Import Risk Analysis: Porcine reproductive and respiratory syndrome (PRRS) virus in pig meat

Review of Submissions

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Biosecurity New Zealand
Ministry of Agriculture and Forestry
Wellington
New Zealand

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Approved for general release

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1. Executive Summary

The MAF import risk analysis on PRRS virus in pig meat was released for public consultation on 25 July 2006 and stakeholder submissions closed on 15 September 2006. Extensions for late domestic submissions were granted to 9 October 2006. Due to delays in sending copies overseas, a further deadline extension until 1 November 2006 was granted to stakeholders from the USA and Canada. Forty four submissions were received, 37 from stakeholders within New Zealand and 7 from overseas trading partners.

The questions, comments and recommendations of these submissions are summarised in this document using direct quotes from each submission. The MAF response to each of these points is given. The full submissions are included in appendix 1 of this document.

Preliminary collation of submissions indicated the following 14 common themes, each of which is addressed in *Key Statements* in section 3 of this document.

i. *It was suggested that it was inappropriate to import any meat that may contain viable PRRS virus and to rely on post-border controls to prevent disease transmission. It was suggested that the status quo measures must be maintained and the approach being taken in this risk analysis is contrary to Biosecurity New Zealand's goal of managing risks offshore.*

ii. *Submissions suggested that the risk analysis had underestimated the level of meat scrap generation and had not considered meat that has been disposed of following the expiry of its "use-by date".*

iii. *Some stakeholders were concerned that there was no definition of "consumer-ready, high value cuts" in the risk analysis.*

iv. *It was stated that the minimum infectious scrap size is unknown.*

v. *Submissions questioned the current level of compliance with the waste feeding regulations [Biosecurity (Meat & Food Waste for Pigs) Regulations 2005] and enforcement of these by MAF. It was stated that MAF did not have adequate resources to enforce compliance with these regulations and MAF had, to date, failed to police these regulations. Compliance with these regulations amongst backyard pigkeepers is described as low in a number of submissions. Conversely, several overseas submissions claimed that MAF's failure to police these laws could not be used to justify the risk management measures recommended in the risk analysis.*

vi. *The current level of biosecurity on commercial pig farms in New Zealand was described as poor and it was suggested that this had been over-estimated in the risk analysis. It was also claimed that, if the recommendations of the risk analysis were adopted, this would necessitate improvements in on-farm biosecurity and the costs of these would need to be met by farmers.*

vii. *A number of submissions state that the risk analysis had under-estimated the risk pathways that exist between the backyard pig population and the commercial sector.*

viii. *Stakeholders suggested that the risk analysis had under-estimated the economic, social and welfare consequences of an incursion of PRRS virus into New Zealand.*

ix. *Several submissions compared the risk pathways and economic consequences associated with foot and mouth disease to those associated with PRRS.*

x. *It was claimed that MAF had under-estimated the likelihood of spread from an index property to other properties, regardless of the level of biosecurity in place. Submissions suggested that local spread by aerosol or vectors had been disregarded in the risk analysis.*

xi. *Stakeholders stated that the current measures in place were not trade restrictive.*

xii. *Submissions claimed that the likelihood of imported meat containing viable PRRS virus had been under-estimated in the risk analysis.*

xiii. *Stakeholders have stated that PRRS can have a synergistic effect with post-weaning multi-systemic wasting syndrome (PMWS).*

xiv. *Some stakeholders are concerned that there is poor national surveillance for PRRS, and if an incursion of PRRS occurred in New Zealand, disease would be well established in the country before being first recognised.*

In order to more fully consider certain points raised in submissions that questioned the interpretation of published scientific studies, a number of technical matters were sent to international PRRS experts for comment. These technical points can be broadly divided as follows:

- general comments regarding the overall level of risk associated with PRRS virus in imported pig meat;
- the use of PCR assay results in the risk analysis;
- the approach the risk analysis took when faced with uncertainty (especially in relation to the likelihood of airborne spread of the virus);
- miscellaneous points relating to individual scientific studies cited in submissions.

As can be seen in appendix 2, although there is some disagreement between experts on some of the above technical points, no new scientific evidence arose that suggested the risk management measures recommended in the risk analysis were not appropriate.

Questions relating to the quantitative model that was included in the published risk analysis were sent to Dr. Noel Murray for comment, and his response is included here as appendix 3.

In response to claims that the garbage feeding regulations have not been adequately publicised, relevant MAF and pork industry publicity material has been included here as appendix 4.

Having considered the responses from stakeholders and other comments shown in the appendices of this document, it is concluded that the recommendations of the risk analysis are sound and can be incorporated into an import health standard for the importation of pig meat.

2. Introduction

Until September 2001 pig meat was imported into New Zealand without sanitary measures for porcine reproductive and respiratory syndrome (PRRS) virus, as the prevailing scientific view was that PRRS virus was unlikely to be transmitted to susceptible pigs through ingestion of pig meat. However, a study commissioned by the Australian Government, carried out in Lelystad in 1999[1], demonstrated that it was possible to transmit the virus by this route. MAF's preliminary assessment of this study resulted in provisional measures being adopted from September 2001. These measures required that imported pig meat be either cooked or subjected to certain pH levels before being given a Biosecurity clearance in New Zealand. Since these measures were provisional, MAF was obliged to undertake a full risk analysis to examine the risk of introducing PRRS in imported pig meat.

The MAF risk analysis on PRRS virus in pig meat was released for public consultation on 25 July 2006 and submissions closed on 15 September 2006, although extensions for late submissions were granted to 9 October 2006. Due to delays in sending copies overseas, a further deadline extension until 1 November 2006 was granted to stakeholders from the USA and Canada. The following submissions were received:

	Date	Name	Organisation represented/location
1	25/9/06	Murray Battersby	Murrellen Pork
2	29/9/06	Sean Newland	Meat & Wool New Zealand Ltd
3	8/9/06	Steve Kidby	Paranui Piggery Co Ltd
4	15/9/06	James and Clare Freeth	Pine Lake Farm
5	13/9/06	Neil Managh	Ratanui Development Co Ltd
6	13/9/06	Grant Skilton	Aorere Farms Partnership
7	22/9/06	Ian & Linda McCallum Jackson	Havoc Farm
8	15/9/06	Ian Barugh	Massey University
9	19/9/06	Peter MacDonald	PIC New Zealand Limited
10	14/9/06	Sharon O'Callaghan	Unknown
11	15/9/06	Anon	Hawera
12	15/9/06	Claire Neal	Canterbury Genetics Limited
13	27/9/06	G A Sexton	Foxton
14	28/9/06	Stephen Macaulay	Pork Processors Association INC
15	15/9/06	Gus Morton	Morven Piggeries
16	18/9/06	Ian Joseph Schultz	MorePork Farm (BOP) Ltd
17	13/9/06	Jens Ravn & Steve Sterne	Patoa Farms Ltd
18	15/9/06	Spencer and Jacqui Johnstone	Greendale
19	15/9/06	Paul Davey	P.M. & S.A. Davey
20	19/9/06	Bindi Ground	Waratah Farms
21	14/9/06	Peter Logan	Healy Exports Limited
22	14/9/06	Graham Taylor	Ariel Farm
23	15/9/06	Ian McIntosh	Freshpork Farms Ltd
24	15/9/06	Lucy Caddick	Paerata Piggery
25	26/9/06	Colin & Karen Battersby	Murrellen Pork

[1] Steverink P (2000). Transmission of porcine reproductive and respiratory syndrome virus through the oral uptake of infected porcine muscular tissue by naïve recipients. *Final report. Study 807-47041-00-99-09*. Lelystad, Netherlands.

	Date	Name	Organisation represented/location
26	14/9/06	G.D. & H Harvie	Hawera
27	29/9/06	Natalie Gerber	New Zealand Feed Manufacturers Association (Inc)
28	14/9/06	R.R. Fox	Oamaru
29	15/9/06	Colin Kay	Fielding
30	12/10/06	Sam McIvor	New Zealand Pork Industry Board
31	27/9/06	Carly Sluys	Federated Farmers of New Zealand (Inc)
32	11/9/06	Dr EBM Welch	Pig Veterinary Services
33	29/9/06	Dr David Lawton et al	Pig Veterinary Society
34	11/9/06*	Selwyn Dobbinson	Veterinary Consultant, Christchurch
35	17/10/06	Roger S. Morris	Massey University EpiCentre
36	18/9/06	Anon	Danish Meat Association
37	8/9/06	Torben Grubbe	Danish Veterinary and Food Administration
38	9/10/06	Anon	Finland FSA
39	11/9/06	Inge Hardenberg	Netherlands MAF
40	15/9/06	Chris Trengrove	Canterbury
41	15/9/06	David Lawton	Porkanon (NZ) Ltd
42	31/10/06	John R Clifford	USDA
43	30/10/06	Joy Philippi	National Pork Producers Council, USA
44	23/10/06	Dr. Debbie Barr	Canadian Food Inspection Agency

*addendum to this submission received 14/9/06

This document addresses the key points made by stakeholders, which are summarised using direct quotes from each submission. Preliminary collation of these submissions indicated a number of common themes or claims. It has been decided to address each of these in the *Key Statements* section of this document (section 3) and where stakeholders have raised points covered by these *Key Statements*, they are referenced appropriately in this document.

Risk analyses are carried out by MAF in the context of Section 22 of the Biosecurity Act 1993, Section 22 (5) lays out what MAF is required to do in regard to issuing import health standards to effectively manage the risks associated with the importation of risk goods. Risk analyses are conducted in accordance with MAF's policy statement on “Conducting Import Risk Analyses and Applying them in the Development of Import Health Standards”, which can be found on the MAF website: www.biosecurity.govt.nz/pests-diseases/risk-policy.htm

As explained in that policy, risk analysis provides the best means of ensuring that chief technical officers, or those acting under their delegated authority, fulfil their legal obligations under Section 22 of the Biosecurity Act when developing import health standards. The policy also states that risk analysis is a management tool that incorporates scientific methods to enable regulators to gather and assess information and data in a thorough, consistent, logical and transparent way, to ensure that:

a) organisms that may cause unwanted harm are identified;
b) the likelihood of these organisms being introduced into New Zealand and the nature and possible effect on people, the environment and the economy is assessed;
c) appropriate biosecurity measures to effectively manage the risks posed by these organisms are developed;
d) the results, conclusions and recommendations arising from the analysis are effectively communicated amongst interested parties.

Section 22 (5) of the Biosecurity Act 1993 also requires chief technical officers to have regard to New Zealand's international obligations when carrying out risk analyses to support the issuing of import health standards. Of particular significance in this regard is the Agreement on the Application of Sanitary & Phytosanitary Measures (the “SPS Agreement”) of the World Trade Organization (WTO). MAF's Policy Statement on the SPS Agreement is also available on the MAF website: www.biosecurity.govt.nz/sps/resources/policies/raspspol.htm

A key obligation under the SPS Agreement is that sanitary measures must be based on scientific principles and maintained only while there is sufficient scientific evidence for their application. In practice, this means that unless MAF is using internationally agreed standards, all sanitary measures must be justified by a scientific analysis of the risks posed by the imported commodity.

Therefore, risk analyses are by nature scientific documents, and they must conform to an internationally recognised process that has been developed to ensure scientific objectivity and consistency. This methodology is outlined in section 2.3 of the risk analysis. The published MAF import risk analysis of PRRSv in pig meat followed published procedures documented in *Import Risk Analysis Animals and Animal Products* (Murray 2002)[2]. It should be noted that risk analyses written since 12 April 2006 now follow procedures published as *Biosecurity New Zealand Risk Analysis Procedures Volume 1* (see: www.biosecurity.govt.nz/files/pests-diseases/surveillance-review/risk-analysis-procedures.pdf), which is largely based on the earlier publication by Murray.

In applying this risk analysis process every step has been taken to ensure transparency. The risk analysis provides a reasoned and logical discussion, supported by references to scientific literature. The risk analysis was peer reviewed, first internally and then externally by the recognised international experts listed on pages iii and iv of the risk analysis. Following the risk analysis process, relevant points raised by reviewers were incorporated into the analysis.

In view of their scientific nature, public consultation on risk analyses is predominantly focussed on technical issues. For this reason, this review of submissions will address issues of science surrounding likelihood[3], not possibility[4], of events occurring. Speculative comments and economic factors other than the effects directly related to a potential hazard are beyond the scope of the document.

It should also be noted that any import health standard that will be developed using the MAF risk analysis on PRRS virus in pig meat will also consider other potential hazards which may be present in imported pig meat based on the recommendations of MAF’s earlier publication *The importation into New Zealand of meat and meat products – a review of the risks to animal health* (see:www.biosecurity.govt.nz/files/pests-diseases/animals/risk/meat-meat-products-ra.pdf).

[2] Murray N (2002) *Import Risk Analysis Animals and Animal Products*. MAF, Wellington, New Zealand.
[3] Likelihood: The quality or fact of being likely or probable; probability; an instance of this.
[4] Possible: Logically conceivable; that which, whether or not it actually exists, is not excluded from existence by being logically contradictory or against reason.

3. Key Statements

As indicated above, preliminary collation of submissions indicated a number of common themes. Each of these common themes is addressed here by *Key Statements*. Where stakeholders have raised points covered by these key statements, they are referenced appropriately in this document.

Key Statement 1

It was suggested that it was inappropriate to import any meat that may contain viable PRRS virus and to rely on post-border controls to prevent disease transmission. It was suggested that the status quo measures must be maintained and the approach being taken in this risk analysis is contrary to Biosecurity New Zealand's goal of managing risks offshore.

Sanitary measures must be based on scientific principles and maintained only while there is sufficient evidence for their application. The sanitary measures described limit imports of fresh or frozen pork to countries free of PRRS or to high value cuts, with all other pig meat requiring further treatment. The sanitary measure of allowing the import of consumer-ready high value cuts has been recommended on the basis that such cuts will be associated with a negligible likelihood of generating fresh meat scraps prior to cooking (see *Key Statement 2* regarding the disposal of meat past its "use-by date"). Further measures such as the Biosecurity (Meat & Food Waste for pigs) Regulations 2005 and standard biosecurity practices on pig farms (such as the NZPIB "Farm Biosecurity Policy" www.pork.co.nz/nzpork/technical_papers/6%20 Pig%20Health%20and%20Welfare.pdf) will further reduce the risk associated with the imported commodity. The cumulative reduction associated with these measures offers an appropriate level of protection against an incursion of PRRS.

There are a number of steps which provide a "cascade of risk reduction" to ensure that there is a negligible likelihood of consumer-ready, high value cuts of pork from a country with PRRSv establishing infection within a New Zealand herd. These steps include:

i. Only 1.2 percent of meat/carcasses selected randomly from Canadian slaughterhouses are positive for PRRSv (after thawing, so this includes the risk reduction effect of the freeze/thaw cycle).

ii. Imported consumer-ready, high value cuts of pork would have to be purchased by a household that has backyard pigs. 4.41.10 of this document estimates in excess of 15,000 properties in New Zealand with backyard pigs. Data from Statistics New Zealand (http://www. stats.govt.nz/additional-information/dwel-hhold-estimates.htm) records 1,569,100 households in New Zealand, therefore it is reasonable to estimate that around 1 percent of households in this country have backyard pigs. Furthermore, it is not unreasonable to suggest that people with backyard pigs keep them in order to achieve a degree of self- sufficiency for pork supplies, so such individuals may be less inclined to purchase imported high value cuts.

iii. Fresh raw scraps would have to be generated from the imported meat (consumer-ready cuts, by their very nature, are associated with a negligible likelihood of this).

iv. Raw scraps would have to be disposed of quickly - NOT held at room temperature for a period long enough to inactivate the virus (it is highly likely that scraps would sit in a garbage bucket for a while (e.g. overnight) before disposal).

v. Raw scraps would have to be disposed of in garbage (as opposed to "insinkerator", rubbish bin, or compost heap) – it cannot be assumed that all owners of backyard pigs would dispose of meat scraps in garbage.

vi. Garbage containing raw scraps would have to be fed to backyard pigs - an unknown proportion of backyard pig owners would be disinclined to feed raw pork to pigs on personal/ethical grounds or due to knowledge of the garbage regulations. The likelihood that such scraps would be fed to other animals, such as dogs, should also be considered.

vii. Pigs would have to ingest enough raw scraps to constitute an infectious dose (this would be affected by how long the meat was held at room temperature before, and by competition from other pigs).

viii. Since stomach acid would inactivate virus, it is likely that the raw meat scraps would have to be chewed rather than swallowed whole (if there is competition for food from other pigs, leisurely chewing is unlikely, so infection may be more likely in single pig units).

ix. An infected pig would have to develop viraemia and pass infection on to other pigs (this would require a group of pigs - a single pig is likely to be a "dead end").

It should also be emphasised that the evaluation of historical imports (section 4.2.3 of the risk analysis), demonstrated that during a 3 ½ year period (1998 to mid-2001) pig meat was imported into New Zealand from PRRS-infected countries *without any controls on garbage feeding* and the country remained free of PRRS infection.

Key Statement 2

Submissions suggested that the risk analysis had underestimated the level of meat scrap generation and had not considered meat that has been disposed of following the expiry of its "use-by date".

As stated in section 4.2.6 of the risk analysis, PRRS virus will be inactivated by normal cooking, so the only exposure pathway of relevance is the feeding of *raw* pork.

The size and quantities of raw meat scraps generated during the preparation of pig meat for human consumption in New Zealand is unknown and this is acknowledged in section 4.2.2.3 of the risk analysis. Acknowledging that it is not possible to accurately estimate the likelihood that scraps of a critical size will be generated prior to cooking, MAF has concluded (section 4.2.2.4) that the likelihood of generating infectious scraps of raw pig meat is non-negligible.

Arteriviruses (such as PRRS) are relatively heat labile and, as discussed in sections 3.4.2 and 4.1.3 of the risk analysis, the titre of PRRS virus present in meat falls by 90 percent after a week at 4°C and (as described in section 4.2.2.2 of the risk analysis) if meat is held at a temperature of 37°C for 24 hours, it could be considered free of infectious PRRS virus. MAF therefore considers that the disposal of meat beyond its 'use-by-date' would be unlikely to result in the production of infectious scraps.

Please also refer to the "cascade of risk reduction" described in *Key Statement 1*.

Key Statement 3

Some stakeholders were concerned that there was no definition of "consumer-ready, high value cuts" in the risk analysis.

The definition of "consumer-ready, high value cuts" will be further developed in the context of an import health standard – the concept behind this is of meat, not from the head, with major lymphatics removed, which will require no further trimming before being cooked. Section 5.2.2.2 of the risk analysis has suggested that such cuts would be associated with a negligible likelihood of generating fresh raw meat scraps prior to cooking.

Based on the above criteria, it is recommended that "consumer-ready, high value cuts" will be commercially packaged for direct retail sale and include bellies, bone-in and boneless roasts, chops, cubed pork, fillets, rib-eyes, spare ribs, stir-fry pieces and steaks.

Key Statement 4

It was stated that the minimum infectious scrap size is unknown.

The risk analysis was careful not to estimate the minimum infectious scrap size and recognises the inadequacy of the data in this regard. As stated in section 4.2.2.4 of the risk analysis, "there has been no attempt to explore the effect of size of scraps and infectivity. Indeed, the infectious dose approach explored by Hermann et al (2005) supports the notion that scraps of any size have the potential to infect an animal orally, and that the likelihood of infection occurring is directly related to the amount of meat fed."

The risk analysis goes on to state, "it is not possible to accurately estimate the likelihood that scraps of a critical size will be generated prior to further processing (cooking) of imported pig meat, so **the likelihood of generating infectious scraps prior to cooking must be considered non-negligible**" (emphasis added).

The risk analysis also does not consider the quantities used in feeding trials (500 – 900g) to suggest a minimal infectious scrap size.

Please also refer to the "cascade of risk reduction" described in *Key Statement 1*.

Key Statement 5

Submissions questioned the current level of compliance with the waste feeding regulations [Biosecurity (Meat & Food Waste for Pigs) Regulations 2005] and enforcement of these by MAF. It was stated that MAF did not have adequate resources to enforce compliance with these regulations and MAF had, to date, failed to police these regulations. Compliance with these regulations amongst backyard pigkeepers is described as low in a number of submissions. Conversely, several overseas submissions claimed that MAF's failure to police these laws could not be used to justify the risk management measures recommended in the risk analysis.

MAF has acknowledged (section 4.2.5 of the risk analysis) that the feeding of waste food to pigs is probably not an uncommon practice in New Zealand, particularly around the main urban centres of the North Island and it is also acknowledged (section 4.2.5.2) that it is very likely that kitchen waste would be fed to backyard pigs. The exposure assessment conclusion (section 4.2.6) again acknowledges that the minimum scrap size likely to infect a pig by the oral route is unknown although scraps of raw pork illegally fed to pigs would be unlikely to approach the size used in transmission studies. Although it accepted that large scraps past their "use-by-date" may be discarded and fed illegally to pigs, for reasons discussed in *Key Statement 2* MAF considers that such scraps would be unlikely to contain infectious virus.

A number of overseas submissions (see 4.36.2, 4.38.14, 4.39.5, 4.42.2, 43.3 and 4.44.6) have suggested that because the Biosecurity (Meat & Food Waste for pigs) Regulations exist in New Zealand, the risk management measures recommended in the risk analysis are unjustified and that pig meat imports should be allowed without sanitary measures against PRRS.

Because it is recognized that the degree of non-compliance with the current garbage feeding regulations is unknown, the risk analysis recommended maintenance of the current cooking or pH treatment requirement for pig meat imported from countries with endemic PRRS, but only for the forms of pig meat that are considered likely to generate significant quantities of fresh raw scraps (unless such imports are to be further processed into consumer-ready, high value cuts in an officially approved facility). Aspects of this matter are covered further in response 4.7.1 below. Please also refer to the "cascade of risk reduction" described in *Key Statement 1*.

Key Statement 6

The current level of biosecurity on commercial pig farms in New Zealand was described as poor and it was suggested that this had been over-estimated in the risk analysis. It was also claimed that, if the recommendations of the risk analysis were adopted, this would necessitate improvements in on-farm biosecurity and the costs of these would need to be met by farmers.

Good biosecurity (see footnote 2 on page 50 of the risk analysis) is considered by the New Zealand Pork Industry Board (NZPIB) to be good industry practice under existing conditions. The NZPIB encourages all pork producers to institute on-farm biosecurity to maintain and protect the health status of each individual farm. The generic "Farm Biosecurity Policy" developed by NZPIB includes isolation of replacement stock, minimisation of visitors, setting of "visitor" procedures appropriate to the animal health status of the farm and control of animal vectors, such as cats, rats and birds. NZPIB's Technology Transfer Programme also has initiatives including careful selection of breeding stock and other stock introduced as well as the adoption of "all in – all out" systems (see www.pork.co.nz/nzpork/technical_papers/6%20Pig%20Health%20and%20Welfare.pdf).

One of the authors of NZPIB's biosecurity policy acknowledges in his submission (see 4.41.17) that the proportion of pig farmers that implement the recommended practices outlined in this policy has increased since PMWS was recognised in New Zealand.

Key Statement 7

A number of submissions state that the risk analysis had under-estimated the risk pathways that exist between the backyard pig population and the commercial sector.

It is acknowledged in section 4.3.1.2 of the risk analysis that, if PRRS was introduced into a backyard piggery, then “some spread to other herds within the backyard sector would be likely, particularly to herds that introduced live animals (including travelling boars) or used semen from the index herd, but possibly to other herds that shared implements such as vehicles or other equipment”.

In the same section of the risk analysis it is stated that “spread to commercial pig herds that observe standard biosecurity practices would be most unlikely”. The basis for that statement is that NZPIB encourages all pork producers to institute on-farm biosecurity to maintain and protect the health status of each individual farm. The generic “Farm Biosecurity Policy” developed by NZPIB includes isolation of replacement stock, minimisation of visitors, setting of “visitor” procedures appropriate to the animal health status of the farm and control of animal vectors, such as cats, rats and birds. NZPIB’s Technology Transfer Programme also has initiatives including careful selection of breeding stock and other stock introduced as well as the adoption of “all in – all out” systems (see www.pork.co.nz/nzpork/technical_papers/6%20Pig%20Health%20and%20Welfare.pdf).

MAF therefore considers the above measures to be “standard biosecurity practices” on commercial piggeries and considers that spread of PRRS from backyard units to commercial units would be unlikely.

Key Statement 8

Stakeholders suggested that the risk analysis had under-estimated the economic, social and welfare consequences of an incursion of PRRS virus into New Zealand.

Article 5.3 of the WTO SPS Agreement lists the relevant factors for assessing the economic impact of a disease as the potential damage in terms of loss of production or sales in the event of entry establishment or spread of a disease, and the costs of control or eradication. These matters are assessed qualitatively in the consequence assessment (section 4.3) of the risk analysis.

The risk analysis acknowledges that PRRS could have a significant direct impact at the farm level. Section 4.3.1.3 of the risk analysis acknowledges that infection of individual breeding herds with PRRS virus may result in significant initial health problems (late-term abortions, stillbirths, weak pigs, lowered farrowing rates, mortality amongst weaned pigs and impaired sow fertility) leading to chronic production losses. The risk estimation (section 4.4) goes on to conclude that, if PRRS did become established in a sector of the pig industry the consequences of PRRS infection would be significant in the breeding herds that became infected. However, the likelihood of secondary spread to any units observing standard biosecurity measures would be negligible.

Since there is limited export of pork from New Zealand, the risk analysis concluded that the introduction of PRRS virus would be expected to have a negligible economic effect in terms of lost exports. Indeed, MAF is unaware of any country outside Australasia that considers PRRS to be a hazard in pig meat, so apart from exports to Australia, there is unlikely to be any market premium for PRRS freedom. Since PRRS virus affects only pigs, it is concluded in the risk analysis that an incursion of this virus would have negligible effects on humans and the environment. MAF's Animal Welfare group has indicated that in their view the risk analysis has not overlooked any issues related to animal welfare.

It is sometimes argued that the effects of a disease incursion go beyond the individual farms affected, and that a variety of flow-on negative impacts may be felt, for example by rural service industries. MAF acknowledges that there are flow-on economic effects, but considers that they are likely to be limited. It is noteworthy that Animal Health Australia's disease strategy for PRRS[5] categorises this disease as one whose economic effects "would not be of a magnitude that would be expected to significantly affect the national economy". That document goes on to state that "the social and economic effects of a PRRS outbreak would be restricted mainly to its effects on farm productivity". There is no reason to consider that the same would not apply if the disease were to occur in New Zealand.

Key Statement 9

Several submissions compared the risk pathways and economic consequences associated with foot and mouth disease to those associated with PRRS.

When FMD was confirmed on 20th Feb 2001 in the UK, swill feeding to pigs was legal and it was only later that it was banned (as an emergency measure) by the Animal By-Products (Amendment) (England) Order 2001, which came into force on 24 May 2001. Although it is likely that the introduction of FMD virus was via scraps of illegally imported meat in garbage fed to pigs (see report of inquiry at www.defra.gov.uk/animalh/diseases/fmd/pdf/fmd origins1.pdf) the actual route of entry of this virus into the UK remains unknown. MAF, like biosecurity agencies all over the world, is acutely aware of the risk of several exotic animal disease agents posed by illegally imported meat. Indeed, it was in view of these risks that the Biosecurity (Meat & Food Waste for Pigs) Regulations 2005 were promulgated.

It is acknowledged in the risk analysis (section 4.2) that compliance with the current garbage feeding regulations in New Zealand is unknown but that variable compliance with these regulations is likely within different sectors. Because of potential non-compliance with these regulations, the risk analysis has recommended maintaining the current cooking or pH treatment requirement for pig meat sourced from countries with endemic PRRS, but only for the forms of pig meat that are likely to generate significant quantities of raw scraps.

The likely consequences of an incursion of FMD are several orders of magnitude higher than those that could reasonably be expected from an incursion of PRRS. Section 4.3.1.3 of the risk analysis states that the introduction of PRRS virus into pig herds in New Zealand would be unlikely to result in significant indirect costs in terms of domestic or international market reactions and that exports of pork from New Zealand are limited to a few hundred kilograms annually to Pacific Islands and Singapore. By contrast, even the reporting of clinical suspicion of FMD in New Zealand would be likely to lead to an immediate suspension of exports of animals and animal products followed by closure of overseas markets upon laboratory confirmation of this diagnosis. Financial losses associated with FMD would be likely to include the loss of export earnings from animals, animal products and byproducts, the costs of control measures and compensation, and costs associated with the storage of animal products

[5] Animal Health Australia (2006) Disease strategy: Porcine reproductive and respiratory syndrome (Version 3.0). Australian Veterinary Emergency Plan (AUSVETPLAN), Edition 3, Primary Industries Ministerial Council, Canberra, ACT.

(e.g. meat and dairy products) during the period of no exports. A report prepared by the Reserve Bank of New Zealand and the Treasury in 2003 (www.rbnz.govt.nz/research/0130346.html) estimated that an outbreak of FMD in New Zealand would result in cumulative losses in nominal GDP of around $6 billion after 1 year, and around $10 billion after 2 years. By comparison, in the NZPIB submission on this risk analysis the total costs of a PRRS epidemic are estimated at about $20 million ($7.1m direct and $12.7m indirect). These costs would amount to about 0.3 percent of the costs estimated for the first year of an FMD outbreak.

Key Statement 10

It was claimed that MAF had under-estimated the likelihood of spread from an index property to other properties, regardless of the level of biosecurity in place. Submissions suggested that local spread by aerosol or vectors had been disregarded in the risk analysis.

As stated in the risk analysis (section 3.4.5), it is widely agreed that the major route of spread of PRRS between farms is the movement of infected pigs, with the second most important route of spread being infected semen. Transmission of PRRS via fomites such as boots, clothing and contaminated needles, has been demonstrated and the risk analysis acknowledges that systems are essential to prevent transmission by contaminated fomites.

There is limited evidence available regarding the role of vectors such as insects and wild birds in transmission of PRRS and the results of these studies, as indicated in the risk analysis, have been difficult to reproduce. Zimmerman et al (1997)[6] did report infection of mallard ducks with PRRSv although the subsequent study by Trincado et al (2004)[7] concluded that “the transmission of PRRSv by adult mallard ducks or ducklings may be an extremely rare event, or may not occur at all under field conditions”. This latter paper also cited personal communications from two other independent researchers (K. Lager and F. Osorio) who had failed to transmit PRRSv from mallard ducks to pigs.

Section 3.4.5.5 of the risk analysis acknowledges that airborne transmission of PRRSv was assumed to be responsible for spread of PRRSv in a number of studies published in the early 1990s. However, studies carried out in the late 1990s were unable to demonstrate airborne transmission of PRRSv over distances greater than 1 metre. Dee et al (2005)[8] did demonstrate movement of PRRSv in aerosol form through a PVC pipe over a distance of 150 metres although they acknowledged that these studies involved large volumes of air inoculated with a high concentration of virus and transported at high speeds, and that these results “cannot be extrapolated in the field”. Other limitations of this model included the use of optimal conditions that did not allow for the influence of environmental and physical variables, and the fact that virus was prevented from dispersing into the atmosphere. The authors of this study concluded that “even under the ideal conditions of this experiment, only three of the six pigs became infected, despite having been exposed to large quantities of air that had been inoculated with large quantities of PRRSv. It therefore appears that, in the field, the

[6] Zimmerman JJ, Yoon KJ, Pirtle EC, Wills RW, Sanderson TJ and McGinely (1997). Studies on PRRS virus infection in avian species. *Veterinary Microbiology* 55, pp329-36.

[7] Trincado C, Dee SA, Rossow KD, Halvorson D and Pijoan C (2004). Transmissions of porcine reproductive and respiratory syndrome virus by non-porcine vectors: A re-evaluation of mallard ducks. *Veterinary Record* 154, pp233-37.

[8] Dee SA, Deen J, Jacobson L, Rossow KD, Mahlum C and Pijoan C (2005) Laboratory model to evaluate the role of aerosols in the transport of porcine reproductive and respiratory syndrome virus. *Veterinary Record* 156, pp501-4.

transmission of PRRSv by aerosols is probably a rare event, if it occurs at all”. There is further discussion concerning the aerosol transmission of PRRSv in appendix 2 of this document. Please also refer to the “cascade of risk reduction” described in *Key Statement 1*.

Key Statement 11

Stakeholders stated that the current measures in place were not trade restrictive.

No country outside Australasia considers it credible or justifiable to have any risk management measures in place for PRRS in pig meat. For most countries, New Zealand’s credibility would increase if MAF were seen to be removing measures that are considered unnecessary, excessively trade restrictive and a technical barrier to trade under the WTO.

Article 2.2 of the SPS agreement states that “Members shall ensure that any sanitary or phytosanitary measure is applied only to the extent necessary to protect human, animal or plant life or health, is based on scientific principles and is not maintained without sufficient scientific evidence, except as provided for in paragraph 7 of Article 5.”

Article 5.6 also states that “Without prejudice to paragraph 2 of Article 3, when establishing or maintaining sanitary or phytosanitary measures to achieve the appropriate level of sanitary or phytosanitary protection, Members shall ensure that such measures are not more trade-restrictive than required to achieve their appropriate level of sanitary or phytosanitary protection, taking into account technical and economic feasibility.”

Although imports of pig meat into New Zealand have increased since the introduction of the current control measures for this commodity, if the current measures cannot be scientifically justified then New Zealand, as a signatory of the SPS agreement, cannot continue to require their implementation.

Data presented in table 2 of the published risk analysis indicates that, between 2000/01 and 2003/04, the amount of pork imported into New Zealand from countries with PRRSv fell by more than 13 percent whilst, over the same period, the amount of pork imported into New Zealand from countries free of PRRSv increased by more than 235 percent. MAF recognises that a number of factors may have accounted for this change in trading pattern although it is not unreasonable to suggest that the measures introduced in 2001 are likely to have had a significant impact on this.

Submissions by some trading partners (e.g. 4.37.2 and 4.44.7 in this document) consider that *any* measures for PRRS in pig meat can be seen as excessively trade restrictive and a technical barrier to trade. However, the recommendation of the risk analysis constitute the removal of some measures that are no longer considered necessary, but the adoption of other measures that effectively manage the risks identified in specific forms of pig meat.

Key Statement 12

Submissions claimed that the likelihood of imported meat containing viable PRRS virus had been under-estimated in the risk analysis.

The quantitative release assessment model (which was included in the risk analysis as appendix 1) was completed in 2001 before the publication of the study results of Magar and

Larochelle in 2004[9]. It was concluded from the results of the model that there was a low likelihood (0.3 percent) of PRRS virus being present in pig meat from countries with endemic PRRS.

The study of Magar and Larochelle examined a total of 1,027 meat samples from 2 different abattoirs. 74.3 percent of pigs were shown to be seropositive to PRRSv and PRRSv was detected in 1.9 percent of meat samples by PCR (i.e. 19 meat samples). Eleven of these PRRSv positive meat samples were used in feeding trials and seven of these were shown to transmit infection to other pigs. From these results, the risk analysis concluded that around 1.2 percent[10] of pigs at slaughter in countries with endemic PRRS can be expected to have infectious virus in meat. MAF considers this figure to be of a similar magnitude to the prediction from the quantitative model.

However, MAF considered that the figure (1.2 percent) derived from the Magar and Larochelle study was a more accurate reflection of the likelihood of infectious PRRSv being present in pig meat than the figure (0.3 percent) predicted by mathematical modelling. This higher figure is the one reflected in the release assessment conclusion (section 4.1.4).

The limitations of earlier field studies are discussed in section 4.1.2.2 vii of the risk analysis, although none of these earlier studies which examined significant numbers of meat samples were able to suggest that the likelihood of PRRSv being present in pig meat at slaughter was in excess of 2 percent.

MAF considers the publication of Magar and Larochelle to represent the most robust study into the presence of PRRSv in pig meat at slaughter that is currently available and, based on this, a likelihood of PRRSv being present in pig meat from countries with endemic PRRS is expected to be in the region of 1.2 percent. There is no evidence to suggest that this likelihood will be any greater than 2 percent, which MAF believes is appropriate to describe as ‘low’.

MAF acknowledges that, although this likelihood is low, it is **not** negligible and this is reflected in the release assessment conclusion. Further discussion relating to the evidence regarding the period of viraemia in pigs infected with PRRSv can be seen in the response to 4.30.19 below and in appendix 2 of this document. Please also refer to the “cascade of risk reduction” described in *Key Statement 1*.

Key Statement 13

Stakeholders have stated that PRRS can have a synergistic effect with post-weaning multi-systemic wasting syndrome (PMWS).

MAF acknowledges that PMWS has been associated with a generalised immunosuppressive effect which can predispose affected animals to a wide-range of (possibly) secondary infections, including PRRS. MAF notes that one of the authors of NZPIB’s biosecurity policy acknowledges in his submission (see 4.41.17) that the proportion of pig farmers that implement the recommended biosecurity practices has increased since PMWS was recognised in New Zealand, and such improvements in biosecurity will reduce the likelihood of PRRS spreading from an index property if it were introduced by any pathway.

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[9] Magar R and Larochelle R (2004) Evaluation of the presence of PRRS virus in pig meat and experimental transmission following oral exposure. *Canadian Journal of Veterinary Research* 68, pp259-66.
[10] i.e. 7/11 x 1.9%

Key Statement 14

Some stakeholders are concerned that there is poor national surveillance for PRRS, and if an incursion of PRRS occurred in New Zealand, disease would be well established in the country before being first recognised.

MAF acknowledges (section 4.3.1.2 of the risk analysis) that the likelihood that an incursion would be detected in a backyard herd is considered to be very low, given the background of endemic diseases and other production-limiting factors in the backyard environment. However, as described in section 4.4 of the risk analysis, MAF considers that spread of infection from such herds to commercial herds would be likely only if commercial herds had inadequate biosecurity practices.

MAF’s post-clearance biosecurity surveillance team is currently developing a joint PRRS surveillance programme with NZPIB although the details of this have not yet been finalised.

4. Review of Submissions

4.1 MURRAY BATTERSBY

4.1.1 I support the technical matters raised by NZPIB

MAF response: Noted.

4.1.2 It appears that the risk analysis proposed by MAF does admit that it will allow PRRS infected pig meat into the country. Its seems to rely on post border measures to control it …

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.1.3 There is no definition of what is to occur when a product has passed its use by date

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.1.4 There is no definition of "consumer ready - high value cuts."

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.2 SEAN NEWLAND

4.2.1 This work did not indicate a minimum size below which infection did not occur so relying on the scrap volumes used in those studies to estimate risk levels does not seem logical. These only indicate the volumes fed, nothing more.

MAF response: Please refer to *Key Statement 4* in section 3 of this document.

4.2.2 Note that in many house hold situations scraps are aggregated from a number of dwellings to feed pigs (personal observation)

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.2.3 If "likely processing methods" are to be used in the risk estimation (as they mitigate the risk) then what happens if they are not required to be followed (they are only "likely") or if they change over time?

MAF response: Section 4.2.2.3 of the risk analysis states "Since the majority of meat purchased for human consumption in households is likely to be in the form of ready to cook cuts, it is concluded that the overall likelihood of generation of raw scraps of pig meat from households is low. The likelihood of raw pig meat scraps being generated by restaurants, retail outlets, processors and manufacturers is considered to be higher than for households". The risk analysis goes on to conclude that (Section 4.2.6 para v) "the form of pig meat likely to be imported into New Zealand and the likely processing that it is submitted to prior to being sold for human consumption means that it is very unlikely to contain infectious PRRS virus".

The risk analysis has not relied on these likely processing methods (such as freezing or refrigeration) to ensure that there is a negligible likelihood of infectious PRRSv in pig meat imported into New Zealand. Please also refer to the issues addressed in *Key Statement 1* in section 3 of this document and the responses to 4.30.38 and 4.43.4 below.

4.2.4 There have been a number of concerns raised (with MAF) by the PIB regarding the lack of enforcement of the feeding regulations and examples of where these regs have been ignored documented. Unless MAF were to undertake adequate enforcement activities and increase the level of compliance (something that it is not possible for the industry to do over ALL producers) then this is a dangerous assumption to add in to the risk estimation.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.2.5 What are the "standard biosecurity practices"? Is there such a thing in the NZ commercial industry and if not how can they be relied upon to limit the spread of PRRS if it got here?

MAF response: Please refer to *Key Statement 6* in section 3 of this document.

4.2.6 The comment regarding "no significant impact on exports" may be correct from an official market access perspective - it does not take in to account however any commercial premium NZ pork may receive due to the current health status (with regard to) PRRS

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.2.7 The comment (with regard to) "inadequate biosecurity practices" is of concern. Why should an industry take on further compliance costs (and there will be costs associated with such practices) to allow the importation of imported product that poses a real risk of introducing a significant exotic disease?

MAF response: Please refer to *Key Statement 6* in section 3 of this document. MAF disagrees that the importation of a product complying with the recommended sanitary measures poses a 'real risk' of introducing a significant exotic disease, and is of the opinion that the recommended sanitary measures will provide an appropriate level of protection against the introduction of PRRS into New Zealand.

Section 4.2.3 of the risk analysis demonstrates that during a 3 ½ year period (1998 to mid-2001) pig meat was imported into New Zealand from PRRS-infected countries without *any* controls on garbage feeding and the country remained free of PRRS infection.

4.2.8 One advantage NZ producers (not only the pork industry) have is that the health status of NZ animals does not, in many cases, require a high (and therefore costly) level of farm biosecurity processes. This is a commercial advantage to the industries involved and by prevention of the entry of exotic diseases through appropriate border controls (rather than relying on "in country" activities) this advantage is maintained.

MAF response: MAF agrees that the high health status of livestock in New Zealand can provide commercial advantages. However, given the presence of PMWS in New Zealand, it may no longer be credible to suggest that commercial pig enterprises here can rely on a lower standard of on-farm biosecurity than similar operations overseas.

The sanitary measures recommended in this risk analysis have been suggested to provide an appropriate level of protection against the introduction of PRRS virus into New Zealand. It should also be noted that Article 5.6 of the SPS agreement (to which New Zealand is a signatory) states that "…when establishing or maintaining sanitary or phytosanitary measures to achieve the appropriate level of sanitary or phytosanitary protection, Members shall ensure that such measures are not more trade-restrictive than required to achieve their appropriate level of sanitary or phytosanitary protection, taking into account technical and economic feasibility."

4.2.9 If either of the "high value cut" options are to be followed a precise definition of these is required

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.2.10 The intimation that NZ industry should put in place "appropriate biosecurity practices" specifically as means to mitigate risks associated with imported goods where such practices are being included within the reasoning to allow the imports. Any additional practice adds cost. If the practices are not needed now the NZ producer has a commercial advantage - which is one of the reasons we (NZ Inc) attempt to keep out exotic diseases

MAF response: As PMWS is recognised as endemic in New Zealand, it is difficult to argue that standard biosecurity practices (such as recommended by NZPIB) are not required on all commercial pig units in this country. Please also refer to *Key Statement 6* in section 3 of this document.

4.2.11 The intimation that if PRRS did get here it would only impact on the non-commercial herd and this would have no real impact on the wider industry. This ignores the realities of the commercial market place…

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.2.12 …ignores the impact on the credibility of the NZ biosecurity system with trading partners

MAF response: Please refer to *Key Statement 1* in section 3 of this document. MAF would also like to refer to issues raised in *Key Statement 11* and re-iterate that, for most countries, New Zealand's credibility would increase if MAF were seen to be removing measures that are considered unnecessary, excessively trade restrictive and a technical barrier to trade under the WTO.

4.3 STEVE KIDBY

4.3.1 …it is not the serious pork producers that flaunt the rules, and an outbreak of foreign disease will occur, it is the back yarders with 3-4 pigs and still collect garbage, and don’t adhere to the new regulations, these people, and there’s thousands of them, even on TradeMe, this is where you, MAF loose sight and control of the problem we see, that you see as not a problem.

MAF response: Please refer to *Key Statements 5* and *7* in section 3 of this document.

4.3.2 …I wish to cast my disapproval at this possibility of allowing imported meat not only pig meat into this country and the lifting of bans to do so, for the simple reason that where there is a risk to this country, and our clean green image, we should not jeopardise this in any way.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.4 JAMES AND CLARE FREETH

4.4.1 An incidence of PRRS on our farm would have a significant effect on the viability of our business and we would be unable to sustain the losses that would inevitably be incurred over a long period.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.4.2 …there are a large number of pigs in back-yards across New Zealand which are fed scraps, and which do not adhere to the food waste regulations…If a housewife or restaurateur had bought one of these imported high-value cuts…and discarded part of the uncooked meat prior to cooking…this could be fed to a back-yard pig, thus introducing the PRRS virus…there is a risk that the disease could then be carried by birds through the muck on their feet, from this animal to a local pig farm… It is the responsibility of the government to protect our interests and provide a safe environment in which we can produce pigs without fear of disease being brought in from abroad.

MAF response: Please refer to *Key Statements 2, 7* and *10* in section 3 of this document.

4.4.3 We therefore support NZPIB's stance that current measures are maintained – that all meat imported from countries where PRRS is endemic is treated by cooking or curing.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.5 NEIL MANAGH

4.5.1 …the strength of N.Z. agriculture has been that it is free of the many animal health issues that plague most other countries of the world.

MAF Response: Noted. Please also see the response to 4.2.8 above.

4.5.2 We fully support the submission of the New Zealand Pork Industry Board detailing areas where the risk analysis has under-estimated the risk to the New Zealand pig herd.

MAF Response: Noted.

4.5.3 While there are regulations in place that mean that all meat should be heated to 100C for one hour before it is fed to pigs, it is a faulty assumption on Biosecurity New Zealand's part to assume that this happens. We are aware that there is no policing of these regulations, and a very low level of follow up to reported cases of non-compliance. Does Biosecurity New Zealand have figures available to demonstrate the level of compliance with these Regulations, which provides facts on which to justify all its proposed options?

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.5.4 Importantly, the 2001 Foot and Mouth Disease outbreak in the UK is thought to have been started by feeding infected meat to pigs despite such feeding being illegal.

MAF response: Please refer to *Key Statement 9* in section 3 of this document.

4.5.5 …non-commercial operators farm alongside commercial piggeries, and so despite our best efforts we are at risk from air-born spread of disease.

MAF response: Please refer to *Key Statement 10* in section 3 of this document.

4.5.6 Expert opinion is that PMWS came via infected meat. Given that PMWS is in New Zealand it is even more important to the commercial pork industry to be protected from PRRS because the on-farm impact of these diseases is additive.

MAF response: The precise nature of the circumstances of the first detection of PMWS in New Zealand in late 2003 are the matter of some scientific debate, and speculation about this is beyond the scope of the risk analysis and this review of submissions. Please also refer to *Key Statement 13* in section 3.

4.5.7 Surely a similar approach will not be adopted with Foot and Mouth Disease…why then is it acceptable for an exotic disease which puts the New Zealand pork producing industry at risk?

MAF response: Please refer to *Key Statement 9* in section 3 of this document.

4.5.8 Maintaining the current treatment measures is not a barrier to trade. Imports have grown significantly (almost doubled) since 2001 when the treatment measures against PRRS infected meat were put in place.

MAF response: Please refer to *Key Statement 11* in section 3 of this document.

4.5.9 New Zealand and Australia are the only two countries where PRRS is not present. This reflects well on New Zealand's biosecurity status.

MAF response: Section 4.2.3 of the risk analysis points out that several countries in Europe have remained free of PRRS, namely Sweden, Finland, Norway and Switzerland. Furthermore, Sweden and Finland import substantial quantities of pig meat from countries where PRRS is present.

4.6 GRANT SKILTON

4.6.1 …our farm would not be economically viable in the face of a PRRS outbreak in our herd.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.6.2 Of major concern to us is the assumption that because feeding of uncooked pig meat to pigs is illegal, that the risk of PRRS virus infecting pig farms by the feeding of uncooked pig meat is negligible…there is probably a reasonable amount of uncooked pig meat being fed to sows now, and so the fact that it is illegal is not an acceptable strategy to prevent a PRRS incursion.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.6.3 Despite a high level of bio-security on our farm, if one of these neighbouring farms did become infected, there is a high risk of our herd becoming infected given the close proximity (300-500m) of these other herds to our herd. Birds, vehicles and even aerosols are potential vectors for the disease…

MAF response: Please refer to *Key Statement 10* in section 3 of this document.

4.7 IAN & LINDA MCCALLUM JACKSON

4.7.1 It is our opinion that MAF currently do not have the resources to deal with this law (2005 Garbage Feeding Law). It has never been communicated to the pig keeping public and is not being policed.

MAF response: A concerted effort has been made to publicise the Biosecurity (Meat and Food Waste for Pigs) Regulations 2005 following their promulgation (please see the media release and fact sheet included in appendix 4). Biosecurity New Zealand and the New Zealand Pork Industry Board have agreed to work together to educate all groups with responsibilities under these Regulations.

On behalf of MAF, the New Zealand Pork Industry Board periodically reminds their members about the Regulations (please see the GAP newsletter also included in appendix 4) and NZFSA has incorporated information about the Regulations in the Codes of Practice being drafted for the restaurant and hospitality sector. MAF recognises that communication is a continuous process and requires continued efforts to publicise these Regulations to both pig farmers and waste food generators.

MAF's Compliance and Enforcement Group follows up on every compliant it receives from the public and the New Zealand Pork Industry Board has been very helpful in this regard.

Biosecurity New Zealand has committed to a rigorous communication campaign which will compile a comprehensive list of key contacts in stakeholder organisations including farmers, waste collectors, waste generators, and local authorities. Over time a comprehensive stakeholder engagement strategy will identify ongoing opportunities for the campaign to engage with and work collaboratively with these organisations. This campaign will also produce a range of resources and education tools that can be referred to, used or distributed by audiences throughout the country. Information will also be available on the Biosecurity New Zealand website and will be developed in consultation with stakeholders and based on their needs.

Please also refer to *Key Statement 5* in section 3 of this document.

4.8 IAN BARUGH

4.8.1 I believe that any risk of an exotic disease is too great.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.8.2 …it is likely that the initial outbreak could occur with a person with nothing at stake taking short cuts and feeding untreated waste food to their back yard pigs.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.8.3 I think as a minimum New Zealand should maintain the current regulations in place for cooking and curing pig meat from countries that have the PRRS virus in a transitional facility and ideally not import pig meat at all from these countries.

MAF response: Please refer to *Key Statements 1* and *11* in section 3 of this document.

4.9 PETER MACDONALD

4.9.1 PRRS is a commercially devastating disease for any pig producer to contend with.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.9.2 There is a lot of scientific literature to say that PRRS can be spread by air, insects and birds. If PIC became infected with PRRS we have the potential, through the supply of breeding stock and semen, to quickly spread the disease through out the NZ pig industry.

MAF response: Please refer to *Key Statement 10* in section 3 of this document.

4.9.3 …around 1.2 percent of meat imported from PRRS infected herds will contain viable virus. At least 40 percent of pork consumption is imported. The risk is not non-negligible and requires retention of transitional treatment for all pork imports from PRRS infected countries.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.9.4 MAF do not have the resources to police and ensure compliance to the (Meat and Food Waste) regulations.

MAF response: Please refer to *Key Statement 5* in section 3 of this document. Please also see the response to 4.7.1 above.

4.9.5 We are very concerned that if "uncooked high value cuts" are garbage fed to pigs the risk of introducing PRRS into the area and that disease being transmitted via birds, insects or air to one of our farms is increased.

MAF response: Please refer to *Key Statement 10* in section 3 of this document.

4.9.6 Currently there are no PRRS surveillance mechanisms in place to detect the presence of PRRS on slaughter of NZ pigs. Therefore PRRS could remain undetected for a long period of time, increasing the spread of the disease.

MAF response: Please refer to *Key Statement 14* in section 3 of this document.

4.9.7 PIC fails to understand why imported high value cuts do not pose a greater risk. High food safety standards mean that meat will get rejected and subsequently disposed of…the uncooked meat will end up being fed to back yard operators.

MAF response: High value, consumer-ready cuts will be associated with a negligible likelihood of generating fresh scraps of raw pig meat. Please refer to *Key Statements 2* and *3* in section 3 of this document.

4.10 SHARON O'CALLAGHAN

4.10.1 MAF is dreaming if they think that they will get a hundred percent compliance on the cooking of food scraps destined for the pigsty…and the policing of this would be cumbersome, expensive and ineffective….

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.11 ANON

4.11.1 We cannot afford the risk of PRRS in this country At All and the minimal level of enforcement of food waste regulations and the wide open gaps that are available for people to flaunt the rules makes this proposition a definite no brainer.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.12 CLAIRE NEAL

4.12.1 Canterbury Genetics Ltd is against the proposed changes because of the potential for PRRS to enter the country and spread.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.12.2 Uncooked meat products are fed to pigs, sometimes by people with a lack of knowledge of the regulations, lack of adequate facilities to cook at 100C for 1 hour, or blatantly ignoring the rules. I have myself in the past witnessed where uncooked restaurant food waste was fed to pigs in ignorance.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.12.3 Current bio security on many pig units is poor.

MAF response: Please refer to *Key Statement 6* in section 3 of this document.

4.12.4 The cost of this disease (PRRS) to our industry would be huge… If PRRS were to become established in NZ, my feeling would be that then there would be no Pork Industry left in New Zealand.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.12.5 No definition is given of what a 'high value cut' is.

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.12.6 High value cut returned on the plate partially uneaten (and not cooked at 100C for 1 hour), added to the pig waste, and then fed to some backyard raised pigs which could then filter into the breeding herd chain and it would then only (be) a matter of time before PRRS infects the whole industry.

MAF response: Please refer to *Key Statements 5* and *7* in section 3 of this document.

4.12.7 If this is allowed to proceed will meat infected with FMD be released knowingly into the country?

MAF response: The recommendations of this risk analysis do not affect the existing measures in place for animals and animal products from countries that are not free from FMD virus. For further discussion, please refer to *Key Statement 9* in section 3 of this document.

4.12.8 The UK outbreak in 2001 was attributed to feeding of infected meat to pigs and it was illegal to feed swill at that time.

MAF response: Please refer to *Key Statement 9* in section 3 of this document.

4.12.9 We believe that the risk analysis does not take into account actual practices on commercial and non commercial farms.

MAF response: Please refer to *Key Statement 6* in section 3 of this document.

4.13 G A SEXTON

The concerns raised in this submission regarding possible negative effects on developing new pig farming operations were noted. These matters are discussed in detail in the response to the NZPIB submission (see section 4.30 of this document).

Further, as discussed in *Key statement 6*, the NZPIB encourages all pork producers to institute on-farm biosecurity to maintain and protect the health status of each individual farm. The generic "Farm Biosecurity Policy" developed by NZPIB includes isolation of replacement stock, minimisation of visitors, setting of "visitor" procedures appropriate to the animal health status of the farm and control of animal vectors, such as cats, rats and birds.

4.14 STEPHEN MACAULAY

4.14.1 …there is a general acceptance of Biosecurity New Zealand's recommended sanitary measures…

MAF response: Noted.

4.14.2 …the Regulations (Biosecurity (Meat & Food Waste for Pigs) Regulations 2005) will only be effective if they are enforced…There seems to be an acceptance that the general principles and practices for managing biosecurity risks tend to be lower in smaller pig herds…We question how creditable the Regulations can be if Biosecurity New Zealand do not enforce these.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.14.3 Based on the Import Risk Analysis, there is a non-negligible likelihood that chilled or frozen pig meat from a country (with) endemic PRRS will harbour infectious PRRS virus when imported into New Zealand…this should also be reflected in the operational practices allowable within the pork processing facilities.

MAF response: The handling of waste packaging (such as cartons) in pork processing facilities is covered under the relevant standard for transitional facilities. MAF Standard 154.02.18 (see:www.biosecurity.govt.nz/files/border/transitional-facilities/animals/154-02-18.pdf) requires that animal product waste and the original packaging material shall be disposed of as specified in the import health standard and the methods used shall be approved by the supervisor. In principle, waste products from processing or unwanted animal product shall be treated or disposed in an approved manner so that any potentially associated organisms can do no harm.

4.15 GUS MORTON

This submission raised issues concerning the interaction of PRRS with PMWS, the disposal of pig meat past its “use by date” and economic impacts on the domestic pig production industry. Please refer to *Key statements 2, 8* and *13*.

4.16 IAN JOSEPH SCHULTZ

4.16.1 I agree that the risk likelihood of the PRRS being found in frozen imported pork products is real.

MAF response: MAF has acknowledged in section 4.1.4 that it considers there will be a non-negligible likelihood that chilled or frozen pig meat from a country with endemic PRRS will harbour infectious PRRS virus when imported into New Zealand. However, please also refer to the "cascade of risk reduction" described in *Key Statement 1* in section 3 of this document.

4.16.2 Even if there are rules which stipulate that imported pig meat must not be fed to pigs, someone in the chain of disposal will find a way to divert the food to a friendly backyard pig farmer.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.16.3 I agree with the Import Risk Analysis where it accepts that commercial pig farms which process food waste properly are not at risk of contracting PRRS, as commercial piggeries have too much at stake to risk not treating scraps properly.

MAF response: Noted.

4.16.4 The minimum quantity of meat required to infect a pig is unknown. The Import Risk Analysis makes an unsupported claim that it is improbable that the volume of scraps generated by a single household at any one time will approach the relatively large quantities (500-900g) that were used in the field trial. I see no evidence to suggest that 500-900g is "large". Indeed if these quantities did routinely cause infection, then it surely can be assumed that a lesser quantity will also cause infection, even if at a lower rate.

MAF response: Please refer to *Key Statement 4* in section 3 of this document.

4.16.5 It is quite common for 500-900g of pork to be disposed of at once. A power failure of a house hold freezer typically means that larger volumes of uncooked meat have to be disposed of.

MAF response: Please refer to *Key Statement 2* in section 3 of this document. In addition, the titre of PRRS virus present in meat can be expected to fall by 75 percent in a single freeze/thaw cycle (as stated in section 4.1.3 of the risk analysis) and this effect would further reduce the likelihood of generating infectious meat scraps through the scenario described.

4.16.6 My experience with PMWS and with the large pool of backyard piggeries in my area is that any virus that is prevalent in the wider group will eventually pass into commercial piggeries.

MAF response: Please refer to *Key Statements* 7 and 10 in section 3 of this document.

4.16.7 Along with all livestock farmers in New Zealand, we have a huge reliance on our freedom from many diseases that are endemic in the countries with which we trade…We must not relax our guard.

MAF response: Please refer to *Key Statement 1* in section 3 of this document and the response to 4.2.8 above.

4.16.8 I am concerned that the precedent set here will carry through to other food imports.

MAF response: Please refer to *Key Statement 1* in section 3 of this document. Please also refer to the responses given to 4.30.2 and 4.31.14 below.

4.17 JENS RAVN & STEVE STERNE

4.17.1 Using the information provided in the analysis, we estimate that this will effectively allow between 25 and 100 tonnes of untreated and infected meat to be distributed around the country each year.

MAF response: The risk analysis (section 4.1.4) acknowledges that there is a non-negligible likelihood that chilled or frozen pig meat from a country with endemic PRRS will harbour PRRS virus when imported into New Zealand.

4.17.2 We don't know what BNZ consider to be a high value cut, other than that they describe these cuts as those that are expected to yield few scraps or trim. On this basis, the authors of the analysis must consider chops, steaks and roasts as high value cuts as they state that it is very unlikely that these would generate scraps. This is simply <u>not</u> true.

MAF response: Please refer to *Key Statement 3* in section 3 of this document. Consumer-ready, high value cuts will be associated with a negligible level of *fresh raw* scrap generation prior to cooking. MAF accepts that roast joints of meat and other cuts listed may be associated with the generation of scraps of cooked meat although, as described in section 4.2.1 of the risk analysis, normal cooking can be considered to inactivate PRRS virus.

4.17.3 In our own experience the amount of food waste that ends up on backyard pig farms is surprisingly large and is derived from all sorts of sources such as retirement homes, army camps, boarding schools, restaurants, butcher shops, supermarkets and individual households.

MAF response: As described above (4.17.2), PRRS virus will be inactivated by normal cooking and risk is associated with the generation of raw scraps prior to cooking. Please also refer to *Key Statement 2* in section 3 of this document.

4.17.4 …we acknowledge that the only plausible way for infected pig meat to lead to an infected pig is if the pig is exposed to the meat … The likely feeding of such meat to pigs and the consequent infection of the pigs with PRRS will be on backyard operations.

MAF response: Infection of pigs would require exposed to *fresh raw* meat containing infectious PRRS virus before the virus is inactivated (e.g. within 3 to 24 hours at 37°C as indicated in section 3.4.2 of the risk analysis). Please also refer to *Key Statements 5* and *7* in section 3 of this document.

4.17.5 It is not uncommon for these (backyard and semi-commercial) pig keepers to share waste food sources, trade pigs with each other and to move boars between farms. It is completely incorrect to suggest that no breeding occurs on these farms. The number of properties on which a small herd of pigs is kept in NZ is huge and they are distributed throughout virtually every corner of the country.

MAF response: Section 2.1.2 of the risk analysis acknowledges that the backyard pig population of New Zealand is a relatively little-understood sector and goes on to suggest that it is generally assumed that herds with less than 20 pigs are unlikely to be breeding units. However, section 4.3.1.2 also acknowledges that there may be backyard breeder units comprising tens of sows and also that some spread of PRRS to other backyard herds would be likely, particularly to herds that introduced live animals (including travelling boars) or used semen from the index herd, but possibly also to other herds that shared implements such as vehicles or other equipment. Please also refer to *Key Statement 7* in section 3 of this document.

4.17.6 We simply cannot prevent the movement of birds (as an example) between backyard pigs units and our own – although we try! We believe it would only be a matter of time before our herd became infected with PRRS once it became established in NZ.

MAF response: Please refer to *Key Statement 10* in section 3 of this document.

4.17.7 As the single largest employer in our area, our contribution to the community extends beyond the immediate staff we employ. Were it not for the work we provide, many of our staff would have to move to other areas in search of opportunities, most of these people have children in the local school, shop locally and so on…Our herd also consumes about 20,000 tonnes of feed a year, most of which is derived from ingredients grown in NZ and all of which is processed in Canterbury. To suggest that the impact of PRRS on our farm would only impact on those directly involved with the farm is completely wrong.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.18 SPENCER AND JACQUI JOHNSTONE

4.18.1 …the back-yard pig industry is particularly high during the lead up to Christmas, whereas the statistics used in AgriBase are based on the census as at 30 June. The figure at 31 October of "herds" of 1-10 pigs could well be double that provided in Table 4 of the risk assessment.

MAF response: Section 2.1.2 of the risk analysis states that "This relatively little-understood sector of the pig industry is thought to be characterised by short term fluctuations both in the number of herds and the number of animals".

4.18.2 Despite the illegality of feeding uncooked food to pigs, it is probable that more than 90 percent of these back-yard operations consider that the rules don't apply to them.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.18.3 MAF has dedicated little or no resources to policing the feeding of uncooked waste and has a record of failing to follow-up on breaches of the Act, or of responding in such a manner that the offender is not really deterred.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.18.4 PRRS can also be spread via faeces and there are many potential vectors not mentioned in the assessment – flies, birds, rodents etc … It is virtually impossible to keep flies, birds and rodents from crossing boundary fences.

MAF response: Please refer to *Key Statement 10* in section 3 of this document.

4.18.5 "mallard ducks were susceptible to infection via drinking water" and "shed the virus in faeces for up to 3 weeks". Does this mean that the virus is also carried in water?

MAF response: As indicated in section 3.4.2 of the risk analysis, the fragility of PRRS virus means that it is relatively quickly inactivated in the environment. Please also refer to *Key Statement 10* in section 3 of this document.

4.18.6 Feral pigs are another possible means of disease spread, and they certainly don't cook their food before eating it!

MAF response: Section 4.2.5.1 of the risk analysis indicates that the likelihood of raw pig meat scraps being consumed within 24 hours of disposal as garbage is remote and that the likelihood of exposure of feral pigs to uncooked scraps that are infectious for PRRS is considered to be very low.

The role of feral pigs is also discussed in section 4.3.1.1 of the risk analysis and the likelihood of PRRSv being maintained in the New Zealand feral pig population is considered to be negligible. Because of this, and the low likelihood of contact between feral pigs and commercial pigs, the consequences of introduction of PRRSv into the feral pig population are considered to be negligible.

4.18.7 A 0.1 percent risk is still too high, considering the tonnage of meat that is imported, the possibility of that meat being fed uncooked to another pig in NZ and the virulent spread that is likely to follow, which will seriously damage the NZ pig industry.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.18.8 The message from pig producers in infected countries is that we do NOT want PRRS, it is a devastating disease.

MAF response: MAF agrees that PRRS is unwanted and the virus is listed on the unwanted organisms register (http://mafuwsp6.maf.govt.nz/uor/ searchframe.htm) as a notifiable organism in this country. Section 4.4 of the risk analysis concludes that there is a non-negligible likelihood of release of PRRS virus in imported pig meat and sanitary measures have been recommended (section 5.2.3) to provide the appropriate level of protection against PRRS. Please also refer to *Key Statement 1* in section 3 of this document.

4.18.9 The risk assessment assumes that everyone operates legally. As we have portrayed, this is certainly not the case – the high risk occurs in numerous small, back-yard operations feeding uncooked waste.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.19 PAUL DAVEY

4.19.1 We need to note that even though swill feeding was strictly illegal in England by 2001, the outbreak of Foot and Mouth Disease in that country has been widely attributed to swill feeding of pigs

MAF response: Please refer to *Key Statement 9* in section 3 of this document.

4.19.2 …an incursion of PRRS into New Zealand will have a significant impact on the pork industry and those who service it.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.19.3 …regulatory relaxation (as proposed) raises the risk of disease incursion of PRRS etc to an unacceptably high level.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.19.4 From a mixed farming operation perspective, relaxing such controls increases the risk of other harmful diseases entering New Zealand.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.19.5 Current rules for the import of pig meat into New Zealand must not be relaxed and waste feeding regulations must be strictly enforced.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.20 BINDI GROUND

4.20.1 Uncooked meat products are fed to pigs, sometimes by people with a lack of knowledge of the regulations, lack of adequate facilities to cook at 100 C for 1 hour, or blatantly ignoring the rules.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.20.2 Current bio security on many pig units is poor … The cost of improving Biosecurity is incurred by the farmer.

MAF response: Please refer to *Key Statement 6* in section 3 of this document.

4.20.3 No definition is given of what a 'high value cut' is.

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.21 PETER LOGAN

4.21.1 We are in agreement with the content of the document with respect to the current Transitional Licence system which effectively creates a defacto Trade Barrier, protecting the Australian Pork Market from USA/Canadian competition within New Zealand.

MAF response: A number of other submissions have suggested that the current measures in place do not act as a barrier to trade (see 4.5.8, 4.32.19 and 4.40.10). However, if the current sanitary measures for imported pig meat cannot be scientifically justified then New Zealand, as a signatory of the SPS agreement, cannot continue to require their implementation. Please also refer to *Key Statement 11* in section 3 of this document.

4.21.2 Thus, we believe that all Boxed Pork meat (meat purchased by Chemical Lean rating so processors have little or no wastage) is value added by this process and is able to be further processed by any competent Restaurant, Takeaways, Wholesale Distributor, Butcher and/or Retailer.

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.21.3 Due to the targeted value added nature of the products they (Food Service Operators and Manufacturers) are able to buy for immediate use and/or further processing, they are able to operate with little risk of wastage.

MAF response: It is reasonable to assume that the likelihood of fresh raw pig meat scraps being generated by food service operators and manufacturers would be higher than for households.

4.21.4 …we think a clear definition of Higher Value Cuts and Officially Approved Facility should include all Boxed Frozen Pork products (with the exclusion of carcase products) that are able to be processed on a premises that currently is able to further process meat products.

MAF response: Please refer to *Key Statement 3* in section 3 of this document. Please also see the response to 4.14.3 above.

4.22 GRAHAM TAYLOR

4.22.1 To suggest that 'high value' meat scraps would not find their way into the porcine food chain is flawed as every meat product has a degree of trim that is discarded. Public awareness of 'use-by dates' also means meat products are discarded into the waste stream

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.22.2 It appears the Food Waste Regs are not policed in any meaningful way.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.22.3 Unfortunately it is the layer of the pig industry, outside the commercial farmers, who will place NZ at the greatest risk as these people freely trade in pigs, waste food, and illegal un-inspected pig meat. Some also release pigs into the wild for later hunting further spreading disease in an uncontrolled population.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

The role of feral pigs is discussed in section 4.3.1.1 of the risk analysis and the likelihood of PRRSv being maintained in the New Zealand feral pig population is considered to be negligible. Because of this negligible likelihood and the low likelihood of contact between feral pigs and commercial pigs, the consequences of introduction of PRRSv into the feral pig population are considered to be negligible.

4.22.4 Should PRRS enter the NZ pig herd the results would be devastating.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.23 IAN MCINTOSH

4.23.1 Assuming the 1100 sow outdoor breeding unit was infected…the consequence through to bacon if the figure (estimated cost) was only $NZ500/sow, equates to a minimum of $183,000 per year over the first 3 years. The flow on effect to the abattoir at Freshpork Bay City would be significant as a reduced kill significantly increase the killing charge per animal.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.23.2 Where live animals were used to test if meat was infective (apparently only two trials reported in the literature (p33-34)) the technique of virus isolation is totally discredited and PCR, while more sensitive, is assumed to be the benchmark rather than being presented as only an indicator…If PCR has been validated against live animal feeding trials then this information should have been presented.

MAF response: Risk can only be assessed based on the scientific information available at the time. MAF is not aware of any such validation study. Please also see the response to 4.30.19 below which discusses virus isolation and PCR results from a number of studies. This issue is also discussed in some detail in appendix 2.

4.23.3 If PCR technology is flawed in its application then the calculation of the risk (1.2 percent, page 34) of the presence of the PRRS virus in meat from slaughtered pigs in a country with endemic infection will be incorrect.

MAF response: MAF is unaware of studies suggesting that PCR technology is flawed, however there is a need for caution in interpretation of the results of such studies as discussed at length in appendix 2 of this document. Please also refer to *Key Statement 12* in section 3 of this document.

4.23.4 In 100 percent of trials (two) where the ultimate test was used i.e. live pigs, despite a negative tissue culture result and inoculating the pigs via the least infective route and using meat that would have been through a process which kills 75 percent of the PRRS virus, the meat still delivered a highly infective dose as indicated by the number of pigs developing clinical disease.

MAF response: This is acknowledged in the risk assessment.

4.23.5 As many pigs in NZ are injected around birth or weaning with a needle common to most, if not all pigs on the day, should PRRS virus infect even one young pig via the oral route then common farm practices could quickly transmit the virus…Otake et al 2002 reports that dirty needles will transmit the PRRS virus.

MAF response: The risk analysis acknowledges the work cited by this submission in section 3.4.5.3. Section 4.1.2.1 of the risk analysis states that the transmission dynamics of PRRS within a herd can be complex and are influenced by herd size and opportunities for contact between subpopulations of susceptible, infectious and immune animals within and between the breeding, nursery and fattening units. The risk analysis has acknowledged that introduction of PRRS virus into a herd may be followed by epidemics of disease (section 4.3.1.3). Transmission of the virus within a herd as suggested by this submission would have no effect on the consequence assessment of the risk analysis.

4.23.6 Mallard ducks were shown to excrete PRRS virus for 3 weeks after drinking contaminated drinking water … The Canterbury plains have a high incidence of outdoor sow herds that are frequented by large numbers of ducks at certain times of the year.

MAF response: Please refer to *Key Statement 10* in section 3 of this document.

4.23.7 "The likelihood of raw pig meat scraps being generated by restaurants, retail outlets, processors and manufacturers is considered to be higher than for households" (page 41) …they are the very ones who are more likely to use the higher value imported unprocessed cuts. In addition they are the ones who would be the hardest to police with regard to garbage disposal given their numerical number.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.23.8 While it is accepted that MAF have different resourcing for the different departments, it goes without saying that resourcing is stretched at times and so low priority cases involving garbage feeding of a few pigs could go uninvestigated.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.23.9 "…no major pork producing country in the Northern Hemisphere considers that PRRS can be transmitted by pork, as evidenced by the lack of regulations for intercommunity trade in pig meat among EU member states" (p50)… Given the vivid reminders of FMD and BSE in Europe, the attitude of authorities and the community are likely to be more diligent in their enforcement of the law.

MAF response: Please refer to *Key Statement 5* in section 3 of this document. Furthermore, MAF is unaware of any robust data that would indicate that compliance with similar garbage-feeding legislation in EU countries is significantly different from compliance in New Zealand.

4.23.10 "When the disease (PRRS) was recognised in the United States, countries…banned the importation of pork from the United States, or required certification that the swine originated from premises where, within the 30 days prior to the issuance of the health certificate, no swine were introduced from a municipality in which a premises infected with the virus is located" (Stan Done, pers. comm.). It is therefore incorrect to downgrade the international attitude toward the perceived risk of PRRS being spread in traded meat.

MAF response: MAF contacted Professor Done regarding this, and he advised that this comment related to a time when PRRS was a little-understood emerging disease in the USA. Professor Done also commented that there was likely to have been political motives behind a number of countries blocking American pork exports at this time[11].

No country outside Australasia considers it credible or justified to have any risk management measures in place for PRRS in pig meat. Section 4.3.1.3 of the risk analysis states that "the introduction of PRRS virus into pig herds in New Zealand would be unlikely to result in significant indirect costs in terms of domestic or international market reactions".

The domestic market is unlikely to be affected as there are no zoonotic or food safety issues surrounding PRRS. Internationally, no major pork producing country in the Northern Hemisphere considers that PRRS can be transmitted by pork, as evidenced by the lack of regulations for intracommunity trade in pig meat among EU Member States, regardless of the fact that at least two of them (Sweden and Finland) are free from PRRS. Moreover, exports of pork from New Zealand are limited to a few hundred kilograms annually to the Pacific Islands and Singapore.

[11] Done S, (S)VIO, VLA Thirsk, UK. E-mail to Stephen Cobb, 7 December 2006

4.24 LUCY CADDICK

4.24.1 ...the authors seem to have little understanding of what goes on in the normal kitchen or the dodgy underworld of backyard pig keepers.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.24.2 I am also aware that there are literally thousands of pigs kept in backyards in and around the South Auckland area where I live and work.

MAF response: Section 2.1.2 of the risk analysis acknowledges this where it states "the backyard pig herds in Auckland and South Auckland are not included in the above figures. There are thought to be a large number of pigs in that region, particularly as a source of pig meat supply to the Polynesian community. It is estimated that up to 70,000 pigs per year may be slaughtered in this area, comprising approximately 10 percent of the national annual kill."

4.24.3 To suggest that scraps will not be generated from high value cuts such as steaks and roasts is nonsense, although I accept that the amount of scraps from these cuts are likely to be less than from some other parts of the carcass.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.24.4 …when I shop I generally buy small ready to eat portions of a variety of meats…one or more of these portions is often not eaten before it passes its "best by" date … in this situation I simply throw the whole portion away…If I had backyard pigs and if I was irresponsible enough to feed these my uncooked household scraps, my pigs may frequently get more than 500g of pork at a time.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.24.5 As far as their understanding of backyard pig keepers is concerned, the authors show their ignorance by suggesting that these people don't breed their pigs and that they are unlikely to spread disease to other farms

MAF response: Section 2.1.2 of the risk analysis acknowledges that the backyard pig population of New Zealand is a relatively little-understood sector and goes on to suggest that it is generally assumed that herds with less than 20 pigs are unlikely to be breeding units. However, section 4.3.1.2 also acknowledges that there may be backyard breeder units comprising tens of sows and also that some spread of PRRS to other backyard herds would be likely, particularly to herds that introduced live animals (including travelling boars) or used semen from the index herd, but possibly also to other herds that shared implements such as vehicles or other equipment. Please also refer to *Key Statement 7* in section 3 of this document.

4.24.6 Given that there are so many unsubstantiated assumptions in the report, that many of these tend to suggest the authors know little of the pig industry or the activities they have analysed, and that the recommendations made in the report are inconsistent with respect to much of the material presented in the report, I am left to ask "how objective have the authors been and if they have some predetermined agenda?"…I cannot help but question if MAF has a problem with the pig industry, or if it is simply prepared to sacrifice the industry for some other motive that I don't understand.

MAF response: As indicated in *Key Statement 11*, as a signatory of the SPS agreement, sanitary or phytosanitary measures applied to imported commodities can only be based on scientific principles and not maintained without sufficient scientific evidence, furthermore these measures must not be more trade-restrictive than required to achieve our appropriate level of sanitary or phytosanitary protection.

Under Section 22 (5) of the Biosecurity Act (1993), recommendations from the chief technical officer to the Director-General relating to the issue of an import health standard must have regard to:

a) the likelihood that goods of the kind or description to be specified in the import health standard may bring organisms into New Zealand;
b) the nature and possible effect on people, the New Zealand environment, and the New Zealand economy of any organisms that goods of the kind or description specified in the import health standard may bring into New Zealand;
c) New Zealand's international obligations;
d) such other matters as the chief technical officer considers relevant to the purpose of this Part.

4.24.7 …if PRRS gets into NZ…it will have a devastating impact on both breeding and grower herd performance

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.25 COLIN & KAREN BATTERSBY

4.25.1 We support the matters raised by the New Zealand Pork Industry Board

MAF response: Noted.

4.25.2 MAF seems to rely on post border measures to control it (PRRS-infected meat) but there appears to be no consideration of how waste will be generated via food outlets, retail outlets and, indeed, consumers.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.25.3 There is also no definition of what is to occur when the product has passed its "use by date". There will be wastage and therefore danger of infection. This wastage needs to be properly defined.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.25.4 There is no definition of "consumer ready – high value cuts"

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.25.5 Why should MAF come to the conclusion that such imports (consumer ready – high value cuts) are necessary?

MAF response: Please refer to *Key Statement 1* in section 3 of this document and to our international obligations as outlined in *Key Statement 11*.

4.25.6 If MAF have approved a pork industry quality bench mark developed by NZPIB requiring very high standards, why is MAF about to punish those who produce very high quality cuts?

MAF response: MAF is not seeking to punish producers of high quality pork cuts. As signatories of the SPS agreement we are obliged to revise any current risk management measures which cannot be scientifically justified. As stated in section 2.1 of the risk analysis, the sanitary measures applied to imported pork in September 2001 were a provisional measure and a risk analysis was required to finalise MAF's position on this issue. This risk analysis has concluded that there is a non-negligible risk of PRRS in imported pig meat and revised sanitary measures have been recommended to ensure the appropriate level of protection against this risk. Please also refer to *Key Statement 11* in section 3 of this document.

4.26 GD & H HARVIE

4.26.1 In Hawera a town of 8000 pop. None of the food waste goes to commercial Piggeries. Most is collected and fed by Backyard operators who have no facilities for cooking.

MAF response: Please refer to *Key Statements 2* and *5* in section 3 of this document.

4.26.2 We consider that if this was the same risk of the chance of Foot and Mouth getting into New Zealand a review such as this would not even be contemplated.

MAF response: Please see *Key Statement 9* in section 3 of this document.

4.27 NATALIE GERBER

4.27.1 Comprehensive, detailed and transparent procedures must be in place prior to any consignments of potentially infected (i.e. from a country not free from PRRS) imported pig meat being treated on New Zealand shores.

MAF response: Any transitional facility which wishes to process imported pig meat undergoes a preliminary inspection by a MAF Biosecurity Officer to assess compliance with the operational standard and the appropriate import health standard prior to approval by the Biosecurity New Zealand Operational Standards Group. Transitional facilities which process animal products such as pork must comply with MAF's 154.02.18 operational standard. See: www.biosecurity.govt.nz/files//border/transitional-facilities/animals/154-02-18.pdf

4.27.2 The NZFMA is concerned that the two alternative options for risk management detailed in the draft IRA, potentially allow for the release of PRRS infected meat into New Zealand and the subsequent infection of both the non-commercial and the commercial pig herd. The two alternative options of concern to the NZFMA are:

- **"in the form of consumer-ready, high value cuts";**
- **"further processed on arrival, in an officially approved facility, into consumer-ready high value cuts".**

MAF response: Please refer to *Key Statements 1* and *3* in section 3 of this document.

4.27.3 Whilst the NZFMA supports the current Biosecurity (Meat and Food Waste for Pigs) Regulations 2005 and believes that the implementation of these regulations are justified, the NZFMA would question whether…the current MAF budget would allow for the enforcement of the current Biosecurity (Meat and Food Waste for Pigs) Regulations 2005, particularly as the majority of the 7132 herd identified by AgriBase are not commercial producers.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.27.4 …the NZFMA does not believe that it is realistic to assume that because an activity is prohibited it does not occur, especially when there are no apparent measures in place to police this.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.27.5 Much of the research conducted on PRRS transmissions had been conducted in Canada and the United States…As the New Zealand pig herd has a unique Biosecurity status, the standard biosecurity measures in place on the majority of farms are likely to be considerably less than the strict biosecurity measures in place on farms such as Canada and the USA …It is therefore essential that Biosecurity New Zealand define what they consider to be standard biosecurity

procedures necessary to prevent commercial herds becoming infected with PRRS and to compare these to current practices in place in New Zealand.

MAF response: Please refer to *Key Statement 6* in section 3 of this document.

4.27.6 "although Biosecurity measures can substantially reduce the risk of introduction…breakdowns are common…". This statement clearly indicates that biosecurity measures on-farm are not fail-safe.

MAF response: Please refer to *Key Statements 6* and *7* in section 3 of this document.

4.27.7 ...the increasing number of outdoor producers must be taken into account when considering the potential to implement high levels of biosecurity on farm… the NZFMA believes that given the unique health status of New Zealand's pig herd, unless specific evidence to the contrary is available the potential risk of spread to outdoor commercial herds and subsequently to commercial pig population as a whole cannot be discounted.

MAF response: Please refer to *Key Statements 6* and *10* in section 3 of this document.

4.27.8 …no description of consumer ready cuts is provided and it is unclear what Biosecurity New Zealand would accept as consumer ready.

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.27.9 Biosecurity New Zealand does not appear to have given any consideration to the potential disposal of consumer ready cuts that are either past their use by date, or disposed of by the consumer for whatever reason.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.27.10 Biosecurity New Zealand states … "it is improbable that the volume of scraps generated from a single household at anyone time will approach the relatively large quantities (500-900g) that were used in feeding trials". However, no consideration is given in this section to restaurants, retail outlets, processors and manufacturers, which Biosecurity New Zealand consider…to have a higher likelihood of generating raw pig meat scraps.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.27.11 <u>neither</u> of these studies (Van der Linden et al (2003) and Magar and Larochelle (2004)) demonstrated that 500g of infective pig meat is the minimum volume required for infection to occur.

MAF response: Please refer to *Key Statement 4* in section 3 of this document.

4.27.12 …it must be noted that producers in the importing country should not be prejudiced as a result of being required to meet higher standards of biosecurity than are currently in place simply to ensure the continued survival of their businesses as well as the health and welfare of their herds.

MAF response: Please refer to *Key Statement 6* in section 3 of this document.

4.27.13 The NZFMA strongly believes that the maintenance of New Zealand's unique biosecurity status and exclusion of exotic disease can only occur of Biosecurity New Zealand maintains it's current stance of ensuring that risks associated with the importation of animal and plant products are addressed off-shore.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.28 RR FOX

4.28.1 The food waste regulations have only very minimal policing and at this point in time are very limited in their effectiveness for biosecurity.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.28.2 The current measure, that is, that <u>all</u> meat from countries where PRRS is endemic is treated by cooking or curing is the absolute minimum standard required for the maintenance of the health and welfare of our animals.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.28.3 Treatment of meat on arrival in the country is the only practical point to prevent another incursion.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.29 COLIN KAY

4.29.1 I would strongly agree with your statement that "if PRRS virus was introduced into New Zealand, the consequences would be significant on affected farms, particularly in breeding units."

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.29.2 New Zealand is entitled to set measures which protect it from exotic diseases infecting its animal populations, and the consequent impact on its citizens.

MAF response: Please refer to *Key Statements 1* and *11* in section 3 of this document. Article 2.2 of the SPS agreement states that "Members shall ensure that any sanitary or phytosanitary measure is applied only to the extent necessary to protect human, animal or plant life or health, is based on scientific principles and is not maintained without sufficient scientific evidence…"

Article 5.6 of the SPS agreement also states that "…when establishing or maintaining sanitary or phytosanitary measures to achieve the appropriate level of sanitary or phytosanitary protection, Members shall ensure that such measures are not more trade-restrictive than required to achieve their appropriate level of sanitary or phytosanitary protection, taking into account technical and economic feasibility."

The sanitary measures have been recommended in the risk analysis because they provide a level of protection against an incursion of PRRS that is considered to be appropriate without being overly trade-restrictive.

4.29.3 I have been closely involved in reports from pork producers of suspected non-compliance with the Biosecurity (Meat and Food Waste) Regulations. Our experience is that there has been very little attention to ensuring compliance. Until NZPIB became involved there was no attention at all.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.29.4 …some pork from high value cuts will be sold as lower value product or discarded as waste, and this can occur at the processing plant, butcher shop, restaurant or in the home…which has the potential to generate considerable quantities of PRRS infected meat. The risk of this pig meat being fed as garbage feed to pigs is no different to low value product.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.29.5 New Zealand is entitled to set sanitary measures to manage the risk of the introduction of unwanted diseases such as PRRS. The transition stations involves a relatively simple process for treating pig meat from PRRS infected countries and based on the volumes of pig meat imported from these countries it has not hindered the flow of imports.

MAF response: Please refer to the response to 4.29.2 above.

4.30 SAM MCIVOR

The structure of this submission from the NZPIB included a number of summaries including both "executive summaries" and "key points". Therefore, many individual issues were repeated several times in the submission. These points have not been addressed each time they appeared although all points raised in the submission have been addressed below.

A number of points raised in this submission indicated disagreement with aspects of the interpretation of scientific data used in this risk analysis. It must be noted that in order to ensure transparency and openness, MAF sought the opinions of a number of internationally recognised experts in this field on the technical issues that were highlighted in this submission. The contributions of these experts are included as appendix 2 of this document. This extra round of external technical review is not part of the standard risk analysis process, and it was carried out in this case to ensure that the technical issues raised in this submission were considered as thoroughly as possible.

4.30.1 NZPIB emphasises that it is fully supportive of the application of carefully evaluated science, considered within the context of the New Zealand environment, as a basis for management of biosecurity risks, including the setting of Import Health Standards.

MAF response: Noted.

4.30.2 We also are concerned in regard to the potential precedent set by this IRA for the setting of sanitary measures generally

MAF response: Each risk analysis by Biosecurity New Zealand must be carried out in accordance with all available relevant scientific information. The sanitary measures recommended in the risk analysis are suggested to specifically manage the risk associated with PRRS virus in imported pig meat.

Under section 22 (5) of the Biosecurity Act 1993, when making a recommendation to the Director-General (including risk management measures of an import health standard), the chief technical officer must have regard to the following matters:

a) the likelihood that goods of the kind or description to be specified in the import health standard may bring organisms into New Zealand;
b) the nature and possible effect on people, the New Zealand environment, and the New Zealand economy of any organisms that goods of the kind or description specified in the import health standard may bring into New Zealand;
c) New Zealand's international obligations;
d) Such other matters as the chief technical officer considers relevant to the purpose of this Part.

It should be noted that the risk analysis *recommends* sanitary measures relating to the commodity defined within that risk analysis, in consideration of parts (a), (b) and (c) of section 22(5) of the Biosecurity Act 1993. Following part (d) of section 22(5) above, the setting of the sanitary measures in an import health standard takes into account these recommendations together with other matters that the CTO considers relevant to the purpose of Part 3 of the Act i.e. "… the effective management of risks associated with the importation of …risk goods."

4.30.3 …the New Zealand pork industry has a high health status and this provides significant productivity benefits.

MAF response: Noted.

4.30.4 NZPIB has strongly supported compliance (with the Biosecurity (Meat and Food Waste for Pigs) Regulations) and encouraged pork producers to report suspected cases of non-compliance…The extent of compliance is unknown…NZPIB is very concerned about this situation as this pathway provides a feasible vector for incursion of diseases – not only PRRS but also foot and mouth disease (FMD) and other major diseases.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.30.5 The IRA does not recognise the limitations of these regulations (the Biosecurity (Meat and Food Waste for Pigs) Regulations) in controlling the exposure of the New Zealand pig herd to sources of exotic infection via waste feeding. Critical limitations are very limited attention to education to date and BNZ's lack of resources for compliance activities.

MAF response: Please refer to *Key Statement 5* in section 3 of this document. Please also see the response to 4.7.1 above.

4.30.6 The New Zealand pork producing industry views this surveillance (a proposal made in conjunction with Dr Eric Neumann of Massey University's EpiCentre) as complementary to maintaining very strong border controls to control the risk of PRRS incursion in the New Zealand pig herd. This commitment to surveillance, plus the thoroughness of this submission are clear indicators of the industry's concern to protect itself from PRRS.

MAF response: *Key Statement 14* acknowledges that MAF is developing a joint PRRS surveillance programme with NZPIB.

4.30.7 There is no definition for the terms used to describe the risk including "low" and "non-negligible"'; and the term "consumer-ready high value cuts" in relation to the recommended sanitary measures.

MAF response: Please refer to *Key Statement 3* in section 3 of this document. Also please see our responses to 4.30.11 and 4.30.79 below.

4.30.8 The statement that "there is a low likelihood that chilled or frozen pig meat from a country with endemic PRRS will harbour the virus when imported into New Zealand" does not reflect the full text of the report nor the body of scientific evidence from peer-reviewed research.

MAF response: The release assessment concludes (section 4.1.4) that the likelihood of infectious PRRS virus being present in meat at the time of slaughter is less than 2 percent. MAF believes that it is reasonable to describe a likelihood of less than 2 percent as "low".

4.30.9 The IRA presumes that the Biosecurity (Meat and Food Waste) Regulations 2005 manage the risk of exposure…Knowledge of, let alone compliance with, these regulations among all these relevant target groups is unknown…the extent to which these regulations manage the risk of exposure must be acknowledged as a critical 'unknown'.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.30.10 The statement that likelihood of spread of PRRS virus from an infected farm to other farms would be low as long as standard biosecurity practices were observed is inconsistent with international experience of spread of PRRS infection, and does not recognise the complexity of interactions within the New Zealand pig herd, including between the commercial through to 'backyard' sector of the industry.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.30.11 Non-negligible' is undefined and its use substantially downplays the true size of the risk.

MAF Response: As described in section 2.3, the risk analysis was written using the framework described in Import Risk Analysis Animals and Animal Products (Murray 2002). The Concise Oxford Dictionary definition of "negligible" is "not worth considering; insignificant". MAF therefore believes that the term "non-negligible" indicates a risk that is not-insignificant and worth considering and that this terminology does not downplay the size of the risk under consideration.

4.30.12 The absolute volume of imports from PRRS infected countries, the likely increase in such volumes, and also the likely volume provided in chilled form should there be a relaxation in treatment requirements to inactivate PRRSv in pig meat, are highly relevant factors in determining the risk of PRRS incursion.

MAF response: It is not possible to accurately predict future market trends following any change in the treatment requirements for imported pig meat. However, as described in Section 4.2.3, an evaluation of historical imports of pig meat during the period 1998 to mid-2001 (when pig meat was imported into New Zealand from PRRS-infected countries with no requirements for cooking or restrictions on garbage feeding) indicated that about 30,000 tonnes of pig meat was imported from PRRS-infected countries with no introduction of infection into New Zealand pigs.

4.30.13 …we note a correction. In section 2.1.2 (page 6), the first sentence below Table 5 states that "Although groups of pigs numbering less than 20 animals are not considered by the New Zealand Pork Industry Board to be 'herds', such units comprise more than 95 percent of the total pig population of New Zealand." This should read …more than 95 percent of the total pig herds of New Zealand.

MAF response: MAF accepts this correction and agrees that more than 95 percent of the pig **herds** in New Zealand have populations of less than 20 animals.

4.30.14 In fact the true number of 'herds' which have pigs over the course of a calendar year will be considerably higher again because the number of people owning pigs on any given date is likely to be a very fluctuating number.

MAF response: This is acknowledged in the risk analysis. Section 2.1.2 of the risk analysis states that "This relatively little-understood sector of the pig industry (i.e. small herds of less than 20 animals) is thought to be characterised by short term fluctuations both in the number of herds and the number of animals".

4.30.15 There is not a single category of non-breeding pig raisers among the 7,000+ para-commercial and backyard pig keepers, but rather multiple layers of interacting networks of small and medium scale pig owners who trade extensively with each other and with the lower end of the commercial pig industry.

MAF response: The risk analysis acknowledges that there is likely to be a degree of interaction between backyard herds. Please refer to *Key Statement 7* in section 3 of this document.

4.30.16 Many smaller herds are known to breed their own pigs, a practice which could involve contact with other pig herds. If these herds are not breeding units then they will be sourcing pigs from another herd. In both cases, pig movement and/or contact between properties is highly likely.

MAF response: Please refer to the response to 4.30.15 above.

4.30.17 The IRA concludes its Hazard Identification section by recognising that PRRS virus is a potential hazard in pig meat. NZPIB fully agrees.

MAF response: Noted.

4.30.18 The IRA does not refer to the EFSA (European Food Safety Authority) Scientific Opinion on PRRS transmission in fresh meat (EFSA-Q-2004-100) which was published a year before this IRA, covers many of the same issues in great depth, but interprets the outcome characterised by many 'unknowns' in a different way.

MAF response: The working group that compiled the EFSA report consisted of ten individuals. It should be noted that two of these (Dr. Lis Alban and Prof. Jeff Zimmerman) provided external scientific review of the entire risk analysis whilst a third member of this group (Prof. Michael Murtaugh) reviewed the release assessment component of the risk analysis. The 2001 draft of this MAF import risk analysis (Murray 2001) is included as a reference in the EFSA report and cited three times in the body of the report (on pages 43, 46 and 50). MAF considers that the import risk analysis was subject to a similar level of scientific scrutiny as the EFSA report cited.

The EFSA report is a review of much the same information as was considered by MAF and the conclusions of this report are not significantly different from the MAF risk analysis. The risk estimation of the EFSA report did not come to a conclusion as to the level of risk in meat and did not contain a section on risk management.

Of particular note, the EFSA report states that their modelling indicated a prevalence of viraemia at slaughter of 1.9 percent. Three different observational studies found that the *prevalence of PRRSv in pig meat at slaughter varies from 0.0 percent to 1.2 percent* (1.9 percent when evaluated by use of PCR). Taking into account that the viral load in meat is two orders of magnitude lower than in blood, EFSA suggested that this may easily explain the differences between results obtained on serum and muscle. The MAF risk analysis concluded (section 4.1.4ii) that there is a low likelihood (0.0118 or about 1.2 percent) of infectious PRRS virus being present in *meat* at the time of slaughter – this is consistent with the EFSA conclusion.

Furthermore, the EFSA report was published on 12th August 2005, by which time the MAF risk analysis on PRRSv in pig meat was almost complete. Nevertheless, MAF noted the conclusions of the EFSA report, and they were considered to be consistent with the MAF risk analysis.

4.30.19 Of key importance is a clear understanding of PRRSv persistence in blood…A partial list of studies that describe the extent of virus persistence that have particular relevance to this IRA are listed below. While this IRA does cite information from some of these studies, data generated from the use of PCR techniques has been disregarded in the IRA, without justification …Collectively, these studies suggest that the vast majority of pigs remain infected for at least 60 dpi with multiple studies demonstrating PRRSv in pigs well beyond the maximum 157 days stated in the IRA.

MAF response: This submission included a table (see the full submission in appendix 1) containing details of a number of papers in support of the claim that the risk analysis had under-estimated the period of viral persistence in infected individuals.

The papers by Wang (1999)[12] and Allende et al (2000)[13] will not be examined again here as these were considered in the risk analysis.

Section 3.4.3 of the risk analysis states, "the virus has been shown by virus isolation techniques to **persist for 35-40 days in young pigs** … and for **up to 16 weeks by PCR in piglets that are viraemic at birth** as a result of in-utero infection... **Persistence of PRRS virus in lymphoid tissues has been demonstrated for up to 135 days** in gilts." MAF considers that inclusion of this data in this paragraph indicates that PCR data was not disregarded in the risk analysis.

The paper cited in this submission by Benfield et al (2000)[14] examined persistently infected pigs following in utero exposure to PRRSv. No PRRSv was detected in serum by virus isolation beyond 48 days after farrowing and no PRRSv was detected in non-lymphoid tissue by virus isolation following euthanasia at 63 days. Virus was detected in lymphoid tissue at 132 days (using PCR) and infected pigs were shown to be able to transmit infection to sentinel pigs at 112 days. As stated above, the risk analysis states that pigs born following in utero infection have been shown to be viraemic (by PCR) until 16 weeks (112 days) and lymphoid tissue has been demonstrated to be positive for PRRSv for up to 135 days (by PCR). The findings of this paper are therefore consistent with section 3.4.3 of the risk analysis.

The paper cited in this submission by Rowland et al (2003)[15] examined the presence of virus in pigs infected in utero. This study detected PRRSv in serum until 48 days post-farrowing by virus isolation and until 78 days post-farrowing by PCR. Sporadic PCR positive results were seen in serum samples until day 228 post-farrowing although previous and subsequent samples from the same animal were negative by PCR. It is suggested in this paper that these sporadic positive results are likely to be due to the presence of a small amount of viral RNA, but at or near the lower detection limits of the PCR assay. This study also demonstrated PCR positive lymphoid tissue in pigs until 132 days post-farrowing and transmission of PRRSv to sentinel pigs from infected pigs until 112 days post-farrowing. MAF therefore considers that the results of this paper are consistent with section 3.4.3 of the risk analysis.

The paper cited by Wills et al (2003)[16] detected no virus in the serum of infected young pigs after 28 days post-inoculation (virus isolation) or after 56 days post-inoculation (PCR). Lymphoid tissue was positive to PRRSv by PCR until 84 days post-inoculation (20/28 animals) and sporadic PCR positive results were obtained from PCR tests on lymphoid tissues until 251 days post-inoculation. In this paper, the authors state that "It should be noted that positive RT-PCR results do not necessarily indicate the presence of viable virus, only the presence of viral RNA". Given the

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[12] Wang FI (1999) Minimal residues of porcine reproductive and respiratory syndrome virus in pig carcases and boar semen. *Proceedings of the National Science Council, Republic of China. Part B, Life Sciences* 23, pp 167-74

[13] Allende R, Laegreid WW, Kutish GF, Galeota JA, Wills RW and Osorio FA (2000) Porcine reproductive and respiratory syndrome virus: description of persistence in individual pigs upon experimental infection. *Journal of Virology* 74, pp10834-37

[14] Benfield DA, Nelson J, Rossow K, Nelson C, Steffen M and Rowland R (2000) Diagnosis of persistent or prolonged porcine reproductive and respiratory syndrome virus infections. *Veterinary Research* 31, p71

[15] Rowland RR, Lawson S, Rossow K and Benfield DA (2003) Lymphoid tissue tropism of porcine reproductive and respiratory syndrome virus replication during persistent infection of pigs originally exposed to virus in utero. *Veterinary Microbiology* 96, pp219-35.

[16] Wills RW, Doster AR, Galeota JA, Sur JH and Osorio FA (2003) Duration of infection and proportion of pigs persistently infected with porcine reproductive and respiratory syndrome virus. *Journal of Clinical Microbiology* 41, pp58-62

sporadic results reported from lymphoid tissue beyond 84 days post-inoculation, together with the comments from the authors of this paper (and the paper cited in the preceding paragraph), MAF considers that the results of this paper are consistent with section 3.4.3 of the risk analysis.

The citation by Zimmerman et al (2000)[17] is a non-refereed abstract from the third International Symposium on PRRS and Aujeszky's Disease, which includes comments that they were able to isolate virus from chronically infected carrier animals until 77 days post-inoculation. This abstract did not specify the method of virus detection or the exposure model used to produce infected pigs. MAF contacted the author for clarification regarding these issues and Professor Zimmerman commented[18] that it was extremely rare for viraemia to last more than 28 days and is usually cleared by 21 days. The comments included in this abstract were based upon the findings of the refereed publication by Horter et al (2002) which are themselves discussed below. Professor Zimmerman went on to comment that there is good reason to believe that some currently available PCRs for the detection of PRRSv are not detecting infectious virus and that Dr. Michael Murtaugh had speculated that these assays may be detecting viral fragments stored in long-lived cells (macrophages), which would explain PCR positive results in the absence of any tangible evidence of infectious virus. Further comments from Professor Zimmerman concerning the use of PCR tests to detect PRRS virus can be found in appendix 2 of this document.

The paper cited by Horter et al (2002)[19] detected no PRRSv in the serum of infected pigs beyond 35 days post-inoculation (virus isolation) or after 91 days post-inoculation (PCR). PRRSv was detected in peripheral blood leucocytes by PCR until 105 days post-inoculation. The authors of this paper suggested that PCR positive results in individuals giving a negative result by virus isolation indicated the detection of inactivated virus in previously infected animals. MAF therefore considers that the results of this paper are consistent with section 3.4.3 of the risk analysis.

A recent study of the role of prairie dogs in transmission of PRRS in the United States[20] concluded that “tissue samples, in particular, are subject to high backgrounds and spurious false-positive results, and that RT-PCR should not be relied on exclusively to provide evidence of PRRS infection, especially when additional test methods, such as serology, are available, or when the PCR results are near the limit of assay sensitivity.” MAF believes that it is appropriate to note comments such as this, in peer-reviewed publications, when considering PCR-based results.

The only section of the published risk assessment where assumptions about viral persistence have a critical effect is the quantitative release assessment model which was written in 2001. This estimated the likelihood of release to be 0.3 percent. However, as discussed in section 4.2.1.5 of the risk analysis and in Key Statement 12 in section 3 of this document, by the time the full risk analysis had been written in 2005, more published data was available. Based on these later transmission studies,

[17] Zimmerman JJ, Chang CC, Horter D and Yoon KJ (2000) Control of porcine reproductive and respiratory syndrome: the challenge of identifying carrier animals. *Veterinary Research* 31, p91.
[18] Zimmerman J, Iowa State University. E-mail to Stephen Cobb, 17 December 2006
[19] Horter DC, Pogranichniy RM, Chang CC, Evans RB, Yoon KJ and Zimmerman JJ (2002) Characterisation of the carrier state in porcine reproductive and respiratory syndrome virus infection. *Veterinary Microbiology* 86, pp213-28
[20] Baker RB, Yu W, Fuentes M, Johnson CR, Peterson L, Rossow K, Daniels S, Daniels AM, Polson D and Murtaugh MP (2007) Prairie dog (*Cynomys ludovicianus*) is not a host for porcine reproductive and respiratory syndrome virus. *Journal of Swine Health and Production* 15(1), pp22-9.

the risk analysis concluded that 1.2 percent of pigs at slaughter could be reasonably expected to contain infectious virus in their meat.

For further discussion concerning the interpretation of PCR data generated by the studies discussed above, please see appendix 2 of this document.

In conclusion, MAF does not consider that the additional evidence presented in the papers cited by this submission have any significant impact on the conclusions stated in section 3.4.3 of the risk analysis.

4.30.20 …there is no assessment about the extent to which New Zealand herds are in the stable state which would allow infection to become truly endemic…Commercial pig farms in New Zealand average an annual replacement rate of breeding animals greater than 40 percent...A very high proportion of new breeding stock now comes from very high health status breeding herds, and these pigs are added to commercial herds at an age where they are immunologically naïve….Therefore the IRA comment about less dramatic impacts of PRRS is not applicable in New Zealand.

MAF response: Section 3.4.4 of the risk analysis that this comment refers to describes the clinical signs that have been reported in herds following PRRS infection, this section is not intended to predict the consequences of a PRRS incursion into a New Zealand herd. However, it is reasonable to expect that infection of a commercial unit overseas would result in similar consequences as an infection of a New Zealand commercial herd with broadly similar management practices.

The consequence assessment of the risk analysis (section 4.3) examines the consequences on the people, the environment and the economy of New Zealand of entry, establishment or spread of PRRS, as stated in the first paragraph of this section. The risk estimation (section 4.4), which draws upon the conclusions of the consequence assessment, clearly states that "the consequences of PRRS infection would be significant in the breeding herds that became infected".

4.30.21 PRRSv is a typical highly mutable RNA virus and exists as multiple quasispecies within herds and within individually infected animals…This leaves the potential for entire breeding populations that could be considered immunologically naïve to particular strains of PRRS under the right circumstances, and new strains are regularly emerging which show differences in epidemiology.

MAF response: The risk analysis states in section 3.4.2 that "Arteriviruses have a high mutation rate due to their mechanism of RNA replication. Thus, PRRS virus is genetically highly unstable, and isolates vary considerably in both nucleic acid sequence and pathogenicity". Furthermore, the entire New Zealand pig population is currently assumed to be serologically naïve to *any* strain of PRRSv.

4.30.22 The single reference used to support the claim that only 20 percent of seropositive herds show clinical signs and that the impact of disease "in many herds even the epidemic period does not have dramatic consequences" …does not accurately represent the international picture…despite PRRS recognition as an important disease worldwide since emergence in the late 1980s, it still commands significant attention from veterinarians and pig scientists.

MAF response: The risk analysis actually states that "*in one study*, only 20 percent of seropositive herds actually experienced *obvious* clinical signs". As stated in the response to 4.30.20, the consequence assessment of the risk analysis (section 4.3) examines the consequences on the people, the environment and the economy of New Zealand of entry, establishment or spread of PRRS, as stated in the first paragraph of this section. The risk estimation (section 4.4), which draws upon the conclusions of the consequence assessment, clearly states that "the consequences of PRRS infection would be significant in the breeding herds that became infected".

MAF acknowledges that PRRS still commands significant attention from veterinarians and pig scientists as this risk analysis was completed following the results of studies published in 2003 and 2004. Furthermore, of the 158 references cited in the risk analysis, over 40 percent of these were published since 2000.

4.30.23 Prolonged effects on overall herd productivity including effects on reproduction, growth, and mortality on these herds has resulted in an annual cost to the US industry of $560 million USD, or about $5.60 per pig sold (Neumann et al 2005)[21]…We cannot assume that a PRRS incursion into New Zealand will be a strain of lower virulence. The New Zealand pig industry should expect any incursion of PRRS virus to result in significant clinical disease in both breeding and growing pig herds.

MAF response: The Neumann et al paper cited in this submission examined the economic effects of PRRSv in a sample of only ten farms with a range of production systems. Furthermore, this study only examined epidemically-infected herds and excluded those which were in a stable endemic phase. This paper went on to use mean values which disguised considerable variation in individual farm performance and extrapolated from these figures to estimate the overall cost to the US industry quoted. MAF has reservations with extrapolating the findings from a small and highly varied sample such as this to estimate the overall economic impact on a national population of swine which annually produces approximately 12 million litters. MAF also notes that the above study identified an unknown number of farms infected with PRRSv where 'the detection of PRRS virus was judged by the herd veterinarian to be incidental or of negligible consequence to the productivity of the operation'.

Dr. Jim Kliebenstein, one of the economists responsible for the above economic study, has subsequently commented to MAF[22], "We do not intend that the projection will be utilised as a, or even considered as a, precise projection. The important point is that

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[21] Neumann EJ, Kliebenstein JB, Johnson CD, Mabry JW, Bush EJ, Seitzinger AH, Green AL and Zimmerman JJ (2005) Assessment of the economic impact of porcine reproductive and respiratory syndrome on swine production in the United States. *Journal of the American Veterinary Medical Association*, 227, pp385-92.
[22] Kliebenstein J, E-mail to Howard Pharo, 3 March 2007

even if the “precise” projection was 30 percent higher or 30 percent lower PRRS is an economically important pig health problem”.

As indicated in *Key Statement 8*, section 4.3.1.3 of the published risk analysis does acknowledge that infection of individual breeding herds can result in significant initial health problems (late-term abortions, stillbirths, weak pigs, lowered farrowing rates, mortality amongst weaned pigs and impaired sow fertility) leading to chronic production losses. The risk estimation (section 4.4) goes on to conclude that, if PRRS did become established in a sector of the pig industry through non-compliance with the garbage feeding regulations, the consequences of PRRS infection would be significant in the breeding herds that became infected.

The risk analysis does not assume that an incursion of PRRSv into New Zealand will be associated with a low virulence strain of this virus. On the contrary, section 4.3.1.3 of the risk analysis acknowledges that the clinical signs of PRRS infection are extremely variable and would depend on, amongst other things, the strain of the virus.

4.30.24 In the case of PRRS, as in FMD, it is likely that there is a very strong influence of strain variation in determining whether airborne spread occurs, and experimental models are very questionable as a basis for drawing conclusions on the issue.

MAF response: The available evidence regarding the issue of airborne spread of PRRSv has been evaluated in section 3.4.5.5 of the risk analysis. The only credible study that has demonstrated airborne spread (under highly artificial experimental conditions) concluded that, in the field, the transmission of PRRSv by aerosols is probably a rare event, *if it occurs at all*. Please also see *Key Statement 10* in section 3 of this document and discussions included in appendix 2.

4.30.25 …transmission has undoubtedly occurred by means which circumvent on-farm biosecurity.

MAF response: The risk analysis does acknowledge that breakdowns in biosecurity occur and that transmission routes between herds can frequently not be traced in the field. Section 3.4.5 of the risk analysis describes a French study where 21 percent of new herd infections were due to “fomites” and a further 3 percent due to “unidentified other sources”. Please also see *Key Statement 10* in section 3 of this document.

4.30.26 Among the 35 PRRS-negative herds that experienced acute PRRS outbreaks after a prior successful elimination programme, 83 percent were thought to be a result of lateral introductions of the virus with only 17 percent attributed to semen or infected animals (Torremorell et al 2004). These experiences come from a major genetic supply system with biosecurity procedures in place that at the time were state-of-the-art.

MAF response: The reference cited here[23] refers to a study which examined the epidemiology of outbreaks of PRRSv in negative systems “*where the source of*

[23] Torremorell M, Geiger JO, Thompson B and Christianson WT (2004). Evaluation of PRRSv outbreaks in negative herds. *Proceedings of the 18th IPVS congress, Hamburg, Germany 2004 – Volume 1*, p103.

replacement animals and semen is negative". In other words, the farms studied were those where replacement animals and semen had been already ruled out as the source of infection. The major route of spread of PRRS between farms is widely agreed to be the movement of pigs, with the second most important route of spread being via infected semen.

There is clearly still some debate concerning the possible mechanisms of indirect spread of PRRSv between herds and this is reflected in discussions in appendix 2 of this document. Whilst field observations have sometimes been interpreted to support mechanisms such as aerosol spread, the results of published, peer-reviewed experimental studies question whether such methods are likely to be significant. Please also refer to *Key Statement 10* in section 3 of this document.

4.30.27 Since it has proved very difficult to keep infection out of the most biosecure segment of the US pig industry, the claim in the IRA that infection would not spread within the industry observing standard biosecurity measures is unrealistic.

MAF response: Please refer to *Key Statements 7* and *10* in section 3 of this document.

4.30.28 The discussion of control and eradication … provides a very optimistic view of the feasibility of effective control and eradication…The global experience which demonstrates the difficulty in achieving control and eradication of PRRS needs to be given adequate weight in assessing the likely impact of an incursion of PRRS into New Zealand (Dee 2002).

MAF response: Section 3.4.6 of the risk analysis discusses the problems that have been seen in association with the use of modified live PRRSv vaccines and the factors which might explain these problems.

Methods of eradication discussed in section 3.4.7 of the risk analysis include "whole herd depopulation and repopulation with virus-free replacement stock, segregated early weaning, test and removal, mass vaccination with unidirectional pig flow, and herd closure". MAF does not consider these measures as being "optimistic."

4.30.29 The figures provided within the IRA show that on average there will be 3 Kg of infected meat per tonne of pig meat from PRRS infected countries…Therefore it is certain that if the level of imports from PRRS infected countries is greater than 10 tonnes of untreated meat in any one year, that inactivated PRRS virus will enter New Zealand.

MAF response: MAF assumes that this stakeholder is referring to *infectious* PRRS virus, not *inactivated* PRRS virus in this statement. The risk analysis clearly concludes that there is a non-negligible likelihood of release of PRRS virus in imported pig meat. The final risk estimation for PRRS virus in imported pig meat (considering the release, exposure and consequence assessments) is that there is a non-negligible risk for small, non-commercial or marginally commercial breeding herds that are not complying with the garbage feeding regulations and for herds with inadequate biosecurity practices.

4.30.30 The IRA needs to re-evaluate the technique to determine the likelihood that pigs are harbouring PRRSv to place more emphasis on the inevitably infected older pigs.

MAF response: The complete risk analysis (rather then the 2001 quantitative release assessment model) used the results of transmission studies by Van der Linden et al, and Magar and Larochelle rather than the earlier virus isolation or PCR studies.

4.30.31 A comprehensive review needs to be done on the currently available literature on PRRSv persistence in tissues (with inclusion of PCR-based results), and the likelihood estimates for pigs harbouring PRRSv at different ages be re-assessed, taking into account all of the published evidence. The persistence of the virus and the age of infection are both greater than the IRA recognises. Correcting the IRA for these factors will demonstrate a greater risk.

MAF response: This is addressed in the responses to 4.30.19 and 4.30.30 above, and this issue is also discussed in further detail in appendix 2 of this document.

4.30.32 It is more appropriate to suggest that pigs will be expected to be viraemic for at least 6 to 9 weeks after becoming infected, not necessarily from 6 to 9 weeks of age.

MAF response: Please see the response to 4.30.30 above.

4.30.33 Earlier references support the fact that viraemia can be expected to last considerably longer than 4 weeks, in many instances with tissue positivity lasting for many months.

MAF response: This is addressed in the responses to 4.30.19 and 4.30.30 above.

4.30.34 …virus can be demonstrated in 1.2 percent of meat of pigs randomly sampled at slaughter…We believe a more accurate number is 1.9 percent as stated in Magar’s publication (19 of 1027 samples positive by PCR).

MAF response: Interpretation of PCR results is difficult as highlighted by a number of comments included in the response to 4.30.19 above and as discussed in appendix 2. Nevertheless, the likelihood of meat from slaughtered pigs containing infectious PRRS is between 1 percent and 2 percent which, for the purposes of the risk analysis, is considered non-negligible.

4.30.35 ...the term “low” is not defined. However, it does carry the inference that the risk is insignificant or not substantive. But a risk of 1.2 percent is significant and substantive. “Low” is therefore not an appropriate term.

MAF response: If the risk was considered to be insignificant or not substantive, it would have been described in the risk assessment as negligible. Instead, the risk analysis has considered a 1.2 percent likelihood as non-negligible. Please see the response to 4.30.79 below regarding the definition of ‘low’.

4.30.36 It will take a very small amount of that volume (of imported pig meat), or an increase in volume, to be imported in a form permitted by the proposed sanitary measures, for it to be certain that PRRSv infected meat will arise. It is therefore incorrect and misleading to state that the likelihood that it will arrive as “non-negligible”.

MAF response: Please see the response to 4.30.11 above.

4.30.37 It is apparent that pigs can be readily infected by consuming meat known to contain PRRSv. In terms of specific cuts, or forms of meat, these studies used muscle from ham cut into 250g pieces, and shoulder cut into 263-450g pieces and found them to be capable of infecting 70 to 100 percent of the pigs that were exposed.

MAF response: As indicated in *Key Statement 4* the risk analysis was careful not to estimate the minimum infectious scrap size and recognises the inadequacy of the data in this regard. As stated in section 4.2.2.4 of the risk analysis, “there has been no attempt to explore the effect of size of scraps and infectivity. Indeed, the infectious dose approach explored by Hermann et al (2005) supports the notion that scraps of any size have the potential to infect an animal orally, and that the likelihood of infection occurring is directly related to the amount of meat fed.”

The risk analysis goes on to state, “it is not possible to accurately estimate the likelihood that scraps of a critical size will be generated prior to further processing (cooking) of imported pig meat, so **the likelihood of generating infectious scraps prior to cooking must be considered non-negligible**” (emphasis added).

4.30.38 While freezing and thawing of meat has an effect on virus concentration in pig meat, the evidence does not support the view that freezing and thawing would reliably eliminate PRRS virus from imported product. In any case, the recommended sanitary measures of the IRA that (undefined) high value consumer-ready cuts could be imported means that it is very likely that the product would be imported in chilled form not frozen form. This means that the freeze-thaw effects are not relevant to the overall decision on the adequacy of risk management measures.

MAF response: The risk analysis does not suggest that freezing meat will eliminate PRRS virus and this is not recommended as a sanitary measure. The release assessment conclusion (section 4.1.4) states that it is likely that significant levels of PRRS virus infectivity will survive the chilling and freezing temperatures for the length of time that pig meat is held at during storage and transport to New Zealand.

Notwithstanding the above, the risk analysis (section 4.2.2.2) does describe studies which show that a freeze/thaw cycle is likely to reduce the titre of virus by 75 percent and that storage of meat for 1 week at $4^{o}C$ will reduce the infectivity of PRRS virus present in meat by approximately 90 percent.

4.30.39 While the IRA presents a diagram illustrating the biological pathways leading from the disposal of scraps contaminated with infectious PRRS to exposure of pigs via swill feeding (Figure 6, page 38) it does not provide data, quantitatively or qualitatively, to assess the risk of exposure. Even a New Zealand reviewer for the IRA questioned [the likelihood that scraps would be generated during preparation of food for human consumption] purely based on his own behaviour.

MAF response: Figure 6 illustrates the biological pathways leading from the disposal of scraps contaminated with infectious PRRS virus to exposure of pigs via swill feeding. The exposure assessment goes on to subsequently discuss the likelihood of scrap generation (section 4.2.2.3), the evaluation of the effect of recent changes to regulation of garbage feeding in New Zealand (section 4.2.4), and the likelihood of exposure to uncooked scraps by feral pigs (section 4.2.5.1), backyard pigs (section 4.2.5.2), and commercial piggeries (section 4.2.5.3). For each of these steps, reliable quantitative data is not available and the risks have been discussed in a qualitative manner.

The internal peer review referred to in the submission was carried out on an early draft of the analysis in March 2006. The comments of the reviewer were noted, and the assessment of the likelihood of raw scraps being generated from chops steaks and roasts (section 4.2.2.3) was changed from *negligible* in the draft to *very low* in the final risk analysis that was released for public consultation in July 2006.

4.30.40 The conclusion in section 4.2.2.4 of the IRA is a key basis…for the proposal to not require heat or pH treatment for high value consumer ready cuts. Yet the conclusion is based entirely on supposition and absence of data.

MAF response: Section 4.2.2.4 of the risk analysis is the conclusion to section 4.2.2 *"Likelihood of generation of infectious scraps prior to cooking"*. The results from a number of papers are considered in section 4.2.2.1 concerning the infectious dose of PRRS by the oral route and section 4.2.2.2 concerning the titre of virus in meat of slaughter age pigs. Section 4.2.2.3 is a reasoned discussion on the likelihood of raw scraps being generated from pig meat during its preparation for human consumption. The conclusion in section 4.2.2.4 is that in view of uncertainties in a number of areas, the likelihood of generating infectious scraps from pig meat prior to cooking must be considered non-negligible. Regarding the recommendation later in the risk analysis that consumer-ready, high value cuts would be associated with a negligible likelihood of generating fresh raw meat scraps prior to cooking, please refer to *Key Statements 1, 2* and *3*.

4.30.41 The IRA points out that the countries within the EU that have remained free of PRRS have benefited from strict controls over the importation of live pigs and porcine genetic material. While they have imported pig meat from countries where PRRS is endemic they have legislation to impose and enforce a prohibition on feeding any vertebrate protein to farmed animals.

MAF response: The Biosecurity (Ruminant Protein) Regulations 1999 prohibit the feeding of ruminant protein (except dairy produce) in any form to ruminant animals in New Zealand. In addition, the Biosecurity (Meat & Food Waste for Pigs) Regulations

2005 prohibit the feeding of untreated meat or untreated food waste to pigs. MAF is unaware of any robust data that would indicate that compliance with similar legislation in EU countries is significantly different from compliance in New Zealand, particularly for backyard and semi-commercial units.

4.30.42 The IRA notes that New Zealand had no controls over meat from PRRS infected countries during the earlier period 1998 to mid-2001, and significant volumes of pig meat from PRRS infected countries was imported. At that time the level of infectious PRRS was not as high as in these countries as currently, nor are the volumes of imports near the same level as currently.

MAF response: From examination of country PRRS status according to the OIE (www.oie.int/hs2/report.asp), since mid-2001 there does not appear to have been any change in the PRRS status of countries which have historically imported significant amounts of pig meat into New Zealand. MAF is unaware of any robust data which would suggest that the level of infectious PRRS in these countries has risen significantly over this period.

As stated in the response to 4.30.12 above, it is not possible to accurately predict future market trends following any change in the treatment requirements for imported pig meat.

4.30.43 …there has been very minimal regulatory attention to compliance with a very low level of reactive follow up to reported suspected cases of non compliance. It is realistic to assume that compliance is likely to be low, at least in some sectors.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.30.44 If commercial piggeries are compliant we agree the risk is zero. However, while we agree that non-compliance in the commercial sector is probably less likely than the backyard sector, regrettably we are aware that it is not zero.

MAF response: MAF recognises that there is likely to be an unknown degree of non-compliance with garbage feeding regulations, and this can be expected to be similar in other countries that have similar bans in place. Please see *Key Statement 5* in section 3 of this document.

4.30.45 ...the point that meat scraps probably have to be large enough so as to require chewing is based entirely on supposition…no one knows the effect of meat scrap size on virus transmission.

MAF response: MAF accepts that the role of chewing in oral transmission of PRRS virus is unproven. However, it is not unreasonable to suggest that if meat were swallowed without chewing, any PRRS virus would be quickly inactivated at the low pH in the stomach.

4.30.46 …a similar lack of data is available to support any assumptions regarding the nature, composition, or magnitude of waste meat scraps coming from NZ household kitchens.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.30.47 The experimental evidence proves conclusively that high value, consumer ready cuts when harvested from infected pigs are very likely to have infectious PRRS virus in a concentration high enough to infect other pigs.

MAF response: MAF does not disagree with this. However, it is considered that such cuts would be associated with a negligible likelihood of generating raw scraps prior to cooking.

4.30.48 We agree that for piggeries that comply with the regulations, the risk of exposure to infectious PRRSv in meat is essentially zero.

MAF response: Noted.

4.30.49 No attempt has been made in the Consequence Assessment of the IRA to assess the economic impact of PRRS infection within the New Zealand pig herd nor the economic and social flow on effect.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.30.50 Based on a 1990 study the IRA incorrectly states that the major losses are associated with the breeding herd whereas a recent study has shown that the grower herd from nursery to finish accounts for greater than 65 percent of the costs over time associated with PRRSv infection (Neumann et al, JAVMA 2005)[24].

MAF response: Please refer to *Key Statement 8* in section 3 of this document and the response to 4.30.23 above.

As indicated in the response to 4.30.23 above, MAF has reservations regarding the small and highly varied sample of farms the Neumann et al (2005) study examined. Furthermore, given the geographical, management and other differences (such as density of pig populations) between swine production in major swine producing countries and New Zealand, the validity of extrapolating the findings of overseas economic analyses in this way is questionable.

[24] Neumann EJ, Kliebenstein JB, Johnson CD, Mabry JW, Bush EJ, Seitzinger AH, Green AL and Zimmerman JJ (2005) Assessment of the economic impact of porcine reproductive and respiratory syndrome on swine production in the United States. *Journal of the American Veterinary Medical Association,* 227, pp385-92.

4.30.51 It is not correct to state that small herds have fewer clinical signs (section 4.3.1.2 of the IRA). All pigs are equally susceptible to the effects of a particular strain. While it is true that the number of susceptible animals will quickly decline in a small herd, the clinical impact to the owner on a per animal basis remains the same.

MAF response: Section 4.3.1.2 states "in very small herds comprising a few fattener pigs for home consumption there would probably be few clinical signs, whereas in backyard breeder units comprising tens of sows the clinical signs could include reproductive losses in sows, mortality in very young piglets and disease in older pigs". Clinical signs associated with reproduction would be unlikely to be prominent in fattener herds whereas they would be much more likely to be apparent in a breeder unit.

Published survey data from the United States[25] indicates that, in breeding females, disease problems due to PRRS were seen in 15.1 percent of small herds surveyed (defined as less than 250 sows and gilts) whereas disease due to PRRS was seen in 58.3 percent of large herds (defined as 500 or more sows and gilts). Similarly, disease due to PRRS was seen in 8.2 percent of suckling pigs from small herds whereas disease due to PRRS was seen in 22.2 percent of suckling pigs in large herds. MAF considers that this USDA data is consistent with the above statement from section 4.3.1.2 of the risk analysis.

4.30.52 …we are very concerned about the potential for PRRS to become established and transmitted before its identification.

MAF response: Please refer to *Key Statement 14* in section 3 of this document.

4.30.53 Even on well-managed pig farms with an explicit need for good biosecurity, the cause of a large majority of PRRS outbreaks was considered to be a result of "lateral introduction" which included the possibility of airborne spread (Torremorell et al 2004).

MAF response: As indicated in section 3.4.5 of the risk analysis, it is widely accepted that movement of pigs and semen is the major route of spread of PRRSv between herds. Please refer to *Key Statement 10* in section 3 of this document and the response to 4.30.26 above.

4.30.54 …Morrison et al recently reported a significant negative correlation between the geographic distance between PRRS infected farms and the genetic similarity of PRRS viruses recovered from those farms. This suggests that between-farm spread of the virus may have been responsible for the similarity of isolates and reinforces the notion that PRRSv can be transmitted between farms (through mechanisms other than pigs or semen) (Mondaca-Fernandez et al 2006).

[25] USDA (2002) Part II, reference of swine health and health management in the United States, 2000. http://www.aphis.usda.gov/vs/ceah/ncahs/nahms/swine/swine2000/swine2kPt2.pdf

MAF response: MAF was unable to identify the Morrison et al paper cited here although the publication cited by Mondaca-Fernandez et al[26] is a short communication which showed, statistically, that the further apart farms were from each other, the lower the genetic similarity of their PRRSv isolates. The results of this short communication are at odds to those published in a paper by Goldberg et al[27] who, using comparable statistical methods concluded that the movement of PRRSv onto farms does not generally occur via distance-limited processes such as wind or wildlife vectors, but more typically occurs via the long-distance transport of animals or semen.

Section 3.4.5.5 of the risk analysis states that 'among the circumstantial evidence used in support of claims for airborne spread was the finding of virtually identical viruses (96-100 percent nucleotide homology of the ORF5 gene) on farms up to 20 miles apart'. However, this section of the risk analysis goes on to discuss more recent investigations which suggest that airborne spread of PRRSv, in field conditions, is highly unlikely. Please refer to *Key Statement 10* in section 3 of this document.

4.30.55 The AD (Aujeszky's Disease) example demonstrated that despite MAF's starting assumption when AD was first identified in New Zealand in the mid-1970s, that it would not spread substantially or move into the commercial sector, the reality was that it spread throughout the North Island and affected a number of the largest commercial herds of the day. Because MAF had not taken action given its assumption that it would not spread, the New Zealand pork producing industry subsequently funded a successful eradication programme, with technical guidance but no financial contribution from MAF.

MAF response: This issue is beyond the scope of this risk analysis.

4.30.56 The heavy reliance of the IRA on farm biosecurity to protect commercial piggeries from PRRS infection is inappropriate…Farm biosecurity is good practice and strongly encouraged by NZPIB, but it is voluntary not regulated.

MAF response: MAF recognises that NZPIB encourages pork producers to institute on-farm biosecurity procedures as outlined in *Key Statement 6* in section 3 of this document.

4.30.57 For the sake of risk assessment, we believe any incursion of PRRS virus should be assumed to result in clinical disease and have the potential to spread within and between farms.

MAF response: The risk analysis has not assumed that an incursion of PRRSv into an index property would not result in clinical disease although the consequences of a herd becoming infected would clearly depend upon the strain of the virus introduced and the nature of the herd. The likelihood of spread from that index property to another property adhering to standard biosecurity measures is considered to be low.

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[26] Mondaca-Fernandez E, Murtaugh MP and Morrison RB (2006) Association between genetic sequence homology of porcine reproductive and respiratory syndrome virus and geographic distance between pig sites. *The Canadian Journal of Veterinary Research* 70, pp237-9

[27] Goldberg TL, Hahn EC, Weigel RW and Scherba G (2000) Genetic, geographical and temporal variation of porcine reproductive and respiratory syndrome virus in Illinois. *Journal of General Virology* 81, pp171-9

4.30.58 The degree of interaction among para-commercial farms or between para-commercial farms and commercial farms is currently unknown but it can safely be assumed that there is some degree of interaction between the two industries and that if PRRS were to become established in either, it would likely be transmitted to the other.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.30.59 Even based on the IRA figures this demonstrates that on average there will be 3kg per tonne of infected pig meat from countries where PRRS is endemic. While this figure reflects pre-transportation, significant levels of PRRS infectivity are recognised to survive the likely storage and transportation regimes…Accordingly it is inevitable that PRRSv will be released into New Zealand if treatment to inactivate it is not required.

MAF response: MAF acknowledges that there is a non-negligible likelihood of release of PRRS virus in imported pig meat (section 4.4), and the risk assessment has recommended sanitary measures to manage this risk. It is recommended that any imported pig meat from countries with PRRSv, which is not associated with a negligible likelihood of generating raw meat scraps prior to cooking, should be treated by approved cooking or pH change or further processed into consumer-ready high value cuts in an officially approved facility. Please also refer to the "cascade of risk reduction" described in *Key Statement 1*.

4.30.60 We agree that the likelihood of exposure for farms not complying with the regulations is not known. However for the reasons already covered in our discussion of the Exposure Assessment, the IRA's conclusion (in the Exposure Assessment Conclusion) that it is 'very low' is unrealistically optimistic.

MAF response: PRRS virus is inactivated by normal cooking so the only exposure pathway of relevance is the feeding of raw pork. There is a low likelihood that quantities of fresh raw pork generated in kitchen waste will be similar to those used in transmission studies. The form of pig meat likely to be imported into New Zealand and the likely processing it will be submitted to means that this meat is very unlikely to contain infectious PRRS virus. It is illegal to feed raw meat scraps to pigs in New Zealand although the level of compliance with this legislation is unknown. Given these factors, MAF is of the opinion that it is reasonable to state that there is a very low likelihood of exposure in piggeries that do not comply with garbage feeding regulations. Please also refer to the "cascade of risk reduction" described in *Key Statement 1*.

4.30.61 We agree that if PRRS did become established the consequences for the New Zealand pork producing industry would be serious. However the IRA has overlooked the follow on consequences for rural supply services and communities demonstrated by our analysis.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.30.62 The statement of purposes of risk management measures is incomplete. Subparagraph 1 should refer to the risk that there is non-compliance with the regulations in the commercial sector. Subparagraph 2 should also state that protection is required for all farms, given the risk of secondary exposure even where standard biosecurity measures are in place.

MAF response: Subparagraph 1, "to protect a sector of the pig industry (*most likely* small, non-commercial or semi-commercial breeding herds that are not complying with the swill feeding regulations) from a risk that they would not be facing if they were complying with the regulation", does not exclude the possibility of non-compliance within the commercial sector although MAF believes that it is reasonable to suggest that non-compliance would be more likely in other sectors of the pig industry.

Subparagraph 2 states, "to protect other farms from secondary exposure to PRRS virus through contacts with farms that are not complying with the swill feeding regulations, on the basis that even for farms that do practice standard biosecurity measures, breaches in biosecurity can occur that may result in PRRS virus being introduced from farms that are infected by illegally feeding garbage". MAF considers that this statement is consistent with that suggested by this submission.

4.30.63 The sanitary measures proposed in sections 5.2.2.2 and 5.2.3 raise several concerns specifically regarding 'consumer-ready high value' cuts…No definition is provided for this term…it is not a term that is clearly defined in SPS or WTO documentation and as such creates a significant difficulty in managing what product would qualify for importation and also for release without treatment from transitional facilities.

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.30.64 The evidence is clear that PRRS has a proclivity for residing in monocytes/macrophage lineage cells, and these cells (and often the associated lymph structures) are found throughout every tissue in the body. The degree to which risk can be mitigated through separation of carcass pieces into high-value versus low-value cuts is unknown and at this point should not be considered as a reasonable strategy to pursue.

MAF response: High value, consumer-ready cuts would be much less likely to generate scraps of raw pig meat than whole carcases or other cuts which require further processing in preparation for human consumption. The volume of raw scraps generated from the imported commodity is likely to be much more significant with regard to the risk of introduction of PRRS than the amount of virus present in the cut itself.

4.30.65 One of the external reviewers for this IRA points this out through inclusion of his Veterinary Record publication (accepted May 2006) entitled "An exploratory study to evaluate the survival of porcine reproductive and respiratory syndrome virus in non-processed meat". In this study, he conclusively proved the potential for meat juice as a contaminant on a person's hand (collected from meat that

could be considered a high-value cut) contained sufficient PRRS virus to infect a pig through oronasal contact. Unprocessed skeletal muscle harvested from infected pigs has repeatedly been shown to contain adequate virus to infect pigs. To dismiss this scientific evidence by attempting to distinguish the riskiness of high-value versus low-value cuts is without basis.

MAF response: MAF agrees that unprocessed muscle tissue from pigs has been shown to contain sufficient PRRS virus to infect pigs and this is discussed in Section 4.1.2.2 of the risk analysis. The conclusion of the release assessment (Section 4.1.4) states that "it is considered that there is a non-negligible likelihood that chilled or frozen pig meat from a country with endemic PRRS will harbour infectious PRRS virus when imported into New Zealand.

The author of the "meat juice" study mentioned above (Professor Dee) does not agree with the conclusion that NZPIB has drawn from his paper on meat juices – see Professor Dee's full comments in appendix 2 of this document.

4.30.66 Research cited in this IRA was gathered from the few available studies that have partially examined the issues. However, to date no one has undertaken the prospective research necessary to definitively determine the individual or combined effects of time, temperature, and pH on PRRS virus survival in pig meat. These variables should be expected to have a different effect on the virus in naturally infected pig meat when compared to in vitro work.

MAF response: The recommended sanitary measures do not suggest using a combination of temperature and pH for treatment of imported meat but rather indicate that approved cooking *or* pH change would be appropriate.

MAF agrees that there is an absence of *in vivo* studies as suggested by this submission, although the published *in vitro* studies are sufficient to suggest that any PRRS virus in pig meat would be susceptible to cooking or pH change as recommended.

4.30.67 The practical problems in administering a new and undefined category of cuts at or behind the border are also significant.

MAF response: The definition of consumer-ready, high value cut will further developed in the of the import health standard. The issue raised here will be addressed within the context of import health standard development. Please also refer to *Key Statement 3* in section 3 of this document.

4.30.68 On the basis of IRA's own data, it is inevitable that PRRSv will exist in each ten tonnes of pig meat sent to New Zealand from PRRS infected countries without treatment. The effect of the recommended measure is therefore to allow a risk good to be imported into New Zealand. However, there is no objective basis for concluding that the relaxation will maintain the existing level of protection against the risk good.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.30.69 It will simply be a matter of time before the virus infects pigs in New Zealand, most likely in a para-commercial herd, and then spread to other herds, either as a result of poor biosecurity or through other transmission pathways which operate despite good biosecurity.

MAF response: Please refer to *Key Statements 6* and *10* in section 3 of this document.

4.30.70 The proposed relaxation will therefore not provide effective management of the risk good. It is therefore contrary to the purposes of the import health standard provisions in the Biosecurity Act.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.30.71 The IRA considers only the risk associated with PRRS. Removal of the cooking requirement may expose New Zealand to increased risk from other exotic pathogens, such as Salmonella typhimurium DT104 … The Biosecurity Act requires that such issues be examined in setting import health standards and the IRA gives no consideration to other pathogens.

MAF response: The risk analysis was limited to consideration of the risk of introducing PRRS virus in imported pig meat. As stated in section 2.1 of the risk analysis, measures introduced for PRRS in pig meat in September 2001 were provisional, requiring the completion of a risk analysis to finalise MAF's position on this issue. Other hazards were outside the scope of this risk analysis.

Any import health standard developed using the MAF risk analysis on PRRS virus in pig meat will also cover other potential hazards which may be present in imported pig meat based on the recommendations of MAF's earlier publication *The importation into New Zealand of meat and meat products – a review of the risks to animal health* (see: http://www.biosecurity.govt.nz/files/ pests-diseases/animals/risk/meat-meat-products-ra.pdf). As with other imports of food for human consumption, imported meat must comply with New Zealand food safety standards.

4.30.72 The exposure assessment, consequence assessment and recommendations on risk management options all consist predominantly of subjective opinions, and do not comply with internationally accepted procedures for conducting risk analyses.

MAF comment: As stated in section 2.3, MAF's risk analysis methodology follows the guidelines in section 1.3 of the Terrestrial Animal Health Code of the World Organisation for Animal Health. The risk analysis framework was applied as described in 'Import Risk Analysis Animals and Animal Products' (Murray 2002), which formed the basis of the OIE handbook on this subject. It should also be noted that Noel Murray was also one of the primary authors of this risk analysis document. Please also see comment 4.38.1 from the Finland FSA.

4.30.73 The animal welfare implications of a PRRS incursion need to be addressed not only for the impact on welfare and health and New Zealand's animal health status but also for the impact on the well-being of owners and carers.

MAF response: The consequence assessment (section 4.3.1.3) does recognise the possible animal welfare implications associated with PRRS and describes the probable clinical impact of the introduction of PRRS in a commercial piggery, including epidemics of abortion, stillbirths and weak pigs, high death rates amongst weaned pigs and impaired sow fertility.

While it is recognised that incursions of animal diseases can be stressful for individual farmers, consideration of possible psychological effects of such incursions on any individual livestock farmer is beyond the scope of this risk analysis.

4.30.74 The risk of exposure from PRRSv in pig meat in the EU is more rigidly controlled compared to New Zealand because the feeding ban is a prohibition on feeding mammalian protein to farm animals and is well established and enforced. Yet this did not prevent the 2001 FMD epidemic originating from infected pig meat. In part this is because the ban is seen as only applying to processed material, not to feeding of food waste.

MAF response: Please refer to *Key Statement 9* in section 3 of this document. Please also refer to the response to 4.30.41 above.

4.30.75 The IRA was reviewed at different stages by a number of overseas individuals … None of those who conducted the reviews were risk analysts…their views and recommendations do not all appear to have been taken into account before the document was released for consultation.

MAF response: Peer reviewers are chosen on the basis of their status as acknowledged authorities in their fields. Where comments from reviewers are appropriate, they will be incorporated into the risk analysis.

4.30.76 …the reviewers are expert scientists and so their focus was on the scientific aspects of the IRA. They have no knowledge of the New Zealand environment with respect to the adequacy of the waste feeding regulations … or the waste generating patterns of New Zealand processors, retailers, restaurants and households.

MAF response: As indicated in several places in the risk analysis document, the degree of compliance with waste feeding regulations is unknown. MAF has not assumed that there will be full compliance with these regulations; if this were the case then no sanitary measures would have been recommended for imported pig meat to manage the risks associated with PRRS.

4.30.77 PIB is making this submission as required under statute because it believes that the recommended range of sanitary measures, if implemented, will impact negatively on on-going returns to New Zealand pork producers, including the encouragement of further investment. Thus the recommended measures will impact on the ability of the New Zealand pork industry to make the best on-going contribution to the New Zealand economy.

MAF response: Under the SPS agreement, sanitary measures applied to an imported commodity cannot be more trade-restrictive than required to achieve the appropriate level of sanitary or phytosanitary protection. If measures were introduced for the protection of local industries, it is highly likely that New Zealand would become subject to legal action before the WTO, possibly with detrimental effects on our access to export markets.

4.30.78 The statutory purpose for the issue of import health standards under the Biosecurity Act is the effective management of risk goods. In having regard to the relevant criteria in section 22 of the Act, the Director General must exercise his powers to achieve this purpose ... However, the recommendation to relax the current standards by permitting the import of untreated "high value consumer ready" cuts is inconsistent with the statutory purpose.

MAF response: As indicated in the response to 4.30.2, under section 22 (5) of the Biosecurity Act 1993, when making a recommendation to the Director-General (regarding an import health standard), the chief technical officer must have regard to the following matters:

a) the likelihood that goods of the kind or description to be specified in the import health standard may bring organisms into New Zealand;

b) the nature and possible effect on people, the New Zealand environment, and the New Zealand economy of any organisms that goods of the kind or description specified in the import health standard may bring into New Zealand;
c) New Zealand's international obligations;
d) such other matters as the chief technical officer considers relevant to the purpose of this Part.

The sanitary measures outlined in the risk analysis are recommendations in respect of points a and b above, and the chief technical officer must have regard to other issues as outlined, before making a recommendation to the Director-General regarding an import health standard.

4.30.79 …the meaning given to terminology used to describe the likelihood of an event or the pathway is not stated. For example, what constitutes 'low' risk?

MAF response: As indicated in Import Risk Analysis Animals and Animal Products (Murray 2002), "Low" has the Concise Oxford Dictionary definition of "Less than average, coming below the normal level".

Please note that appendix 1 of the NZPIB submission, which raised a number of questions concerning the quantitative model in the risk analysis, was sent to the author of this model (Noel Murray) for further comment. Dr. Murray's response to these points is included in this review of submissions document as appendix 3.

4.30.80 …the unrestricted risk has not been estimated and so it is not possible to estimate the degree to which control strategies reduce the risk, or the extent to which risk management procedures need to be monitored to ensure compliance

MAF response: The risk analysis has concluded that there is a non-negligible likelihood of release of PRRS virus in imported pig meat (section 4.4). The sanitary measures described in section 5.2.3 have been recommended to provide the appropriate level of protection against this risk.

Please note that appendix 1 of the NZPIB submission, which raised a number of questions concerning the quantitative model in the risk analysis, was sent to the author of this model (Noel Murray) for further comment. Dr. Murray's response to these points is included in this review of submissions document as appendix 3.

4.30.81 …the unit of interest is not defined (e.g. pig, kilogram of meat or tonne), and hence the analysis does not give any consideration to volume of trade and the way in which that influences risk

MAF response: As indicated in our response to 4.30.12 above, it is not possible to accurately predict future market trends following any change in the treatment requirements for imported pig meat.

Please note that appendix 1 of the NZPIB submission, which raised a number of questions concerning the quantitative model in the risk analysis, was sent to the author of this model (Noel Murray) for further comment. Dr. Murray's response to these points is included in this review of submissions document as appendix 3.

4.30.82 …no information is provided to describe how steps in the pathway were combined to estimate the likelihood of entry and likelihood of entry and exposure

MAF response: As described in section 2.3 of the risk analysis, the risk assessment has followed the guidelines in section 1.3 of the Terrestrial Animal Health Code of the World Organization for Animal Health ("the OIE"). Under this methodology, the risk assessment comprises the release, exposure and consequence assessments to arrive at a risk estimation. Using a qualitative methodology, as the release, exposure, and consequence assessments were all concluded to be non-negligible, the only possible conclusion can be a non-negligible risk estimation.

Please note that appendix 1 of the NZPIB submission, which raised a number of questions concerning the quantitative model in the risk analysis, was sent to the author of this model (Noel Murray) for further comment. Dr. Murray's response to these points is included in this review of submissions document as appendix 3.

4.30.83 …no matrix is provided to indicate how the consequence, and the likelihood of entry and exposure were combined to estimate the risk. In fact, it appears that only the release assessment was conducted according to standard procedures (although with the deficiencies noted above), and the other components of the assessment are subjective opinions, unsupported by standard analytical procedures. These are the exposure assessment, the consequence assessment and the unit risk (per unit of trade and per year).

MAF comment: The quantitative release assessment included in the risk analysis was carried out in 2001 to estimate the likelihood of pig meat harbouring infectious PRRS virus at the time of slaughter, whilst the other components of the risk analysis took a qualitative approach. Murray (2002)[28] states:

"No single method of import risk assessment has proven applicable in all situations, and different methods may be appropriate in different circumstances. A qualitative risk assessment is essentially a reasoned and logical discussion of the relevant commodity factors and epidemiology of a hazard where the likelihood of its release and exposure and the magnitude of its consequences are expressed using non-numerical terms such as high, medium, low or negligible. It is suitable for the majority of risk assessments and is, in fact, the most common type of assessment undertaken to support routine decision-making. In some circumstances it may be desirable to undertake a quantitative risk assessment, for example, to gain further insights into a particular problem, to identify critical steps or to compare sanitary measures. Quantification involves developing a mathematical model to link various aspects of the epidemiology of a disease, which are expressed numerically. The results, which are also expressed numerically, invariably present significant challenges in interpretation and communication."

Please note that appendix 1 of the NZPIB submission, which raised a number of questions concerning the quantitative model in the risk analysis, was sent to the author of this model (Noel Murray) for further comment. Dr. Murray's response to these points is included in this review of submissions document as appendix 3.

4.30.84 …the assessments made of risk management methods are also subjective, and make no attempt to examine the effect on risk of either the recommended policy or alternatives which could have been adopted, and no final risk of the proposed policy is estimated.

MAF response: Please see the response to 4.30.83 above. Murray (2002) continues to state:

"Regardless of which method is adopted it is important to appreciate that a risk assessment inevitably includes a degree of subjectivity…Although a quantitative assessment involves numbers, it is not necessarily more objective, nor are the results necessarily more "precise" than a qualitative assessment."

Please note that appendix 1 of the NZPIB submission, which raised a number of questions concerning the quantitative model in the risk analysis, was sent to the author

[28] Murray N (2002) Import Risk Analysis – Animals and Animal Products, New Zealand Ministry of Agriculture and Forestry, Wellington, New Zealand

of this model (Noel Murray) for further comment. Dr. Murray's response to these points is included in this review of submissions document as appendix 3.

4.30.85 …in this model, the probability of infectious PRRS virus being present in meat at the time of slaughter and the probability that the pig was infected prior to slaughter were multiplied together to determine the probability of harbouring infectious PRRS virus at slaughter. In doing this, a stochastic approach is used to calculate this step. This makes the analysis appear more comprehensive than it really was, since only the expected value (mean) is reported. The standard deviation should have been reported in order to correctly represent a stochastic modelling process – effectively the analysis has been reported as if it had been done deterministically, and makes no attempt to describe the effects of variability or uncertainty.

MAF response: Section 4.1.2.5 of the risk analysis compares the results of the model presented in appendix 1 of the risk analysis with results of later field studies. The likelihood of virus being detected in pigs at slaughter demonstrated by these field studies (1.2 percent) was accepted in the release assessment rather than the likelihood prediction of the model (0.3 percent). Changes to the assumptions made in the model would therefore have no significant effect on the overall findings of the published risk analysis.

Please note that appendix 1 of the NZPIB submission, which raised a number of questions concerning the quantitative model in the risk analysis, was sent to the author of this model (Noel Murray) for further comment. Dr. Murray's response to these points is included in this review of submissions document as appendix 3.

4.30.86 …the model did not include variability in the prevalence of PRRS infected in each age group, the duration of viraemia and the persistence of viraemia. Failure to include variability is likely decrease the estimated number of infected animals at the time of slaughter.

MAF response: Please see the response to 4.30.85 above.

4.30.87 …in estimating the prevalence of viraemia in pigs within each age group, a weighted average was used that appears to include data from non-infected farms. It could be argued that the input values should have been a weighted average of farms with PRRS infection because the model is trying to estimate the age of infection, given the animal is infected. Therefore, only data from farms with one or more infected animals should have been used.

MAF response: Please see the response to 4.30.85 above.

4.30.88 Our estimates of all known costs (indirect) based on assumptions as stated in appendix 1 is around $12.7 million in an epidemic event. In conclusion we estimate total costs (direct and indirect) to be substantial if the opportunity to maintain the current health status is compromised.

MAF response: This estimate of indirect costs appears to be based on a list of assumptions that are included in a table in Appendix 2 of the submission. The list helps provide an indication of the range of indirect effects that might arise from a PRRS outbreak. However, the approach taken to calculating the magnitude of these indirect effects can not be easily verified due to lack of references and is considered likely to overstate the indirect costs for a number of reasons. First, the calculation appears to rest on an assumption of 10 percent of the national sow herd being affected in an outbreak. As discussed in the risk analysis, it is considered that transmission from an index herd would be negligible for herds observing standard biosecurity practices, so this assumption is somewhat questionable. The estimated drop in consumer prices nationwide due to negative consumer preferences of PRRS appears rather high, and it does not account for the benefits to consumers (those still buying meat) that such a drop in retail prices would deliver. The estimate does not take into account off-setting price effects whereby a lower supply would lead to higher prices for non-affected farmers. The estimate does not appear to account for the ability of resources being able to be put to alternative purposes. The estimate uses changes in sales values at different stages of the production chain (retail, farm gate), and using sales value rather than economic value added is likely to lead to double counting. The estimate appears to over-estimate the scale of dependence between the pig industry and other industries. MAF notes, however, that the loss estimates do not include a number of other costs that are not quantified.

Please also refer to *Key statement 8* in section 3 of this document.

4.31 CARLY SLUYS

4.31.1 While the New Zealand pork producing industry has maintained a predominantly domestic focus because internationally it is a relatively high cost producer due to feed costs in particular, it has a significant productivity advantage associated with its favourable disease status.

MAF response: Noted.

4.31.2 The reliance on post border measures is unacceptable, due to the unknown practices in regard to the quantity of waste generated from potentially PRRS infected consumer-ready high value cuts and the unknown levels of compliance with the Biosecurity (Meat and Food Waste) Regulations 2005.

MAF response: Please refer to *Key Statements 2* and *5* section 3 of this document.

4.31.3 … the current import standards must remain in place unless and until the risk analysis can establish that the risk of PRRS infection of the New Zealand pig herd can be effectively controlled in other ways. This would require at the least:

No assumptions made or "unknowns" in regard to the level of control established by post border measures

An investigation in to the pathways by which waste meat may be generated and distributed, including the level of compliance with the Biosecurity (Meat and Food Waste) Regulations 2005

The term "consumer-ready high value cuts" is clearly defined.

MAF response: As indicated in *Key Statement 11* in section 3 of this document, as a signatory of the SPS agreement, sanitary or phytosanitary measures applied to imported commodities can only be based on scientific principles and not maintained without sufficient scientific evidence, furthermore these measures must not be more trade-restrictive than required to achieve our appropriate level of sanitary or phytosanitary protection.

The current requirement for treatment of pig meat from countries with endemic PRRS was imposed in September 2001 pending the results of further scientific studies (published in 2003 and 2004) and completion of a risk analysis of PRRS virus in imported pig meat. The results of these further studies and the completed risk analysis indicate that continued imposition of sanitary measures for high value, consumer-ready cuts of pork cannot be scientifically justified. Therefore, in view of our commitments under the SPS agreement, we cannot justify the continued imposition of this sanitary measure.

Please also see *Key Statements 3 and 5* in section 3 of this document.

4.31.4 As a general principle, Federated Farmers strongly believes that prevention is more effective than eradication.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.31.5 New Zealand pork producers with their knowledge of the dynamics of pig ownership and activities, and food waste feeding practices do not believe that the risk analysis has correctly assessed the New Zealand environment. Federated Farmers does not therefore accept that the Risk Analysis is factually based.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.31.6 These post border measures rely on the assumption that every owner of a pig knows that feeding of uncooked meat including pig meat to pigs is illegal as required by the Biosecurity (Meat and Food Waste) Regulations, and complies with these requirements.

MAF response: The risk analysis has not assumed total compliance with the waste feeding regulations. Indeed, if such an assumption had been made, it would not have been necessary to recommend *any* risk management measures for imported pig meat. Rather, as discussed in *Key Statement 1* in section 3 of this document, the assessment of risk does not rest solely on any single link in the overall risk pathway. The recommended measures are only one of many steps in the “cascade of risk reduction” which together are considered adequate to effectively manage the risk in the commodity. A number of overseas submissions (see 4.36.2, 4.38.14, 4.39.5, 4.42.2, 4.43.3 and 4.44.6) have suggested that because these regulations exist in New Zealand, the risk management measures recommended are unjustified and pig meat imports should be allowed without sanitary measures against PRRS. Please also refer to *Key Statement 5* in section 3 of this document.

4.31.7 …the source of PRRS transmission internationally is commonly unknown and may supersede farm biosecurity measures. This is particularly relevant to the New Zealand situation where commercial pork producers co-exist alongside other farmers who own a few pigs, and where there is significant outdoor farming in areas such as Canterbury and South Canterbury. It is impossible for farmers to maintain biosecurity measures that fully protect their pigs against infection pathway such as air borne spread and birds.

MAF response: Please refer to *Key Statement 10* in section 3 of this document.

4.31.8 …assumption have been made on human behaviour without any factual basis…On what basis, for example, has the volume of pig meat scraps generated from a single household not exceeding 500g – 900g … been assessed as ‘improbable’?

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.31.9 Federated Farmers have considerable difficulty with the use of the term consumer-ready, high value cuts if meat. This term is not defined and yet it is central to understanding the impact of the proposed measures.

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.31.10 There is no justification for the statement … in the case of consumer-ready cuts of pork, it is considered that there is negligible likelihood of meat scraps being generated prior to cooking… Does BNZ have information to support this consideration?

MAF response: If a cut of meat requires no further trimming or cutting prior to cooking, it is reasonable to assume a negligible likelihood of raw scraps being generated from that cut.

4.31.11 That about product that is close or past its 'use by' date?

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.31.12 The risk analysis as presented is incomplete because it has not addressed and assessed the extent to which waste meat may be generated via the range of sanitary options proposed and therefore has not fully addressed the risk.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.31.13 PRRS is a pig disease with severe welfare implications…An incursion of another disease for which the on-farm impact is synergistic with PMWS, not only places the animal's welfare under further strain, but places the industry under more pressure.

MAF response: Please refer to *Key Statement 13* in section 3 of this document. Please also refer to the response to 4.30.73 above.

4.31.14 Federated Farmers is concerned at the precedent this may be setting for future biosecurity import health standards…We especially do not support reliance on post border measures in this case when there are so many unknowns and assumptions in regard to establishing and assessing potential pathways for infection of the national pig herd.

MAF response: The sanitary measures recommended in the risk analysis are suggested to specifically manage the risk associated with PRRS virus in imported pig meat. Under section 22 (5) of the Biosecurity Act 1993, when making a recommendation to the Director-General (including risk management measures of an import health standard), the chief technical officer must have regard to the following matters:

a) the likelihood that goods of the kind or description to be specified in the import health standard may bring organisms into New Zealand;

b) the nature and possible effect on people, the New Zealand environment, and the New Zealand economy of any organisms that goods of the kind or description specified in the import health standard may bring into New Zealand;
c) New Zealand's international obligations;
d) such other matters as the chief technical officer considers relevant to the purpose of this Part.

It should be noted that the risk analysis only *recommends* sanitary measures relating to the commodity defined within that risk analysis, and the setting of the sanitary measures within an import health standard will take into account these recommendations together with those other matters listed above.

4.31.15 …this risk analysis is setting a precedent for allowing infected meat into the country, given that regulations prohibit the feeding of uncooked meat to pigs. However, these regulations are un-policed and the extent of knowledge and compliance is unknown. Most critically, other countries would be in a position to exploit this post border risk mitigation method given that a precedent has been set.

MAF response: Please see the response to 4.31.6 above.

4.31.16 We are also very concerned at the implications of this precedent for the future of rural communities

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.32 DR EBM WELCH

4.32.1 The IRA discusses the likelihood of slaughter age pigs being viraemic and infective at the time of slaughter with limited references but pays insufficient attention to the fact that newly infected "epidemic" herds will have pigs of all ages infective.

MAF response: Please refer to *Key Statement 12* in section 3 of this document.

4.32.2 The IRA appears to have overlooked work by authors such as Mateusen at al (2002) and Dewey et al (2004) amongst others, both of which illustrate the fact that in some herds exposure, seroconversion and thus infectivity of individual pigs in grower herd populations can occur at older ages often coinciding with slaughter age.

MAF response: Please refer to *Key Statement 12* in section 3 of this document.

4.32.3 It is commonplace to introduce PRRS negative breeding stock into PRRS positive herds…with average breeding herd replacement rates in excess of 50 percent per annum…a significant proportion will be culled prior to mating for various reasons…and these will enter the food chain as slaughter-weight pigs at the time when they are possibly most viraemic and infective.

MAF response: Please refer to *Key Statement 12* in section 3 of this document.

4.32.4 The increasing amount of food waste being generated goes into this "system" (backyard and small-scale commercial swill feeders) which remains poorly monitored and characterised to say the least.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.32.5 …such behaviours are likely to only subside after many years of education and rigorous enforcement, neither of which has been embarked upon in New Zealand to date.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.32.6 In backyard operations these regulations are most likely frequently disregarded and this sector still produces pigs that go into other farms in the "network" and either directly or indirectly culminate in weaners that enter sale yards for on-sale to small scale commercial operations that network with other like operations.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.32.7 …it is very clear that the risk of introduction of any disease, including PRRS, via "garbage feeding" is substantial.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.32.8 BNZ needs to develop a far more thorough understanding of the status quo within New Zealand with regard to feeding uncooked meat to pigs before it can confidently include this step of the risk assessment process in this and other IRAs.

MAF response: The risk analysis has not assumed total compliance with the waste feeding regulations. Indeed, if such an assumption had been made, it would not have been necessary to recommend *any* risk management measures for imported pig meat. Rather, as discussed in *Key Statement 1* in section 3 of this document, the assessment of risk does not rest solely on any single link in the overall risk pathway. The recommended measures are only one of many steps in the "cascade of risk reduction" which together are considered adequate to effectively manage the risk in the commodity. A number of overseas submissions (see 4.36.2, 4.38.14, 4.39.5, 4.42.2, 4.43.3 and 4.44.6) have suggested that because these regulations exist in New Zealand, the risk management measures recommended are unjustified and pig meat imports should be allowed without sanitary measures against PRRS. Please also refer to *Key Statement 5* in section 3 of this document.

4.32.9 The industries of Europe and North America have biosecurity standards far in advance of those in the New Zealand pig industry … and yet PRRS has successfully penetrated these industries to up to 80 percent of their National herd. This is without the weaner networks and high-risk practices that are commonplace in the small-scale commercial pig sector of New Zealand, which have evolved under disease-free circumstances allowing them to do so.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.32.10 …there is evidence that insects are likely to be able to act as vectors for transmission of PRRSv (Boorman et al 2003; Otake et al 2003).

MAF response: Please refer to *Key Statement 10* in section 3 of this document.

4.32.11. There is a large amount of evidence available that would refute this statement ("If pig farms in this country did become infected with PRRS through the illegal feeding of uncooked imported pig meat, the likelihood of spread to other farms would be low as long as standard biosecurity practices were observed") and I strongly suggest that this be reviewed and modelled (with the help of skilled epidemiologists familiar with the PRRS virus) and re-written with more accurate expert guidance and field information.

MAF response: Possible routes of transmission of PRRSv between herds have been examined in section 3.4.5 of the risk analysis. Please also refer to *Key Statement 10* in section 3 of this document.

4.32.12 PMWS has moved between farms, as in other countries "like a propagating epidemic" …PMWS and PRRS would combine most ably and synergistically on affected farms to destroy the favourable disease status that the New Zealand pig industry has enjoyed to date.

MAF response: Please refer to *Key Statement 13* in section 3 of this document.

4.32.13 This implies that "consumer-ready high value cuts" (which are not adequately defined in the IRA) do not pose a risk of introduction of PRRS virus due to the fact that they contain less virus and that they are less likely to be fed un-cooked to pigs. While both of these are true, there is no support for the assumption that the reduction in risk is enough to justify the recommendations.

MAF response: Please refer to *Key Statements 1* and *3* section 3 of this document.

4.32.14 The EFSA report (Have et al 2005) supports the IRA's view that the risk is non-negligible. Indeed it is surprising and concerning that this report, which pre-dates the BNZ IRA by a year, and which is probably the most politically significant document on the subject, is not referred to in the IRA.

MAF response: Please see the response to 4.30.18 above.

4.32.15 …the amount of fresh uncooked meat that is required to be rejected for human consumption is greater than it has ever been, trimmed or not. Often this gets put in the "bin out back" which then gets collected by the helpful local pig farmers. BNZ should cater for this in the IRA.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.32.16 On many farms on which "garbage feeding" is practiced, it is common for these pigs to consume various types of traumatic foreign bodies…These foreign bodies would lead to excoriations and ulcerations of the oral, pharyngeal and oesophageal mucosa that would be potential entry points for PRRS virus.…the modern "commercial pig" is capable of extremely efficient conversion of feed to pig meat…These genetics are making their way into garbage-feeding and backyard units…When these (nutritional) demands do not get met the result is that such pigs are more prone to becoming immunocompromised than their fat, hardy predecessors …(this) should be considered when researching or interpreting research on likely infective dose, which is generally done on fat, healthy pigs under pristine research conditions.

MAF response: As previously indicated, the risk analysis was careful not to estimate the minimum infectious scrap size and recognises the inadequacy of the data in this regard. As stated on page 41 of the risk analysis, "the infectious dose approach explored by Hermann et al (2005) supports the notion that scraps of any size have the potential to infect an animal orally, and that the likelihood of infection occurring is directly related to the amount of meat fed."

The risk analysis also does not consider the quantities used in feeding trials (500 – 900g) to suggest a minimal infectious scrap size. Therefore, although it is not unreasonable to suggest that oropharyngeal trauma or sub-optimal nutrition may have an effect on susceptibility to infection by PRRSv, these factors would have no effect on the overall risk estimation.

4.32.17 The suggestion that chewing is necessary for infection to occur is inaccurate.

MAF response: Please see the response to 4.30.45 above.

4.32.18 …the review states the fact that Sweden, Finland and New Zealand have remained PRRS-free to date despite PRRS positive importations are supportive of the fact that the risk is low. This does not consider the fact that compliance with garbage feeding regulations in Sweden and Finland are relatively high.

MAF response: Please refer to *Key Statement 5* in section 3 of this document. MAF is unaware of any robust data that would indicate that compliance with garbage feeding legislation in Sweden and Finland is significantly different from compliance in New Zealand, particularly in regard to backyard or non-commercial units.

4.32.19 Transitional cooking is not a trade barrier (as evidenced by the increase in imports), it is simply a Biosecurity precaution. I am puzzled and alarmed by the failure to apply it.

MAF response: Please refer to *Key Statement 11* in section 3 of this document.

4.32.20 …the economic consequences have been under-estimated, the risks grossly under-estimated through lack of understanding…

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.33 DR DAVID LAWTON ET AL

4.33.1 …based on the assumption that infected pig meat is unlikely to be fed to pigs. We consider this assumption to be wrong and that it sets a very dangerous precedent for the management of exotic diseases in New Zealand.

MAF response: Please refer to *Key Statement 1* in section 3 of this document, in particular please refer to the "cascade of risk reduction" in that statement. Please also see the response to 4.30.2.

4.33.2 …the proposed changes do not adequately manage the risk of PRRSV entering and establishing in New Zealand. If applied, the changes are such that the introduction would only be a question of "when" rather than "if".

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.33.3 There is insufficient data available to support the notion that "trimmed meat from high value, consumer ready cuts" is less infective than tissue from the rest of the carcass or that such trimmed meat is less likely to be fed to pigs. In the absence of these data the contention that such meat presents a negligible risk is unsupportable.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.33.4 How Biosecurity New Zealand has then relied on compliance with the regulations by this 'farming' group (waste feeding by backyard pig keepers) as the cornerstone of its management plan to prevent the introduction of PRRSV makes no sense.

MAF response: The risk analysis has not assumed total compliance with the waste feeding regulations. Indeed, if such a "cornerstone" assumption had been made, it would not have been necessary to recommend *any* risk management measures for imported pig meat. Rather, as discussed in *Key Statement 1* in section 3 of this document, the assessment of risk does not rest solely on any single link in the overall risk pathway. The recommended measures are only one of many steps in the "cascade of risk reduction" which together are considered adequate to effectively manage the risk in the commodity. However, it is noteworthy that several overseas submissions (see 4.36.2, 4.38.14, 4.39.5, 4.42.2, 4.43.3 and 4.44.6) have suggested that because these regulations exist in New Zealand, the risk management measures recommended are unjustified and pig meat imports should be allowed without sanitary measures against PRRS. Please also refer to *Key Statement 5* in section 3 of this document.

4.33.5 …in our experience, backyard pig keepers observe no biosecurity and frequently trade their pigs for other commodities, share boars, sell weaners into commercial sale yards and so on… Should PRRSV enter and establish in a group of backyard pigs, we expect that it would move rapidly through this sector, which in turn would result in the inevitable infection of commercial pig farms.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.33.6 …large amounts of food waste from restaurants and other food outlets in urban centres finds its way onto small scale commercial pig units. Just as with backyard pig keepers, it is our experience that these farms have limited ability or motivation to comply with existing regulations.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.33.7 …we don't agree with the presumption that "high-value, consumer ready cuts" present a significantly lower risk than trim from other parts of the pig simply because such cuts are likely to yield less waste or are less likely to be discarded themselves, or because they are likely to contain less virus. The document itself acknowledges that the dose of virus required to transmit PRRSV through meat has not been adequately researched…High value cuts may themselves be discarded once they have passed their use-by date or if they are mishandled.

MAF response: Please refer to *Key Statements 2* and *4* in section 3 of this document.

4.33.8 The risk analysis states that "The economic consequences of the introduction of PRRS virus would be restricted to the micro-environment effects arising from direct losses incurred at the level of individual pig farms." We refute this and point out that confidence in New Zealand's assurances with regard to its biosecurity systems more generally would be compromised by the introduction of PRRSV, especially as the route of entry is likely to be exactly the same as that by which FMD has entered some other countries.

MAF response: Please refer to *Key Statements 8* and *9* in section 3 of this document. Please also refer to *Key Statements 1* and *11* in section 3 of this document. It needs to be borne in mind that, for most countries, New Zealand's credibility would increase if MAF were seen to be removing measures that are considered unnecessary, excessively trade restrictive and a technical barrier to trade under the WTO.

4.33.9 It appears that PMWS, apparently another viral agent, has entered New Zealand on at least two occasions despite the current porcine biosecurity measures that BNZ has in place…It would seem completely inappropriate to weaken an already flawed process until such time that the factor or factors that have led to this biosecurity failure have been fully explored.

MAF response: The cause and precise nature of the circumstances of the first detection of PMWS in New Zealand in late 2003 remain a matter of some scientific debate, and speculation about this is beyond the scope of the risk analysis and this review of submissions. Please also refer to *Key Statement 13* in section 3 of this document.

4.33.10 We shudder to think what might happen to this country should the same rationale be used to justify the importation of ruminant material from a country infected with BSE on the basis that BNZ stated that it was illegal to feed such material to ruminants.

MAF response: There is clearly a significant difference in the consequences of a BSE incursion into New Zealand and an incursion of PRRSv. The NZPIB (see submission 4.30 from Sam McIvor) have estimated that the indirect costs associated with a PRRS epidemic in New Zealand would be around $12.7 million. As stated in the risk analysis (section 4.3.1.3) , there are no zoonotic or food safety issues surrounding PRRS and exports of pork from New Zealand are limited to a few hundred kilograms annually to the Pacific Islands and Singapore. By comparison, the consequences of even a single case of BSE in this country are likely to be similar to those of an outbreak of foot and mouth disease, a matter that is addressed in *Key Statement 9* in section 3 of this document.

The risk analysis has described the possible routes by which PRRSv could enter this country through imported pig meat and risk management measures described have been recommended to effectively manage the risk. Please refer to the “cascade of risk reduction” in *Key Statement 1* in section 3 of this document.

4.34 SELWYN DOBBINSON

4.34.1 I am extremely concerned that it is being proposed that New Zealand's current biosecurity measures for pig meat are to be eroded rather than enhanced.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.34.2 …I find it incredible that BNZ would consider *any* measure that might weaken our current porcine-related border security without first knowing how PMWS entered New Zealand.

MAF response: The precise nature of the circumstances of the first detection of PMWS in New Zealand in late 2003 are the matter of some scientific debate, and speculation about this is beyond the scope of the risk analysis and this review of submissions. Please also refer to response 4.33.9 and *Key Statement 13* in section 3 of this document.

4.34.3 …the rationale provided to support BNZ's proposal is significantly flawed. I will not dwell on the errors that appear to have been made in BNZ's interpretation of the current state of scientific knowledge on PRRS virus as I am aware that my colleagues intend to itemise the issues in some detail.

MAF response: MAF notes this comment. The submission from the NZPIB (see submission number 4.30) raised a large number of points raised in this submission that indicated disagreement with aspects of the interpretation of scientific data used in this risk analysis. In order to ensure transparency and openness, MAF sought the opinions of a number of independent internationally recognised experts in this field on the technical issues that were highlighted in that submission. The contributions of these independent experts are included as appendix 2 of this document. Although this extra round of external technical review is not part of the standard risk analysis process, it was carried out in this case to ensure that the technical issues raised in this submission were considered as thoroughly as possible.

4.34.4 No matter how a piece of meat is presented … there will be pieces of uncooked meat that will be trimmed … (and) there will be some product that will need to be disposed of after having passed their 'used by' date. There is a high probability that meat sourced from *any* of the Northern Hemisphere countries and many of the Southern Hemisphere countries will ensure that such trim will contain viable PRRS virus particles in sufficient quantity that such waste will have the capability of infecting naïve pigs.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.34.5 The potential for such trim to be used by processors in the production of salami or other uncooked value-added products is very real. Such uncooked pig meat can become available to "backyard" pig farmers through the feeding of out-of-date sandwiches or filled rolls. Equally, the potential for "backyard" pig farmers

to feed small quantities of trim produced during normal food preparation, without cooking the material, is extremely likely. Supermarket, restaurant and hotel kitchen waste can also be expected to contain such potentially infectious material that may be fed to pigs without prior cooking.

MAF response: Please refer to *Key Statements 2* and *5* in section 3 of this document.

4.34.6 Recent investigations involved in the PMWS outbreak in the South Island highlighted that even well informed commercial pig farmers did not make the connection between feeding out-of-date filled rolls sourced from supermarkets that contained ham and salami, and the need to cook such waste foods. … When questioned, a staff member of one such commercial pig farmer admitted that she had regularly fed barrow-loads of out-of-date filled rolls and/or sandwiches to the herd's dry sows, on a weekly basis.

MAF response: Please refer to *Key Statements 2* and *5* in section 3 of this document.

4.34.7 I do not believe that BNZ has adequately recognised the potential for PRRS virus to contaminate 'backyard' operations.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.34.8 … despite regulations, there are people who raise pigs who do not adequately cook potentially infectious food products. It would seem therefore that if a PMWS incursion can occur, the risk of a PRRS incursion is equally probable.

MAF response: The precise nature of the circumstances of the first detection of PMWS in New Zealand in late 2003 are the matter of some scientific debate, and speculation about this is beyond the scope of the risk analysis and this review of submissions. Please also refer to *Key Statement 13* and *Key Statement 5* in section 3.

4.34.9 In essence it is stated that "there is little connection between pigs produced by backyard farmers and commercial piggery operators". This is far from the truth… There are many 'backyard farmers' in the Canterbury region who manage 10 – 20 sows with the sole purpose of selling surplus weaners at sale yards … such weaners become scattered throughout rural areas and will inevitably end up being housed in close proximity to commercial piggery operations without the knowledge of the commercial pig farmer.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.34.10 Additionally a number of commercial piggery operators purchase such weaners to top-up their sheds during periods when their own production flow has been inadequate.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.34.11 Hence, not only is there the risk that such small operators could produce infected animals that could be in sufficiently close proximity to commercial piggery operations that they were capable of infecting them through aerosol, bird or insect vector transmission, but the commercial piggery operators could inadvertently purchase carrier animals through saleyards and introduce them into their herds.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.34.12 It has been shown that flies can carry infective doses of PRRS virus for at least two miles from an infected source and that such quantities of virus were capable of infecting naïve animals [reference available if requested].

MAF response: Please refer to *Key Statement 10* in section 3 of this document.

4.34.13 Current thinking on the transmission of PMWS is that seagulls have been able to mechanically carry infective material to several commercial piggeries over a very short timeframe; clearly the same mechanism could apply to the transmission of PRRS virus.

MAF response: The precise nature of the circumstances of the first detection of PMWS in New Zealand in late 2003 are the matter of some scientific debate, and speculation about this is beyond the scope of the risk analysis and this review of submissions. Moreover, MAF is unaware of any studies that have demonstrated transmission of PRRS between pig herds via seagulls as suggested in this submission. Please also refer to *Key Statement 10* in section 3 of this document.

4.34.14 Another potential risk factor is via contaminated transport vehicles. Research in the USA indicates that the normal cleaning and disinfection practices used in New Zealand would be totally inadequate for the management of PRRS virus [reference available if requested].

MAF response: Section 3.4.5.3 of the risk analysis acknowledges that transmission of PRRSv has been demonstrated via contaminated boots and clothing. However, the importance of fomites relative to other routes of transmission is unknown. MAF would expect that commercial pig enterprises would consider adequate cleansing and disinfection of vehicles to form part of standard on-farm biosecurity practices, especially given that PMWS is now recognised in New Zealand. Please also refer to *Key Statement 10* in section 3 of this document.

4.34.15 ...some commercial piggery operators … have their dry sows managed off-site by third party managers. I am aware of two such third party managers who have fed uncooked kitchen waste in the past in an endeavour to reduce the feed cost and so make a greater profit…Several such third party managers maintain small herds of their own pigs in conjunction with those that are being managed for a commercial piggery operation… The connection between backyard farmer, saleyard and commercial piggery operator is very real and quite extensive.

MAF response: Please refer to *Key Statement 7* in section 3 of this document. Furthermore, MAF would expect a commercial piggery owner would ensure any such third party managers have adequate biosecurity practices in place before exposing their dry sows to diseases present in New Zealand such as PMWS.

4.34.16 It must therefore be assumed that some level of feeding of uncooked feed waste *will* occur and that such practices will put commercial piggery operators at risk. *I do not believe that BNZ have adequately recognised this area of risk.*

MAF response: The risk analysis has not assumed total compliance with the waste feeding regulations. Indeed, if such an assumption had been made, it would not have been necessary to recommend *any* risk management measures for imported pig meat. Rather, as discussed in *Key Statement 1* in section 3 of this document, the assessment of risk does not rest solely on any single link in the overall risk pathway. The recommended measures are only one of many steps in the "cascade of risk reduction" which together are considered adequate to effectively manage the risk in the commodity. However, it is noteworthy that several overseas submissions (see 4.36.2, 4.38.14, 4.39.5, 4.42.2, 4.43.3 and 4.44.6) have suggested that because these regulations exist in New Zealand, the risk management measures recommended are unjustified and pig meat imports should be allowed without sanitary measures against PRRS. Please also refer to *Key Statement 5* in section 3 of this document.

4.34.17 There are a number of different strains of the PRRS virus … it must be assumed that the most virulent and contagious virus strain will be the one to be introduced when establishing a risk management assessment. *It appears that the proposed protocol is not based on this principle.*

MAF response: MAF has acknowledged the existence of different strains of PRRS virus and states (in section 4.3.1.3 of the risk analysis) that "the clinical signs of PRRS infection are extremely variable, and depend on the strain of the virus, the immune status of the herd, the presence of intercurrent disease and management factors".

4.34.18 The BNZ proposal appears to emphasise the impact of the strains of virus that are most associated with reproductive failure and has largely ignored the huge pre-weaning mortalities that are commonly associated with some strains of the virus… From an economic point of view one must consider the potential for significantly increased pre- and post-weaning mortalities as well as the increased number of sows that abort.

MAF response: Section 3.4.4 of the risk analysis states "An outbreak of PRRS in a naïve herd may involve an acute onset of reproductive failure in the breeding herd with sows aborting or farrowing pre-term, the birth of stillborn and mummified piglets, sow deaths and *pre-weaning mortality amongst piglets*" (emphasis added).

4.34.19 I do not believe that the model that has been used by BNZ adequately recognises the impact of a PRRS incursion on animal welfare.

MAF response: Please see the response to 4.30.73 above.

4.34.20It (PRRS) is an extremely infectious organism that is difficult to diagnose.

MAF response: Section 3.4.5.1 of the risk analysis acknowledges the infectiousness of this organism, stating: "infection of susceptible pigs probably takes place by nose to nose contact or by breaks in the skin of susceptible animals being contaminated with urine or faeces of infected animals".

Regarding diagnosis of PRRS, chapter 2.6.5 of the OIE manual of diagnostic tests and vaccines for terrestrial animals states "A variety of assays for the detection of serum antibodies to PRRSV have been described. Serological diagnosis is, in general, easy to perform, with good specificity and sensitivity, especially on a herd basis." See: www.oie.int/eng/normes/mmanual/A_00099.htm.

4.34.21 It is likely that an incursion involving "backyard" farmers will never be recognised until it has spread to commercial operators who have better veterinary surveillance... it is most likely that an incursion of PRRS virus will not be recognised for some months and by then will have spread widely throughout New Zealand.

MAF response: Please refer to *Key Statement 14* in section 3 of this document.

4.34.22 It is pertinent to study the effect that the combination of FMD followed by Classical Swine Fever had on the British pig industry. Currently the British industry is producing roughly 25 percent of the volume of pig meat that it did prior to the advent of those two diseases and is struggling to survive let alone regain its previous production. It is likely that a PRRS incursion in New Zealand will have a similar effect on the New Zealand pig industry.

MAF response: Classical swine fever affected 16 farms in the East Anglia region of the United Kingdom in 2000, and was promptly eradicated. The most recent UK FMD outbreak occurred after this and was eradicated by the end of 2001. Figures from the National Audit Office (www.nao.org.uk) indicate that during the 2001 FMD outbreak only 1.7 percent of culls on infected premises and 4.3 percent of dangerous contact culls were pigs. Neither of these diseases has been present in the United Kingdom since their eradication. It is difficult to see how these past disease outbreaks could be thought to be still impacting on the British pig industry.

Rather, MAF considers that UK legislative changes to improve animal welfare were the primary reason for the decline of the UK pig industry since 2000. Most importantly, stalls and tethers for non-lactating sows were banned in the UK from 1 January 1999, a measure which went beyond existing EU Council Directives and which had a severe impact on the profitability of pig farming in the UK. A large number of reviews on the economics and competitiveness of UK pig industry are relevant to this matter. While undoubtedly some pig farms were depopulated for disease control purposes during the CSF and FMD outbreaks, the decision by many farmers not to repopulate their farms was based on sound economic reasons.
The RSPCA report of March 1999[29]. concluded that the new regulations were:

[29] Effects of the free trade rules as a barrier to raising animal welfare standards: a case study of the UK pig industry. RSPCA, March 1999

"…a contributing factor to the current crisis faced by pig farmers. By increasing the costs of production, the stall and tether ban has, in effect, raised the production break even point. This implies that when the pig cycle is at its low point (as it is currently), UK producers will face financial difficulties at an earlier stage than they would have without the ban and earlier than their competitors on the UK and common export markets."

Further, in a 2002 postal survey carried out by the University of Exeter[30] a questionnaire was sent out to farm holdings known to have been pig farmers according to returns in the previous 5 years agricultural censuses. Of 900 respondents to the questionnaire (a 61 percent response rate), 587 indicated that they had no pigs. While 21 holdings had been depopulated due to disease control measures, only 2 had restocked while 6 indicated that they would definitely not be restocking. A further 19 respondents indicated that they were in the process of destocking and that they intended to exit the industry.

4.34.23 I do not believe the current BNZ proposal has adequately recognised either the short term or long term impact of a PRRS virus incursion on the pig industry and its support industries.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.34.24…the dynamics of pig movements in New Zealand has not been properly assessed and that there has been too much reliance on the legal requirement for trimmed meat to be cooked before being fed to pigs.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.34.25 The surface of pre-packaged meat is commonly trimmed by housewives before being cooked. Such scraps are often accumulated before being disposed of so significant volumes of contaminated product could be fed to pigs at one time.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.34.26 The analysis assumes that the centre of a piece of meat is heated to the same temperature as the surface. 'Rare' steaks and other cuts are commonly prepared so that the internal temperatures may not be adequate to inactivate PRRS virus. Thus it would appear that high value cuts may still result in waste that could be infective to naïve animals.

MAF response: Section 3.4.2 of the risk analysis indicates that PRRS virus will persist for 6 to 20 minutes at 56^{o}C. Cooking a pork steak to achieve a pale pink centre requires an internal temperature of 60 to 63^{o}C and during the resting time, meat continues to cook and the internal temperature may raise further (http://whatscookingamerica.net/Information/MeatTemperature Chart.htm).

[30] The structure of the pig population in England – results of national survey of pig production systems, 1 March 2002, University of Exeter.

4.34.27 In any viral family there are members that behave differently to other members so that a global acceptance of the sensitivity of PRRS to pH, heat, freezing and thawing should not be made. References such as Benfield et al, 1999, do not indicate which PRRS strain was used so that broad assumptions should not be made.

MAF response: MAF is unaware of any studies which demonstrate strains of PRRS virus that are significantly more thermostable or resistant to pH changes than indicated in the risk analysis.

4.34.28 It would appear possible that the length of PRRS virus survival in meat may be greater than calculated by in vitro studies and survival in meat products, such as salami, *may* be possible: there are no studies presented that rule out this possibility.

MAF response: As discussed in the risk analysis, PRRS virus is known to be relatively sensitive to pH and is rapidly inactivated outside a pH range of 6.0 to 7.5. Because of this, a wide range of salamis can be considered to pose a negligible risk of PRRS.

Section 4.1.3 of the risk analysis has concluded that PRRSv in raw pig meat will persist in chilled and frozen pig meat during storage and transport to New Zealand.

4.34.29 …no matter what the owner may think or advise, staff may not be biosecurity conscious and may not be selective when feeding stock. If meat trim were to be included in supermarket waste [including out-of-date product], one could be confident that some of it will be fed to pigs.

MAF response: Please refer to *Key Statements 2* and *5* in section 3 of this document.

4.34.30 I know of several backyard farmers who own either one or two sows and sell the majority of their weaners at the local saleyard.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.34.31 Aerosol spread has clearly been debated and largely refuted in the analysis. However, whether spread is by aerosol or flies and other airborne insects, appears immaterial; the scientific evidence shows that airborne transmission has occurred overseas.

MAF response: As discussed in section 3.4.5.5 of the risk analysis, there is no scientific evidence to prove airborne spread of PRRSv under field conditions in any country. The only credible study that has demonstrated airborne spread (under highly artificial experimental conditions) was carried out in 2005 by Prof Dee. It was concluded from this study that, in the field, the transmission of PRRSv by aerosols is probably a rare event, *if it occurs at all*.

The issue of airborne spread is discussed at length in appendix 2 of this document. Although various claims have been made that airborne spread is the only possible explanation for specific field observations, the results of published, peer-reviewed experimental studies question whether this route of transmission is likely to be significant. Please also refer to *Key Statement 10* in section 3 of this document.

4.34.32 …young pig carcasses are extensively trimmed before being trussed on a barbeque. I have seen farmers feed such trim directly to farm dogs that were hanging around so the possibility that such trim could be fed to pigs can be assumed. If these pigs were viraemic at birth there would be a significant potential that they could harbour very high levels of active virus, this practice poses a serious risk that has not been quantified.

MAF response: Entire pig carcasses would not be classified as consumer-ready high-value cuts as indicated in section 5.2.2.2 of the risk analysis. Thus, an entire pig carcass imported from a country with endemic PRRS would have to be treated by approved cooking or pH change under the recommendations in section 5.2.3 of the risk analysis, and this would inactivate any PRRS virus present.

4.34.33 …contact between backyard piggeries and commercial outdoor operations, through seagull contact, will be greatest when such outdoor herds have the greatest number of vulnerable stock. In the winter time and early spring, mallard duck populations are very high in outdoor piggeries as the ducks forage in the puddles and bogs created by sows during the wet season; the significance of mallard ducks was noted in the analysis but disregarded as a significant risk. Since duck populations on any given farm can be counted in their hundreds and seagulls [at any given time] in their thousands [actual counts are available if requested], bird vectors must be regarded as a significant risk factor.

MAF response: MAF is unaware of any studies that have demonstrated transmission of PRRS between pig herds via seagulls as suggested in this submission. Please also refer to *Key Statement 10* in section 3 of this document.

4.34.34 Despite assertions in the analysis that feral pig contact with commercial piggeries is rare, the presence of feral pigs amongst outdoor units in the South Island is a frustratingly common occurrence.

MAF response: The role of feral pigs is discussed in section 4.3.1.1 of the risk analysis and the likelihood of PRRSv being maintained in the New Zealand feral pig population is considered to be negligible. Because of this negligible likelihood and the low likelihood of contact between feral pigs and commercial pigs, the consequences of introduction of PRRSv into the feral pig population are considered to be negligible.

4.35 ROGER S. MORRIS

4.35.1 It seems clear in s 22 (1) that the risk management measures must be applied *before* the items can be released into commercial distribution within New Zealand, and risk management cannot rely entirely on the way in which biosecurity measures are taken by individual users of the risk goods after their release for commercial distribution.

MAF response: The risk analysis has not relied entirely on post-border measures after the goods are given a biosecurity clearance, nor has total compliance with the waste feeding regulations been assumed in the risk analysis. Indeed, if such an assumption had been made, it would not have been necessary to recommend *any* risk management measures for imported pig meat. Rather, as discussed in *Key Statement 1* in section 3 of this document, the assessment of risk does not rest solely on any single link in the overall risk pathway. The recommended measures are only one of many steps in the "cascade of risk reduction" which together are considered adequate to effectively manage the risk in the commodity. While s22(1) indicates that an IHS relates to pre-clearance measures, the matters that a CTO must have regard to in s22(5) include post-clearance issues, and the risk analysis refers to post-clearance matters as part of its assessment of the risks of importing pork that may carry PRRS virus, not as part of the biosecurity measures that it recommends. The CTO is entitled to take these post-clearance matters into account and indeed realistically must do so to comply with s22(5)(c). Provisions of the SPS Agreement contemplate that if no international (in this case, OIE) standards exist to effectively manage the risk, then a member country may apply appropriate risk management measures based on a scientific risk assessment, which includes an assessment of the likelihood of "entry, establishment or spread" of an organism and an assessment of "associated potential biological and economic consequences" (eg Article 5(3) and definition of "risk assessment" in Annex A). It is not possible to assess consequences without looking at post-clearance circumstances such as how domestic fauna and flora might be exposed to an organism that might cause unwanted harm, and whether that is likely to occur.

4.35.2 …it could be argued that all importers who distributed raw pig meat commercially would be in breach of s 52 of the Act, which prohibits the release of an unwanted organism. There may also be issues of liability in the event of an outbreak of PRRS, should distribution of raw infected pig meat be permitted.

MAF response: MAF considers that importers would not be in breach of s 52 of the Biosecurity Act 1993, because there would be no risk of communication, release or spread of PRRS virus while the pork remained in the control of the importer, even if the importer was aware that there was a high statistical likelihood that the virus was present somewhere in the shipment.

4.35.3 Biosecurity New Zealand has made very limited efforts to publicise the regulations or draw them to the attention of even the known pig owners …, and has made even less effort to achieve compliance through enforcement measures.

MAF response: A concerted effort has been made to publicise the Biosecurity (Meat and Food Waste for Pigs) Regulations 2005 following their promulgation (please see the media release and fact sheet included as appendix 4). On behalf of MAF, the New

Zealand Pork Industry Board periodically reminds their members about the Regulations (please see the GAP newsletter also included in appendix 4) and NZFSA has incorporated information about the Regulations in the Codes of Practice being drafted for the restaurant and hospitality sector. MAF recognises that communication is a continuous process and requires continued efforts to publicise these Regulations to both pig farmers and waste food generators.

MAF's Compliance and Enforcement Group follows up on every complaint it receives from the public and the New Zealand Pork Industry Board has been very helpful in this regard. Please also refer to *Key Statement 5* in section 3 of this document.

4.35.4 Australia has had a total ban on garbage feeding for decades, yet a recent study limited to the peri-urban area of Sydney showed that the practice still occurred.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.35.5 …it appears that BNZ wishes to rely entirely on total compliance with a post-border regulatory mechanism which it acknowledges is far from effective, to prevent establishment of an unwanted organism which would have very serious effects on the pork industry.

MAF response: The risk analysis has not assumed total compliance with the waste feeding regulations. Indeed, if such an assumption had been made, it would not have been necessary to recommend *any* risk management measures for imported pig meat. Rather, as discussed in *Key Statement 1* in section 3 of this document, the assessment of risk does not rest solely on any single link in the overall risk pathway. The recommended measures are only one of many steps in the "cascade of risk reduction" which together are considered adequate to effectively manage the risk in the commodity. It is worth noting, however, that several overseas submissions (see 4.36.2, 4.38.14, 4.39.5, 4.42.2, 4.43.3 and 4.44.6) have suggested that because these regulations exist in New Zealand, the risk management measures recommended are unjustified and pig meat imports should be allowed without sanitary measures against PRRS. Please also refer to *Key Statement 5* in section 3 of this document.

4.35.6 It is very questionable whether the measures proposed would meet the requirements of s 22 (5) (a) even if 100 percent compliance were achieved, and therefore it appears that the CTO cannot recommend adoption of an IHS based on the IRA.

MAF response: Please see response 4.35.1

4.35.7 The PRRS IRA discounts windborne spread of PRRS, but the evidence it uses to do so could just as easily be used to discount airborne spread of FMD, since some FMD strains show little or no windborne spread, while others are readily spread my this method.

MAF response: As discussed in section 3.4.5.5 of the risk analysis, there is no scientific evidence to prove airborne spread of PRRS virus under field conditions in any country. The only credible study that has demonstrated airborne spread (under highly artificial experimental conditions) was carried out in 2005 by Prof Dee. It was concluded from this study that, in the field, the transmission of PRRSv by aerosols is probably a rare event, *if it occurs at all*.

The issue of airborne spread is discussed at length in appendix 2 of this document. Although various claims have been made that airborne spread is the only possible explanation for specific field observations, the results of published, peer-reviewed experimental studies question whether this route of transmission is likely to be significant. Please also refer to *Key Statement 10* in section 3 of this document.

4.35.8 Pigs are also very important in the overall surveillance strategy for introduced animal diseases, due to their susceptibility to many of these diseases, and their value as detectors…this function must be taken into account in deciding what risk management measures to take against diseases such as PRRS.

MAF response: The risk management measures recommended provide the appropriate level of protection against PRRS based on the available scientific literature without being more trade-restrictive than required to achieve this level of protection. This is in line with New Zealand's commitments as a signatory of the SPS agreement.

4.35.9 There are therefore major technical inconsistencies between the position of BNZ on diseases such as FMD, and the claims of the IRA in relation to PRRS. I am very concerned that adoption of the recommendations of the IRA would seriously undermine New Zealand's favourable biosecurity status in a number of ways, by undermining border control measures as a key element of biosecurity, and I argue that the adoption of the IRA would contravene s 22 (5) (a) of the Act.

MAF response: As indicated in *Key Statement 9* in section 3 of this document, section 4.3.1.3 of the risk analysis states that the introduction of PRRS virus into pig herds in New Zealand would be unlikely to result in significant indirect costs in terms of domestic or international market reactions and that exports of pork from New Zealand are limited to a few hundred kilograms annually to Pacific Islands and Singapore. In contrast, clinical suspicion of FMD in New Zealand would be likely to lead to an immediate suspension of exports of animals and animal products followed by closure of overseas markets upon laboratory confirmation of this diagnosis. Financial losses associated with FMD would be likely to include the loss of export earnings from animals, animal products and byproducts, the costs of control measures and compensation, and costs associated with the storage of animal products (e.g. meat and dairy products) during the period of no exports.

MAF is satisfied that there are no legal issues relating to the interpretation of s 22 of the Biosecurity Act that should cause MAF to reassess the approach indicated in the risk analysis.

4.35.10 Such analyses should consider the national economic benefit from biosecurity measures in accordance with standard economic principles.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.35.11 …economic effects of PRRS are dismissed as minor on the basis of a very inadequate and purely descriptive consideration of the issues, with no attempt to undertake a true consequence assessment.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.35.12 From the viewpoint of the commercial pork industry, it can validly be argued that PRRS is a disease which would be more damaging to it than FMD, because in the long term the productivity effects of PRRS on the commercial pig industry would cause continuing damage, whereas FMD has much smaller and more temporary effects on pig herd productivity, and the disease would be eradicated promptly in the larger national interest.

MAF response: Please see the response to 4.35.9 above.

4.35.13 Because exports represent only a small part of output, the pork industry would not suffer substantial net losses, yet it is a vital cornerstone of detection effort for a possible incursion of FMD.

MAF response: Biosecurity New Zealand's website lists a number of measures currently in place to protect the country against the introduction of FMD (www.biosecurity.govt.nz/pests-diseases/animals/foot-n-mouth/mafs-role.htm). These measures include:

a) Nine new x-ray machines have been installed at our international airports making a total of fifteen at nine airports. These machines can detect plant, meat, fruit and food material.
b) All baggage coming into New Zealand is x-rayed or hand-searched.
c) Mail coming into New Zealand also goes through an x-ray machine and is screened by detector dogs. Risk parcels are then examined by MAF staff.
d) Eleven new teams of detector dogs are being trained to work at airports. Once they are on board, there will be a total of 21 dogs who can smell food and plant material on people and their clothing and in their bags.
e) Passengers arriving in New Zealand from countries that have Foot and Mouth Disease are being treated as high risk and are singled out for special checking.
f) One hundred new biosecurity staff are being recruited to bolster numbers working at the airports. Extra staff are currently working at peak times and staff have had their leave restricted.
g) A new, more detailed and easier to understand biosecurity declaration card has been produced, and must be completed by all travellers to New Zealand.
h) If passengers are careless when completing their declaration card or forget to declare items, they will be instantly fined $200. If they deliberately make a false declaration, they could be fined up to $100,000 and imprisoned for up to five years.
i) A major education campaign is under way to inform travellers, farmers and people living in urban areas about Foot and Mouth Disease.

Primary surveillance for FMD on farms is provided by farmers and/or veterinary practitioners and a freephone number is available to report any suspected cases, which results in an initial investigation by an approved veterinarian.

Generally, cattle are considered to be the sentinel species for this disease because they consistently show textbook clinical signs of FMD whereas pigs (which show less dramatic clinical signs following infection) are considered to act as amplifiers of the disease because they are relatively resistant to airborne infection and are by far the most potent source of airborne virus[31], thereby enhancing the spread of FMD.

4.35.14 The industry is in fact a very responsible participant in exotic disease preparedness, because it takes a wider view than purely pursuing its own self-interests. It is therefore very disappointing that BNZ takes such a narrow and incomplete view of economic issues affecting biosecurity decisions.

MAF comment: Noted.

4.35.15 The IRA also gives no consideration to the possibility that other unwanted organisms could enter in uncooked meat from approved countries, since the current IHS includes no protective measures against agents other than PRRS.

MAF response: Current IHSs for imported pig meat have measures for a number of diseases apart from PRRS based on the recommendations of MAF's earlier publication *The importation into New Zealand of meat and meat products – a review of the risks to animal health* (see: www.biosecurity.govt.nz/files/ pests-diseases/animals/risk/meat-meat-products-ra.pdf). For example, pig meat from the USA is imported on the basis of country freedom from African swine fever, foot and mouth disease, classical swine fever, rinderpest and swine vesicular disease. The present risk analysis was limited to consideration of the risk of introducing PRRS virus in imported pig meat. As stated in section 2.1, measures introduced for PRRS in pig meat in September 2001 were provisional, requiring the completion of a risk analysis to finalise MAF's position on this issue. Other hazards were outside the scope of this risk analysis.

4.35.16 The very brief consequence assessment in the IRA does not adequately consider the items required to be evaluated under s 22 (5) (b), and does not give adequate weight to the larger biosecurity implications of the proposed change.

MAF response: Please see response 4.36.1. Please also refer to *Key Statement 8* in section 3 of this document.

4.35.17 New Zealand complies with its international obligations in relation to pig meat imports, and there is no technical justification for a relaxation of these measures. The proposed relaxation is incompatible with New Zealand law.

MAF response: Statements in this review of submissions document (e.g. 4.37.2 and 4.44.7) indicate that our trading partners *do* see the current measures as excessively trade restrictive and a technical barrier to trade under the WTO. MAF is satisfied that there are no legal issues relating to the interpretation of s 22 of the Biosecurity Act

[31] Donaldson AI, Alexandersen S, Sorensen JH and Mikkelsen T (2001), Relative risks of the uncontrollable (airborne) spread of FMD by different species. *The Veterinary Record* 148, 602-4.

that should cause MAF to reassess the approach indicated in the risk analysis. Please also see *Key Statement 11* in section 3 of this document.

4.35.18 The IRA as circulated does not comply with s 22 of the Biosecurity Act, and if it were adopted as a modified IHS, importers could be argued to be in breach of s 52. This could possibly extend as far as legal liability for the adverse effects, if PRRS was discovered in New Zealand in the future.

MAF response: MAF is satisfied that there are no legal issues relating to the interpretation of sections 22 or 52 of the Biosecurity Act that should cause MAF to reassess the approach indicated in the risk analysis.

4.35.19 It is therefore concluded that the CTO is unable to recommend the adoption of the proposed changes, because they fail to meet the obligations of the Act.

MAF response: Please see the response to 4.35.18 above.

4.36 DANISH MEAT ASSOCIATION

4.36.1 We believe that international recommendations on trade with commodities, as stated by the OIE, should always be the foundation for trade so as to avoid obstructive and non-scientifically based trade barriers.

MAF response: Under section 22 (5) (c) of the Biosecurity Act, the chief technical officer must have regard to New Zealand's international obligations, before making a recommendation to the Director-General relating to the issue or amendment of an import health standard. This is in line with Article 3.1 of the WTO SPS agreement. However, article 3.3 of the SPS agreement states that members may introduce or maintain measures which result in a higher level of sanitary protection provided those measures are supported by a scientific assessment of the risks in accordance with Article 5 of the SPS agreement. The PRRS risk analysis released by MAF in July 2006 was carried out following international (OIE) guidelines for animal health risk analysis, and therefore is in accordance with Article 5 of the WTO SPS agreement.

4.36.2 …we hold significant concern for the notified risk management measures in light of New Zealand's failure to enforce its own internal rules in relation to the feeding of waste to pigs.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.36.3 …the risk analysis does not provide for a clear understanding of 'consumer ready cuts' and in particular the use of the term 'high value' appears unnecessary and may lead to further confusion and therefore additional barriers to trade.

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.36.4 …it is our view that provided fresh and or chilled pork meat is processed into consumer ready packs for sale to the consumer, then the need to further specify the value of the cut becomes irrelevant and should therefore be removed.

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.37 DANISH VETERINARY AND FOOD ADMINISTRATION

4.37.1 The Danish Veterinary and Food Administration therefore fully agree with your comments that the risk analysis basically concludes that the risk is negligible and that the proposed measures are not in accordance with a negligible risk.

MAF response: The risk analysis concludes that there is a non-negligible likelihood of release of PRRS virus in imported pig meat although the likelihood of exposure through feeding raw scraps of imported pork is considered negligible for any farm complying with the 2005 garbage feeding regulations.

However, MAF does recognise that there are small, non-commercial or marginally commercial herds which may not be complying with garbage feeding regulations and this is reflected in the overall non-negligible risk estimation.

4.37.2 We therefore also fully agree that the enforcement problems of the NZ authorities should not be the reason for trade barriers.

MAF response: Please refer to *Key Statements 5* and *11* in section 3 of this document.

4.37.3 The definition of *consumer-ready high value cuts* is of crucial importance to the solution.

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.38 FINLAND FSA

4.38.1 The reported risk analysis follows the guidelines in Section 1.3 of the OIE *Terrestrial Animal Health Code,* which is the internationally accepted approach for import risk analysis.

MAF response: Noted.

4.38.2 Hazard identification - The conclusions of the section, paragraph 3.5 on p 18, are considered valid

MAF response: Noted.

4.38.3 The release assessment result calculated from the data of the article of Magar and Larochelle (2004) is presented as the conclusive point ii) in the Release assessment section 4.1.4 on p 36. The report lacks a critical appraisal of the validity of this one report and of the reliability and representativeness of the cited prevalence of the virus in pig meat in countries endemic with PRRS.

MAF response: The findings of the Magar and Larochelle study indicated a similar likelihood of infectious PRRS virus being present in the meat of pigs at slaughter as the likelihood predicted by the quantitative release assessment model in the risk analysis. Based on this extensive study it is not unreasonable (given that the risk analysis has taken a qualitative approach) to conclude that there is a low (but non-negligible) likelihood of infectious PRRSv being present in the meat of slaughtered pigs from a country with endemic PRRS.

4.38.4 …Magar and Larochelle do not give any indication of random sampling in their Materials and methods section. The conclusion ii) (p 36) to have a possibly selected non-random sample from two Canadian abattoirs represent all the pig meat in the countries outside New Zealand, which are endemic with PRRS, cannot therefore be accepted as valid.

MAF response: Please see the response to 4.38.3 above.

4.38.5 …it would have been useful to know the survival of PRRS virus in muscle in cases where the pigs had been infected more than 11 days before slaughter which probably would decrease the amount of virus present in muscle samples.

MAF response: The risk analysis highlighted a number of points on which further scientific information would be useful. However, risk analyses can only draw upon whatever scientific literature is available at the time of the analysis. If further scientific studies are carried out on relevant points, recommended sanitary measures may change in the future.

4.38.6 In the paper it was concluded that it is likely that the infectivity will persist in chilled and frozen pig meat during storage and transport to New Zealand (p 36). The conclusion would be more tenable with more detailed description about the process including handling after slaughter in the country of origin, transport to New Zealand and how the meat is handled in New Zealand and how long (how many days) it takes before pieces of raw meat could end up to be eaten by pigs on commercial pig farms, in case of illegal feeding of uncooked imported pig meat.

MAF response: The assessment of the likelihood of PRRS surviving storage and transportations in section 4.1.3 of the risk analysis suggests that it is likely that significant levels of PRRS virus infectivity will survive the chilling and freezing temperatures for the length of time that pig meat is held at during storage and transport to New Zealand.

4.38.7 The probability of a pig being infected prior to slaughter is set as a point estimate …based on the results from the NAHMS serological study which was made in 4756 pigs from 284 finishing herds not vaccinating against PRRS in the USA… the resulting probability for virus being present in oropharyngeal and tonsillar tissue is 0,26 (1 in four) and, as a result of this, it is concluded … that the risk is moderate to high…a reference in the text (Albina, 1997) states that although it is believed that more than 50 percent of farms are affected in Europe, there are low density pig areas with much lower prevalences…The level of seroconversion is not a reliable estimate of the infection status of the animals at slaughter.

MAF response: Section 4.1.2.5 of the risk analysis compares the results of the 2001 quantitative model with results of later field studies. The likelihood of virus being detected in pigs at slaughter demonstrated by these field studies (1.2 percent) was accepted in the release assessment rather then the 0.3 percent prediction of the model. Changes to the assumptions made in the model would therefore have no significant effect on the overall findings of the published risk analysis.

4.38.8 The model seems to set the probability for infectious PRRS present at the time of slaughter (P2) to 0 if age at slaughter is smaller than the sum of the age of infection and the duration of viremia. Otherwise P2 is set to 1. The probability (P3) of a pig harbouring infectious PRRS in tissues at slaughter is calculated as P1 x P2. This implies that the model uses the seroconversion rate in the assessment always when the age at slaughter is less than the sum of age of infection and the duration of viremia.

MAF response: Please see the response to 4.38.7 above.

4.38.9 The effect of these two points on the conclusions of the release assessment has not been discussed in the report.

MAF response: Please see the response to 4.38.7 above.

4.38.10 The results of the model are given in point estimates of the expected value. This does not give a clear view of the distribution of results and therefore not of the uncertainty and basis of the conclusions of the release assessment. The number of iterations per each simulation is not stated.

MAF response: Please see the response to 4.38.7 above.

4.38.11 The conclusions of the section, paragraph 4.2.6 on p 44-45 (exposure assessment), are considered valid

MAF response: Noted.

4.38.12 The conclusions of the section, paragraph 4.3.2 on p 50 (consequence assessment), are considered valid.

MAF response: Noted.

4.38.13 The (risk estimation) conclusion "…, there is a non-negligible likelihood of release of PRRS virus in imported pig meat." cannot be accepted as valid if it is based solely on the results by Magar and Larochelle (2004).

MAF response: As stated in section 2.3.2, the risk estimation is based on the release, exposure and consequence assessments and therefore considers all relevant available scientific literature.

4.38.14 According to the report the only exposure pathway for PRRS would exist on pig farms that are not complying with the garbage feeding regulations of New Zealand. Considering this the recommended sanitary measures to manage the risk can not be regarded justified. This problem should be managed with measures of Veterinary authorities of New Zealand to intensify controls or other ways to improve enforcement of regulations.

MAF response: A number of submissions to this risk analysis (for example see 4.31.6, 4.32.8, 4.33.4, 4.34.16, and 4.35.5) have argued that, because of the unknown level of compliance with New Zealand's garbage feeding regulations, the sanitary measures recommended do not provide an appropriate level of protection against an incursion of PRRS. Please refer to *Key Statement 5* in section 3 of this document.

4.39 NETHERLANDS MAF

4.39.1 In general we can support the argumentation / conclusions of the Finish delegation.

MAF response: Noted.

4.39.2 The argumentation / conclusions in the report regarding hazard identification, exposure assessment, consequence assessment are considered valid.

MAF response: Noted.

4.39.3 The (non-negligible) likelihood of persistence of virus in chilled/frozen meat during transport / storage to/in NZ would be more tenable with a more detailed description of the process of the meat and estimated timeframes until pieces of raw meat could be eaten by pigs in NZ.

MAF response: The assessment of the likelihood of PRRS surviving storage and transportations in section 4.1.3 of the risk analysis suggests that it is likely that significant levels of PRRS virus infectivity will survive the chilling and freezing temperatures for the length of time that pig meat is held at during storage and transport to New Zealand.

4.39.4 The likelihood of pigs being infected prior to slaughter is based on a (probably non random) point survey in the USA. (In view of) the sensitivity of this parameter to the model, it might not be appropriate to assume this as the situation in all countries that export to NZ.

MAF response: Section 4.1.2.5 of the risk analysis compares the results of the 2001 quantitative model with results of later field studies. The likelihood of virus being detected in pigs at slaughter demonstrated by these field studies (1.2 percent) was accepted in the release assessment rather then the 0.3 percent prediction of the model.

4.39.5 (In view of) the conclusion of the report that the only exposure pathway for PRRS would exist on pig farms that are not complying with the garbage feeding regulations of NZ, the recommended sanitary measures to manage the risk cannot be regarded justified. This problem should be managed (primarily) with measures of the NZ authorities within the country in order to increase compliance.

MAF response: A number of submissions to this risk analysis (for example see 4.31.6, 4.32.8, 4.33.4, 4.34.16, and 4.35.5) have argued that, because of the unknown level of compliance with New Zealand's garbage feeding regulations, the sanitary measures recommended do not provide an appropriate level of protection against an incursion of PRRS. Please refer to *Key Statement 5* in section 3 of this document.

4.40 CHRIS TRENGROVE

4.40.1 I fully support NZPIB's submission.

MAF response: Noted.

4.40.2 The recommended sanitary measures proposed in the Import Risk Analysis include options that would allow pork meat infected with PRRS to be released into New Zealand. This is despite the fact that it recognises that such meat has the ability to infect naive pigs through feeding. I am very concerned that the level of risk is under-estimated. I do not accept that the range of options proposed will manage the identified risk

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.40.3 …what is a "consumer-ready high value cut"? Such cuts have the ability to infect naive pigs.

MAF response: Please refer to *Key Statement 3* in section 3 of this document.

4.40.4 The Biosecurity (Meat and Food Waste) Regulations 2005 are the theoretical protection measure against PRRS infecting the New Zealand pig herd. This is a very flattering view of how these Regulations are working in practice.

MAF response: Please refer to *Key Statement 5* in section 3 of this document.

4.40.5 When MAF recommended that regulations be re-instated following its 2001 review, it proposed that there would be reactive policing rather than proactive policing…Hindsight over the last 15 months has now amply demonstrated that reactive policing of these regulations has been a very low priority. A very low level of follow up on reported suspected cases of non-compliance has only recently been set up in response to considerable efforts from NZPIB. I believe until the end of June 2006 there had only been two actual farm visits, and some phone calls and letters to these reported suspected cases of non-compliance. I have personally met with both the BNZ Director of Biosecurity and the Minister to reinforce the concern of NZPIB at the potential for biosecurity incursion via this regulated but substantially unchecked route. My concern is certainly for the New Zealand pig herd but also for New Zealand agriculture generally. The UK learned a very hard lesson in 2001 with FMD, where it is most likely that the incursion was through feeding infected material to pigs despite this being an illegal practice.

MAF response: Please refer to *Key Statement 5* and *9* in section 3 of this document.

4.40.6 The Risk Analysis … relies on the assumption that consumer-ready high value cuts (undefined) will not end up as waste…there are a number of reasons for product becoming waste, as well as the trimmed or discarded component. Other

significant pathways generating waste are via product out of quality specification, and past or close to 'use by' date…There is no reference at all in the Risk Analysis to these pathways which will be potentially significant in terms of generating PRRS infected pork within New Zealand.

MAF response: Please refer to *Key Statements 2* and *3* in section 3 of this document.

4.40.7 With PMWS now endemic, it is even more crucial that New Zealand is protected from PRRS incursion, as these diseases have a synergistic effect in terms of on-farm disease impact.

MAF response: Please refer to *Key Statement 13* in section 3 of this document.

4.40.8 The Risk Analysis overlooks some important considerations about pig ownership in New Zealand…it assumes that there is little contact between the commercial sector and non-commercial sector, and that the commercial industry can take steps to protect its biosecurity …the commercial pork sector is at risk from the geographic location of non-commercial pig ownership. I have attached a map illustrating AgriBase figures (June 2006) which shows commercial pork producing units and other farms. These sectors are clearly geographically overlaid.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.40.9 I am aware that Dr Eric Neumann of Massey University's EpiCentre has a proposal with BNZ seeking its support to investigate the nature of the para-commercial pork industry and to establish linkages with the commercial sector. This is crucial factual data required before the Risk Analysis can make assumptions that there are, or should be, barriers of interaction between the commercial and non-commercial industries.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.40.10 I want to emphasize that appropriate sanitary measures to prohibit the release of PRRS infected meat into New Zealand are not a barrier to trade…Imports have flourished: since the sanitary measures were imposed - growing from 17,616 tonnes (bone-in equivalent weight) in 2001 to 31,862 tonnes (bone-in equivalent weight) in 2005. While there are a number of factors which impact on trade, this percentage increase of 81 percent includes both PRRS infected countries (e.g. USA) and non- PRRS infected countries (e.g. Australia).

MAF response: Although imports of pig meat into New Zealand have increased since the introduction of the current control measures for this commodity, if the current measures cannot be scientifically justified then New Zealand, as a signatory of the SPS agreement, cannot continue to require their implementation. Furthermore, statements in this review of submissions document (e.g. 4.37.2, and 4.44.7) indicate that our trading partners *do* see the current measures as excessively trade restrictive and a technical barrier to trade under the WTO.

4.40.11 A PRRS incursion would have major impact on commercial pork producers, their staff and families and the supporting rural communities

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.41 DAVID LAWTON

4.41.1 My exposure to the backyard sector is relatively unique amongst those in the pig industry…prior to the identification of these properties through various and often necessarily creative means, neither I nor the commercial farmer has been aware of their existence. The need to investigate these herds has generally arisen because of contacts with other potentially at risk herds…when the links emerge it is clear that they are numerous and that there is a complex network of regular and haphazard contacts within this sector.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.41.2 Pig breeding on these (backyard) properties is common and pigs are freely traded between properties for all sorts of reasons….In addition,… it is not uncommon for food sources to be shared amongst properties. Almost without exception these small pig herds are fed a variety of food waste that is derived from every available source. These sources include restaurants, bakeries, hospitals, supermarkets and large food processors. The food itself is a mixture of cooked and uncooked waste that ranges form supermarket green waste to reject pies. On more than one occasion I have personally seen uncooked pork cuts in such waste.

MAF response: Please refer to *Key Statements 5* and *7* in section 3 of this document.

4.41.3 I believe that the activities of backyard pig keepers are a risk for the introduction of an exotic disease. Some of these diseases, such as PPRS, are fairly pig specific, while others such as FMD are highly infectious to a range of livestock.

MAF response: Please refer to *Key Statement 7* in section 3 of this document.

4.41.4 Some in MAF recognize this and have sought to understand the backyard sector more fully. This led to a call for proposals…to characterize the population of backyard pig herds in the area surrounding the Auckland International Airport…MAF chose not to fund the research as the funding required exceeded their anticipated budget for this project.

MAF response: Funding of research projects by MAF is beyond the scope of this risk analysis.

4.41.5 From my wide and ongoing experience within the New Zealand pig industry and of the many backyard pig keepers that are not part of the industry, I believe the authors show very little understanding of either of these sectors in addition to their apparent lack of objectivity. As a result, the authors have proposed changes to the current sanitary measures that on the data that they themselves provide, will not adequately manage the risk of PRRS entering New Zealand and infecting the national herd.

MAF response: Please refer to *Key Statement 7* and also to the "cascade of risk reduction" in *Key Statement 1* in section 3 of this document.

4.41.6 …the authors accept that PRRS virus will enter New Zealand in pig meat imported from countries affected by PRRS and that some of this meat will be infective at the point of its end use where, <u>if</u> it is fed to a pig, it may infect that pig with the virus.

MAF response: Please refer to *Key Statement 1* in section 3 of this document.

4.41.7 Between June 2003 and June 2004, 8,855 tonne of pig meat was imported into New Zealand from counties affected by PRRS. Of this, 97 percent was frozen. If it assumed that all of the remaining 3 percent was processed in a manner that inactivates PRRS (e.g. as salami etc), then the relevant tonnage is 8,580. Using the data of Magar and Larochelle (2004) to which the authors attribute some importance, it is expected that 103 tonnes of this meat will contain virus sufficient to be detected by PCR. With freezing and thawing the titre of virus declines, such that after freezing at -23^{0}C, 75 percent of samples that had had sufficient virus for detection by viral isolation, no longer had detectable levels after 10 days. …Note, however, that in Table 15 data is presented that indicates that there is still some probability of infection following ingestion of only 1 g of this meat. As dose is dependent on both virus titre and the quantity of meat ingested, without making an assumption about the expected quantity of meat that will be ingested it is not possible to make a precise estimate. The authors conclude that it is reasonable to assume that the virus titre decreases by 75 percent from that present at slaughter over one freeze and thaw cycle. This is not an unreasonable assumption, although it is does not necessarily follow that 75 percent of meat is no longer infective. Thus, any estimate of the amount of meat that is infective at the point of use is crude at best. However, if it is assumed that all of the 103 tonnes of imported meat that was expected to harbour virus (PCR positive) in 2003/2004 is infective and that 75 percent of this infectivity is lost during a freeze and thaw cycle, 25,750 kg of pig meat would have been infective to pigs at its point of use in that year were it not for the existing sanitary measures.

MAF response: It is recommended in the risk analysis that the existing sanitary measures remain in place for pig meat coming from countries with endemic PRRS that is not in the form of consumer-ready, high value cuts or will not be processed on arrival into consumer-ready, high value cuts. The release assessment agrees that there is a non-negligible likelihood of chilled or frozen pig meat from a country with endemic PRRS harbouring infectious PRRS when imported into New Zealand and the exposure assessment, consequence assessment and risk estimation demonstrate that there is a non-negligible risk to small, non-commercial or marginally commercial breeding herds that are not complying with the garbage feeding regulations and for herds with inadequate biosecurity practices. Please refer to the "cascade of risk reduction" in *Key Statement 1* in section 3 of this document.

4.41.8 As 1.2 percent of pig meat imported from North America (where PRRS is endemic) is expected to harbour the virus the description of the likelihood as "low" is misleading when referring to a recognized hazard. Such a description is

generally reserved for risks that are less than 1 in 1 million or 0.0001 percent in this context.

MAF response: As indicated in Import Risk Analysis Animals and Animal Products (Murray 2002), 'Low' has the Concise Oxford Dictionary definition of 'Less than average, coming below the normal level'. MAF believes it is quite reasonable to describe a likelihood of 1.2 percent as low and is unaware of an alternative definition which reserves this term for likelihoods of less than 0.0001 percent.

4.41.9 The authors correctly conclude in the executive summary that the threat of imported pig meat that contains PRRS virus leading to the infection of a New Zealand pig <u>only</u> exists if a New Zealand pig is exposed to this meat. However, they then go on to state that an exposure pathway would only exist on pig farms that were not complying with the garbage feeding regulations. While this statement is technically correct … it is at the same time very misleading as it fails to identify the exposure pathway that would exist on properties where small herds of pigs are kept and the owners fail to comply with the garbage feeding… A more appropriate conclusion would be that "a potential exposure pathway is likely to exist on many of the more than 7000 properties on which a small herd of pigs is kept but that are not recognised or registered as pig farms". By omitting to identify this exposure pathway in the executive summary, the risk of exposure is grossly misrepresented. It is possible that this was an oversight.

MAF response: Please refer to *Key Statement 5* and *7* in section 3 of this document.

4.41.10 This number (over 7,000 properties with small pig herds) is derived from Agribase which is incomplete. In addition, it does not include properties in the South Auckland area where the density of backyard pig keepers is believed to be very high. It is possible therefore that the total number of such properties may exceed 15,000.

MAF response: This is not disputed. Section 2.1.2 of the risk analysis states "Since AgriBase does not attempt coverage in the urban areas, the backyard pig herds in Auckland and South Auckland are not included in the above figures. There are thought to be a large number of pigs in that region, particularly as a source of pig meat supply to the Polynesian community. It is estimated that up to 70,000 pigs per year may be slaughtered in this area, comprising approximately 10 percent of the national annual kill."

4.41.11 …it is assumed that a pig must eat about 500 g of infective pig meat to receive an infectious dose simply because this quantity of meat was used in transmission studies. There is no basis for this assumption, although the work on which this assumption was derived does perhaps show that when 500 g of meat is fed, the probability of infection is high and that sufficient virus is provided to establish infection even when the titre of virus is below that detectable by virus isolation…Thus, the authors comment that it is unlikely that scraps in quantities similar to those used in the transmission studies will be generated in kitchen waste from households is irrelevant.

MAF response: The risk analysis does not make the assumption claimed in this submission. Please refer to *Key Statement 4* in section 3 of this document.

4.41.12 In addition, as noted earlier, many of the scraps that are fed to backyard pigs do not originate from household kitchens, but are sourced from the kitchens of large institutions, restaurants and so on. Even if any importance was to be given to the 500 g quantity, to assume that such commercial kitchens would not generate this volume of scraps is presumptuous.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.41.13 One of the reasons why the authors suggest that the amount of scraps will be low and thus available for pig feed, is that the proposed changes to the sanitary measures will only apply to high value cuts. Although what constitutes a high value cut is not defined as such, reading of the analysis suggests that they include chops, steaks and roasts. While I accept that these will yield less scraps than some other cuts, that they yield a little bit of trim is likely. In a commercial kitchen, a little bit of trim from many cuts can surely add up to a lot?

MAF response: Please refer to *Key Statements 2* and *3* in section 3 of this document.

4.41.14 It is also well known that at times whole cuts are discarded for a variety of reasons including because a product may be past its ‘use by’ date. There is no recognition of the potential for large quantities of high value cuts to be discarded at retail level because it is close to or past its ‘use by’ date.

MAF response: Please refer to *Key Statement 2* in section 3 of this document.

4.41.15 The authors state that should pig farms in New Zealand become infected with PRRS, the likelihood of spread to other pig farms would be low as long as standard biosecurity practices are observed…While many routes of transmission between the backyard herd and that on the pig farm would be eliminated if the pig farm adhered to basic biosecurity procedures, some transmission routes such as aerosol spread are simply beyond the control of the farmer.

MAF response: As discussed in section 3.4.5.5 of the risk analysis, there is no scientific evidence to prove airborne spread of PRRSv under field conditions in any country. The only credible study that has demonstrated airborne spread (under highly artificial experimental conditions) was carried out in 2005 by Prof Dee. It was concluded from this study that, in the field, the transmission of PRRSv by aerosols is probably a rare event, *if it occurs at all*.

The issue of airborne spread is discussed at length in appendix 2 of this document. Although various claims have been made that airborne spread is the only possible explanation for specific field observations, the results of published, peer-reviewed experimental studies question whether this route of transmission is likely to be significant. Please also refer to *Key Statement 10* in section 3 of this document.

4.41.16 In the South Island where almost half of the sow herds on commercial farms are housed and farrow outdoors, seagulls are ubiquitously present... It is through this behaviour that we suspect PMWS has spread between farms in Canterbury over the past eight months.

MAF response: The precise nature of the circumstances of the detection and spread of PMWS in New Zealand since late 2003 are the matter of some scientific debate, and speculation about this is beyond the scope of the risk analysis and this review of submissions. However, MAF is unaware of any studies that have demonstrated transmission of PRRS between pig herds via seagulls as suggested. Please also refer to *Key Statement 10* in section 3 of this document.

4.41.17 There is no "standard" biosecurity practice in New Zealand, although we have encouraged producers to implement biosecurity measures both at an individual and industry level. For example the NZDPIB has a Farm Biosecurity Policy document that I developed for them at their request a few years ago and that is referred to in the analysis. The proportion of pig farmers that implement all of the recommended practices outlined in that policy is small, although it has increased since PMWS was recognised. Nevertheless, I am aware of individual farms that have developed PMWS despite having very comprehensive biosecurity programs. The bottom line is that a pig farmer can only control those factors that are under his or her control. While they may insist that only clean trucks come onto their property, say to deliver feed or cart pigs, they are ultimately dependent on the integrity of the trucking company or driver for compliance.

MAF response: Please refer to *Key Statement 6* in section 3 of this document.

4.41.18 If PRRS virus was introduced into New Zealand, the impact on individual producers and the industry as a whole would be catastrophic…It is the authors opinion that the consequences of PRRS introduction would be negligible apart from the direct losses to affected farms. I consider this naïve. Pigs have to eat. On commercial pig farms in New Zealand, over 270,000 tonnes of feed is consumed annually and most of this is either grown in New Zealand or derived as a by-product from other industries e.g. milk powder, meat and bone meal, poultry offal. There are also many other support and service industries that benefit from the pig industry e.g. trucks cart pigs and feed and abattoir workers kill pigs.

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.41.19 This analysis should not only be of concern to the New Zealand pig industry, but to all persons who value rural New Zealand, its productivity and the contribution it has made to development and ongoing economic and social success of this nation

MAF response: Please refer to *Key Statement 8* in section 3 of this document.

4.42 JOHN R CLIFFORD

4.42.1 The risk assessment is well written and conforms to guidelines from the World Organisation for Animal Health.

MAF response: Noted.

4.42.2 You indicate that the main risk of import and spread of PRRS virus is posed by feeding uncooked scraps to domestic swine. It is currently illegal in New Zealand to feed uncooked meat scraps to swine, yet before this prohibition there were no outbreaks of PRRS. Therefore, we would conclude that the final risk assessment of risk is negligible, as opposed to your designation that the risk is non-negligible.

MAF response: A number of submissions to this risk analysis (for example see 4.31.6, 4.32.8, 4.33.4, 4.34.16, and 4.35.5) have argued that, because of the unknown level of compliance with New Zealand's garbage feeding regulations, the sanitary measures recommended do not provide an appropriate level of protection against an incursion of PRRS. Please refer to *Key Statement 5* in section 3 of this document.

4.42.3 APHIS is pleased that the risk mitigations will allow importation of uncooked, consumer-ready, high-value cuts of pork for direct export.

MAF response: The risk analysis has recommended that consumer-ready, high value cuts of pig meat from countries with PRRSv can be imported with no further sanitary measures against PRRSv. Further details of this trade will be developed within the context of an import health standard.

4.42.4 We are also happy that there will be an option for uncooked pork to be processed upon arrival into consumer-ready, high-value cuts of pork.

MAF response: The risk analysis has recommended that pig meat from countries with endemic PRRSv could be further processed on arrival, in an officially approved facility, into consumer-ready high value cuts with no further sanitary measures against PRRSv. Further details will be developed within the context of an import health standard.

4.42.5 We would like to verify that uncooked pork offals and trimmings can be exported from the United States to New Zealand for sausage production.

MAF response: Comment on this issue is beyond the scope of this risk analysis.

4.43 JOY PHILIPPI

4.43.1 The first conclusion in the document states that there is a low likelihood of the PRRS virus being present in the pig meat at the time of slaughter…We concur, as various scientific studies have investigated PRRS infectivity at slaughter and support this conclusion.

MAF response: Noted.

4.43.2 The risk assessment goes on to acknowledge that from 1998 to mid-2005 there were no regulatory controls enforced in New Zealand on the feeding of food waste to pigs…

About 97 percent of all imported pig meat is imported frozen, and…a single freeze/thaw cycle can be expected to reduce the amount of PRRS virus in pork by 75 percent...

About 95 percent of imported frozen pork would have been further processed…Such processing commonly involves cooking …

Most chilled meat would have been held for a total of 7 days between slaughter and sale to consumers in New Zealand, over which time about 90 percent of any PRRS infectivity present would be lost…

…there would have been limited trimming prior to cooking and therefore limited generation of raw scraps…

An examination of historical trade, combined with the four observations provided above, argue for negligible, not non-negligible risk.

MAF response: As stated in 4.2.3, the evidence presented indicates that the likelihood of effective exposure from PRRS in imported pig meat is remote in practice, and for piggeries complying with the garbage feeding regulations the likelihood of exposure to infectious PRRS virus in pig meat is essentially zero. However, for other piggeries there remains a very low likelihood of exposure. As there would be significant consequences should PRRS infection occur in a breeding herd, the overall risk estimate is considered to be non-negligible and risk management measures are therefore appropriate.

4.43.3 Assuming that New Zealand will continue to enforce their regulations banning untreated food waste feeding, the risk of pigs being exposed to PRRS through ingestion of pig meat is therefore negligible.

MAF response: A number of submissions to this risk analysis (for example see 4.31.6, 4.32.8, 4.33.4, 4.34.16, and 4.35.5) have argued that, because of the unknown level of compliance with New Zealand's garbage feeding regulations, the sanitary measures recommended do not provide an appropriate level of protection against an incursion of PRRS. Please refer to *Key Statement 5* in section 3 of this document.

4.43.4 It is notable that the meat in the Magar and Larochelle study was stored at -70°C which maximises the survival of the virus but which is a temperature well below the common temperature used for frozen meat transport (-20°C) . Therefore, you can reasonably expect negligible risk of PRRS transmission in pork that is held or transported at -20°C or greater because viral survival will be negatively affected.

MAF response: MAF recognises that a single freeze/thaw cycle has been shown to reduce the titre of PRRS virus in pig meat by up to 2 logs and that the likelihood of virus isolation in thawed meat was shown to be only 25 percent of that prior to freezing (section 5.2.2.1 of the risk analysis). However, it is MAF's opinion that this level of reduction is not sufficient to reduce the likelihood of release to a negligible level.

4.43.5 …the science supports the conclusion that there is a negligible likelihood of release of the PRRS virus in imported pig meat.

MAF response: Having evaluated all available scientific evidence, MAF has concluded that there is a non-negligible likelihood that chilled or frozen pig meat from a country with endemic PRRS will harbour infectious PRRS virus when imported into New Zealand.

4.43.6 …it is our understanding that, on the basis of the current risk assessment, the United States would be allowed to export high value pork cuts, but prohibited from exporting pork offal or pork trimmings to New Zealand. While we are clearly opposed to import policies that would in any way restrict the import of U.S. pork, we would appreciate confirmation that our reading of the current risk assessment is correct.

MAF response: As indicated in the responses to 4.42.3, 4.42.4 and 4.42.5, the details of a specific trade will be addressed within the context of any import health standard developed from the recommendations contained in this risk analysis so we will seek to address this question then. However, pork offal and pork trimmings would not fall within the definition of consumer-ready high-value cuts.

4.44 DR. DEBBIE BARR

4.44.1 It is the opinion of the Animal Health Risk Assessment (AHRA) group that the generic risk analysis on porcine reproductive and respiratory syndrome (PRRS) virus in pig meat is a very thorough, well documented and transparent document.

MAF response: Noted.

4.44.2 The New Zealand risk assessment looks at one possible hazard (PRRS), and if the virus is present in the exporting country, restrictions are applied without determining the country situation. This could be unfair since the prevalence of the disease, detection capability, controls in place and management practices will have a direct impact on the release assessment, and would result in variable levels of risk…an exporting country such as Canada should be able to have a release assessment more adapted to its situation, which would therefore be more accurate in regards to the potential risk to the importing country (New Zealand).

MAF response: One of the key scientific publications used in the release assessment (Magar & Larochelle, 2004) is a report on a random survey in 2 slaughterhouses in Canada. MAF is unaware of any more recent data that would allow a reassessment of the country situation.

4.44.3 In 1995, the AHRA group performed a risk assessment on PRRS in Canadian pork meat. The outcome was that the likelihood of infection in exporting up to 30000 tonnes of Canadian pork meat would be 1 infection in 2755 years (0.03 percent chance), with a 95 percent confidence level. This outcome is considered extremely low and is in agreement with the outcome of the New Zealand release assessment, which is essentially negligible risk for New Zealand piggeries complying with garbage feeding regulations and very low for piggeries not complying with garbage feeding regulations.

MAF response: The 2004 study cited in response 4.44.2 indicates that 1-2 percent of pig carcasses at slaughter contain infectious PRRS virus.

4.44.4 The experimental infection was done through ingestion of 500 to 900 g of meat fed over two consecutive days. The New Zealand risk analysis has not demonstrated that swine in New Zealand would likely be exposed to such a large quantity of infected meat resulting from importing contaminated meat.

MAF response: MAF agrees with this. However, the risk analysis also does not consider the quantities used in feeding trials (500 – 900g) to suggest a minimal infectious scrap size.

4.44.5 The assessors assumed that the likelihood of exposure is higher for farms not complying with garbage feeding regulations, but could not estimate this likelihood because of lack of information concerning the minimum amount of

uncooked meat that contains an infective dose…In our opinion, the New Zealand risk assessment took a conservative approach.

MAF response: MAF agrees that there is no information regarding the minimum infectious scrap size, and, as stated above, the risk analysis did not consider the quantities used in feeding trials (500 – 900g) to suggest a minimal infectious scrap size. Although this submission considers this to be a conservative approach, a number of other submissions would strongly disagree.

4.44.6 The risk management options proposed in the New Zealand's Import Risk Analysis: *PRRS Virus in Pig Meat* do not address the option of reducing the likelihood of exposure by improving compliance by New Zealand producers with the 2005 garbage feeding regulations.

MAF response: MAF has recognised that the level of compliance with these regulations is unknown. To provide an appropriate level of protection against an incursion of PRRS without sanitary measures on imported pork, MAF would need to be confident that there is total compliance with these regulations by New Zealand pig keepers. Unfortunately, this would not be economically feasible to achieve.

4.44.7 Canadian access to the New Zealand pork market has been hampered by technical barriers.

MAF response: Please refer to *Key Statement 11* in section 3 of this document.

Appendix 1: Copies of Submissions

1. MURRAY BATTERSBY

The MAF analysis recommends relaxation of import regulations around what is termed “high value cuts”, This is of particular concern to me as you will establish from reading the attached profile. I have spent much of my lifetime developing one of New Zealand’s most desirable pork brands and I believe Murrellen Pork has become a heavy weight in the niche pig market. There is no definition of “consumer ready - high value cuts.” Why should MAF come to the conclusion that such imports are necessary? If MAF have approved a pork industry qualify process bench mark developed by the pork industry requiring very high standards why is it necessary for MAF to punish those who have qualified in producing the very high quality cuts it is processed to import.

I support NZPIB and its submission and ask that matters I refer to above are further considered by MAF before any final decision is taken.

My farm holds a MAF approved pork industry quality process PIQP MAF approved pork industry quality process benchmark which was developed by the pork industry and my farm is one of few that met that standard.

In support of what I am saying I attach a local newspaper profile which recently appeared in the Central Canterbury News in support of my ability to make this submission. My submission is as follows:

I believe I am qualified to make critical comment of firstly the risk analysis proposed by MAF and comment on the commercial food waste market and the limited level of policing of same.

My name is Murray Battersby. Until recently, following the sale of my pig farm to my son and daughter-in-law, my wife and I have spent much of our lives developing the pork industry from our farm and have created one of New Zealand’s most desirable pork cuts - Murrellen Pork.

1. I support the technical matters raised by NZPPIB. I understand that that organisation is working with its technical experts to review details and has identified a number of areas where deficiencies occur. It appears that the risk analysis proposed by MAF does admit that it will allow PRRS infected pig meat into the country. Its seems to rely on post border measures to control it but there appears to be no consideration of how waste will be generated via food outlets, retail outlets and indeed consumers. There is no definition of what is to occur when a product has passed its use by date. There will certainly be wastage and therefore danger of infection. Swill needs to be properly defined. I do not feed my stock waste but if it is to continue in my view it must be cooked to a temperature which will dispose of disease factors and fed out within a reasonable time thereafter.

2. SEAN NEWLAND

I have not gone in to too great a detail on this risk analysis given its limited connection to the sheep and beef industry. There are however a number of issues of more of a RA and biosecurity principles nature that do concern me and I have noted these below.

I am happy to discuss these points with BNZ staff if that helps.

4.2.6

ii) This work did not indicate a minimum size below which infection did not occur so relying on the scrap volumes used in those studies to estimate risk levels does not seem logical. These only indicate the volumes fed, nothing more.

iii) Note that in many house hold situations scraps are aggregated from a number of dwellings to feed pigs (personal observation).

v) If "likely processing methods" are to be used in the risk estimation (as they mitigate the risk) then what happens if they are not required to be followed (they are only "likely") or if they change over time?

vi) There have been a number of concerns raised (with MAF) by the PIB regarding the lack of enforcement of the feeding regulations and examples of where these regs have been ignored documented. Unless MAF were to undertake adequate enforcement activities and increase the level of compliance (something that it is not possible for the industry to do over ALL producers) then this is a dangerous assumption to add in to the risk estimation.

4.3.1.2 - what are the "standard biosecurity practices"? Is there such a thing in the NZ commercial industry and if not how can they be relied upon to limit the spread of PRRS if it got here?

4.4 The comment regarding "no significant impact on exports" may be correct from an official market access perspective - it does not take in to account however any commercial premium NZ pork may receive due to the current health status WRT PRRS.

The comment WRT "inadequate biosecurity practices" is of concern. Why should an industry take on further compliance costs (and there will be costs associated with such practices) to allow the importation of imported product that poses a real risk of introducing a significant exotic disease? If the current NZ pig herd health status means such practices are not required why add that cost to assist manage the risk associated with imports? Suggest that MAF look at the actual practices carried out in NZ (and not the ideal) and estimate risk based on this.

5.1 - see comment above. One advantage NZ producers (not only the pork industry) have is that the health status of NZ animals does not, in many cases, require a high (and therefore costly) level of farm biosecurity processes. This is a commercial advantage to the industries involved and by prevention of the entry of exotic diseases through appropriate border controls (rather than relying on "in country" activities") this advantage is maintained.

5.2.3 - If either of the "high value cut" options are to be followed a precise definition of these is required. This definition needs to be linked to the removal of any infectious materials (e.g. lymphoid tissues) given that a) the minimum infectious dose is not known and b) compliance with the feeding regulations is known to be "imperfect".

General Comment

Two main areas of concern

1 The intimation that NZ industry should put in place ““appropriate biosecurity practices” specifically as means to mitigate risks associated with imported goods where such practices are being included within the reasoning to allow the imports. Any additional practice adds cost. If the practices are not needed now the NZ producer has a commercial advantage - which is one of the reasons we (NZ Inc) attempt to keep out exotic diseases.

2 The intimation that if PRRS did get here it would only impact on the non-commercial herd and this would have no real impact on the wider industry. This ignores the realities of the commercial market place where a change in health status is often used as leverage to reduce the price paid to producers or exporters, and ignores the impact on the credibility of the NZ biosecurity system with trading partners.

3. STEVE KIDBY

My name is Steve Kidby, I partly own and operate Paranui Piggery Co Ltd, we have about 250 sows and 2700 pigs in total, and are a farrow to finisher operation just north of Foxton.

I am very concerned and absolutely agasphed to read that MAF have deemed in their wisdom, that its is ok, providing protocol is observed, to allow entry into NZ of pig meat from countries that have PRRS, this decision on the heals of the recent outbreak into our industry of PMWS, is I think very short sighted.

I have been in this industry now for 38 years, we have invested about $2 million into our present Pork production unit, and it has always been a concern of mine, that our own personal Bio security program is important to the future profitability of this unit and our industry as a whole, the above just undermines our commitment to , not only our own biosecurity plans but to our national biosecurity, whom we as an industry are fully aware that if any foreign or overseas disease e.g. Foot and Mouth, or PRRS, will more than likely come through our industry, even though it might not be our fault, and this decision by MAF to turn a blind eye to PRRS, only opens the gates wider for something like this to happen.

If we are passionate about biosecurity in NZ then tell why is this happening?

It should be made known that it is not the serious pork producers that flaunt the rules, and and outbreak of foreign disease will occur, it is the back yarders with 3-4 pigs and still collect garbage, and don’t adhere to the new regulations , these people and there’s thousands of them, even on Trade me, this were you, MAF loose sight and control of the problem we see, that you see as not a problem.

Finally I wish to cast my disapproval at this possibility of allow imported meat not only pig meat into this country and the lifting of the bans to do so, for the simple reason that were there is a risk to this country , and out clean green image, we should not jeopardize this in any way.

4. JAMES AND CLARE FREETH

We are writing with reference to the recently released Import Risk Assessment for pig meat from countries with PRRS.

We own and manage a 550-sow outdoor pig herd, selling weaners at 20kg. We emigrated from the UK in 2004, and have been pig producers for over 15 years.

In the UK we owned and managed a 500 sow breeding to finishing unit, and had first hand experience of the PRRS virus in our own herd. We also lived close to a farm which tragically had all of it’s sheep flock culled in the Foot and Mouth outbreak of 2001. We know how easy it is for diseases to take hold, and how devastating they can be once they arrive on a farm - despite all our best attempts to keep them at bay. Like many pig farmers in mid-Cantebury we are reliant on pig production for our income, and our budgets are tight and realistic for normal situations. However, an incidence of PRRS on our farm would have a significant effect on the viability of our business and we would be unable to sustain the losses that would inevitably be incurred over a long period.

One of the attractions for us of moving to New Zealand to set up a pig production business, was the low incidence of disease prevelant in the national pig herd and the stringent border controls and positive steps taken to keep the country clean of disease. What this Risk Analysis is proposing would be a backward step for the NZ pig industry, and once PRRS has been allowed to enter the country it would be too late to do anything about it.

We are already at risk from the PMWS virus which is now in the mid-canterbury area, and as PRRS acts synergistically with PMWS, the health impact on the NZ pig industry if we succumbed to PRRS would be far higher than if PMWS were not present.

We ourselves are diligent in our bio-security measures and are unlikely to be the cause of an introduction of PRRS. However, there are a large number of pigs in back-yards across New Zealand which are fed scraps, and which do not adhere to the food waste regulations. It is perfectly possible that the PRRS virus could be introduced through these pigs. If a housewife or restauranteur had bought one of these imported high-value cuts, had cut the meat up for a stir fry and discarded part of the uncooked meat prior to cooking, such as a bone or fatty portion of the cut, this could then be fed to a back-yard pig, thus introducing the PRRS virus to the animal. Despite any biosecurity measures taken by nearby pig farmers, there is a risk that the disease could then be carried by birds through the muck on their feet, from this animal to a local pig farm. Fait accompli.

This risk is unacceptable. We have worked hard to move to a country which takes biosecurity measures seriously, and to build up a business which meets all the standards of health and welfare for the animals and which provides a living for us and our staff. We feel that it is the responsibility of the government to protect our interests and provide a safe environment in which we can produce pigs without fear of disease being brought in from abroad.

We therefore support NZPIB’s stance that current measures are maintained - that all meat imported from countries where PRRS is endemic is treated by cooking or curing.

We hope you will take our concerns seriously.

5. NEIL MANAGH

The above company is owned and operated by Father & Son team Neil and Andrew Managh. It is a large integrated operation, farming pigs, sheep and cattle near Feilding in the Manawatu.

The piggery side of the business farms 750 sows producing some 15,800 heavy pigs for the N.Z. market annually.

The sheep side is a lamb finishing operation producing in excess of30,000 lambs for the export market. A flow on from this is some 400 bales of lamb's wool produced.

Up to 700 cattle are also finished for the export market.

The business generates over $7 million in turnover of which 12 permanent staff and their families totally rely on, for their living. As well, many contractors and support industries service our business. e.g. shearing contractors - feed supplies - agriculture contractors etc also rely on us running a successful business

With so many people depending on us it is our responsibility as owner operators of the business to see that it is no way threatened by external damaging factors.

To date the strength of N.Z. agriculture has been that it is free of the many animal health issues that plague most other countries of the world.

Hence we become very alarmed at the real possibility of the options that would allow pig meat from PRRS infected countries into New Zealand without treatment to inactivate the PRRS virus. The Risk Analysis shows that such pig meat is a source of infection of naïve pigs. We do not believe that the risk analysis correctly establishes the level of risk. We fully support the submission of the New Zealand Pork Industry Board detailing areas where the risk analysis has under-estimated the risk to the New Zealand pig herd. While there are regulations in place that mean that all meat should be heated to 100C for one hour before it is fed to pigs, it is a faulty assumption on Biosecurity New Zealand's part to assume that this happens. We are aware that there is no policing of these regulations, and a very low level of follow up to reported cases of non-compliance. Does Biosecurity New Zealand have figures available to demonstrate the level of compliance with these Regulations, which provides facts on which to justify all its proposed options?

Importantly, the 2001 Foot and Mouth Disease outbreak in the UK is thought to have been started by feeding infected meat to pigs despite such feeding being illegal.

There are a very large number of properties with pigs in New Zealand (around 7,500), and a large number of these properties have 10 pigs or less. Commercial pork producers such as ourselves are very concerned to protect ourselves and our industry from exotic diseases and have developed on-farm biosecurity measures to protect our piggeries from many sources of disease incursion. However there is far less commitment from properties with a few pigs. Yet these non-commercial operators farm alongside commercial piggeries, and so despite our best efforts we are at risk from air-born spread of disease.

New Zealand has recently had to accept that PMWS is present. Expert opinion is that PMWS came via infected meat. Given that PMWS is in New Zealand it is even more important to the commercial pork industry to be protected from PRRS because the on-farm impact of these diseases is additive.

We are very concerned about the precedent of allowing a source of infection for an exotic disease into New Zealand. Our concern is not only for the New Zealand pork producing industry in respect ofPRRS, but for the whole of New Zealand agriculture. Surely a similar approach will not be adopted with Foot and Mouth Disease which would cripple the whole of New Zealand agriculture and the New Zealand economy. If such an approach would not be taken with Foot and Mouth Disease why then is it acceptable for an exotic disease which puts the New Zealand pork producing industry at risk?

Maintaining the current treatment measures is not a barrier to trade. Imports have grown significantly (almost doubled) since 2001 when the treatment measures against PRRS infected meat were put in place.

New Zealand and Australia are the only two countries where PRRS is not present. This reflects well on New Zealand's biosecurity status.

In conclusion: we request that the current treatment requirements remain in place to ensure that no pig meat infected with PRRS is released into New Zealand. We have no confidence that the current very low level of attention to compliance with the Meat and Food Waste Regulations provides any protection for the commercial pork producing industry, unless Biosecurity New Zealand can provide figures to the contrary. We are very concerned indeed about the precedent that would be set by allowing a source of infection of disease into the country. The pork processing industry has already adjusted to operating with treatment measures in place for pig meat imported from countries where PRRS is endemic so it cannot be argued that there are trade issues

6. GRANT SKILTON

Aorere Farms operates a 250 sow farrow to finish piggery close to Wanganui. The 6000 pigs we produce per year are fed entirely on grain based feed and the farm is benchmarked to be one of the most efficient in New Zealand. Additionally the farm compares very favourably on productivity measures when benchmarked internationally. The farm employs 10 people, and contributes approximately $1.5 million to the local economy.

As our livelihood is dependent on our success in the pig industry we are extremely concerned at the proposal to lower the bio-security import standards for pig meat suggested in the Import Risk Analysis on the PRRS virus in pig meat. We are a high cost, low margin industry and our farm would not be economically viable in the face of a PRRS outbreak in our herd.

Of major concern to us is the assumption that because feeding of uncooked pig meat to pigs is illegal, that the risk of PRRS virus infecting pig farms by the feeding of uncooked pig meat is negligible. Our farm is surrounded by lifestyle block owners some of whom keep pigs which are fed on food scraps from local restaurants. When questioned about their feeding practises, either by ourselves or authorities, it is all too easy to assure that all the food waste is “already cooked or if its not here is our pot that we cook it in”. We are sure the reality is far from this assurance – uncooked pork trimmings or spoilt meat could be relatively easily mixed with cooked waste and go un-noticed, and subsequently pigs on neighbouring farms could become infected with the PRRS virus. Even if the small producers do attempt to cook the product the type of facilities which are typically used for the process do not give any guarantee that the cooking will be thorough enough to destroy disease organisms such as the PRRS virus. Thus the reality of the situation is that there is probably a reasonable amount of uncooked pig meat being fed to pigs now, and so the fact that it is illegal is not an acceptable strategy to prevent a PRRS incursion.

Despite a high level of bio-security on our farm, if one of these neighbouring farms did become infected, there is a high risk of our herd becoming infected given the close proximity (300-500m) of these other herds to our herd. Birds, vehicles and even aerosols are potential vectors for the disease, and all of these routinely spread over the range between our herd and these small herds over which we have no control.

Thus we would urge the New Zealand Authorities to leave in place the requirements for imported pig meat to be cooked before sale or further processing for consumption in New Zealand.

Please contact us if you have any questions about this submission.

7. IAN & LINDA MCCALLUM JACKSON

We are pig farmers from South Canterbury and have read carefully MAF’s proposal on this matter. At this point in time we in our industry are in the middle of a PMWS epidemic it’s foot hold in New Zealand is directly attributable to MAF’s inability to keep us safe from it. When PMWS arrived in New Zealand MAF did not have the resources to deal with it. The current reality is we have to learn to live with this killer disease and watch our pigs die from it.

Now it is being recommended that our industry be exposed to yet another pig killing disease PRRS.

It seems to us that the bio -security of our industry revolves around diseases on/in imported pig meat and the 2005 Garbage Feeding Law. It is our opinion that MAF currently do not have the resources to deal with this law. It has never been communicated to the pig keeping public and is not being policed. Surely MAF’s role is to keep us all safe from unwanted diseases entering New Zealand and the most effective place to do this is at our borders.

We therefore submit that the proposal to lower the standards on imported pig meat be stopped and further work be undertaken to give MAF the resources to raise the standards on imported pig meat to exclude pig meat coming into New Zealand from countries that have diseases we do not have.

8. IAN BARUGH

To give you an indication of why I feel I can comment on this issue I will supply you a brief background to my work history. I have been employed in the pork industry for many years in a number of roles. These include working on and managing pork production units (4 years), as an on farm advisory officer/consultant (13 years), managing a pork procurement company (3 years), an in my current role as technical manager for 10 years providing technical support for the New Zealand Pork Industry Board (NZPIB), NZPIB staff, pork producers, nutritionists, veterinarians and other personnel servicing the pork industry.

I believe that any risk of an exotic disease is too great. A gap in the regulations for handling food waste is attributed to the recent outbreak of PMWS which the pork industry is still coming to grips with.

PRRS virus is recognised as a major hazard to the NZ pork industry and every endeavour should be made to keep New Zealand free of a disease that will have negative effect on reproductive performance of the breeding herd (abortions, weak born piglets, failure to farrow, and sow death) and in the grower herd, respiratory symptoms, pneumonia, difficulty breathing, poor performance, and death). I have visited farms in the Midwest of the US with the disease PRRS and witnessed the heartache of the operators having to continually treat sick pigs and remove dead ones, as well as suffer the crippling performance loss. The effects of PRRS and PRRS seem to compound when these diseases act together.

While it is acknowledged that the regulations controlling imported pigmeat, being frozen from countries with PRRS infections, non feeding of untreated food waste to pigs and the use of transitional facilities to process this pigmeat might work in a perfect world, we know that there are breakdowns in this system, - the recent reported case of imported pigmeat from Korea slipping through the net. While the commercial scale pork producers are aware of the regulations and the risk to their industry of a disease incursion such as PRRS following on from the recent PMWS outbreaks, it is likely that the initial outbreak could occur with a person with nothing at stake taking short cuts and feeding untreated waste food to their back yard pigs.

The New Zealand Pork Industry Board through its technology transfer programmes has been informing producers of the food waste regulations, posters of foot and mouth and seminars informing pork producers and other pork industry personnel why New Zealand does not want PRRS and why we should keep this costly exotic disease out of New Zealand.

Therefore in summary I think as a minimum New Zealand should maitain the current regulations in place of cooking and curing pigmeat from countries that have the PRRS virus in a tranistional facility and ideally not import pigmeat at all from these countries.\

9. PETER MACDONALD

PIC New Zealand Ltd (PIC) is a pig breeding company supplying high health pig genetics to the NZ Pig Industry. PIC operates 4 large pig breeding units – two in the North Island and two in the South Island and has 2,200 sows in production.

As a national breeding company we are concerned at MAF's recommendations in the Risk Analysis to relax regulations for transitional treatment of "high value cuts" of imported pork from countries where PRRS is endemic. Our concerns are as follows:

1. PRRS is a commercially devastating disease for any pig producer to contend with. As a breeding company our business would be crippled if any one of our farms became infected with PRRS.

2. PIC regularly imports semen from USA and are subject to very tight import health standard requirements to prevent the importation of exotic diseases such as PRRS. We happily abide by these standards in the knowledge that they are always in the interest of protecting the NZ pig industry's health status.

3. PIC operates tight biosecurity protocols to protect its health status, however not all risks can be totally eliminated. There are is a lot of scientific literature to say that PRRS can be spread by air, insects and birds. If PIC became infected with PRRS we have the potential, through the supply of breeding stock and semen, to quickly spread the disease through out the NZ pig industry.

4. The Risk Analysis acknowledges that around 1.2 % of meat imported from PRRS infected herds will contain viable virus. At least 40 % of pork consumption is imported. This risk is **not** non-negligible and requires **retention** of transitional treatment for all pork imports from PRRS infected countries.

5. PIC's sales staff regularly come in contact with low level / "backyard" operators who garbage feed. There is a low level of understanding of the Meat and Food Waste regulations and often a lack of care or carefree attitude to them – a typical "she'll be right" attitude. MAF do not have the resources to police and ensure compliance to the regulations. Many of these people operate in the South Auckland area and are close to two of our farms. We are very concerned that if "uncooked high value cuts" are garbage fed to pigs the risk of introducing PRRS into the area and that disease being transmitted via birds, insects or air to one of our farms is increased.

6. Currently there are no PRRS surveillance mechanisms in place to detect the presence of PRRS on slaughter of NZ pigs. Therefore PRRS could remain undetected for a long period of time, increasing the spread of the disease.

7. MAF and Biosecurity NZ need to learn from the PMWS disease incursion. Indications are that it came in via imported pork being garbage fed and subsequently spread throughout Canterbury by seagulls. This disease has been a major blow for many producers, forcing some of them out of the industry.

8. PIC fails to understand why imported high value cuts do not pose a greater risk. High food safety standards mean that meat will get rejected and subsequently get disposed of. This will either be to landfill or to food waste handlers. Despite the best intentions of the Meat and Food Waste regulations, the uncooked meat will end up being fed to back yard operators. One case of PRRS in NZ is one case too many!

In summary, PIC strongly urge Biosecurity NZ to retain the transitional cooking regulations for **all** imported pork from PRRS infected countries and not make any exemptions. PIC and the NZ pig industry are reliant on having an industry that is free from the major diseases that affect other countries to remain competitive. We have a reputation of having one of the highest health statuses in the world – lets keep it that way.

10. SHARON O'CALLAGHAN

hi there ...i was really disturbed to hear that the importation of uncooked/unproccessed/disease carrying pork into new zealand is being considered. i had thought that in this country we took Biosecurity seriously. maf is dreaming if they think that they will get a hundred percent compliance on the cooking of food scraps destined for the pigsty....and the policing of this would be cumbersome, expensive and ineffective....the next step will no doubt be to liscense all piggeries so that the fees can recoup the cost of policing...then there will be added cost to small farmers of setting up a cooking facility....then will it be an offence for small farmers to fatten a pig for christmas...?

so what do we, the new zealand comunity gain from importing this dodgy pork

----

1 more restrictive legislation and expensive administration

2 more work for maf

3 compliance issues that could put small farmers out of bussiness and threaten our traditional rural lifestyle

4 new diseases for our pigs

5 more expenses through stock losses and vetenary services

WHAT POSSIBLE JUSTIFICATION IS THERE FOR ALL THIS......

11. ANON

I am a pig farmer from Hawera in the Lower North Island and an agent for other pig farmers. Your department's proposal to make changes to import standards re PRRS has them and myself appalled and extremely alarmed.

Whilst our industry is in the process of trying to recover from the impact of PMWS which came into the country through lax regulations, you now want to throw open a massive door to expose us to another substantial risk. None of you obviously have investment in a pig farm or you would not even consider this.

Is it your wish for us to become like the beekeepers or will you do the right thing like you did for the forestry industry and take appropriate action. We cannot afford the risk of PRRS in this country At All, and the minimal level of enforcement of food waste regulations and the wide open gaps that are available for people to flaunt the rules make this proposition a definite no brainer. We have food institutions all over this country (and increasing) that have little regard for their waste food disposal process – just so long as it goes, but when it becomes a problem it is our Industry that stands to cop the fallout.

Despite your efforts to state the risk as minimal, as a Pork producer I do not believe you. Why should we then not be allowed to mix bovine feeds through our facilities on the extremely low risk factor involved there, and yet you expect us to stand back and accept this change – That's fair. YEA - Right!!!!

12. CLAIRE NEAL

Who are we:

Canterbury Genetics Limited is a privately owned agribusiness company deriving greater than 80% of annual turnover from pork production and related activities.

The other 20% is derived from beef production. CGL supplies breeding stock within the South Island. Established in 2002, CGL employs 8 people and has an annual total revenue of approx. $2 million.

Basis of submission:

Canterbury Genetics Ltd is against the proposed changes because of the potential for PRRS to enter the country and spread. We have made 5 points below.

1.

We have over time gathered a lot of knowledge of the New Zealand pig industry and do not agree with the view that the current commercial food waste regulations protect the industry from PRRS. In practice – every day – the regulations are broken by farmers of pigs. Uncooked meat products are fed to pigs, sometimes by people with a lack of knowledge of the regulations, lack of adequate facilities to cook at 100 C for 1 hour, or blatantly ignoring the rules. I have myself in the past witnessed where uncooked restaurant food waste was fed to pigs in ignorance.

2.

Current bio security on many pig units is poor. Should the disease enter the country we believe it would be able to spread readily. The Risk assessment says *"As at December 2005, 384 herds with about 255,000 pigs were registered on the voluntary system. However, the NZPIB voluntary farm registration system does not capture all the farms with pigs. As at December 2005 AgriBase contained records of a further 7,132 properties with pigs, accounting for about another 82,000"* Page 5

Poor Biosecurity amongst any of the 7516 properties (384+7132) could lead to the spread of the disease.

3.

The cost of this disease to our industry would be huge. Recently the chairman of the British Pig Executive (BPex) spoke at our industry conference. Himself a pig farmer, Stewart Houston outlined that PMWS was a disease that caused much harm to the British industry, but PRRS coupled with PMWS was part of the reason the industry was decimated. A lethal cocktail of disease is how we would put it. PRRS affects the reproductive side of the production equation. As farmers if our ability to produce viable live young stock is effected we have a cost of production to spread over fewer animals. PMWS then causes losses in the animals that survive and we are hit with a double whammy. If PRRS where to become established in NZ, my feeling would be that then there will be no Pork Industry left in New Zealand.

4.

No definition is given of what a ‘high value cut’ is. Our fear is that it would only take one breach of practice, however well intentioned, for meat containing the PRRS to get into a situation where it could infect domestic pigs. Restaurant waste is a prime example of how this could happen. High value cut returned on the plate partially uneaten (and not cooked at 100 C for 1 hour), added to the pig waste, and then feed to some backyard raised pigs which could then filter into the breeding herd chain and it would then only a matter of time before PRRS infects the whole industry.

5.

We are also concerned for the precedent this sets in relation to our beef unit. If this is allowed to proceed will meat infected with FMD be released knowingly into the country. The UK outbreak in 2001 was attributed to feeding of infected meat to pigs and it was illegal to feed swill at that time. BNZ level of policing is low – then how long until a FMD outbreak?

Summary:

We are against the changes proposed. We believe the threat of possible introduction of PRRS is real and would have huge implications to the New Zealand Pork Industry. We believe that the risk analysis does not take into account actual practices on commercial and non commercial farms.

13. G. A. SEXTON

At this point in time I run a large Dairy operation some 1200 cows milking all year round, and intend to raise this to 2500 cows being milked on 1500 hectares of coastal land country situated near Palmerston North. It is supported by 200 hectares of prime river silt land and 600 hectares of land situated near Pongaroa, where all weaner cattle are raised and fattened, allowing us to sell 1200 head of cattle per annum.

The main reason why I am writing to you expressing deep concerns is that the large coastal property has beeen identified by Horizon council staff as the ideal place to sight a new piggery involving overseas technology. However we fell that all this would be at risk if raw pig meat containing the PRRS virus (high value cuts) was allowed to be imported into NZ. We have invested a signifient amount of money and effort into the project. Eg extensive overseas studies, levelling of some 12 hectares of sand hills soucing power polls and so on.

So once again all we can say is don't do anything that could jeopardize this project in any way. We don't want another repeat of the importantations of the opossum or rabbits. Keep N.Z. free of diseases namely PRRS.

14. STEPHEN MACAULAY

Thank you for granting an extension to comment on the Import Risk Analysis: Porcine Reproductive and Respiratory Syndrome (PRRS) virus in pig meat.

This submission is from the Pork Processors Association Incorporated (PPA). The PPA represents the interests and views of pork processing and smallgood manufacturers operating within New Zealand. PPA members sell approximately 90% of all processed pork products sold on the New Zealand market. As part of the process of submitting our views to the Import Risk Analysis, we distributed a copy to the PPA membership for comment.

Based on the comments received there is general acceptance of Biosecurity New Zealand's recommended sanitary measures, in that pig meat must be:

either

- from a country free from PRRS
  or
- treated prior to import or on arrival, in an officially approved facility, by approved cooking or pH change
  or
- in the form of consumer-ready, high value cuts
  or
- further processed on arrival, in an officially approved facility, into consumer-ready high value cuts

General Comments

1. Under the *Biosecurity (Meat & Food Waste for Pigs) Regulations 2005* (the Regulations), the feeding to pigs of untreated meat or untreated food waste is prohibited in order to prevent the risk of disease occurring in the national pig herd.

   Like any government statute, the Regulations will only effective if they are enforced by the regulators. What the Import Risk Analysis has highlighted is that there may be close to 7,000 pig herds in New Zealand that are considered to be non-commercial units, including semi-commercial herds, small backyard heard and hobby-farms.

   There seems to be an acceptance that the general principles and practices for managing biosecurity risks tend to be lower in smaller pig herds. What is concerning is that having identified the problem, there seems to be limited consideration as to how Biosecurity New Zealand intends to remedy the situation. We question how creditable the Regulations can be if Biosecurity New Zealand do not enforce these.

2. Based on the Import Risk Analysis, there is a non-negligible likelihood that chilled or frozen pig meat from a country endemic PRRS will harbour infectious PRRS virus when imported into New Zealand.

   If the recommended sanitary measures are accepted, then this should also be reflected in the operational practices allowable within pork processing facilities. For example: the disposal of cartons that contained imported pork products into normal recycling; or using imported pork trim into the production of fresh sausage. The scope of the Import Risk

Analysis does not appear to go into this level of detail, or consider the wider flow-on effect to the pork processing sector. Such operational issues will need to be reconsidered in light of the proposed changes to the sanitary measures advocated in the Import Risk Analysis.

15. GUS MORTON

To whom this may concern.

I am writing this submission in concern over the relaxing of ME.A.F standard's on imported pig meats.

The risk of P.R.R.S virus along with P.M.W.S which the industry has all ready got, would become devastating to the NZ Pork Industry. The problem we are faced with, is product not consumed with-in use-by date trim from carcass preparation for retail ending up in waste form and creating problems in garbage feeding system's were "Back Yard" farmers?, aren't complying with regulations. The scientific research show's that under the current proposal the chance of a manager outbreak could occur and may go beyond the pig industry i.e.:Foot + Mouth. As a pig producer myself employing 4 full time staff, 2 temporary and supporting transport company's i.e.: cereal growers, abattoir's/Meat whole sales. With out the pig industry all these different sections would be affected in some form. I would suggest that who-ever is making the decision's to make sure they realise NZ needs pork producers, and not legislation that kill's rural NZ. At the expense of foreign products to settle some form of free trade agreements to please politicians that have no financial investment in the industry.

16. IAN JOSEPH SCHULTZ

Background

I am a 52 year old commercial pig farmer.

I hold an honours degree in Agricultural Science from Massey and a Master of Science degree from the University of Minnesota.

I have produced pigs continuously for the past 26 years on my farm located on Rangiuru Road near Te Puke in the Bay of Plenty. My piggery has 160 breeding sows and produces about 2600 pigs of 65-70 Kg carcass for sale each year. I feed a mixture of by-products, mostly milk based, from Fonterra's Edgecumbe factory or Bakels at Mt Maunganui. I also feed large quantities of waste kiwifruit, orange and feijoa. I do not use food wastes or meat products (other than non-porcine blood and meat meal).

I also produce kiwifruit commercially (10 ha canopy) and avocados (2 ha) for export.

PMWS on my farm

In spite of strict on-farm biosecurity, PMWS arrived at my farm last month. I am facing a major problem with weaners dying every day.

I operate a closed herd policy with all my breeding stock coming from one supplier. We do not trade in pigs, my staff work only on my piggery, and we have no contact with other piggeries.

We are remote compared to other commercial piggeries, but are in an area where there are numerous backyard piggeries. I know of five along a 14 km stretch of Rangiuru Road. While I do not know the health status of these other farms, I suspect that many have PMWS but do not know or admit it. I recently attended a clearing sale of a PMWS infected herd in the Waikato. I observed Bay of Plenty farmers buying sows at this sale. There is no doubt that these sows are now somewhere near me. Virtually all backyard farmers trade piglets, boar services, sows and food. If one of these herds near me becomes infected with PMWS, then you can be sure that most are. I suspect that the transmission of PMWS to my farm came via seagulls which visit my farm, as is suspected to have occurred in the South Island PMWS outbreak.

Going on the experience of other farmers who have PMWS, I will have a tough time dealing with weaner deaths due to PMWS for the next two years at least. Financially, we will struggle to break even over this period, given that we continue to experience weaner deaths at the current 12% rate.

I do not want to face an epidemic of PRRS on top of this. The impact of PRRS seems to compound if it occurs in conjunction with PMWS.

My Concerns with the BNZ Import Risk Analysis

I have briefly read the BNZ paper on the Import Risk Analysis paper produced by BNZ and wish to make the following comments on it.

1) I agree that the risk likelihood of the PRRS being found in frozen imported pork products is real.

2) I agree that food wastes containing uncooked imported pork will be generated by the food processing, institutional catering and restaurant industries. Such waste represents an opportunity for both the waste producer and the pig farmers. There is usually some mutually beneficial deal whereby both parties make sure the food is not disposed of in land fill. Even if there are rules which stipulate that imported pig meat must not be fed to pigs, someone in the chain of disposal will find a way to divert the food to a friendly backyard pig farmer.

3) I agree with the Import Risk Analysis where it accepts that commercial pig farms which process food waste properly are not at risk of contracting PRRS, as commercial piggeries have too much at stake to risk not treating scraps properly.

4) I do not agree with the Import Risk Analysis when it states that the risk of infection from feeding of food scraps by back yard piggeries is low. My reasons are:

   a) PRRS can be transmitted in uncooked pig meat. The report accepts in 4.2.2.4 page 41 *that PRRS virus can be transmitted by the feeding of both experimentally- and naturally-infected frozen/thawed meat*.

   b) The minimum quantity of meat required to infect a pig is unknown. The Import Risk Analysis makes an unsupported claim that *it is improbable that the volume of scraps generated by a single household at any one time will approach the relatively large quantities (500-900g) that were used in the feeding trial*. I see no evidence to suggest that 500-900g is "large". Indeed if these quantities did routinely cause infection, then it surely can be assumed that a lesser quantity will also cause infection, even if at a lower rate

   c) In practice, the quantity of 500-900 g of imported pig meat scraps will be regularly fed by back yard piggeries. Much greater quantities would be routinely produced by any small bakery or small-goods manufacturer. Even households will produce these sorts of quantities. It is quite common for 500-900 g of pork to be disposed of at once. A power failure of a house hold freezer typically means that larger volumes of uncooked meat have to be disposed of. We occasionally have purchased meat which goes off before we eat it. As a lifestyle lot owner myself, I know it is easier to feed it to the chooks or pigs than to dig a hole and bury it!

   d) If a backyard piggery becomes infected, the Import Risk Analysis concludes in 4.3.1.2 that it would be unlikely to spread from the backyard operations to commercial piggeries. I do not agree with this conclusion. My experience with PMWS and with the large pool of backyard piggeries in my area is that any virus that is prevalent in the wider group will eventually pass into commercial piggeries. Overseas experience shows that the vector for PRRS spread is often unknown. I took all best practice precautions against PMWS yet the virus still arrived at my piggery.

5) New Zealand pig farmers struggle to compete against imported pig meat which is produced by farms which do not have to operate under the same conditions that we do. Imported pig meat does not have to be produced under the same environmental and animal welfare restrictions that we face. Foreign pig farmers can use antibiotics and growth promotants that we are not allowed to use. Farm support systems mean that their grain is often cheaper than ours. We survive by being efficient farmers, by utilising by-products and by having a high health status.

Along with all livestock farmers in New Zealand, we have a huge reliance on our freedom from many of the diseases that are endemic in the countries with which we trade. To date we have been largely successful in keeping the worst of these diseases out of New Zealand. We must make sure that we do not lose this last advantage. The recent lapse in the swill feeding regulations saw PMWS established in NZ. It could just have easily been Foot and Mouth disease which was established, in exactly the same way. We must not relax our guard.

6) I am concerned that the precedent set here will carry through to other food imports. As a kiwifruit and avocado grower, I see strong parallels which could apply to the fruit industry. Earlier this week, the detection of fruit fly larvae in cucumbers demonstrated the risks associated with imported produce. Our entire kiwifruit and avocado export industry would be at risk if fruit fly is detected by traps in the Bay of Plenty during the harvest. The risk might be small, but the consequence of fruit fly infestation is immense. We cannot afford to be taking these risks.

17. JENS RAVN & STEVE STERNE

Patoa Farms is situated in North Canterbury and is the largest pig farm in New Zealand with 3,500 sows and the sale of about 65,000 bacon pigs annually. We alone account for 8% of domestic pork production and employ about 50 staff. All of our sows are housed and farrow outdoors. Our pig herd has a high health and is free of most important production limiting diseases which occur in NZ at the present time and this is a significant contributor to our profitability.

In order to support and progress the development of our business we have travelled overseas on numerous occasions to seek out new technologies and to explore the potential application of these innovations within our enterprise. Several of our trips have been to PRRS affected countries where we have been introduced to many pig farmers and talked extensively with them as part of our information gathering process. Many of these farmers have had personal experience with PRRS. We have also attended meetings where papers have been presented on this disease and PRRS is often featured in publications we receive. For all of these reasons, we are very aware of the seriousness of this disease and its potential impact on our business and the NZ pig industry as a whole, should it be introduced.

We were thus alarmed to find out that Biosecurity NZ (BNZ) is proposing that MAF allow pig meat from countries where PRRS virus is known to be present to enter and be sold to the NZ public without being treated either before it is imported or on arrival. To better understand the changes proposed, we have reviewed the Import Risk Analysis dated 25 July 2006 and spoken to others within the industry – which has done nothing to ease our concerns. BNZ **<u>are</u>** proposing to allow pig meat into NZ that they know will include a portion of product that is infected with PRRS virus without any transitional treatment.

Furthermore, they openly acknowledge that this **<u>will</u>** mean that pig meat will be available to the public that is capable of spreading PRRS virus into pigs should they have contact with it. Using the information provided in the analysis, we estimate that this will effectively allow between 25 and 100 tonnes of untreated and infected meat to be distributed around the country each year. We have based this estimate on the historical tonnage of pig meat imported from PRRS affected countries per year, the conclusion in the analysis that 1.2% of this meat will have detectable levels of virus in it, and that a reasonable portion of this meat (e.g. 25%) will be capable of infecting pigs after some loss of virus through storage or freezing. The review indicates that almost all meat imported from PRRS affected countries is frozen and that about 75% of virus activity is lost during the freezing and thawing process. We presume that this will render some of the 1.2% un-infective although the analysis indicates that the information necessary to accurately predict this is lacking.

BNZ acknowledge that the import of this meat without treatment is a risk. However, BNZ suggest that this risk is low and that it can be managed by limiting the untreated imports to “high value consumer ready cuts” which they assume will not be fed to pigs, or at least in very small amounts. We consider this assumption, which is fundamental to their whole proposal, to be completely wrong. We don’t know what BNZ consider to be high value cuts, other than that they describe these cuts as those that are expected to yield few scraps or trim. On this basis, the authors of the analysis must consider chops, steaks and roasts as high value cuts as they state that it is very unlikely that these would generate scraps. This is simply **<u>not</u>** true. What’s more, at times cuts such as these are discarded completely for a variety of reasons. This means that pig meat scraps or cuts that are infected with PRRS virus **<u>will</u>** enter the food waste chain, be this from a farm kitchen or a restaurant.

As pig farmers with extensive involvement in the pig industry and that have lived in rural NZ for many years, we are very aware of what happens to some of the material that enters the food waste chain. The authors of the analysis themselves acknowledge that backyard pig keepers will probably feed their kitchen waste to their pigs even if they are aware of the regulations prohibiting this. Given this and the acceptance by the authors that some pig meat waste will contain PRRS virus, for them to propose that infected pig meat be allowed into the country without treatment suggests that they either believe the amount of uncooked pig meat that ends up on the backyard farms is incredibly small or they are indifferent to the threat of PRRS entering NZ.

We disagree strongly with the view that very little uncooked pig meat from imported high value cuts will enter the food waste chain. In our own experience the amount of food waste that ends up on backyard pig farms is surprisingly large and is derived from all sorts of sources such as retirement homes, army camps, boarding schools, restaurants, butcher shops, supermarkets and individual households. On some properties, through the behaviour of the owners who collect food waste from multiple sources, pig meat scraps from a surprisingly wide area can effectively be concentrated into relatively few pigs. After reading the Risk Analysis, it is clear to us that its authors have limited knowledge of what really goes on behind the scenes. Relying on an assumption that infected pig meat will not be fed to pigs is simply not a tenable management strategy.

That said, however, we are also concerned by the inference made in the report that if PRRS were to enter it would be because one or more pig farmers fed infected meat to their pigs. While we acknowledge that the only plausible way for infected pig meat to lead to an infected pig is if the pig is exposed to the meat, we consider it very unlikely that this will happen on a "pig" farm. The likely feeding of such meat to pigs and the consequent infection of the pigs with PRRS will be on backyard operations. By definition, these operators have next to nothing invested in their pigs (i.e. by feeding waste they don't even pay for their pig feed) and are unconcerned about their performance or disease status. For the most part they have nothing to do with the commercial industry and are unknown to and beyond the influence of the Pork Industry Board. They are all risk and no responsibility.

In our opinion if MAF accepts the changes to the treatment requirements for imported pig meat that have been proposed by BNZ, PRRS will enter NZ within a relatively short period of time. For the reasons discussed, we believe it will enter via the backyard sector, but it **will not** stay there. Although the backyard sector has little contact with commercial farmers, they have multiple contacts within their sector and also interact with what the analysis describes as semi-commercial pig units. It is not uncommon for these pig keepers to share waste food sources, trade pigs with each other and to move boars between farms. It is completely incorrect to suggest that no breeding occurs on these farms. The number of properties on which a small herd of pigs is kept in NZ is huge and they are distributed throughout virtually every corner of the country. Even when a commercial unit takes great care of its business and biosecurity, it cannot control all of the risks backyard pig keepers in their area present.

As the owners of one of the highest health herds in the country, we place considerable importance on our biosecurity and insist on the highest standards of practice from our staff. To date we have been fortunate to remain free of PMWS which, as you may know, is spreading in the South Island. However, as all of our sows are outdoors we know we are at risk as seagulls have been identified as the probable mechanism of spread. You may also be aware that, while unproven, it is though that this disease most probably entered NZ through the feeding of imported pig meat waste to pigs that was infected with PMWS. We struggle to see how the authors of the analysis can consider the spread of PRRS to be any less likely than has occurred with PMWS. We simply cannot prevent the movement of birds (as an example) between backyard pigs units and our own – although we try! We believe it would only be a matter of time before our herd became infected with PRRS once it becomes established in NZ.

If our herd became infected with PRRS it is likely that the impact on our performance and profitability would be substantial. In the Risk Analysis, it is reported that work from the States estimates the impact of PRRS entering a herd is such that during the first year, profits are expected to be reduced by 80%. This is consistent with what we have heard from American farmers ourselves. As a farm that is undergoing continual investment and development, were our business to experience such devastation it is unlikely that we would be able to service interest and other commitments, such that the very viability of our business would be threatened. As the single largest employer in our area, our contribution to the community extends far beyond the immediate staff we employ. Were it not for the work we provide, many of our staff would have to move to other areas in search of opportunities, most of these people have children in the local school, shop locally and soon.

Our herd also consumes about 20,000 tonne of fed a year, most of which is derived from ingredients grown in NZ and all of which is processed in Canterbury. To suggest that the impact of PRRS on our farm would only impact on those directly involved with the farm is completely wrong.

We implore MAF to reassess the proposed relaxation of the sanitary requirements for imported pig meat proposed by BNZ. These measures are not an obstacle to trade, as is evidenced by the steady increase in imported pig meat into New Zealand over recent years from countries that include those with PRRS, but rather they are reasonable steps that are taken to manage the known presence of PRRS virus in some of this meat. To relax the current measures would be irresponsible and show a serious disregard for an important component of the NZ farming industry.

18. SPENCER AND JACQUI JOHNSTONE

We have a 250 sow outdoor pig farm in Greendale, Selwyn District, Canterbury. We have built the business from scratch over the past 12 years to the stage where we now grow out half our weaners to bacon in a deep litter finishing shed and sell the other half to another bacon finisher.

We are extremely concerned to hear that Biosecurity NZ is suggesting that the current rules designed to prohibit the importation of PRRS into NZ should be relaxed. Especially with the recent arrival of PMWS, it frightens us to think that another disease could soon follow.

1. Back-yard pig growers

Our experience is that people frequently ask us to sell them a weaner pig for back-yard fattening. This is particularly common around August/September/October - the back-yard pig industry is particularly high during the lead up to Christmas, whereas the statistics used by Agribase are based on a census as at 30 June. The figure at 31 October of “herds” of 1-10 pigs could well be double that provided in Table 4 of the risk assessment.

2. Feeding of uncooked waste

As the common factor with these pigs is the feeding of household scraps, this is where the high risk of any disease incursion is likely to occur. Despite the illegality of feeding uncooked food to pigs, it is probable that more than 90% of these back-yard operations consider that the rules don’t apply to them.

Some of these operators with one or two sows feeding uncooked waste will also sell grower pigs on to other properties, another means of disease spread. MAF has dedicated little or no resources to policing the feeding of uncooked waste and has a record of failing to follow-up on reports of breaches of the Act, or of responding in such a manner that the offender is not really deterred. It is already well known within the rural community that the Act is not being well policed.

3. Disease vectors

The risk assessment discusses the possibility of airborne spread of PRRS and considers this unlikely.

PRRS can also be spread via faeces and there are many potential vectors not mentioned in this assessment - flies, birds, rodents, etc, just as seagulls are believed to have spread PMWS. Canterbury in particular has many outdoor sow units and we are very exposed to such vectors, despite making every attempt to isolate ourselves from disease incursion. It is virtually impossible to keep flies, birds and rodents from crossing boundary fences.

The report does mention that “mallard ducks were susceptible to infection via drinking water” and “shed the virus in faeces for up to 3 weeks”. Does this mean that the virus is also carried in water? This is not considered further in the report but has potentially frightening implications.

The risk of PRRS spreading within the NZ pig industry has therefore not been adequately considered. Most of the international research is likely to be based on risk of spread between indoor farms - the situation is very different in NZ, particularly in Canterbury. Yet even overseas PRRS has spread vigorously and not all means of spread have been identified.

In our case, one of our boundaries is a river. Approximately 2 months ago we were told about two dead pigs in the riverbed upstream from our property. On investigation these looked like feral pigs (we did not go too close for biosecurity reasons!) that someone had decided to cut up in the riverbed. Feral pigs are another possible means of disease spread, and they certainly don't cook their food before eating it!

Comments on the Conclusions in the Executive Summary

1

The report does not support this conclusion. It states that "PRRS virus is very stable when stored at temperatures of -70° to -20°C" and most of the pigmeat imported from PRRS infected countries is stored and transported at such temperatures. The research discussed in the report shows a huge range of results. It is stated that "A feeding trial is the ultimate test" and the study by Van der Linden et al (2003) showed that pigs became infected by eating meat which was infected, although at levels below the level of virus isolation detection - and even a PCR negative sample resulted in infection of the ingesting pigs. This fact is not carried through to the conclusion of 1.2% risk from the subsequent study. The 1.2% figure used is from 1 study in Canada and is not sufficient to make a valid conclusion of risk from all imports into NZ.

A 0.1% risk is still too high, considering the tonnage of meat that is imported, the possibility of that meat being fed uncooked to another pig in NZ and the virulent spread that is likely to follow, which will seriously damage the NZ pig industry.

2

As stated above, the risk of infected, uncooked pork being fed to pigs in NZ is high, much too high.

3

PMWS spread quickly within a small area in Canterbury, despite high biosecurity on most of those properties. There is nothing in this report to reassure us that this is any less likely to occur with PRRS - in fact because this disease is even more devastating the likely consequences are unprintable.

4

This is the only conclusion that we can actually agree with!

The summary then states that

"It is considered that the risk of PRRS in imported pigmeat is non-negligible…" yet as the report does not clearly quantify this risk, and we consider it to be a high risk, there is no justification at all for reducing the controls currently in place.

In conclusion there is nothing to be gained yet a lot potentially lost from relaxing the current controls on importation of pork from PRRS endemic countries. The message from pig producers in infected countries is that we do NOT want PRRS, it is a devastating disease.

The risk assessment assumes that everyone operates legally. As we have portrayed, this is certainly not the case - the high risk occurs in the numerous small, back-yard operations feeding uncooked waste. Commercial pig farmers like us do obey the law and we are not the ones who will place the industry at risk but we are being placed at risk every day. We are the ones who will ultimately pay the cost (financially and psychologically) of another incursion, it won't hurt those who are putting us at risk.

There are too many examples - PMWS introduction to NZ recently, Foot & Mouth in the UK (illegally imported meat, illegally fed). NZ also has recent examples of illegally imported meat.

Are the proponents of relaxing the legislation prepared to be held accountable and put their chequebook on the line?

The risks are too high! Please do not allow this to happen!

19. PAUL DAVEY

This submission is from Paul Davey, farmer, Central Canterbury.

I own, in partnership with my wife, a pig farrow – finish operation of 800 breeding sows producing some 16000 pigs per year. We also have a 700 head flock of super-fine Merino breeding ewes (producing fine wool from the ewes and their progeny) and 100 beef breeding cows from which we sell calves. Particularly our pigs (but also the other species to a lesser extent) are strictly quarantined. Several hundred thousand dollars have been spent in the last four years in a depopulation – repopulation and quarantine programme of the pig herd to eliminate known specific pathogens, and also to reduce the risk of infection from pathogens endemic in much of the NZ pig population. So far this has proven very successful, but the pathogens that we have eliminated are bacterial and mycoplasmal rather than viral.

We do not currently have PMWS, but it is now within 12km of us. Best evidence is that this disease is caused by PCV type II, and the hypothesis that this disease entered the NZ pig population through improperly cooked pig meat fed to pigs is far from idle speculation.

So, we believe it fair to say that our farming livelihood depends on pathogens specific to any or all of the above species not currently in NZ being kept out by a vigilant, national, biosecurity regime which eliminates any risk of breech to virtually zero. We believe this is vital for not only us, but all producers of cloven hoofed ungulates. Our national sheep meat, beef, venison, wool (to a lesser extent), dairy and pig industries are all exposed to risk if pigs can have access to viral infected meat.

Before becoming a farmer, some 22 years ago, I worked for a multi-national pharmaceutical company, servicing mainly pig and poultry producers. During this period I had opportunity to work with an extensive raft of producers throughout the country. Whilst I heartily concur that the vast majority of farmers exercise care commensurate with their level of knowledge, when it comes to biosecurity, *etc*, I am sufficiently experienced both with farmers, and with the vicissitudes of human nature, to know that there is a portion (albeit small), who from ignorance or negligence (it doesn’t matter which), will not exercise due care in the feeding of their livestock. Pigs, being omnivorous and scavengers by nature, will eat most things readily. Meat – cooked or uncooked - is a delicacy to pigs, and the people most likely to feed meat, in that they tend to be the swill feeders, are by far the most likely to “cut corners”. My observation is that these tend to be the least educated and least careful farmers. Admittedly there are substantially fewer of them now than in the 1980s but there are still quite a few (licensed and unlicensed) and one is enough to do the damage.

Sadly, with many diseases such as foot and mouth disease, the dangerous pathogens enter the wider (geographic), species, production base of any region unfortunate enough to be so infected. Uncooked meat is such a high risk item to import (in that any of it may be fed to pigs) that one cannot understand that all the dairy and sheep and cattle farmers, and all of the population dependent on them, are not upset by this practice, apart from the fact that most don’t actually realize the risk.

We need to note that even though swill feeding was strictly illegal in England by 2001, the outbreak of Foot and Mouth Disease in that country has been widely attributed to swill feeding of pigs.

But the host nonspecific, viral pathogens are not the only ones that are risky for pigs. PRRS and African swine fever, to name but two, are serious and costly to the national sub-economies of pig producers where such are present.

We have two very experienced English pig men on our staff. They have experienced PMWS, PRRS, *etc*, on farms they have worked on in Britain. They testify to the fact that there are increased harmful effects when several serious viral conditions operate concurrently in a herd. There are severe economic and welfare issues to contend with in these situations.

Any move which exposes the NZ livestock industries to serious disease risk is, quite simply, inequitable, potentially expensive (to the point of bankrupting some individuals), and, in a word, unconscionable.

In conclusion:

Industry experts' advice, and my own experience, leave the inevitable conclusion that an incursion of PRRS into New Zealand will have a significant impact on the pork industry and those who service it.

From a pork producer's perspective regulatory relaxation (as proposed) raises the risk of disease incursion of PRRS, *etc*, to an unacceptably high level.

From a mixed farming operation perspective, relaxing such controls increases the risk of other harmful diseases entering New Zealand. The impact of these diseases would go way beyond the pork industry and expose other export industries unacceptably.

Current rules for the import of pig meat into New Zealand must not be relaxed and waste feeding regulations must be strictly enforced.

20. BINDI GROUND

Who are we: Waratah Farms Limited is a privately owned agribusiness company deriving greater than 70% of annual turnover from pork production and related activities.

Waratah supplies breeding stock within New Zealand via a multiplication network, semen sales and live animal sales. Breeding sales of live animals have exported within the Pacific region. Established in 1957, Waratah Farms employs 28 people and has an annual total revenue in excess of $6 million.

Basis of submission: Waratah Farms is against the proposed changes because of the potential for PRRS to enter the country and spread. We have made 4 points below.

1.

We have extensive knowledge of the New Zealand pig industry and do not agree with the view that the current commercial food waste regulations protect the industry from PRRS. In practice – every day – the regulations are broken by farmers of pigs. Uncooked meat products are fed to pigs, sometimes by people with a lack of knowledge of the regulations, lack of adequate facilities to cook at 100 C for 1 hour, or blatantly ignoring the rules.

2.

Current bio security on many pig units is poor. Should the disease enter the country we believe it would be able to spread readily. The Risk assessment says *"As at December 2005, 384 herds with about 255,000 pigs were registered on the voluntary system. However, the NZPIB voluntary farm registration system does not capture all the farms with pigs. As at December 2005 AgriBase contained records of a further 7,132 properties with pigs, accounting for about another 82,000"* Page 5

Poor Biosecurity amongst any of the 7516 properties (384+7132) could lead to the spread of the disease. The cost of improving Biosecurity is incurred by the farmer.

3.

The cost of this disease to our industry would be large. Recently the chairman of the British Pig Executive (BPex) spoke at our industry conference. Himself a pig farmer, Stewart Houston outlined that PMWS was a disease that caused much harm to the British industry, but PRRS coupled with PMWS was part of the reason the industry was decimated. A lethal cocktail of disease is how we would put it. PRRS affects the reproductive side of the production equation. As farmers if our ability to produce viable live young stock is effected we have a cost of production to spread over fewer animals. PMWS then causes losses in the animals that survive and we are hit with a double whammy.

4.

No definition is given of what a 'high value cut' is. Our fear is that it would only take one breach of practice, however well intentioned, for meat containing the PRRS to get into a situation where it could infect domestic pigs. Restaurant waste is a prime example of how this could happen. High value cut returned on the plate partially uneaten (and not cooked at 100 C for 1 hour), added to the pig waste, and then feed to some backyard raised pigs. Breeding pigs suffer losses, backyard operator sells poor performing breeding animals at the sale yard.

"PRRS virus persists for 1-6 days at 20-21°C" page 11

"However, in many herds even the epidemic period does not have dramatic consequences. For example, in one study, only 20% of seropositive herds actually experienced obvious clinical signs (Pejsak and Markowskadaniel, 1997). Therefore, the short term economic consequences of PRRS are extremely variable, ranging from very serious, where 55-80% of farm income may be lost (Brouwer et al, 1994; Polson et al, 1990), to no obvious consequences (Pejsak et al, 1997)." Page 12

Summary:

We are against the changes proposed. We believe the threat of possible introduction of PRRS is real and would have huge implications to the New Zealand Pork Industry. We believe that the risk analysis does not take into account actual practices on commercial and non commercial farms.

21. PETER LOGAN

Introduction

Healy is an importer of Frozen Pork Meat from USA, Canada, Sweden, Australia and Denmark. We service a broad range of customers from Wholesalers (to Food Service Industry) and Retailers (Butchers), to Manufacturers.

We currently operate two sets of inventory, one for our Transitional Licence holding manufacturing customers and another for our Food Service and Catering customers where product is sourced from PRRS free countries.

Healy has been in the business of importing and trading meat for some 35 years.

We are in agreement with the content of the document (25th July 2006) with respect to the current Transitional Licence system which effectively creates a defacto Trade Barrier, protecting the Australian Pork Market from USA/Canadian competition within New Zealand.

The New Zealand Pork Market is essentially protected by virtue of the fact that supermarket business in New Zealand is done with Chilled product, which is unlikely to be sourced from North America due to shelf life restrictions.

Submission

1. We would like to enlarge upon what we believe would be a "high value cut" in terms of the Food Service marketplace we operate in.

The Boxed Frozen Pork Market is very sophisticated in that Food Service Operators are able to purchase the product they want by the CL (Chemical Lean) rating that suits their business. By way of example, the primary product used in Asian Stir Fry dishes is Pork Shoulder Meat (or Picnic). This is boneless whole shoulder that the manufacturer has trimmed typically to 80CL

or 90CL rating, thus the operator can buy the product that suits them best and has the least amount of wastage

Similarly, with boneless Legmeat, the specifications call for various grades such as 1/16th inch Fat/trimmed to the Blue (no external fat)/or trimmed to the Red (no fat or membrane).

Essentially the Food Service operator is provided with a wide variety of specifications that allow them to use product with little or not wastage by means of Chemical Lean and Fat Cover specifications.

Thus, we believe that all Boxed Pork meat is value added by this process and is able to be further processed by any competent Restaurant, Takeaways,

Wholesale Distributor, Butcher and/or Retailer.

We would like to clarify the term ‘Officially Approved Facility’. It would be a concern if another Approved Facility Programme grew from the ashes of the Transitional Licence Facility, which this document makes a strong case, for being ‘no longer required’.

2. **As above, the products in Boxed Pork are value added and are capable of being processed (as they are now) by all types of qualified Food Service and Manufacturing Facilities, that are able and licensed, to process any kind of meat.**

Summary

We need to ensure that any change in regulations encompasses the needs of Food Service Operators and Manufacturers who make up the bulk of the current buyers of Frozen Pork. Due to the targeted value added nature of the products they are able to buy for immediate use and/or for further processing, they are able to operate with little risk of wastage.

In light of this, we think a clear definition of Higher Value Cuts and Officially Approved Facility, should include all Boxed Frozen Pork products (with the exclusion of carcase products) that are able to be processed on a premises that currently is able to further process meat products. This would include approved Restaurants, Takeaways, Butchers, Wholesale Meat Distributors, Catering Facilities, etc. etc.

Thank you for the opportunity to provide some feedback on the document.

22. GRAHAM TAYLOR

I am deeply concerned at the proposed relaxation of controls on imported pig meat into NZ. I farm 185 sows in a farrow to finish operation and have been farming pigs for 26 years. Since 1992 I have been a director of NZ Pork Industry Board representing the northern region. My region experienced an outbreak of PMWS in 2004 which fortunately was contained and almost stamped out by the imposition of strict biosecurity measures on farm as well as the placement of RP notices on affected farms. Maintaining strict biosecurity is the only way I can protect my business from new and exotic diseases.

It seems madness to me to propose relaxing the Import Standards in the manner proposed. My consultant vet has suggested that an operation of my size would not survive if PRRS were to enter NZ. I feel we should be strengthening biosecurity measures in the face of new and emerging diseases worldwide rather than relaxing them.

To suggest that ‘high value’ meat scraps would not find their way into the porcine food chain is flawed as every meat product has a degree of trim that is discarded. Public awareness of ‘use-by dates’ also means meat products are discarded into the waste stream. I live north of Auckland in an area of increasing lifestyle block development. Many of these people keep a few pigs and have a perception that any food waste can be fed to pigs. They are certainly unaware of the Food Waste Regulations or choose to ignore the regs in the knowledge they are very unlikely to be caught. It appears the Food Waste Regs are not policed in any meaningful way.

Recently while holidaying overseas I met a Christchurch lady who told me she fed a couple of pigs on waste from her local Thai restaurant. Most food outlets, particularly outside the major centers, have a local ‘pig keeper’ who collects their food waste. There would be no separation of meat waste in this collection. I am often approached at community functions and asked if I want to take the left over food for my pigs. Of course I refuse.

I understand the last outbreak of Foot and Mouth disease in the UK was triggered by the feeding of infected pig meat to pigs.

Unfortunately it is the layer of the pig industry, outside the commercial farmers, who will place NZ at the greatest risk as these people freely trade in pigs, waste food, and illegal un-inspected pig meat. Some also release pigs into the wild for later hunting further spreading disease in an uncontrolled population.

Should PRRS enter the NZ pig herd the results would be devastating. NZ producers are highly skilled and productive farmers but our position is vulnerable. One real positive is our relative disease free status. As I live in an area where PMWS was present the threat of PRRS in combination would be devastating.

I urge MAF to continue to insist that all pig meat from countries where PRRS occurs is handled through the existing transitional facilities and that these facilities be rigorously monitored for compliance. Only by maintaining and enforcing existing biosecurity measures can the NZ pig industry continue to enjoy its current health status. This will also protect the health status of the rest of the NZ live stock industry.

23. IAN MCINTOSH

Company Profile

Freshpork NZ Ltd is a specialist pig company that buys live pigs from approximately ninety producers throughout New Zealand and also takes its own pigs from the field to the plate. In other words it is vertically integrated and also buys from independent producers. To achieve this it consists of five separate businesses.

- Freshpork NZ Ltd is the parent company and is the marketing division which processes approximately 3,500 to 4,500 pig carcasses per week, the majority of which are slaughtered through the company's own specialist pig abattoir, Freshpork Bay City Ltd.

- Freshpork Bay City Ltd is in Timaru and slaughters pigs only. It also has its own cutting floor to allow appropriate efficient distribution of pig meat throughout New Zealand.

- Freshpork Levin Ltd is the cutting and distribution floor in Levin which services the North Island with pigs from Freshpork Bay City Ltd and those killed through a contracted abattoir in the North Island.

- Freshpork Northern Ltd is the distribution outlet in Auckland, and

- Freshpork Farms Ltd consists of

- a 220 sow indoor unit growing 110 pigs from birth to bacon. It also buys in 200 weaners per week to grow to bacon
- a 1100 sow outdoor herd producing 7 kg weaners for sale to dedicated farmers
- a specialist feedmill producing approximately 15,000 tonnes of pig feed per year for the company's own use and independent pig farmers. Approximately 70% of this is locally grown grain.
- a leased 450 sow indoor unit producing 20 kg weaners for contracted growers to produce bacon pigs, and
- a weaner pig trading division that oversees the trading of 800 weaners per week from associated breeders to growers who grow them to bacon for resale back to the company.

The total number of staff employed by Freshpork NZ Ltd businesses is 119.

Freshpork NZ Ltd (FPNZ) obviously has a major investment in the New Zealand pig industry and is fully aware of the need to remain globally competitive by technological and capital investment.

The company is not averse to competition from imports as we are aware that we can compete by sound management techniques in animal husbandry, nutrition and animal health, particularly farm biosecurity.

We see any reduction in national biosecurity as a major threat to our farm security and future viability through either

- **a direct animal health challenge, or**
- **a disincentive to invest in future improvements in equipment or buildings to reduce costs of production.**

Financial Consequences of PRRS to Freshpork Farms Ltd

The Biosecurity New Zealand "Import Risk Analysis: Porcine Reproductive and Respiratory Syndrome (PRRS) Virus In Pig Meat" report 25 July 2006, ('the report') presents the results of a USA financial model that indicates the cost of a PRRS outbreak at "80% reduction in expected profits for the year of the outbreak" with "anecdotal accounts of losses continuing in the endemic period for 15-24 months. Nevertheless, using assumptions on possible losses in the endemic period, the model projected total costs over a 3 year period of approximately US$500 per sow" (page 49). Given that NZ has higher feed and labour costs than the USA, $US500 will be a higher and more realistic figure in NZ.

Assuming the 1100 sow outdoor breeding unit was infected (the most likely farm to break since PMWS initially infected only outdoor breeding farms in Canterbury) the consequence through to bacon if the figure was only $NZ500/sow, equates to a minimum of $183,000 per year over the first 3 years. The flow on effect to the abattoir at Freshpork Bay City would be significant as a reduced kill would significantly increase the killing charge per animal. It should be obvious why national biosecurity is so important to our company and industry.

Comments on the "Import Risk Analysis: Porcine Reproductive and Respiratory Syndrome (PRRS) Virus In Pig Meat" 25 July 2006 report ('the report')

FPNZ has no confidence that BCNZ's risk analysis provides satisfactory guidance for a policy to manage the introduction of PRRS in uncooked meat entering the New Zealand fresh meat market as unprocessed meat. We have already seen that national biosecurity measures have failed to prevent the entry of

- PMWS into the North Island
- PMWS into the South Island
- Illegal Korean pig meat into supermarkets

Indeed despite PMWS separately infecting the NI and SI there still seems to be a lack of understanding of how the disease first arrived in NZ and then later arrived in the SI despite boarder controls between the two islands.

While many efforts are made to reduce the risk of introducing PRRS through boarder controls and national laws on garbage feeding, the effectiveness of those controls unfortunately depends on

1. the scientific understanding of the PRRS virus as outlined in reviews such as 'the report',

2. the people enforcing the laws,

3. the resources dedicated at our boarders and within NZ to reduce the risks of law violations, and

4. the obedience of NZ pig farmers in complying with laws covering garbage feeding.

1. Scientific Understanding of the Risk of the PRRS Virus

i). ‘The report’ clearly shows there are a wide array of assumptions that are used to deduce the probability of 0.3% of PRRS being in unprocessed meat imported into New Zealand.

ii). It is highly disappointing that there is a vast array of technical data presented that appears convincing but there is virtually no validation of the techniques used against the live animal, the ultimate test. Where live animals were used to test if meat was infective (<u>apparently only two trials reported in the literature</u> (P33-34)) the technique of virus isolation is totally discredited and PCR, while more sensitive, is <u>assumed</u> to be the benchmark rather than being presented as only an indicator. For example as only 19 pigs of a possible 1027 were positive to PCR then it assumed these were the only pigs to contribute meat samples for feeding to live pigs. If PCR has been validated against live animal feeding trials then this information should have been presented.

‘The report’ itself highlights the risk of drawing conclusions from negative tissue culture results (page 33) and the need to use live animals to validate laboratory techniques.

If PCR technology is flawed in its application then the calculation of the risk (1.2%, page 34) of the presence of the PRRS virus in meat from slaughtered pigs in a country with endemic infection will be incorrect.

For example the commentary for the figures in Figure 5 reads “The probability of pig meat harbouring infectious PRRS virus <u>**assuming**</u> the sensitivity of both virus isolation by cell culture and detection of viral antigen by PCR is <u>**100%**</u>”.

Clearly the research using live animals (page 33-34) shows that assuming a 100% sensitivity is totally unfounded so what influence will such an assumption have on the true risk probability.

iii). Page 40 under 4.2.2.2 states “Nevertheless, in both feeding trials the meat fed to pigs was thawed, and this has been shown to reduce by 75% the frequency of samples being positive by virus isolation”. Despite this high perceived kill rate, when this product was fed to pigs the infectivity rate in one case was 100% and the other 63%. In addition the oral route was the means of infection which is concluded to pose the lowest risk due to “the low pH of the porcine stomach rapidly destroying the PRRS virus, so it is considered that infection via the oral route would require the virus making contact with the mucosal surface of the oropharynx and tonsils” (page 41).

Therefore in 100% of trials (two) where the ultimate test was used, i.e. live pigs, despite a negative tissue culture result <u>and</u> inoculating the pigs via the least infective route <u>and</u> using meat that would have been through a process that kills 75% of the PRRS virus, the meat still delivered a highly infective dose as indicated by the high number of pigs developing clinical disease.

iv). The issue of the minimum infective dose highlights another gap in current knowledge. Page 39 of ‘the report’ records research with mice with a virus in the same family as PRRS. A single virus particle was all that was required to supply a minimum infective dose by intraperitoneal or tail cartilage injections. Therefore any assumptions on the minimum dose of PRRS in meat needs to be validated against one virus particle.

As many pigs in NZ are injected around birth or weaning with a needle common to most, if not all pigs on the day, should the PRRS virus infect even one young pig via the oral route then common farm practices could quickly transmit the virus if the mice research applies to PRRS. Otake et al 2002 (Vet. Rec., 150,114.102) reports that dirty needles will transmit the PRRS virus.

v). ‘The report’ highlights that birds have not been excluded as vectors. Mallard ducks were shown to excrete the PRRS virus for 3 weeks after drinking contaminated drinking water (page 14). Prof Done says the research shows that mallards can excrete the virus for 39 days (pers. comm.).

The Canterbury plains have a high incidence of outdoor sow herds that are frequented by large numbers of ducks at certain times of the year.

Seagulls are another bird that could be a vector given that they are suspected of being responsible for transmitting the causative organism in the recent outbreak of PMWS in the Christchurch area.

vi). ‘The report’ comments “The likelihood of raw pig meat scraps being generated by restaurants, retail outlets, processors and manufacturers is considered to be higher than for households” (page 41). We would totally agree with this conclusion. Unfortunately they are the very ones who are more likely to use the higher value imported unprocessed cuts. In addition they are the ones who would be the hardest to police with regard to garbage disposal given their numerical number.

General Manager of Freshpork Farms Ltd, Hamish Gerard, was previously involved in running a MAF approved organic feed waste plant (kitchen, restaurant and food processing waste). He commented that the biggest issue to an organised collection service was the small pig farmer who would come and collect waste often with dirty drums and always at no charge to the waste producer.

Hamish’s feed waste plant operated with a “Quality Assurance and Operating Procedures Manual” while the small pig farmer appeared to have little regard or awareness for the requirements of cooking feed waste.

2. The People Enforcing the Laws

My personal observation at Christchurch International Airport in the early morning of 5th April 2006 during luggage inspection from a Jetstar flight from the Gold Coast is testimony to the deficiencies that exist at present. I watched as two suitcases passed through the scanning machine with the male attendant so engrossed in a conversation with a female staff member that neither suitcase was examined. While on paper the national boarders were being monitored that night, a staff member had a poor attitude to our biosecurity.

3. The Resources Dedicated at our Boarders and Within NZ to Reduce the Risks of Law Violations

Recently I reported a case of animal welfare abuse to MAF. An hour later I was rung by the SPCA to get details on the case. When asked why the MAF were not following up the issue the SPCA told me the MAF were too busy.

While it is accepted that MAF have different resourcing for the different departments, it goes without saying that resourcing is stretched at times and so low priority cases involving garbage feeding of a few pigs could go uninvestigated.

4. The Obedience of NZ Pig Farmers in Complying with Laws Covering Garbage Feeding

It is unfortunate that many people in rural industries show an arrogance for laws that could reduce their ability to make money. Even the well debated and publicized Animal Welfare Code for Pigs (2005) is poorly known of or understood by many smaller and even some larger pig farmers in NZ. Given the large number of small farmers who will have pigs and who will not be known by the NZPIB or AgriBase, it is highly likely that the vast majority of them will not know the laws on garbage feeding and even if they do some will not comply because that is their nature.

Conclusion

Comment is made in ‘the report’ that “Internationally, no major pork producing country in the Northern Hemisphere considers that PRRS can be transmitted by pork, as evidenced by the lack of regulations for intercommunity trade in pig meat among EU Member States, regardless of the fact that at least two of them (Sweden and Finland) are free from PRRS (page 50). However this needs to be balanced in two ways.

Firstly ‘the report’ states that “EU Member States are obliged by legislation to impose and enforce a prohibition on the feeding of any mammalian protein to any farmed animals, so there would have been a negligible likelihood of exposure by this route within the EU” (page 41). Given the vivid reminders of FMD and BSE in Europe, the attitude of authorities and the community are likely to be more diligent in their enforcement of the law.

Secondly Prof Done comments that “The export market for pork from a country can be seriously affected when a disease such as PRRS occurs. When the disease was recognized in the United States, countries such as Mexico, Japan, Canada, and South Korea banned the importation of pork from the United States, or required certification that the swine originated from premises where, within the 30 days prior to the issuance of the health certificate, no swine were introduced from a municipality in which a premises infected with the virus is located” (pers. comm.).

It is therefore incorrect to downgrade the international attitude toward the perceived risk of PRRS being spread in traded meat.

FPNZ does not object to pig meat imports coming into NZ providing any that originates from a PRRS positive country is processed only through registered importers who are audited regularly to ensure they are complying with minimum standards. Surely the recent reminders by the emergence of new diseases or the arrival of exotic diseases in new countries around the world is a lesson in our incomplete understanding of diseases and the importance of at least maintaining what measures we already attempt to provide. Anything less is to forsake the privilege that isolation has provided NZ farmers in minimising their costs of production because we farm without several of the world’s significant production limiting exotic diseases.

24. LUCY CADDICK

I am the manager of a 640-sow piggery that is located near Pukekohe (Paerata Piggery) and that is owned by Bally McCahill Ltd. I have been involved in the pig industry for over 13 years. During this time I have worked on pig farms in both the South and North Island, including both nucleus and multiplier herds, and have also been a sales representative for Pig Improvement Company. In addition to my current position, I am the District Chairman for Region 1 (north half of North Island).

I am very disturbed about the suggestion that MAF may relax the current sanitary measures that are imposed on pork imported from PRRS affected countries. I have read the Import Risk Analysis and find the assumptions and conclusions that are drawn, and the recommendations that are made on the basis of these, quite absurd.

While I am not in a position to comment of the scientific content of the analysis and accept that this is probably factual, given my own experience in the pig industry I am stunned by many of the assumptions made and subjective interpretations applied by the authors Murray and Pharo. Speaking from my experience, I have to say that the authors seem to have little understanding of what goes on in the normal kitchen or in the dodgyunderworld of backyard pig keepers - who I might add are not part of the pig industry. As District Chairman it is one of my roles to know and communicate with the pig farmers in the region. There are no backyard pig keepers amongst this group and all of the farmers I deal with, yet I am also aware that there are literally thousands of pigs kept in backyards in and around the South Auckland area where I live and work.

To suggest that scraps will not be generated from high value cuts such as steaks and roasts is nonsense, although I accept that the amount of scraps form these cuts are likely to be less than from some other parts of the carcass. Furthermore, while I don’t feed the pork scraps or pork I discard to pigs, of that which I do throw out, the volume of high value cuts would exceed the volume of scraps, and I suspect the same is true for many housewives. For instance, when I shop I generally buy small ready to eat portions of a variety of meats suitable for a meal for two. Depending on how the week pans out, one or more of these portions is often not eaten before it passes its “best by” date or at least passes the point beyond which I am happy to eat it. In this situation I simply throw the whole portion away. In had backyard pigs and if I was irresponsible enough to feed these my uncooked household scraps, my pigs may frequently get more than 500g of pork at a time. As a result, much of the analysis, and especially that from pages 37 to 41, is in my view rubbish.

As far as their understanding of backyard pig keepers is concerned, the authors show their ignorance by suggesting that these people don’t breed their pigs and that they are

unlikely to spread disease to other farms. They do however accept that this group of pig keepers is unlikely to pay much attention to the waste feeding regulations that were reintroduced last year.

From my lay perspective, I just cannot see how MAF can:

- firstly say that PRRS is a nasty disease that is exotic to NZ (Le. a hazard),
- then provide plenty of scientific evidence to show that some of the meat from countries with PRRS will be infected when it is imported if the current conditions are relaxed (Le. there is a risk if some meat is exempt from transitional cooking),

- then say that the only way this meat will result in disease in pigs is if it is fed to pigs but that they accept that this will happen at least in the backyard situation (Le. exposure will occur),
- and then turn round and recommend that some meat be exempt from transitional cooking.

It just doesn't make sense!

I am left wondering if I am just stupid or if the authors of the report assume that everybody else is. If the latter is true, I just hope this assumption is as wrong as most of the other assumptions are that they have made in their report.

Given that there are so many unsubstantiated assumptions in the report, that many of

these tend to suggest the authors know little of the pig industry or the activities they have analysed, and that the recommendations made in the report are inconsistent with respect to much of the material presented in the report, I am left to ask "how objective have the authors been and if they have some predetermined agenda?"

Again, while only a "pig farmer" myself, I cannot help but question if MAF has a problem with the pig industry or if it is simply prepared to sacrifice the industry for some other motive that I don't understand. The reality is that if PRRS gets into NZ, from what I understand of this disease, it will have a devastating impact on both breeding and grower herd performance, such that many farmers would no longer be profitable and would be forced to close. The legitimate and profitable commercial pig industry may virtually collapse while, on the other hand, the backyard pig keepers who are the real problem would continue relatively unaffected. In fact I suspect that the number of these types of units would increase dramatically if the legitimate and responsible commercial industry was to fall over. This in turn would greatly increase the risk of increased waste feeding to pigs and increase the risk of other even nastier diseases such as Foot and Mouth entering NZ.

DO MAF REALLY KNOW WHAT THEY ARE DOING?

I would be happy to discuss any of the issues I have raised in this letter with you, should you wish to do so.

25. COLIN & KAREN BATTERSBY

Our names are Colin and Karen Battersby. Having had 20 years experience working within the pig industry, we recently purchased a pork finishing unit complete with a niche marketing operation, Murrellen Pork.

Our submission is as follows:

1. We support the matters raised by New Zealand Pork Industry Board. We understand the NZPIB is working with its technical experts to review details and has identified a number of areas where deficiencies occur. It appears the risk analysis proposed by MAF does admit it will allow PRRS infected pig meat into the country. MAF seems to rely on post border measures to control it but there appears to be no consideration of how waste will be generated via food outlets, retail outlets and, indeed, consumers. There is also no definition of what is to occur when the product has passed its ‘use by date.’ There will be wastage and therefore danger of infection. This wastage needs to be properly defined.

2. The MAF analysis recommends relaxation of import regulations around what is termed “high value cuts.” There is no definition of “consumer ready - high value cuts.” Why should MAF come to the conclusion that such imports are necessary? If MAF have approved a pork industry quality bench mark developed by NZPIB requiring very high standards, why is MAF about to punish those who produce very high quality cuts?

26. G.D. & H. HARVIE

Submission from G.D. & J. Harvie in regard of allowing imports of high value cuts of fresh pig meat from countries with PRRS.

We are f family owned Pork Producer operating a farm of 450 sows and growing all pigs to bacon weight selling to a meat Wholesaler.

Having been to the U.S.A. and personally seen the effect of PRRS on pig farms there we are very concerned about proposals to allow pig meat from PRRS infected countries to be imported and used at other than Bacon Processors as at present.

Our concerns are as follows: In the Risk Review page 36 quote “it is concluded that it is likely that the infectivity will persist in chilled and frozen pig meat during storage and transport to New Zealand.” On page 34 it states “63% became infected when fed PCR positive pigmeat”. In Hawera a town of 8000 pop. Non of the food waste goes to commercial Piggeries. Most is collected and fed by Backyard operators who have no facilities for cooking. We have had requests from establishments asking us to remove food waste which we rejected. Although there are regulations regarding cooking waste it receives extra low priority in policing. We ourselves managed to explain to one backyarder what he was doing was illegal and convinced him to close, however someone else takes over collecting the waste. We consider that if this was the same risk of the chance of Foot and Mouth getting into New Zealand a review such as this would not even be contemplated.

From what we have seen overseas of PRRS it would be disastrous to the N.Z. Pig Industry if it was introduced through imported infected pig meat fed to pigs by backyard operators which is how it is believed PMWS was introduced to the North Island. It is also believed that feeding imported uncooked meat was how the last outbreak of Foot and Mouth Disease was introduced to the United Kingdom.

In conclusion we believe that the risks involved far outweigh any benefits of allowing free importation’s without cooking or processing requirements as at present.

27. NATALIE GERBER

Import risk analysis: Porcine reproductive and respiratory syndrome (PRRS) virus in pig meat

The New Zealand Feed Manufacturers Association (NZFMA), contactable at the above address, represents almost all of the animal feed manufacturing companies in New Zealand, with NZFMA members producing in excess of 80 % of animal feed produced in New Zealand.

The New Zealand pork industry plays an important role in the stability of the New Zealand feed industry, with pig feed production making up more than 25 % of the total animal feed produced by NZFMA members. Consequently, any factor, which significantly affects the profitability of the New Zealand pork industry and therefore the numbers of New Zealand pork producers, will have an impact on New Zealand Feed Manufacturers.

The NZFMA has recently reviewed the Import Risk Analysis: Porcine reproductive and respiratory syndrome (PRRS) virus in pig meat (subsequently referred to as the draft IRA) and note the following points.

New Zealand has a unique animal health status and a unique environment and it is in recognition of this unique status that Biosecurity New Zealand operates. Similarly, the New Zealand pork industry and the non-commercial pork herd both have a favorable animal health status, with many of the diseases endemic in other pork producing countries absent from New Zealand. The NZFMA is therefore concerned that Biosecurity New Zealand is recommending a reduction in the sanitary measures currently in place for imported pig meat.

The NZFMA supports the first two of Biosecurity New Zealand's options for risk management, namely that imported pig meat must be

"either

from a country free from PRRS

or

treated prior to import or on arrival, in an officially approved facility, by approved cooking or pH change".

However, it must be acknowledged that by allowing treatment of a potentially infected product (i.e. from a country not free from PRRS) within New Zealand, even in an officially approved facility, shifts the risk for disease control from the exporter to New Zealand Inc., including the New Zealand pork industry and Biosecurity New Zealand. Comprehensive, detailed and transparent procedures must be put in place prior to any consignments of potentially infected (i.e. from a country not free from PRRS) imported pig meat being treated on New Zealand shores.

In contrast, the NZFMA is concerned that the two alternative options for risk management detailed in the draft IRA, potentially allow for the release of PRRS infected meat into New Zealand and the subsequent infection of both the non-commercial and the commercial pig herd. The two alternative options of concern to the NZFMA are;

"or

- in the form of consumer-ready, high value cuts

or

- further processed on arrival, in an officially approved facility, into consumer-ready high value cuts"

Although the NZFMA acknowledges the view, held by Biosecurity New Zealand, that the risk to commercial pig herds are limited due primarily as a result of the current *Biosecurity (Meat and Food Waste for Pigs) Regulations 2005*, the NZFMA strongly disagrees with this view based on the arguments listed below;

1. Biosecurity New Zealand states in **Section 2.1.3** (Regulation of feeding garbage to pigs in New Zealand), that following a review of the *Garbage (Feed for Swine or Poultry) Regulations 1980*, these regulations were found to be "unenforceable given MAF budgets at that time".

   Section 2.1.3 (Regulation of feeding garbage to pigs in New Zealand) further states that following the outbreak of foot and mouth disease in the United Kingdom and a review of international practice relating to the feeding of waste to pigs, it was recommended that New Zealand re-impose regulations around the feeding of waste to pigs and this was done under the current *Biosecurity (Meat and Food Waste for Pigs) Regulations 2005.*

   Whilst the NZFMA supports the current *Biosecurity (Meat and Food Waste for Pigs) Regulations 2005* and believes that the implementation of these regulations are justified, the NZFMA would question whether, given the 7 156 (Table 4, page 5) properties with pigs reported by AgriBase, the current MAF budget would allow for the enforcement of the current *Biosecurity (Meat and Food Waste for Pigs) Regulations 2005*, particularly as the majority of the 7 132 herds identified by AgriBase are not commercial producers.

   The NZFMA acknowledges that there is a lack of certainty associated with any risk analysis and that it is occasionally necessary, in order to complete a risk analysis, to make some assumptions based on expert opinion. However, the NZFMA does not believe that it is realistic to assume that because an activity is prohibited it does not occur, especially when there are no apparent measures in place to police this.

2. Biosecurity New Zealand states in point 3, Section 1 (Executive Summary) that "if pig farms in this country did become infected with PRRS through the illegal feeding of uncooked imported pig meat, the likelihood of spread to other pig farms would be low as long as standard biosecurity practices were observed".

   However, the draft IRA does not include any description of what, Biosecurity New Zealand considers for the purpose of the IRA, to be standard biosecurity practices. Much of the research conducted on PRRS transmission has been conducted in Canada and the United States, where "most producers employ strict biosecurity protocols" on pig farms in order to reduce the risk of introduction of infectious diseases. As the New Zealand pig herd has a unique Biosecurity status, the *standard* biosecurity measures in place on the majority of farms are likely to be considerably less than the *strict* biosecurity measures in place on farms in countries such as Canada and the USA where the prevalence of infectious pig diseases is considerably higher. It is therefore essential that Biosecurity New Zealand define what they consider to be standard biosecurity procedures necessary to prevent commercial herds becoming infected with PRRS and to compare these to current practices in place in New Zealand. The added costs of implementing strict on-farm biosecurity measures should also be taken into account.

Similarly, **Section 3.4.5.3** (Fomites) states "although Biosecurity measures can substantially reduce the risk of introduction or re-introduction of PRRS virus into free herds (Zimmerman, 2003) breakdowns are common, and systems are considered essential to prevent transmission by contaminated fomites (Dee *et al.*, 2002a; 2002b)". This statement clearly indicates that biosecurity measures on-farm are not fail-safe. In the interests of maintaining New Zealand's unique biosecurity status and national pig herd health status, Biosecurity New Zealand must therefore maintain an appropriate level of protection (ALOP) pre-clearance.

3. The issue of production animal welfare continues to receive increasing public attention within New Zealand and many New Zealand producers have converted to outdoor production systems, particularly in Canterbury and South Canterbury. Although the NZFMA acknowledges that there is little scope to consider animal welfare in a traditional import risk analysis, the increasing number of outdoor producers must be taken into account when considering the potential to implement high levels of biosecurity on farm.

   Section 3.4.5.4 (Vectors) notes that mosquitoes have been implicated in the short distance mechanical transmission of PRRS under experimental conditions and that mallard ducks infected via drinking water shed the virus for up to 3 weeks. The NZFMA acknowledges that the significance of these observations under normal conditions is not known. However, the NZFMA believes that given the unique health status of New Zealand's pig herd, unless specific evidence to the contrary is available the potential risk of spread to outdoor commercial herds and subsequently the commercial pig population as a whole cannot be discounted.

   Biosecurity New Zealand argues that consumer-ready cuts of pork pose a lower risk than whole carcasses as there is negligible likelihood of meat scraps being generated prior to cooking (**Section 5.2.2.2** (Measures that reduce the likelihood of exposure)). However, no description of consumer ready cuts is provided and it is unclear what Biosecurity New Zealand would accept as consumer ready. Similarly, Biosecurity New Zealand does not appear to have given any consideration to the potential disposal of consumer ready cuts that are either past their use by date, or disposed of by the consumer for whatever reason.

   Biosecurity New Zealand states in **Section 4.2.2.4** (Conclusion) that "it is improbable that the volume of scraps generated from a single household at anyone time will approach the relatively large quantities (500 – 900 g) that were used in the feeding trials". However, no consideration is given in this section to restaurants, retail outlets, processors and manufacturers, which Biosecurity New Zealand consider in **Section 4.2.2.3** (Likelihood of generation of raw scraps during preparation for human consumption) to have a higher likelihood of generating raw pig meat scraps.

The NZFMA believes that Biosecurity New Zealand should consider the risk pathways associated with the generation of raw scraps by restaurants, retail outlets, processors and manufacturers, who are likely to purchase and process considerably larger volumes of pig meat than households, usually in single batches. In contrast to household waste, which Biosecurity New Zealand believes is unlikely to contain 500 – 900 g of pig meat scraps, it would not be unlikely that waste collected from restaurants, retail outlets, processors and manufacturers, contain meat scraps in excess of 500 – 900 g.

More importantly, it appears that Biosecurity New Zealand consider the volume of pig meat required to cause infection to be in excess of 500 – 900 g (**Section 4.2.2.4**, **Section 4.2.5.2**, and point ii) **Section 4.2.6** (Exposure Assessment Conclusion)). This seems to be based on the work conducted by Van der Linden *et al*. (2003) and Magar and Larochelle (2004). However,

neither of these studies demonstrated that 500 g of infective pig meat is the minimum volume required for infection to occur. As the work by Van der Linden *et al.* (2003) and subsequent work by Magar and Larochelle (2004) appear to be the only reports where the infectivity of infected pig meat has been investigated, it must be assumed that any volume of meat is sufficient to cause infection.

It is accepted that the basic tenet of the World Trade Organisation (WTO) Sanitary and Phytosanitary (SPS) agreement is to prevent the establishment of unjustified trade barriers (thereby prejudicing potential exporting countries) whilst still allowing (importing) member countries to determine the level of SPS protection they deem appropriate for protection of their human, animal or plant life. Thus, it must be noted that producers in the importing country should not be prejudiced as a result of being required to meet higher standards of biosecurity than are currently in place simply to ensure the continued survival of their businesses as well as the health and welfare of their herds.

In **Section 2.1.3** (Regulation of feeding garbage to pigs in New Zealand), Biosecurity New Zealand states that following review of the *Garbage (Feed for Swine or Poultry) Regulations 1980*, "it was considered that increased border security was a more appropriate way to manage the risk of exotic diseases entering the pig population" as a result of feeding waste to pigs. Similarly, Biosecurity New Zealand's traditional focus has been to prevent the entry of exotic diseases into New Zealand by addressing risks before they reach New Zealand shores. This view was reiterated at the Biosecurity New Zealand Import Health Standard work programme seminar held recently in Auckland.

The NZFMA strongly believes that the maintenance of New Zealand's unique biosecurity status and exclusion of exotic disease can only occur if Biosecurity New Zealand maintains it's current stance of ensuring that risks associated with the importation of animal and plant products are addressed off-shore.

Please do not hesitate to contact me should you have any queries.

28. R.R. FOX

My name is Ray Fox. I have an interest in two farms operated by my sons, with the capacity to produce approximately 7090 pigs per year.

One of these farms has started the process of total depopulation in order to attain a high health status. The reason for this is that the herd was suspected of being infected with the PMWS virus.

The Risk Analysis acknowledges that some meat from countries with herds infected by PRRS will contain viable virus.

The food waste regulations have only very minimal policing and at this point in time are very limited in their effectiveness for biosecurity.

The recent breaches of N.Z. biosecurity, Varroa bee mites and PWMS in pigs have dramatically showy that MAF Biosecurity has not the capacity to control and eradicate a disease incursion once it becomes established on our shores

The current measures, that is, that all meat from countries where PRRS is endemic is treated by cooking or curing is the absolute minimum standard required for the maintenance of the health and welfare of our animals.

Treatment of meat on arrival in the country is the only practical point to prevent another incursion. It would be gross negligence to retreat from the present standard.

29. COLIN KAY

I am a pork producer, a director of Five Star Pork NZ Ltd, a pork wholesaler and exporter, and a director of New Zealand Pork Industry Board (NZPIB). My farming operation involves 900 sows selling 19,000 pigs per year. I employ 12 staff and have an expenditure budget of 4 million dollars. The bulk of this expenditure is spent on locally produced feed such as barley, proteins (milk powders, meat and bone meal and blood meal) and local services and supplies. I am currently applying for resource consent to build a new piggery. I have read the Import Risk Analysis and I have major concerns about allowing imported fresh or frozen pig meat from countries that have PRRS to be sold in New Zealand without previously being treated in a transition station to inactivate the PRRS virus.

I have visited pig farms in USA, Holland, Denmark and UK which have PRRS and I have seen, first hand, the serous problems this disease causes. Farmers have had to make major changes to the management of their farms at considerable financial and emotional cost. I heard stories of some smaller farms losing money and farmers being forced off their farms due to the cumulative effects of PRRS and other diseases. I would strongly agree with your statement that "if PRRS virus was introduced into New Zealand, the consequences would be significant on affected farms, particularly in breeding units." I am such a farmer. My enterprise as described above, my livelihood, and the livelihood of my staff and all our families are significantly at risk, and supporting industries are also at risk. New Zealand is entitled to set measures which protect it from exotic diseases infecting its animal populations, and the consequent impact on its citizens.

My concern is the recommendation that high value cuts be allowed into New Zealand with out any treatment. These concerns arise from my experiences as a director of Five Star Pork and some of the issues we face with exporting high value pork to Singapore. In addition my role as a NZPIB Director means that I have been closely involved in reports from pork producers of suspected non-compliance with the Biosecurity (Meat and Food Waste) Regulations. Our experience is that there has been very little attention to ensuring compliance. Until NZPIB became involved there was no attention at all.

Pork has a short shelf life as compared to beef and lamb and therefore needs to be packaged to extend the shelf life while it being transported to the overseas market. This packaging consists of a plastic bag and the meat is either vacuum packed or gas flushed ie the air is sucked out of the bag which contains the meat and a gas mixture containing carbon dioxide and others is pumped back in and the bag is sealed. The experiences I will describe could easily apply to a pork exporter in any overseas country exporting pork into New Zealand. I have visited Singapore three times so I have a close working knowledge of the Singapore market.

A customs officer in Singapore opened a box of gas flushed pork and thought the expanded plastic bag was caused by rotting meat. To check this he pierced the bag with a knife and when he found the meat was still fresh closed the box up. That meat had to be dumped.

We changed the killing plant from Land Meat Wanganui to The Stratford Abattoirs and Singapore customs did not have The Stratford Abattoirs on their list of approved export killing plants and so refused to clear the shipment. It took about a week to get this sorted out. This could easily have caused the product to go over its use by date and it would have to be dumped.

We have experienced problems with containers being left at the airport, being delivered to the wrong cool store or being lost. While I am not aware of any of these problems causing us to dump product we have been forced to sell some near use by dated product on the local wet market for a quick sale.

There have been examples of product delivered out of specification caused by changes in market demand or by mistakes in ordering or production. Usually this pork is sold in the wet market.

Branded high value products need to look perfect so any visual faults will cause the meat to be down graded and sold in a low value market. We tend to over supply the orders so we can cater for unexpected demand between ordering and delivery which can be several weeks with sea freight.

These examples show that some pork from high value cuts will be sold as lower value product or discarded as waste, and this can occur at the processing plant, butcher shop, restaurant or in the home. New Zealand will experience all of these issues if the proposed options are permitted and the Risk Analysis takes no account of this, which has the potential to generate considerable quantities of PRRS infected meat. The risk of this pig meat being feed as garbage feed to pigs is no different to low value product.

The Risk Analysis has significantly overlooked and misjudged how waste is generated and what happens to it, as indicated above. It has not considered that compliance with the regulations is likely to be low among non-commercial pig farmers given very little policing or retribution. When MAF recommended re-introducing some controls on feeding meat to pigs from its 2001 review, it was within the context that border control measures had been significantly upgraded. This proposal however would mean that border control measures are lessened by permitting infected meat into New Zealand.

New Zealand is entitled to set sanitary measures to manage the risk of the introduction of unwanted diseases such as PRRS. The transition stations involves a relatively simple process for treating pig meat from PRRS infected countries and based on the volumes of pig meat imported from these countries it has not hindered the flow of imports.

I request that the current sanitary measures remain in place. There is no basis to change the current measures.

30. SAM MCIVOR

1.0 Executive Summary

The New Zealand Pork Industry Board has carefully reviewed the Import Risk Analysis (IRA): Porcine reproductive and respiratory syndrome (PRRS) virus in pig meat (25 July 2006) with input from its science advisers and in consultation with its New Zealand pork producing stakeholders.

We have identified a number of concerns within the various stages of the risk analysis process followed in the IRA. The collective outcome of these issues is that the risk of PRRSv being released into New Zealand and infecting the New Zealand pig herd is considerably under-estimated, it is in fact certain that PRRSv will arrive in untreated meat, and the recommended relaxation in the current sanitary measures will not be effective to manage the risk of infection arising from allowing the risk good into New Zealand.

Our major concerns with the IRA are:

Hazard Identification:

- we agree with the IRA that PRRSv in pig meat is a potential hazard
- the science presented in the IRA underestimates the scope and scale of the risk.

Release Assessment:

- when correctly expressed in relation to the volume of pig meat imported from PRRSv infected countries it is inevitable that PRRSv will be imported each year if the recommended range of sanitary measures is adopted, and it is likely that at some point the commercial pig industry will become infected as a consequence.

Exposure Assessment:

- is based on supposition and assumptions unsupported by information
- the nature and extent of waste generation is unknown but known to be substantial
- the nature of infection from infected meat is unknown but known that it is possible from consumer-ready high value cuts
- the extent of compliance with waste feeding regulations is unknown, but it is known to be far from complete
- the likelihood of exposure is unknown but it is known that pathways for exposure exist.

Consequence Assessment:

- spread between pig herds is highly likely despite standard biosecurity measures practiced by most fully commercial herds
- the consequences are serious for the New Zealand pork producing industry and there are flow-on consequences for rural support services and rural communities.

Risk Estimation:

- when correctly expressed in relation to the volume of pig meat imported from PRRSv infected countries it is inevitable that PRRSv will be imported each year if the recommended range of sanitary measures is adopted
- the likelihood of exposure is unknown but it is known that pathways for exposure exist

- transmission between pig herds is very likely
- the consequences are serious for the New Zealand pork producing industry and there are flow-on consequences for rural support services and rural communities.

Risk Management:

- the risk management options available are not discussed in objective terms and there is no formal evaluation of their impact on the level of risk
- given the inevitability that PRRSv in pig meat will be introduced each year, the lack of substantive data on the likelihood of exposure, and recognising that there are pathways for exposure, it is appropriate to implement sanitary measures to control the likelihood of release
- the recommended sanitary measures that enable release of PRRSv infected pig meat viz. the release of the undefined ‘consumer-ready high value cuts’ is intended to reduce the likelihood of exposure. However the recommendation is based on unsubstantiated assumptions, at least some of which are known to be incorrect. There is no complementary action to reduce the risk of virus being imported regularly in pig meat from PRRS infected countries. The effect is to knowingly take an unjustified risk
- the recommendation of pH adjustment is not fully supported by the science available.

As noted above, the appropriate risk management option is to prevent release of PRRSv in pig meat. Therefore treatment options to inactivate the PRRSv in pig meat prior to release into New Zealand are required. The available science supports heat treatment as an option but has not fully clarified the impact of pH adjustment on PRRSv survival in pig meat. However the proposed relaxation would not effectively manage the risk and it would be inconsistent with the relevant provisions of the Biosecurity Act 1993.

The IRA has not attempted to quantify the consequences to New Zealand’s pork producers. NZPIB has done this analysis which shows them to be considerably more significant than implied by the IRA. In addition the IRA has overlooked the flow on impact on rural support service and rural communities.

In regard to trade matters, import growth over the 5 year period since the implementation of treatment requirements to inactivate PRRSv in pig meat from countries where PRRS is endemic demonstrate clearly that such requirements are not a barrier to trade, and act purely to protect New Zealand’s favourable disease status.

We wish to highlight that the text of the IRA demonstrates the lack of substantive knowledge on the New Zealand pig herd, particularly the para commercial herd and its interactions with the commercial herd. This is very important information not only for managing biosecurity within the New Zealand pig industry but more broadly for managing animal industry biosecurity. NZPIB has put forward to BNZ proposals to address this important area and would be pleased for the opportunity to contribute.

Finally we thank Biosecurity New Zealand (BNZ) for its offer to meet to discuss critical issues, and wish to do so at BNZ’s earliest convenience.

2.0 Introduction

2.1 Description of submission

This submission is set out as follows:

- the Introduction and Background explain the format of the submission and provides relevant background on the New Zealand Pork Industry Board and the reasons for its concerns with the Import Risk Analysis (IRA)
- the analysis then follows the layout of the IRA. Additional information is put forward in each section where required, relevant comments made, and conclusions are drawn from the analysis and compared to those in the IRA. Within each section key points are highlighted
- after the analysis of the IRA, additional issues relevant to the IRA are covered
- the summary and conclusions are presented
- appendices provide supporting analysis and finally, additional references are noted.

2.2 New Zealand Pork Industry Board

The New Zealand Pork Industry Board (NZPIB) is a statutory producer board funded by pork producers (farmers) in New Zealand. NZPIB's activities are governed by the Pork Industry Board Act 1997.

NZPIB's object is set out in Section 5 of that Act. This section requires the Board to:

"*Help in the attainment, in the interests of pig farmers, of the best possible net on-going returns for pigs, pork products and co-products.*

In pursuing its object the Board must have regard to the desirability of the pork industry's making the best possible net on-going contribution to the economy".

To meet its statutory obligations, NZPIB sets key strategic areas of focus, one of which is:

Support and promote all facets of pork production and farming practices that enhance the sustainability of the industry.

NZPIB is making this submission as required under statute because:

- NZPIB believes that the recommended range of sanitary measures, if implemented, will impact negatively on on-going returns to New Zealand pork producers, including the encouragement of further investment.
- the recommended measures will impact negatively on the ability of the New Zealand pork industry to make the best on-going contribution to the New Zealand economy.

2.3 Import Risk Analysis: Porcine reproductive and respiratory syndrome (PRRS) virus in pig meat

This Import Risk Analysis (IRA) dated 25 July 2006 has been released for public consultation, which is an important review step prior to its confirmation and acceptance of recommendations for appropriate sanitary measures.

The IRA and its recommendations for sanitary measures have major implications for the disease status, animal welfare and economic well-being of the New Zealand pork producing industry. The New Zealand pork producing industry, including individual pork producers and NZPIB as their representative body, are the key affected stakeholders. For these reasons NZPIB and its technical advisers have undertaken a careful review and this submission reports on the review.

NZPIB emphasises that it is fully supportive of the application of carefully evaluated science, considered within the context of the New Zealand environment, as a basis for management of biosecurity risks, including the setting of Import Health Standards. However we have major concerns relating to details of the IRA as currently presented, conclusions drawn, and the recommended range of sanitary measures. We also are concerned in regard to the potential precedent set by this IRA for the setting of sanitary measures generally. Our concerns are documented in this submission, and NZPIB wishes to accept Biosecurity New Zealand's (BNZ) invitation to meet and discuss critical issues.

3.0 Background

3.1 New Zealand's disease status

Key point:

- *The New Zealand pork producing industry's favourable disease status is a comparative advantage*

By international standards New Zealand's agricultural industries enjoy a favourable disease status and this is critical to New Zealand's trading position and the economy. As one component, the New Zealand pork industry has a high health status and this provides significant productivity benefits. This is important because feed costs in particular mean that New Zealand is a relatively high cost pork producer. While to date the New Zealand pork industry has maintained a domestic focus, it is now committed to growing recently established niche export market opportunities.

Until 2003, New Zealand and Australia were two of very few countries not affected by either PRRS or PMWS (Post-weaning Multi-systemic Wasting Syndrome). Unfortunately PMWS was identified in the North Island in 2003 and while the imposition of regulatory control measures supported by industry initiatives contained the disease very effectively, a second incursion into the South Island in January 2006 meant that control was then beyond the scope of the Board to maintain.

New Zealand has suffered incursions of Aujeszky's Disease and PMWS despite very high intensity border control. The most likely explanation for the arrival of PMWS is the importation of infected pig meat which was fed to pigs. This scenario is known to have occurred.

PRRS is a serious and highly infectious disease of pigs. It has been estimated to potentially cost the New Zealand pork industry around $7.1 million per year through direct production losses only (Neumann, 2006) and around a further $12.7 million in known indirect costs in an epidemic event. In addition there would be the roll-on impact on staff, rural families, rural communities and supporting industries (refer Appendix 2).

3.2 Current control measures against PRRS infection via pig meat

Key points-:

- ***The risk of a PRRS incursion via pig meat is currently controlled by minimising the likelihood of release (border control)***
- ***The likelihood of exposure of the New Zealand pig herd to sources of infection via feeding meat is dependent on recently introduced regulations for which the level of compliance is unknown but known to be far from complete***

Up to 2001, New Zealand did not impose sanitary measures on imported pig meat for PRRS, based on the view that pig meat could not contain the virus. In 2001 provisional sanitary measures were put in place to control the risk of PRRS, following the 1999 Lelystad study which demonstrated that the PRRS virus could be transmitted to pigs by the consumption of infected pig meat. The provisional sanitary measures required the heat treatment of pig meat, at a level which inactivates the PRRS virus, from countries where PRRS is endemic, prior to its release into New Zealand. The measures were subsequently amended to also allow for pH treatment in a manner which inactivated the PRRS virus. These measures remain in place and the New Zealand pork processing industry has adjusted to meeting these requirements by establishing MAF approved transitional facilities.

The current sanitary measures manage the risk of PRRS entry from all legally imported and correctly cleared product. The only risk is from product smuggled by passengers, and unauthorized, incorrectly cleared or smuggled product through commercial channels. There is intensive border control monitoring of passengers and commercial channels are stringently controlled through MAF quarantine procedures. Despite this, MAF data indicate that a substantial amount of meat is seized at the border and additional product is known to get in without detection (slippage). The recent Korean incident is a striking reminder that despite sustained world class border control activity there has been and presumably will in future be breaches of border security in relation to trade, not just through passenger traffic.

Since 1998 until recently, there were no further regulatory controls on feeding meat including imported pork to pigs in New Zealand. In 2005 the Biosecurity (Meat and Food Waste for Pigs) Regulations were promulgated. These regulations require that meat and food waste containing meat must be treated to 100C for one hour before being fed to pigs. NZPIB has strongly supported compliance and encouraged pork producers to report suspected cases of non-compliance. However, enforcement activity is limited to a very low level of reactive activity to these reported cases of suspected non-compliance. To date the focus has simply been on encouraging voluntary compliance. The extent of compliance with the 2005 regulations is unknown but NZPIB’s market intelligence indicates that compliance is far from complete. NZPIB is very concerned about this situation as this pathway provides a feasible vector for incursion of diseases – not only PRRS but also foot and mouth disease (FMD) and other major diseases. This was the pathway for the UK 2001 FMD incursion.

NZPIB has made considerable effort to educate its 340 registered producers about the importance of the Biosecurity (Meat and Food Waste) Regulations. to date the wider population of pig owners probably has less knowledge. The Import Risk Analysis notes that there are around 7,000 rural pig herds of which around 6,500 have no more than 10 pigs (AgriBase data). There are also an unknown number of urban and peri-urban pig owners numbering in the thousands outside the Agribase coverage. The ability to educate all these owners on the regulations is challenging. BNZ and NZPIB are now preparing a wider education campaign spanning all relevant target groups, including waste generators, distributors and owners of pigs.

The IRA does not recognise the limitations of these regulations in controlling the exposure of the New Zealand pig herd to sources of exotic infection via waste feeding. Critical limitations are very limited attention to education to date and BNZ’s lack of resources for compliance activities.

BNZ’s communication to NZPIB states that ‘ *Education is the key approach to managing the risks of waste feeding. The Ministry of Agriculture and Forestry (MAF) accepts that we have not achieved the profile on this matter that we intended*.’ (BNZ ADG letter to NZPIB CEO, 11 Sept 2006) and ‘*Agreed that we may get a better compliance result if we focussed on a very small number of suspected serious offenders rather than using scarce resources to follow* *up on every possible non-compliance'*. (BNZ Post-Clearance Director email to NZPIB, 6 July 2006).

Regarding compliance activity, to the end of July 2006, MAF Enforcement Group figures (provided on a two monthly basis to NZPIB) indicate that 28 suspected cases have been assessed; and 12 educational letters and a 'further bring up' are shown. MAF Enforcement has advised NZPIB that initial phone calls are made and visits are scheduled as resources allow. A report has been received by NZPIB of one visit to date.

3.3 Proposed surveillance

Key point:

- ***The New Zealand pork producing industry is committed to minimising the impact of a PRRS incursion***

With PMWS established in New Zealand the commercial industry is very vulnerable to the impact of a PRRS incursion. NZPIB has therefore sought advice from Massey University's EpiCentre (Dr Eric Neumann) on surveillance methods to identify and enable containment of PRRS should there be an incursion. The proposed surveillance has two broad components: one focusing on the commercial industry and the other proposing to investigate the para-commercial (non-commercial) industry with the objective of defining an appropriate basis for surveillance within this currently unscoped industry sector. NZPIB has requested BNZ's support to implement surveillance within the commercial sector as an example of Industry – BNZ partnership. Dr Eric Neumann has also submitted a proposal to BNZ (Request for Proposal for Animal Exotic Disease Operational Research June 2006) to characterise the para-commercial industry and its interactions with the commercial industry.

The New Zealand pork producing industry views this surveillance as complementary to maintaining very strong border controls to control the risk of a PRRS incursion in the New Zealand pig herd. This commitment to surveillance, plus the thoroughness of this submission are clear indicators of the industry's concern to protect itself from PRRS.

Note the combined effect of minimising the risk of entry (border control) and surveillance will potentially minimise the cost to MAF of PRRS incursion response.

4.0 Import Risk Analysis

We have considered the IRA section by section and our concerns on specific matters are covered below.

4.1 Executive Summary

Key points:

- ***The terms used to describe the level of risk are undefined***
- ***The likelihood of release is significantly understated when related to volumes of pig meat imported from PRRSv endemic countries***
- ***The likelihood of exposure is not based on fact but assumed to be controlled by regulations for which the level of compliance is unknown, but known to be incomplete***
- ***The likelihood of spread between farms is significantly understated and does not reflect international experience of PRRS spread nor the dynamics of pig ownership in New Zealand***

- ***The consequences of a PRRS incursion are significantly understated and do not recognise the full impact on New Zealand pork producers, the New Zealand pork industry, rural employment, supporting industries and hence the health of rural communities***
- ***The proposed range of sanitary measures is not technically justified by the analytical processes within the IRA.***

There is no definition provided for the terms used to describe the risk including ‘low’ and ‘non-negligible’; and the term ‘consumer-ready high value cuts’ in relation to the recommended sanitary measures.

The statement that “there is a low likelihood that chilled or frozen pig meat from a country with endemic PRRS will harbour the virus when imported into New Zealand” does not reflect the full text of the report nor the body of scientific evidence from peer-reviewed research. The IRA provides no indication in the body of the report on what it means by ‘low’. Most critically the likelihood is, that on average there will be 3kg of infected pig meat per tonne of pig meat sent to New Zealand from PRRS infected countries. Therefore we must expect that every tonne of pig meat from PRRS infected countries will be infected.

The inference that exposure to virus in imported pig meat would be unlikely because feeding such material to pigs is illegal, is not supported by any factual evidence. The IRA presumes that the Biosecurity (Meat and Food Waste) Regulations 2005 manage the risk of exposure. The reality is that this assumption is dependent on the collective handling practices of pork processors, retailers, restauranteurs, takeaway outlets, institutions, consumers, waste food distributors and owners of pigs to prevent exposure of New Zealand pigs to untreated PRRSv meat. Knowledge of, let alone compliance with, these regulations among all these relevant target groups is unknown. Neither knowledge of, nor compliance with, these regulations has been established. NZPIB has reported to BNZ a number of cases of suspected non-compliance across various sectors including pig owners. MAF Enforcement figures and information provided to NZPIB show that follow up action has been largely restricted to telephone calls and educational letters. Given such a very minimal level of reactive enforcement activity, after a lengthy period when feeding of such material was legal, the extent to which these regulations manage the risk of exposure must be acknowledged as a critical ‘unknown’.

The statement that likelihood of spread of PRRS virus from an infected farm to other farms would be low as long as standard biosecurity practices were observed is inconsistent with international experience of spread of PRRS infection, and does not recognise the complexity of interactions within the New Zealand pig herd, including between the commercial through to ‘backyard’ sector of the industry.

The statement that “it is considered that the risk of PRRS in imported pig meat is non-negligible …”, while not a false statement, is uninformative about the true risk. ‘Non-negligible’ is undefined and its use substantially downplays the true size of the risk.

The sanitary measures recommended which by-pass treatment to inactivate PRRSv, are not justified by the IRA. The IRA underestimates the likelihood of release in a number of areas and critically does not interpret this in terms of the volume of imported pig meat from PRRS infected countries. The exposure assessment has not investigated the pathways within the New Zealand environment where the undefined consumer-ready high value cuts may infect the New Zealand pig herd. It is based solely on assumptions. Nor has the IRA fully assessed the consequences.

These points are covered in more detail in the following sections.

4.2 IRA Introduction

4.2.1 Pig Meat Imports into New Zealand

Key points:

- ***The IRA does not account for natural growth in imports***
- ***Relaxing treatment requirements to allow importation and distribution of the undefined consumer-ready high value cuts from PRRS infected countries as proposed, would almost certainly further increase imports and divert imported pig meat via this route.***
- ***This increase in imports results in an increased risk of PRRS infection.***

Over the last five years the quantity of pig meat imported into New Zealand has risen steeply and now accounts for around 40% of New Zealand's pork consumption. This is illustrated in the following table which updates the figures provided in the IRA. This table also shows that the number of countries supplying product has increased, and now includes a number of countries of unfavourable or very uncertain status with respect to pig diseases.

IMPORTS PER MEAT YEAR (Oct-Sept)									
			00/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006
			Full Year	Full Year	Full Year	Full Year	Full Year	Up to July
Total Imports		Tonnes	12960	16411	19513	18733	23344	21445
12 Months	Up to July	Tonnes	13570	15980	18387	19288	22203	25223
Country	PRRS Status							
Australia	×	Tonnes	2946.46	5908.84	9593.39	8749.58	10056.71	9428.17
		%	22.73	36.01	49.16	46.71	43.08	43.96
Canada	✓	Tonnes	8727.48	7787.37	7322.24	5613.19	6961.75	6440.09
		%	67.34	47.45	37.52	29.96	29.82	30.03
China	✓	Tonnes	54.79	72.66	63.27	104.97	118.19	147.84
		%	0.42	0.44	0.32	0.56	0.51	0.69
Denmark	✓	Tonnes	793.41	512.74	3.90	115.29	269.45	227.52
		%	6.12	3.12	0.02	0.62	1.15	1.06
Finland	×	Tonnes						430.15
		%						2.01
Italy	✓	Tonnes						8.13
		%						0.04
Hong Kong		Tonnes	1.35	0.72	1.04	0.78	0.57	0.05
		%	0.01	0.00	0.01	0.00	0.00	0.00
Netherland	✓	Tonnes	23.07	11.02	1.34	0.14	0.05	0.03
		%	0.18	0.07	0.01	0.00	0.00	0.00
Sweden	×	Tonnes						1381.10
		%						6.44
U.S.A	✓	Tonnes	409.91	1440.63	1631.73	2952.12	4201.81	3366.38
		%	3.16	8.78	8.36	15.76	18.00	15.70
Other3	✓	Tonnes	3.87	676.58	896.27	1196.68	1735.82	15.91
		%	0.03	4.12	4.59	6.39	7.44	0.07
Total		Tonnes	12960	16411	19513	18733	23344	21445
		CWE1	17616	22386	26467	25366	26706	29615
	Imports %2		27.61	33.15	35.92	32.85	38.67	41.07

1 Carcass weight equivalent basis (bone-in)
2 Calculations based on CWE tonnage
3 Other- Taiwan, Thailand, Korea, Japan, Sweden (upto 2004/05), Germany, Ireland, UK, France, Ukraine, Croatia, Italy (upto 2004/05), Russia, South Africa, New Caledonia

NZPIB's current market analysis predicts that New Zealand's pork consumption will continue to grow. Current market analysis (Rabobank 2006) predicts an increase in global movement of pork. Relaxation in the requirement for treatment to inactivate the PRRSv in pig meat would undoubtedly encourage the application of new packaging technologies to enable the provision of chilled pig meat to New Zealand.

The absolute volume of imports from PRRS infected countries, the likely increase in such volumes, and also the likely volume provided in chilled form should there be a relaxation in treatment requirements to inactivate the PRRSv in pig meat, are highly relevant factors in determining the risk of PRRS incursion.

4.2.2 Pig Farming in New Zealand

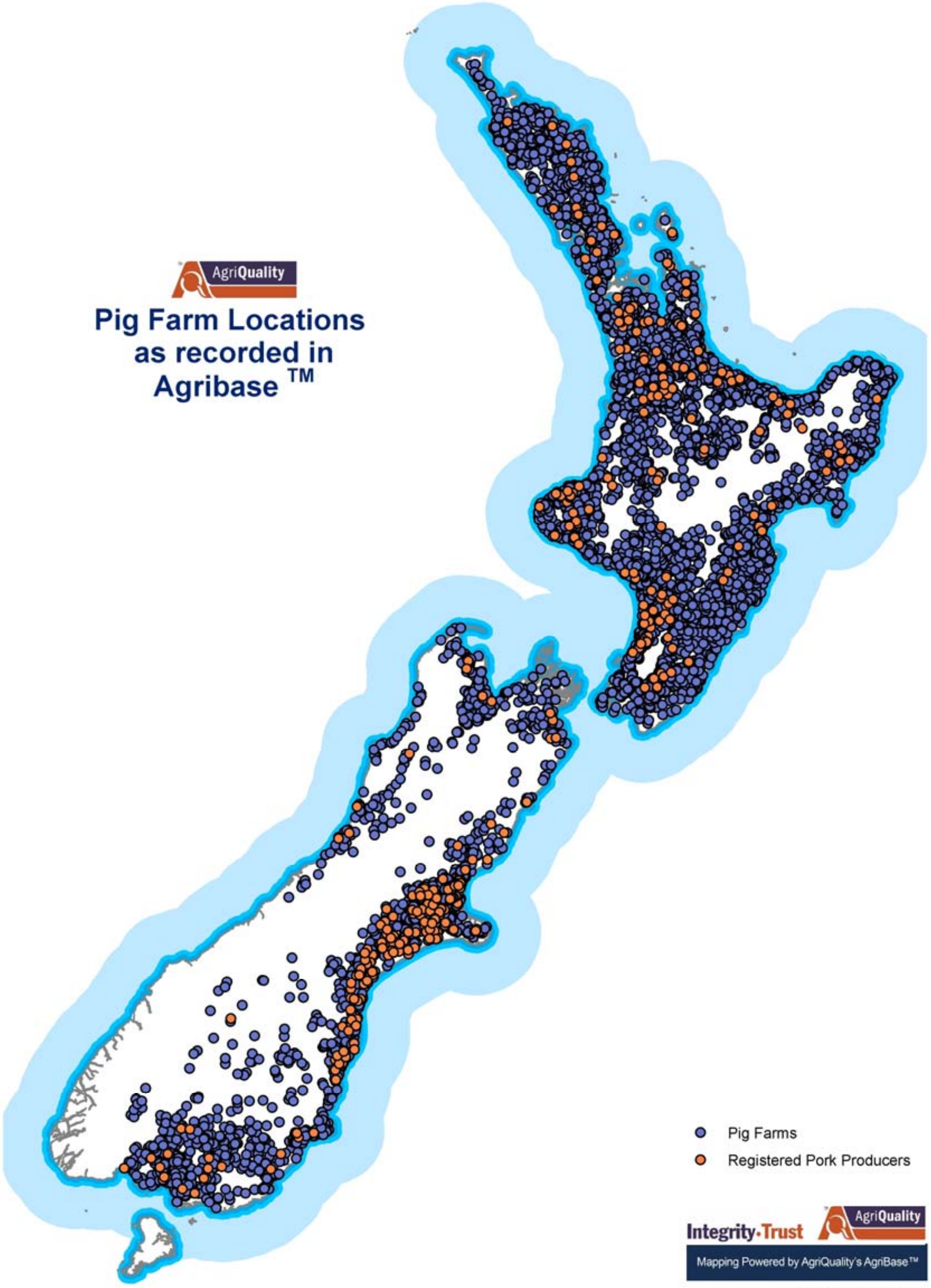
Key points:

- ***The IRA does not fully capture the nature and dynamics of the New Zealand pig industry including the complex network of interaction between farms and industry sectors, and the geographic proximity of the commercial sector and 'backyard' farms***
- ***Not fully appreciating the nature of the New Zealand pig industry leads to inaccuracies in later sections of the IRA in regard to transmission and the protective effect of farm biosecurity.***

First of all, we note a correction. In **section 2.1.2** (page 6), the first sentence below Table 5 states that "Although groups of pigs numbering less than 20 animals are not considered by the New Zealand Pork Industry Board to be 'herds', such units comprise more than 95% of the total pig population of New Zealand." This should read …more than 95% of the total pig **herds** of New Zealand.

The IRA notes that the total number of small herds is substantially higher than the number recorded in AgriBase, because the latter does not include urban and peri-urban areas. In fact the true number of 'herds' which have pigs over the course of a calendar year will be considerably higher again because the number of people owning pigs on any given date is likely to be a very fluctuating number. This means that within any year there will be a greater number of potential points of infection.

The following map shows the distribution of commercial and para-commercial herds in New Zealand, as recorded in AgriBase (June 2006).


AgriQuality
Pig Farm Locations
as recorded in
Agribase ™
Pig Farms
Registered Pork Producers
Integrity-Trust
AgriQuality
Mapping Powered by AgriQuality's AgriBase™
Prepared 22 June 2006 MMD

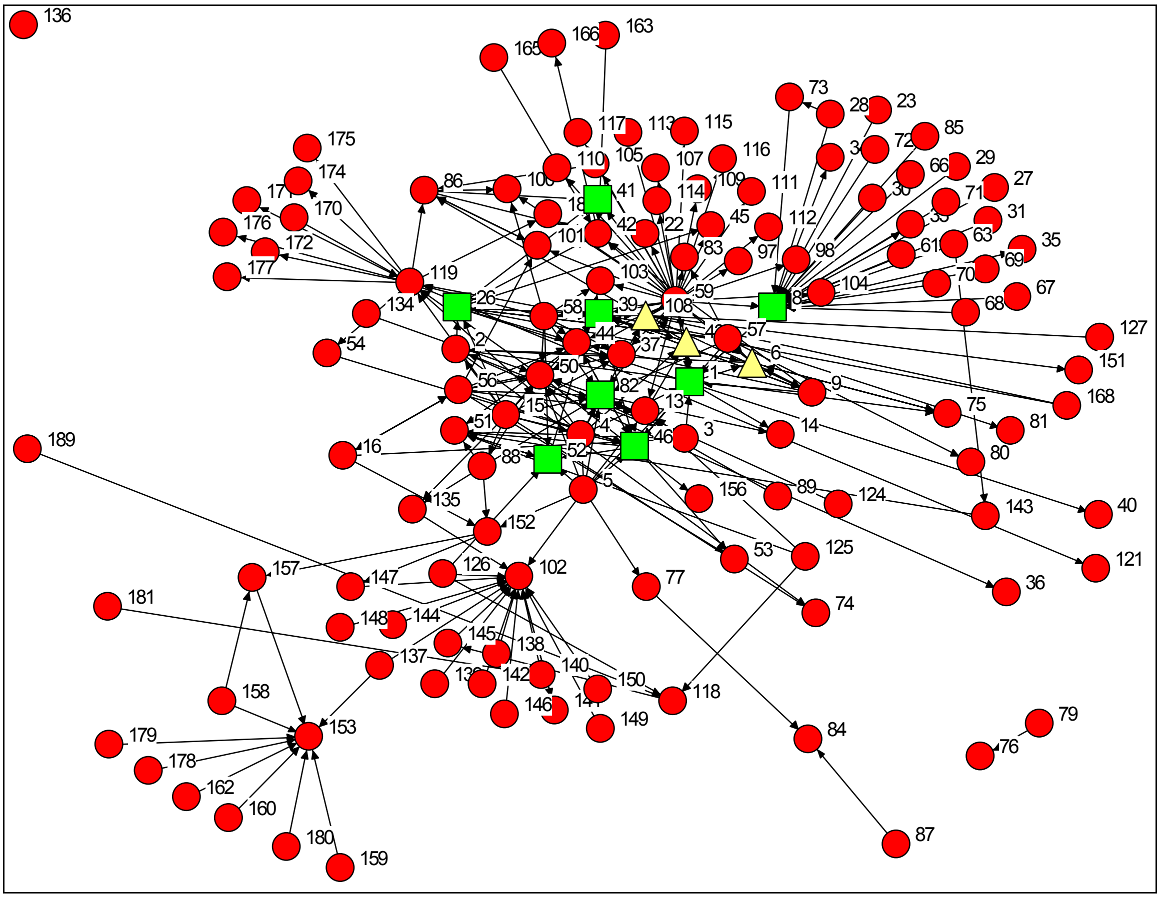
This map illustrates that para-commercial herds on AgriBase properties occur throughout most farmed areas of New Zealand, and co-exist geographically in close proximity with commercial herds in the more restricted localities where commercial pig farming takes place.

The structure of the pig population in reality is far more complex than the IRA recognises. The production and consumption/marketing networks which exist outside the commercial industry are not well documented, but they do involve extensive breeding of pigs and widespread movement of pigs and fomites between different units. There is not a single category of non-breeding pig raisers among the 7,000+ para-commercial and backyard pig keepers, but rather multiple layers of interacting networks of small and medium scale pig owners who trade extensively with each other and with the lower end of the commercial pig industry.

For example, **section 2.1.2** (page 6 of the IRA) states that "*It is generally assumed that herds with less than 20 pigs are unlikely to be breeding units*…" There is no supporting evidence for this statement and it begs the question where these herds would get their pigs from, if there is no breeding in this small-scale sector of the industry. Many smaller herds are known to breed their own pigs, a practice which could involve contact with other pig herds. If these herds are not breeding units then they will be sourcing pigs from another herd. In both cases, pig movement and/or contact between properties is highly likely.

A striking illustration of interaction between pork producers is provided by a Social Network Analysis constructed from movement of materials between farms based on a subset of contact tracing data within the North Island PMWS incursion response during 2003 and 2004. This data subset involved 136 farms, and the PMWS status of 74 was classified from MAF's data as PMWS positive, negative and suspicious.

A graph of the network, referred to as the PMWS network is given overleaf:



A social network graph of the positive (■), suspect (▲) and negative (●) premises in the network as well as their connections (lines). Note that the spatial location is arbitrary and bears no reflection to true spatial location.

(French and Titus, Presentation to PMWS Update and Debrief Meeting August 2005)

Note that Dr Eric Neumann's proposal to BNZ (Request for Proposal for Animal Exotic Disease Operational Research June 2006) (already referred to in section 3.3) to characterise the para-commercial industry and its interactions with the commercial industry would provide factual input for Exposure and Consequence Assessments.

4.2.3 Regulation of feeding garbage to pigs in New Zealand

Key point:

- ***The proposed range of sanitary measures in the IRA does not reflect BNZ's own assessment on the importance of border security.***

Section 2.1.3 (page 6) covers the history of regulation of feeding meat to pigs in New Zealand including MAF's 1997 consideration that 'increased border security was a more appropriate way to manage the risk of exotic diseases entering the pig population by this route' (meaning waste feeding).

MAF's subsequent review of Feeding Waste to Pigs (November 2001) recommended a suite of measures to manage the risk of entry of exotic diseases including FMD. These measures also included maintenance of high levels of border security.

Aspects of the recommended sanitary measures are inconsistent with this approach.

Risk Analysis methodology

The internationally recognised risk analysis process used is illustrated in **Figure 1** page 10 of the IRA and discussed in more detail within **section 2.3** of the IRA.

It follows the steps:

- Hazard Identification
- Risk Assessment covering
  - release assessment
  - exposure assessment
  - consequence assessment
  - risk estimation
- Risk Management covering
  - risk evaluation
  - option evaluation
  - recommended measures

Importantly **section 2.3** of the IRA notes the requirement for MAF to consider the likelihood that the imported commodities may harbour organisms and the effect that these organisms may have on people, the environment and the economy of New Zealand (Biosecurity Act 1993, section 22 (5)). In addition the SPS requirement that Members cannot impose measures on imported goods that are more restrictive than those placed on domestically-produced goods, which in effect means that measures may be considered only for exotic organisms or for endemic organisms that are under official control.

4.3 Hazard Identification

Key points:

- ***We agree with the IRA's conclusion that PRRSv is a potential hazard in pig meat.***
- ***But PRRSv persistence in the blood and other tissue has been only selectively reported and PCR data disregarded. This underestimates the risk.***
- ***The potential impact of PRRS infection in New Zealand is underestimated by not considering all the scientific literature and its specific applicability to New Zealand.***
- ***The international experience demonstrating PRRS transmission by means which circumvent on-farm biosecurity is not adequately recognised.***
- ***Inherent difficulties with control and eradication strongly support risk management by prevention of entry.***

The IRA concludes its Hazard Identification section by recognising that PRRS virus is a potential hazard in pig meat. NZPIB fully agrees.

However we have a number of concerns about the material presented in regard to Epidemiology, Control and Eradication, and most importantly, about the interpretation of the overall body of evidence on PRRS. The flawed interpretation underestimates the risk of PRRSv infection via pig meat to the New Zealand pig herd and this in turn impacts on the recommended range of sanitary measures.

EFSA Scientific Opinion

The IRA reports on a review of the scientific literature on PRRS virology, pathogenesis, and epidemiology, but it has not drawn on some key references which are given later in this section. The IRA does not refer to the EFSA (European Food Safety Authority) Scientific Opinion on PRRS transmission in fresh meat (EFSA-Q-2004-100) which was published a year before this IRA, covers many of the same issues in great depth, but interprets the outcome characterized by many 'unknowns' in a different way (Anonymous 2005). Importantly the EFSA review establishes that there is a risk associated with the import of pig meat from infected countries but the level cannot be quantified with the current state of knowledge.

PRRSv persistence in blood (viraemia) and other tissue

Of key importance is a clear understanding of PRRSv persistence in blood (viraemia) and other tissue. In **section 3.4.3** (page 12) of the IRA, several relevant studies have not been cited that reveal the true potential for PRRSv to persist in swine. The third paragraph of this section notes persistence of 35-40 days in the blood of young pigs and up to 16 weeks in neonates infected prior to birth. The issue of viral persistence in non-blood tissue has only been selectively reported in the IRA. The longest period of viral persistence in any tissue that is cited is Batista's 2004 study showing PRRSv was present in swine lymphoid tissue for up to 135 dpi. A partial list of studies that describe the extent of virus persistence and that have particular relevance to this IRA are listed below. While this IRA does cite information from some of these studies, data generated from the use of PCR techniques has been disregarded in the IRA, without justification.

Design	Finding(s)	Test	Reference
Piglets infected in utero, late gestation.	Tonsil and lymph nodes positive through 132 dpi.	Virus isolation (VI)	(Benfield et al 2000)
	PRRSv transmitted to sentinels through 112 dpi.	VI	
Random slaughter pigs at abattoir	85.4% seropositive	Enzyme linked immunosorbent assay (ELISA)	(Wang 1999)
	7.9% positive sera	Reverse transcriptase polymerase chain reaction (RT-PCR)	
1-2 month old, exp. infected pigs	6 of 10 pigs infected at 84 dpi.	Swine Bioassay (BA)	(Allende et al 2000)

	2 of 5 pigs infected at 150 dpi.	BA	
Piglets infected in utero, late gestation.	Serum positive through 48 dpi.	VI	(Rowland et al 2003)
	Serum positive through 228 dpi.	RT-PCR	
2 wk old, exp. infected pigs.	7 of 28 pigs carrying virus between 168 and 251 dpi.	RT-PCR	(Wills et al 2003)
	3 of 28 pigs carrying virus through 251 dpi.	RT-PCR	
Experimentally infected pigs	18 of 18 pigs infected in various tissues at 60 dpi.	VI	(Zimmerman et al 2000)
	11 of 12 pigs infected in various tissues at 70 dpi.	VI	
3 wk old, exp. infected pigs.	10 of 11 pigs were infected in various tissues through 105 dpi.	BA, VI or RT-PCR	(Horter et al 2002)

It is evident from this information that PRRSv persistence is an important feature of the disease. The virus is routinely found in multiple tissues of the pig, including blood, for months after infection. Collectively, these studies suggest that the vast majority of pigs remain infected for at least 60 dpi with multiple studies demonstrating PRRSv in pigs well beyond the maximum of 157 days stated in the IRA.

The IRA needs to consider all the relevant scientific literature regarding PRRSv persistence, which shows longer persistence of PRRSv. Incorporation of this data into the risk model will result in a higher level of risk.

Clinical impact of PRRS infection

Section 3.4.4 (page 13) of the IRA, refers to "…*reproductive problems are therefore considerably less dramatic*" in endemically infected farms with clinical signs generally being limited to immunologically naïve animals. This is correct in principle. However there is no assessment about the extent to which New Zealand herds are in the stable state which would allow infection to become truly endemic.

Commercial pig farms in New Zealand average an annual replacement rate of breeding animals greater than 40%. This means that at any given time, approximately 17% of the breeding animals in the herd would not yet have reached their first parity and be likely to be immunologically naïve. A very high proportion of new breeding stock now comes from very high health status breeding herds, and these pigs are added to commercial herds at an age where they are immunologically naïve.

Therefore the IRA comment about less dramatic impacts of PRRS is not applicable in New Zealand.

Beyond this, PRRSv is a typical highly mutable RNA virus and exists as multiple quasispecies within herds and within individually infected animals. At the herd level, the implications of this are that multiple strains of PRRSv (with unpredictable cross-protection) often circulate within a farm at the same time. (Rowland et al 1999; Dee et al 2001). This leaves the potential for entire breeding populations that could be considered immunologically naïve to particular strains of PRRS under the right circumstances, and new strains are regularly emerging which show differences in epidemiology.

The single reference used to support the claim that only 20% of seropositive herds show clinical signs and that the impact of the disease '*in many herds even the epidemic period does not have dramatic consequences*" (page 12 of the IRA) is one from Poland, where at the time accuracy of observation is likely to have been low to very low because of the nature of production and management. It does not accurately represent the international picture at all. We point out that despite PRRS recognition as an important disease worldwide since emergence in the late 1980's, it still commands significant attention from veterinarians and pig scientists. This was evidenced recently at the 2006 meeting of the International Pig Veterinary Society in Denmark where over 11% (104 of 934 abstracts) of the total abstracts presented at the meeting were focused on the disease. This clearly shows the high level of concern about PRRS and suggests that its clinical importance remains substantial

There are numerous variant strains of PRRS which vary in virulence, but in general most strains should be considered capable of causing disease in pigs unless the virus has been specifically attenuated as in the case of modified-live vaccines. The disease in North America is demonstrated by more severe respiratory manifestations than in Europe making the disease much more troublesome in North American herds. Prolonged effects on overall herd productivity including effects on reproduction, growth, and mortality on these herds has resulted in an annual cost to the US industry of $560 million USD, or about $5.60 per pig sold. (Neumann et al 2005). There is a range of factors influencing virulence and severity. We cannot assume that a PRRS incursion into New Zealand will be a strain of lower virulence. The New Zealand pig industry should expect any incursion of PRRS virus to result in significant clinical disease in both breeding and growing pig herds.

Transmission of PRRS virus between herds

The discussion of aerosol transmission of PRRS virus is not adequate and as a result, contributes to the inaccurate conclusion that *the likelihood of spread to other pig farms would be low as long as standard biosecurity practices were observed.*

The nature of bioaerosols and their role in disease transmission is a complex issue which has been the subject of considerable research, but it is difficult to investigate objectively, especially in experimental models. For example, there was clear field evidence for decades that *Mycoplasma hyopneumoniae* could spread between herds in physical proximity despite intensive biosecurity. Attempts to confirm the presence of the organism in air samples failed until a decade ago, when improved technology allowed confirmation to be achieved. There has been similar experience with classical swine fever virus. Aerosol transmission is very dependent on the precise micrometeorological conditions, and therefore it appears to be capricious and unpredictable, unless refined methods are used to study it. In the case of PRRS, as in FMD, it is likely that there is a very strong influence of strain variation in determining whether airborne spread occurs, and experimental models are very questionable as a basis for drawing conclusions on the issue.

It is very clear from the international literature that farms close to infected farms but with no known means of contact are at greater risk than more distant farms, and if the mechanism is not aerosol spread then it must be another spread mechanisms. In either case, transmission has undoubtedly occurred by means which circumvent on-farm biosecurity.

This IRA makes extensive use of a very dated publication about the epidemiology of PRRS (Albina 1997), rather than more recent findings. Since the time of this publication, additional information has been generated to describe the importance of different risk factors both in maintaining the infection, and transmitting the infection among swine populations. **Sections 3.4.5.1 and 3.4.5.2** of the IRA identify infected pigs and semen as the two important means by which the virus can be spread. However Albina's idea that "…*so long as AI centres do not become infected, then control of PRRS can be achieved by standard biosecurity measures*." is no longer considered valid. Genetic suppliers worldwide have undertaken the task of eliminating PRRSv from their production systems. Torremorell et al, 2004 shared their findings in the PIC company about the cause for PRRSv elimination failures. Among the 35 PRRS-negative herds that experienced acute PRRS outbreaks after a prior successful elimination programme, 83% were thought to be a result of lateral introductions of the virus with only 17% attributed to semen or infected animals. (Torremorell et al 2004) These experiences come from a major genetic supply system with biosecurity procedures in place that at the time were state-of-the-art.

The idea that standard biosecurity measures are in place on at-risk farms for PRRS is also unrealistically optimistic. The IRA points out that the proportion of pig-owning herds which are commercial in scale in New Zealand is well under 10% of the total number of herds. Few if any of the para-commercial herds are likely to practise worthwhile biosecurity. These latter herds are also the ones most likely to be the initial site of infection due to their feeding practices, while commercial herds would be exposed from these para-commercial herds. Since it has proved very difficult to keep infection out of the most biosecure segment of the US pig industry, the claim in the IRA that infection would not spread within the industry observing standard biosecurity measures is unrealistic. Therefore the conclusions presented for the Consequence Assessment (see **section 4.6.2**) that '*for any pig farm adhering to standard biosecurity measures the likelihood of becoming infected with PRRS virus is considered to be low'* is a wrong assessment of the potential likelihood of infection.

All the current scientific literature regarding the risk factors associated with maintenance of infection and between herd transmission needs to be considered within the IRA in the Exposure and Consequence assessments. This literature demonstrates that there is a considerable risk of transmission despite standard biosecurity measures. Incorporation of this data into the risk assessment will result in a higher level of risk.

Control and Eradication

The discussion of control and eradication in **sections 3.4.6 and 3.4.7** of the IRA (pp16-17) provides a very optimistic view of the feasibility of effective control and eradication in commercial herds, and recognizes but does not give adequate weight to the inherent problems with the use of vaccination as a control strategy, which make prevention of entry of the virus a much more effective risk management option. Denmark provides perhaps the best example of how even a well considered and controlled central planning response to recent arrival of PRRS virus into an industry can go awry. In their case, beyond the direct production costs of the disease, extensive use of PRRS vaccine created additional production losses and complicated the control effort. (Botner et al 1997) The global experience which demonstrates the difficulty in achieving control and eradication of PRRS needs to be given adequate weight in assessing the likely impact of an incursion of PRRS into New Zealand. (Dee, 2002) Consequently emphasis must be given to preventative measures.

Hazard Identification Conclusion

We agree with the overall conclusion that PRRS virus is a potential hazard in pig meat.

However our discussion above highlights inaccuracies with the material contained in the section on Hazard Identification (**section 3** of the IRA). These inaccuracies underestimate the significance of this pathogen once it becomes endemic in a population, and the risk factors underpinning the likelihood of this occurring. Throughout the IRA these inaccuracies have the effect of underestimating the risk.

4.4 Risk Assessment

4.4.1 Release Assessment

Key points:

- ***The figures used in the IRA on the likelihood of chilled or frozen pig meat from a country with endemic PPRS harbouring the infectious PRRS virus at slaughter have been re-calculated in relevant terms, that is, in relation to volumes of pig meat likely to be imported into New Zealand. This indicates that it is inevitable that there will be infected pig meat in each 10 tonnes of meat from PRRS infected countries, if the pig meat is not treated to inactivate PRRS***
- ***Significant levels of infectivity will survive transportation and storage regimes.***
- ***The IRA underestimates the likelihood above because it overlooks the potential for older age pigs being infected and by underestimating PRRSv persistence in tissue by limited consideration of the literature and by not including PCR-based results***

Quantitative release assessment

NZPIB has examined the analytical procedures followed in the IRA.

Based on figures provided within the IRA, we have re-assessed the proportion of infected meat in relation to the volume of pig meat imported. The figures provided within the IRA show that on average there will be 3 kg of infected meat per tonne of pig meat from PRRS infected countries. The absolute risk is directly proportionally to the number of kilograms imported. To illustrate: the likelihood per tonne of pig meat, that one or more kilograms of pig meat are harbouring the PRRS virus is 0.97. The likelihood that one or more kilograms of pig meat would harbor the PRRS virus if 10 tonnes of pig meat was imported from a PRRS infected country without any treatment to inactivate PRRSv would be 1. Therefore it is certain that if the level of imports from PRRS infected countries is greater than 10 tonnes of untreated meat in any one year, that inactivated PRRS virus will enter New Zealand. Within the context of the current level of imports and their natural growth, plus developments in packaging technology to enable the supply of chilled product with an extended shelf-life, volumes far exceeding this amount is certain.

While this probability reflects pre-transportation, significant levels of PRRS infectivity are recognised to survive the likely storage and transportation regimes.

Therefore even on the basis of the figures provided in the IRA we can expect that on an annual basis pig meat imported without treatment from PRRS infected countries will be infected, if the volume of such pig meat exceeds 10 tonne. This is virtually certain given the level of imports currently. Further, we consider that various components of the figures used for the release assessment within the IRA are underestimated. Using more accurate assessments (discussed below), the level of infected meat arriving in New Zealand is even higher.

Our analysis and concerns are included in Appendix 1.

Likelihood that a pig will be infected

Section 4.1.2.1 (pages 20 to 23) details the background data used to support model assumptions for the likelihood that a pig will be infected with PRRSv based on its age. While the approach is sound, the data relies heavily on a single study conducted in Taiwan and published in 1997. The temporal dynamics of PRRS viraemia and tissue infection can be expected to vary widely due to many farm-level factors. Dee (2002) described many of these factors and lists issues such as breeding herd stability, occurrence of negative (and positive) subpopulations in infected breeding herds, gilt management and acclimatization procedures, presence of multiple diverse PRRS strains, and the recognized incidence of multiple transmission pathways (saliva, mammary secretions, in utero, inanimate fomites, and insect vectors) as challenges that need to be met in order to control the spread of disease within a farm (Dee 2002). Beyond these factors, we know that weaning age (Clark et al 1994), use of all-in all-out pig flow (Dee et al 1993), vaccination strategies (Diaz et al 2006), the extent of neonatal cross-fostering (McCaw 2000), and the adoption of multi-site segregated production techniques (Gillespie and Carroll 2003) all have an impact on the pattern of PRRSv transmission within a farm. We know nothing about these factors for the farms surveyed in the Taiwanese study and by not considering them, there exists a risk of underestimating the extent to which virus may exist in older pigs. This would significantly impact on the risk of release. The IRA needs to re-evaluate the technique to determine the likelihood that pigs are harbouring PRRSv to place more emphasis on the inevitably infected older pigs. We believe that this will more correctly assess the risk of a pig being infected prior to slaughter.

The presence and duration of PRRS viral infection

The presence and duration of PRRS viral infection/contamination in pig tissues is reviewed in **section 4.1.2.2** of the IRA. As noted above this does not consider all the relevant and current literature. Aside from not including several sources that demonstrate the propensity of the virus to exist in the pig beyond the 157 dpi maximum stated in the IRA, this report also appears to discount the value of RT-PCR based studies and instead focuses only on those studies that rely on virus isolation (VI). While PCR technology does not have the capability of distinguishing infectious virus from inactivated virus or incomplete viral particles, the value of the assay with its increased level of sensitivity relative to VI cannot be ignored. Even in the case where only a limited number of experimentally infected animals demonstrated the presence of viral RNA at 251 dpi, Wills et al suggest that "*it appears likely that in order for viral RNA to be detected up to 251 dpi., replicating virus must also be present for extended periods of time*". (Wills et al 2003).

A comprehensive review needs to be done of the currently available literature on PRRSv persistence in tissue (with inclusion of PCR-based results), and the likelihood estimates for pigs harbouring PRRSv at different ages be re-assessed, taking into account all of the published evidence. The persistence of the virus and the age of infection are both greater than the IRA recognises. Correcting the IRA for these factors will demonstrate a greater risk.

Release Assessment Conclusion

First of all, referring to the considerations listed in **section 4.1.2.5** (page 35):

i) refers to endemic situations in which animals are expected to be viraemic from 6 to 9 weeks of age. As has been shown in references noted earlier, the age at which viraemia is present is exclusively related to the age at which a particular pig becomes infected. Every farm will have a different viraemic profile based on when infection and transmission is occurring. It is more appropriate to suggest that pigs will be expected to be viraemic for at least 6 to 9 weeks after becoming infected, not necessarily from 6 to 9 weeks of age

ii) mistakenly reports that "*…duration of viraemia in natural infections being as long as 4 weeks*". Earlier references support the fact that viraemia can be expected to last considerably longer than 4 weeks, in many instances with tissue positivity existing for many months

vi) states that virus can be demonstrated in 1.2% of meat of pigs randomly sampled at slaughter (presumably based on Magar's 2004 work). We believe a more accurate number is 1.9% as stated in Magar's publication (19 of 1027 samples positive by PCR).

We consider that the conclusion of **section 4.1.2.5** understates the risk. First, the term "low" is not defined. However, it does carry the inference that the risk is insignificant or not substantive. But a risk of 1.2% is significant and substantive. "Low" is therefore not an appropriate term.

Further, as we have stated above, various of the individual components of the analysis which led to that conclusion themselves understate the risk. As a result, the likely risk is greater than is conveyed by section **4.1.2.5.**

The overall release assessment conclusion in **section 4.1.4** is literally true, because the likelihood is certainly not negligible. However, the conclusion does not accurately state the degree of risk.

First, as discussed above, the risk involved in various components of the risk model is understated. However, even relying on the IRA's own assessment, the IRA overlooks completely applying the likelihood that meat will be infected at the time of slaughter to the volume of meat which could be exported to New Zealand from PRRS infected countries. As Appendix 1 demonstrates, there is a probability of 1.0 that in every ten tonnes of meat imported from a country where PRRS is endemic, there will be meat that harbours PRRSv given, as the IRA states, it is likely that infectivity will persist during storage and transport.

As the import data on page 13 of this submission shows, over 10,000 tonnes is imported from PRRS countries. It will take a very small amount of that volume, or an increase in volume, to be imported in a form permitted by the proposed sanitary measures, for it to be certain that PRRSv infected meat will arise. It is therefore incorrect and misleading to state that the likelihood that it will arrive as “non-negligible”.

4.4.2 Exposure Assessment

Key Points:

- ***There is not sufficient information to justify the assumptions and conclusions***
- ***The nature and extent of food waste generated in New Zealand is unknown. However indications are that it is substantial***
- ***The nature of infection from infected meat is unknown***
- ***The level of compliance with the food waste regulations is unknown but it is known to be far from complete***
- ***Consumer-ready high value cuts from infected pigs are likely to have infectious PRRS virus in concentrations capable of infecting pigs***
- ***The likelihood of exposure to infectious virus in pig meat is unknown but it is known that pathways for exposure exist***

Infectivity of meat containing PRRSv

Section 4.2.2.2 (page 40) describes the expected titre of PRRSv that could be expected to be in the meat of slaughter age pigs. The IRA points out that the meat feeding trials completed by Van der Linden et al (2003), and Magar and Larochelle (2004) did not specifically attempt to determine the dose of virus administered to the experimental pigs or to determine the oral ID_{50}. Based on the limited knowledge of the subject, a more appropriate interpretation may be to simply consider infected meat to be fully capable of infecting a pig once consumed. Indeed, all pigs that consumed meat known to contain virus in the Van der Linden study became infected as did 14 of the 20 pigs in the Magar study. It is apparent that pigs can be readily infected by consuming meat known to contain PRRSv. In terms of specific cuts, or forms of meat, these studies used muscle from ham cut into 250g pieces, and shoulder cut into 263-450g pieces and found them to be capable of infecting 70 to 100% of the pigs that were exposed.

While freezing and thawing of meat has an effect on virus concentration in pig meat, the evidence does not support the view that freezing and thawing would reliably eliminate PRRS virus from imported product. In any case, the recommended sanitary measures of the IRA that (undefined) high value consumer-ready cuts could be imported means that it is very likely that the product would be imported in chilled from not frozen form. This means that the freeze-thaw effects are not relevant to the overall decision on the adequacy of risk management measures.

Likelihood of generation of raw scraps during preparation for human consumption

Section 4.2.2.3 describes the likelihood that meat scraps would be generated during preparation of food for human consumption. There is no information presented in the IRA to justify the assumptions of likelihood even though this is critical information for assessing the risk of exposure. The statements made are purely on the basis of supposition. Even a New Zealand peer reviewer for the IRA questioned it purely based on his own behaviour of generating raw scraps of pork from other cuts almost certainly qualifying as the undefined ‘consumer-ready high value cuts’.

In the limited time available, NZPIB has sought some feedback from major meat retailers on the potential for waste to be generated at retail level from consumer-ready high value cuts. While indicative only, it is clear that there is a significant level of waste generated at retail level.

As the Meat Category Manager of one of the major retail groups said "*Of course there is waste –it's not a can of baked beans*". His estimate is that retail presentation of consumer-ready high value cuts generates around 5% of 'discards' due to shelf life constraints. The common pathway is initially to discount (thus becoming lower value items, and undermining the 'high value' assumption); then if still remaining, to either dispose of it directly or in some cases, to further process or re-present in products such as mince or patties. The further processed or re-presented product may also be disposed of at the end of its shelf life. For case ready manufacturing businesses the pathway is more direct and shelf life constraints are dealt with via discounting and then if necessary, disposal.

The Exposure Assessment lacks any factual data on which it can base an assessment of likelihood of exposure to PRRSv infected meat. It is populated by assumptions. While the IRA presents a diagram illustrating the biological pathways leading from the disposal of scraps contaminated with infectious PRRS to exposure of pigs via swill feeding (**Figure 6,** page 38) it does not provide data, quantitatively or qualitatively, to assess the risk of exposure.

Section 4.2.2.4 (page 41) is entitled Conclusions and this refers to the likelihood of generating infectious scraps including volume. The IRA notes that it is not possible to calculate the minimum size of meat scrap necessary to infect a pig yet it proposes that there is probably a "*…minimum scrap size below which infection is unlikely to occur, regardless of the amount of virus present.*" It also states in the final paragraph in the section that "*…it is improbable that the volume of scraps generated from a single household at any one time will approach the relatively large quantities (500-900g) that were used in the feeding trials*".

These conclusions are flawed, given that:

- The nature of meat/food waste generated by food preparers in unknown; and
- Infection may establish by multiple routes, and claims that scrap sizes must be large enough to require chewing are purely conjectural. They are based on the unsupported assumption that infection will occur from tonsillar exposure, and that this contact is brief.
- The importance of contact time between meat and swine tonsils is unknown; and
- The size or form of meat waste consumed by pigs, as related to contact time with pig tonsils, is unknown; and
- The quantity of meat scraps generated by a household will not exceed 500 to 900g at one time is unknown and so cannot be assumed to be *improbable*; and
- The minimum quantity of infected meat (and the dose of virus contained in that meat) necessary to be consumed to result in infection with PRRSv is unknown but likely to be relatively small(far less than 500 to 900 g); and
- The methods by which meat scraps generated by a household (or commercial preparer) is dealt with is unknown. For example, it may be that waste may be accumulated over several days before disposal.
- The conclusion in **section 4.2.2.4** of the IRA is a key basis (along with assumptions about compliance with the food waste regulations, discussed below) for the proposal to not require heat or pH treatment for high value consumer ready cuts. Yet the conclusion is based entirely on supposition and absence of data. Proposing a relaxation to the current

sanitary measures, which will inevitably lead to PRRSv arriving in New Zealand, on this basis is not consistent with the statutory obligation to effectively manage risk goods.

Historical imports

We make the following points about **Section 4.2.3,** entitled *Evaluation of historical imports*:

The IRA points out that the countries within the EU that have remained free of PRRS have benefited from strict controls over the importation of live pigs and porcine genetic material. While they have imported pig meat from countries where PRRS is endemic they have legislation to impose and enforce a prohibition on feeding any vertebrate protein to farmed animals. In other words the situation is not analogous to New Zealand where controls on waste feeding are now in place on swill feeding but which require heat treating not prohibition. Significantly, as covered in Section 2.2 and referred to again below, there has been a very low level of education and enforcement of the New Zealand regulations.

The IRA notes that New Zealand had no controls over meat from PRRS infected countries during the earlier period 1998 to mid-2001, and significant volumes of pig meat from PRRS infected countries was imported. At that time the level of infection of PRRS was not as high as in these countries as currently, nor are the volumes of imports near the same level as currently.

Consistently, disease epidemics have been demonstrated to occur when the ‘dice rolls the wrong way’ in regard to enabling a probability event to occur.

Evaluation of the effect of recent changes in regulation of garbage feeding (Section 4.2.4)

Within Section 2.2 we have already highlighted that knowledge and compliance with these regulations is unknown. These regulations are very recent (mid 2005) and followed a period of no regulation. Education to date has been mainly undertaken by NZPIB and so focuses on the commercial industry. To NZPIB’s concern, there has been very minimal regulatory attention to compliance with a very low level of reactive follow up to reported suspected cases of non compliance. It is realistic to assume that compliance is likely to be low, at least in some sectors.

We do not accept that the statement *Nevertheless, even normal levels of compliance will mean that the likelihood of exposure is less than it was in the 3½ years discussed above* is accurate or appropriate. While it might be true as a hypothesis, it is of no relevance or assistance in the risk assessment process which must be done on the basis of best estimates and information about actual practice.

Waste food feeding practices

Section 4.2.5.2 (page 44) discusses the waste food feeding practices of premises housing “backyard pigs”. While there is agreement from both the NZPIB and BNZ that this sector of the industry is very likely to be feeding food waste, no data is available to describe the extent of the practice, the relative components of the waste being fed, or the degree of compliance with standards that regulate the practice. For these reasons, we believe that the conclusion that the likelihood of exposure of this sector to scraps containing infectious PRRS is “very low” is wrong. In the absence of hard data, it is imprudent to make an assumption that risk is very low. The precautionary approach should apply.

Information that discusses the practice of waste food feeding for commercial piggeries is covered in **section 4.2.5.3**. If commercial piggeries are compliant we agree the risk is zero. However while we agree that non-compliance in the commercial sector is probably less likely than the backyard sector, regretably we are aware that it is not zero. The recent experience of the PMWS incursion indicated that uncooked food waste was indeed fed.

Exposure Assessment Conclusion

Three points are of particular concern in the conclusions presented for the Exposure Assessment.

First, the point that meat scraps probably have to be large enough so as to require chewing is based entirely on supposition. The Van der Linden (2003) and the Magar (2004) studies that are referenced by BNZ and most closely relate to this issue were not designed to provide any estimates of "scrap size" necessary to infect a pig. They were conducted simply to demonstrate the potential for oral transmission to occur (which was demonstrated emphatically) but they did not in any way provide data to indicate the magnitude of meat necessary for transmission to occur. One could as easily suggest that the need for excessive chewing may lead to a *reduction* in transmission because of the dilutive effect of salivation and the effect of salivary enzymes on PRRSv survivability. The point is, no one knows the effect of meat scrap size on virus transmission.

Second, the supposition that there is a low likelihood that scraps of raw pork in quantities similar to those used in transmission studies will be present in kitchen waste from household. Aside from the complete lack of data suggesting the minimum scrap size necessary for transmission, a similar lack of data is available to support any assumptions regarding the nature, composition, or magnitude of waste meat scraps coming from NZ household kitchens. As this is a key assumption in the risk exposure path, a conservative approach needs to be adopted before assuming it to be of low likelihood.

Third, the consideration that the form of pig meat likely to be imported into NZ (and its likely processing before sale) makes it very unlikely to contain infectious PRRS virus. This is in direct contrast to the experimental data that successfully used skeletal muscle derived from either the shoulder or ham to conduct the oral transmission research. We certainly expect that skeletal muscle in 250 to 500g pieces would be part of the array of imported pig meat that ultimately ends up in New Zealand homes and commercial kitchens if the recommended range of sanitary measures is implemented. The experimental evidence proves conclusively that high value, consumer ready cuts when harvested from infected pigs are very likely to have infectious PRRS virus in a concentration high enough to infect other pigs.

The exposure assessment conclusion itself understates the risk. We agree that for piggeries that comply with the regulations, the risk of exposure to infectious PRRSv in meat is essentially zero. However, the real issue is the extent of compliance. In relation to the commercial sector, the order of compliance is unknown. In the non-commercial sector it is far from complete. As MAF has agreed, the level of education and enforcement of the regulations is very low.

The IRA conclusion that the risk of exposure is very low for noncompliant piggeries is based on supposition and lack of data. For these reasons and for the specific points summarised above, the "very low" conclusion is unrealistically optimistic.

4.4.3 Consequence Assessment

Key points:

- ***The economic consequences of a PRRS incursion are significant for the New Zealand pork producing industry and the flow-on consequences are significant for supporting services and rural communities***
- ***There is capability for transmission between farms including both commercial and para commercial, despite on-farm biosecurity.***

There are a number of inaccuracies or mis-interpretations within this section of the IRA.

Consequences of a PRRS incursion

First of all the IRA dismisses the economic consequences of the introduction of the PRRS virus as *restricted to the micro-economic effects arising from direct losses incurred at the level of individual pig farms.* We do not agree. We have attached as Appendix 2 our analysis documenting the consequences of a PRRS incursion and this involves follow-on consequences for support services including:

- feed suppliers
- transport
- abattoirs
- equipment and animal health suppliers and deliverers.

Therefore there are consequences for rural families and communities and this has economic and well-being aspects.

No attempt has been made in the Consequence Assessment of the IRA to assess the economic impact of PRRS infection within the New Zealand pig herd nor the economic and social flow on effect.

Our analysis estimates that PRRS, which is a serious and highly infectious disease of pigs, would potentially cost the New Zealand pork industry around $7.1 million per year through direct production losses only (Neumann, 2006) and around a further $12.7 million in known indirect costs in an epidemic event. In addition there is the roll-on impact on staff, rural families, rural communities and supporting industries.

Based on a 1990 study the IRA incorrectly states that the major losses are associated with the breeding herd whereas a recent study has shown that the grower herd from nursery to finish accounts for greater than 65% of the costs over time associated with PRRSv infection (Neumann et al, JAVMA 2005).

Transmission of PRRSv infection between herds

It is not correct to state that small herds have fewer clinical signs (**section 4.3.1.2** of the IRA). All pigs are equally susceptible to the effects of a particular strain. While it is true that the number of susceptible animals will quickly decline in a small herd, the clinical impact to the owner on a per animal basis remains the same. This same paragraph notes that given the type of farming environment backyard infections are likely not to be identified rapidly. In addition, small herds tend to exchange pigs extensively, thus maintaining a susceptible population within the herd and causing clinical expression to continue. For these reasons we are very concerned about the potential for PRRS to become established and transmitted before its identification.

If PRRS established in para-commercial or backyard herds, commercial herds located nearby would be exposed to infection. Even on well-managed pig farms with an explicit need for good biosecurity, the cause of a large majority of PRRS outbreaks was considered to be a result of "lateral introduction" which included the possibility of airborne spread (Torremorell et al 2004). Further, Morrison et al recently reported a significant negative correlation between the geographic distance between PRRS infected farms and the genetic similarity of PRRS viruses recovered from those farms. This suggests that between-farm spread of the virus may have been responsible for the similarity of isolates and reinforces the notion that PRRSv can be transmitted between farms (through mechanisms other than pigs or semen) (Mondaca-Fernandez et al 2006).

Furthermore we have already noted the demonstrated capability of transmission by means which circumvent on-farm biosecurity, including aerosol transmission (within our section 3.3 Hazard Identification). The Torremorell study quoted there, indicates that it is difficult to identify how most herds get infected. This is particularly relevant within the context of our discussion on the structure of pig farming in New Zealand (refer our section 3.2.2) and the inter-relationships between backyard operators through to the commercial industry. These inter-relationships involve pigs including breeding stock and semen and a range of fomites, and common points of intersection which will involve private sale, sale yards, abattoirs and exhibitions.

As was demonstrated in the Aujeszky's Disease (AD) incursion and eradication programme in New Zealand, backyard networks can maintain and transmit disease very effectively, and may escape detection by standard surveillance practices, while spreading disease into the commercial sector. The IRA does not draw on the AD experience which would have better informed its assumptions and conclusions regarding transmission of disease. The AD example demonstrated that despite MAF's starting assumption when AD was first identified in New Zealand in the mid-1970s, that it would not spread substantially or move into the commercial sector, the reality was that it spread throughout the North Island and affected a number of the largest commercial herds of the day. Because MAF had not taken action given its assumption that it would not spread, the New Zealand pork producing industry subsequently funded a successful eradication programme, with technical guidance but no financial contribution from MAF. This is a very relevant example for risk pathways for PRRS spread, which is more highly infectious and more difficult to control than AD.

The heavy reliance of the IRA on farm biosecurity to protect commercial piggeries from PRRS infection is inappropriate, not only for the reasons above, but also because it makes implicit assumptions about the level of on-farm biosecurity in operation. Farm biosecurity is good practice and strongly encouraged by NZPIB, but it is voluntary not regulated.

In section 3.3 we have already commented that Albina's assertion "*…so long as AI centres do not become infected, then control of PRRS can be achieved by standard biosecurity measures*." is no longer considered valid and explained the reasons for this. Therefore the IRA's assumption that *as long as the AI centres do not become infected the disease can be controlled by standard farm-level biosecurity measures* does not hold.

Consequence Assessment Conclusions

As was described earlier in this document, we strongly believe that all PRRS virus strains should be considered capable of causing pathology in pigs if they have not been purposefully attenuated to modify this behaviour. Despite intensive research efforts and extensive use of genomic sequences of both specific hypervariable regions of the virus and the entire genome, no one has published any laboratory assay or feature of the virus that allows us to predict its virulence. Even direct nucleotide-level comparisons of attenuated live vaccine strains of PRRS and field strains have not revealed the main virulence attributes of the virus. Aside from this, as a highly mutable RNA virus one cannot suggest that any particular strain will remain homologous with respect to its virulence after even one passage through a host. While the existence of nonpathogenic strains has been hypothesized, to consider this possibility as a key dependency in the consequence assessment is wrong. For the sake of risk assessment, we believe any incursion of PRRS virus should be assumed to result in clinical disease and have the potential to spread within and between farms.

We re-iterate that New Zealand has a large and relatively undescribed para-commercial pig industry. These pigs must be bred or sourced in some other way. Therefore it must be accepted that there is some pig breeding occurring on some of these farms, that semen is being purchased by these farms, that boars are being housed/purchased/borrowed for use on these farms, and/or that pigs are being purchased and/or sold by the farms. The degree of interaction among para-commercial farms or between para-commercial farms and commercial farms is currently unknown but it can safely be assumed that there is some degree of interaction between the two industries and that if PRRS were to become established in either, it would likely be transmitted to the other. The virus is highly infectious (as few as 10 virus particles necessary to infect a pig) and so even minor biosecurity failures or occasional contact between farms (through aerosol, semen, infected pig, or vector) will perpetuate epidemic spread.

4.4.4. Risk Estimation

Key points:

- ***It is inevitable that PRRSv will be released into New Zealand in imported pig meat from PRRS infected countries each year if 10 tonnes or more is imported, for which treatment to inactivate is not required***
- ***There is insufficient information to conclude that likelihood of exposure is 'very low'***
- ***Secondary spread will not be controlled by standard biosecurity measures***
- ***The economic consequences of a PRRS incursion are significant for the New Zealand pork producing industry and the flow-on consequences are significant for supporting services and rural communities***

Likelihood of release

We have already pointed out that the IRA under estimates the risk of release and wrongly describes it as a non-negligible likelihood of release of PRRSv in imported pig meat.

Based on figures provided within the IRA, we have re-assessed the likelihood, to establish a likelihood in relation to the volume of pig meat imported from PRRS infected countries. Even based on the IRA figures this demonstrates that on average there will be 3kg per tonne of infected pig meat from countries where PRRS is endemic. While this figure reflects pre-transportation, significant levels of PRRS infectivity are recognised to survive the likely storage and transportation regimes.

Therefore even on the basis of the figures provided in the IRA we can expect on average that every tonne of meat imported without treatment from PRRS infected countries will be infected, and it is certain that there will be infected product in 10 tonnes or more. Using more accurate assessments the level of infected meat arriving in New Zealand is even higher.

Accordingly it is inevitable that PRRSv will be released into New Zealand if treatment to inactivate it is not required.

Likelihood of exposure

We agree that the likelihood of exposure for farms not complying with the regulations is not known. However for the reasons already covered in our discussion of the Exposure Assessment, the IRA's conclusion (in the Exposure Assessment Conclusion) that it is 'very low' is unrealistically optimistic.

Likelihood of secondary spread

Our analysis does not support the IRA's conclusion that the likelihood of secondary spread to any units observing standard biosecurity measures would be negligible.

Rather international experience (refer section 4.6 earlier) with PRRS transmission has demonstrated transmission in ways that has circumvented farm biosecurity. The close proximity of commercial and para commercial herds, and particularly the New Zealand experience with PMWS in the South Island, proves the relevance of this work to New Zealand.

Consequences

We agree that if PRRS did become established the consequences for the New Zealand pork producing industry would be serious. However the IRA has overlooked the follow on consequences for rural supply services and communities demonstrated by our analysis.

Risk estimate

The risk estimate in the IRA understates the position. It completely omits the risk of secondary infection for farms complying with the waste feeding regulations and with standard biosecurity. It understates the risk for farms not complying with the waste feeding regulations. It makes no assessment of what comprises 'standard' biosecurity, and it overlooks the fact that fewer than 10% of pig herds in New Zealand are commercial and therefore likely to be applying 'standard' biosecurity.

5.0 Risk Management

Key points:

- ***In practice sectors of the New Zealand pig industry are not self contained or distinct***
- ***Available risk management options are border controls including treatment to inactivate (addressing the risk of release) and post border controls (addressing the risk of exposure)***
- ***Given the likelihood of release of PRRS infected meat into New Zealand on an annual basis and the uncertainty surrounding post border controls, border control measures are the appropriate option***
- ***Border control measures to minimise the risk of release are justified under the Biosecurity Act 1993 and international trade obligations. That is pig meat from PRRS infected countries require treatment to inactivate the virus before release into New Zealand***
- ***The use of pH adjustment is not fully supported by the available science.***

5.1 Risk Evaluation

We have already covered in some detail the reasons why describing the risk as non-negligible is inappropriate because it gives no indication of the magnitude; and also why it is impractical to base an assessment on separation between commercial and other farms. In practice separation will not be able to be achieved due to inter-actions between sectors, standard of biosecurity in place, the demonstrated ability for disease transmission to supercede biosecurity, and geographic location.

The statement of purposes of risk management measures is incomplete. Subparagraph 1 should refer to the risk that there is non-compliance with the regulations in the commercial sector. Subparagraph 2 should also state that protection is required for all farms, given the risk of secondary exposure even where standard biosecurity measures are in place.

5.2 Option Evaluation

We agree that a reduction in the risk of PRRS infection in theory can be addressed at two levels – by reducing the likelihood of release and / or reducing the likelihood of exposure.

The sanitary measures proposed in **sections 5.2.2.2 and 5.2.3** raise several concerns specifically regarding ‘consumer-ready high value’ cuts. The first issue is that there is a real practical problem in administering such a category of cuts. No definition is provided for this term. To our knowledge, it is not a term that is clearly defined in SPS or WTO documentation and as such creates a significant difficulty in managing what product would qualify for importation and also for release without treatment from transitional facilities. While dissecting carcasses into separate risk categories has been accepted for reducing risk in some cases (bone-in versus deboned as an example), the dissection standards in these cases are easily understood (by meat processors and regulators), easy to document (though auditing), and have good scientific basis (the space inside bone resists heat treatment more than does skeletal muscle). Less easily defined standards (such as removal of head and lymph nodes) have been the source of lengthy debate for the same reasons as above. To propose even further distinctions between individual pieces of meat by considering one to be high-value with others presumably considered low-value, is likely to create significant compliance issues throughout the processing and distribution chain.

Beyond the practical difficulties presented through the use of this distinction, the breadth of the science does not substantially support risk mitigation for PRRS through importation or presentation of consumer-ready high-value cuts. The evidence is clear that PRRS has a proclivity for residing in monocytes/macrophage lineage cells, and these cells (and often the associated lymph structures) are found throughout every tissue in the body. The degree to which risk can be mitigated through separation of carcass pieces into high-value versus low-value cuts is unknown and at this point should not be considered as a reasonable strategy to pursue. One of the external reviewers for this IRA points this out through inclusion of his Veterinary Record publication (accepted May 2006) entitled “An exploratory study to evaluate the survival of porcine reproductive and respiratory syndrome virus in non-processed meat”. In this study, he conclusively proved the potential for meat juice as a contaminant on a person’s hand (collected from meat that could be considered a high-value cut) contained sufficient PRRS virus to infect a pig through oronasal contact. Unprocessed skeletal muscle harvested from infected pigs has repeatedly been shown to contain adequate virus to infect pigs. To dismiss this scientific evidence by attempting to distinguish the riskiness of high-value versus low-value cuts is without basis.

We support comments made by the external reviewers suggesting the need for further research on the effects of time, temperature, and pH on PRRS virus survival in pig meat, particularly to determine whether pH adjustment in uncooked products is sufficient to inactivate the virus. Research cited in this IRA was gathered from the few available studies that have partially examined the issues. However, to date no one has undertaken the prospective research necessary to definitively determine the individual or combined effects of time, temperature, and pH on PRRS virus survival in pig meat. These variables should be expected to have a different effect on the virus in naturally infected pig meat when compared to *in vitro* work.

Section 5.2.2.2 of the IRA contains a very brief discussion of a measure which is expected to reduce the risk of exposure. As referred to elsewhere in this submission, this discussion is based on supposition and absence of data. There is no discussion of other risk pathways, such as the risk of retail downgrade or discard as a source of meat scraps. The practical problems in administering a new and undefined category of cuts at or behind the border are also significant.

5.3 Preferred option

The proposed relaxation of the current Import Health Standard, that is allowing consumer ready high value cuts to be imported without heat or pH treatment, is unjustified.

The basis for the relaxation is:

- a series of assumptions with no supporting information about the likelihood of infectious meat causing transmission,
- assumptions about the degree of compliance with the regulations, which are inconsistent with MAF’s own comments about the low level of education and enforcement of the regulations, given scarce resources,
- assumptions that the risk of transmission is negligible if standard biosecurity is followed, which is inconsistent with the international literature.

On the basis of IRA’s own data, it is inevitable that PRRSv will exist in each ten tonnes of pig meat sent to New Zealand from PRRS infected countries without treatment. The effect of the recommended measure is therefore to allow a risk good to be imported into New Zealand. However, there is no objective basis for concluding that the relaxation will maintain the existing level of protection against the risk good.

It will simply be a matter of time before the virus infects pigs in New Zealand, most likely in a para-commercial herd, and then spread to other herds, either as a result of poor biosecurity or through other transmission pathways which operate despite good biosecurity.

The proposed relaxation will therefore not provide effective management of the risk good. It is therefore contrary to the purposes of the import health standard provisions in the Biosecurity Act.

There is no basis under the Act to implement the proposed relaxation.

6.0 Other Relevant Points

The risk analysis does not meet internationally accepted standards for the conduct of IRAs and does not consider all relevant issues in an appropriate way.

6.1 *Implications for Other Hazards and Other Species*

The IRA considers only the risk associated with PRRS. Removal of the cooking requirement may expose New Zealand to increased risk from other exotic pathogens, such as *Salmonella typhimurium DT104*, which may survive in raw meat and either were not considered in earlier examinations of pig meat imports, or were not given adequate weight in relation to their current importance, where the particular pathogen has increased in risk or consequences in recent years. The Biosecurity Act requires that such issues be examined in setting import health standards and the IRA gives no consideration to other pathogens.

6.2 *Adequacy of the Risk Analysis Method*

The OIE Terrestrial Animal Health Code lays out procedures for conducting risk analyses. While this IRA claims to be a full evaluation, in reality only the release assessment has been conducted in a reasonably standard fashion, and it concludes that there is a risk which requires management. The exposure assessment, consequence assessment and recommendations on risk management options all consist predominantly of subjective opinions, and do not comply with internationally accepted procedures for conducting risk analyses.

6.3 *Welfare Implications*

The IRA makes no reference to the welfare implications on the New Zealand pig herd of a PRRS incursion. Yet PRRS has serious effects on both breeder and grower animals. All strains are capable of causing problems in both the breeder herd and grower pigs. Symptoms of reproductive failure in the breeding herd include abortions, weak born piglets, failure to farrow and sow death. In the grower herd respiratory symptoms include pneumonia, difficulty breathing, poor performance and death. The virus has the ability to cause persistent infections which in turn can make other common diseases more severe.

The animal welfare implications of a PRRS incursion need to be addressed not only for the impact on welfare and health and New Zealand’s animal health status but also for the impact on the well-being of owners and carers.

6.4 *International Comparisons*

PRRS has become established in most countries with Australia, New Zealand and Sweden and Finland being notable exceptions.

The risk of exposure from PRRSv in pig meat in the EU is more rigidly controlled compared to New Zealand because the feeding ban is a prohibition on feeding mammalian protein to farm animals and is well established and enforced. Yet this did not prevent the 2001 FMD epidemic originating from infected pig meat. In part this is because the ban is seen as only applying to processed material, not to feeding of food waste.

For Australia: as for the EU the feeding prohibition is long established and enforced, so that once again the risk of exposure is more controlled. All states and territories ban feeding vertebrate protein (consistently defined) to ruminants and pigs. For pigs, all jurisdictions except Western Australia also cast a more general obligation to take steps to ensure that animals do not have access to animal products (e.g. by disposing of thoughtfully, by keeping animals separate). Victoria and Tasmania, whilst imposing this obligation for pigs, do not explicitly state it in their ruminant ban (although ruminants must be kept away from labeled pig MBM feeds). Three jurisdictions (Queensland, Tasmania, Victoria) also make it an offence for a third party to supply animal scraps (e.g. a restaurant allowing a producer to collect its garbage). Queensland and Victoria, also make steps prior to the actual feeding (possession with intent, and collection with intent respectively) offences.

In addition, the Generic Import Risk Analysis (IRA) for Pig Meat 2004 assessed that heat treatment or specified dry curing was required to provide Australia's ALOP (acceptable level of protection) with respect to PRRSv in pig meat. The sanitary measures in place extend further because in practice importing countries with PRRS also have PMWS. These additional measures on account of PMWS require the removal of head and neck, major peripheral lymph nodes and bone from pig meat imported.

6.5 External Reviews

The IRA was reviewed at different stages by a number of overseas individuals, and their reviews have been examined. None of those who conducted the reviews were risk analysts. As well as favourable comments, criticisms and gaps were noted by the reviewers, and their views and recommendations do not all appear to have been taken into account before the document was released for consultation.

It is also important to note that the reviewers are expert scientists and so their focus was on the scientific aspects of the IRA. They have no knowledge of the New Zealand environment with respect to the adequacy of the waste feeding regulations (beyond the face value knowledge that these regulations exist) or the waste generating patterns of New Zealand processors, retailers, restaurants and households.

6.6 Precedent Set

We point out the disturbing precedent that will be set for New Zealand if the recommended sanitary measures are adopted. On the basis of a number of unsupported assumptions leading to the overall conclusion that pig meat infected with PRRSv will not reach pigs, an acknowledged source of infection would be released into the country continuously, with total reliance on post border control measures of unknown effectiveness (although the limitations are clearly recognised). Once this precedent is established, it would make it much more difficult for New Zealand to maintain other forms of border control, since the precedent could be used to challenge other border control measures.

7.0 Summary and Conclusions

7.1. Summary

The New Zealand Pork Industry Board has carefully reviewed the Import Risk Analysis (IRA) with input from its science advisers and in consultation with its New Zealand pork producing stakeholders.

NZPIB is making this submission as required under statute because it believes that the recommended range of sanitary measures, if implemented, will impact negatively on on-going returns to New Zealand pork producers, including the encouragement of further investment. Thus the recommended measures will impact on the ability of the New Zealand pork industry to make the best on-going contribution to the New Zealand economy.

We have a number of concerns with each stage of the risk analysis process in the IRA. The collective outcome of these issues is that the risk of PRRSv being released into New Zealand and exposed to the New Zealand pig herd is considerably under-estimated, and so the range of recommended sanitary measures are not appropriate to manage the risk. Furthermore, we are concerned with the undefined subjective nature of terms used to describe risk and likelihood including 'low' and 'non-negligible', and the use of the undefined 'consumer-ready high value cuts' term.

Our major concerns are covered below by contrasting the conclusion of the IRA at each stage of the process with our own analysis:

Hazard Identification

IRA:

PRRSv is a potential hazard in the commodity.

NZPIB:

- *We agree with the IRA's conclusion that PRRSv is a potential hazard in pig meat.*

But

- *PRRSv persistence in the blood and other tissue has been only selectively reported and PCR data disregarded. This underestimates the risk.*
- *The potential impact of PRRS infection in New Zealand is underestimated by not considering all the scientific literature and its specific applicability to New Zealand.*
- *The international experience demonstrating PRRS transmission by means which circumvent on-farm biosecurity is not adequately recognised.*
- *Inherent difficulties with control and eradication strongly support risk management by prevention of entry.*

Release Assessment

IRA:

Non-negligible likelihood.

NZPIB:

- *The figures used in the IRA on the likelihood of chilled or frozen pig meat from a country with endemic PPRS harbouring the infectious PRRS virus at slaughter have been re-calculated in relevant terms that is, in relation to volumes of pig meat likely to be imported into New Zealand. This indicates that it is inevitable that there will be infected pig meat in each 10 tonnes of meat from PRRS infected countries, if the pig meat is not treated to inactivate PRRS.*
- *Significant levels of infectivity will survive transportation and storage regimes.*
- *The IRA underestimates the likelihood given above because it overlooks the potential for older age pigs being infected, and by underestimating PRRSv persistence in tissue by limited consideration of the literature and by not including PCR-based results.*

Exposure Assessment

IRA:

Piggeries complying with garbage regulations essentially zero, and for other piggeries, very low.

NZPIB:

- *There is not sufficient information to justify the assumptions and conclusions.*
- *The nature and extent of food waste generated in New Zealand is unknown. However indications are that it is substantial.*
- *The nature of infection from infected meat is unknown.*
- *The level of compliance with the food waste regulations is unknown but it is known to be far from complete.*
- *Consumer-ready high value cuts from infected pigs are likely to have infectious PRRS virus in concentrations capable of infecting pigs.*
- *The likelihood of exposure to infectious virus in pig meat is unknown but it is known that pathways for exposure exist.*

Consequence Assessment

IRA:

Spread between farms only likely if there are biosecurity lapses.

Direct losses on affected farms, otherwise negligible.

NZPIB:

- *There is capability for transmission between farms including both commercial and para commercial, despite on-farm biosecurity.*
- *The economic consequences of a PRRS incursion are significant for the New Zealand pork producing industry and the flow-on consequences are significant for supporting services and rural communities.*

Risk Estimation

IRA:

Non-negligible for small, non-commercial or marginally commercial breeding herds not complying with garbage feeding regulations and herds with inadequate biosecurity.

NZPIB:

- *It is inevitable that PRRSv will be released into New Zealand in imported pig meat from PRRS infected countries each year if 10 tonnes or more is imported for which treatment to inactivate is not required*
- *There is insufficient information to conclude that likelihood of exposure is 'very low'*
- *Secondary spread will not be controlled by standard biosecurity measures*
- The economic consequences of a PRRS incursion are significant for the New Zealand pork producing industry and the flow-on consequences are significant for supporting services and rural communities

Risk Management – including risk evaluation, option evaluation and recommended sanitary measures

IRA:

Measures could be applied to protect industry sector at risk or other farms via secondary exposure.

Measures to address likelihood of release and exposure recognised as options. In terms of reducing likelihood of release, options identified are removal of high risk tissues, sourcing pig meat from stabilised herds, and heat treatment and curing to inactivate PRRSv.

In terms of reducing the likelihood of exposure, the option identified is to minimise trimming.

Recommended sanitary measures are heat or pH treatment, or release as undefined ‘consumer-ready high value cuts’.

NZPIB:

- *In practice sectors of the New Zealand pig industry are not self contained or distinct*
- *Available risk management options are border controls including treatment to inactivate (addressing the risk of release) and post border controls (addressing the risk of exposure)*
- *Given the likelihood of release of PRRS infected meat into New Zealand on an annual basis and the uncertainty surrounding post border controls, border control measures are the appropriate option*
- *Border control measures to minimise the risk of release are justified under the Biosecurity Act 1993. That is, all pig meat from PRRS infected countries require treatment to inactivate the virus before release into New Zealand*
- The use of pH adjustment is not fully supported by the available science.

7.2 Conclusions

The statutory purpose for the issue of import health standards under the Biosecurity Act is the effective management of risk goods. In having regard to the relevant criteria in section 22 of the Act, the Director General must exercise his powers to achieve this purpose.

The IRA contains a wide-ranging review of the scientific literature. However, the recommendation to relax the current standards by permitting the import of untreated “high value consumer ready” cuts is inconsistent with the statutory purpose.

The IRA release assessment conclusion that the likelihood of infectious meat arriving from PRRS endemic countries is “non-negligible” is literally true in respect of any particular kilogram of imported meat. However, the conclusion is misleading because it is certain, given the level of imports, that infected meat will arrive. On the IRA’s own data, it is certain that each 10 tonnes of meat imported from PPRS endemic countries without treatment to inactivate the virus will contain at least 1 kilogram of infected meat.

Accordingly, the proposed relaxation in the sanitary measures to allow “high value consumer ready” cuts to be imported without treatment will result in the inevitable importation into New Zealand of the risk good. This is prevented at present by the current sanitary measures.

Such a relaxation will only be appropriate if post border control measures produce equally effective management of the risk achieved by the current border control measures.

However, the IRA’s conclusion that the risk arising from its proposed relaxation will be negligible is flawed:

- the extent of compliance with the waste food regulations is unknown but far from complete. MAF acknowledges that education about the regulations has not achieved the result MAF intended, and that resources for compliance are scarce;
- the assumption that the risk of infection from the untreated high value consumer ready cuts in piggeries not complying with the regulations is negligible is based on pure supposition and lack of data about the amount, manner, and duration of consumption of waste which causes infection, and the likelihood of scraps being generated;
- the risk of transmission between herds is underestimated, given proximity and interactions between and within commercial and para-commercial herds, the unknown and far from complete extent of compliance with what are voluntary standard biosecurity measures, and international experience of transmission despite good biosecurity measures;
- the category of “high value consumer ready” cuts is not administratively defined and therefore raises obvious difficulties in enforcement.

The proposed relaxation would amount to a positive decision to reduce the effectiveness of sanitary measures at the border, and to take the risk of relying on post border compliance with the regulations and standard biosecurity practice. However, the proposed relaxation is based on assumptions, lack of information and a mistaken view about the risk of transmission despite good biosecurity.

The proposed measures would result in significantly less protection than the current measures. It would simply be a matter of time before an incursion. The proposed measures would therefore not provide effective management of the risk good in accordance with the Act.

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Appendix 1 Risk Assessment Method

The risk assessment method has serious flaws which undermine its value, as currently presented, in determining an appropriate import health standard:

- the meaning given to terminology used to describe the likelihood of an event or the pathway is not stated. For example, what constitutes 'low' risk?
- the unrestricted risk has not been estimated and so it is not possible to estimate the degree to which control strategies reduce the risk, or the extent to which risk management procedures need to be monitored to ensure compliance;
- the unit of interest is not defined (e.g. pig, kilogram of meat or tonne), and hence the analysis does not give any consideration to volume of trade and the way in which that influences risk;
- no information is provided to describe how steps in the pathway were combined to estimate the likelihood of entry and likelihood of entry and exposure;
- no matrix is provided to indicate how the consequence, and the likelihood of entry and exposure were combined to estimate the risk. In fact, it appears that only the release assessment was conducted according to standard procedures (although with the deficiencies noted above), and the other components of the assessment are subjective opinions, unsupported by standard analytical procedures. These are the exposure assessment, the consequence assessment and the unit risk (per unit of trade and per year).
- the assessments made of risk management methods are also subjective, and make no attempt to examine the effect on risk of either the recommended policy or alternatives which could have been adopted, and no final risk of the proposed policy is estimated.
- in this model, the probability of infectious PRRS virus being present in meat at the time of slaughter and the probability that the pig was infected prior to slaughter were multiplied together to determine the probability of harbouring infectious PRRS virus at slaughter. In doing this, a stochastic approach is used to calculate this step. This makes the analysis appear more comprehensive than it really was, since only the expected value (mean) is reported. The standard deviation should have been reported in order to correctly represent a stochastic modelling process – effectively the analysis has been reported as if it had been done deterministically, and makes no attempt to describe the effects of variability or uncertainty.

Other concerns with the model are that:

- the model did not included variability in the prevalence of PRRS infected in each age group, the duration of viraemia and the persistence of viraemia. Failure to include variability is likely decrease the estimated number of infected animals at the time of slaughter.
- in estimating the prevalence of viraemia in pigs within each age group, a weighted average was used that appears to include data from non-infected farms. It could be argued that the input values should have been a weighted average of farms with PRRS infection because the model is trying to estimate the age of infection, given the animal is infected. Therefore, only data from farms with one or more infected animals should have been used.

Annual risk

If high value cuts are obtained from multiple animals for importation, and combined into a shipment, then we can say the likelihood that a randomly chosen kilogram of pig meat harbouring the PRRSv is 0.003. So on average 3 kg of every tonne imported will be infected

The absolute risk is directly proportionally to the number of kilograms imported and can be calculated using the following equation:

$$1 - (1 - P)^n$$

Where P = Probability that each kg of meat is infected (i.e. 0.003) and n = number of kilograms imported.

Using this equation, the likelihood that one or more kilograms of pig meat is harbouring PRRS virus, per tonne of pig meat, is 0.97 and the likelihood per 10 tonnes is 1.0 with a negligible confidence interval. Hence the annual risk of entry of PRRS virus to New Zealand is 1.0, with a negligible confidence interval.

Appendix 2 Consequence Assessment

1. Background

The pig industry in New Zealand is small by world standards. However it is a significant player in the New Zealand meat sector and the total value to the New Zealand economy is estimated to be around $725 million (Anon, 2004). The annual production of pork in New Zealand in 2004-05 was 50,845 tonnes (based on bone-in equivalent weight). This production volume contributed to around 62% of the domestic supply of pork and was valued at approximately $170 Million (based on MAF estimates) at the farm gate.

Further to this the number of people employed in pork production on commercial farms is estimated to be around 450. Additionally, many communities have a level of financial dependency on rearing of pigs in varying scales of operation down to lifestylers. The direct livelihoods of all these people are likely to be affected by the incursion of an exotic disease to greater or lesser extent. Equally important will be the welfare concerns of the sick pigs and the emotional well-being of the people caring for the ill pigs in an PRRS outbreak situation.

2. Anticipated losses due to PRRS

PRRS has been estimated to cost the New Zealand pork industry $NZ 7.1 million per year as a result of direct production losses (Neumann, E, 2006). This estimate does not include costs associated with increased veterinary costs, increased monitoring and diagnostic costs related to managing PRRS, or increased losses accruing from endemic diseases as a result of PRRS tendency to make other diseases more severe. These have not been estimated but would be substantial to the producers.

2.1 Effect to local economy

In the case of an exotic disease incursion that affects the economic viability of the New Zealand pig industry, there will be related financial losses in businesses associated with the pig industry:

- Transport operators are key participants in the pig industry as they are involved in both delivery of inputs to the farm and movement of pigs to abattoirs or other farms. The transport activities are important to freight operators because of their regularity and their timely imperative. Pork production operates on a weekly basis and as such provides regular work for freight companies and other service providers.
- Cereal grains make up 80% of the feed inputs to a pig unit and as such the pork industry is a major user of cereal grains (estimated usage of 180,000 tonnes per year). Providers of other feed ingredients will also be affected.
- Local abattoirs, often purpose built for pigs, depend on the weekly supply of pigs in order to remain a viable employer for the local community.
- Other local businesses that would be affected by an exotic disease incursion include those supplying animal health, electric power, vehicle and equipment servicing, and building and facilities maintenance.
- Suppliers of breeding stock to individual farms will be affected as will couriers that attend to the weekly deliver of semen for artificial insemination.
- Local employment, business confidence, and community liveliness will all be affected.

Apart from these direct economic effects on the local community, additional costs as mentioned below would be substantial.

2.2 Pork Industry related costs

- Costs related to managing quarantine, movement control, and increased surveillance.
- Costs related to carcass disposal and piggery disinfection.
- Costs related to the inability to market/source pigs due to implementation of movement control.
- Loss of income due to the closure of individual piggeries for a given period.
- Negative effect on consumer perception related to diseased pigs could affect demand of pork and be reflected in lower overall price. This would further reduce the viability of individual pork production businesses.

2.3 National costs

- If restricted area and zoning is established, movement control could possibly have some impact on other meat producers.
- Possible erosion of New Zealand's high health status.
- Possible effect on export certification of other livestock such as the introduction of more stringent certification and testing requirements.

Apart from all the above costs there could also be damage to the environment due to excessive use of sanitizers and antibiotics.

Garner et al. (2001) in their estimation of the impact of PRRS on the pig industry of Australia have reported a 21-31% reduction in the expected gross income following disease epidemics within the selected region, based only on lost production and disposal costs. Our estimates of all known costs (indirect) based on assumptions as stated in appendix 1 is around $12.7 million in an epidemic event. In conclusion we estimate total costs (direct and indirect) to be substantial if the opportunity to maintain the current health status is compromised.

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ESTIMATED COSTINGS FOR NEW ZEALAND

Description	Assumption	Cost ($M)
DAMAGE TO ENVIRONMENT		
Increased use of disinfectants for sanitising infected piggeries.		Unknown
Increased use of antibiotics.		Unknown
Mass burial of carcassess (if decision to stamp-out by mass euthanasia).		Unknown
OTHER COSTS		
Costs related to managing quarantine, movement control, increased surveillance		Unknown
Veterinary costs		Unknown
Costs related to disposing carcasses and piggery disinfection.	10% of herd affected in Canterbury area.	1.80
Costs related to the inability to market/source supply of pigs due to implementing movement control.	Drop in schedule price for 4 weeks, with whole of Canterbury under controlled area.	0.71
Negative effect on consumer perceptions causing reduced sales and therefore negative effect on price.	5% drop in retail value nationally for 8 weeks.	5.01
Higher production cost and low returns due to disease will cause structural changes to the industry forcing out many operating at a margin affecting employment, business confidence, and community liveliness. Also included loss of demand for	2% loss of Canterbury region's farm gate value.	2.23

goods and services specifically used for the pig industry.		
Loss of income from closure	Closure of 2X250 sow farms	1.80
OTHER COSTS (NATIONAL)		
If RA and zoning is established movement control could have some impact on other meat producers.		Unknown
Financial losses incurred by sale yards / abattoirs/ transporters due to drop in pig numbers.	5% drop in pig kill for Canterbury area.	1.14
Erosion of New Zealand's high health status.		Unknown
Possible effect on export certification of other livestock such as the introduction of more stringent certification and testing requirements.		Unknown
TOTAL KNOWN COSTS		**12.7 Million**

General assumptions: Calculations based on an epidemic event specific to Canterbury area (covers Canterbury, Ashburton, and Temuka) affecting 10% of the herd.

31. CARLY SLUYS

Introduction

Federated Farmers of New Zealand (Inc) welcomes the opportunity to make a submission on the Import risk analysis: Porcine reproductive and respiratory syndrome (PRRS) virus in pig meat.

Federated Farmers is an industry organisation that represents approximately 17,000 farmers and various other rural businesses. The federation has a long and proud history of representing the needs and interests of New Zealand's farming communities, primary producers and agricultural exporters. Within our membership we have 83 members who are pig farmers, with a further 86 members who have indicated they have a special interest in pigs.

The Federation aims to add value to its members' farming business by ensuring that New Zealand provides an economic and social environment within which our members may operate their business in a fair and flexible commercial environment.

Safeguarding New Zealand's biosecurity is a critical issue for the primary sectors of New Zealand agriculture. New Zealand's unique biosecurity status and freedom from serious diseases gives us a major competitive advantage in a highly subsidised global market, with almost 60% of our exports and 20% of our GDP dependent upon efficient and healthy primary production. While the New Zealand pork producing industry has maintained a predominantly domestic focus because internationally it is a relatively high cost producer due to feed costs in particular, it has a significant productivity advantage associated with its favourable disease status.

Summary of Recommendations

Federated Farmers has major concerns regarding the specific implications for the New Zealand pork producing industry and more generally for the precedent set for managing biosecurity risks to New Zealand.

Federated Farmers recommends that the current import standards remain in place. Federated Faremrs do not support the options proposed which remove border protection against PRRS infected meat being released into New Zealand. The reliance on post border measures is unacceptable, due to the unknown practices in regard to the quantity of waste generated from potentially PRRS infected consumer-ready high value cuts and the unknown levels of compliance with the Biosecurity (Meat and Food Waste) Regulations 2005.

Federated Farmers recommends that the current import standards must remain in place unless and until the risk analysis can establish that the risk of PRRS infection of the New Zealand pig herd can be effectively controlled in other ways. This would require at the least:

No assumptions made or 'unknowns' in regard to the level of control established by post border measures;

An investigation in to the pathways by which waste meat may be generated and distributed, including the level of compliance with the Biosecurity (Meat and Food Waste) Regulations 2005:

The term 'consumer-ready high value cuts' is clearly defined.

As a general principle Federated Farmers strongly supports the implementation of necessary border control measures to ensure that exotic sources of infection are not imported into New Zealand, as set out in the Biosecurity Act 1993 (section 22).

General Comments

New Zealand's unique biosecurity status and freedom from serious diseases gives us a major competitive advantage in a highly subsidised global market. The ability of New Zealand to maintain this advantage is not only paramount to Federated Farmers members, but to New Zealand as a whole.

At the extreme level of severity, the outbreak of a disease such as Foot and Mouth Disease would halt all exports of meat, animal by-products and dairy products and not resume until at least three months after the slaughter of the last infected animal. The country's trade reputation would be damaged, unemployment would rise (up about 20,000 jobs) and the Gross Domestic Product (GDP) would lose $10 billion over a two year period[1].

As a general principle, Federated Farmers strongly believes that prevention is more effective than eradication. Allowing the importation and release into New Zealand of infected meat, with reliance on unknown levels of compliance with post-border controls can only increases the risk of an outbreak. This may be setting a dangerous precedent for New Zealand which may have serious consequences for farmers and the whole economy..

We strongly believe the highest priority needs to be placed on retaining the healthy and favourable disease status of New Zealand's pigs. New Zealand is entitled to set border control measures to protect it from the likelihood that exotic organisms may be brought into New Zealand. New Zealand pork producers with their knowledge of the dynamics of pig ownership and activities, and food waste feeding practices do not believe that the risk analysis has correctly assessed the New Zealand environment. Federated Farmers does not therefore accept that the Risk Analysis is factually based.

[1]Foot and Mouth Disease**:** http://www.biosecurity.govt.nz/pest-and-disease-response/pests-and-diseases-watchlist/foot-and-mouth-disease

Specific Comments

Reliance on Post Border Measures

The range of proposed sanitary measures to manage the risk of PRRS infection of the national pig herd includes the option of allowing PRRS infected meat into New Zealand. While the risk analysis recognises that such pig meat has the potential to infect naïve pigs by ingestion based on scientific research, it assumes that the risk of infection can be managed by post border measures. These post border measures rely on the assumption that every owner of a pig knows that feeding of uncooked meat including pig meat to pigs is illegal as required by the Biosecurity (Meat and Food Waste) Regulations, and complies with these requirements. Furthermore it considers that even if owners of pigs (as distinct from commercial pork producers) transgress the regulations it will not impact on the commercial pig herd because commercial pig farms are able to protect themselves by adopting on-farm biosecurity measures. This latter point is based on a discussion of aerosol spread which does not acknowledge that the source of PRRS transmission internationally is commonly unknown and may supersede farm biosecurity measures. This is particularly relevant to the New Zealand situation where commercial pork producers co-exist alongside other farmers who own a few pigs, and where there is significant outdoor farming in areas such as Canterbury and South Canterbury. It is impossible for farmers to maintain biosecurity measures that fully protect their pigs against infection pathway such as air borne spread and birds.

Throughout the risk analysis certain assumptions have been made on human behaviour without any factual basis. Humans are unpredictable creatures by nature, and experience many varied situations. On what basis, for example, has the volume of pig meat scraps generated from a single household not exceeding 500g – 900g (Section 4.2.2.4 pg 41) been assessed as 'improbable'? There are no statistics to provide validity to this statement. No variability in households' routine has been taken into account for, such as a time in which a household may increase in its members, during the holidays etc, where more scraps are likely to be produced.

High Value Cuts

Federated Farmers have considerable difficulty with the use of the term consumer-ready, high value cuts of meat. This term is not defined and yet it is central to understanding the impact of the proposed measures. There is no justification offered for the statement... *in the case of consumer-ready cuts of pork, it is considered that there is negligible* likelihood of meat scraps being generated prior to cooking (section 5.2.2.2, p55). Does BNZ have information to support this consideration? What about product that is close or past its 'use by' date? The risk analysis as presented is incomplete because it has not addressed and assessed the extent to which waste meat may be generated via the range of sanitary options proposed and therefore has not fully addressed the risk.

Animal Welfare Implications

Another concern is the animal welfare implications of lessening justified measures to protect against a disease incursion. PRRS is a pig disease with severe welfare implications. The disease is known to have the following effects:

- Reproductive failure in sows.
- The birth of stillborn and mummified piglets.
- Respiratory diseases.

- Mortality.

Allowing infected meat into New Zealand, which is a known source of infection to pigs, with reliance on unknown compliance with post border measures, will increase the risk of an incursion. The pork industry is currently dealing with the recent arrival of PMWS. An incursion of another disease for which the on-farm impact is synergistic with PMWS, not only places the animal's welfare under further strain, but places the industry under more pressure.

Precedent for allowing other infected meat into NZ

Federated Farmers is concerned at the precedent this may be setting for future biosecurity import health standards. New Zealand is entitled to set sanitary measures to protect it from incursions of exotic diseases. There are sanitary measures currently in place which require that pig meat from countries where PRRS is endemic must be treated before being released in New Zealand. Import figures show that imports of pig meat have grown substantially since these measures were put in place. Federated Farmers do not support the principle of reliance on post border measures when pre-border measures are justified . Exclusion is a more effective method to manage risk. We especially do not support reliance on post border measures in this case when there are so many unknowns and assumptions in regard to establishing and assessing potential pathways for infection of the national pig herd.

We are also extremely concerned about the position taken in this risk analysis because the feeding of waste, including meat to pigs, is a vector for a number of potentially devastating diseases including FMD. It could be that this risk analysis is setting a precedent for allowing infected meat into the country, given that regulations prohibit the feeding of uncooked meat to pigs. However, these regulations are un-policed and the extent of knowledge and compliance is unknown. Most critically, other countries would be in a position to exploit this post border risk mitigation method given that a precedent has been set.

We are also very concerned at the implications of this precedent for the future of rural communities. The New Zealand pork producing industry while a compact industry itself is serviced by considerable levels of support including feed supply, equipment supply and maintenance, and slaughterhouse capability. We are aware that the industry is very actively working to ensure a higher level of control against a PRRS incursion given that PMWS has recently established in New Zealand. It is therefore totally counter productive to lessen border controls on sources of infection.

32. DR EBM WELCH

I am a practicing registered Veterinarian who services only the pig industry as a private practitioner and production consultant. I consult directly to approximately 20% of the "commercial" pigs present in New Zealand.

With reference to the above document, I would like to raise the following concerns:-

In the Executive Summary, Point 1. "There is a low likelihood that chilled or frozen pig meat from a country with endemic PRRS will harbour the virus when imported into New Zealand."

> The Import Risk Assessment (IRA) itself quotes Magar and Larochelle (2004) who found that 1.2% of randomly tested carcasses were infective in a Canadian survey.

> Have et al. (the EFSA Journal 2005, 239, 1-85) in their risk analysis assumed that 1.9% of carcasses would be infective.

> The IRA discusses the likelihood of slaughter age pigs being viraemic and infective at the time of slaughter with limited references but pays insufficient attention to the fact that newly infected "epidemic" herds will have pigs of all ages infective.

> The IRA appears to have overlooked work by authors such as Mateusen et al. (2002) and Dewey et al. (2004) amongst others, both of which illustrate the fact that in some herds exposure, seroconversion and thus infectivity of individual pigs in grower herd populations can occur at older ages often coinciding with slaughter age.

> It is commonplace to introduce PRRS negative breeding stock into PRRS positive herds in PRRS affected countries on an ongoing basis with average breeding herd replacement rates in excess of 50% per annum. Of these breeding gilts a significant proportion will be culled prior to mating for various reasons including infertility, locomotor, "mating target all ready met" etc. and these will enter the food chain as slaughter-weight pigs at the time when they are possibly most viraemic and infective, having recently encountered the PRRS virus. These would account for say 0.25% of pigs slaughtered from an average production unit killing at over 110kg liveweight (as occurs in most PRRS positive countries supplying New Zealand.)

> In consideration of the above points and in light of the fact that 40% of pig meat consumed in New Zealand is imported, this is by no means a "low likelihood." At 1.2% infective carcasses this equates to around 440 tonnes of infective pig meat imported annually.

Point 2. "Since Cooking Inactivates PRRS virus …..It is concluded that an exposure pathway would exist only on pig farms that were not complying with the garbage feeding regulations."

> From my experiences working within the industry the level of compliance with the aforementioned regulations is uncharacterised at best and poor at worst, and a number of pig farmers (ranging from backyard to small-scale commercial) have difficulty in consistently complying, and have insufficient motivation to always comply (neither positive or negative rewards being particularly compelling.) The increasing amount of food waste being generated goes into this "system" which remains poorly monitored and characterised to say the least.

> It is very difficult for both government and industry bodies to control the activities of such individuals and such behaviours are likely to only subside after many years of education and rigorous enforcement, neither of which has been embarked upon in New Zealand to date. It

would take a long time to precipitate a "change of culture" as has occurred in Europe over the generations.

> In backyard operations these regulations are most likely frequently disregarded and this sector still produces pigs that go into other farms in the "network" and either directly or indirectly culminate in weaners that enter sale yards for on-sale to small scale commercial operations that network with other like operations. Breeding sows and boars also move freely between the backyard and semi-commercial farms. The MAF exotic disease investigators are partly aware of these "networks" from their experiences in the PMWS and Brucella suis investigations amongst others.

> At recent producer meetings to outline the progress of PMWS it became apparent on a number of occasions that a few members of the audience were unaware that it was illegal to feed uncooked pig meat to pigs despite the Pork Industry Board having publicised the fact. These were generally law-abiding people acting in ignorance. The less conscientious operators are less likely to attend such meetings or avail themselves of such changes in regulations, which have not been well publicized at all.

> For all of the above reasons it is very clear that the risk of introduction of any disease, including PRRS, via "garbage feeding" is substantial. The recent discovery of imported fresh Korean pig meat having illegally entered New Zealand by commercial channels and being detected six months after its entry raises concerns about the risk of introduction of PRRS, FMD and a number of other diseases.

> BNZ needs to develop a far more thorough understanding of the status quo within New Zealand with regard to feeding uncooked meat to pigs before it can confidently include this step of the risk assessment process in this and other IRAs.

Point 3. "If pig farms in this country did become infected with PRRS through the illegal feeding of uncooked imported pig meat, the likelihood of spread to other farms would be low as long as standard biosecurity practices were observed."

> This is possibly the most inaccurate and potentially embarrassing statement in the document and highlights insufficient reference to and understanding of the "field" situation in countries into which PRRS has penetrated, as well as of the population dynamics of the New Zealand pig population. The industries of Europe and North America have biosecurity standards far in advance of those in the New Zealand pig industry (in which biosecurity is virtually non-existent apart from in breeding herds at the top of the pyramid and the medium to large scale commercial operators) and yet PRRS has successfully penetrated these industries to up to 80% of their National Herd. This is without the weaner networks and high-risk practices that are commonplace in the small-scale and commercial pig sector of New Zealand, which have evolved under disease-free circumstances allowing them to do so.

> The Pig Scientific literature is littered with papers on how successfully PRRS moves between herds. It is now becoming commonly considered in North America, for example, to filter incoming air into pig breeding operations to reduce the risk of a new strain of PRRS entering the herd despite relative geographical isolation. Furthermore there is evidence that insects are likely to be able to act as vectors for transmission of PRRSv (Boorman et al 2003; Otake et al 2003.)

> The list goes on, but the fact remains that PRRS is one of the most successful diseases in the pig world when it comes to propagating itself. For BNZ to fail to recognize this against the background of a highly vulnerable New Zealand pig population is a major oversight.

> There is a large amount of evidence available that would refute this statement and I strongly suggest that this be reviewed and modelled (with the help of skilled epidemiologists familiar with the PRRS virus) and re-written with more accurate expert guidance and field information.

> As for New Zealand's ability to detect a new PRRS incursion in time to prevent further spread, the fact that PMWS is known to have been present in New Zealand for at least 2 years in a network of small-scale "commercial" herds before it was detected in 2003 speaks for itself in this regard.

> Recent observations of how effectively and devastatingly PMWS has moved through the pig industry have been very sobering and a good predictor of how PRRS will do the same. Within less than a year the percentage of the commercial industry (by pig numbers) affected by Type 3 (epidemic) PMWS has increased from ~1% to over 10% of the industry (unpublished, Lawton, Welch, Dobbinson, Sept. 2006) and spread appears to be ongoing. Between outdoor herds in the South Island this spread has been particularly effective, it is assumed with seagulls' webbed feet acting as a mechanical vector as they fly between sow herds at feeding time. This could quite easily be repeated with PRRSv. PMWS has moved between farms, as in other countries "like a propagating epidemic" with a distinct commencement date, an acute phase and a chronic phase assisted by developing breeding herd immunity. PMWS and PRRS would combine most ably and synergistically on affected farms to destroy the favourable disease status that the New Zealand pig industry has enjoyed to date.

Point 4. It is acknowledged that the risk of PRRS in imported pig meat is non-negligible. Yet clearly any importation from a PRRS positive country poses a risk, and yet the IRA proposes that untreated pig meat may enter in the form of "consumer –ready high value cuts" or be further processed on arrival in an officially approved facility.

> This implies that "consumer-ready high value cuts" (which are not adequately defined in the IRA) do not pose a risk of introduction of PRRS virus due to the fact that they contain less virus and that they are less likely to be fed un-cooked to pigs. While both of these are true, there is no support for the assumption that the reduction in risk is enough to justify the recommendations.

> The EFSA report (Have et al, 2005) supports the IRA's view that the risk is non-negligible. Indeed it is surprising and concerning that this report, which pre-dates the BNZ IRA by a year, and which is probably the most politically significant document on the subject, is not referred to in the IRA.

> The fact that the IRA concludes the "Case-Ready High Value Cuts" and the like should not require transitional cooking implies that these are not expected to be fed to pigs. This is inaccurate. As a trained food safety auditor in which my training was completed with human food safety professionals I can attest to the fact that operational standards currently employed for all public and hospitality food preparation are vastly increased over previous standards under the imposition of Codex Alimentarius and the HACCP principles generally applied to food preparation. This results in a large number of different types of "hazards" of various description and multiple reasons for failure of food product at Critical Control Points in the food safety chain, sometimes for reasons no greater than a thermometer reading being out of range, past use-by date, foreign body found in one sample and the like. Accordingly the amount of fresh uncooked meat that is required to be rejected for human consumption is greater than it has ever been, trimmed or not. Often this gets put in the "bin out back" which then gets collected by the helpful local pig farmers. BNZ should cater for this in the IRA.

> It appears to be generally accepted that insufficient information is available about the required infective dose when meat is administered via the oral route, although it is considered to be low (Have et al EFSA report) and that infection would need to occur prior to the meat reaching the gastric acid. It is also accepted that infectivity of meat if fed to pigs is present well below the limit of detection of the PRRS virus in meat, as outlined in the IRA. I suggest that before any conclusions are reached in this respect there are three major factors that should be considered, namely:-

o On many farms on which “garbage feeding” is practiced, it is common for these pigs to consume various types of traumatic foreign bodies including knives and forks, toothpicks, fish-bones, chicken bones etc. As an example, on some units that feed bread a significant cause of morbidity (and occasionally mortality) when procedures become careless is the damage caused by the ingestion of the plastic wrapper clip, which has sharp edges. These foreign bodies would lead to excoriations and ulcerations of the oral, pharyngeal and oesophageal mucosa that would be potential entry points for PRRS virus, most probably with a lower infective dose than if they were not present. This should be taken into consideration in any risk assessment.

o With the rate of genetic improvement of commercial pigs the modern “commercial pig” is capable of extremely efficient conversion of feed to pig meat with very lean carcasses and thus has a requirement for very highly concentrated macro- and micro-nutrients. These genetics are making their way onto garbage-feeding and backyard units with their high nutrient demands. When these demands do not get met the result is that such pigs are more prone to becoming immunocompromised than their fat, hardy predecessors of past decades. This level of immune compromise should also be considered when researching or interpreting research on likely infective dose, which is generally done on fat, healthy pigs under prisitine research conditions

o The suggestion that chewing is necessary for infection to occur is inaccurate. When presented with swill, pigs will mix it up, partly chew it and spit it out, stand on meat scraps and generally macerate the meat, liberating infectious particles into the “swill.” If they are presented with more food than they can consume at one sitting (which is very common) they will lie and play in their food, resulting in potential infection through external wounds such as tail-bites, pressure sores, foot lesions, greasy pig disease skin lesions and so forth. This should also be considered.

On page 50 the review states that the fact that Sweden, Finland and New Zealand have remained PRRS-free to date despite PRRS positive importations are supportive of the fact that the risk is low. This does not consider the fact that compliance with garbage feeding regulations in Sweden and Finland are relatively high. They also should not be used as objective evidence supporting low risk in the New Zealand situation any more than the fact that Wellington not having had a major earthquake in the last 10 years should not be used as support for a relaxation of preparedness for an earthquake in the future.

I strongly urge Biosecurity New Zealand to re-examine their conclusions as outlined in the Executive Summary to take into consideration more fully the risks present to the health status of the New Zealand pig industry as well as New Zealand’s international reputation as a country willing and able to keep out such exotic diseases. The current conclusions are not consistent with the facts available and the Status Quo prevailing in the New Zealand pig industry, and would, in my view, put the industry’s health status at unnecessary risk. Transitional cooking is not a trade barrier (as evidenced by the increase in imports,) it is simply a Biosecurity precaution. I am puzzled and alarmed by the failure to apply it.

In simple terms, the economic consequences have been under-estimated, the risks grossly under-estimated through lack of understanding of the situation and standards have been applied that set a very dangerous precedent for the future of New Zealand Biosecurity.

33. DR DAVID LAWTON ET AL

This submission has been written by the current committee of the New Zealand Pig Veterinary Society (a Special Interest Branch of the New Zealand Veterinary Association) following canvassing of, and contributions from, its 49 members.

Biosecurity New Zealand has recently released a document entitled “Import risk analysis: Porcine reproductive and respiratory syndrome (PRRS) virus in pig meat” in which changes to the current sanitary measures that are imposed on imported pig meat into New Zealand are proposed. Namely, it is proposed that the current cooking or pH change requirements that are imposed on pig meat imported from countries where PRRSV is endemic need no longer be applied to “high value, consumer ready cuts”, whether these (1) are imported directly or (2) are derived from other pig meat in an officially approved facility once in New Zealand.

We are very concerned by these proposed changes for three reasons:-

1 They are based on the assumption that infected pig meat is unlikely to be fed to pigs. We consider this assumption to be wrong and that it sets a very dangerous precedent for the management of exotic diseases in New Zealand

2 Our considered opinion is that the proposed changes do not adequately manage the risk of PRRSV entering and establishing in New Zealand. If applied, the changes are such that the introduction would only be a question of “when” rather than “if”.

3 There is insufficient data available to support the notion that “trimmed meat from high value, consumer ready cuts” is less infective than tissue from the rest of the carcass or that such trimmed meat is less likely to be fed to pigs. In the absence of these data the contention that such meat presents a negligible risk is unsupportable.

We consider the proposed changes surprising given the content of the analysis itself. Firstly, it identifies PRRSV as a hazard and then presents data which indicates that a significant portion of untreated pig meat from countries with PRRS will contain viable virus at its point of use. Our surprise is heightened by the reliance Biosecurity New Zealand is prepared to place on the assumption that individual pig keepers will not feed this meat to pigs.

As a society whose members service many sectors of the rural community in New Zealand, in addition to commercial pig farmers, we are familiar with the all too common practice of keeping a few pigs “out the back” to eat the household scraps and provide the Christmas ham. In the document, Biosecurity New Zealand reports that the number of properties on which such pigs are kept exceeds 7,000 sites, and that these represent at least 95% of all sites with pigs in New Zealand. While the feeding of meat scraps to pigs may be discouraged, and regulations may exist that try to control these activities, the practice continues relatively unchecked. This is acknowledged in the document which “considers it very likely that kitchen waste would be fed to these pigs, whether or not the householders are aware of their obligations under the garbage feeding regulations of 2005”. We completely agree with this statement. How Biosecurity New Zealand has then relied on compliance with the regulations by this ‘farming’ group as the cornerstone of its management plan to prevent the introduction of PRRSV makes no sense.

The document to some extent tries to dismiss this contradiction by suggesting that, should PRRSV enter the backyard sector, it would not spread to other pig populations or commercial farms. We consider this assumption to be baseless, as in our experience backyard pig keepers observe no biosecurity and frequently trade their pigs for other commodities, share boars, sell weaners into commercial sale yards and so on. Many of these sites are also located in close proximity to commercial pig farms. While many true commercial pig farms do observe biosecurity practices, the farmers are of course only able to manage the risks over which they have control. They are thus unable to prevent aerosol spread or the movement of vectors such as birds and insects between farms. Should PRRSV enter and establish in a group of backyard pigs, we expect that it would move rapidly through this sector, which in turn would result in the inevitable infection of commercial pig farms.

These issues aside, we believe that although Biosecurity New Zealand accepts that uncooked pig meat is likely to be fed to pigs on backyard operations, it underestimates the magnitude of the problem. For instance, in addition to waste generated from the kitchens of such farms themselves, we are aware that large amounts of food waste from restaurants and other food outlets in urban centres finds its way onto small scale commercial pig units. Just as with the backyard pig keepers, it is our experience that these farms have limited ability or motivation to comply with existing regulations.

Furthermore, we don’t agree with the presumption that “high value, consumer ready cuts” present a significantly lower risk than trim from other parts of the pig simply because such cuts are likely to yield less waste or are less likely to be discarded themselves, or because they are likely to contain less virus. The document itself acknowledges that the dose of virus required to transmit PRRSV through meat has not been adequately researched and the data that is heavily relied upon in the release assessment is derived from meat rather than (say) tonsillar or other lymphoid tissue. High value cuts may themselves be discarded once they have passed their use-by date or if they are mishandled.

The risk analysis states that “The economic consequences of the introduction of PRRS virus would be restricted to the micro-environment effects arising from direct losses incurred at the level of individual pig farms.” We refute this and point out that confidence in New Zealand’s assurances with regard to its biosecurity systems more generally would be compromised by the introduction of PRRSV, especially as the route of entry is likely to be exactly the same as that by which FMD has entered some other countries.

It appears that PMWS, apparently another viral agent, has entered New Zealand on at least two occasions despite the current porcine biosecurity measures that BNZ has in place. The mechanism or mechanisms by which these incursions have occurred has not been elucidated at this time. It would seem completely inappropriate to weaken an already flawed process until such time that the factor or factors that have led to this biosecurity failure have been fully explored.

We thus urge Biosecurity New Zealand to reconsider the proposed changes to the sanitary measures currently imposed on imported pig meat. We also urge Biosecurity New Zealand to re-evaluate its approach to biosecurity in general, the threat of exotic disease introductions and the management of these. We shudder to think what might happen to this country should the same rationale be used to justify the importation of ruminant material from a country infected with BSE on the basis that BNZ stated that it was illegal to feed such material to ruminants.

34. SELWYN DOBBINSON

I am extremely concerned that it is being proposed that New Zealand's current biosecurity measures for pig meat are to be eroded rather than enhanced. Being intimately involved in the repercussions from a recent exotic disease incursion amongst pigs, namely PMWS, I find it incredible that BNZ would consider *any* measure that might weaken our current porcine-related border security without first knowing how PMWS entered New Zealand.

Arguably the science surrounding PRRS is much better understood than that of the PCV2 virus and PMWS, however the rationale provided to support BNZ's proposal is significantly flawed. I will not dwell on the errors that appear to have been made in BNZ's interpretation of the current state of scientific knowledge on PRRS virus as I am aware that my colleagues intend to itemise the issues in some detail. However two issues that I feel need to be emphasised are 1. there has been no definition of a "high value cut" and an apparent assumption that there will be little or no trim resulting from such products 2. PRRS appears to have been treated as a single entity with a single set of pathogenic features with a focus on the reproductive aspects of some of the PRRS virus strains.

1. Issues related to meat trim from "high value cuts":

Potential volume of trim:

No matter how a piece of meat is presented, as a raw unpackaged piece of tissue or as a gas-flushed, fully wrapped product, there will be pieces of uncooked meat that will be trimmed either by meat processors for the purposes of packaging, or by the person preparing the meat for cooking. Additionally there will be some product that will need to be disposed of after having passed their 'used by' date. There is a high probability that meat sourced from *any* of the Northern Hemisphere countries and many of the Southern Hemisphere countries will ensure that such trim will contain viable PRRS virus particles in sufficient quantity that such waste will have the capbility of infecting naïve pigs.

The potential for such trim to be used by processors in the production of salami or other uncooked value-added products is very real. Such uncooked pig meat can become available to 'backyard' pig farmers through the feeding of out-of-date sandwiches or filled rolls. Equally, the potential for 'backyard' pig farmers to feed small quantities of trim produced during normal food preparation, without cooking the material, is extremely likely. Supermarket, restaurant and hotel kitchen waste can also be expected to contain such potentially infectious material that may be fed to pigs without prior cooking.

Recent investigations involved in the PMWS outbreak in the South Island highlighted that even well informed commercial pig farmers did not make the connection between feeding out-of-date filled rolls sourced from supermarkets that contained ham and salami, and the need to cook such waste foods. That 'backyard' pig farmers equally do not see the need to cook out-of-date sandwiches and filled rolls is a certainty. When questioned, a staff member of one such commercial pig farmer admitted that she had regularly fed barrow-loads of out-of-date filled rolls and/or sandwiches to the herd's dry sows, on a weekly basis.

In any urban environment there are significant amounts of out-of-date filled rolls and sandwiches from bakeries, supermarkets, deli's etc that need to be disposed of. A significant percentage of such potentially infectious material will inevitably end up being fed to pigs raised in 'backyard' farms and, despite current legal requirements, much of that material will be fed without being cooked. *I do not believe that BNZ has adequately recognised the potential for PRRS virus to contaminate 'backyard' operations.*

Current expert opinion on how the South Island PMWS incursion was started centres on the probability that infected imported pig meat was fed to pigs in an, as yet, unidentified 'backyard' farm that was situated in close proximity to Christchurch. The timing of such an event by *my* assessment suggests that the original incursion probably occurred in mid-2005; a time when the current requirements for cooking feed waste was in force. This indicates that despite regulations, there are people who raise pigs who do not adequately cook potentially infectious food products. It would seem therefore that if a PMWS incursion can occur, the risk of a PRRS incursion is equally probable.

Connection between 'backyard' piggeries and commercial operators:

I am concerned that BNZ does not appear to be fully cognisant of the dynamics of pig production in the South Island; I am unfamiliar with North Island issues and so am unable to comment on the interrelationships between pig farms in that region. In essence it is stated that "there is little connection between pigs produced by backyard farmers and commercial piggery operators". This is far from the truth.

There are many 'backyard farmers' in the Canterbury region who manage 10 – 20 sows with the sole purpose of selling surplus weaners at sale yards. Small numbers of such weaners are purchased by a wide range of end users such as 10 acre block farmers or dairy farmers [who use them as a means to dispose of waste milk]. Thus such weaners become scattered throughout rural areas and will inevitably end up being housed in close proximity to commercial piggery operations without the knowledge of the commercial pig farmer.

Additionally a number of commercial piggery operators purchase such weaners to top-up their sheds during periods when their own production flow has been inadequate. This can also happen at this time of the year when commercial piggery operators purchase extra pigs that will be finished in time for the lucrative Xmas market.

Hence, not only is there the risk that such small operators could produce infected animals that could be in sufficiently close proximity to commercial piggery operations that they were capable of infecting them through aerosol, bird or insect vector transmission, but the commercial piggery operators could inadvertently purchase carrier animals through saleyards and introduce them into their herds.

Vector and transport transmission:

It has been shown that flies can carry infective doses of PRRS virus for at least two miles from an infected source and that such quantities of virus were capable of infecting naïve animals [reference available if requested]. Current thinking on the transmission of PMWS is that seagulls have been able to mechanically carry infective material to several commercial piggeries over a very short timeframe; clearly the same mechanism could apply to the transmission of PRRS virus.

Another potential risk factor is via contaminated transport vehicles. Many transport operators not only carry pigs to saleyards and abattoirs but also move breeding stock from farm to farm with minimal disinfection between loads. Research in the USA indicates that the normal cleaning and disinfection practices used in New Zealand would be totally inadequate for the management of PRRS virus [reference available if requested].

Third party managers:

Another risk practice is the tendency for some commercial piggery operators to have their dry sows managed off-site by third party managers. I am aware of two such third party managers who have fed uncooked kitchen waste in the past in an endeavour to reduce the feed cost and so make a greater profit. I would be surprised if these two persons do not from time-to-time repeat such practices without informing anyone.

Several such third party managers maintain small herds of their own pigs in conjunction with those that are being managed for a commercial piggery operation. Sows for these small herds are usually purchased at saleyards or are simply ‘good looking gilts’ selected from weaners that have been produced from their own sows. The connection between backyard farmer, saleyard and commercial piggery operator is very real and quite extensive.

Unfortunately it is impossible to police the management of uncooked feed waste to an extent that would render the practice unlikely to lead to an exotic disease incursion. As has been shown, there is a relatively close connection between ‘backyard’ farms and commercial operations in the South Island of New Zealand that pose serious risks for commercial operators. It must therefore be assumed that some level of feeding of uncooked feed waste *will* occur and that such practices will put commercial piggery operators at risk. *I do not believe that BNZ have adequately recognised this area of risk.*

2. The significance of PRRS virus variants:

There are a number of different strains of the PRRS virus and within those strains a range of virulence and differences in the way in which the virus expresses itself on different farms. Since there is no way of knowing which strain will be introduced into New Zealand, it must be assumed that the most virulent and contagious virus strain will be the one to be introduced when establishing a risk management assessment. *It appears that the proposed protocol is not based on this principle.*

Unlike the PMWS virus where experts debate whether there are two strains or possibly only one strain throughout the world, the PRRS virus research clearly shows a range of strains that have significantly different characteristics. There are some strains that are readily transmitted in aerosols and others for which aerosol transmission has never been demonstrated. Some strains appear to be more resistant to the effect of disinfection than others whilst others are more associated with the voiding of dead foetuses as opposed to those where large numbers of newborn piglets are born with very low viability.

The BNZ proposal appears to emphasise the impact of the strains of virus that are most associated with reproductive failure and has largely ignored the huge pre-weaning mortalities that are commonly associated with some strains of the virus. My most vivid memory, after visiting a number of very large piggeries in the USA at the time that PRRS virus was first seen in their industry, was of piles of dead or culled piglets stacked in heaps in the alleys outside every pen in their huge sheds. The pre- and post-weaning mortality was every bit as serious as that that currently occurs with PMWS.

From an economic point of view one must consider the potential for significantly increased pre- and post-weaning mortalities as well as the increased number of sows that abort.

Welfare:

The OIE recognise and emphasises that one cannot separate animal health from animal welfare. That PRRS virus can lead to a seriously compromised animal welfare status is clearly a major issue. An associated welfare issue relates to the effect that repeated high mortalities amongst pigs has on the farmers and staff caring for them, as has been seen in the current PMWS outbreak in New Zealand.

I do not believe that the model that has been used by BNZ adequately recognises the impact of a PRRS incursion on animal welfare. There is a significant animal welfare difference between a disease that is characterised by high mortality associated with sudden death and those diseases that have an associated high morbidity that leads to the production of large numbers of weakened animals that have to be culled for reasons of their welfare.

Effect of a PRRS incursion on the pig industry:

I believe that it is naïve to consider that in the future a PRRS incursion will be localised and able to be contained.

It is an extremely infectious organism that is difficult to diagnose. It is common for pig farmers to have reproductive failures in the summer months from the so-called ‘Summer Infertility’ problem. Equally, because of the amount of outdoor pig production that is associated with the use of straw, reproductive failure associated with abortions has become commonplace as a result of mycotoxicosis. Now that PMWS is endemic, the appearance of increased pre- and post-weaning mortalities is also commonplace.

It is likely that an incursion involving ‘backyard’ farmers will never be recognised until it has spread to commercial operators who have better veterinary surveillance. There will be a considerable delay in making a diagnosis even in well run commercial operations as the more common diseases are ruled out; it took a little over six weeks from the time of the first PMWS case in the South Island to be recognised, until the incursion was officially declared. Hence it is most likely that an incursion of PRRS virus will not be recognised for some months and by then will have spread widely throughout New Zealand.

Due to the long lead-in time that can be expected, the combination of abortions and pre- and post-weaning mortality will dramatically reduce the availability of locally produced pigs leading to an influx of imported meat that will no longer require the current heat treatment that appears to have been effective in managing the introduction of the PRRS virus into New Zealand up to this date.

It is pertinent to study the effect that the combination of FMD followed by Classical Swine Fever had on the British pig industry. Currently the British industry is producing roughly 25% of the volume of pig meat that it did prior to the advent of those two diseases and is struggling to survive let alone regain its previous production. It is likely that a PRRS incursion in New Zealand will have a similar effect on the New Zealand pig industry.

I do not believe the current BNZ proposal has adequately recognised either the short term or long term impact of a PRRS virus incursion on the pig industry and its support industries.

Conclusion:

The proposed risk management assessment purports that there is a minimal risk that would result from allowing “high value cuts” to enter New Zealand without the protective procedures currently required for the importation of carcass or primal meat.

My colleagues and I believe that the science on which this proposal has been based is seriously flawed. I believe that the dynamics of pig movements in New Zealand has not been properly assessed and that there has been too much reliance on the legal requirement for trimmed meat to be cooked before being fed to pigs.

A PRRS virus incursion represents the single most serious threat to the New Zealand pig industry. It is most likely that before a positive diagnosis can be made the disease will be widespread throughout the New Zealand industry; such an event would devastate an already struggling industry.

I believe that BNZ should review their risk management assessment and reconsider their views in light of the lessons learned from the recent PMWS incursion.

Submission addendum

Some of my colleagues have pointed out that in my haste to present my submission on time, I have not adequately explained the reasons behind some of the concerns expressed in my earlier submission. Could you please add these explanatory notes to my submission?

Potential volume of trim:

- Some packaged meat could have surface contamination from bone marrow or other potentially infectious material. The surface of pre-packaged meat is commonly trimmed by housewives before being cooked. Such scraps are often accumulated before being disposed of so significant volumes of contaminated product could be fed to pigs at one time.
- The analysis assumes that the centre of a piece of meat is heated to the same temperature as the surface. 'Rare' steaks and other cuts are commonly prepared so that the internal temperatures may not be adequate to inactivate PRRS virus. Thus it would appear that high value cuts may still result in waste that could be infective to naïve animals.
- The analysis assumes that all genotypes and strains of PRRS virus behave in the same way as other members of the Arteriviridae family. There is little evidence presented to validate this assumption. In any viral family there are members that behave differently to other members so that a global acceptance of the sensitivity of PRRS to pH, heat, freezing and thawing should not be made. References such as Benfield et al, 1999, do not indicate which PRRS strain was used so that broad assumptions should not be made.
- Many of the research results presented are based on in vitro studies rather than in vivo. Some of the data presented show unexpected in vivo results that were inconsistent with in vitro studies. Consequently it would appear possible that the length of PRRS virus survival in meat may be greater than calculated by in vitro studies and survival in meat products, such as salami, *may* be possible: there are no studies presented that rule out this possibility.
- The PMWS investigation quoted, demonstrates that no matter what the owner may think or advise, staff may not be biosecurity conscious and may not be selective when feeding stock. If meat trim were to be included in supermarket waste [including out-of-date product], one could be confident that some of it will be fed to pigs.

Connection between 'backyard' piggeries and commercial operators:

- I know of several backyard farmers who own either one or two sows and sell the majority of their weaners at the local saleyard. Thus it is not true that farmers with very small numbers of pigs do not have sows that could produce infected weaners that may end up with direct or indirect contact with commercial piggeries.
- Aerosol spread has clearly been debated and largely refuted in the analysis. However, whether spread is by aerosol or flies and other airbourne insects, appears immaterial; the scientific evidence shows that airbourne transmission has occurred overseas.
- There is an extensive market in barbeque suckers and pigs of up to 18 or 20kg throughout the year. These young pig carcasses are extensively trimmed before being trussed on a barbeque. I have seen farmers feed such trim directly to farm dogs that were hanging around so the possibility that such trim could be fed to pigs can be assumed. If these pigs were viraemic at birth there would be a significant potential that they could harbour very high levels of active virus, this practice poses a serious risk that has not been quantified.
- Commercial piggeries commonly have a 45% or more, annual replacement rate. Therefore there will always be significant numbers of naïve gilts [assuming that gilts are being purchased from 'clean' sources] on a farm. Many farmers tend to purchase the bulk of

their replacement gilts in the springtime as a means to reduce the impact of summer infertility. It appears that contact with seagulls is greatest in the springtime in outdoor piggeries as gulls compete with sows for food to feed their chicks. Hence contact between backyard piggeries and commercial outdoor operations, through seagull contact, will be greatest when such outdoor herds have the greatest number of vulnerable stock. In the winter time and early spring, mallard duck populations are very high in outdoor piggeries as the ducks forage in the puddles and bogs created by sows during the wet season; the significance of mallard ducks was noted in the analysis but disregarded as a significant risk. Since duck populations on any given farm can be counted in their hundreds and seagulls [at any given time] in their thousands [actual counts are available if requested], bird vectors must be regarded as a significant risk factor.

- Despite assertions in the analysis that feral pig contact with commercial piggeries is rare, the presence of feral pigs amongst outdoor units in the South Island is a frustratingly common occurrence. Apart from the birth of uneconomic litters, feral boars spread lice amongst outdoor pigs; a situation that I have found nearly impossible to control. Feral boars have been known to travel down the Rakaia riverbed and been seen in close proximity to Rakaia township. They have repeatedly caused problems for piggeries at Otaio and Hunter.

I apologise for these omissions and trust that you will be able to have them attached to my original submission. I will post a hard copy of this addendum in the mail tomorrow.

35. ROGER S. MORRIS

Content of this Submission

EpiCentre personnel have provided technical advice to the New Zealand Pork Industry Board for its submission, and many of our serious technical concerns about the IRA are described in that submission. These views will not be repeated here, in the interests of brevity.

However the risk management recommendations put forward in the IRA appear to represent a major shift in the philosophy of biosecurity risk management as implemented by Biosecurity New Zealand (BNZ), and the larger issues raised by this shift are covered here, as they are considered to be of national importance yet are not examined specifically in the IRA.

Responsibilities of BNZ under the Biosecurity Act

Section 22 of the Act provides the Chief Technical Officer (CTO) in BNZ with powers to prepare an Import Health Standard (IHS) and make a recommendation to the Director-General for it to be issued. The IHS specifies (in s 22 (1)) the requirements which must be met "for the effective management of risks associated with the importation of risk goods *before* (my emphasis) those goods may be imported, moved from a biosecurity control area or a transitional facility, or given a biosecurity clearance; and may in a like manner, amend or revoke any import health standard so issued."

In s 22 (3) it is made clear that the Director General is not obliged to "have an import health standard in force for goods of any kind or description if, in the Director General's opinion, the requirements that could be imposed on the importation of those goods would not be sufficient to enable the purpose of this Part to be met if the importation of those goods were permitted."

It seems clear in s 22 (1) that the risk management measures must be applied *before* the items can be released into commercial distribution within New Zealand, and risk management cannot rely entirely on the way in which biosecurity measures are taken by individual users of the risk goods after their release for commercial distribution. The Section makes clear that the risk management measures must be applied to all examples of the risk goods, since for example it specifies that goods cannot be moved from a transitional facility into commercial circulation until the risks have been managed.

In preparing a recommendation under s 22 (1), the CTO *must* have regard to three quite specific matters which are described in s 22 (5) and must also consider other relevant matters (s 22 (5) (d)). The use of the term "must" in s 22 (5) makes this a mandatory duty which must be undertaken in each case, not a directory responsibility which leaves the CTO with some flexibility about how to implement the duty.

Responsibility to deal with the likelihood of agent entry

Under s 22 (5) (a) the CTO must have regard to "the likelihood that goods of the kind or description to be specified in the import health standard may bring organisms into New Zealand."

Porcine reproductive and respiratory syndrome (PRRS) virus is an unwanted organism under the Biosecurity Act. The analysis provided in the Pork Industry Board submission (in conjunction with the IRA itself) shows a probability of 0.97 that PRRS virus would be present in each tonne of raw pig meat imported under the proposed change to the IHS, and that that probability reaches 1.0 once the annual quantity reaches 10 tonnes. The amount of raw pig meat which could be expected to be imported if the recommendations in the IRA were adopted would be far in excess of 10 tonnes, and hence the virus would be imported in substantial quantities each year. Given this information, it could be argued that all importers who distributed raw pig meat commercially would be in breach of s 52 of the Act, which prohibits the release of an unwanted organism. There may also be issues of liability in the event of an outbreak of PRRS, should distribution of raw infected pig meat be permitted.

The IRA proposes no specific measures to modify the likelihood that the pig meat would bring unwanted organisms to New Zealand, and instead relies entirely on an unsupported claim that none of this pig meat would reach pigs. This is justified by the fact that garbage feeding regulations were promulgated in 2005, which impose a requirement for cooking of meat products which are to be fed to pigs.

The IRA contains no evidence-based evaluation to justify the opinion that this would prevent exposure, but simply uses the introduction of the 2005 garbage feeding regulations as a basis to claim that "an exposure pathway would exist only on pig farms that were not complying with the garbage feeding regulations." It then states that "if pig farms in this country did become infected with PRRS through illegal feeding of uncooked imported pig meat, the likelihood of spread to other pig farms would be low as long as standard biosecurity practices were observed".

As shown in the Pork Industry Board submission, the number of commercial pig farms in New Zealand is very small relative to the total number of owners of pigs (around 3 to 5% of the total), and very few of the non-commercial and para-commercial producers practise accepted biosecurity measures or are aware of the garbage feeding regulations.

Biosecurity New Zealand has made very limited efforts to publicise the regulations or draw them to the attention of even the known pig owners (as recorded in Agribase), and has made even less effort to achieve compliance through enforcement measures. BNZ cites funding limitations as a reason why so little effort has been made. Even if far greater effort had been made, compliance would be lower among small producers. Australia has had a total ban on garbage feeding for decades, yet a recent study limited to the peri-urban area of Sydney showed that the practice still occurred.

Hence it appears that BNZ wishes to rely entirely on total compliance with a post-border regulatory mechanism which it acknowledges is far from effective, to prevent establishment of an unwanted organism which would have very serious effects on the pork industry.

It is very questionable whether the measures proposed would meet the requirements of s 22 (5) (a) even if 100% compliance were achieved, and therefore it appears that the CTO cannot recommend adoption of an IHS based on the IRA. However in addition, the compliance level with post-border measures is currently too low for them to be considered even as ancillary to effective border protection measures.

The contrast between the measures proposed for PRRS and those currently taken for FMD and other multi-species diseases is also a matter of great concern. Taking FMD as the example, the only two mechanisms likely to be responsible for establishment of FMD in New Zealand under current circumstances are bioterrorism and importation of pig meat. Extremely strict measures are taken to prevent introduction of meat by passengers, to prevent establishment of FMD. Yet according to the IRA, no such meat will ever reach pigs, and even if it does, spread of PRRS virus from affected farms would be limited due to biosecurity measures. Contrary to the claims in the IRA, spread of PRRS virus between farms is substantial, and while on some occasions pigs would play an even more significant role in FMD transmission, this would only be true for certain strains which are windborne from pigs (the UK 67/68 strain, but not the UK 2001 strain), and is far from universal. In many outbreaks of FMD, pigs play little part. The PRRS IRA discounts windborne spread of PRRS, but the evidence it uses to do so could just as easily be used to discount airborne spread of FMD, since some FMD strains show little or no windborne spread, while others are readily spread by this method.

Even in the case of bioterrorism, widespread dissemination of virus would be most likely to occur if pigs were used as an initial dissemination vehicle at multiple locations.

Pigs are also very important in the overall surveillance strategy for introduced animal diseases, due to their susceptibility to many of these diseases, and their value as detectors. It is important that the support of pig owners throughout the country be maintained in order to encourage reporting of disease, and this function must be taken into account in deciding what risk management measures to take against diseases such as PRRS.

There are therefore major technical inconsistencies between the position of BNZ on diseases such as FMD, and the claims of the IRA in relation to PRRS. I am very concerned that adoption of the recommendations of the IRA would seriously undermine New Zealand's favourable biosecurity status in a number of ways, by undermining border control measures as a key element of biosecurity, and I argue that the adoption of the IRA would contravene s 22 (5) (a) of the Act.

Nature and Possible Effects of Introduction of an Organism

In s 22 (5) (b) the CTO must have regard to "the nature and possible effect on people, the New Zealand environment, and the New Zealand economy of any organisms that goods of the kind or description specified in the IHS may bring into New Zealand".

As a trained agricultural economist, I have continuing major concerns about the way in which BNZ considers economic issues both in relation to import health standards and in relation to pest management strategies. Such analyses should consider the national economic benefit from biosecurity measures in accordance with standard economic principles.

In the IRA, economic effects of PRRS are dismissed as minor on the basis of a very inadequate and purely descriptive consideration of the issues, with no attempt to undertake a true consequence assessment. From the viewpoint of the commercial pork industry, it can validly be argued that PRRS is a disease which would be more damaging to it than FMD, because in the long term the productivity effects of PRRS on the commercial pig industry would cause continuing damage, whereas FMD has much smaller and more temporary effects on pig herd productivity, and the disease would be eradicated promptly in the larger national interest. Because exports represent only a small part of output, the pork industry would not suffer substantial net losses, yet it is a vital cornerstone of detection effort for a possible incursion of FMD. If the economic logic of the IRA is followed, the pig industry could be considered to gain very little from FMD prevention and control policies and should therefore not invest in such activities. The industry is in fact a very responsible participant in exotic disease preparedness, because it takes a wider view than purely pursuing its own self-interests. It is therefore very disappointing that BNZ takes such a narrow and incomplete view of economic issues affecting biosecurity decisions.

Importation of raw pig meat, including the possibility of substitution of meat from a non-approved country or failure of border control measures (as in the recent Korean incident) would make it much more likely that other unwanted organisms could enter the country. The IRA also gives no consideration to the possibility that other unwanted organisms could enter in uncooked meat from approved countries, since the current IHS includes no protective measures against agents other than PRRS.

The very brief consequence assessment in the IRA does not adequately consider the items required to be evaluated under s 22 (5) (b), and does not give adequate weight to the larger biosecurity implications of the proposed change.

New Zealand's international obligations

The current IHS complies with these obligations (as required in s 22 (5) (d)), and there is no justification under any of our international obligations for allowing PRRS-infected raw pig meat to enter New Zealand. Given the EFSA report and other evidence, it would be extremely difficult for any country to take the current measures for pig meat importation to a WTO Panel for review.

New Zealand complies with its international obligations in relation to pig meat imports, and there is no technical justification for a relaxation of these measures. The proposed relaxation is incompatible with New Zealand law.

Conclusion

The IRA as circulated does not comply with s 22 of the Biosecurity Act, and if it were adopted as a modified IHS, importers could be argued to be in breach of s 52. This could possibly extend as far as legal liability for the adverse effects, if PRRS was discovered in New Zealand in the future.

It is therefore concluded that the CTO is unable to recommend the adoption of the proposed changes, because they fail to meet the obligations of the Act.

36. ANON

General remarks

We welcome the opportunity to comment on the import risk analysis. Decisions on risk management, based upon risk estimation, have now become more transparent due to public consultations of the report.

We believe that international recommendations on trade with commodities, as stated in the OIE, should always be the foundation for trade so as to avoid obstructive and non-scientifically based trade barriers. It should therefore be noted that we hold significant concern for the notified risk management measures in light of New Zealand's failure to enforce its own internal rules in relation to the feeding of waste to pigs, which as a direct result significantly penalises international trade on an ongoing basis. We therefore expect in light of these facts that New Zealand continues to act in good faith to significantly improve overall compliance and therefore provide the opportunity for a future review of the proposed measures.

Specific remarks to the proposed risk management

The proposals for risk management in the report provides for some flexibility for the export of pork from countries with PRRS, however the risk analysis does not provide for a clear understanding of 'consumer ready cuts' and in particular the use of the term 'high value' appears unnecessary and may lead to further confusion and therefore additional barriers to trade.

In 5.2.2.2. measures to reduce the likelihood of exposure, page 55 in the report, it is stated that "consumer-ready-cuts" of pork is considered to give negligible likelihood of meat scraps. It is our understanding that the background for introducing a risk management procedure, as described in the third and fourth dot in 5.2.3, is to reduce generation of scraps in the private households and thereby reduce the possibility of pigs being exposed to scraps. On this basis it is our view that provided fresh and or chilled pork meat is processed into consumer ready packs for sale to the consumer, then the need to further specify the value of the cut becomes irrelevant and should therefore be removed.

Based on the production processes in Danish meat plants and commercial requests for access to markets in New Zealand for Danish pork meat, the top priority for market access remains with the export of pork for further processing into consumer ready portions. Providing for the option of sending unrestricted raw bulk manufacturing meat to New Zealand '*officially approved facilities*' for further cutting into consumer ready portions - would therefore represent a significant advancement in our view. However if the cost and processes involved for the approval of such facilities were unrealistically high, then again we would hold considerable concern for their introduction, which again would be perceived by exporting parties as unnecessary and unjustifiable barriers to trade.

We therefore trust that you fully understand that we continue to hold strong reservations for the introduction of risk management measures for PRRS and in particular in light of New Zealand's failure to effectively implement internal waste feeding rules, however positive consideration of the points above would substantially reduce a number of the current barriers to trade and as a result we look forward to further reviewing the final publication of the risk analysis.

37. TORBEN GRUBBE

The Danish Veterinary and Food Administration have previously commented the draft for external review of the New Zealand import risk analysis on PRRS virus in pig meat, which was forwarded to you by email on 1 February 2006. In the comments on the draft for external review the main concerns were related to the risk management part of the risk analysis, where some of the proposed sanitary measures were considered to be out of proportion with the estimated risk. It was also acknowledge that “the preferred option is Option 3” (i.e. No sanitary measures). It was suggested that the removal of major lymphoid tissues could be proposed as a recommended sanitary measures. Finally it was recommended that alternative measures to reduce the likelihood of exposure should be included in the option evaluation.

The Danish Veterinary and Food Administration therefore fully agree with your comments that the risk analysis basically concludes that the risk is negligible and that the proposed measures are not in accordance with a negligible risk. We therefore also fully agree that the enforcement problems of the NZ authorities should not be the reason for trade barriers. However we acknowledge the recommended sanitary measures *“pig meat in the form of consumer-ready, high-value cuts”* and *“pig meat processed on arrival, in an officially approved facility, into consumer-ready high value cuts”* are attempts to solve the trade problem. The definition of *consumer-ready high value cuts* is of crucial importance to the solution. The Danish Meat Associations conclusions on “consumer-ready high value cuts” is included in their comments on the import risk analysis, which is attached to this letter.

38. ANON

General

The reported risk analysis follows the guidelines in Section 1.3 of the OIE *Terrestrial Animal Health Code,* which is the internationally accepted approach for import risk analysis. The points below accord with the Code:

1 Hazard identification

The conclusions of the section, paragraph 3.5 on p 18, are considered valid

2 .Risk assessment

2.1 Release assessment

The report states in paragraph 3 on p 33 that “A feeding trial is the ultimate test of whether meat of slaughter age pigs contains enough virus to infect other pigs when eaten.”, and on p 34 the report describes the article of Magar and Larochelle (2004) as the one report to contain pertinent feeding trial data from the field. A few other studies on the occurrence of PRRS virus in pig meat are cited (on p32-33) but a caveat is presented on the limitations of the results in these studies. The release assessment result calculated from the data of the article of Magar and Larochelle (2004) is presented as the conclusive point ii) in the Release assessment section 4.1.4 on p 36.

The report lacks a critical appraisal of the validity of this one report and of the reliability and representativeness of the cited prevalence of the virus in pig meat in countries endemic with PRRS. The report states (line 1-2, paragraph 2, p 34) that ‘Magar and Larochelle (2004) took samples of meat at random from…’ This is reiterated in conclusion vi) on p 35 and in point ii) on p 37. In fact, Magar and Larochelle do not give any indication of random sampling in their Materials and methods section. The conclusion ii) (p 36) to have a possibly selected non-random sample from two Canadian abattoirs represent all the pig meat in the countries outside New Zealand, which are endemic with PRRS, cannot therefore be accepted as valid.

Further comments on Release assessment:

On p 35: In studies involving survival of PRRS virus in muscle derived from infected pigs, the samples have been collected from pigs infected 7 days and 11 earlier. Other data involving survival of PRRS virus in samples collected from pigs that would have been infected earlier in the finishing period was not presented nor discussed. In the same page (4.1.2.5, i) it was said that in endemic situations the majority of animals are viraemic from about 6 to 9 weeks of age. In practise, it would have been useful to know the survival of PRRS virus in muscle in cases where the pigs had been infected more than 11 days before slaughter which probably would decrease the amount of virus present in muscle samples.

In the paper it was concluded that it is likely that the infectivity will persist in chilled and frozen pig meat during storage and transport to New Zealand (p 36). The conclusion would be more tenable with more detailed description about the process including handling after slaughter in the country of origin, transport to New Zealand and how the meat is handled in New Zealand and how long (how many days) it takes before pieces of raw meat could end up to be eaten by pigs on commercial pig farms, in case of illegal feeding of uncooked imported pig meat.

Assumptions of the model (Appendix 1. pg. 67)

The likelihood of pigs being infected prior to slaughter (P1)

The probability of a pig being infected prior to slaughter is set as a point estimate of 0,575, as no distribution for this value is implied. This estimate is based on the results from the NAHMS serological study which was made in 4756 pigs from 284 finishing herds not vaccinating against PRRS in the USA where 57,5% of the pigs had seroconverted to PRRS.

The model used in the release assessment seems to be very sensitive to the used estimate of P1. Using this P1 the resulting probability for virus being present in oropharyngeal and tonsillar tissue is 0,26 (1 in four) and, as a result of this, it is concluded in the release assessment that the risk is moderate to high. It might not be appropriate to assume that a point estimate from a survey in the USA would represent the situation in most of the countries and areas in Europe. In fact, a reference in the text (Albina, 1997) states that although it is believed that more than 50% of farms are affected in Europe, there are low density pig areas with much lower prevalences.

Furthermore, setting the P1 the level of seroconversion leads to bias. The level of seroconversion is not a reliable estimate of the infection status of the animals at slaughter. The model seems to set the probability for infectious PRRS present at the time of slaughter (P2) to 0 if age at slaughter is smaller than the sum of the age of infection and the duration of viremia. Otherwise P2 is set to 1. The probability (P3) of a pig harbouring infectious PRRS in tissues at slaughter is calculated as P1 x P2. This implies that the model uses the seroconversion rate in the assessment always when the age at slaughter is less than the sum of age of infection and the duration of viremia.

The effect of these two points on the conclusions of the release assessment has not been discussed in the report.

Technical comments.

The results of the model are given in point estimates of the expected value. This does not give a clear view of the distribution of results and therefore not of the uncertainty and basis of the conclusions of the release assessment.

The number of iterations per each simulation is not stated.

2.2 Exposure assessment

The conclusions of the section, paragraph 4.2.6 on p 44-45, are considered valid

2.3. Consequence assessment

The conclusions of the section, paragraph 4.3.2 on p 50, are considered valid

2.4 Risk estimation

The conclusion "…, there is a non-negligible likelihood of release of PRRS virus in imported pig meat." cannot be accepted as valid if it is based solely on the results by Magar and Larochelle (2004).

Further comments on Risk estimation

According to the report the only exposure pathway for PRRS would exist on pig farms that are not complying with the garbage feeding regulations of New Zealand. Considering this the recommended sanitary measures to manage the risk can not be regarded justified. This problem should be managed with measures of Veterinary authorities of New Zealand to intensify controls or other ways to improve enforcement of regulations.

3. Risk management

The recommended sanitary measures (p 55) insofar they are based on the risk estimation (section 4.4, p 50-51), cannot be accepted as well-grounded.

Reference

Magar R., Larochelle R., 2004. Evaluation of the presence of porcine reproductive and respiratory syndrome virus in pig meat and experimental transmission following oral exposure. The Canadian Journal of Veterinary Research 68, 259-266

39. INGE HERDENBERG

In general we can support the argumentation / conclusions of the Finish delegation which are:

1. The argumentation / conclusions in the report regarding hazard identification, exposure assessment, consequence assessment are considered valid.

2.The (non-neglegible) likelihood of persistence of virus in chilled/frozen meat during transport / storage to/in NZ would be more tenable with a more detailed description of the process of the meat and estimated timeframes until pieces of raw meat could be eaten by pigs in NZ.

2. The likelihood of pigs being infected prior to slaughter is based on a (probably non random) point survey in the USA. Seen the sensitivity of this parameter to the model it might not be appropiate to assume this as the situation in all countries that export to NZ.

3. Seen the conclusion of the report that the only exposure pathhway for PRRS would exist on pig farms that are not complying with the garbage feeding regulations of NZ, the recommended sanitary measures to manage the risk cannot be regarded justified. This problem should be managed (primarily) with measures of the NZ authorities within the country in order to increase compliance.

40. CHRIS TRENGROVE

Reason for submission

My name is Chris Trengrove and I have been a pork producer in West Melton Canterbury for the last 27 years. I currently own and farm a breeding to fInishing unit of 380 sows, providing around 7,750 pigs to market per year. I am a dedicated pork producer. My operation is a $1.75 million business with obvious spin-offs to farming supply companies and my community. I employ 4 full-time workers. I have recently extended the farming partnership of my wife and myself to include my Farm Manager Nigel Slater, a 32 year old farmer who has worked on my farm for the last 17 years, progressing from worker to Farm Manager. Nigel, who has three young children, is an outstanding example of a committed young farmer and rural citizen.

I have served as a Director of the New Zealand Pork Industry Board (NZPffi) for the last 10 years, and as Chairman over the last 4 years. In this capacity I have guided and been closely involved in the setting of the strategic direction ofNZPffi, including its work with pork producers and also in building relationships across the supply chain.

I believe therefore I am in a position to submit on this Import Risk Analysis as a financial stakeholder at risk of suffering consequences at a personal and industry level from the proposal as presented. In addition I believe I am in a position to comment on the ability of the supply chain to operate effectively with sanitary measures in place in respect of PRRS infected pig meat. NZPffi has consulted with its technical advisers to review the detailed aspects of the Risk Analysis on behalf of pork producers. I fully support NZPffi's submission.

Key points

1. Under the Biosecurity Act 1993 there is an obligation to have regard to:

the likelihood that goods of the kind or description to be specifIed in the import health standard may bring organisms into New Zealand;

the nature and possible effect on people, the New Zealand environment, and the New Zealand economy of any organisms that goods of the kind or description specified in the import health standard may bring into New Zealand;

New Zealand's international obligations;

any other matters relevant to the purposes of this part (of the Act).

(section 22, clause 5.)

2. The recommended sanitary measures proposed in the Import Risk Analysis include options that would allow pork meat infected with PRRS to be released into New Zealand. This is despite the fact that it recognises that such meat has the ability to infect naIve pigs through feeding. I am very concerned that the level of risk is under-estimated. I do not accept that the range of options proposed will manage the identifIed risk because the Risk Analysis makes a number of assumptions where it has no data about the New Zealand environment. These areas are discussed in more detail below.

My fIrst question is: what is a 'consumer-ready high value cut'? Such cuts have the ability to infect naIve pigs.

3. Given that it proposes that some infected product may enter New Zealand, the Risk Analysis relies on post border measures to protect the New Zealand pig herd from infection with PRRS.

The Biosecurity (Meat and Food Waste) Regulations 2005 are the theoretical protection measure against PRRS infecting the New Zealand pig herd. This is a very flattering view of how these Regulations are working in practice.

When MAF recommended that regulations be re-instated following its 2001 review, it proposed that there would be reactive policing rather than proactive policing. Note that this proposal was within the context that very effective border control mechanisms were in place. The effect of the whole range of options proposed in this Risk Analysis is to drastically reduce border control mechanisms in respect of PRRS infection. Because consumer-ready high value cuts are not defmed it is not even possible to understand the extent of the reduction of protection for the New Zealand pig herd from this source of infection.

Hindsight over the last 15 months has now amply demonstrated that reactive policing of these regulations has been a very low priority. A very low level of follow up on reported suspected cases of non-compliance has only recently been set up in response to considerable efforts from NZPIB. I believe until the end of June 2006 there had only been two actual farm visits, and some phone calls and letters to these reported suspected cases of non-compliance. I have personally met with both the BNZ Director of Biosecurity and the Minister to reinforce the concern ofNZPIB at the potential for biosecurity incursion via this regulated but substantially unchecked route. My concern is certainly for the New Zealand pig herd but also for New Zealand agriculture generally. The UK learned a very hard lesson in 2001 with FMD, where it is most likely that the incursion was through feeding infected material to pigs despite this being an illegal practice.

4. The Risk Analysis has not even attempted an analysis of the nature and extent of the food waste ‘market’. It relies on the assumption that consumer-ready high value cuts (undefIned) will not end up as waste. This is a very faulty assumption because there are a number of reasons for product becoming waste, as well as the trimmed or discarded component. Other signifIcant pathways generating waste are via product out of quality specifIcation, and past or close to ‘use by’ date. These pathways are associated with consumers, retail, and manufacture. There is no reference at all in the Risk Analysis to these pathways which will be potentially signifIcant in terms of generating PRRS infected pork within New Zealand. I am aware that a number of my colleagues will be illustrating these pathways from their own experience.

It is not acceptable to permit a recognised source of exotic infection into a country without any certainty in terms of control of the source of infection. Therefore until the risk of these pathways is (a) assessed and (b) demonstrated to be able to be managed, it cannot be dismissed.

5. Disease impact. I am in the very unfortunate position of appreciating first hand the impact of a previously exotic disease. My own farm is infected with PMWS (Postweaning Multi-systemic Wasting Syndrome). Expert opinion is that the initial incursion ofPMWS into the North Island of New Zealand was via feeding PMWS infected meat to pigs. It is likely that the South Island incursion was also via this route. If this is the case, it is likely that this happened after the 2005 regulations were in place.

With PMWS now endemic, it is even more crucial that New Zealand is protected from PRRS incursion, as these diseases have a synergistic effect in terms of on-farm disease impact.

6. Nature of impact on people. Again I am in the unenviable position of commenting from direct experience. My Farm Manager, a very conscientious young farmer who is a natural stockman, has been seriously affected by dealing with PMWS on our farm. Continuously dealing with wasting pigs which die or fail to thrive, despite his strenuous efforts, have taken a major toll on his health. He has lost weight and is currently undergoing counselling. Among my fairly close neighbours, another young farmer has opted to sell his farm rather than farming with PMWS. I understand two further farmers are considering going out of business. Options for these producers are even further constrained because there will be no or very little return for breeding stock from PMWS affected farms. Within the North Island PMWS incursion and investigation, among the affected producers, there were 2 premature deaths and another serious health condition.

While the many unknowns regarding PMWS meant that border controls were more difficult to apply, the same does not apply to PRRS.

7. The Risk Analysis overlooks some important considerations about pig ownership in New Zealand. It rightfully points out that there are around 7,500 properties with pigs of which around 6,500 properties have up to 10 pigs. However it assumes that there is little contact between the commercial sector and non-commercial sector, and that the commercial industry can take steps to protect its biosecurity.

This assumption cannot be supported even with the limited available information. At the very least, the commercial pork sector is at risk from the geographic location of noncommercial pig ownership. I have attached a map illustrating AgriBase figures (June 2006) which shows commercial pork producing units and other farms. These sectors are clearly geographically overlaid.

This represents a particular risk for outdoor pig farming in New Zealand. Again I am speaking from my own difficult experience with PMWS infection. Expert opinion is that gulls were the most likely vector of infection to my farm from a geographically close farm. No biosecurity measures can protect the commercial industry from infection via such a route. Hence border control is critical. The conclusion of the exposure assessment (P45) is therefore wrong by omission, by not recognising that it is possible that piggeries either complying or not complying with the feed regulations, can be exposed to PRRS infection in a chain reaction - from infected pigs, which have been infected from consumption of infected meat.

Ironically there are considerable pressures on the New Zealand pork industry to pursue less intensive methods of farming, such as my own. A further irony is that the countries from which imports are drawn are all more intensive than New Zealand.

I am aware that Dr Eric Neumann of Massey University’s EpiCentre has a proposal with BNZ seeking its support to investigate the nature of the para-commercial pork industry and to establish linkages with the commercial sector. This is crucial factual data required before the Risk Analysis can make assumptions that there are, or should be, barriers of interaction between the commercial and non-commercial industries.

8. Trade impact. I want to emphasise that appropriate sanitary measures to prohibit the release of PRRS infected meat into New Zealand are not a barrier to trade. Our experience over the last 5 years since sanitary measures were put in place clearly demonstrates this fact. The pork processing industry in New Zealand has adjusted to the treatment

requirements to inactivate the PRRS virus from countries where PRRS is endemic. Imports have flourished: since the sanitary measures were imposed - growing from 17,616 tonnes (bone-in equivalent weight) in 2001 to 31,862 tonnes (bone-in equivalent weight) in 2005. While there are a number of factors which impact on trade, this percentage increase of 81 % includes both PRRS infected countries (e.g. USA) and non- PRRS infected countries (e.g. Australia).

It therefore cannot be argued that NZ is not meeting its trade obligations - it obviously IS.

Conclusions

The proposal to reduce sanitary measures is not supported by a consideration of all the relevant factors.

The proposed measures mean that infected pig meat would enter New Zealand, when such meat is a recognized source of infection for the New Zealand pig herd. I believe New Zealand is entitled under the Biosecurity Act to protect itself from sources of infection.

As proposed the measures therefore mean that protection of the New Zealand pork industry from PRRS infection is dependent on post border measures.

Such reliance is flawed on at least three key bases:

compliance with the regulations controlling feeding to pigs is at best unknown there is no understanding or analysis of the nature and extent of waste generated through exempting the undefined consumer-ready high value consumer cuts from treatment requirements

there is incomplete knowledge and incorrect recognition of the potential range of interactions between the commercial and non-commercial sectors of pig ownership While more information is required the available information shows at least these sectors are geographically overlaid.

Therefore there is not sufficient information to justify that the risk of PRRS infection of the New Zealand pig herd can be managed if infected pig meat is released into New Zealand.

A PRRS incursion would have major impact on commercial pork producers, their staff and families and the supporting rural communities.

The current sanitary measures have not been a barrier to trade as the growth in imports between 2001 and 2006 amply demonstrates.

Therefore I submit that the current sanitary measures must remain in place. Sanitary measures can only be reduced if there is sufficient information to justify that the risk of infection post border can be managed.

41. DAVID LAWTON

I am a veterinary consultant to the New Zealand pig industry. Presently I am employed by a private company that is specialised in providing veterinary and production services to commercial pig producers. The farms I service produce in excess of 30% of the annual kill. Previously I was employed as the Senior Lecturer in Pig Health at Massey University. In addition to my work with individual farmers, I also do work for nutrition, marketing and pharmaceutical companies, the NZPIB and MAF. Over the years I have been employed by MAF to investigate a number of suspicious disease events that have involved pigs both within and outside the industry. Several of these events, such as the *Trichenella* investigation in 2001, have involved small backyard pig keepers. Through these, I have had the experience of investigating on-farm practices (such as feed management) and of tracing pig movements within the backyard sector, a sector that I was previously virtually unaware existed. I was also involved in the initial diagnosis of PMWS on the index farm and was engaged by MAF to assist in the ongoing investigation into that disease over two years. As part of that investigation alone, I investigated 49 herds, many of which were backyard operations.

My exposure to the backyard sector is relatively unique amongst those in the pig industry. Many of the properties with backyard pig herds that I have investigated are situated in close proximity to other large commercial herds that I service routinely, yet prior to the identification of these properties through various and often necessarily creative means, neither I nor the commercial farmer has been aware of their existence. The need to investigate these herds has generally arisen because of contacts with other potentially at risk herds. These epidemiological links are often hard to puzzle together as information is not always forthcoming, but when the links emerge it is clear that they are numerous and that there is a complex network of regular and haphazard contacts within this sector. Pig breeding on these properties is common and pigs are freely traded between properties for all sorts of reasons. As much of the activity is “under the table”, much of it is hidden. In addition to the trading of live pigs which obviously provides the greatest potential for disease transmission, it is not uncommon for food sources to be shared amongst properties. Almost without exception these small pig herds are fed a variety of food waste that is derived from every available source. These sources include restaurants, bakeries, hospitals, supermarkets and large food processors. The food itself is a mixture of cooked and uncooked waste that ranges form supermarket green waste to reject pies. On more than one occasion I have personally seen uncooked pork cuts in such waste. For instance, a large diary farm that I used to service while at Massey used to run about half a dozen sows around their unused wool shed. Each of these sows would have a litter or two each year. In addition to these pigs, they also had four pens on another section of the farm in which pigs that were sourced from the East Cape were fattened. All of the pigs were fed a mixture of waste from the dairy shed (e.g. withheld milk) and scraps sourced from the Linton Army Base. These scraps frequently included material that was clearly pork, such as ribs and bacon scraps, and that I suspect came both from the kitchen and from plate scrapings, and that I also suspect included at least some material that was uncooked. I was always concerned by this particular set up as personnel from the army base frequently travelled to countries such as Indonesia and I could envisage a potential pathway for material unwittingly brought back from overseas reaching these particular pigs and for a serious disease of national importance such as Foot and Mouth virus to be introduced. Through my subsequent experiences with the backyard sector I now realise that this example is not unique and, if anything, is typical.

I believe that the activities of backyard pig keepers are a risk for the introduction of an exotic disease. Some of these diseases, such as PPRS, are fairly pig specific, while others such as FMD are highly infectious to a range of livestock. Many of the activities of backyard pig keepers are also very suited for the rapid transmission of disease between herds and regions of the country. Some in MAF recognise this and have sought to understand the backyard sector more fully. This led to a call for proposals for research funding from the MAF Operational Fund to characterise the population of backyard pig herds in an area surrounding the Auckland International Airport, as this is seen as the perhaps the most risky of this risky sector (Project number EOI-35). Because of my experience with backyard pig keepers and the concern I have regarding many of their activities, my interest in this group was raised and I submitted a proposal jointly with Ian Barugh, also of Massey University, to do this work. MAF chose not to fund the research as the funding required exceeded their anticipated budget for this project.

I have reviewed the recently released Import Risk Analysis entitled Porcine reproductive and respiratory syndrome (PRRS) virus in pig meat and the sanitary measures it proposes to manage the risk that pig meat imported from countries with PRRS presents to the New Zealand pig industry.

I am very disappointed in this analysis and the measures proposed as I believe it to be heavily biased in favour of a relaxation of the current sanitary measures, despite the evidence that the analysis itself provides that shows that this will greatly increase the risk of PRRS virus entering and establishing in New Zealand. This evidence is dismissed, and thus the proposed changes justified, on the back of a number of subjective and largely false assumptions. Were these assumptions correct, the proposed changes to the sanitary measures that are currently in place might be reasonable, the problem is they are not! From my wide and ongoing experience within the New Zealand pig industry and of the many backyard pig keepers that are not part of the industry, I believe the authors show very little understanding of either of these sectors in addition to their apparent lack of objectivity. As a result, the authors have proposed changes to the current sanitary measures that on the data that they themselves provide, will not adequately manage the risk of PRRS entering New Zealand and infecting the national herd.

While it is possible to point out a number of places within the analysis where the scientific research is unfairly represented, for the most part I am not concerned about these issues as most of the conclusions drawn from the science by the authors are acceptable. They conclude:

1. that PRRS is a hazard
2. that a portion of the pig meat imported from countries affected by PRRS will contain PRRS virus
3. that some of the imported meat infected with PRRS will contain virus that is capable of infecting a pig after it has been thawed should the pig be exposed to it

In other words, the authors accept that PRRS virus will enter New Zealand in pig meat imported from countries affected by PRRS and that some of this meat will be infective at the point of its end use where, <u>**if**</u> it is fed to a pig, it may infect that pig with the virus. The only relevant questions then become:

1. how much (kg) of imported pig meat is likely to contain virus?

   how much (kg) of this meat is likely to be infective at the point of use?

2. how likely is it that some of the infective pig meat will be fed to pigs?
3. how likely is it that the infection of one or more pigs will lead to infection of the national herd?

4. what are the likely consequences, should this occur?

The Import Risk Analysis in essence attempts to answer these questions. Its answers are wrong for the reasons covered below..

1 how much (kg) of the imported pig meat is likely to contain virus and how much (kg) of this meat is likely to be infective at the point of use?

Using historical import data and the data provided in the review, I estimate that at least 25 tonne of pig meat will be infective at the point of use. Between June 2003 and June 2004, 8,855 tonne of pig meat was imported into New Zealand from counties affected by PRRS. [2] Of this, 97% was frozen.[3] If it assumed that all of the remaining 3% was processed in a manner that inactivates PRRS (e.g. as salami etc), then the relevant tonnage is 8,580. Using the data of Magar and Larochelle (2004) to which the authors attribute some importance, it is expected that 103 tonnes of this meat will contain virus sufficient to be detected by PCR. With freezing and thawing the titre of virus declines, such that after freezing at -23^{0}C, 75% of samples that had had sufficient virus for detection by viral isolation, no longer had detectable levels after 10 days.[4] The level of virus that can be detected using this technique is said to be $10^{1.8}$TCID per g of meat.[5] Note, however, that in Table 15 data is presented that indicates that there is still some probability of infection following ingestion of only 1 g of this meat. As dose is dependent on both virus titre and the quantity of meat ingested, without making an assumption about the expected quantity of meat that will be ingested it is not possible to make a precise estimate. The authors conclude that it is reasonable to assume that the virus titre decreases by 75% from that present at slaughter over one freeze and thaw cycle. This is not an unreasonable assumption, although it is does not necessarily follow that 75% of meat is no longer infective. Thus, any estimate of the amount of meat that is infective at the point of use is crude at best. However, if it is assumed that all of the 103 tonnes of imported meat that was expected to harbour virus (PCR positive) in 2003/2004 is infective and that 75% of this infectivity is lost during a freeze and thaw cycle, 25,750 kg of pig meat would have been infective to pigs at its point of use in that year were it not for the existing sanitary measures.

Note that the authors in the executive summary[6] state that there is a low likelihood that frozen pig meat from a country with endemic PRRS will harbour the virus when imported into New Zealand. As 1.2% of pig meat imported from North America (where PRRS is endemic) is expected to harbour the virus[7] the description of the likelihood as "low" is misleading when referring to a recognized hazard. Such a description is generally reserved for risks that are less than 1 in 1 million or 0.0001% in this context.

2 how likely is it that some of the infective pig meat will be fed to pigs?

The authors correctly conclude in the executive summary that the threat of imported pig meat that contains PRRS virus leading to the infection of a New Zealand pig only exists if a New Zealand pig is exposed to this meat. However, they then go on to state that an exposure pathway would only exist on pig farms that were not complying with the garbage feeding

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[2] Table 2, page 4.

[3] 2.1.1, page 3.

[4] $.1.3, page 35.

[5] 4.2, page 37.

[6] Page 1

[7] 4.1.4, page 36.

regulations. While this statement is technically correct in that, within the population of pig farms, transmission will only occur if a farmer fails to comply with the regulations, it is at the same time very misleading as it fails to identify the exposure pathway that would exist on properties where small herds of pigs are kept and the owners fail to comply with the garbage feeding. This omission is conspicuous by its absence given that the authors accept that there are over 7,000 properties[8] on which a small herd of pigs is kept that **are not** pig farms and they state that "it is **very likely** that kitchen waste would be fed to these pigs, whether or not the householders are aware of the of their obligations under the garbage feeding regulations of 2005".[9] A more appropriate conclusion would be that "a potential exposure pathway is likely to exist on many of the more than 7000 properties on which a small herd of pigs is kept but that are not recognised or registered as pig farms". By omitting to identify this exposure pathway in the executive summary, the risk of exposure is grossly misrepresented. It is possible that this was an oversight.

My own experience, some of which is described earlier in this letter, is that for the most part backyard pig keepers are not pig farmers and it would be unusual for them to describe themselves as such. The specific example that was given earlier was on a dairy farm with more than 600 cows. This farmer considers himself to be a dairy farmer and at the time that I viewed Agribase records at the then NCDI, the presence of pigs on this farm had not been captured by that system.

Although the existence of an exposure pathway via backyard pigs is acknowledged in the test but not the summary, the authors conclude that it is unlikely that backyard pigs will be fed sufficient scraps for infection to occur. This conclusion is based on a number of largely subjective assumptions, all of which I consider to be either wrong or questionable. Firstly, it is assumed that a pig must eat about 500 g of infective pig meat to receive an infectious dose simply because this quantity of meat was used in transmission studies. There is no basis for this assumption, although the work on which this assumption was derived does perhaps show that when 500 g of meat is fed, the probability of infection is high[10] and that sufficient virus is provided to establish infection even when the titre of virus is below that detectable by virus isolation. [Four of the recipient pigs that became viraemic by day 3 had been fed meat from which virus could not be detected by virus isolation either before or after freezing i.e. the titre was less than $10^{1.8}$TCID per g.] Given the detection limit of $10^{1.8}$TCID per g cited in the analysis, as virus could not be detected in the meat before the sample was frozen, all of these pigs became infected after receiving no more than $10^{4.4}$TCID. However, if as the analysis suggests, 75% of the virus is lost through a freeze/thaw cycle, these pigs possibly received less than $10^{3.9}$TCID. In other words, there is no reason to suggest that pigs need to ingest more than 1 g of meat that has a titre of $10^{3.9}$TCID or more to become infected. Thus, the authors comment[11] that it is unlikely that scraps in quantities similar to those used in the transmission studies will be generated in kitchen waste from households is irrelevant. In addition, as noted earlier, many of the scraps that are fed to backyard pigs do not originate from household kitchens, but are sourced from the kitchens of large institutions, restaurants

[8] This number is derived from Agribase which is incomplete. In addition, it does not include properties in the South Auckland area where the density of backyard pig keepers is believed to be very high. It is possible therefore that the total number of such properties may exceed 15,000.

[9] 4.2.5.2 page 44.

[10] Three days after feeding, 50% of recipient pigs were viraemic.

[11] 4.2.6 page 44

and so on. Even if any importance was to be given to the 500 g quantity, to assume that such commercial kitchens would not generate this volume of scraps is presumptuous.

One of the reasons why the authors suggest that the amount of scraps will be low and thus available for pig feed, is that the proposed changes to the sanitary measures will only apply to high value cuts. Although what constitutes a high value cut is not defined as such, reading of the analysis suggests that they include chops, steaks and roasts.[12] While I accept that these will yield less scraps than some other cuts, that they yield a little bit of trim is likely. In a commercial kitchen, a little bit of trim from many cuts can surely add up to a lot? It is also well known that at times whole cuts are discarded for a variety of reasons including because a product may be past its 'use by' date. There is no recognition of the potential for large quantities of high value cuts to be discarded at retail level because it is close to or past its 'use by' date. .

3 how likely is it that the infection of one or more pigs will lead to infection of the national herd?

The authors state that should pig farms in New Zealand become infected with PRRS, the likelihood of spread to other pig farms would be low as long as standard biosecurity practices are observed.[13] This statement indicates a lack of understanding of the probable vectors of spread in New Zealand and of standard biosecurity practices on New Zealand pig farms, and thereby misrepresents the risk to commercial pig farms. It is also quite inconsistent with the experience of other countries that do have PRRS.

From my experience with backyard pig keepers, my expectation is that PRRS would spread rapidly within this sector. While I agree that epidemic fadeout would occur on some units,[14] the frequency of contacts between both people and pigs in this sector would probably result in such herds becoming re-infected over and over again. As these small herds are scattered throughout New Zealand, while there is more than 3 km between most pig farms, most pig farms have one or more small herd of backyard pigs nearby. While many routes of transmission between the backyard herd and that on the pig farm would be eliminated if the pig farm adhered to basic biosecurity procedures, some transmission routes such as aerosol spread are simply beyond the control of the farmer.

In the South Island where almost half of the sow herds on commercial farms are housed and farrow outdoors, seagulls are ubiquitously present. The behaviour of these birds is very conducive to the spread of diseases that are capable of being spread in pig faeces as the birds regularly move between farms, and clearly they make little distinction between a backyard pig herd and a commercial unit – their primary incentive being the presence of food. Commonly seagulls become entrained to the usual feeding pattern on a farm and will fly in just as feeding time approaches, stomp around the feeding area (often amongst the sows) and then fly off to the next farm once the food has been eaten. It is through this behaviour that we suspect PMWS has spread between farms in Canterbury over the past eight months.

There is no "standard" biosecurity practice in New Zealand, although we have encouraged producers to implement biosecurity measures both at an individual and industry level. For example the NZDPIB has a Farm Biosecurity Policy document that I developed for them at

[12] 4.2.2.3 page 40

[13] Executive summary, page 1.

[14] 4.3.1.2, page 48.

their request a few years ago and that is referred to in the analysis.[15] The proportion of pig farmers that implement all of the recommended practices outlined in that policy is small, although it has increased since PMWS was recognised. Nevertheless, I am aware of individual farms that have developed PMWS despite having very comprehensive biosecurity programs. The bottom line is that a pig farmer can only control those factors that are under his or her control. While they may insist that only clean trucks come onto their property, say to deliver feed or cart pigs, they are ultimately dependent on the integrity of the trucking company or driver for compliance.

4 what are the likely consequences, should PRRS be introduced?

If PRRS virus was introduced into New Zealand, the impact on individual producers and the industry as a whole would be catastrophic. In the report the authors refer to American work[16] that showed that farm profit is expected to be reduced by as much as 80% in the year of an outbreak. As part of the service I provide to some of my clients, I benchmark their annual accounts. Through this process I am familiar with the true profitability of many of their businesses, and one of the indices I monitor in order to evaluate their "financial health" is their interest coverage ratio. In order to sustain an 80% reduction in profit and yet remain viable, assuming all else remained equal, they would require an ICR of 5. None of them achieve this. Individual farms would vary in their ability to sustain a negative cash flow and in their ability to secure finance to support running costs during this time. Amongst those without other equity against which to borrow, a portion would not be able to continue. The impact on these farmers and to a lesser extent their staff would be severe. It is the authors[17] opinion that the consequences of PRRS introduction would be negligible apart from the direct losses to affected farms. I consider this naïve. Pigs have to eat. On commercial pig farms in New Zealand, over 270,000 tonnes of feed is consumed annually and most of this is either grown in New Zealand or derived as a by-product from other industries e.g. milk powder, meat and bone meal, poultry offal. There are also many other support and service industries that benefit from the pig industry e.g. trucks cart pigs and feed and abattoir workers kill pigs.

Proposed management of the risk

In my opinion the risk that uncooked pig meat from PRRS affected countries presents to the New Zealand pig industry is misrepresented by the authors. The assessment of this risk as it is summarised in the executive is inconsistent with the data provided in the analysis itself. This is a concern. Nevertheless, the authors acknowledge that the risk is non-negligible and propose sanitary measures to manage the risk of PRRS virus being introduced with meat imported from PRRS affected countries. Essentially these measures involve one of two options

1 treatment (heat or pH) in an approved facility **<u>if the meat is not</u>** a high value, consumer ready cut

2 **<u>no</u>** treatment if the meat is a high value, consumer ready cut.

I find it very difficult to see how the second of these measures can be considered sufficiently reliable or how it can be considered a measure at all. It simply cannot be justified given the

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[15] Footnote, page 50.

[16] 4.3.1.3, page 49

[17] 4.3.2, page 50

content of the analysis, unless one accepts the unsubstantiated and often ill-informed assumptions that are made in the document.

In summary, the assumptions that are wrong but that are essential for the recommendation that has been proposed are

1. that high value cuts will yield no or extremely little waste that will not enter the food waste chain
2. that if these cuts do yield waste the amount will be so low that it is very unlikely to result in disease
3. that if PRRS does enter New Zealand it is unlikely to spread to and throughout the national herd.

If the recommendations that are made in this analysis are accepted, a dangerous precedent will have been set. This analysis should not only be of concern to the New Zealand pig industry, but to all persons who value rural New Zealand, its productivity and the contribution it has made to development and ongoing economic and social success of this nation.

I would welcome any opportunity to elaborate further on any comments I have made in this letter.

42. JOHN R CLIFFORD

Thank you for the opportunity to comment on the New Zealand document, “Import risk analysis: Porcine reproductive and respiratory syndrome **(PRRS)** virus in meat.” The Animal and Plant Health Inspection Service (APHIS) is pleased that New Zealand is revising its import policies for pork meat to reflect current science on PRRS, although we feel that it would have been more appropriate to notify the World Trade Organization about the risk assessment to ensure that all trading partners were aware of the document and had opportunity to comment.

The risk assessment is well written and conforms to guidelines from the World Organization for Animal Health. You indicate that the main risk of import and spread of PRRS virus is posed by feeding uncooked scraps to domestic swine. It is currently illegal in New Zealand to feed uncooked meat scraps to swine, yet before this prohibition there were no outbreaks of PRRS. Therefore, we would conclude that the final assessment of risk is negligible, as opposed to your designation that the risk is non-negligible.

APHIS is pleased that the risk mitigations will allow importation of uncooked, consumer ready, high-value cuts of pork for direct export. We are also happy that there will be an option for uncooked pork to be processed upon arrival into consumer-ready, high-value cuts of pork. We would like to verify that uncooked pork offals and trimmings can be exported from the United States to New Zealand for sausage production.

We look forward to future revisions of the risk assessment as additional science becomes available on PRRS. We have enclosed comments from the U.S. pork industry for your consideration.

43. JOY PHILIPPI

The U.S. pork industry is pleased to have this opportunity to offer industry comments on the Import risk analysis: Porcine Reproductive and Respiratory Syndrome (PRRS) in pig meat. We have formulated comments to the conclusions stated throughout the import risk analysis: "Porcine reproductive and respiratory syndrome (PRRS) virus in pig meat." These conclusions will be addressed individually.

The first conclusion in the document states that there is a low likelihood of the PRRS virus being present in the pig meat at the time of slaughter (page 35, Section 4.1.2.5, last sentence). We concur, as various scientific studies have investigated PRRS infectivity at slaughter and support this conclusion.

The second conclusion indicates that it is likely PRRS infectivity will persist in chilled and frozen pig meat during storage and transport (page 36, Section 4.1.3, last sentence). Based on this second conclusion, the report states that "it is considered that there is non-negligible likelihood that chilled or frozen pig meat from a country with endemic PRRS will harbor infectious PRRS virus when imported into New Zealand" (page 36, Section 4.1.4, last sentence).

The risk assessment goes on to acknowledge that from 1998 to mid-2005 there were no regulatory controls enforced in New Zealand on the feeding of food waste to pigs. Despite this, New Zealand has remained free from PRRS virus. As stated in the document, the fact that this did not result in the introduction of PRRS suggests that the likelihood of effective exposure to PRRS virus via pig meat is remote. In an attempt to explain this, the document stated the following facts:

1) About 97% of all imported pig meat is imported frozen, and although PRRRS virus can survive in frozen meat, a single freeze/thaw cycle can be expected to reduce the amount of PRRS virus in pork by 75%, such that the likelihood of an infectious dose being present in meat that was imported in frozen form is only 25% that of meat that was imported chilled.

2) About 95% of imported frozen pork would have been further processed before being sold to consumers in New Zealand. Such processing commonly involves cooking, which would inactivate any residual PRRS virus present.

3) Most chilled meat would have been held for a total of 7 days between slaughter and sale to consumers in New Zealand, over which time about 90% of any PRRS infectivity present would be lost.

4) The increasing importation of higher value consumer-ready cuts would have meant that there would have been limited trimming prior to cooking and therefore limited generation of raw scraps.

An examination of historical trade, combined with the four observations provided above, argue for negligible, not non-negligible, risk.

A third conclusion states that "it is considered that for piggeries complying with the garbage feeding regulations the likelihood of exposure to infectious PRRS virus in pig meat is essentially zero, and for other piggeries the likelihood of exposure is very low" (page 45, Section 4.2.6, last sentence). Since July 2005, the feeding of untreated meat or untreated food waste to pigs in New Zealand is prohibited. As stated in the report, "Clearly, if the regulations are complied with by all pig farmers, then there cannot be any exposure pathway by which

PRRS virus in imported pig meat could cause infections in New Zealand pigs.” Assuming that New Zealand will continue to enforce their regulations banning untreated food waste feeding, the risk of pigs being exposed to PRRS through ingestion of pig meat is therefore negligible.

Yet, even with consideration to all these points, the overall conclusion in the report is that the risk of importing PRRS in pig meat is considered non-negligible because science has not identified the minimum amount of uncooked pork that contains an infectious dose of PRRS virus (page 50). Two research papers (Van der Linden et al 2003, and Magar and Larochelle 2004) were sited throughout the report as finding PRRS is infective to pigs in pig meat when fed 0.25-1 kg of meat per day. The Import risk analysis: “Porcine reproductive and respiratory syndrome (PRRS) virus in pig meat” also correctly states that this large amount of uncooked scrap is unlikely to be accessible to pigs. It is notable that the meat in the Magar and Larochelle study was stored at -70^{o}C which maximizes survival of the virus but which is a temperature well below the common temperature used for frozen meat transport (-20^{o}C). Therefore, you can reasonably expect negligible risk of PRRS transmission in pork that is held or transported at -20^{o}C or greater because viral survival will be negatively affected.

Therefore, when considering the facts discussed above, the science supports the conclusion that there is a negligible likelihood of release of the PRRS virus in imported pig meat. We hope that New Zealand will develop import policies on PRRS consistent with a science-based risk analysis, and take into full account the concerns mentioned in this letter.

In the meantime, it is our understanding that, on the basis of the current risk assessment, the United States would be allowed to export high value pork cuts, but prohibited from exporting pork offal or pork trimmings to New Zealand. While we are clearly opposed to import policies that would in any way restrict the import of U.S. pork, we would appreciate confirmation that our reading of the current risk assessment is correct.

The U.S. pork industry appreciates the opportunity to comment on the New Zealand PRRS risk assessment, and is willing to offer further clarification if needed.

44. DR DEBBIE BARR

GENERAL COMMENTS

It is the opinion of the Animal Health Risk Assessment (AHRA) group that the generic risk analysis on porcine reproductive and respiratory syndrom (PRRS) virus in pig meat is a very thorough, well documented and transparent document. Canada appreciates the opportunity to provide comments.

APPROACH

• As a general comment, AHRA agrees with the principles of the methodology used. It is legitimate to attempt a generic assessment that will ensure that all trading partners are treated the same way, as it provides consistency. Canada has used this generic approach in the past, such as for horse importations. However, the disadvantage of this approach is that it treats all trading partners as if they are at the same level of risk, regardless of their situation.

• The New Zealand risk assessment looks at one possible hazard (PRRS), and if the virus is present in the exporting country, restrictions are applied without determining the country situation. This could be unfair since the prevalence of the disease, detection capability, controls in place and management practices will have a direct impact on the release assessment, and would result in variable levels of risk.

• It is the opinion of AHRA that a generic risk assessment should have enough flexibility to adapt to the situation of the exporting country. In other words, an exporting country such as Canada should be able to have a release assessment more adapted to its situation, with would therefore be more accurate in regards to the potential risk to the importing country (New Zealand).

ASSESSMENT

• The Canadian Food Inspection Agency (CFIA) provided scientific review comments on the 2005 draft of the risk analysis, and many of those comments have been addressed in the final document.

• In 1995, the AHRA group performed a risk assessment on PRRS in Canadian pork meat. The outcome was that the likelihood of infection in exporting up to 30 000 tonnes of Canadian pork meat, would be 1 infection in 2755 years (0.03% chance), with a 95% confidence level. This outcome is considered extremely low and is in agreement with the outcome of the New Zealand release assessment, which is essentially negligible risk for New Zealand piggeries complying with garbage feeding regulation and very low for piggeries not complying with garbage feeding regulations.

• Experimental infection of pigs due to ingestion of contaminated meat was demonstrated, however it was never reported in the field. The experimental infection was done through ingestion of 500 to 900 g of meat fed over two consecutive days. The New Zealand risk analysis has not demonstrated that swine in New Zealand would likely be exposed to such a large quantity of infected meat resulting from importing contaminated pig meat.

• The New Zealand risk estimate for PRRS virus in imported pig meat is negligible for any farm complying with the garbage feeding regulation. The assessors assumed the likelihood of exposure is higher for farms not complying with garbage feeding regulations, but could not estimate this likelihood because of lack of information concerning the minimum amount of uncooked meat that contains an infective dose. In the absence of that information, they concluded this risk estimate as non-negligible.

• In our opinion, the New Zealand risk assessment took a conservative approach.

SUMMARY OF THE ASSESSMENT

• The risk management options proposed in the New Zealand's Import Risk Analysis: *PRRS Virus in Pig Meat* do not address the option of reducing the likelihood of exposure by improving compliance by New Zealand producers with their 2005 garbage feeding regulations.

• Mitigating measures recommended to be applied to pork meat exported to New Zealand are based on the assessment of the disease caused by PRRS virus, and include:

Pig meat for export to New Zealand be:

either

from a country free from PRRS (not applicable to Canada);

or

treated prior to import or on arrival, in officially approved facilities, by approved cooking or pH change (already a requirement for processed pig meat products from Canada);

or

in the form of consumer-ready, high value cuts;

or

further processed on arrival in New Zealand, in an officially approved facility, into consumer ready, high value cuts.

• Canadian access to the New Zealand pork market has been hampered by technical barriers. In 2001, New Zealand imposed new requirements suspending the importation of unprocessed pork products, including from Canada and the US, due to alleged concerns about PRRS. The measure requires that imported pork must be either cooked in the exporting country or in a transitional facility in New Zealand, similar to Australian measures imposed upon Canadian unprocessed pork for several years.

• The recommendations in this document, if adopted, would allow export to New Zealand of uncooked Canadian pork in the form of consumer ready high value cuts or uncooked pork for further processing on arrival in New Zealand, in an officially approved facility, into consumer-ready, high value cuts.

APPENDIX 2

INTRODUCTION

The key technical issues raised in the submission from NZPIB (see section 4.30 of the main section of this document) were sent, together with a copy of the risk analysis, to the following internationally recognised PRRS experts for further technical comment.

- Kelly Lager, Veterinary Medical Officer, USDA, Ames, USA.
- Brian Meehan, Senior Lecturer, RMIT University, Melbourne, Australia.
- Jeff Zimmerman, Associate Professor, Iowa State University, USA.
- Scott Hurd, Director WHO collaborating center for risk assessment and hazard identification in foods of animal origin, Iowa State University, USA.
- Scott Dee, Professor, College of Veterinary Medicine, University of Minnesota, USA.
- Robert Desrosiers, Technical service veterinarian with Boehringer Ingelheim (Canada) Ltd.
- Montse Torremorell, Health Director, Genus Plc, Franklin, Kentucky, USA.

This appendix is divided into the following sections:

1) A summary of the comments from the experts mentioned above

2) General comments from experts, with MAF's responses

3) Comments made by experts in response to specific points raised by NZPIB, with MAF's responses.

1. SUMMARY

The opinions of these experts regarding the technical points raised show that there remains some disagreement regarding the issues discussed. These discussions can be broadly divided into general comments regarding the overall level of risk associated with PRRS virus in imported pigmeat, the use of PCR assay results in the risk analysis, the approach the risk analysis took when faced with uncertainty (especially in relation to the likelihood of airborne spread of the virus), and miscellaneous points relating to individual studies.

It must be acknowledged that there remain uncertainties regarding a number of technical issues discussed in this appendix and consensus amongst the experts who have contributed to this debate would therefore be unlikely. However, reflecting upon the points raised by these experts and the matters discussed in the published risk analysis and in the main body of this review of submissions, it is concluded that the recommendations of the risk analysis are sound and should be considered for incorporation into an import health standard for the importation of pig meat.

Summary of general comments

Although Dr Lager was unable to respond to specific points raised, he believed that the risk of transmission of PRRS virus to New Zealand via the importation of fresh or frozen pork products was 'extremely low'. Similarly, Professor Dee stated that, especially considering the history of imports into New Zealand, he believed that there was a negligible likelihood of release of PRRS virus in imported pig meat. Dr Desrosiers concluded that the likelihood of

PRRS infected meat serving as a source of infection for New Zealand pigs appeared to be very low, but non-negligible, indicating broad agreement with the conclusions of the risk analysis.

However, Dr Hurd suggested that the magnitude of the risk considered had not been adequately quantified in the published risk analysis and he would have liked to have seen greater use of the available data to produce more ‘informative’ results.

Summary of comments regarding PCR data

Dr Meehan commented that the risk analysis had been dismissive of RT-PCR assay data and that longer viral persistence had been demonstrated using these assays whilst Dr Hurd stated that the risk analysis had depended too heavily on virus isolation results which seemed to have a low sensitivity. Dr Desrosiers was of the opinion that the ‘safe’ approach would be to consider pigs that are PCR-positive as more likely to be infected with live virus than not.

However, Professor Zimmerman stated that the PCR test was not what ‘we expected it to be’ and that perfect performance of this test was very rare. Professor Zimmerman went on to state that there is a major disconnect between PCR positive data and the presence of infectious virus, that PCR positive results in the absence of infectious virus was meaningless, and that PRRS virus PCR positives commonly occur completely in the absence of infectious virus. In agreement with this, Professor Dee stated that no conclusions could be drawn on the ability of a PCR-positive sample to harbour infectious virus, let alone infect susceptible pigs.

Summary of comments regarding scientific uncertainty

Dr Hurd indicated that, where there was any uncertainty, more stringent risk management measures were appropriate and that he believed that herds with good biosecurity could pick up new, highly virulent strains of PRRS virus from unknown sources and that many routes of transmission were unknown. However, Professor Dee described how current work was increasing our ability to accurately determine how herds get infected and that such studies now make is feasible to develop cost-effective biosecurity plans to protect commercial herds against infection with PRRS virus. Professor Dee went on to state that the ability to eradicate PRRS virus from herds was well documented and that vaccination, whilst not perfect, had advantages.

Dr Desrosiers provided an extensive commentary supporting the argument that aerosol transmission was a significant mechanism of spread although this was based on field observations in ‘hog-dense’ areas, and not on experimental studies. Based on these observations, he concluded that that air filtration plus good biosecurity measures would be necessary to protect farms located in areas where there are other PRRS-infected farms. Dr Desrosiers suggested that questions persisted regarding the causes of indirect transmission between herds and the significance of these and also noted that “one should not see area/aerosol transmission everywhere and in all unexplained cases of PRRS contamination.”

Dr Torremorell commented on the unpredictable effects that PRRSv can have in an endemic situation and questioned whether or not disease would be readily identified in New Zealand following introduction where infection was associated with mild clinical signs. Dr Torremorell also discussed uncertainty in relation to the minimum infectious scrap size and the role of transport in the dissemination of PRRSv infection between farms.

Summary of miscellaneous comments

Professor Dee questioned the value of studies conducted on experimentally-infected animals and went on to argue that, based on studies performed in market-age animals, the risk was lower than that described in the import risk analysis.

Dr Meehan agreed with the NZPIB that it cannot be assumed that a PRRS incursion into New Zealand would be a strain of lower virulence although Professor Dee stated that such a possibility did exist and could not be ruled out.

Professor Zimmerman agreed that further work on aerosol transmission was needed although he dismissed the idea that stains of virus would show differing abilities to be transmitted via this mechanism.

Dr Meehan expressed concern regarding the implications of a ‘meat juice’ study (unpublished) mentioned in the NZPIB submission. However, Professor Dee, one of the authors of this study, dismissed the implications of this work as it had used acutely infected pigs rather than persistently infected animals.

Dr Torremorell discussed how production systems in place in the United States were thought to be delaying the age at which pigs become viraemic with PRRS which would impact upon the predictions of the quantitative model shown in the risk analysis

2. GENERAL COMMENTS FROM EXTERNAL REVIEWERS

Kelly Lager comment: "I am not able to make the time to provide an adequate review of the "PRRSV in Pigmeat Risk Analysis". I was able to skim through the document and the literature review seemed adequate. As I have stated previously, I believe experience has proven that the risk of transmitting PRRSV to New Zealand via the importation of fresh or frozen pork products is extremely low. In general, I believe the risk analysis states the same conclusion, perhaps a different choice of words, but the same conclusion. I wish you the best of luck on resolving this issue."

> ***MAF response:*** Noted.

Brian Meehan comment: "All-in-all the NZPIB have done a logical "tour de force" and it is hard to disagree with their central thesis. In essence, they have you over a barrel and the onus will be on you to substantiate the RA further. You got off to a bad start in being so dismissive of the RT-PCR assays [I agree to a certain extent]... I have 2 major points. 1. Ensure that all pig swill is adequately treated as apart from PRRSV there could be other "bogy man" viruses in the pork. ... 2. On page 9 they refer to an article that I cannot seem to find. It is really important but regardless in vivo assays are the ones that count. If you are tasked with getting supporting information then in vitro assays can be criticised but it is hard to argue with a seropositive or seronegative pig. Forget about in vitro assays of infectivity at the end of the day the ultimate arbitrator will be the pig."

> ***MAF response:*** MAF disagrees that the risk analysis was dismissive of RT-PCR results as discussed in the response to 4.30.19 above. The interpretation of PCR results in the context of the published risk analysis is discussed at length below.
>
> Any import health standard developed using the MAF risk analysis on PRRS virus in pig meat will also consider other potential hazards which may be present in imported pig meat based on the recommendations of MAF's earlier publication *The importation into New Zealand of meat and meat products – a review of the risks to animal health* (see: www.biosecurity.govt.nz/files/pests-diseases/animals/risk/meat-meat-products-ra.pdf).
>
> The paper by Scott Dee referred to has not yet been published although details of this work can be seen in the Proceedings of the 19th IPVS Congress, Copenhagen, Denmark, 2006 (see: www.ipvs2006.dk/restricted/2006/VIRAL/ O_04-03.pdf). This study does appear to demonstrate that meat juice from PRRS-infected pigs may contain sufficient virus to transmit infection. This work could challenge any assumption that the quantity of meat used in feeding studies represents a minimum infectious dose. However, as clearly stated in *Key Statement 4,* the risk analysis did not consider the quantities used in feeding trials (500-900g) to suggest a minimal infectious scrap size. Professor Dee further comments on the interpretation of this work later in this appendix.

Jeff Zimmerman comment: "I went through the technical points, albeit quickly. Much of the document does not actually seem to deal with introduction of PRRSV via meat - and I let these parts slide.

Couple of general comments -

it is true that some of the literature is under-cited, but is very difficult to keep up. Anyway, the initial report was whole in substance, even if it lacked the latest frosting.

PCR is not the test we expected it to be. It is very dangerous to generalize because there is a huge range in performance among labs running PRRSV PCR (see Truyen et al. 2006. A ring test performed in Germany to assess RT-PCR detection methods. J Vet Med B Infect Dis Vet Public Health 53:68), but Truyen shows that perfect performance is very rare. In my opinion, there is an increasing body of awareness that, in some cases, there is a major disconnect between PCR positive and the presence of infectious virus. There is an interesting article that just came out documenting problems with PCR (see attachment)[18]. In this case, the vertebrate which is subject of the article is the prairie dog, but we think we are seeing similar results in pigs."

> ***MAF response:*** The comments made above regarding the possible major disconnect between PCR-positive samples and the presence of infectious virus are consistent with our response to 4.30.19 above.
>
> As discussed in our response to 4.30.19 above, the recent study of the role of prairie dogs in transmission of PRRS in the United States mentioned by Professor Zimmerman concluded that "tissue samples, in particular, are subject to high backgrounds and spurious false-positive results, and that RT-PCR should not be relied on exclusively to provide evidence of PRRS infection, especially when additional test methods, such as serology, are available, or when the PCR results are near the limit of assay sensitivity." MAF believes that it is appropriate to note comments such as this, in peer-reviewed publications, when considering PCR-based results.

Scott Hurd comment: "I realize how hard this is to do a risk assessment and I don't want to be critical. Hopefully, my comments will help risk managers to judge the work and make appropriate decisions based on its output and comments of others. The bottom line question is not so much the methods, data and assumptions, but whether the risk management recommendations are reasonable and effective, and if they pose a justifiable burden to NZ pork producers and consumers.

Overall, the analysis could be termed as accurate in that it reports a "non-negligible" risk of PRRS due to importation of pork meat. What remains unclear is the magnitude of that risk. This problem is, of course the weakness in a qualitative analysis; non-negligible could be 1 in 1 billion or 90%. I think much of the criticisms noted in the (NZPIB document) were due to the non specificity of the results, particularly in the Release and Consequence assessments. For example, the (NZPIB document) says "inaccuracies have the effect of underestimating the risk". However, since the risk estimate was not quantified, this statement is unsupportable.

Another difficulty with qualitative results is they may not be very informative. For

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[18] Baker RB, Yu W, Fuentes M, Johnson CR, Peterson L, Rossow K, Daniels S, Daniels AM, Polson D and Murtaugh MP (2007) Prairie dog (*Cynomys ludovicianus*) is not a host for porcine reproductive and respiratory syndrome virus. *Journal of Swine Health and Production* 15(1), pp22-9.

example the Release Assessment concludes there is a "non-negligible likelihood …that meat will harbour infectious PRRS virus." In my opinion, it would have been possible to use the detailed quantitative data presented in combination with the model in Appendix 1, to present a result such as the number of days in a year the infectious PRRS virus might actually be reported. An example is shown in that section below.

Finally, the risk characterization and the Risk Management discussions were incomplete. The feasibility and impact of proposed management options should have been evaluated. It is difficult to tell if the risk justifies these measures, if the measures can be accomplished, and if their impact will be worth the benefit."

> ***MAF response:*** The above comments indicate that this reviewer would have preferred MAF to have adopted a quantitative risk assessment methodology throughout instead of the qualitative methodology largely used in the published import risk analysis. As stated in the introduction to this review of submissions and in the introduction to the published risk analysis, the risk analysis framework was applied by MAF as described by Murray (2002)[19] which states (2.7) the following:
>
> "No single method of import risk assessment has proven applicable in all situations, and different methods may be appropriate in different circumstances.A qualitative risk assessment is essentially a reasoned and logical discussion of the relevant commodity factors and epidemiology of a hazard where the likelihood of its release and exposure and the magnitude of its consequences are expressed using non-numerical terms such as high, medium, low or negligible. **It is suitable for the majority of risk assessments and is, in fact, the most common type of assessment undertaken to support routine decision-making** … Quantification involves developing a mathematical model to link various aspects of the epidemiology of a disease, which are expressed numerically. The results, which are also expressed numerically, invariably present **significant challenges in interpretation and communication**." (emphasis added)
>
> The above text also appears in volume 1 of the OIE risk analysis handbook which was published in 2004[20]. Further to this, Article 1.3.2.3 of the OIE Terrestrial Animal Health Code 2006 states that "Both qualitative risk assessment and quantitative risk assessment methods are valid."
>
> MAF recognises the value of both quantitative and qualitative methodologies although the challenges of interpretation and communication described above by Murray and the OIE, and difficulties with quantitative models in the absence of reliable data are significant factors which should be considered before undertaking a quantitative risk assessment.

Scott Dee comment: "First and foremost, despite all the efforts everyone has put forth attempting to assess the risk of the introduction of PRRSV into New Zealand via pig meat,

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[19] Murray N (2002) *Import risk analysis animals and animal products*. New Zealand Ministry of Agriculture and Forestry, Wellington, New Zealand.

[20] Murray N, MacDiarmid SC, Wooldridge M, Gummow B, Morley RS, Weber SE, Giovannini A and Wilson D (2004) *Handbook on import risk analysis for animals and animal products, volume 1*. OIE, Paris, France.

history argues against it. For the record, let me re-state an opinion rendered in my previous report:

"I have a fundamental criticism of the overall conclusion of the risk assessment stating that there is a non-negligible likelihood of release of PRRS virus in imported pig meat. This statement is clearly not supported by history. As documented in the analysis, despite the importation of tons pig meat for many years from countries endemically infected with PRRSV, New Zealand is still PRRSV-free. Fundamentally, this does not make sense".

However, the NZPIB argues against history and attempts to identify inaccuracies in the section on Hazard Identification in the IRA, stating that not only does the risk exist, but it has been underestimated (page 5, lines 19-25). I then critically reviewed the response to the key points and have formulated the following opinions regarding each of them."

> ***MAF response:*** MAF interprets the above comments to indicate broad agreement with many aspects of the published risk analysis, especially section 4.2.3 (evaluation of historical imports). Professor Dee also further indicates that, in his opinion, MAF has over-estimated the risk of introduction of PRRS virus into New Zealand through the importation of pig meat. Section 4.2.6 of the published risk analysis (exposure assessment conclusion) agrees that for piggeries complying with garbage feeding regulations the likelihood of exposure to infectious PRRS virus in pig meat is essentially zero. However, as it is not unreasonable to suggest that, unfortunately, an unknown number of piggeries may choose not to comply with these regulations, MAF concluded that (without sanitary measures) such units may have a low likelihood of exposure to PRRS virus through imported pigmeat.

3. SPECIFIC COMMENTS IN RESPONSE TO POINTS RAISED BY THE SUBMISSION FROM NZPIB

The following summary was extracted from the NZPIB submission to convey the key technical concerns raised. As described above, this was sent together with a copy of the import risk analysis to a number of internationally recognised experts for comment. The comments of these experts are included below within the context of the summary document they were sent.

KEY SUBMISSION POINTS FOR FURTHER EXPERT OPINION

Biosecurity New Zealand, 3 November 2006

3. HAZARD IDENTIFICATION

PRRSv persistence in blood (viraemia) and other tissue

NZPIB states: Of key importance is a clear understanding of PRRSv persistence in blood (viraemia) and other tissue. In section 3.4.3 (page 12) of the IRA, several relevant studies have not been cited that reveal the true potential for PRRSv to persist in swine. The third paragraph of this section notes persistence of 35-40 days in the blood of young pigs and up to 16 weeks in neonates infected prior to birth. The issue of viral persistence in non-blood tissue has only been selectively reported in the IRA. The longest period of viral persistence in any tissue that is cited is Batista's 2004 study showing PRRSv was present in swine lymphoid tissue for up to 135 dpi. A partial list of studies that describe the extent of virus persistence and that have particular relevance to this IRA are listed below. While this IRA does cite information from some of these studies, data generated from the use of PCR techniques has been disregarded in the IRA, without justification.

Brian Meehan comment: "The big problem was in the working you used in the RA as you were very dismissive of the value of RT-PCR measurements. Page 1 and 9 are perhaps the most damning comments on your risk assessment."

> ***MAF response:*** MAF disagrees that the risk analysis was dismissive of RT-PCR results as discussed in the response to 4.30.19 above. The issue of interpretation of PCR data within the context of the published risk analysis is discussed in detail below.

NZPIB states:

Design	Finding(s)	Test	Reference
Piglets infected in utero, late gestation.	Tonsil and lymph nodes positive through 132 dpi.	Virus isolation (VI)	(Benfield et al 2000)
	PRRSv transmitted to sentinels through 112 dpi.	VI	
Random slaughter pigs at abattoir	85.4% seropositive	Enzyme linked immunosorbent assay (ELISA)	(Wang 1999)
	7.9% positive sera	Reverse transcriptase polymerase chain reaction (RT-PCR)	
1-2 month old, exp. Infected pigs	6 of 10 pigs infected at 84 dpi.	Swine Bioassay (BA)	(Allende et al 2000)
	2 of 5 pigs infected at 150 dpi.	BA	
Piglets infected in utero, late gestation.	Serum positive through 48 dpi.	VI	(Rowland et al 2003)
	Serum positive through 228 dpi.	RT-PCR	
2 wk old, exp. infected pigs.	7 of 28 pigs carrying virus between 168 and 251 dpi.	RT-PCR	(Wills et al 2003)
	3 of 28 pigs carrying virus through 251 dpi.	RT-PCR	
Experimentally infected pigs	18 of 18 pigs infected in various tissues at 60 dpi.	VI	(Zimmerman et al 2000)
	11 of 12 pigs infected in various tissues at 70 dpi.	VI	
3 wk old, exp. Infected pigs.	10 of 11 pigs were infected in various tissues through 105 dpi.	BA, VI or RT-PCR	(Horter et al 2002)

It is evident from this information that PRRSv persistence is an important feature of the disease. The virus is routinely found in multiple tissues of the pig, including blood, for months after infection. Collectively, these studies suggest that the vast majority of pigs remain infected for at least 60 dpi with multiple studies demonstrating PRRSv in pigs well beyond the maximum of 157 days stated in the IRA.

Brian Meehan comment: "I appreciate where you were coming from with regard to your dismissal of the RT-PCR measurements but they (NZPIB) are correct; longer persistence has been demonstrated using RT-PCR"

> ***MAF response:*** As previously indicated, the risk analysis was not dismissive of RT-PCR results. Moreover, the comments from Professor Zimmerman below and the response to 4.30.19 in the body of this review of submissions illustrate that interpreting the results of RT-PCR tests as demonstrating viral persistence may not strictly be accurate. MAF considers that, on the basis of comments from experts such as Professor Zimmerman, our interpretation of these results has been appropriate.

NZPIB states: The IRA needs to consider all the relevant scientific literature regarding PRRSv persistence, which shows longer persistence of PRRSv. Incorporation of this data into the risk model will result in a higher level of risk.

Jeff Zimmerman comment: "Collectively, these studies suggest that the vast majority of pigs remain infected for at least 60 dpi with multiple studies demonstrating PRRSv in pigs well beyond the maximum of 157 days stated in the IRA." I would not agree – there is one study showing recovery of infectious virus at 157 days (and a couple manuscripts working their way through the system that will report recovery of infectious virus at 160-165 days). PCR positive in the absence of infectious virus is meaningless. There is increasing evidence that PRRSV PCR positives commonly occur completely in the absence of infectious virus. I have attached a recent publication showing an extreme, but well-documented example of such."

> ***MAF response:*** The above comments indicate the difficulty in interpretation of RT-PCR results. In view of these comments and further to our response to 4.30.19 above, MAF believes the risk analysis has placed appropriate emphasis on published studies which have used RT-PCR techniques to examine the persistence of PRRS virus infections in pigs. Furthermore, it should also be stressed that any different interpretation of such data would only impact upon the model described in appendix 1 of the published import risk analysis and that MAF chose to use the results of the Magar and Larochelle (2004)[21] experimental study in the release assessment conclusion in preference to the lower predictions of the quantitative model.

Scott Dee comment: " The NZPIB criticizes the IRA for excluding data on the detection of PRRSV by PCR (page 1, lines 19-12). They then provide a lengthy list of studies to support their claim that PRRSV persists in the pig for longer periods than the IRA reported, thereby elevating the risk. In my opinion, the prior exclusion of PCR-based studies is justified, due to the fact that this assay only detects the presence of RNA, not viable virus. Therefore, no conclusions can be drawn on the ability of a PCR-positive sample to harbor infectious virus, let alone infect susceptible pigs.

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[21] Magar R and Larochelle R (2004) Evaluation of the presence of PRRS virus in pig meat and experimental transmission following oral exposure. *Canadian Journal of Veterinary Research* 68, pp259-66.

In regards to the studies used by the NZPIB to support the importance of persistence, I find only one of them (Wang 1999) pertinent to the question at hand. This paper reports the detection of PRRSV RNA in the serum of randomly sampled market swine at an abattoir, stating that 7.9% of sampled animals were viremic at the time of slaughter. Due to the fact that the viremic period in finishing pigs is rather short in duration (1-2 weeks in length, (Batista and others, CJVR 2002)), these animals were clearly acutely infected, providing ample opportunity for muscle tissue to harbor infectious virus, according to findings by Cano and others (Vet Rec, accepted).

In my opinion, the remaining persistence studies referenced by the NZPIB are not applicable to the risk of pig meat as a vehicle for PRRSV, due to the fact that they all deal with chronically infected animals and focus their testing on lymphoid tissues, not meat. Furthermore, many of the studies are terminated prior to the age when animals would be slaughtered. This latter point is important because attempts to detect PRRSV in carcasses have been inconsistent. Two studies by Magar and others (Vet Rec 1995 and CJVR 2004) have evaluated the presence of virus in slaughter pigs. The former study found PRRSV at 7 days post-infection in 6-month old finishing pigs, but not at 14 days post-infection. Also, meat samples from 44 randomly selected swine at slaughter were negative on all tests employed. In the latter study, across 1027 meat samples collected from naturally infected, slaughter-age animals only 19 (1.9%) were PRRSV positive by PCR and only 1/19 successfully demonstrated the presence of infectious virus.

In conclusion, these data suggest that the results found under commercial conditions may be very different than those found when animals are experimentally infected (with doses of virus which may be unrealistically high), when infection occurs at a pre-determined point in time (third trimester of gestation), which tissue type which is tested lymphoid/pulmonary vs. meat) and when infected animals are evaluated (acute vs. chronic). Therefore, I find their argument that the issue of persistence would elevate the risk invalid. I would further argue that based on the work done in market-age animals, the risk should be lowered in the IRA."

> ***MAF response:*** As previously indicated, MAF does not believe that the published import risk analysis was dismissive of PCR data. However, the above comments by Professor Dee and earlier comments by Professor Zimmerman illustrate the difficulty in interpreting the PCR data as indicating the persistence of viable PRRS virus in pigs.
>
> Submissions received indicate that a number of stakeholders may have struggled with the interpretation of PCR results discussed in the published import risk analysis which has led to some confusion regarding the value and meaning of such data. MAF hopes that commentary from internationally recognised experts in this field, such as Professors Zimmerman and Dee, can help to resolve this misunderstanding.
>
> MAF would also like to re-iterate that any different interpretation of such PCR data would only impact upon the model described in appendix 1 of the published import risk analysis and that MAF chose to use the results of the Magar and Larochelle (2004)[22] experimental study in the release assessment conclusion in preference to the lower predictions of the quantitative model. Therefore, any

[22] Magar R and Larochelle R (2004) Evaluation of the presence of PRRS virus in pig meat and experimental transmission following oral exposure. *Canadian Journal of Veterinary Research* 68, pp259-66.

subtle changes to the model associated with a less rigorous interpretation of PCR data would be unlikely to have a significant impact on the results of the published risk analysis.

Robert Desrosiers comment: "Most of the information available in the literature suggests that pigs can remain infected with the PRRS virus for extended periods of time (several months). For now the longest period where infectious virus was identified by virus isolation is 157 days. The longest period where viral genetic material was detected by PCR is 251 days. One can argue that the many studies where results are based on PCR may detect virus that is non infectious, but we certainly have many examples of situations where specimens that were negative by virus isolation but PCR positive were found to contain live virus. In fact we even have situations where PCR negative specimens were actually proven to contain live virus.[23,24] This fortunately does not appear to be frequent. Given the much greater sensitivity of PCR compared to virus isolation and the fact that in various experiments PCR-positive samples were determined to contain live virus, the safe approach seems to be to consider pigs that are PCR-positive as more likely to be infected with live virus than not.

Another point that would logically have to be taken in consideration is the actual period of time for which pigs seem to retain their capacity to infect other pigs. In other words if pigs are infected with the virus on day 0, how long will they be able to infect negative sentinel animals placed directly in contact with them? We could refer to that period as the shedding period. The data suggest that it is considerably shorter than the carrier period. Desrosiers[25] reviewed that topic and in nine studies, the shedding periods were the following: transmission at 8 weeks, but not at 20 and 26 weeks post infection; no transmission at 77 and 91 days; no transmission at 90 days; transmission at 42 days, but not at 56, 70 and 84 days; transmission at 56 days, but not at 70 and 83 days; transmission at 60 and 62 days, but not at 67 and 69 days; transmission at 86 days; and transmission at 99 days. So up to date, the longest identified shedding period, for pigs infected after birth, is 99 days. In one study pigs infected in utero (infection of pregnant sows at day 90 of gestation) were able to infect sentinel pigs at 64, 84, 98 and 112 days of age, but not at 260 days. In another study where again sows were infected at day 90 of gestation, the pigs of these infected sows were able to infect sentinel pigs at 154 days of age, after being subjected to movement stress and given exogeneous corticosteroids. In this study however it was difficult to determine if pigs were really infected in utero, or sometimes after birth.

Most pigs are infected with PRRS virus after birth, and the shedding period of such pigs appears to be quite a bit shorter than the carrier period. One would think that if pigs have a hard time to infect other pigs by direct contact after a period of about 10 to 14 weeks, the capacity of their meat and tissues to infect other pigs could also be much reduced after a certain time. This is important since it is clear that in most situations, pigs become infected with this virus when they are young, and in most cases before they are 12 weeks old. There

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[23] Allende R, Laegreid WW, Kutish GF, Galeota JA, Wills RW and Ozorio FA (2000) Porcine reproductive and respiratory syndrome virus: Description of persistence in individual pigs upon experimental infection. *J Virol*, 74, pp10834-7.

[24] Desrosiers R, unpublished data.

[25] Desrosiers R (2004) Epidemiology, diagnosis and control of swine diseases. *Proc Am Ass Swine Vet*, 2004, pp9-37.

are however cases where pigs become infected later and thus closer to the time when they are slaughtered. These would obviously constitute the greatest risk. While these cases are certainly not the norm, they do occur and as such have to be included and considered in the analysis."

> ***MAF response:*** The comments from Dr. Desrosiers regarding interpretation of PCR data differ from those put forward by Professors Zimmerman and Dee. These differences of opinion clearly illustrate the difficulties associated with interpretation of such data. MAF believes that the risk analysis reflected these difficulties and was not dismissive of PCR results but instead took a circumspect approach to their interpretation. Moreover, it should again be emphasised that if the risk analysis had chosen to acquiesce with those regarding the PCR as a more reliable test for the presence of infectious virus, this would have only affected the mathematical model presented in appendix 1 of the published document. As indicated above, MAF chose to use the results of the Magar and Larochelle (2004)[26] experimental study (1.2%) in the release assessment conclusion in preference to the lower prediction of this model (0.3%).
>
> The period of time for which pigs seem to retain their capacity to infect other pigs would have no effect on the outcome of the published risk analysis as the issue relevant to pig meat is the period of time following infection that the meat remains infectious to another pig if eaten.
>
> The age at which a pig is likely to become infected is discussed in section 4.1.2.1 of the published risk analysis and modelling of the available data for this is shown in figure A2 of the mathematical model described in appendix 1 of that document. However, again it should be stressed that subtle variations in that model would have no effect on the conclusion of the release assessment which chose to use the results of the Magar and Larochelle (2004) study instead of the lower prediction from the model.

Clinical impact of PRRS infection

NZPIB states: Section 3.4.4 (page 13) of the IRA, refers to "…reproductive problems are therefore considerably less dramatic" in endemically infected farms with clinical signs generally being limited to immunologically naïve animals. This is correct in principle. However there is no assessment about the extent to which New Zealand herds are in the stable state which would allow infection to become truly endemic.

Montse Torremorell comment: "(The term stable should not be used for New Zealand herds at this point since it refers to positive populations. NZ is negative to PRRSV and therefore all herds should be considered naïve and at risk. The terminology "stable" is confusing in my opinion).

Regarding the statement in page 13 (also previous paragraph). The IRA only refers to the effects in endemic breeding herds. However, this is not quite correct for growing pigs. In endemic herds the real cost remains the cost in the growing pigs due to mortality and effects

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[26] Magar R and Larochelle R (2004) Evaluation of the presence of PRRS virus in pig meat and experimental transmission following oral exposure. *Canadian Journal of Veterinary Research* 68, pp259-66.

on growth, medication and feed efficiency. The IRA refers to the effect of the virus in endemic breeding herds but it doesn't address the effect of the virus in growing pigs. In endemic herds the virus is kept active and circulating in growing pigs (nursery or early finishing stages), which is where the real costs are under endemic conditions (the cost will also depend on the sort of production system affected among other factors (farrow to finish vs. 3-site, etc)).

In addition, the IRA doesn't take in consideration the risk of a positive herd to become re-infected. In such conditions the effect of the new virus is unpredictable but the effect may range from very severe to very little effect."

> ***MAF response:*** Although section 3.4.4 of the published risk analysis does not directly address the issues raised above, section 4.3.1.3 of the consequence assessment section describes chronic production losses in weaners and fattener pigs associated with endemic PRRSv infection.
>
> The opening sentence of section 4.3.1.3 also states, "the clinical signs of PRRS infection are extremely variable, and depend on the strain of the virus, the immune status of the herd, the presence of intercurrent disease and management factors". This acknowledgement of unpredictability is mirrored in section 3.4.4 which states that, "clinical signs of PRRS are extremely variable, influenced by the strain of virus, the immune status of the herd, and management factors".

NZPIB states: Commercial pig farms in New Zealand average an annual replacement rate of breeding animals greater than 40%. This means that at any given time, approximately 17% of the breeding animals in the herd would not yet have reached their first parity and be likely to be immunologically naïve. A very high proportion of new breeding stock now comes from very high health status breeding herds, and these pigs are added to commercial herds at an age where they are immunologically naïve.

Jeff Zimmerman comment: "Replacement rate is the same in technified herds throughout the world. NZ is not unique"

> ***MAF response:*** Noted.

Montse Torremorell comment: "This may or not be correct. It will depend of the procedures utilized in NZ to introduce negative replacements in positive herds. It is recommended that in positive herds, replacements previously acclimatized (exposed, immune and recovered from the infection), are introduced in positive herds eliminating this way the risk to introduce naïve animals. In turn this will create a stable population (positive, immune with very limited active virus circulating in the breeding herd)."

> ***MAF response:*** Noted.

NZPIB states: Therefore the IRA comment about less dramatic impacts of PRRS is not applicable in New Zealand.

***Montse Torremorell comment:* "**I agree with this but mostly because of the effect in the growing pigs and the fact that in endemic breeding herds the PRRSV effects are often unpredictable (in many instances there are no effects but in other instances there are significant losses because endemic herds may become active).**"**

> ***MAF response:*** The clinical effects of PRRSv on growing pigs are discussed in section 4.3.1.3 of the published risk analysis which states, "acute losses could last 4-6 months, after which the disease is likely to become endemic and lead to chronic production losses in weaners and fattener pigs". This section goes on to state, "the economic consequences of PRRS are extremely variable and range from very serious to no obvious consequences". MAF is of the opinion that these statements reflect the effects of infection on growing pigs and their unpredictability.

NZPIB states: Beyond this, PRRSv is a typical highly mutable RNA virus and exists as multiple quasispecies within herds and within individually infected animals. At the herd level, the implications of this are that multiple strains of PRRSv (with unpredictable cross-protection) often circulate within a farm at the same time. (Rowland et al 1999; Dee et al 2001). This leaves the potential for entire breeding populations that could be considered immunologically naïve to particular strains of PRRS under the right circumstances, and new strains are regularly emerging which show differences in epidemiology.

The single reference used to support the claim that only 20% of seropositive herds show clinical signs and that the impact of the disease '*in many herds even the epidemic period does not have dramatic consequences*" (page 12 of the IRA) is one from Poland, where at the time accuracy of observation is likely to have been low to very low because of the nature of production and management. It does not accurately represent the international picture.

Montse Torremorell comment: " I agree with this observation. The impact of the epidemic forms are difficult to predict, since the impact will depend on a wide range of factors. However, for the purposes of this assessment, I would assume that an important % of NZ herds would experience obvious clinical signs. Another point of discussion is whether NZ producers would be able to identify the clinical signs fast enough to report them. They may just see some scours in the farrowing rooms with some reproductive disorders and consider those "normal" and these be gone after strict management procedures for controlling preweaning death."

> ***MAF response:*** As indicated above, the risk analysis acknowledges the difficulties of predicting the clinical outcome of introducing PRRSv into a herd due to a number of variable factors (such as strain of virus, immune status of the herd and management factors).
>
> Section 4.3.1.3 of the published risk analysis acknowledges that, even in the initial epidemic period, infections in finishing pigs, boars, unbred glits and sows often go unnoticed. This section does go on to indicate that in breeding herds one might reasonably expect to see clinical signs including marked increases in late-term

abortions, stillbirths and weak pigs, lowered farrowing rates, high death rates amongst weaned pigs and impaired sow fertility. However, it is also acknowledged in the risk analysis that not all herds may experience such dramatic consequences, even in the epidemic phase.

Please also refer to *Key Statement 14* in section 3 of this review of submissions document.

NZPIB states: There are numerous variant strains of PRRS which vary in virulence, but in general most strains should be considered capable of causing disease in pigs unless the virus has been specifically attenuated as in the case of modified-live vaccines. The disease in North America is demonstrated by more severe respiratory manifestations than in Europe making the disease much more troublesome in North American herds. Prolonged effects on overall herd productivity including effects on reproduction, growth, and mortality on these herds has resulted in an annual cost to the US industry of $560 million USD, or about $5.60 per pig sold. (Neumann et al 2005). There is a range of factors influencing virulence and severity. We cannot assume that a PRRS incursion into New Zealand will be a strain of lower virulence. The New Zealand pig industry should expect any incursion of PRRS virus to result in significant clinical disease in both breeding and growing pig herds.

Brian Meehan comment: "I agree with them"

MAF response: As indicated in the response to 4.30.23 above, the risk analysis has identified *all* strains of PRRSv as potential hazards. There is no assumption that an incursion of PRRSv into New Zealand will be associated with a low virulence strain of this virus.

Scott Dee comment: "I agree with the NZPIB's conclusion that the introduction of PRRSV into New Zealand would result in some level of clinical disease. However, while the authors state that they "cannot assume that a PRRS incursion into New Zealand will be a strain of lower virulence" (page 3, lines 23-24), this possibility does exist and cannot be ruled out. Furthermore, I do not agree with their over-conclusion regarding the potential for immunological naivety in previously infected breeding populations (page 3, lines 5-6). This infers a complete lack of cross-protection following prior exposure and this is clearly not the case. Partial to complete cross-protection against homologous and heterologous isolates of PRRSV has been demonstrated many times by many investigators, such as Murtaugh, Osorio, Lager and Mengeling. Recently, work by Cano and others (AJVR, accepted and Vaccine, manuscript under review) clearly demonstrated a significant reduction in clinical signs in previously exposed or previously exposed/vaccinated pigs challenged with a contemporary, highly virulent PRRSV isolate (MN-184) versus naïve challenge controls. Therefore, it is clear that some level of cross-protection between isolates does exist."

MAF response: Noted.

Robert Desrosiers comment: "There are indeed differences between the PRRS situations in various parts of the world. In Europe, some countries like France and the UK were affected with PRRS problems in the early nineties, but the situation has quite rapidly improved afterwards. In North America, countries like Canada and the US suffered severe losses following the upsurge of the problem, but are still struggling hard today. Some farms are breaking with PRRS almost every year, and the cases can be severe even though these herds were positive from previous contacts with other strains. The lack of cross protection between PRRS strains is one of the biggest problems that we have to face and deal with. The commercial vaccines that are presently available are producing good results in some situations, but not in others. Today the percentage of cases where PRRS losses are not acceptable is too high and the North American industry is looking very seriously at the possibility of trying eradication on a country or even a continent basis. Eradication attempts are actually already on their way in some areas, and they are discussed in others.

In essence what I believe has to be understood here is that if PRRS virus was introduced into New Zealand, the possibility for commercial herds to have serious economical problems, for a long time, is real. Among the main factors that would determine the outcome would be the virulence of the strain introduced, and the rapidity with which the New Zealand industry would detect its presence and be able to stop its diffusion. As will be seen below, limiting the transmission of this virus from one farm to another can be a very difficult task."

> ***MAF response:*** MAF agrees that PRRSv could potentially have serious economic consequences on affected farms. Section 4.3.1.3 of the published risk analysis states, "the economic consequences of PRRS are extremely variable and range from very serious to no obvious consequences".

Montse Torremorell comment: "Agree."

> ***MAF response:*** As indicated in the response to 4.30.23 above, the risk analysis has identified *all* strains of PRRSv as potential hazards. There is no assumption that an incursion of PRRSv into New Zealand will be associated with a low virulence strain of this virus.

Transmission of PRRS virus between herds

NZPIB states: The discussion of aerosol transmission of PRRS virus is not adequate and as a result, contributes to the inaccurate conclusion that *the likelihood of spread to other pig farms would be low as long as standard biosecurity practices were observed.*

The nature of bioaerosols and their role in disease transmission is a complex issue which has been the subject of considerable research, but it is difficult to investigate objectively, especially in experimental models. For example, there was clear field evidence for decades that *Mycoplasma hyopneumoniae* could spread between herds in physical proximity despite intensive biosecurity. Attempts to confirm the presence of the organism in air samples failed until a decade ago, when improved technology allowed confirmation to be achieved. There has been similar experience with classical swine fever virus. Aerosol transmission is very dependent on the precise micrometeorological conditions, and therefore it appears to be capricious and unpredictable, unless refined methods are used to study it. In the case of PRRS, as in FMD, it is likely that there is a very strong influence of strain variation in determining whether airborne spread occurs,

and experimental models are very questionable as a basis for drawing conclusions on the issue.

Jeff Zimmerman comment: "I would agree that more work on aerosols is needed. I would not agree that there is any evidence that one isolate is superior to another re aerosol transmission. If this were the case, the isolate better adapted to aerosol spread would eventually end up the dominant strain. One might suppose that this has already happened. So the theory is moot. It is true that there is one publication in which it is claimed that there are strain differences, but the experimental design cannot actually support this claim."

> ***MAF response:*** Please see the response to 4.30.24 above and also refer to *Key Statement 10* in section 3 of this document.

NZPIB states: It is very clear from the international literature that farms close to infected farms but with no known means of contact are at greater risk than more distant farms, and if the mechanism is not aerosol spread then it must be another spread mechanisms. In either case, transmission has undoubtedly occurred by means which circumvent on-farm biosecurity.

Montse Torremorell comment: "Dr. Scott Dee is currently in the middle of a study where he is evaluating the risk of aerosol transmission under field conditions. In this study, where he is conducting several replicates of the same model, he is proving that infection by aerosol is possible and a frequent event, under certain conditions (cold in MN with low temperatures and favourable winds) and that it is related to proximity to the infected unit and that infection was not possible by any other route. In addition, US experiences and research where farms have air filtration systems are less likely to get infected than farms without the filtration system, suggesting that under certain conditions the aerosol route is more likely to happen than previously assumed. Again, it's a combination of the right conditions and the frequency of the event triggering the favourable conditions."

> ***MAF response:*** Professor Dee has provided commentary on this ongoing study below. The published risk analysis has concluded that, based on the available studies, transmission of PRRSv by aerosols under field conditions was probably a rare event. MAF has not been able to identify any studies which have clearly demonstrated that aerosol spread is likely to be a frequent or significant factor in spread of infection between premises. Section 4.3.1.2 of the risk analysis does acknowledge the possibility that, rarely, transmission of PRRSv by aerosol may occur but such transmission is, in our opinion, likely to be only possible within infected barns.

NZPIB states: This IRA makes extensive use of a very dated publication about the epidemiology of PRRS (Albina 1997), rather than more recent findings. Since the time of this publication, additional information has been generated to describe the importance of different risk factors both in maintaining the infection, and transmitting the infection among swine populations. Sections 3.4.5.1 and 3.4.5.2 of the IRA identify infected pigs and semen as the two important means by which the virus can be spread. However Albina's idea that "…*so long as AI centres do not become infected, then control of PRRS can be achieved by standard biosecurity measures*." is no longer considered valid.

Brian Meehan comment: “Correct”

> ***MAF response:*** Section 3.4.5 of the risk analysis presents available evidence concerning the possible roles of animal movements, semen, fomites (such as boots, clothing and hypodermic needles), vectors (such as mosquitoes and ducks) and aerosols in the transmission of PRRS. Although there is questionable evidence regarding the role of vectors and aerosols (and this is discussed above in *Key Statement 10*), the overwhelming consensus is that animal movements are the most significant means of viral spread in most countries, with infected semen being the second most important route of transmission.

NZPIB states: Genetic suppliers worldwide have undertaken the task of eliminating PRRSv from their production systems. Torremorell et al, 2004 shared their findings in the PIC company about the cause for PRRSv elimination failures. Among the 35 PRRS-negative herds that experienced acute PRRS outbreaks after a prior successful elimination programme, 83% were thought to be a result of lateral introductions of the virus with only 17% attributed to semen or infected animals. (Torremorell et al 2004) These experiences come from a major genetic supply system with biosecurity procedures in place that at the time were state-of-the-art.

Montse Torremorell comment: “I agree with the above comment. Knowing what we know nowadays about PRRSV, breeding stock animals are a low risk for PRRSV introduction as long as the genetic supplier is negative and that the animals are first introduced through an isolation/quarantine facility where they can be isolated and tested. Most of the infections reported in the industry in the US are due to lateral infections (non-semen, non-pigs) either because of transport or area spread. Regarding semen, this is true as long as the boar stud doesn’t get infected through a lateral infection.

This IRA doesn’t report on the risk of transport as a mean of spreading PRRSV in NZ. Transport can be an important route of virus spread in a naïve system. It’s impact will depend on the NZ infrastructure for transporting pigs, the washing, disinfection and drying procedures and the in route risk of infection. It may be worth to comment on the risk of transport for the spread of the virus in NZ should an infection occur.”

> ***MAF response:*** MAF considers that transmission of infection through transport is included under the discussion of fomites (section 3.4.5.3) which includes vehicles as a suggested contributor to “area spread”. Section 4.3.2 (consequence assessment conclusion) suggests that standard biosecurity measures on commercial pig farms would include control of visitors and fomites onto the farm. Please also refer to *Key Statement 7* in section 3 of this review of submissions.

NZPIB states: The idea that standard biosecurity measures are in place on at-risk farms for PRRS is also unrealistically optimistic. The IRA points out that the proportion of pig-owning herds which are commercial in scale in New Zealand is well under 10% of the total number of herds. Few if any of the para-commercial herds are likely to practise worthwhile biosecurity. These latter herds are also the ones most likely to be the initial site of infection due to their feeding practices, while commercial herds would be exposed from these para-commercial herds. Since it has proved very difficult to keep infection out of the most biosecure segment of the US pig industry, the claim in the IRA that

infection would not spread within the industry observing standard biosecurity measures is unrealistic. Therefore the conclusions presented for the Consequence Assessment (see section 4.6.2) that *'for any pig farm adhering to standard biosecurity measures the likelihood of becoming infected with PRRS virus is considered to be low'* is a wrong assessment of the potential likelihood of infection.

Brian Meehan comment: "Are there not guidelines for the treatment of swill in NZ? If not there certainly should be there could be other even nastier bogey men viruses in the meat as well. In Europe they tend to blame a tourist with a ham sandwich for CSFV outbreaks."

> ***MAF response:*** This is covered by the Biosecurity (Meat & Food Waste for Pigs) Regulations 2005 which are discussed throughout the review of submissions. Please also refer to *Key Statement 5* in section 3 of this document.

Montse Torremorell comment: "I agree. In fact you won't know how good your existing biosecurity practices are until PRRSV is present. Biosecurity is a complex concept and it goes beyond downtimes and showers. However, not having personal experience and knowing much about the existing biosecurity practices in NZ, it is hard for me to comment on whether those would be effective enough should PRRSV enter the country. However, I would agree with the paragraph above where it is not likely to have strict biosecurity practices in the segment for backyard pigs or para-commercial production herds.

A key question for NZ is how much pig movement is there between herds? Are ones buying from each other? Are the buying stations where pigs are commingled and then distributed for fattening? These are key points to include in the assessment to really evaluate the risk of spread. Basically, what are the movements of pigs within the NZ industry? Let me know if you need me to elaborate more on this. The IRA has a nice summary on what's published but it doesn't extrapolate that to what would happen in NZ."

> ***MAF response:*** MAF acknowledges throughout the published risk analysis that there is a degree of uncertainty in predicting the outcome of introducing PRRSv into a herd in New Zealand and the conclusions of the risk analysis reflect our evaluation of the published studies as far as they can be reasonably applied to the New Zealand environment.
>
> Risk analysis is essentially a tool for predicting the future which needs to achieve a balance between acquiring perfect knowledge and obtaining reasonable estimates upon which to base predictions with a reasonable level of confidence. Any risk analysis is therefore likely to deal with some level of uncertainty.
>
> Murray (2002)[27] addressed how risk analyses should tackle issues such as this, "it is not acceptable to simply conclude that, because there is significant uncertainty, measures will be selected on the basis of a precautionary approach…Since it is very difficult or perhaps impossible to prove that a particular pathway does not exist, there will always be a degree of uncertainty. In some cases a pathway may be hypothetical rather than ascertainable. It is not appropriate to consider such pathways in a risk assessment".

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[27] Murray N (2002) *Import risk analysis animals and animal products*. New Zealand Ministry of Agriculture and Forestry, Wellington, New Zealand.

The risk analysis does consider movements of pigs between backyard herds and acknowledges that spread of infection would be likely in herds that introduced live animals or used semen from an index herd. However, spread from an infected backyard herd to a commercial herd observing standard biosecurity practices (including careful selection of breeding stock and other stock introduced – see *Key Statements 6* and *7*) would be most unlikely.

NZPIB states: All the current scientific literature regarding the risk factors associated with maintenance of infection and between herd transmission needs to be considered within the IRA in the Exposure and Consequence assessments. This literature demonstrates that there is a considerable risk of transmission despite standard biosecurity measures. Incorporation of this data into the risk assessment will result in a higher level of risk.

Brian Meehan comment: "Once any such virus is introduced it is just a complete "can of worms"!"

MAF response: Noted.

Scott Dee comment: "I agree with the NZPIB that the Albina article is outdated and no longer valid. However, based on current work in progress from our group (Pitkin and others), the statement made by Torremorell in her 2004 publication that it is "difficult to determine how most herds get infected" (page 7, lines 28-29) is also rapidly becoming inaccurate. Furthermore, the biosecurity practices for the genetic company referenced in the study (page 4, lines 23-25), in my opinion, can no longer be considered in "state of the art". I base many of these opinions on preliminary data from a study on PRRSV transmission and biosecurity that is underway at our Minnesota-based Swine Disease Eradication Center research farm (Pitkin and Dee). The study has been running for almost 1 year and is scheduled to be completed in May 2007. Its purpose is to identify routes of PRRSV spread, record their frequency and test whether various intervention strategies can reduce risk of virus entering neighboring "farms" using a model of a swine-dense production region. While these data are preliminary, we have been able to determine routes of transmission between herds and observe evidence of aerosol spread of PRRSV over a distance of 120 meters between experimentally infected source populations and outlying sentinel populations. However, when a biosecurity program involving an air filtration system is utilized, infection via airborne spread is eliminated, and populations of naïve pigs are successfully protected, despite being placed within close proximity to a highly infectious and contagious source population. Furthermore, similar results are being observed in the field, where boar studs utilizing air filtration systems are remaining PRRSV, swine influenza virus and Mycoplasma hyopneumoniae free, despite being housed in a swine-dense region of the Midwest USA.

The significance of these data as they pertain to New Zealand is as follows: should PRRSV enter New Zealand, it is my opinion that cost-effective biosecurity plans could be developed in short order to protect herds at risk. Therefore, the spread of the virus between herds has a good chance to be contained to circumscribed areas. In regards to the argument made about the inability of the para-commercial herds in New Zealand to practice worthwhile biosecurity (page 4, lines 28-29), rather than continuously reference this limitation, I suggest the NZPIB devote the proper resources, time and effort towards correcting the problem, instead of continuing to use it as a means to argue their position."

MAF response: In light of the above comments, MAF approached Professor Dee for further details regarding this current study[28] and we were told that, so far, people and fomites were seen to be the major route of PRRS virus transmission identified, followed by airborne spread and insects. Professor Dee also confirmed that this study was only looking at indirect routes of transmission so the role of pig and semen movements were not included in this study. Professor Dee also commented that this current study would "put an end to the mystery of area spread and give us answers on how to prevent it from happening".

MAF considers the above comments to be consistent with section 3.4.5 of the published import risk analysis (transmission between herds). Furthermore, Professor Dee's comments regarding the feasibility of cost-effective biosecurity plans to protect herds against PRRS virus are consistent with *Key Statements 6* and *7* in section 3 of this document and contrast with suggestions from a number of stakeholders that such measures would impose an unnecessary financial burden on local producers and have only limited effectiveness.

Professor Dee further commented that the demonstration of airborne spread of an experimental PRRS virus infection over a distance of 120 meters described in his comment above had occurred between two sheds and did not use the experimental system described in his earlier studies[29] which demonstrated movement of PRRS virus in aerosol form through a PVC pipe over a distance of 150 meters. In this earlier report it was acknowledged that these studies involved large volumes of air inoculated with a high concentration of virus and transported at high speeds, and that these results "cannot be extrapolated in the field" and it was concluded that "in the field, the transmission of PRRSv by aerosols is probably a rare event, if it occurs at all". Section 4.3.1.2 of the risk analysis discusses the likelihood of airborne spread from a backyard herd and states "research carried out since the late 1990s has led to general agreement that in the field the transmission of PRRS virus by aerosols is probably a rare event, and that if it occurs at all it is likely to be possible only within infected barns". MAF considers that a preliminary (unpublished) report of experimental airborne transmission of PRRS virus over a distance of 120 meters is not inconsistent with this conclusion. The risk analysis does not state that aerosol transmission does not occur, but rather that this method of spread is likely to be of little significance in the field.

Robert Desrosiers comment: "This is an interesting topic since opinions on it have significantly changed over the last few years. It is true that not so long ago, many scientists and academicians were stating that pigs and semen were the two main sources of PRRS contamination of swine farms. It is also true that for a time there was a belief that observance of good biosecurity rules would prevent introduction of the PRRS virus into swine barns. So producers and their veterinarians have gone to all types of efforts and expenses to conceive and apply stricter and stricter biosecurity programs, only to find that in many cases this was simply not good enough. In spite of all their efforts, the virus kept finding its way into many

[28] Dee S. E-mail to Stephen Cobb 19/2/07

[29] Dee SA, Deen J, Jacobson L, Rossow KD, Mahlum C and Pijoan C (2005) Laboratory model to evaluate the role of aerosols in the transport of porcine reproductive and respiratory syndrome virus. *Veterinary Record* 156, pp501-4.

of the herds applying these programs. Boar studs are an excellent example of that situation. Because of the enormous impact that contamination of boar studs can have, the biosecurity measures observed for them are at the highest possible level. Still many boar studs are breaking every year in the US and Canada, and the causes for these outbreaks are frequently not found.

The fact of the matter is that in many countries most PRRS breaks are not associated with the introduction of infected pigs, which would be classified as direct contact, but to indirect contact, which means infection associated with anything other than the introduction of infected pigs. Desrosiers[30] recently reported the results of some studies or trials where this was investigated. Table 1 shows the results that were obtained.

Table 1: Percentage of PRRS cases where indirect transmission was considered to be responsible for the outbreak.

Reference	*Country*	*Cases*	*Indirect transmission %*
Robinson, 1992	***UK***	***100***	***82***
	Belgium	***81***	***91***
Larochelle et al, 2003	***Canada***	***226***	***81***
Desrosiers, 2004	***Canada***	***44***	***100***
Torremorell et al, 2004	***USA***	***35***	***97***

As can be seen, indirect transmission was responsible for 81 to 100% of the cases reported in these investigations. This also fits with findings from Baekbo et al[31], who reported that in Denmark, only 15 to 20% of PRRS cases were thought to be associated with introduction of infected pigs, and 80 to 85% were thought to be associated with area spread.

Two of the big questions that remain today are:

- What are these causes involved in the indirect transmission of the PRRS virus between farms?

- What is the relative importance of each of these causes? In other words, what percentage of cases are associated to contaminated trucks or fomites, to aerosol, to contaminated semen, etc.

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[30] Desrosiers R (2006) Indirect transmission of the PRRS virus (Part 1). *International Pigletter*, November 2006, Vol 26, No 9c.

[31] Baekbo P, Mortensen S (2001) Aerosol transmission of swine pathogens. *Proc Allen D Leman Swine Conf*, pp30-6.

Without this knowledge, it is difficult to determine where time, efforts and money should be spent in preventive measures.

Desrosiers[32,33] has recently reviewed the literature on the possibility for the PRRS virus, among other pathogens, to get transmitted by aerosol. It is becoming quite clear now that this pathogen can get transmitted that way, and this is at least one of the reasons why it seems to be so difficult to keep it out of the barns, particularly in hog dense areas. Air filtration is one technique that has been used successfully to prevent introduction of the PRRS virus by aerosol. Of the 35-40 units that I know to be installed with a complete air filtration system, none has broken with PRRS yet. And some of these farms are located in areas where they should not remain negative. I have visited one such farm in Brittany, France, an area where about 50% of the swine production of the country is concentrated. Within a radius of three km from this farm there are 23 other hog farms, which are all thought to be PRRS positive, and a slaughter house that is slaughtering two million pigs a year. This farm, which was equipped with air filtration and populated eight years ago, is still PRRS negative. In a very nice experiment that is still going on, Dr Scott Dee is recreating conditions that are a bit similar to those that are seen in hog dense areas. His experiment is showing that the virus can get transmitted to a unit where biosecurity rules are maximal, but that is not equipped with air filtration. However the unit with the same biosecurity measures but with air filtration remains negative.[34] Overall what this means is that air filtration plus good biosecurity measures can keep the virus out, but not the latter alone if the farm is located in areas where there are other hog farms around.

Intuitively we would think that for area spread of microorganisms to occur, the size of the source of infection matters, and in fact this has been proven scientifically. In that respect, if only a few pigs in a backyard become infected with PRRS virus, this should constitute a much lower infection risk than if a large herd becomes infected. However one example here appears to be particularly relevant to that question. A large PRRS-negative sow farm was located in an area where only PRRS-negative pigs were thought to be present.[35] This farm broke without any obvious explanation and a thorough epidemiological investigation was undertaken. It was eventually discovered that about 0.8 km from the farm, a small property kept 12 backyard pigs of unknown status. Nobody knew about the presence of these pigs and in fact it was learned that they had been there only for a short period of time. The owner was contacted and agreed to let samples be taken on these pigs to determine if they were PRRS positive, and if so, if a sequence of the strain could be obtained and compared with the one that made the farm break. The samples revealed that the pigs were PRRS-positive, a positive PCR was obtained and the sequence was found to be 99.7% homologous to the strain responsible for the farm break. A combination of results form the backyard pigs suggested that these pigs were infected with the PRRS strain before the farm break. In all likelihood, these backyard pigs appeared to be responsible for the contamination of a large sow herd. And the losses were not limited to that single farm. The closest farm to the index case (about 1.6 km) was the second one to break. Infected pigs from that herd were sent to a nursery, and eventually into

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[32] Desrosiers R (2004) Epidemiology, diagnosis and control of swine diseases. *Proc Am Ass Swine Vet*, pp9-37.

[33] Desrosiers R (2005) Aerosol transmission of swine pathogens: overview of the subject and evaluation of suspected field cases. *Proc Am Ass Swine Vet*, pp405-16.

[34] Dee S (2006) The next ten years in animal health. *International Pigletter*, Dec 2006, Vol 26, No 10b.

[35] Daniels CS (2003) Area spread of PRRS virus from a small population of backyard pigs. *Proc AASV pre-conference Seminar on: Preventing and controlling PRRSV: mission impossible?* Orlando, Florida. pp29-33.

gilt developers and this led to the contamination of several other herds (Daniels S, personal communication, 2003). This example illustrates that a very tiny potential source of contamination was most likely responsible for what became a large PRRS outbreak affecting many farms of that system. How the virus may actually have gone from the backyard pigs to the sow farm is unknown, but the two main possibilities would appear to be insects or aerosol.

The question of how far the PRRS virus could travel in the air, or through area spread between farms remains an open debate. In most cases where we believe from epidemiological investigations conducted in North America that area spread, most likely aerosol, was involved, the distances were of about 2 or 3 km or less.[36] This would fit quite well with what we know of the aerosol transmission of Mycoplasma hyopneumoniae.[37,38] It would also fit with the early investigations in UK and Belgium that were reported by Robertson[39]. Of the first 100 cases reported in UK, 63 were thought to have been caused by aerosol, and all of them involved distances of 3 km or less. Of 81 cases studied in Belgium, 56 were thought to have been caused by airborne spread, and of these 90% involved distances of two km or less. In an epidemiological study conducted in Denmark, Mortensen et al[40] evaluated the risk of becoming infected depending on the distance to an infected herd. Without going into details, for 100 days of exposure if a farm was located 1 km away from an infected herd, this farm was 1.5 times more likely to become contaminated compared to a similar farm that would have no infected herds within a radius of 3 km. If the farm was only 300 meters away to an infected herd, then the risk was 45 times greater. In Quebec it does appear that farms that are PRRS negative and located three km or more from infected premises are often able to maintain their PRRS-negative status over significant periods of time. On the opposite those that are located in areas where swine production is more intensified, so closer to infected farms, usually, sooner or later, become infected.

There are however cases in the literature where transmission of PRRS virus by area spread was hypothesized on longer distances than that. For example, Lager et al[41] reported cases of suspected area spread between farms where distances were between 1 and 13 km, and in the case of one farm 33 km. Similarly the contamination of Denmark is thought to have occurred through aerosol from infected herds in Northern Germany distanced by about 15 km.[42] This however would have been mainly over water, which we know can increase the distance that microorganisms can travel in the air. Time will tell eventually if the virus can on occasion travel such distances in the air.

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[36] Desrosiers R (2005) Aerosol transmission of swine pathogens: overview of the subject and evaluation of suspected field cases. *Proc Am Ass Swine Vet*, pp405-16.

[37] Desrosiers R (2004) Epidemiology, diagnosis and control of swine diseases. *Proc Am Ass Swine Vet*, pp9-37.

[38] Desrosiers R (2005) Aerosol transmission of swine pathogens: overview of the subject and evaluation of suspected field cases. *Proc Am Ass Swine Vet*, pp405-416.

[39] Robertson IB (1992) Porcine reproductive and respiratory syndrome (blue eared pig disease): some aspects of its epidemiology. *Proc Soc Vet Epi Prev Med*. Edinburgh, Scotland. pp24-37.

[40] Mortensen S, Stryhn H, Søgaard R, Boklund A, Stärk KDC, Christensen J and Willeberg P (2002) Risk factors for infection of sow herds with porcine reproductive and respiratory syndrome (PRRS) virus. *Prev Vet Med*, 53, pp83-101.

[41] Lager KM, Mengeling WL, Wesley RD (2002) Evidence for local spread of porcine reproductive and respiratory syndrome virus. *J Swine Health Prod*,10, pp167-70.

[42] Mortensen S, Madsen K (1992) The occurrence of PRRS in Denmark. *AASP newsletter*, 4, p48.

Of course one should not see area/aerosol transmission everywhere and in all unexplained cases of PRRS contamination. There are evidently other sources of contamination that can and do play a role in our breaks. The main point to keep in mind here is that if the virus gets into New Zealand, avoiding its spread to other farms of the country may not be a simple task, and depending on the circumstances related to that introduction (e.g. number of pigs initially involved in the contamination, number of pigs in the area, possible direct or indirect contact of the initially infected pigs with other farm or wild pigs, time that it takes to detect the contamination), it could definitely need much more to avoid long term losses than just the observance of good biosecurity practices."

MAF response: The paper which presents data from the UK and Belgium[43] contains a very interesting discussion regarding its conclusions concerning mechanisms of indirect spread. "Airborne spread of the disease is difficult, of course, to demonstrate conclusively from field evidence…there are two problems of interpretation. The first is in defining the date of entry…The second is determining whether the direction of spread is truly consistent with wind direction, given that the coastal plain of East Yorkshire is subject to very frequent short-term changes in wind direction. The Lelystad institute have attempted, without success, to recover virus from air filters from houses in which acutely ill pigs were confined". Despite these difficulties in interpretation, this paper concludes that 63 of the first 100 cases of PRRS in the UK were introduced via airborne spread. It is also interesting to note that, over the first six months of this UK outbreak, the proportion of outbreaks concluded to be due to airborne spread increased from 25% to 83% *despite* this being difficult to demonstrate conclusively from field evidence as described above.

Larochelle et al[44] described a molecular study of the epidemiology of PRRSv isolates recovered from field cases in Quebec over a four-year period. Based on the results of an epidemiology questionnaire, the authors of this study concluded that 33% of these outbreaks were due to 'area spread', which they attributed to either aerosol spread, mechanical or biological vector transmission, or contaminated fomites. This study also noted that "most of the herds were located in a high density area with often additional surrounding farms for which the health status was unknown". For those herds thought to have been infected by 'area spread', it was suspected that aerosol transmission was responsible where farms with similar strains of virus belonged to different owners, used different feed providers, technical support teams or sources of animals. Given that there appears to have been no investigation of prevailing wind conditions in this study and the limitations described above, MAF considers that this paper provides no conclusive evidence that aerosol transmission of PRRSv occurs between herds in the field.

The 44 cases of indirect spread quoted in the above table (Desrosiers (2004)[45]) are cited from a personal communication relating to outbreaks in herds located in pig

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[43] Robertson IB (1992) Porcine reproductive and respiratory syndrome (blue eared pig disease): Some aspects of its epidemiology. *Proc Soc Vet Epi Prev Med*. Edinburgh, Scotland. pp24-37.

[44] Larochelle R, D'Allaire S and Magar R (2003) Molecular epidemiology of porcine reproductive and respiratory syndrome virus (PRRSV) in Quebec. *Virus Research*, 96, pp3-14.

[45] Desrosiers R (2004) Epidemiology, diagnosis and control of swine diseases. *Proc Am Ass Swine Vet*, pp9-37.

dense areas within a Quebec integration company between 1999 and 2002. This paper provides limited information concerning the epidemiological investigations that were undertaken to arrive at this conclusion and the suggested mechanisms for transmissions were described as trucks, contaminated material or equipment or ‘area spread’.

MAF has commented already on the Torremorell[46] study cited in the above table – please see the response to 4.30.26 in the review of submissions.

The published risk analysis acknowledges (section 3.4.5.5) that airborne transmission by aerosols was assumed to be responsible for “area spread” that occurred in the early years of PRRS introduction into several countries and that this assumption was reflected in the way field data were interpreted. However, once experimental studies were undertaken to critically examine this assumption, it appeared that aerosol transmission of PRRSv was probably a rare event in the field, if it occurs at all. MAF also questions the value in extrapolation from field observations and anecdotal reports taken from major pig producing countries where stocking densities are much higher than seen in this country. Please also refer to *Key Statement 10* in the section 3 of this review of submissions.

It should also be noted that Murray (2002)[47] addresses how risk analyses should tackle issues such as this, “it is not acceptable to simply conclude that, because there is significant uncertainty, measures will be selected on the basis of a precautionary approach…Since it is very difficult or perhaps impossible to prove that a particular pathway does not exist, there will always be a degree of uncertainty. In some cases a pathway may be hypothetical rather than ascertainable. It is not appropriate to consider such pathways in a risk assessment”. On the basis of robust, peer-reviewed scientific studies discussed in section 3.4.5.5 of the risk analysis, MAF concluded (in section 4.3.1.2 of the risk analysis) that, in the field, the transmission of PRRS virus by aerosols is probably a rare event, and that if it occurs at all it is likely to be possible only within infected barns.

Montse Torremorell comment: “Need to include information on transport risk.”

MAF response: As previously indicated, MAF considers that transmission of infection through transport is included under the discussion of fomites (section 3.4.5.3) which includes vehicles as a suggested contributor to “area spread”. Section 4.3.2 (consequence assessment conclusion) suggests that standard biosecurity measures on commercial pig farms would include control of visitors and fomites onto the farm. Please also refer to *Key Statement 7* in section 3 of this review of submissions.

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[46] Torremorell M, Geiger JO, Thompson B and Christianson WT (2004). Evaluation of PRRSv outbreaks in negative herds. *Proceedings of the 18th IPVS congress, Hamburg, Germany 2004 – Volume 1,* p103.

[47] Murray N (2002) *Import risk analysis animals and animal products*. New Zealand Ministry of Agriculture and Forestry, Wellington, New Zealand.

Control and Eradication

NZPIB states: The discussion of control and eradication in sections 3.4.6 and 3.4.7 of the IRA (pp16-17) provides a very optimistic view of the feasibility of effective control and eradication in commercial herds, and recognizes but does not give adequate weight to the inherent problems with the use of vaccination as a control strategy, which make prevention of entry of the virus a much more effective risk management option. Denmark provides perhaps the best example of how even a well considered and controlled central planning response to recent arrival of PRRS virus into an industry can go awry. In their case, beyond the direct production costs of the disease, extensive use of PRRS vaccine created additional production losses and complicated the control effort (Botner et al 1997). The global experience which demonstrates the difficulty in achieving control and eradication of PRRS needs to be given adequate weight in assessing the likely impact of an incursion of PRRS into New Zealand (Dee, 2002). Consequently emphasis must be given to preventative measures.

Brian Meehan comment: "I understand both sides with regard to this – prevention is more straightforward than treatment and control following any introduction"

> ***MAF response:*** As noted in our response to 4.30.28 above, section 3.4.6 of the risk analysis discusses the problems that have been seen in association with the use of modified live PRRSv vaccines and the factors which might explain these problems.
>
> Methods of eradication are discussed in section 3.4.7 of the risk analysis and it is difficult to understand how the description of "whole herd depopulation and repopulation with virus-free replacement stock, segregated early weaning, test and removal, mass vaccination with unidirectional pig flow, and herd closure" can be described by NZPIB as "very optimistic".
>
> MAF acknowledges that PRRS virus is exotic to New Zealand and risk management options have been recommended to provide the appropriate level of protection against an incursion of this virus.

Scott Dee comment: "I disagree with using an out dated, non-refereed paper (Dee 2002) to argue against the opinion of the IRA on the issues of control and eradication. The ability to eradicate PRRSV from herds is well documented (Dee 1998, Torremorell, 2001) and evaluations of the methods to reduce the risk of area spread are underway as previously described. In regards to control, the NZPIB use the situation in Denmark as a means to argue against the use of vaccination as a possible strategy (page 5, lines 7-9). They base this argument on another outdated paper (Botner and others), published in 1997. I served as an investigator of the Danish situation from 1996-1998 and found several issues that contributed to the problem, such as inappropriate use of vaccine in boar studs, vaccination of partial populations in one-site farrow to finish farms and early diagnostic evidence of porcine circovirus type 2, which later became a major health issue in the country. Therefore, while PRRSV vaccines are not perfect, they do have some advantages when applied to populations of pigs. In recent work by Cano and others (AJVR, accepted and Vaccine, manuscript under review), the use of a modified-live PRRSV vaccine was able to reduce transmission of wild-type PRRSV and as mentioned, significantly reduce clinical signs post-challenge. Regarding its limitations, repeated vaccination over a 120-day period did not eliminate wild-type virus from the body of the pig, nor did it prevent re-infection of heterologous challenge strains.

These 2 studies provide well-controlled scientific data regarding the strengths and limitations of commercial MLV vaccines, and decisions regarding its use or lack of use should be based on studies of this nature and not uncontrolled field observations that are potentially biased."

> ***MAF response:*** The above comments from Professor Dee regarding the use of vaccination to control PRRSv are consistent with section 3.4.6 of the published risk analysis. MAF therefore considers such comments to support our assertion that the risk analysis did give adequate weight to the inherent problems with the use of vaccination as a control strategy.

Robert Desrosiers comment: "According to some authors PRRS virus is the virus with the fastest rate of nucleotide substitution known. What this means is that it changes all the time, and this is one of the main reasons why it is very difficult to have vaccines that will provide a high level of protection against all strains. I have been working with these vaccines for 13 years. There are definitely situations where they have great value, but in others the results are not satisfactory and as mentioned above, the fact that the North American industry is now assessing what the best ways are to eliminate the virus from areas, and eventually countries is a good indication that the present control means have weaknesses. In this context I can only agree with the position that emphasis must be given to preventive measures, and I'm referring here to measures to prevent introduction of the virus in the country, not to measures to prevent the disease once the virus has already been introduced in the country."

> ***MAF response:*** MAF agrees that it is important to prevent the introduction of this virus into New Zealand and the risk management measures described in the risk analysis are recommended to provide the appropriate level of protection against its introduction.

Montse Torremorell comment: "You may want to refer to the National Eradication Program for Chile. Chile is undergoing a nation-wide eradication program for PRRSV which is expected to be completed in March 07. Although national eradication programs are possible, they require a lot of resources and commitment. You need to evaluate whether such an eradication program is feasible in NZ and I agree with the comments above that efforts should be in place for prevention rather than control.

Also, it is not likely that MLV vaccines will be accepted in NZ should the infection become present. Therefore, you will need to rely on management tools and cooperation between farmers and producers to make control and eradication a possibility. Response to vaccine is unpredictable and vaccine doesn't prevent new infections in already positive herds.

Nowadays control programs are based on prevention and biosecurity, and negative replacements and semen are part of the must haves but are not enough to achieve control. So, I would disagree with the first paragraph of the IRA in section 3.4.6."

> ***MAF response:*** The above points are noted. Please see also the responses above to Dr Meehan and Professor Dee regarding both eradication and the use of vaccines.

Hazard Identification Conclusion

NZPIB states: We agree with the overall conclusion that PRRS virus is a potential hazard in pig meat.

However our discussion above highlights inaccuracies with the material contained in the section on Hazard Identification (section 3 of the IRA). These inaccuracies underestimate the significance of this pathogen once it becomes endemic in a population, and the risk factors underpinning the likelihood of this occurring. Throughout the IRA these inaccuracies have the effect of underestimating the risk.

Scott Hurd comment: "It is easy to agree that PRRS is a hazard needing further consideration including a RA. The fact that PRRS is exotic to NZ and continues to cause trouble world-wide combined with recent data demonstrating the infectivity of pork meat, seems like strong evidence. The MAF (Ministry of Agriculture and Forestry) Hazard Identification presented clear and compelling evidence that import of pork meat presents a risk to the NZ swine industry. Many of the critiques raised by the (NZPIB) document don't specifically apply to the Hazard Assessment, but to different components of the Risk Assessment. This point is substantiated by the statement, "Throughout the IRA these inaccuracies have the effect of underestimating the risk". I will respond to some of the critiques in the following relevant sections."

> ***MAF response:*** Noted.

Scott Dee comment: "As I stated earlier, I disagree with the overall conclusion that PRRSV is a potential hazard in pig meat (page 5, line 19) and that the inaccuracies of the IRA "have the effect of undermining the risk" (page 5, line 25)."

> ***MAF response:*** Noted.

Robert Desrosiers comment: "I don't have anything to add here other than reinforcing the fact that as opposed to what is mentioned in the IRA document, PRRS control cannot be achieved simply by maintaining boar studs non infected and by standard biosecurity measures. The percentage of PRRS cases in Quebec that are associated with contamination of boar studs is extremely low. While no official studies have looked at this specifically, the general opinion of swine practitioners and the data available are suggesting that it is probably in the area of 1 or 2%. Yet PRRS outbreaks in this province have been the greatest health problem in swine for many years, in spite of all the efforts that have been placed on biosecurity."

> ***MAF response:*** It is inaccurate to say that the risk analysis claims that PRRS control can be achieved simply by maintaining non-infected boar studs and by standard biosecurity measures. Section 3.4.6 of the published risk analysis, which outlines control programmes for PRRS, describes how, for all herds, semen should be sourced from known free sources, and for free herds, this policy also must apply to gilts. This section also describes movement controls, test and removal, and AI centre freedom used to control PRRSv in the Pays de la Loire region of France. The use of stabilised breeding herds in the USA where replacement gilts are exposed to local strains of the virus well before they join the

breeding herd as replacements is discussed. There is also discussion of the use of vaccines, which do not prevent infection although have been used to minimise the impact of the virus.

Montse Torremorell comment: "Agreed."

MAF response: Noted.

4. RISK ASSESSMENT

4.1 Release assessment

Likelihood that a pig will be infected

NZPIB states: Section 4.1.2.1 (pages 20 to 23) details the background data used to support model assumptions for the likelihood that a pig will be infected with PRRSv based on its age. While the approach is sound, the data relies heavily on a single study conducted in Taiwan and published in 1997. The temporal dynamics of PRRS viraemia and tissue infection can be expected to vary widely due to many farm-level factors. Dee (2002) described many of these factors and lists issues such as breeding herd stability, occurrence of negative (and positive) subpopulations in infected breeding herds, gilt management and acclimatization procedures, presence of multiple diverse PRRS strains, and the recognized incidence of multiple transmission pathways (saliva, mammary secretions, in utero, inanimate fomites, and insect vectors) as challenges that need to be met in order to control the spread of disease within a farm (Dee 2002). Beyond these factors, we know that weaning age (Clark et al 1994), use of all-in all-out pig flow (Dee et al 1993), vaccination strategies (Diaz et al 2006), the extent of neonatal cross-fostering (McCaw 2000), and the adoption of multi-site segregated production techniques (Gillespie and Carroll 2003) all have an impact on the pattern of PRRSv transmission within a farm.

Brian Meehan comment: "This is a complete minefield. It is likely to change on a farm-by-farm basic and a region-by-region basis as well. So many variables it is best left to theoretical physicists and "Chaos Theory"!"

MAF response: As stated above, MAF chose to use the results of the Magar and Larochelle (2004)[48] experimental study in the release assessment conclusion in preference to the predictions of the model. Therefore any minor changes in this model will have no effect on the release assessment conclusion. Such issues illustrate the problems, discussed above, that can be associated with quantitative risk assessments.

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[48]Magar R and Larochelle R (2004) Evaluation of the presence of PRRS virus in pig meat and experimental transmission following oral exposure. *Canadian Journal of Veterinary Research* 68, pp259-66.

NZPIB states: We know nothing about these factors for the farms surveyed in the Taiwanese study and by not considering them, there exists a risk of underestimating the extent to which virus may exist in older pigs. This would significantly impact on the risk of release. The IRA needs to re-evaluate the technique to determine the likelihood that pigs are harbouring PRRSv to place more emphasis on the inevitably infected older pigs. We believe that this will more correctly assess the risk of a pig being infected prior to slaughter.

Robert Desrosiers comment: "There seems to be one main way to determine to what extent the meat from a given country could constitute a significant source of contamination and this would be to feed negative pigs with meat from commercial slaughter houses after it has gone through the same process than would be the case for meat that reaches New Zealand. My understanding is that this may not be something that has been done yet. Van der Linden et al[49] have used pigs that had just been infected experimentally (11 days before) which clearly does not reflect the usual situation in PRRS infected herds, where infection in the vast majority of cases occurs when the pigs are young (less than 12 weeks of age), and so many weeks and often months before slaughter. Furthermore, the meat was simply kept frozen and thawed. In the case of the Magar et al[50] study, a very low percentage of meat samples was found to be PRRS-positive and capable of infecting pigs, and the meat was only kept frozen for a short period at an optimal conservation temperature (- 70° C). So in both of these studies the meat used to infect the pigs was not processed the way it would normally be processed in New Zealand, at least according to the IRA (page 42, item ii). This, it seems, is something that should be evaluated."

> ***MAF response:*** As discussed in section 4.2.3 of the risk analysis, even in the absence of any regulation of garbage feeding in New Zealand, the combination of international market conditions, handling practices and consumer preferences have ensured that the likelihood of effective exposure from PRRS in imported pig meat is remote in practice. This is further reduced by the 'cascade of risk reduction' described in *Key Statement 1*. However, based on the available evidence, it was not possible for MAF to conclude that this likelihood of exposure was negligible. Therefore, MAF concluded that risk management measures are necessary to ensure that New Zealand is protected against the introduction of PRRS virus into the pig population through imported meat. MAF imposed preliminary measures in 2001 and waited until two key relevant studies had been completed and published (van der Linden et al, 2003; Magar & Larochelle, 2004). The only feeding study carried out using meat from commercial slaughterhouses is that reported by Magar & Larochelle (2004). While further studies would be valuable in order to further understand the risk, decisions must be made on available scientific evidence.

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[49] Van der Linden IFA, van der Linde-Bril EM, Voermans JJM, van Rijn PA, Pol JMA, Martin R and Steverink PJGM (2003) Oral transmission of porcine reproductive and respirarory syndrome virus by muscle of experimentally infected pigs. *Vet Microbiol*, 97,pp45-54.

[50] Magar R and Larochelle R (2004) Evaluation of the presence of PRRS virus in pig meat and experimental transmission following oral exposure. *Canadian Journal of Veterinary Research* 68, pp259-66.

Montse Torremorell comment: "The belief that PRRSV circulates in the nursery for the most part (6-9 wks of age), may be true in some scenarios but may not be the most common observation in US herds nowadays. A few things to consider: circulation in nursery age pigs is very predictable in farrow-to-finish herds but not in 3-site segregated production systems which predominate in the US swine production industry. In addition, as herds become stable, seroconversion gets delayed and viremic pigs may appear later in life increasing the chances of still harvesting the virus at a later age than the one reported in some of the original studies. Also commingling of pigs and multi-site may happen in the finisher stages and not earlier increasing the chances of becoming infected after moving the pigs in the finishers. Therefore, all this may result in an increase in the prevalence of viremic pigs at slaughter and the information present in table 6 may not represent what you would find in large commercial segregated production systems."

> ***MAF response:*** The age at which a pig is likely to become infected is discussed in section 4.1.2.1 of the published risk analysis and modelling of the available data for this is shown in figure A2 of the mathematical model described in appendix 1 of that document. However, again it should be stressed that subtle variations in that model would have no effect on the conclusion of the release assessment which chose to use the results of the Magar and Larochelle (2004) study instead of the model's lower predictions.
>
> It should also be noted that the Magar and Larochelle study collected 1027 meat samples from 214 pork producers using two commercial slaughterhouses in Canada in 2002. The findings of this study are therefore likely to represent what happens in the field situation where there are modern commercial production systems and, more importantly, are likely to reflect the likelihood of PRRSv being present in meat originating from countries with endemic PRRSv.

The presence and duration of PRRS viral infection

NZPIB states: The presence and duration of PRRS viral infection/contamination in pig tissues is reviewed in section 4.1.2.2 of the IRA. As noted above this does not consider all the relevant and current literature. Aside from not including several sources that demonstrate the propensity of the virus to exist in the pig beyond the 157 dpi maximum stated in the IRA, this report also appears to discount the value of RT-PCR based studies and instead focuses only on those studies that rely on virus isolation (VI). While PCR technology does not have the capability of distinguishing infectious virus from inactivated virus or incomplete viral particles, the value of the assay with its increased level of sensitivity relative to VI cannot be ignored. Even in the case where only a limited number of experimentally infected animals demonstrated the presence of viral RNA at 251 dpi, Wills et al suggest that "*it appears likely that in order for viral RNA to be detected up to 251 dpi., replicating virus must also be present for extended periods of time*". (Wills et al 2003).

Brian Meehan comment: "As always the only way to do this is to do the experiment. Forget about VI or RT-PCR the ultimate "proof of the pudding" is always the pig itself. A PCR product never killed an animal and high-tech based approaches are always open to technical comments. A seropositive or seronegative pig is a seropositive or seronegative pig. No one can argue with it."

MAF response: MAF considers that the use of the Magar and Larochelle[51] data in the release assessment conclusion in preference to the results of the quantitative model is consistent with the above comment.

Jeff Zimmerman comment: "Interesting how PCR – once touted as the perfect test - has muddled rather than clarified many situations. The PCR discussion could go forever and a day."

MAF response: Noted.

NZPIB states: A comprehensive review needs to be done of the currently available literature on PRRSv persistence in tissue (with inclusion of PCR-based results), and the likelihood estimates for pigs harbouring PRRSv at different ages be re-assessed, taking into account all of the published evidence. The persistence of the virus and the age of infection are both greater than the IRA recognises. Correcting the IRA for these factors will demonstrate a greater risk.

Scott Hurd comment: "The Release assessment portion of (the risk analysis) is very well done and complete. It concludes that the Release probability is "non-negligible". The difficulty with this term is it could be mean "high" or "low", leaving the overall assessment open to criticism from all opinions. It is a shame to see such elegant work wasted. There is considerable quantitative data and analysis on the key epidemiologic aspects of PRRS infection and persistence. The overall Release estimate could have been strengthened by full utilization of these data and presentation of a quantitative result. The probability results shown in Appendix 1 could have been combined with import data (tonnes) to estimate the number days or times per day that PRRS virus could be imported. This result might be more compelling and informative than the currently presented results of "moderate" or "low".

Maybe part of the problem is the definition of "low" which was applied to the 0.3% and 1.2% likelihood of PRRS virus in the meat. If say, the likelihood is 1%, and 1 kg is required to infect a pig, and 55% of imported pork comes from PRRS endemic countries (Table 2) then, crudely, 104,500 infected portions (19 mill kg*.01*.55) could arrive per year or over 400 portions per business day. To me, seems higher than what was described as a "low" risk.

There is a great deal of discussion, in the (risk analysis) and the (NZPIB document) about the length of time that pigs can be viremic after infection. In theory, this element could have great impact on the magnitude of the risk. However, these data are only useful if the importer has some knowledge of when first infection occurred. It the absence of that information, we should accept the "inevitably of infected older pigs." In other words, we must assume that market pigs have equal chance of being viremic as younger pigs. In my opinion, this assumption would raise the risk estimate above "low".

Additionally, I agree with the (NZPIB document) regarding the PCR. The critique's points on this topic show the difficulty with using survey data to estimate risk. Survey data are impacted by the sensitivity of the test. Virus isolation seems to have a low sensitivity. The impact of

[51] Magar R and Larochelle R (2004) Evaluation of the presence of PRRS virus in pig meat and experimental transmission following oral exposure. *Canadian Journal of Veterinary Research* 68, pp259-66.

this low sensitivity is shown in the compelling research by Van der Linden et al, 2003 where virus isolation negative meat samples were shown to make up to 50% of pigs viremic. The MAF analysis depends too heavily on virus isolation results which seem to have very low sensitivity.

I have difficulty with the MAF's combination of survey data and experimental feeding trial data from the Magar and Larochelle (2004) study. A prevalence estimate has much different statistical properties than the very small experimental trial done with a few selected PCR positive samples. They should be combined with caution. Therefore, I am not comfortable a 1.2% likelihood of PRRS positive meat (pg 35).

The greatest challenge with any PRRS virus analysis is variability. From genome, to virulence, to herd management PRRS is highly unpredictable. This unpredictability results in significant modeling uncertainty which generally calls for more stringent risk management options."

> ***MAF response:*** Please refer to the response earlier in this appendix to other comments made by this reviewer. Qualitative and quantitative methodologies are both acceptable under the framework used by MAF and the guidelines published by the OIE in the Terrestrial Animal Health Code 2006. It should, however, again be emphasised that MAF used the Magar and Larochelle[52] results in the release assessment conclusion in preference to the lower prediction of the quantitative model. For further discussion of the quantitative model please see the comments from the author (Dr. Noel Murray) in appendix 3.
>
> The conclusion of a 1.2% likelihood of PRRS positive meat (based on the study of Magar and Larochelle) is of the same order of magnitude as the prediction of the published model (0.3%). Magar and Larochelle identified 19 meat samples from a survey of 1,027 as being positive for PRRSv by PCR (i.e. 1.85%) and, of these positive samples, eleven were fed to pigs with seven passing on infection. The problems of interpreting PCR results have been discussed at length above and it is not unreasonable to combine these data to predict a 1.2% likelihood of PRRS positive meat. Regardless of the arguments above, if the release assessment had concluded a 0.3%, 1.2% or 1.85% likelihood of PRRS positive meat, the release assessment would have concluded that this is a low but non-negligible likelihood.
>
> As a signatory of the SPS agreement, MAF can apply sanitary measures only to the extent necessary to protect human, animal or plant life or health, based on scientific principles and not maintained without sufficient scientific evidence. The risk analysis presents a comprehensive account of the existing scientific evidence at this time, and the recommended measures are considered appropriate for the effective management of the identified risk. It should be noted, however, that several trading partners consider both the preliminary measures imposed by MAF in 2001 and the new measures recommended in the risk analysis to be unjustified and excessively precautionary.

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[52] Magar R and Larochelle R (2004) Evaluation of the presence of PRRS virus in pig meat and experimental transmission following oral exposure. *Canadian Journal of Veterinary Research* 68, pp259-66.

Montse Torremorell comment: " Section 4.1.2.5. I would not assume that under current US industry practices (large companies with multi-site production) the majority of pigs are viremic at 6-9 weeks of age, if anything we see a delayed in the age when pigs become viremic. The seroconversion pattern is getting delayed towards early-middle of the finisher instead of the nursery as a result of the control strategies in the sow herd (stable herds will result in less viremic pigs at birth and therefore a delay in seroconversion). In turn, this may increase the risk of meat being infectious.

I would say however, that the likelihood of PRRSV being present in the pig meat at slaughter is low to medium. I would consider medium for the cases that originate from large segregated commercial systems where infection may happen in mid to late finisher.

Of course it's almost impossible to know whether the meat arriving into NZ will originate from standard endemic herds or from newly infected pigs."

> ***MAF response:*** The release assessment conclusion (section 4.1.4) used the results of the Magar and Larochelle (2004) study rather than the lower prediction of the quantitative model described in appendix 1 of the published risk analysis. Further refinement of the quantitative model as suggested would, therefore, be unlikely to have any impact on the conclusions of the release assessment. The Magar and Larochelle study collected 1027 meat samples from 214 pork producers using two commercial slaughterhouses in Canada in 2002. The findings of this study are therefore likely to represent what happens in the field situation where there are modern commercial production systems and, more importantly, are likely to reflect the likelihood of PRRSv being present in meat originating from countries with endemic PRRSv.

4.2 EXPOSURE ASSESSMENT

Exposure Assessment Conclusion

NZPIB states: **The point that meat scraps probably have to be large enough so as to require chewing is based entirely on supposition.**

Brian Meehan comment: "Pigs don't chew their food much"

> ***MAF response:*** MAF accepts that the role of chewing in oral transmission of PRRS virus is unproven. However, it is not unreasonable to suggest that if meat were swallowed without chewing, any PRRS virus would be quickly inactivated at the low pH in the stomach.

NZPIB states: The Van der Linden (2003) and the Magar (2004) studies that are referenced by BNZ and most closely relate to this issue were not designed to provide any estimates of "scrap size" necessary to infect a pig. They were conducted simply to demonstrate the potential for oral transmission to occur (which was demonstrated emphatically) but they did not in any way provide data to indicate the magnitude of meat necessary for transmission to occur. One could as easily suggest that the need for excessive chewing may lead to a *reduction* in transmission because of the dilutive effect

of salivation and the effect of salivary enzymes on PRRSv survivability. The point is, no one knows the effect of meat scrap size on virus transmission.

Brian Meehan comment: "If the swill is properly treated then all of this is irrelevant"

> ***MAF response:*** This is a requirement under the Biosecurity (Meat & Food Waste for Pigs) Regulations 2005. However, as discussed in *Key Statement 5*, the degree of non-compliance with these current garbage feeding regulations is unknown.

Jeff Zimmerman comment: "Refer to Hermann JR, Muñoz-Zanzi CA, Roof MB, Burkhart K, Zimmerman JJ. 2005. Probability of porcine reproductive and respiratory syndrome (PRRS) virus infection as a function of exposure route and dose. Vet Microbiol 110:7-16."

> ***MAF response:*** The published risk analysis refers to this publication on a number of occasions and in response to 4.30.26 above, i.e. "the infectious dose approach explored by Hermann et al (2005) supports the notion that scraps of any size have the potential to infect an animal orally, and that the likelihood of infection occurring is directly related to the amount of meat fed." Please also refer to *Key Statement 4*.

Scott Hurd comment: "The magnitude of the Exposure is largely dependant on compliance with cooking regulations. Based on my experience with small backyard operations cooking, compliance can be assumed to be low (USDA:APHIS 1995). In NZ, backyard operations represent a remarkably large portion (95%) of pig population. Their impact, on likelihood of PRRS exposure, must be weighted accordingly (page 6).

There is a good discussion regarding the infectious dose and how that may change by processing, freezing, thawing, etc. These considerations are important for risk management. However, it is clear from the feeding trials, that virus isolation negative meat can transmit PRRS. The epidemiology of PRRS suggests, the time of pig infection and the virus titer in imported pork will not be known. Therefore, untreated meat imported from PRRS infected countries should be considered infectious, with a high likelihood.

The historical experience of 1998-2001, supports the conclusion of a low Exposure likelihood. However, there is a great deal of uncertainty around this conclusion. The uncertainty arises from multiple sources: 1) 95% pigs are at risk in backyard operations,2) feed source of these pigs is unknown and variable, 3) compliance with cooking regulations is unknown. More uncertainty implies higher risk. On average the likelihood may be low, but a quantitative distribution of this Exposure likelihood might show a tail into the very high range."

> ***MAF response:*** The unknown level of compliance with current garbage feeding regulations is discussed in *Key Statement 5*. Experimental studies discussed in the risk analysis suggest that the likelihood of meat from countries with endemic PRRS containing infectious virus is around 1.2%, although a number of submissions have tried to argue that it may be as high as 1.85%. A number of other factors will impact upon the likelihood of pigs in New Zealand being exposed to PRRSv via imported meat – please refer to the 'cascade of risk

reduction' described in *Key Statement 1* and also reproduced later in this appendix in response to a comment from Dr. Meehan.

Scott Dee comment: "I disagree with the emphasis that the NZPIB places upon the studies by Van der Linden and Magar regarding the role of meat in the transmission of PRRSV. While the results are interesting, based on many limitations, they cannot be used a basis for decision making without further assessment. In both studies, meat samples from acutely infected pigs were fed to very hungry animals. As I stated earlier, the use of acutely infected animals negates the use of the persistence data as a risk factor. The same argument holds for the conclusion the NZPIB draws from my meat juice paper, since these juices were collected from animals 7 days post-infection. In order for the NZPIB to successfully employ the persistence argument, the studies would need to be repeated using meat and/or juice samples for persistently infected pigs, ideally involving a range of viral concentrations. Future studies should also attempt to replicate conditions used at slaughter to collect, process, store, and transport samples prior to feeding, before drawing conclusions."

MAF response: Professor Dee's comments illustrate the difficulties which arise when extrapolating the findings of experimental studies to the situation which occurs under field conditions. Nevertheless, studies have demonstrated the potential of PRRS virus to be transmitted to pigs through the feeding of meat from a viraemic animal and these studies were the basis of sanitary measures imposed by MAF from September 2001. As indicated in Key Statement 12 in section 3 of this document, MAF considers the publication of Magar and Larochelle to represent the most robust study into the presence of PRRSv in pigmeat at slaughter that is currently available and, based on this, the likelihood of PRRS virus being present in pig meat from countries with endemic PRRS is expected to be in the region of 1.2%. MAF acknowledges that, although this likelihood is low, it is <u>not</u> negligible and this is reflected in the release assessment conclusion.

Robert Desrosiers comment: " I would say that this last sentence concerning meat scrap size is only partially right. In fact the Hermann et al[53] paper clearly shows, for the strain used in the study, that the dose of infection did make a difference when oral infection was attempted. In other words, a small dose is less likely to infect pigs compared to a large dose, particularly in the case of oral infection. It seems quite obvious that the oral route of infection is way less efficacious to infect pigs than intra-muscular injection, for example. To give an idea of that difference, let's consider that virtually 100% of negative pigs that are vaccinated by intra-muscular injection with modified live vaccines available in North America will seroconvert. In three different attempts where I tried to vaccinate pigs in the water, so through oral consumption, I failed to produce seroconversion (Desrosiers unpublished data)."

MAF response: The reported results of attempts to vaccinate pigs against PRRS virus using oral inoculation are consistent with the findings of experiments using

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[53] Hermann JR, Munoz-Zanzi, Roof MB, Burkhart K and Zimmerman JJ (2005) Probability of porcine reproductive and respiratory syndrome (PRRS) virus infection as a function of exposure route and dose. *Vet Microbiol*, 110,pp7-16.

the lactic dehydrogenase-elevating virus of mice described in section 4.2.2.1 of the published risk analysis.

Montse Torremorell comment**:** "A point to consider regarding the oral route that has not been included in the IRA, is regarding the natural behaviour of the pigs that has to do with the fact that pigs will smell and play with the food (rooting behaviour). It is very possible that if virus is present in the meat, the true route of infection of the pig is through the aerosol droplets of the meat and then the infection route maybe more strictly nasal than oral. You should consider whether the risk would increase if that's the case.

Also, this would mean that smaller infected portions may be infectious compared to larger portions as the ones used in the published studies.

The statement in section 4.2.2.2. re: "…lowest titer expected in animals from stabilized herds" is misleading and not true. In fact, stable herds may have delayed seroconversion and therefore higher amount of virus at slaughter age.

Section 4.2.3. it's important to emphasize the information on the years when NZ did authorize the introduction of pork from infected areas. Although the past is not always a prediction of the future, in this case it does give a measure of risk under NZ conditions.

Section 4.2.5.2. Scrap size to calculate effective infectious dose hasn't been tested. Although it is not likely that scrap sizes of 1kg will be generated, the reality is that smaller scrap sizes may be enough. Also the size of 1 kg assumes the strict oral route but it doesn't consider the droplets that maybe generated for the oro-nasal route (or a combination of the routes)."

MAF response: The above points concerning scrap size would have impacted upon the outcome of the risk analysis if MAF had attempted to predict a minimum infectious scrap size. The risk analysis was careful not to estimate the minimum infectious scrap size and recognises the inadequacy of the data in this regard. As stated in section 4.2.2.4 of the risk analysis, "there has been no attempt to explore the effect of size of scraps and infectivity. Indeed, the infectious dose approach explored by Hermann et al (2005) supports the notion that scraps of any size have the potential to infect an animal orally, and that the likelihood of infection occurring is directly related to the amount of meat fed."

The risk analysis goes on to state, "it is not possible to accurately estimate the likelihood that scraps of a critical size will be generated prior to further processing (cooking) of imported pig meat, so **the likelihood of generating infectious scraps prior to cooking must be considered non-negligible**" (emphasis added).

The risk analysis also does not consider the quantities used in feeding trials (500 – 900g) to suggest a minimal infectious scrap size.

Although the risk analysis discussed the concept of stabilized herds as a potential risk management option, it was not considered possible to recommend this option in view of several uncertainties regarding efficacy.

Further to the above comment regarding historical imports of meat from countries with endemic PRRSv, MAF would like to emphasise that approximately 30,000 tonnes of pig meat could have been imported from such countries during a period when there were *no* controls on garbage feeding in place in New Zealand.

4.3 CONSEQUENCE ASSESSMENT

Transmission of PRRSv infection between herds

Montse Torremorell comment: "Section 4.3.1.1 – this section under estimates the role that feral pigs may represent as reservoirs should the virus become existent in NZ and a national eradication program was implemented. So, feral pigs may become the reservoirs and threaten the success of future eradication programs."

> ***MAF response:*** As indicated in section 4.3.1.1, there is no evidence of clinical signs of infection in wild pigs and no indication that they have any role in transmission to domestic pigs. Because of the low density of feral pig populations, it is considered unlikely that PRRSv could be maintained in wild pig populations. This is supported by New Zealand's experience with eradication of Aujeszky's disease, for which surveys failed to find evidence in wild pigs.

NZPIB states: It is not correct to state that small herds have fewer clinical signs (section 4.3.1.2 of the IRA).

Jeff Zimmerman comment: "USDA data says otherwise"

> ***MAF response:*** Noted. These data are referred to in response to 4.30.51 above.

NZPIB states: All pigs are equally susceptible to the effects of a particular strain. While it is true that the number of susceptible animals will quickly decline in a small herd, the clinical impact to the owner on a per animal basis remains the same. This same paragraph notes that given the type of farming environment backyard infections are likely not to be identified rapidly. In addition, small herds tend to exchange pigs extensively, thus maintaining a susceptible population within the herd and causing clinical expression to continue. For these reasons we are very concerned about the potential for PRRS to become established and transmitted before its identification.

Montse Torremorell comment: "Agree. Also, smaller backyard herds tend to inter-exchange animals among them easily therefore increasing the risk of spread. Also, how are the backyard pigs being commercialized? Is there the risk for spread through transport?

So, basically the risk of backyard pigs may depend on the probability of controlling pig movement between herds (and people and fomites)."

> ***MAF response:*** The risk analysis acknowledges (section 4.3.1.2) that some spread to other herds within the backyard sector would be likely, particularly to herds that introduced live animals (including travelling boars) or used semen from an index herd, and also possibly to other herds that shared implements such as vehicles or other equipment. However, the presence of an extensive backyard, or

para-commercial, pig industry in New Zealand did not hamper the eradication of Aujeszky's disease.

NZPIB states: If PRRS established in para-commercial or backyard herds, commercial herds located nearby would be exposed to infection. Even on well-managed pig farms with an explicit need for good biosecurity, the cause of a large majority of PRRS outbreaks was considered to be a result of "lateral introduction" which included the possibility of airborne spread (Torremorell et al 2004). Further, Morrison et al recently reported a significant negative correlation between the geographic distance between PRRS infected farms and the genetic similarity of PRRS viruses recovered from those farms. This suggests that between-farm spread of the virus may have been responsible for the similarity of isolates and reinforces the notion that PRRSv can be transmitted between farms (through mechanisms other than pigs or semen) (Mondaca-Fernandez et al 2006).

Furthermore we have already noted the demonstrated capability of transmission by means which circumvent on-farm biosecurity, including aerosol transmission (within our section 3.3 Hazard Identification). The Torremorell study quoted there, indicates that it is difficult to identify how most herds get infected. This is particularly relevant within the context of our discussion on the structure of pig farming in New Zealand (refer our section 3.2.2) and the inter-relationships between backyard operators through to the commercial industry. These inter-relationships involve pigs including breeding stock and semen and a range of fomites, and common points of intersection which will involve private sale, sale yards, abattoirs and exhibitions.

Montse Torremorell comment: "Agree."

> ***MAF response:*** The mechanisms likely to be responsible for "area spread" of PRRS infection are discussed at some length above in response to comments by Dr Desrosiers.

NZPIB states: In section 3.3 we have already commented that Albina's assertion "…*so long as AI centres do not become infected, then control of PRRS can be achieved by standard biosecurity measures*." is no longer considered valid and explained the reasons for this. Therefore the IRA's assumption that *as long as the AI centres do not become infected the disease can be controlled by standard farm-level biosecurity measures* does not hold.

Montse Torremorell comment: "Agree. It needs to consider other sources of infection besides pigs and semen. Consider example in Chile. Even when semen and breeding stock replacements were negative, new infections detected each year were due to lateral infections due to breaches in biosecurity due to personnel or other practices.

Conclusion on section 4.3.2.1 – this section underestimates the consequences of infection in backyard piggery. The consequences of spread in this section should be considered medium in its ability of spread."

> ***MAF response:*** As indicated previously, the mechanisms likely to be responsible for "area spread" of PRRS infection are discussed at some length above in response to comments by Dr Desrosiers.

Consequence Assessment Conclusions

NZPIB states: As was described earlier in this document, we strongly believe that all PRRS virus strains should be considered capable of causing pathology in pigs if they have not been purposefully attenuated to modify this behaviour. Despite intensive research efforts and extensive use of genomic sequences of both specific hypervariable regions of the virus and the entire genome, no one has published any laboratory assay or feature of the virus that allows us to predict its virulence. Even direct nucleotide-level comparisons of attenuated live vaccine strains of PRRS and field strains have not revealed the main virulence attributes of the virus.

Aside from this, as a highly mutable RNA virus one cannot suggest that any particular strain will remain homologous with respect to its virulence after even one passage through a host. While the existence of nonpathogenic strains has been hypothesized, to consider this possibility as a key dependency in the consequence assessment is wrong.

Brian Meehan comment: "In the absence of any proof to the contrary"

> ***MAF response:*** As indicated in the response to 4.30.23 and above, the risk analysis has identified *all* strains of PRRSv as potential hazards. There is no assumption in the risk analysis that an incursion of PRRSv into New Zealand will be associated with a low virulence strain of this virus.

NZPIB states: For the sake of risk assessment, we believe any incursion of PRRS virus should be assumed to result in clinical disease and have the potential to spread within and between farms.

Montse Torremorell comment: "Agree."

> ***MAF response:*** As indicated in the response to 4.30.23 and above, the risk analysis has identified *all* strains of PRRSv as potential hazards. There is no assumption in the risk analysis that an incursion of PRRSv into New Zealand will be associated with a low virulence strain of this virus.

NZPIB states: We re-iterate that New Zealand has a large and relatively undescribed para-commercial pig industry. These pigs must be bred or sourced in some other way. Therefore it must be accepted that there is some pig breeding occurring on some of these farms, that semen is being purchased by these farms, that boars are being housed/purchased/borrowed for use on these farms, and/or that pigs are being purchased and/or sold by the farms. The degree of interaction among para-commercial farms or between para-commercial farms and commercial farms is currently unknown but it can safely be assumed that there is some degree of interaction between the two industries and that if PRRS were to become established in either, it would likely be transmitted to the other. The virus is highly infectious (as few as 10 virus particles necessary to infect a pig) and so even minor biosecurity failures or occasional contact

between farms (through aerosol, semen, infected pig, or vector) will perpetuate epidemic spread.

Scott Hurd comment: "In my opinion, the greatest error in the analysis occurs in this section. While the clinical impact in PRRS affected herds may be debatable, the spread potential is not. As noted in the (NZPIB document), the Torremorell study, and experience of many swine practitioners have shown the ease and rapidity with which these viruses can move between herds. Stable herds with high biosecurity can pick up new, highly virulent strains, from unknown sources (Hurd et al, 2001).

As another example, of ready transmission between modern commercial swine farms, consider Salmonella DT 104 in Denmark. Salmonella is a bacterium that has little to no aerosol transmission potential. However, the attempts, by Danish authorities to eradicate it were abandoned because of its rapid spread among herds. (http://dfvf.dk/Default.aspx?ID=9980)

Backyard operations are expected to have lower biosecurity, less confined housing, and decreased ability to recognize an infected source herd. Therefore, PRRS can be expected to quickly infect all herds within a region. Due to pig and fomites movement, I would predict that area to be much greater than 3km.

As shown in the Release assessment, backyard operations are most like to be infected first with PRRS. If it spreads completely among them, then the remaining question is the spread potential to commercial operations. An element affecting the likelihood of spread is geographic location of the backyard operations relative to the commercial. As noted, this virus is extremely contagious, routes of transmission are unknown, and few herds stay negative for long. Therefore, I expect a large portion of commercial herds would eventually be infected.

Regarding the clinical and economic impact of PRRS infection, available data suggest that some herds can "live" with it. However, the US swine industry still considers it "the most economically significant disease in the US industry today" http://www.pork.org/newsandinformation/news/docs/wpx-prrs.doc. It should be reiterated that when PRRS first arrives in NZ it will not create and endemic "stable" situation for a considerable length of time. During this early epidemic phase, losses to the industry are guaranteed to be significant.

Granted, the overall consequence to NZ economy is low - negligible, because the size of the industry is small and there is no export market. But for pork producers, the consequence will be long term and "most economically significant"."

> ***MAF response:*** The spread of Salmonella DT104 amongst Danish pig farms is likely to be associated with exposure pathways which are not applicable to PRRSv such as rodents, feed contamination or wild birds. Further discussion of this is beyond the scope of the risk analysis.
>
> Regarding biosecurity practices on New Zealand commercial farms and the possible routes of transmission between commercial and non-commercial herds, please refer to *Key Statements 6* and *7* in section 3 of this document.
>
> The consequence assessment (section 4.3.1.3) describes and acknowledges the probable clinical impact of the introduction of PRRS in a commercial piggery, including epidemics of abortion, stillbirths and weak pigs, high death rates amongst weaned pigs and impaired sow fertility.

Scott Hurd comment: "RE: Risk estimation (section 4.4) It is most unfortunate that the excellent detailed quantitative work in (the risk analysis) is reduced to a non informative descriptor such as "non-negligible". This leaves the report open to unnecessary criticism, as readers could interpret that term as very low to high. It does not seem that it would have taken much more work to make the model crudely quantitative, providing some curve or distribution as to what the term "non-negligible" might really mean. It would have been nice to see those results by sector (commercial and backyard)."

> ***MAF response:*** Please see earlier comments regarding quantitative and qualitative risk assessments.

Robert Desrosiers comment: "I don't know enough about the New Zealand swine industry to be able to properly assess if the risk of maintaining endemic infection with PRRS is greater or smaller than elsewhere. There are two main obstacles that would need to be overcome. The first one is that the diagnosis of the disease is not always that easy. There are situations where pigs become infected with PRRS virus and don't show significant clinical signs. This apparent lack of clinical signs may be particularly true for the respiratory form of the disease and there have been many experimental infections with PRRS virus in growing pigs to substantiate that. This apparent lack of clinical signs has also been the case with what happened in Chile, where the presence of the virus was learned through a serological survey.[54] So pigs could become infected and not be detected as such for a while. Usually the smaller the herds the less likely are producers to invest in diagnostic work. In New Zealand there are way more backyard pigs and the herds are much smaller than in North America, so detecting infected herds or pigs early would likely be more of a challenge.

The second obstacle is what I have discussed above on the difficulty to limit the indirect transmission of that pathogen. If contamination was occurring in New Zealand in an area where the swine industry is significant, and if the right circumstances are present, the virus could spread to several farms rapidly. This is not however as if there would be no hope of circumscribing the infection. We do have examples of countries or areas that were able to limit the diffusion of the virus, and even eliminate its presence by taking appropriate measures. In the Pays de la Loire region, in France, early measures following the infection of some farms in the area were successful in limiting the progression of the infection.[55] Two years after the first outbreak, 98% of the herds had remained PRRS-free. Similarly, Chile is on the verge, if it's not already done, of regaining a negative status on a country basis.[56] So again it is not as if an initial infection would inevitably result in widespread diffusion of the organism, but rapid detection of the virus and implementation of an efficient control program would be crucial steps to avoid it."

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[54] Pinilla JC, Rojas M and Cuevas L (2006) PRRS virus eradication in Chile: A country-wide eradication approach. *Proc AASV*, pp409-16.

[55] Le Pothier MF, Blanquefort P, Morvan E and Albina E (1997) Results of a control programme for the porcine reproductive and respiratory syndrome in the French 'Pays de la Loire' region. *Vet Microbiol*, 55, pp355-60.

[56] Pinilla JC, Rojas M and Cuevas L (2006) PRRS virus eradication in Chile: A country-wide eradication approach. *Proc AASV*, pp409-16.

> ***MAF response:*** Noted. As mentioned in *Key Statement 14*, MAF's post-clearance biosecurity surveillance team is currently developing a joint PRRS surveillance programme with NZPIB although the details of this have not yet been finalised.

Montse Torremorell comment: "Agree.

Also, the IRA needs to assess the risk of transport and use of contaminated vehicles to move pigs between farms.

In addition, NZ needs to assess whether the illegal movement between farms is a real risk for the industry or not. Are robberies common? A comment on illegal movement should be included in the IRA.

There could be an impact in exports in the sense that number of pigs available for exports could be decreased should there be an storm of mortality and reproductive disorders."

> ***MAF response:*** The role of fomites, such as vehicles, is discussed in section 3.4.5.3 of the published risk analysis.
>
> MAF considers it unlikely that there would be illegal movement of pigs from backyard herds into commercial herds in New Zealand as this would clearly be an unacceptable biosecurity risk to such properties. MAF cannot rule out the possibility of illegal movement of pigs from commercial enterprises into backyard herds through theft although, given that backyard herds are likely to have a lower health status, such movements are unlikely to contribute significantly to disease spread.
>
> As indicated in the risk analysis, exports of pork from New Zealand are limited to a few hundred kilograms annually to the Pacific Islands and Singapore.

5. RISK MANAGEMENT

5.2 Option Evaluation

NZPIB states: The sanitary measures proposed in sections 5.2.2.2 and 5.2.3 raise several concerns specifically regarding 'consumer-ready high value' cuts. The first issue is that there is a real practical problem in administering such a category of cuts. No definition is provided for this term. To our knowledge, it is not a term that is clearly defined in SPS or WTO documentation and as such creates a significant difficulty in managing what product would qualify for importation and also for release without treatment from transitional facilities. While dissecting carcasses into separate risk categories has been accepted for reducing risk in some cases (bone-in versus deboned as an example), the dissection standards in these cases are easily understood (by meat processors and regulators), easy to document (though auditing), and have good scientific basis (the space inside bone resists heat treatment more than does skeletal muscle). Less easily defined standards (such as removal of head and lymph nodes) have been the source of lengthy debate for the same reasons as above. To propose even further distinctions between individual pieces of meat by considering one to be high-value with others presumably considered low-value, is likely to create significant compliance issues throughout the processing and distribution chain.

Brian Meehan comment: "The pork is being imported to be fed to humans. It should not be fed to pigs without suitable treatment."

> ***MAF response:*** Such treatment is a requirement under the Biosecurity (Meat & Food Waste for Pigs) Regulations 2005. However, as discussed in *Key Statement 5*, the level of compliance with these regulations is unknown.

NZPIB states: Beyond the practical difficulties presented through the use of this distinction, the breadth of the science does not substantially support risk mitigation for PRRS through importation or presentation of consumer-ready high-value cuts. The evidence is clear that PRRS has a proclivity for residing in monocytes/macrophage lineage cells, and these cells (and often the associated lymph structures) are found throughout every tissue in the body. The degree to which risk can be mitigated through separation of carcass pieces into high-value versus low-value cuts is unknown and at this point should not be considered as a reasonable strategy to pursue. One of the external reviewers for this IRA points this out through inclusion of his Veterinary Record publication (accepted May 2006) entitled "An exploratory study to evaluate the survival of porcine reproductive and respiratory syndrome virus in non-processed meat".

Brian Meehan comment: "OK, this is REALLY important. I cannot find this article. But if it has indeed been published then it is their "Ace Card"."

> ***MAF response:*** As stated earlier, the paper by Scott Dee referred to has not yet been published although details of this work can be seen in the Proceedings of the 19th IPVS Congress, Copenhagen, Denmark, 2006 (see: http://www.ipvs2006.dk/restricted/ 2006/VIRAL/ O_04-03.pdf). This study does appear to demonstrate that meat juice from PRRS-infected pigs may contain sufficient virus to transmit infection. This work could challenge any assumption that the quantity of meat used in feeding studies represents a minimum infectious

dose. However, as clearly stated in *Key Statement 4,* the risk analysis did not consider the quantities used in feeding trials (500-900g) to suggest a minimal infectious scrap size. Please also see the comments above from Professor Dee regarding the limitations of this 'meat juice' study.

NZPIB states: In this study, he conclusively proved the potential for meat juice as a contaminant on a person's hand (collected from meat that could be considered a high-value cut) contained sufficient PRRS virus to infect a pig through oronasal contact. Unprocessed skeletal muscle harvested from infected pigs has repeatedly been shown to contain adequate virus to infect pigs. To dismiss this scientific evidence by attempting to distinguish the riskiness of high-value versus low-value cuts is without basis.

Brian Meehan comment: "Again – ban the feeding of pork to pigs and you are "sorted"!"

MAF response: The sanitary measure of allowing the import of consumer-ready high value cuts has been recommended on the basis that such cuts will be associated with a negligible likelihood of generating fresh meat scraps prior to cooking (see *Key Statement 2* regarding the disposal of meat past it's 'use-by date'). Further measures such as the Biosecurity (Meat & Food Waste for pigs) Regulations 2005 and standard biosecurity practices on pig will further reduce the risk associated with the imported commodity. The cumulative reduction associated with these measures offers an appropriate level of protection against an incursion of PRRS.

There are a number of steps which provide a "cascade of risk reduction" to ensure that there is a negligible likelihood of consumer-ready, high value cuts of pork from a country with PRRSv establishing infection within a New Zealand herd. These steps include:

i. Only 1.2% of meat/carcasses selected randomly from Canadian slaughterhouses is positive for PRRSv (after thawing, so this includes the risk reduction effect of the freeze/thaw cycle).

ii. Imported consumer-ready, high value cuts of pork would have to be purchased by a household that has backyard pigs. 41.10 of this document estimates in excess of 15,000 properties in New Zealand with backyard pigs. Data from Statistics New Zealand records 1,569,100 households in New Zealand, therefore it is reasonable to estimate that around 1% of households in this country have backyard pigs. Furthermore, it is not unreasonable to suggest that people with backyard pigs keep them in order to achieve a degree of self-sufficiency for pork supplies, so such individuals may be less inclined to purchase imported high value cuts.

iii. Fresh raw scraps would have to be generated from the imported meat (consumer-ready cuts, by their very nature, are associated with a negligible likelihood of this).

iv. Raw scraps would have to be disposed of quickly - NOT held at room temperature for a period long enough to inactivate the virus (it is highly likely that scraps would sit in a garbage bucket for a while (e.g. overnight) before disposal).

v. Raw scraps would have to be disposed of in garbage (as opposed to insinkerator, rubbish bin, or compost heap) – it cannot be assumed that all owners of backyard pigs would dispose of meat scraps in garbage.

vi. Garbage containing raw scraps would have to be fed to backyard pigs - an unknown proportion of backyard pig owners would be disinclined to feed raw pork to pigs on personal/ethical grounds or due to knowledge of the garbage regulations. Also, such scraps may also be fed to household pets or working dogs, rather than to pigs.

vii.Pigs would have to ingest enough raw scraps to constitute an infectious dose (this would be affected by how long the meat was held at room temperature before, and by competition from other pigs).

viii. Since stomach acid would inactivate virus, the raw meat scraps would have to be chewed rather than swallowed whole (if there is competition for food from other pigs, leisurely chewing is unlikely, so infection may be more likely in single pig units).

ix. An infected pig would have to develop viraemia and pass infection on to other pigs (this would require a group of pigs - a single pig is likely to be a dead end).

NZPIB states: We support comments made by the external reviewers suggesting the need for further research on the effects of time, temperature, and pH on PRRS virus survival in pig meat, particularly to determine whether pH adjustment in uncooked products is sufficient to inactivate the virus. Research cited in this IRA was gathered from the few available studies that have partially examined the issues. However, to date no one has undertaken the prospective research necessary to definitively determine the individual or combined effects of time, temperature, and pH on PRRS virus survival in pig meat. These variables should be expected to have a different effect on the virus in naturally infected pig meat when compared to *in vitro* work.

Scott Hurd comment: "This section provides an evaluation of options and where they might make an impact risk, i.e. Release, Exposure, and Consequence. However the feasibility of the management options needs to be evaluated. For example, do other countries have routine procedures that allow for the removal of lymphoid tissue? The (NZPIB document) suggest not. Some analysis of the cooking feasibility might be added. Is it possible to import consumer ready high value cuts?

One control option, whose feasibility is evaluated, is the purchase of pork from PRRS stabilized herds. The MAF report suggests this option is impossible, "there is no accepted standard for herd stability…and protocols have not yet been developed". I agree it is not feasible to buy pork based on PRRS status.

It would be most helpful to decision makers if the impacts of proposed sanitary measures were discussed some in this section. Some might argue this type of analysis is not risk assessor role. However, if a risk management option has the impact of increasing some alternative risk, then it clearly is the assessor role to describe that impact. Additionally, the assessor has the most quantitative knowledge about the industry structure and interrelationships. This analysis could aid in risk management.

Following is some ill-informed description of some potential impacts that should be addressed in this section.

1. PRRS free country

If 45% of pork comes from Australia which is PRRS free and if NZ production can be increased slightly, the impact of this recommendation should be acceptable

2. Treated prior to arrival

Data on the type of pork consumed, the company structure, and willingness to supply this product should be evaluated. There are likely a small number of companies shipping pork to NZ, their capability to supply this type of product should be evaluated.

3. High value cuts

The above comment on capability of pork supplies applies to this recommendation also.

4. Further processing

With data on the amount of product imported, the consequence of this recommendation could be evaluated. Possibly a new business will be developed or expanded in NZ"

> ***MAF comment:*** Noted. Overseas trading partners and New Zealand importers of pig meat who have sent submissions to MAF concerning the published risk analysis have not indicated that the proposed risk management measures are not feasible (see submissions 14, 21, 36, 37, 38, 39, 42, 43, and 44).

Scott Hurd comment: "Conclusion: In my opinion, the risk is higher than inferred by the conclusions of "non-negligible". If the management options are feasible, I think severe measures are indicated to save an industry from PRRS."

> ***MAF response:*** The risk analysis was written using the framework described by Murray (2002)[57]. The Concise Oxford Dictionary definition of 'negligible' (as used by Murray) is 'not worth considering; insignificant'. The same definition is adopted by the OIE in their 2004 risk analysis handbook[58]. MAF therefore believes that the term 'non-negligible' indicates a risk that is not-insignificant and worth considering and that the use of this term is entirely appropriate to describe the risk associated with PRRS virus associated with imported pigmeat.
>
> As indicated in *Key Statement 11*, as a signatory of the SPS agreement MAF can only apply measures to the extent necessary to protect human, animal or plant life or health, based on scientific principles and not maintained without sufficient scientific evidence. The measures recommended in the published risk analysis are consistent with this commitment under the SPS agreement and provide the

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[57] Murray N (2002) *Import risk analysis animals and animal products*. New Zealand Ministry of Agriculture and Forestry, Wellington, New Zealand.

[58] Murray N, MacDiarmid SC, Wooldridge M, Gummow B, Morley RS, Weber SE, Giovannini A and Wilson D (2004) *Handbook on import risk analysis for animals and animal products, volume 1*. OIE, Paris, France.

appropriate level of protection against the introduction of PRRS virus in imported pigmeat.

Scott Dee comment: "I am in agreement with the NZPIB and all other reviewers that much more research is needed on the epidemiology of PRRSV in meat, as well as the testing of strategies to reduce risk, before any final decisions should be made. Before this work is completed, it is premature to prevent the introduction of fresh pork from countries endemically infected with PRRSV. History continues to, and most likely will, argue against it."

MAF response: MAF acknowledges that there remain areas of uncertainty concerning the epidemiology of PRRS and these uncertainties are discussed throughout the published import risk analysis. When dealing with uncertainty in a risk analysis, Murray (2002)[59] stated:

"Where there is significant uncertainty in the estimated risk, a precautionary approach to managing risk may be adopted. However, the measures selected must nevertheless be based on a risk assessment that takes account of the available scientific information. In these circumstances the measures should be reviewed as soon as additional information becomes available[60] and be consistent with other measures where equivalent uncertainties exist. It is not acceptable to simply conclude that, because there is significant uncertainty, measures will be selected on the basis of a precautionary approach. The rationale for selecting measures must be made apparent.

Biological pathways considered in the release and exposure assessments must be ascertainable. Since it is very difficult or perhaps impossible to prove that a particular pathway does not exist, there will always be a degree of uncertainty. In some cases a pathway may be hypothetical rather than ascertainable. It is not appropriate to consider such pathways in a risk assessment."

Much of the above text was also reproduced in the OIE handbook on risk analysis published in 2004[61]. MAF considers the measures recommended in the published import risk analysis to be consistent with the above guidance from Murray and the OIE.

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[59] Murray N (2002) *Import risk analysis animals and animal products*. New Zealand Ministry of Agriculture and Forestry, Wellington, New Zealand.

[60] Article 5.7 of the SPS Agreement states that "a Member may provisionally adopt sanitary … measures" and that "Members shall seek to obtain additional information … within a reasonable period of time." Since the pleural noun "Members" is used in reference to seeking additional information a co-operative agreement is implied between the importing and exporting country. That is the onus is not just on the importing country to seek additional information.

[61] Murray N, MacDiarmid SC, Wooldridge M, Gummow B, Morley RS, Weber SE, Giovannini A and Wilson D (2004) *Handbook on import risk analysis for animals and animal products, volume 1.* OIE, Paris, France

Robert Desrosiers comment: "My overall conclusions on this document and on the potential infection of New Zealand swine herds through the importation of contaminated meat in the country are the following:

1) It is clear that pigs can be carriers of PRRS virus for several months after infection, but the capacity of infected animals to infect other pigs appears to be of significantly shorter duration. If pigs have recently been infected with the virus their capacity to infect other pigs is much greater than it is after 10-12 weeks or more post infection.

2) In PRRS-positive countries, most pigs come in contact with PRRS virus before they are 12 weeks of age, but there are situations where this is not the case and where they are infected closer to the time when they are slaughtered. These situations are evidently those that represent the greatest risk.

3) There seems to be no study that would have taken meat obtained from PRRS positive herds, frozen it, processed it the way it would be processed in New Zealand (see page 42 of the IRA, item ii) and then given to pigs. The van der Linden et al (2003) and the Magar et al (2004) studies have shown that the frozen meat of infected pigs can be a source of infection for negative pigs, but they do not prove that this meat would have produced infection if processed the way it would be in New Zealand.

4) The likelihood that PRRS infected meat could serve as a source of infection for New Zealand pigs appears to be very low, but not negligible for the following reasons:

- New Zealand has imported meat from PRRS positive countries for 14 years without becoming infected

- Given the law adopted in 2005 on garbage feeding, it would seem that the danger should be even less today than before

- There is no confirmed case described in the literature where a country or even a herd would have become infected because of consumption of infected meat. This however does not mean that it never happened since in many cases the origin of infection is not found

- In PRRS positive countries, most pigs are infected with the virus months before being slaughtered, so at slaughtering time they are less likely to represent an important source of infection

- The processing of meat, from the time the animal is slaughtered in a foreign country to the time it could be served to pigs in New Zealand does reduce and perhaps eliminate (if the processing involves cooking) its capacity to serve as an efficient source of infection

- The meat is most likely to be cooked by consumers before being served to pigs, and cooking would destroy the virus

- If, however everything went wrong (pigs infected close to slaughtering time; meat from infected pigs not being cooked and served in sufficient quantity to pigs to infect them) it would be possible for New Zealand pigs to get infected because of contaminated meat consumption.

5) If the virus was introduced into New Zealand, the financial consequences could in my opinion vary from being negligible, to important and long lasting for commercial producers. This would depend on the circumstances (time taken to detect the infection; virulence of the

strain introduced; number of direct and indirect contacts between the pigs initially infected and other pigs; efficacy of the eliminations methods employed). The introduction of this virus in swine farms cannot be prevented by simply following standard biosecurity measures, at least in hog dense areas. In these regions the virus can and regularly does find its way in swine farms in spite of the fact that strict biosecurity measures are being applied. Given the pig population of New Zealand, it could be though that there are very few areas that would be considered as hog dense.

6) There are examples of countries (Chile) or areas (Pays de la Loire) that were previously negative, became infected but were able to limit infection to a very low percentage of farms, or eliminate the virus after its introduction. Since New Zealand is currently negative, which makes diagnostic interpretation easier, and since accurate and reliable diagnostic tools are available to detect the presence of the virus in swine herds or pigs, there would be a possibility of limiting the diffusion of the organism after its introduction. This would depend on how quickly the PRRS virus presence is detected after its introduction, the circumstances of that introduction and on the efficacy of the elimination program. Given the large number of feral and backyard pigs in the country, and the relative lack of control on these, the challenge could be significant."

> ***MAF response:*** MAF interprets these concluding comments as indicating broad agreement with the overall conclusions of the published risk analysis.

Montse Torremorell comment: "In conclusion, in my opinion the risk for NZ to become infected with PRRSV through the consumption of infected meat is low. However, should this happen, the spread within the country would be more important than what this IRA is considering.

Other comments:

Is there any evidence of transmission of exotic diseases in New Zealand via pork beyond PRRSV? NZ has imported meat from China and this country has other significant diseases. Is there any evidence of transmission of other important diseases?"

> ***MAF response:*** MAF acknowledges that, as illustrated by this appendix, there is disagreement amongst recognised experts as to the mechanisms and significance of "area spread" of PRRSv . In the absence of robust experimental studies, such disagreement will inevitably lead to a degree of uncertainty which must be reflected in the conclusions of a risk analysis. For further discussion relating to the treatment of uncertainty in a risk analysis, please refer to our response to Professor Dee above.
>
> MAF has previously examined the animal health risks associated with the importation of meat and meat products into New Zealand and the results of this earlier risk analysis were published (see: http://www.biosecurity.govt.nz/files/
>
> pests-diseases/animals/risk/meat-meat-products-ra.pdf). The findings of this earlier risk analysis will be used alongside the recently published import risk analysis for PRRSv in pig meat when drafting an import health standard for the importation of pig meat into New Zealand.

Appendix 3

Appendix 1 of the NZPIB submission raised a number of questions relating to the quantitative release assessment model presented in appendix 1 of the published risk analysis. This appendix of the NZPIB submission was sent to the author of the quantitative model (Dr. Noel Murray) for response.

The comments of Dr. Murray are reproduced below within appendix 1 of the NZPIB submission:

APPENDIX 1 RISK ASSESSMENT METHOD

The risk assessment method has serious flaws which undermine its value, as currently presented, in determining an appropriate import health standard:

- the meaning given to terminology used to describe the likelihood of an event or the pathway is not stated. For example, what constitutes 'low' risk?
- the unrestricted risk has not been estimated and so it is not possible to estimate the degree to which control strategies reduce the risk, or the extent to which risk management procedures need to be monitored to ensure compliance;
  Dr Murray comments: *The risk estimate from the release assessment was the unrestricted risk estimate. It was an estimate of the likelihood of a pig harbouring PRRS at the time of slaughter for two scenarios: 1. the likelihood that a pig (carcass) would have PRRS virus present in muscle, 2. the likelihood that a pig (carcass) would have PRRS virus present in oropharyngeal/tonsil tissue.*
- the unit of interest is not defined (e.g. pig, kilogram of meat or tonne), and hence the analysis does not give any consideration to volume of trade and the way in which that influences risk;
  Dr Murray comments: *The unit of interest in the release assessment was a pig, that is, it provided an estimate of for two scenarios: 1. the likelihood that a pig (carcass) would have PRRS virus present at the time of slaughter in muscle, 2. the likelihood that a pig (carcass) would have PRRS virus present at the time of slaughter in oropharyngeal/tonsil tissue.*
- no information is provided to describe how steps in the pathway were combined to estimate the likelihood of entry and likelihood of entry and exposure;
- no matrix is provided to indicate how the consequence, and the likelihood of entry and exposure were combined to estimate the risk. In fact, it appears that only the release assessment was conducted according to standard procedures (although with the deficiencies noted above ***(Dr Murray comments:*** *See comments above)*, and the other components of the assessment are subjective opinions, unsupported by standard analytical procedures. These are the exposure assessment, the consequence assessment and the unit risk (per unit of trade and per year).
- the assessments made of risk management methods are also subjective, and make no attempt to examine the effect on risk of either the recommended policy or alternatives which could have been adopted, and no final risk of the proposed policy is estimated.
- in this model, the probability of infectious PRRS virus being present in meat (***Dr Murray comments:*** *and also oropharyngeal/tonsil tissue*) at the time of slaughter and the probability that the pig was infected prior to slaughter were multiplied together to determine the probability of harbouring infectious PRRS virus at slaughter. In doing this, a stochastic approach is used to calculate this step. This makes the analysis appear more comprehensive than it really was, since only the expected value (mean) is reported. The

standard deviation should have been reported in order to correctly represent a stochastic modelling process – effectively the analysis has been reported as if it had been done deterministically, and makes no attempt to describe the effects of variability or uncertainty.

Dr Murray comments: *Correct – @Risk was used to estimate the probability that PRRS virus was present in either oropharyngeal tissue or meat at the time of slaughter given that a pig had been infected prior to slaughter. The following algorithms were used: 1. for oropharyngeal tissue IF(age at slaughter > age when infected + persistence in oropharyngeal and tonsil tissue,0,1), 2. for meat IF(age at slaughter > age when infected + duration of viraemia,0,1). As explained in the text distributions were used to model the variation in the age at slaughter, the age when a pig is infected, the persistence of PRRS virus in oropharyngeal and tonsil tissue and the duration of viraemia as a surrogate indicator for the presence of PRRS virus in meat.*

The convenience of simulation was used to run a large number of trails or iterations using the algorithms described above in order to obtain an estimate of the relevant probability. The algorithm returns a value of 1 if for a success (PRRS virus present at the time of slaughter) or 0 for a failure (PRRS virus NOT present at the time of slaughter). The results from the simulation will then be the number of successes (x) observed in (n) trials (iterations). With a sufficiently large number of trials a very good estimate of the probability of interest, which is the limit of the ratio x/n as n approaches infinity, can be obtained. That is, as more trials (iterations) are undertaken, we can be increasingly certain of the true value of the probability. This is the frequentist view of probability – it is a measurable property of the physical world. The uncertainty in the estimate, based on 20,000 iterations, was captured in the original model using the beta distribution function Beta(x+1,n-x+1). It is worth noting that the level of uncertainty in this situation is influenced by the number of iterations (trials) undertaken in estimating P2 (probability that PRRS virus is present at the time of slaughter given that the pig was infected). As more iterations are undertaken the confidence intervals about the mean will become narrower. For example, the results for P3 (probability that PRRS virus is present in meat at the time of slaughter) are: 1. based on 20,000 iterations - mean = 3.42E-03, 95% CL = 2.84E-03 – 4.06E-03; 2. based on 100,000 iterations – mean = 2.98E-03, 95% CL = 2.73E-03 – 3.24E-03. As a result, in such circumstances where simulation was used to obtain a point estimate for P2 and P1 (probability that a pig was infected prior to slaughter) was modelled as a point estimate, it is appropriate to report the expected value rather than focusing on the confidence intervals. Even if the upper 95% confidence interval rather than the expected value had been reported the estimate would not change. It is important to appreciate that the whole purpose of modelling is to gain insights and not to over specify the analysis. Considering that the approach adopted in the model was to work from first principles to estimate the likelihood of virus being present at the time of slaughter based on the likelihood of a pig being infected, when it is likely to become infected, the duration of viraemia, age of slaughter etc, all of which were based on the relevant literature at the time (2001) it is reassuring that the models predictions are actually so similar to the results from the trial undertaken by Magar and Larochelle in subsequent years.

Other concerns with the model are that:

- the model did not included variability in the prevalence of PRRS infected in each age group, the duration of viraemia and the persistence of viraemia. Failure to include variability is likely decrease the estimated number of infected animals at the time of slaughter.

__Dr Murray comments:__ This comment is somewhat surprising considering that, as explained in considerable detail in the risk analysis, distributions were actually used to model variability for each of these variables – see section 4.1.2 and Appendix 1.

- in estimating the prevalence of viraemia in pigs within each age group, a weighted average was used that appears to include data from non-infected farms. It could be argued that the input values should have been a weighted average of farms with PRRS infection because the model is trying to estimate the age of infection, given the animal is infected. Therefore, only data from farms with one or more infected animals should have been used.
  __Dr Murray comments:__ This is not correct. As explained in the risk analysis (Section 4.1.2.1), the data for estimating the prevalence of infection within each age group was based on herds with endemic PRRS. Uninfected herds were not included.

Annual risk

If high value cuts are obtained from multiple animals for importation, and combined into a shipment, then we can say the likelihood that a randomly chosen kilogram of pig meat harbouring the PRRSv is 0.003. So on average 3 kg of every tonne imported will be infected

The absolute risk is directly proportionally to the number of kilograms imported and can be calculated using the following equation:

$1 – (1 – P)^n$

Where P = Probability that each kg of meat is infected (i.e. 0.003) and n = number of kilograms imported.

*__Dr Murray comments:__ The use of this equation in this situation is not correct. The underlying assumption that there are (n) independent trials is violated as it is not plausible to assume that each kilogram of pig meat is independent from the next. This would only be true if the weight of high value cuts from each pig was just one kilogram. In reality, one pig would contribute (w) kg of high value cuts in which case the number of pigs per tonne would be 1000/w. The probability that a tonne of pig meat would contain meat from an infected pig would then be 1-BINOMDIST(0,1000/w,0.003,0) – note this is an Excel function. If a consignment consisted of (c) tonnes then the probability that it contained meat contaminated with PRRS virus would be 1-BINOMDIST(0,c*1000/w,0.003,0). As an example, if 20 kg of high value cuts are derived from each pig then there would be 50 pigs contributing to a tonne. Given a probability of 0.003 that PRRS virus is present in meat at the time of slaughter, the probability that a tonne of pigmeat would harbour PRRS virus be 0.14. For 10 tonnes the probability would increase to 0.78. The amount of pig meat that might be contaminated in any one consignment could be estimated as RiskBinomial(n,p)*w*c where n = the number of pigs per tonne, p = probability that PRRS is present at the time of slaughter, w = weight of high value cuts per pig in kg, c = size of the consignment in tones. Note that if a distribution is used for (w) rather than a point estimate a slightly different approach would be needed to account for different amounts of meat per pig.*

Using this equation, the likelihood that one or more kilograms of pig meat is harbouring PRRS virus, per tonne of pig meat, is 0.97 and the likelihood per 10 tonnes is 1.0 with a negligible confidence interval. Hence the annual risk of entry of PRRS virus to New Zealand is 1.0, with a negligible confidence interval.

Appendix 4

FEEDING YOUR PIGS

The feeding of meat and food waste containing meat to pigs has been identified as a potential foot and mouth disease risk to New Zealand's livestock industries. Consequently the Biosecurity (Meat and Food Waste for Pigs) Regulations 2005 have been introduced.

These regulations are also a way to control the spread of other diseases like swine vesicular disease and classical swine fever, were they to enter New Zealand.

Please read the following carefully to ensure that you comply with the regulations.

Meat and food waste that has come in contact with meat must be heated to 100°C for one hour. The easiest way to do this is to boil it for one hour, stirring frequently.

The Regulations define meat as flesh (raw or cooked) from any animal, including fish, birds and snail.

Items that do not have to be heated include:

- commercially manufactured pig feed;
- food waste that does not contain meat and did not come in contact with meat;
- eggs, milk or rendered material.

If you are found feeding non-compliant food to your pigs you can be fined a maximum of $5,000 for an individual and $15,000 for a corporation under the Biosecurity Act 1993.

March 2006

For more information visit:
www.biosecurity.govt.nz/pests-diseases/animals/foot-n-mouth/food-waste-to-pigs/index.htm
Contact: Nasser Ahmed Biosecurity New Zealand, tel: 04 819 0550, email: nasser.ahmed@maf.govt.nz

BIOSECURITY NEW ZEALAND

GOOD AGRICULTURAL PRACTICE

GAP

Issue 2
July 2005

nzpork INDUSTRY BOARD

This is the second issue of NZPIB's GAP publication, a series to assist pork producers in applying good agricultural practice on-farm. This issue focuses on aspects of GAP required for commercial farms wishing to achieve registration as a farm eligible to export pig meat to Singapore. It also explains what is required to meet the new Biosecurity (Meat and Food Waste for Pigs) Regulations 2005.

1. Export of New Zealand Pork to Singapore

A Singaporean regulatory requirement for New Zealand grown pig meat that is exported to Singapore is an assurance that the risk of infection with *Trichinella* is very strictly controlled. Until June 2005, this assurance has been provided by 100% product testing. NZPIB is pleased to advise pork producers that the Singapore Agri-Food and Veterinary Authority has now agreed that this assurance can also be provided by the application of a Quantitative Risk Assessment model developed by the EpiCentre, Massey University. This model has been developed based on the infection pathway covered in a substantial amount of international literature on *Trichinella*, and the risk probability established within the context of all the New Zealand surveillance data on *Trichinella*.

Importantly, the model establishes:

- **All New Zealand commercial herds** (unless 'swill' is fed) **qualify to export pork offal excluding tongue and diaphragm.**
- **All commercial herds with a confined production system** (unless 'swill' is fed) **qualify to supply pig meat.** Confined production system herds are defined as commercial pig farms where animals do not have unrestricted access to the outdoor environment (external to pig rearing buildings) during the grower phase. In this way the key risk factor for *Trichinella*, which is potential contact with rodents and other wild life including cats, is controlled.

A herd certification system has been developed which further reduces the risk of *Trichinella* infection by setting GAP standards in relation to other risk factors for *Trichinella* infection and re-infection. These factors include on-farm rodent control, appropriate feed storage, containment of any feed spillage, general hygiene, good housekeeping and maintenance in and around the buildings, and appropriate disposal of rubbish and carcasses. Declarations are required from suppliers to the farm. Feed suppliers need to declare that they control rodents. Suppliers of any pigs to the farm need to declare that they do not feed swill, and suppliers of any grower pigs to the farm need to declare that these grower pigs have been raised in a confined production system.

GAP Issue 1 (March 2005) has already covered rat control and effective baiting. GAP recommendations in relation to further reducing any risk of *Trichinella* infection are covered below, and are appropriate farm practices for all pork production units.

Feed – Sourcing, Storage & Spillage:

All feed should be sourced from suppliers with rodent programmes in place. All feed should be stored and prepared in buildings that are designed or set up for the purpose. All practical efforts should be taken to exclude wildlife including cats from these buildings. All bagged feed should be stored on pallets and be at least 0.6 m away from the walls of the building. There should be minimal amounts of spill feed, other than that which has been directly spilled by pigs. Any feed spillage should be promptly cleaned up.

General Hygiene & Rubbish Disposal:

General hygiene and sanitation must be maintained to a satisfactory standard i.e. there should be minimal

Please Turn Over →

amounts of rubbish around the farm. Fly numbers, as an indicator of poor hygiene, should not be excessive. Vegetation should be controlled around the farm buildings by regular mowing or spraying.

Disposal of Pig Carcasses:

All pig carcasses need to be disposed of promptly. The only acceptable methods of carcass disposal are burial, an offal pit, composting or incineration. If burial is used, all dead pigs must be placed in a pit over 1 m deep and be covered by at least 30 cm of soil immediately. If an offal pit is used, it **must** have a secure cover and manhole. If pigs are composted, pigs **must** be covered by compost and the compost bin must be sealed. Carcasses **must** not be accessible to pigs (refer section 3 below).

2. Swill Feeding

A market access requirement for Singapore is that there is no 'swill' feeding. Swill is defined as commercial or domestic food waste that includes or may have had contact with animal matter excluding dairy, eggs or rendered material.

Farms that feed swill to any pigs in any quantity are ineligible to export to Singapore, regardless of whether the material is cooked or not. Farms that source any pigs from a farm that feeds swill are also ineligible.

3. Biosecurity (Meat & Food Waste for Pigs) Regulations 2005

These New Zealand regulations came into effect on 7 July 2005. Any food waste that contains meat, and also any meat from any source at all (e.g. carcasses) must be 'treated' before being permitted to be fed to pigs. 'Treated' is defined as heated to 100 degrees C for an hour. The regulations state that persons must not feed, or allow, cause or permit a pig to eat these products unless treated. They also state that persons must not collect, distribute or trade these products if they are for, or intended for feeding to pigs, unless they have been treated or will be treated.

These regulations therefore place responsibility on all persons who are involved in the supply of food waste to feed pigs, as well as the pork producer.

Note also that the scope of the regulations covers dead animals, and so pork producers must prevent access of pigs to any animal carcasses at all times.

Under the Biosecurity Act 1993, individuals found feeding non-compliant food to pigs can be fined a maximum of $5,000. Corporations in breach of these regulations face a $15,000 fine.

Please be vigilant in ensuring that you fully comply with these new regulations, and please be prepared to ensure that others are also complying by explaining the requirements and if necessary, reporting non-compliance.

If you have any queries about these matters please feel free to ring the Board's free phone number 0800 NZPORK (0800 697 675) for further information.

nzpork
INDUSTRY BOARD

DATE 5 July 2005

Feeding your pigs

New pig feeding regulations aim to mitigate the risk of foot and mouth disease and control the spread of other diseases, like swine vesicular disease and classical swine fever.

From 7 July 2005, all food containing meat that is fed to pigs must be heated to 100ºC for one hour.

The easiest way to comply with the regulations is to boil meat and food waste containing meat for one hour, stirring frequently.

Items that do not have to be heated to 100ºC before consumption include:

- commercially manufactured pig feed;
- food waste that does not contain meat and has not been in contact with meat; and
- eggs, milk or rendered material.

Although the risk of foot and mouth disease, or other serious exotic diseases, infecting New Zealand livestock through feeding of food wastes to pigs is low, the consequences to farmers and the whole economy would be great.

Under the Biosecurity Act 1993, individuals found feeding non-compliant food to pigs can be fined a maximum of $5,000. Corporations in breach of the new regulations face a $15,000 fine.

The Biosecurity (Meat and Food Waste for Pigs) Regulations 2005 can be found at www.knowledge-basket.co.nz/regs/reglists.html

For more information visit: www.biosecurity.govt.nz

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