Risk Assessment and risk management measures relating to the return of sheep on the "M.V. *Al Messilah*" to Adelaide

12 August 2011

Introduction

A major mechanical failure occurred on the live sheep export vessel 'MV *Al Messilah*' in the Australian maritime zone on 9th August 2011. The vessel was only 24 hours into its voyage and did not leave the Australian maritime zone. The failure was caused by a crack in a sewage outlet pipe which allowed seawater and sewage to fill an emergency generator room. The vessel has been obliged, for maritime safety reasons, to return to Port Adelaide.

The vessel departed Port Adelaide on 8th August 2011. The vessel is carrying approximately 67,000 sheep intended for s47 (1)(b) in the Middle East.

The veterinarian accompanying the sheep reports their continuing good health and maintenance of satisfactory conditions for their welfare.

Animal Health Committee (AHC) with relevant industry representatives met by teleconference on 10 August 2011 to discuss this incident. AHC requested that a risk assessment concerning the welfare and health of the sheep on the Al Messilah be undertaken by DAFF.

It has been confirmed that all previous shipments by the Al Messilah undertaken in the last three months were only Australian animals and only Australian origin fodder and water was taken on board. The Master of the vessel has also advised that no animals were loaded onto the vessel in the past 6 months at any place other than Australia. No animals have been treated with any veterinary therapeutics since the vessel's departure from Adelaide.

The vessel returned to Port Adelaide on 11th August and will be assessed for seaworthiness on arrival. This risk assessment and risk management plan will be used if the vessel is unable to be repaired or if there are concerns regarding the welfare of the animals.

Purpose

The purpose of this paper is to assess the animal health risks and determine the risk management measures required that would manage risks associated with the returned livestock to an acceptable level. The risk management plan would address animal welfare and health concerns associated with the return of sheep to the Australian mainland for the livestock to be immediately unloaded and moved directly to an export registered feedlot.

It is proposed the sheep will be held under quarantine government supervised conditions at the feedlot pending their re-export or directly to slaughter for processing within Australia. The aim of this arrangement is to ensure appropriate animal health and welfare outcomes are met.

Background

Livestock vessels undergo cleaning, disinfection and disinsection procedures before entry into Australian ports, and are subject to AQIS inspection before being allowed to load livestock for export.

Livestock consignments face a number of hazards once they leave Australia. Hazards include major exotic animal pathogens or exotic strains of endemic pathogens of quarantine concern that the animals could potentially be exposed to enroute to their destinations, or at their destinations even if they had not been disembarked. Although livestock vessels are cleaned and disinfected prior to loading, no disinfection procedure can be guaranteed to be 100% effective.

Waters within twelve nautical miles of a country's coastline are determined to belong to that country, beyond which the ocean is classified as international waters. Livestock on board vessels travelling close to an interim country's coastline may inadvertently be exposed to the coastal state's animal diseases via windborne insect vectors, dust and aerosols.

Enroute to the country of destination livestock could also be exposed to a number of risks including any potentially contaminated food, feed, water and veterinary therapeutics. Potentially, food provisions for the crew can be loaded from any port in any country. Most food would not be loaded at Australian ports because food provisions would be cheaper bought from overseas ports. Although food provisions are kept on a separate deck where no livestock are present, there is a potential risk of exposure of livestock to discarded contaminated food and food wastes.

Veterinary therapeutics are added to the kit from potentially any port that the vessel stops at. The onboard kit commonly comprises veterinary medications from all over the world including medications that are not registered for use in Australia. When the vessel arrives in Australia for livestock loading the veterinary kit is locked so that no medications can enter Australia. However there are no restrictions regarding the use of those medications on livestock loaded onto a vessel. Importing countries may also require livestock consignments on departure from Australia to be vaccinated for diseases that are exotic to Australia, or with vaccines that are not approved for use in Australia.

Hazards list - Pests and diseases of concern

The main pests and diseases of concern would therefore be those which may have infected the previous shipment of Australian sheep whilst in-transit or in the Middle East ports leading to possible fomite contamination of the vessel. Of these, if any, only those which would survive the disinfection and disinsection process would be considered a significant risk.

The following pests and diseases could have been transmitted to (or had contact with) the sheep on the previous shipment while they were in the Middle East:

- Foot-and-mouth disease;
- Peste des petits ruminants;
- Sheep pox;

- Surra;
- Rift Valley fever;
- Bluetongue;
- Screw-worm fly (SWF);
- *Culicoides imicola* (a vector of bluetongue);
- Transmissible spongiform encephalopathies (TSEs);
- West Nile virus;
- Exotic ticks and mosquitoes;
- Tick-borne diseases (*Theileria annulata* and Crimean-Congo haemorrhagic fever).

Exposure pathways

The pathways by which animals in a consignment could become infected with an exotic disease agent include:

1. The use contaminated vessels in the transport of the consignment. This could potentially occur if the vessels had carried animals from another country and had not be properly decontaminated before being used to ship Australian animals. Even if the vessels had transported only Australian animals, movement of people and equipment and fodder at the overseas destination could result in the inadvertent contamination of the vessel.
2. Cleaning and disinfection procedures undertaken on board returning livestock vessels if not properly undertaken could allow risk materials to remain.
3. Animal feed if sourced from another country
4. Water if sourced from an unknown source in another country
5. Personnel or crew on board the vessel who may have had contact with diseased animals while the vessel was overseas. Overseas officials and other personal who boarded the vessel at the port of destination would similarly present a risk.
6. Provisions for the crew are generally sourced from overseas ports as they are cheaper. Animal products from those sources may not be sufficiently processed to address quarantine risks, and may inadvertently be fed to animals in the consignment.
7. Veterinary therapeutics not approved for use in Australia may be used to treat livestock
8. Insect vectors (en route to destination and at port of destination) that could carry vector-borne diseases. There is a potential for insects to survive disinsection treatments of the vessel, especially for insects which use livestock faeces in their livecycle.
9. Wind borne diseases en route to destination and in port of destination. In the case of screwworm fly, the vessel may be sufficiently close to the shore for the pest to make its own way to the vessel, or be blown there by the wind.

Discussion on exposure pathways

Insect vectors, screwworm fly and windborne diseases

Waters within twelve nautical miles of a country's coastline are determined to belong to that country, beyond which the ocean is classified as international waters. According to international convention[1], there are no restrictions on how close a vessel can travel to foreign coastal states as long as the vessel travels in a manner that does not upset the peace and security of the coastal state. Livestock on board vessels travelling close to an interim country's coastline may inadvertently be exposed to screwworm fly, and other animal diseases via windborne insect vectors, dust and aerosols. The risk of this consignment being exposed to those factors is negligible given that the vessel had not left the Australian maritime zone.

Cleaning, disinfection and disinsection of vessels

AQIS Seaports Program conduct surveillance and regulation of Australia's wharf areas and incoming vessels. Before entering Australian waters a livestock carrying vessel is required to be cleaned and disinfected and reported in the 'Statement by Master of Livestock Vessel Form'. AQIS Seaports Program created the 'Masters Information Sheet' which outlines the cleaning and disinfection procedures required to assist Masters of livestock vessels to meet Australian requirements for incoming vessels.

The Masters Information Sheet requires every livestock vessel to be thoroughly cleansed. The vessel must then be disinfected with 4% soda ash (sodium carbonate) solution applied to all livestock holding areas for a minimum of 30 minutes.

Disinfection is followed by disinsection of the vessel using Permethrin applied to at least 10 per cent of the surfaces and partitions of the open deck pen areas, crew quarters, recreation areas, dining areas and storage areas. Permethrin should also be applied to cool, dry, dark areas where Pestigas is unlikely to penetrate.

Within 2-48 hrs prior to arrival at the quarantine line the vessel must be disinsected using Pestigas (active ingredient: 4g/kg pyrethrins, 20g/kg piperonyl butoxide) or Insectigas-D (active ingredient: 50g/kg dichlorvos); both are insecticides registered for use in Australia. The areas that must be disinsected are all the below decks and all enclosed animal accommodation levels. The minimum dose rate is 200gm/300m3 at a rate of 3gms/second at 800 PSI (5720KPa). For Pestigas, ventilation can be reopened two hours after spraying has ceased; for Insectigas-D, ventilation can be reopened four hours after spraying has ceased and the ventilation should be operated for 30 minutes before re-occupation and inspection is permitted.

Insectocutors with light intensity of at least 160 watts UV must be installed on at least one open deck. The insectocutor tray must be cleaned and activated immediately on completion of the cleaning and disinfection and prior to arrival in Australian waters, and must remain active until 24 hours after leaving the last Australian port.

The vessel is required to maintain a soda ash 4% footbath at the bottom of the gangway and crew and visitors to disinfect their footwear. The AQIS Seaports Work Instruction (WI) directs quarantine officers to check the Statement by Master of Livestock Vessel against the Deck Log Book; and check that all decks have been treated for disinfection and disinsection according to vessel requirements. The WI directs that if treatments of the decks are not performed adequately, or if the vessel has carried livestock not of Australian origin, quarantine officers issue a Quarantine Treatment for Insanitary Vessels directing the vessel to be cleaned and disinfected using soda ash 4% solution performed dockside or at a contingency cleaning zone at sea to contain run-off.

Therefore the steps routinely undertaken in the cleaning, disinfection and disinsection of the vessel, and the checks undertaken by AQIS should address quarantine risks associated with the entry of any livestock vessel to Australia.

Food, feed, water, veterinary therapeutics

Enroute to the country of destination livestock could be exposed to a number of risks including food, feed, water, veterinary drugs or therapeutics.

Food provisions are kept on a separate deck where no livestock are present, and given the short duration of this voyage, the risk of exposure of livestock to discarded potentially contaminated food and food wastes is minimal.

Veterinary therapeutics including those not registered for use in Australia are added to the kit from potentially any port that the vessel stops at. When the vessel arrives in Australia for livestock loading the veterinary kit is locked so that no medications can enter Australia. However there are no restrictions regarding the use of those medications on livestock loaded onto a vessel. Importing countries may also require livestock consignments on departure from Australia to be vaccinated for diseases that are exotic to Australia, or with vaccines that are not approved for use in Australia. The risk from this pathway for the current voyage of the Al Messilah is negligible as to date none of the animals in this consignment has been treated with any veterinary therapeutics.

Most vessels carrying livestock from Australia have the ability to create potable water via desalination and reverse osmosis. Alternatively, or in addition to, vessels carry water in tanks. Water for tanks may be loaded at any port around the world with no restrictions. For the Al messilah the biosecurity risk is negligible as all water used on the vessel is of Australian origin or made by the vessel by desalination of seawater.

Fodder that has been overseas cannot be fed to livestock while in Australian waters and the WI directs quarantine officers to request fodder be bagged/shrink wrapped and covered by a tarp while in port. All fodder on this ship is of Australian origin, and therefore does not present any quarantine risk.

Ship's crew/personnel

Crew members who work aboard livestock carrying vessels may changeover staff at any port stopped at along the livestock voyage. Crew members could potentially interact with hazardous material while at the last port of call overseas prior to entering Australia. However, given the length

of time taken to travel between the last port of call and Australia and the intervening vessel cleaning, disinfection and disinsection procedures, the risk of a crew member carrying a viable agent and passing the infection to the consignment is considered to be minimal.

Officials/other personal at port of destination
This is not an issue in this case.

Assessment of the Risks

The following evaluates the relative risks associated with each animal pest or disease that might be introduced into Australia by the sheep on the vessel returning to Port.

The ship was loaded with sheep in Adelaide, departed on 8th August 2011 and had mechanical problems on 9th August 2011. The ship did not leave Australia's maritime zone, remaining within the waters of Southern Australia. There would be no disease vectors of significance within this area.

Prior to this shipment, the vessel had transported a shipment of sheep to the Middle East and returned empty. The vessel was subsequently disinfected using soda ash and disinsected using permethrin prior to loading.

Returning livestock vessels pose additional quarantine risks because of the nature of their cargo. While loaded, such vessels possess an ideal population of potential susceptible hosts for a number of disease carrying organisms. In some cases, fodder and waste can form ideal breeding sites for some parasitic arthropods.

As this and the previous shipment of sheep were of Australian origin only, *Theileria annulata* (a tick-borne pathogen), transmissible spongiform encephalopathies (TSEs), exotic ticks, surra, West Nile virus, Rift Valley fever, peste des petits ruminants and Crimean–Congo haemorrhagic fever are unlikely to be present on the vessel, especially given the thorough disinfection and disinsection applied prior to loading. These pests and diseases also lack a transmission pathway in the absence of direct exposure to infected animals or relevant vectors, and/or a feasible exposure pathway in Australia associated with this particular shipment. They can therefore be discarded from further consideration.

The risk associated with the remaining pests and diseases should predominate in risk management decisions. They are foot-and-mouth disease, sheep pox, bluetongue (an insect-borne disease), *Culicoides imicola* (a biting midge involved in the transmission of bluetongue) and screw-worm fly.

SWF larvae are known to be able to pupate in bedding and dung. The nature of trade in some cases results in itineraries which, with multiple port discharges and quick return journeys from ports means that inadequate cleaning, disinfection or disinsection, or a combination of these, may result in incomplete destruction of insect larvae. However the risk of viable SWF insects or their larval/pupae stages currently being present is considered remote as all dung and other potential harbours of insect pupae should be removed prior to departure from the middle East post and AQIS procedures ensure rigorous cleaning, disinsection and inspection prior to loading within Australian ports.

Bluetongue would spread in Australia only if insect vectors were available according at the place and time the sheep were returned. This is unlikely to occur as Adelaide is in the bluetongue free zone due largely to the absence of competent vectors. As the sheep on board are Australian origin, the only bluetongue risk would be due to exposure to any virus competent *Culicoides* remaining on the vessel from the previous shipment to the Middle East. The long time period for the vessel to travel empty from the Middle East to Australia and the rigorous AQIS controls on cleaning, disinsection and inspection prior to loading at Australian ports ensure the risk of viable *Culicoides* insects being present is negligible.

Foot-and-mouth disease and sheep pox are highly contagious and clinical cases would be expected to be clearly apparent if they were present. The incubation period of foot-and-mouth disease is usually only a few days although it may be as long as 10 - 14 days depending on the strain and level of exposure to the virus. Sheep pox has an incubation period of 5 - 14 days. Further, the index case may not be detected. Thus it is possible that two or more incubation periods are necessary to be confident that any outbreak would be detected. Therefore it is possible that no clinical expression of disease would be detected until after the sheep are unloaded.

Disinfection of livestock vessels presents some problems not seen in other vessels. Faecal and other organic material provides protection for some viruses and bacteria against chemical inactivation. Micro-organisms on lower decks are well protected from sunlight and desiccation. In the case of the Al Messilah, which is fully enclosed vessel, all desks should be considered to have low sunlight (UV light) exposure. It is for these reasons that a high standard of cleanliness, disinfection and disinsection throughout the vessel, confirmed by visual inspection is of such importance. Accordingly, vessels are carefully inspected by AQIS to verify disinfection and disinsection procedures have been performed at the standard necessary to meet the level of quarantine protection. This was the case with the current voyage of the Al Messilah.

Pox viruses are particularly resistant to many disinfectants and environmental desiccation. However, sheep pox is readily inactivated by soda ash which is listed in the AUSVETPLAN Operational Procedures Manual on decontamination as a preferred treatment for both foot-and-mouth disease and sheep pox.

Although it is not feasible to achieve standards of sterility of the entire vessel, the cleaning and disinfection of the vessels target the risk areas and also those pests and diseases of concern. There has been no evidence of survival of these pests and diseases despite many years of exporting livestock from Australia. AQIS has confirmed that the Al Messilah underwent the required disinfection, disinsection and inspection prior to loading.

Conclusion - Risk Assessment

Although the vessel did not leave the Australian maritime zone, the following pests and diseases are considered to be a potential risk of infecting sheep on board a vessel which had previously visited Middle Eastern ports: Sheep pox, screw-worm fly, bluetongue, *Culicoides imicola* and foot-and-mouth disease.

Of these pests and diseases, the following are considered to have the capacity to be present and/or contaminate fomites and survive on the vessel for extended periods, especially if protected from

environmental desiccation: Foot-and-mouth disease, sheep pox, screw worm fly and *Culicoides imicola*.

As the previous shipment in the vessel was only Australian animals, the long time for the vessel to travel empty from the Middle East to Australia, and the rigorous AQIS controls on cleaning, disinfection, disinsection and inspection prior to loading at Australian ports should ensure the risk of viable screw worm fly, *Culicoides spp*, FMD virus or sheep pox virus being present when this current shipment was loaded is minimal.

Although the likelihood of any incursion associated with this consignment is considered to be minimal, it is not zero. Each of these hazards has the potential to establish and spread in Australia and as there would be significant consequences of their incursion, additional risk management measures are considered necessary for this consignment on the Al Messilah to address the minimal residual risk.

Risk management measures

The following Risk mitigation strategies have been proposed:

Cleaning/disinfection after removal of sheep

It is understood that the Al Messilah will depart for repairs in Asia after the vessel has been unloaded. However the Al Messilah would not to be allowed back into Australian ports until thoroughly cleaned and disinfected after sheep had been removed.

Disposal – Sheep/Sheep products/waste

Once the vessel is in the port, any dead sheep, dung and other waste would need to be managed using appropriate biosecurity procedures for disposal and decontamination.

Environment

The cleaning of the vessel and exchange of ballast water would need must be carried out in compliance with requirements of the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983*.

Animal Welfare

The welfare of the sheep would remain a priority and all efforts would be made to provide the appropriate level of hygiene and nutrition to maintain good health and wellbeing of the animals. The on-board veterinarian should closely monitor these aspects.

Surveillance

On-board veterinarian and/or animal health officers should monitor sheep for clinical signs of disease, particularly those relating to the identified highest risk diseases to provide important data in support of risk assessments and management approaches. Any post mortem examinations undertaken should be photographically recorded.

Once in the feedlot, daily official animal health inspections should be undertaken. Any evidence of infectious disease should be notified immediately to the State Chief Veterinary Officer (CVO). A post mortem should be undertaken on all dead animals in consultation with the State CVO.

Quarantine and movement restrictions

The *Quarantine Act 1908* and South Australian state legislation provides powers to proclaim a location as a quarantine area. This then permits action to be taken to control access to the vessel and any restricted area around it. The proposed feedlot is already an AQIS-approved pre-export registered premises under a state government order which prevents stock being moved within South Australia except for export or directly to slaughter for processing. It is essential that full security be provided to the quarantine area and the quarantine corridor to the feedlot and on the animals' return to the Port for loading.

Susceptible livestock

Due to the potential susceptibility of Australian livestock to the diseases of concern, no other ruminants should be allowed within 400 metres of the wharf area used for this shipment or the feedlot for a period of 48 hours after the departure of the sheep and cleaning and disinfection of the wharf area and feedlots.

People

It is important to note that livestock are frequently exported from Australia and that this shipment of Australian sheep did not leave Australian waters and it has only been a couple of days since its departure. Therefore, the risk associated with people is not considered significantly greater than that of any other livestock vessel which frequent our ports. However, there may be risks associated with access by people to the sheep if sufficient time is allowed for the incubation period of any disease of concern. Therefore access by people to the sheep once unloaded (e.g. in the feedlot) should be strictly controlled as people can carry a number of the diseases on their clothing. People granted access to the feedlot would need to be recorded to permit tracing for human or animal health related matters, if required. As a precautionary measure only, details of all people having access to the vessel and trucks should also be recorded.

Any people given access to the sheep would need to wear suitable personal protective clothing and all personnel and clothing would need to be appropriately disinfected on leaving the feedlot.

Equipment

All equipment to be removed from the vessel or feedlot that has been in contact with the animals would need to be inspected for material that may harbour disease or vectors. Equipment would need to be cleaned and disinfected on the wharf before being permitted to exit the quarantine area. The standard for this should draw upon the AQIS protocol developed for re-importing military equipment from East Timor and the Middle East.

Fodder

No fodder would be removed from the vessel while it is in port. Any fodder bags would need to be collected and disposed of as quarantine waste in accordance with AQIS requirements.

Waste

No animal waste matter would be removed from the vessel while it is in port. Manure on the wharf or ramps leading to the wharf, would need to collected and bagged in plastic bags and sealed. Disposal of this material would need to occur in accordance with the AQIS protocols developed for disposal of animal waste.

Rodents, birds and insects

Rats, mice, birds, cats and insects that interact with the vessel and sheep pose a risk of spreading any potential disease. Measures would need to be taken before the arrival of the vessel to reduce populations of these species on the designated wharf.

Decontamination and disinfection

Decontamination standards for quarantine areas would be as set out in the AUSVETPLAN manual for decontamination (http://www.aahc.com.au/ausvetplan/decfnl2.pdf).

Transport

All aspects of transport of the animals from removal from the vessel to arrival and disposal at the processing plant or feedlot would need to be controlled to ensure biosecurity and animal welfare standards are maintained.

The transport route would need to be selected in consultation with the relevant South Australian authorities, giving consideration to the following important issues:

- most direct route;
- least risk of animals crossing this transport route and coming into contact with any waste from the truck; and
- Prevention of escape of animals.

Additional precautionary measures while unloading sheep from the vessel or loading onto vehicles should be evaluated to minimise the escape of excreta.

Sufficient trained and experienced stockmen, transport vehicle drivers and other necessary assistants would need to be immediately available once the vessel arrives and would need to remain available until the entire operation is completed. If trucks were not immediately available or the trucks do not have access direct alongside the vessel, the sheep would need to be unloaded in a controlled manner, securely penned and loaded as soon as possible.

Government officers would need to monitor each transport vehicle carrying the returned sheep.

Decontamination and disinfection of vehicles and equipment

Vehicles, transport trucks and/or transport containers and associated equipment would need to be clean at the commencement of the operation. The transport trucks would need to be cleaned at the destination facility before travelling back along the approved route for another load. On completion

of all loading/unloading procedures, all trucks used should be thoroughly cleaned and disinfected. Cleaning and decontamination procedures would need to be as outlined in AUSVETPLAN.

Waste disposal

Manure, droppings and any other biological products from the vessel or the transport trucks would need to be collected and treated in an approved manner.

Animal Welfare

Best practice animal welfare standards would need to be maintained at all stages of transport. The operational advice would need to be based on the Australian Model Code of Practice for the Welfare of Animals (http://www.affa.gov.au/docs/operating_environment/armcanz/pubsinfo/mcpwa/animal_welfare.html).

Destination

The destinations for sheep returning to Australia on the Al Messilah have been identified and two options are proposed.

(1) **Feedlot for re-export (in 3-4 weeks).** Feedlot conditions would include the following:

Daily official animal health inspection

The flock shall undergo a daily animal health examination by an official animal health inspector. This would include a general visual inspection with a more detailed physical examination of any individual animal that has been identified as suspect of ill health. Daily records of these examinations need to be completed and maintained. The State CVO would be notified immediately of any suspect infectious disease.

Suspect or sick animals

Suspect or sick animals to be confined to isolation pens for observation and treatment. Records need to be maintained for all animals in isolation.

Health Records

Records covering health, feeding and stock management need to be maintained and made available for checking by government officers.

Dead or euthanised animals

A full post mortem examination of dead or euthanized animals is to be conducted by a veterinarian and in consultation with the State CVO. Any post mortem examinations undertaken should be photographically recorded.The carcase would need would need to be managed in line with AUSVETPLAN manuals for disposal and decontamination.

People

Details of people granted access to the feedlot would need to be recorded to permit tracing for human or animal health related matters, if required.

Any people given access to the sheep would need to wear suitable personal protective clothing and all personnel and clothing would need to be appropriately disinfected on leaving the feedlot.

Equipment

All equipment that has been in contact with the animals or their waste to be removed from the feedlot would need to be inspected for material that may harbour disease or vectors. Equipment would need to be cleaned and disinfected at the feedlot before being permitted to exit the quarantine area.

Waste

No animal waste matter would be removed from the feedlot during the quarantine period and until such additional time as determined. Manure and other animal waste matter at the feedlot would need to disposed of or treated on site. Disposal of this material would need to occur in accordance with the AQIS protocols developed for disposal of animal waste.

Rodents, birds and insects

Rats, mice, birds, dogs, cats and insects that interact with the sheep in the feedlot pose a risk of spreading any potential disease. Measures would need to be taken to reduce populations of these species on the feedlot.

Decontamination of the feedlot

After the removal of all animals and before additional animals are permitted entry to the feedlot the premises will be required to be cleaned and manure treated by composting. If there are any infectious disease concerns identified then cleaning and disinfection should be conducted in accordance with the AUSVETPLAN. The feedlot shall remain empty for a period of 48 hours after the departure of the sheep.

(2) **Slaughter for processing at an abattoir** – if slaughter for processing of the animals at an Australian abattoir (for human consumption) is selected a more detailed plan for this option would need to be developed.