the feedback from respondents. However, rather than replying to all of the individual points made by respondents, MPI has summarised replies to similar or repeated comments based on subject to keep the document concise and avoid unnecessary repetition.

MPI Responses to Submitters on the 2015 version of the Draft IHS (including information on changes proposed for inclusion in the 2017 version).

1: Importation of used break-bulk vehicles from Japan

A range of responses were received by MPI regarding the difference between break-bulk items imported into NZ and other means of importing vehicles, machinery and equipment such as in containers. There appeared to be some confusion about what the term "break-bulk" actually related to, and comments were also received as to why restrictions were imposed on the importation of break-bulk items from Japan and not from other countries.

Up until the re-development of this IHS in 2015, MPI has focused primarily on the management of break-bulk (non-containerised) commercial consignments of sea freighted vehicles (predominantly cars but including trucks) from Japan due to the risk posed by AGM.

The 2015 draft version of the IHS specifically mentioned used vehicles imported as "break-bulk" items from Japan as being required to be processed through an MPI-approved system. In addition, break-bulk vehicles and machinery imported from the USA were also required to be treated by fumigation or heat before being shipped to NZ.

Under Part 3.4.1 of the revised 2017 draft version of the IHS, MPI has ceased requiring separate methods of management for break-bulk or containerised consignments or for commercial and private consignments from Japan. MPI will now require that all used vehicles (whether break-bulk or containerised and including all commercial or private consignments) must be managed via an MPI-approved system in Japan before export to NZ. To provide clarity, MPI has defined the terms "break-bulk" and "containerised" consignments in the "Definitions Section" of the revised draft 2017 version of the IHS.

The high-risk nature and high volume of imports from Japan via the used imported vehicle pathway (95% of all imported used vehicles enter NZ from Japan) means that the biosecurity risk associated with all used vehicles must be managed in Japan. MPI considers that the potential impact to NZ from high-risk pests such as AGM to be too great as not to require that all used vehicles from Japan (whether commercial or private consignments) are managed through MPI-approved systems. MPI considers that management of vehicles in this manner will drive high levels of compliance and reduced on-arrival risk in NZ. MPI realises that the proposed IHS changes will have an initial impact on some parts of the Japanese vehicle industry, but MPI has worked extensively with the importers and their service providers to ensure the pathway is properly protected, while minimising disruption to trade and working for the best outcomes for all concerned.

The Japanese used vehicle industry has indicated to MPI that it has the capacity to establish and provide pre-clearance facilities to service 100% of the Japanese used vehicle export market to NZ (including covering regional Japan). MPI-approved systems in Japan have grown over time to manage 95% of the Japan export market to NZ so MPI considers the move to 100% is easily achievable. Importers will also able to request equivalence for Japan based alternatives that manage the risk appropriately and effectively.

2: MPI-approved systems and management options for vehicles, machinery and equipment.

A range of responses were received by MPI regarding the management of imported vehicles, machinery and equipment through MPI-approved systems from Japan or from other countries. Some comments raised questions about the nature of such systems and held concerns about the possibility of importer's businesses being negatively affected by this requirement. MPI does not believe that the concerns raised about the negative effects on businesses are valid given that importers will be able to request equivalence for Japan based alternative vehicle management methods that meet the requirements of the IHS.

MPI wants to facilitate entry into NZ of clean and compliant vehicles, machinery and equipment by requiring the use of targeted management for vehicles (and possibly machinery) being processed through MPI-approved systems. MPI's import data confirms that management of high volume vehicles, machinery and equipment from high-risk countries such as Japan is best achieved by requiring management through an MPI-approved system.

Historic Management of Japanese Vehicles

The rationale and explanation for MPI's revised IHS requirements is outlined in the Risk Management Proposal *Review and amendment of the Import Health Standard for Vehicles, Machinery and Tyres* (September 2015 and as modified in 2017). The proposed changes to the IHS are informed and supported by MPI's Vehicles and Machinery Import Risk Analysis undertaken in 2007. This identified that high-risk export countries such as Japan based on pests that could potentially arrive on imported vehicles as well as the high vehicle volumes. The Japanese used vehicle pathway has historically provided significant levels of biosecurity risks to NZ including ants, AGM and other biosecurity risk material. Over the last 10 years, MPI's management of this pathway has directly influenced steady improvement to compliance through cooperation with importers and their service providers. MPI still considers this pathway to be a high-risk pathway and it will be managed as such.

Currently, the Japanese vehicle pathway is managed almost completely (with the existing IHS) under MPI-approved systems. Since their inception systems have proven to be the best way to manage the risk associated with most important pathway for imported vehicles into NZ. There are currently three operators of MPI-approved systems in Japan; and MPI has also been approached by other companies who are interested in becoming approved to operate

such systems. Biosecurity contaminants and regulated pests are occasionally detected at the NZ border on imported vehicles or machinery that have been processed through Japanese MPI-approved systems. On discovery of such contamination at the NZ border, MPI applies fumigation or heat treatment where appropriate; and such remedial management will continue to be conducted by MPI.

Movement to Total Management of the Used Vehicle Pathway under MPI-Approved Systems
In contrast to the above remedial situation, MPI will no longer allow any vehicle that has been identified as being contaminated or infested in Japan before export to NZ to be shipped for treatment on arrival. Treatment on arrival in NZ as an export option will be prohibited. For example, "Red Stickered" vehicles (being those that do not meet export standards for NZ) will not be allowed to be loaded on break-bulk vessels (or in containers) for export to NZ for treatment on arrival under the revised IHS.

MPI-Approved System Requirements and Service Provision
MPI-approved systems are, or include a set of linked, organised management procedures and processes for cleaning and/or treatment of used vehicles (cars and trucks) in order to meet the required outcome of the IHS. Appropriate cleaning and/or treatment (as specified in system documentation) must be performed in Japan under MPI-approved systems for all consignments of used vehicles in Japan before being shipped to NZ.

MPI-approved (management) systems are developed by a prospective service provider and submitted for approval to an MPI CTO and may include the use of MPI-approved treatments. Information on MPI-approved treatments can be found in the MPI standard: *Approved Biosecurity Treatments (MPI-STD-ABTRT*). This document may be found at: http://www.biosecurity.govt.nz/files/regs/stds/bnz-std-abtrt.pdf and this provides details of approved treatments for commodities, pathways and pests. Applications for system approval are assessed on a case-by-case basis through a risk-based decision process. The option of applying to become a MPI service provider in Japan is an option available to any company. MPI has information on its website on how to apply to have a cleaning system approved as well as to confirm the current status of systems (refer to: http://www.mpi.govt.nz/importing/other/vehicles-and-machinery/ - Go to: Quick Links - Vehicle Systems).

MPI supports having a suitable number of service providers being available in Japan (or in other countries) to run MPI-approved systems. However, MPI has no direct influence on the commercial decisions made by these parties to become a service provider. Given that an increasing number of parties in Japan have indicated to MPI that they are considering becoming a service provider under the requirements of the new IHS, MPI considers there will be a sufficient variety of organisations with the capacity available in Japan to assist importers with vehicle management options.

MPI has also been informed by more than one company that the use of a suitable fumigant or heat treatment or is considered to be a viable option for inclusion in Japanese systems. MPI will consider proposals for Japan-based treatments (or systems based in other countries) that are supported by appropriate technical data. Appropriate numbers of MPI Inspectors will continue to work in Japan to assist with monitoring MPI-approved systems. Numbers of MPI Inspectors are also dependent on the volume of imported vehicles, compliance history and relevant audit rates for MPI-approved system operators.

Importation of Vehicles from Other Countries
An MPI-approved system could be used as an option to cover management of vehicles (or machinery) from any country prior to importation into NZ. However, where importation into NZ is from countries with low volumes and relatively low-risk pathways there is no justification for mandatory management through an MPI-approved system or being treated prior to shipment to NZ. This is because the risk associated with the much lower number of imported vehicles from these countries is found to be significantly reduced by comparison with high-risk pest and high volume countries such as Japan or the USA.

Importation of vehicles originating in countries such as Australia or the United Kingdom will continue to be permitted without having to be managed through an MPI-approved system. MPI still requires that all vehicles from these countries must be clean and free of biosecurity contaminants and regulated pests on arrival in NZ.

Ideally, all vehicles, machinery and equipment imported into NZ should be managed through MPI-approved systems or by treatment in the country of origin before entry into NZ. However, such management is only justified from high-risk, high volume countries such as Japan with AGM or from the USA with BMSB. Note, the change to 100% preclearance

management through MPI-approved systems for all vehicles in Japan will be rolled out in a staged process (timing to be finalised) to allow the industry and importers time to successfully meet the requirements of the revised version of the IHS.

3: Brown Marmorated Stink Bug (BMSB) treatments for effective management.

A range of responses were received by MPI regarding concerns about the effectiveness and validity of treatments for appropriate management of BMSB associated with imported vehicles, machinery and equipment. Feedback included concerns about why MPI does not require mandatory treatment for vehicles entering NZ from all countries, and a lack of scientific evidence regarding the required level of fumigation or heat treatment efficacy to manage BMSB in the pathway.

The Required Treatment Efficacy for BSMB Management

Approximately 4 million risk good units (of all kinds and via all risk pathways) enter NZ from BMSB host countries per annum. Of these risk items, around 30,000 vehicles arrive per annum from the BMSB areas that are considered by MPI to present a high-risk, enough to require mandatory treatment with fumigation or heat. For vehicles being exported to NZ from these countries during the Northern Hemisphere winter risk period (1st of September to the 30th of April), only unmated overwintering adult BMSB are found as other stages are not present given the pest's lifecycle. Since 2005, the maximum number of BMSB found in a vehicle was 49. The highest number of BMSB found alive was 36, and only 14 vehicle consignments have been intercepted with 10 BMSB or more. Even with untreated consignments, normally only 1 or 2 BMSB are usually found alive as there is a high natural mortality due to shipping conditions that appear to be unfavourable to BMSB survival.

Treatment efficacy can be described in a number of ways, but the most common method is to state that an appropriately effective treatment achieves a % mortality of the most tolerant life stage likely to be present at the 95% level of confidence. Given the relatively low numbers of vehicles from the BMSB risk areas and the low level of infestation, it is considered that treatment efficacy at 99.9% mortality of the adults at the 95% level of confidence (= no survivors in 1,000) is sufficient. This efficacy can also be referred to as Probit-8. Probit-8 is sufficient to prevent adult BMSB accumulating in the highest relevant cargo arrival area (being the Auckland region) in numbers sufficient to establish a breeding population.

The level of treatment efficacy required was determined by modelling the number of adult BMSB arriving via the vehicle pathway in NZ (at any location) over the most likely survival period. Factors included in the modelling were:

- The level at which the risk goods were infested (and the level of aggregation);
- The destination of the risk goods within NZ; and
- BMSB's biological characteristics such as adult longevity and the distance of spread.

MPI considers the use of Probit-9 as being unnecessary treatment efficacy for BMSB management in the vehicle pathway and Probit-8 is sufficient. The concept of Probit-9 as an efficacy standard originated with Baker (1939), who used it to recommend cold and heat treatments for fruit flies. Baker gave no rationale for selecting Probit-9 mortality as an efficacy criterion other than to, "assure no survival of [fruit fly] eggs or larvae in the products treated". Importantly, Baker (1939) did not test sufficient individuals to meet Probit-9 requirements and confirm no survivors among 93,616 insects at the dose expected to achieve that mortality (Schortemeyer 2011).

Probit-9 efficacy was established by the USA as the efficacy requirement for the treatment of fruit flies (Diptera: Tephritidae) or pests of similar significance. Probit-9 efficacy is equivalent to 99.9968% or no survivors in around 30,000 of the target pest at the 95% level of confidence. This number or approximate numbers have often been reported in the literature for a number of pest species, however in recent years alternative levels of efficacy have been estimated for other pest species.

For instance Australia, Japan, and New Zealand now accept a quarantine treatment efficacy of 99.99% for fruit fly pests. At a 95% confidence level, a 99.99% level of efficacy equates to no survivors in 10,000 treated pests. Determining an appropriate level of treatment efficacy must address the expected prevalence of a pest on the material in question, the biological characteristics of the pest, and the minimum number of pests required to create a new breeding population (i.e. the maximum pest limit).

Once a target level of efficacy has been established, research is required to verify that a treatment can achieve the target. Where treatment verification to appropriate numbers may not be possible, the analysis of carefully designed

dose response experiments may be used to define appropriate treatment dosages. Trials carried out to date have shown that adult BMSB are very susceptible to treatments used on the vehicle pathway such as fumigation by both Methyl bromide (MB) and Sulfuryl fluoride (SF), and the use of heat.

Research on Treatments for BMSB Management

Prior to December 2014, the treatments available in the version of the IHS for management of BMSB were based on an existing treatment schedule covering a wide range of pests associated with vehicles. At the end of 2014, due to BMSB challenges, MPI added additional treatments as emergency measures to the existing MB and heat treatments, and also utilised SF treatments to deal with infestation.

After the 2015 draft IHS consultation period, MPI received comments from stakeholders about MPI's proposed treatments for management of BMSB. Concerns were raised about the efficacy of MPI's use of existing or new treatments and when they would be applied. However, MPI has confidence that the efficacy and timing of MB and SF fumigation and heat treatments is sound and is the measures are supported by the science. In addition, no scientific evidence was provided that proved a different position to that held by MPI. Given concerns from stakeholders, MPI undertook to gather ongoing interception information on live or dead BMSB after treatment and conduct further work on effective pre-export measures for VME.

From 2015, MPI re-evaluated available data on BMSB treatments to monitor efficacy, and this included research data provided in 2015 by the United States Department of Agriculture, Agricultural Research Service (USDA-ARS) and the Virginia Institute of Technology. This data showed that BMSB was also susceptible to lower doses of MB and SF and lower heat treatment temperatures. Since that time, additional fumigation regimes have been added as extra effective treatment options. These were specified and used under the direction of MPI Chief Technical Officer Decision Documents for the management of BMSB.

Fumigation with MB

The existing MB treatment rate of 48 g/m^3 for 24 hours will still apply for treatments at the 10-15°C temperature range as no new data were supplied for doses of MB at temperatures less than 15°C. Relevant literature on the effectiveness of MB fumigation on insects found on or near the surface of commodities reports that it is very effective with direct application to exposed insects at a concentration:time (C:T) value of <140 g.h/m^3 and temperatures >10°C; or at 120 g.h/m^3 at > 15°C. However, higher doses are required when the insects are partially or completely enclosed in a commodity such as being in wood.

For fumigation of vehicles and machinery, penetration is very good as long as all sealed compartments such as boots, compartments, hatches and trunks are opened up before the treatment begins (currently a standard pre-fumigation action). Based on the information supplied by the USDA-ARS on the fumigation of 2nd-3rd instars of BMSB (the most tolerant stage) and the efficacy data for direct MB exposure to a range of insects to achieve an Probit-8 efficacy), a reduced MB fumigation C:T rate of >140 g.h/m^3 for treatments at >10°C is very effective for killing BMSB.

Fumigation with SF

In both the USA and in Europe, SF is the only fumigant available for the treatment of vehicles. The USDA-ARS demonstrated that SF fumigation at was very effective for killing adult BMSB. MPI conducted a peer reviewed assessment of level of SF efficacy that is required to manage the risk of BMSB on the vehicle pathway (Ormsby 2016). The assessment was conducted on cargo volume and detected contamination levels using both data for the dead and live BMSB found to model the maximum number of insects.

Modelling used the exposed trial numbers only (without extrapolation) and the cargo that had been treated up until that time. It showed a specified SF fumigation treatment C:T value of >135 g.h/m^3 for treatments conducted at >10°C and applied over a >12 hour period (8 g/m^3 of fumigant remaining at treatment completion) provided a SF treatment at Probit-8 efficiency level that was sufficient for appropriate BMSB management through the VME pathway.

The C:T advice for SF was based on modelling of the numbers of BMSB used by Walse et al 2015 which reported exploratory research trial with relatively low numbers of BMSB in each repeated part of the trial. Mortality of BMSB seen in the fumigation trials showed that as soon as the C:T of 96g.h/m^3 was achieved there were no survivors, and insect mortality began at 48g.h/m^3. The likelihood of there being significant variation in insect death for surface dwelling/hiding BMSB adults in greater numbers is considered to be far less likely than for other insect eggs, larvae or pupae that may

be better protected within a commodity such as fruit or wood to varying degrees. It is considered that a SF rate of 140g.h/m^3 is sufficient to kill BMSB risk on this pathway as large numbers of BMSB have not been intercepted. As the biggest number of BMSB detected in a consignment so far at the NZ border was 56 (where there was a mixture living and dead individuals) the efficacy stated above is appropriate and effective for mortality.

MPI works cooperatively with the Australian government (Department of Agriculture and Water Resources - DAWR) in managing BMSB associated with imported risk goods such as vehicles, machinery and equipment. DAWR's SF treatment schedule for BMSB aligns with MPI's requirements and are equivalent to the current MPI rates for 12 hours. These SF treatments being at least 48g/m^3 for a period of 6 hours or longer; at least 16g/m^3 for a period of 12 hours or longer; and both with an SF concentration end point of 50% or greater (minimum of 24 and 8 g/m^3 respectively) when conducted at temperatures of 10°C or greater.

MPI also conducted verification audits of treatment operations for BMSB in late 2015 in the USA. The fumigations audited were found to be achieving 40% higher C:T values than the target concentrations. The increased concentration values were explained by the fumigant being retained well in the fumigation space and a longer fumigation period being used matching the normal working period. The verification audits results provided high level assurance that BMSB was being killed on vehicles and machinery from the USA after being treated effectively. Since the current SF rate were implemented, over 46,000 vehicles have been treated and only dead BMSB have been found in fumigated cargo imported into New Zealand (and Australia) to date.

To summarise fumigation for BMSB management with MB and SF, MPI has conducted a thorough assessment on the rates of both fumigants. MPI is satisfied that the fumigants and rates used are effective for appropriate control of BMSB (and other regulated pests) that may be associated with imported vehicles, machinery and equipment. Temperature is also known to be an important factor in influencing the action of fumigants (FAO 1984). Therefore, the proposed reduction in fumigant dose of MB at 15°C or greater is consistent with increased temperature at which it is applied.

Heat Treatment

MPI studied heat treatment data for appropriate management of BMSB. MPI considered the effectiveness of the heat treatment requirements of 56°C for 30 minutes under the International Standard for Phytosanitary Measures Number 15 (International Plant Protection Convention - ISPM 15 - Regulation of Wood Packaging Material in International Trade) given it is well established and recognised. The work conducted with BMSB showed that it was effectively managed by this temperature and time regime. BMSB work corresponded to that conducted previously with a wide range of insect wood pests. MPI also considered research conducted by Aigner and Kuhar from the Virginia Institute of Technology in the USA on the mortality of BMSB after heat treatment. Mortality of 100% for adult BMSB was shown at 45°C for 1 hour or at 50°C for 15 minutes.

However, to improve confidence that heat treatment will kill BMSB (and other pests), MPI has also provided the temperature requirement to 60°C as an option. This decision is based on experience in NZ where heat treatment providers found items of larger mass were more difficult to heat to attain the core temperature required (at coldest part of the item). MPI will require heat treatment at 60°C for 10 minutes for vehicles weighing less than 3,000 kg; or 60°C for 20 minutes for vehicles weighing more than 3,000 kg is utilised to manage inconsistencies with heating rates throughout heavy vehicles or machinery.

Revised Treatment Measures for the Management of BMSB

The revised fumigation and treatment requirements are:

- Methyl bromide fumigation at 10°C+ to achieve a minimum C/T of 140 g.h/m^3 over 12 hrs with a starting dose of 16 g/m^3 and a final reading concentration of at least 8 g/m^3 or
- Sulfuryl fluoride fumigation at 10°C+ to achieve a minimum C/T of 140 g.h/m^3 over 12 hrs with a starting dose of 16 g/m^3 and a final reading concentration of 8 g/m^3 or
- Heat treatment at 56°C for 30 minutes for VME or
- Heat treatment at 60°C for 10 minutes for VME weighing less than 3,000kg; or
- Heat treatment at 60°C for 20 minutes for VME weighing more than 3,000kg (in the coldest location).
- MPI-approved insecticide treatment before shipping and also on arrival, followed by MPI inspection for aircraft.

Note 1: All of these treatments are permitted to have a post–treatment storage period of 120 hours for break-bulk VME.

Note 2: Where management options have been conducted before shipping to NZ, post-treatment protection before export of such items to NZ is required.

In summary, MPI considers that the revised treatment measures (fumigation and heat treatments) specified above effectively kill diapausing BMSB associated with vehicles and machinery prior to export to NZ. MPI will continue to monitor the pathway with regard to treatment effectiveness and will continue to gather more data on the efficacy of different treatments at differing rates. This is to better inform any consideration to change treatment rates as consulted on in the draft standard. The current treatments as previously proposed and supplemented will be required under the revised 2017 draft version of the IHS.

4: BMSB and the Northern Hemisphere winter–window risk period.

A range of responses were received by MPI regarding the proposed Northern Hemisphere winter-window risk period from the 1st of September to the 30th of April for the active management of BMSB associated with imported vehicles, machinery and equipment. Feedback primarily related to concerns about reducing active management from 12 months per year down to the winter-window period of risk (as above) for imported risk items from the USA and a lack of scientific or technical data relating to the movements of BMSB and its lifecycle.

The establishment of a population of BMSB in NZ relies on multiple individuals arriving simultaneously, surviving, and remaining in close proximity. Given the low numbers of BSMB that have been recorded as arriving in NZ during the low risk NZ autumn/winter period (corresponding to Northern Hemisphere spring/summer months of May to August), MPI considers the chance of establishment of a viable population resulting from BMSB arriving during this period is extremely low.

The evidence gathered supports application of the measures (as specified above) over the winter-window risk period from the 1st of September to 30th of April of any year for any other Northern Hemisphere country where BMSB is considered to be a risk. MPI considers that no evidence was provided by respondents on BMSB being a threat and justifying treatment of vehicle, machinery or equipment pathways outside of the winter-window risk period. MPI considers that respondent's assertions of there being risk from BMSB during the NZ autumn/winter period are unfounded.

In addition to MPI's findings as discussed in the Risk Management Proposal, MPI obtained additional expert advice from Dr Anne Nielsen (Assistant Professor/Extension Specialist, Rutgers University Entomology Department, USA). MPI requested assistance on the likelihood of establishment of BMSB during the NZ autumn/winter period. Dr Nielsen's advice confirmed the likelihood that BMSB establishing during the autumn/winter period in NZ (from the beginning of May to the end of August of any year) was seen as being so low as to be considered negligible. Dr Nielsen's advice stated that if one assumed that a female BMSB was reproductively able, it was unlikely that she would re-enter diapause on encountering NZ's lower temperatures and shorter day lengths in the autumn/winter period.

In addition, Dr Nielsen stated that if an egg-bearing female BMSB arrived during this period, it would most likely lay viable eggs. However, whether the BMSB eggs hatch or not is dependent on the temperature in which the female BMSB was subject to. Given that the minimum temperature for development of all life stages is reported to be between 11 and 14.7°C there is the possibility that there may be some egg hatch and development in warmer areas of NZ.

Dr Nielsen stated that if the eggs did hatch and the day-length was not suitable (where the hatched BMSB nymphs did not encounter the long days of summer that would signal a move to a reproductive state), such BMSB nymphs may continue to develop (albeit slowly) into a diapausing adult. Dr Nielsen concluded that it was more likely that any developing nymph in that situation would die due to lack of suitable host plants and unsuitable weather conditions. There is a very low likelihood that egg laying and subsequent survival and development of BMSB nymphs would result from egg-bearing females entering NZ during the autumn/winter period in NZ. MPI considers that the advice from Dr Nielsen supports the conclusion of the technical advice that informs the inclusion of the MPI risk period from 1st of September to the 30th of April in the IHS.

MPI's interception data has shown an increase in the number of BMSB since 2015. This is the result of increasing numbers of BSMB over an expanding range in a number of countries, MPI's increasing ability to detect BMSB, and the focus on detecting them at the NZ border. While it is possible that there are BMSB that have not been detected at the

NZ border, the pattern of interceptions do not provide evidence to justify MPI imposing mandatory fumigation or heat treatment of these pathways for the NZ autumn/winter period from the beginning of May to the end of August. Requiring measures for BMSB during this autumn/winter period is not scientifically justified nor operationally of value. Of note, DAWR interception records and BMSB research shared with MPI, aligns well with MPI's own interception data recorded to date, and supports that the MPI data records are reliable.

In summary, the likelihood of BMSB being found on any part of the imported vehicles, machinery and equipment pathway during the NZ autumn/winter period is insignificant. MPI considers that the likelihood of BMSB becoming established during that time is so low as to be considered negligible. Therefore, MPI will impose quarantine measures for BMSB for relevant Northern Hemisphere countries from the 1st of September to the 30th of April only.

5: Required evidence that MPI's IHS requirements have been met.

A range of responses were received by MPI questioning what constitutes documented evidence that MPI's IHS requirements have been met. A number of these responses related to how used agricultural, forestry or horticultural vehicles and machinery needed to be managed and certified. With regard to the importation of vehicles, machinery and equipment, MPI requires verifiable certification that cleaning or required treatment has been conducted for such items and that they are compliant with the IHS.

For example, for used agricultural, forestry and horticultural vehicles and machinery from all countries it is the importers responsibility to provide documented evidence of what has been done to manage these items. For example, cleaning, fumigation or heat treatment certification is acceptable. This may be in the form of a document from the service or treatment provider (these companies do not need to be MPI-approved). Certification can be supplemented by photographic or video evidence of the extent of dismantling and type of cleaning or treatment undertaken. MPI uses a risk based evaluation for verification of all documentation. MPI also provides more information on what can be submitted in the Guidance Document to the IHS.

As is mentioned above, the IHS has also been revised to clarify management requirements for specific regulated pests in Part 3 of the document; and Schedule 3 specifies the countries in which management for BMSB must occur. MPI has also included a "quick reference" check list of requirements for specific items for vehicles, machinery and equipment (including components and parts) in the Guidance Document. The guidance box in Part 3.1 of the IHS also recommends that where possible, items that have been cleaned remain dismantled for importation into NZ so verification can be easily conducted by MPI.

6: On-Arrival management and pending container treatment and safeguarding of consignments.

MPI received comments about containerised consignments of vehicles, machinery or equipment that require inspection, treatment or other types of suitable post-entry management. The comments related to possible delays and inconvenience caused to importers by MPI requiring containers to be safeguarded on arrival prior to being treated in NZ if treatment had not been carried out in the country of origin. This is commonly where MPI requires an external insecticide treatment to be applied externally to containers to ensure regulated pests such as insects, mites and spiders are unable to escape.

Where possible, MPI specifically works with other regulatory agencies in the case of trans-shipping, and with importers to ensure containerised consignments are managed appropriately and that unjustified delays to clearance and possible re-treatments are avoided. However, non-compliant consignments may be re-shipped or require remedial actions or treatments to be conducted before biosecurity clearance can be granted

Ends.