Investigating best practice for managing contractors in the delivery of Destruction, Disposal and Decontamination (3D) activities in an emergency animal disease response

FINAL REPORT

Victorian Emergency Services Travel Scholarship (2014)

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Emergency Services Foundation

State Government Victoria

CONTENTS

ACRONYMS

3D (Australian)	Destruction, Disposal and Decontamination
3D (United States)	Depopulation, Disposal and Decontamination
ADD	Assistant District Director
AHC	Animal Health Committee
AIIMS	Australasian Inter-service Incident Management System
APHIS	Animal and Plant Health Inspection Service
AUSVETPLAN	Australian Veterinary Emergency Plan
BIMS	Biosecurity Incident Management System
CAFS	Compressed Air Foaming System
CDC	Center for Disease Control
CDFA	California Department of Food and Agriculture
DATCP	Department of Agriculture, Trade and Consumer Protection
DEDJTR	Department of Economic Development, Jobs, Transport and Resources
DELWP	Department of Environment , Land, Water and Planning
DHS	Department of Homeland Security
EAD	emergency animal disease
EADRA	Emergency Animal Disease Response Agreement
EPA	Environmental Protection Agency
FBO	Federal Business Opportunity
FDA	Food and Drugs Administration
FEMA	Federal Emergency Management Agency
FMD	Foot and mouth disease
GFP	government furnished property
HAZMAT	hazardous materials
HPAI	Highly Pathogenic Avian Influenza
HSPD-9	Homeland Security Presidential Directive 9
HSEEP	Homeland Security Exercise and Evaluation Program
IPOPS	Infected Premises Operations
IS4S	Integrated Solutions for Systems
KIFCO	Kifco Incorporated
LPAI	Low Pathogenic Avian Influenza
NIMS	National Incident Management System
NVS	National Veterinary Stockpile
OSC	Operations Section Chief
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
QUADS	Quadrilateral group - Australia, New Zealand , US and Canada
RSPCA	Royal Society for Prevention of Cruelty to Animals
SAHO	State Animal Health Official
SMI	stockpile managed inventory
SOW	statement of work
USDA	United States Department of Agriculture
USES	United States Environmental Services
VAHS	Victorian Animal Health Service
VMI	vendor managed inventory
VS	Veterinary Services
WING	Wisconsin National Guard

EXECUTIVE SUMMARY

This report provides an analysis of the United States National Veterinary Stockpile (NVS) Program as a case study for the management of contractors in the delivery of Destruction, Disposal and Decontamination (3D) activities in an emergency animal disease response.

The methods of analysis included participation in a US National Veterinary Stockpile Full Scale Logistics Exercise, attendance at a Large Scale Decontamination Demonstration, the interviewing of subject matter experts and research of private contracting companies.

Results of the investigation showed that the employment of private contractors under the National Veterinary Stockpile 3D Response Support Services Program can be a very effective way of improving emergency response capacity and capability, provided the process is managed through the use of government contracts and the conditions of these contracts are actively monitored. Examples where the 3D Response Support Services Program have been successful in the United States include the New York State Low Pathogenic Avian Influenza Response (2007), the Iowa Flood Response (2008) and the current Highly Pathogenic Avian Influenza Response (2015).

The report highlights the importance of emergency agencies having a good knowledge of the process (who, what, where, how, why, when) for accessing skilled 3D staff and equipment, both in the government and non-government sectors and concludes that it would be advantageous for Australian state jurisdictions to have similar arrangements with private contractors.

Recommendations discussed include:

- that Australia should continue to liaise with other countries on best practice for 3D preparedness and response activities through the 3D QUADS group (NZ, USA, Australia and Canada)
- that the Victorian Animal Health Service identify private companies in the waste disposal industry who have the capacity, capability and amenability to be involved in 3D preparedness and response activities
- that the Victorian Animal Health Service liaise more closely with private contractors from the animal industries (intensive & extensive) to better understand their 3D response capabilities
- that the Victorian Animal Health Service investigate what physical resources (land, equipment and staff capability) are available for 3D activities within the Victorian state emergency management agencies and how they can be accessed ie. Hazmat operators for Decontamination services

Limitations of the investigation include:

- that in the interests of national security many details about the NVS could not be supplied
- the investigator was not able to interview any private contractors

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I would also like to thank staff from the US Department of Agriculture, Animal and Plant Health Inspection Services (USDA-APHIS) and the Wisconsin State Department of Agriculture for their generosity in sharing information and permission to participate in their preparedness exercises.

I am particularly indebted to Lori Miller, a true champion of the 3D discipline, for organising a very interesting and informative schedule of activities.

1. INTRODUCTION

1.1 Project Title

Investigating best practice for managing contractors in the delivery of Destruction, Disposal and Decontamination (3D) activities in an emergency animal disease response.

1.2 Background

In Australia, biosecurity emergencies involving animal diseases are referred to as Emergency Animal Diseases (EAD's). These EAD's, as defined in the Australian Veterinary Emergency Plan (AUSVETPLAN) include diseases that are:

a) exotic to Australia, or
b) a variant of an endemic disease, or
c) a serious infectious disease of unknown or uncertain cause, or
d) a severe outbreak of a known endemic disease, and that is considered to be of national significance with serious social or trade implications.

Currently there are 63 of these emergency animal diseases listed in the Emergency Animal Disease Response Agreement (EADRA).

The EADRA is a cornerstone of Australia's EAD preparedness and response activities. It is a contractual arrangement that brings together the Australian Commonwealth, State and Territory governments and livestock industry groups to collectively and significantly increase Australia's capacity to prepare for, and respond to, emergency animal disease incursions. The EADRA is a world first initiative, and Animal Health Australia is its custodian. The Agreement (otherwise known as "The Government and Livestock Industry Cost Sharing Deed in Respect of Emergency Animal Disease Responses") provides certainty of funding for the initial response to an EAD incursion through the partnership of the Australian Government, state and territory governments, and major livestock industry organisations. The agreement was signed by all parties in 2002 and specifies the 63 diseases, which are classified into four categories. The sharing of costs among governments and industries depends on who benefits most from control, assessed by the likely impact of the specific EAD on human health, socio-economic concerns, the environment and livestock production. Categorisation can be reviewed and new diseases added as circumstances change.

Another cornerstone of national preparedness and response is the Australian Veterinary Emergency Plan. AUSVETPLAN is a coordinated national response plan for the management and wherever possible, eradication of EAD's. The purpose of AUSVETPLAN is to ensure the coherent operations and procedures among national, state and territory animal health authorities and emergency management organisations in the management of an EAD incident by:

- providing policy and guidelines for the consistent management of an EAD incident by appropriately trained personnel
- improving the technical validity of strategies to combat disease emergencies and improving deficiencies in technical knowledge
- assisting in identifying research priorities
- providing a focus for training
- providing guidelines for the development of standard operating procedures

AUSVETPLAN consists of a series of manuals and supporting documents that include individual disease strategies, response policy briefs, operational procedures, enterprise manuals, management manuals, resource and guidance documents. Three of the key AUSVETPLAN

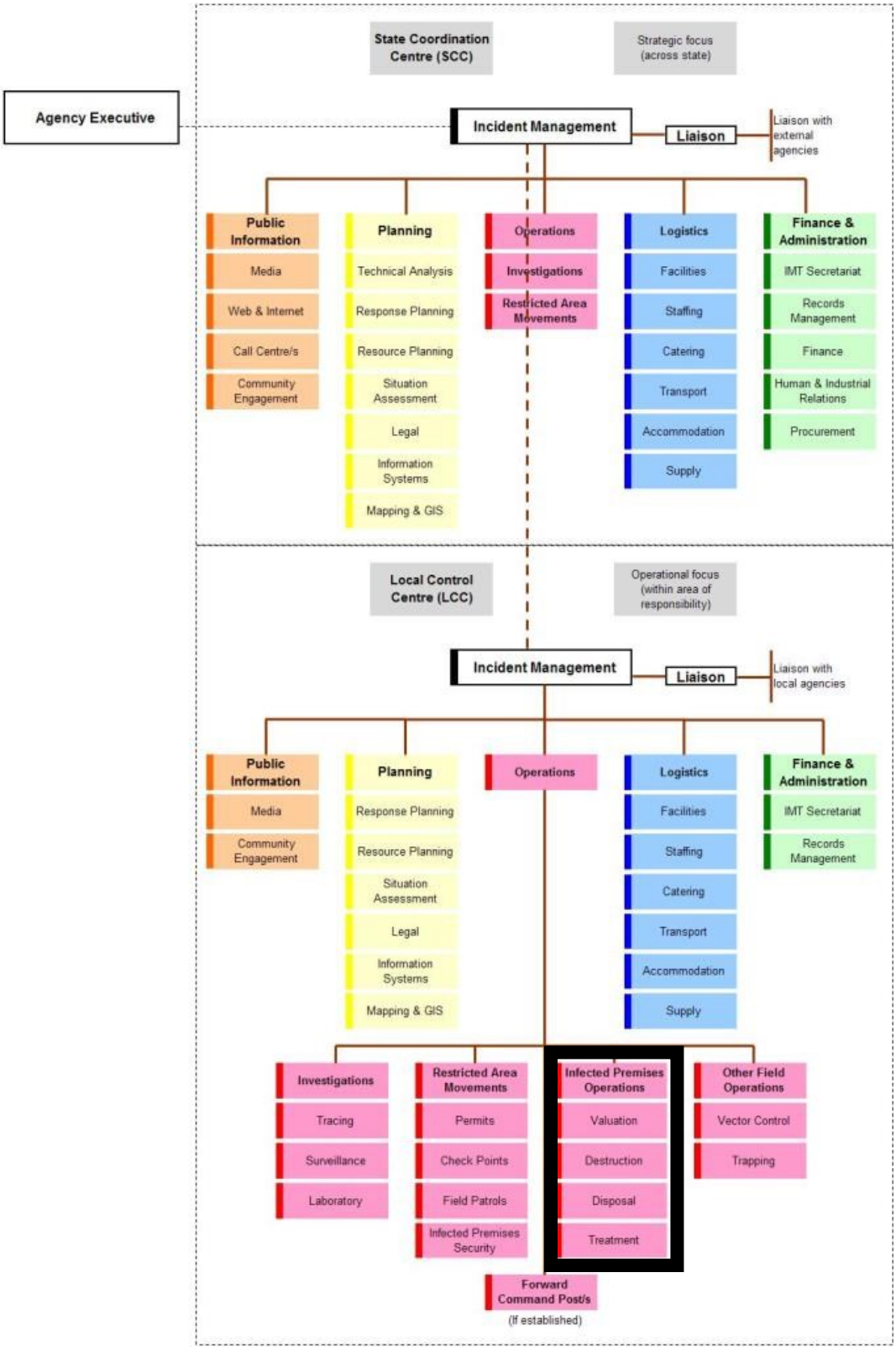
Operational procedures manuals include the Destruction of Animals Manual, the Disposal Manual and the Decontamination Manual.

In Australia biosecurity emergencies operate under an Incident Management System known as the Biosecurity Incident Management System (BIMS) (See Figure 1). BIMS is a uniform approach for managing the response to biosecurity incidents and can be applied to all biosecurity sectors. It is based on established incident management systems which are widely recognised and used throughout Australia[1]. BIMS is an "all hazards" approach which:

- represents the most contemporary approach to incident management
- co-exists with and complements current, sector specific and jurisdictional response arrangements
- is contextualised to a biosecurity environment
- can be applied to all biosecurity incidents, irrespective of sector or scale of response
- provides a guide for personnel working within operations centres established at national, state/territory, local and field levels
- is consistent with contemporary incident management systems employed by other emergency response agencies across Australia and other countries, including; Australasian Inter-service Incident Management System (AIIMS) and National Incident Management System (NIMS) in the United States

[1] Biosecurity Emergency Management – Biosecurity Incident Management System (V1.0 – 29th October, 2012), BEPWG

Figure 1. Biosecurity Incident Management System (BIMS) structure



Source: Biosecurity Incident Management System Manual – Vers 1.0 (Australian Dept of Agriculture)

Note: The heading “Treatment” is a biosecurity all inclusive term meaning Decontamination in the EAD context

Within the Operations area of the biosecurity response structure lies the Infected Premises Operations (IPOPS) section. This section is responsible for all of the activities that take place on an Infected Premises (IP) to both contain and eradicate disease. These activities include:

- maintaining biosecurity
- inventory and valuation of animals for compensation
- humane **destruction** of animals
- effective **disposal** of carcases and contaminated materials
- cleaning and disinfection **(decontamination)**
- wild animal and pest control
- implementing a sentinel animal program

The specialty areas of ***Destruction, Disposal and Decontamination activities*** (3D's) are critical operational tasks required in many emergency animal disease response programs. Typically these activities include the systematic *destruction/depopulation* of affected animals, followed by the effective *disposal* of carcasses and contaminated materials and finally the *decontamination* of animal holding facilities and general environs. The 3D activities are generally the highest risk activities undertaken in a response and are usually the most rate limiting, stressful and publicly controversial.

1.3 Relevance of the Project

In November 2012, the Australian Animal Health Committee (AHC) Foot and Mouth Disease Resources Working Group released a report on resourcing a potential Foot and Mouth Disease (FMD) response in Australia. In response to this report, the Victorian State Government responsible for Agriculture known as DEDJTR (Department of Economic Development, Jobs, Transport and Resources) conducted an assessment of the resources required to respond to a medium to large FMD outbreak in Victoria.

This Victorian FMD readiness assessment identified that during the first week of a medium to large FMD outbreak in the state, 1042 staff would be required to directly respond to the outbreak. Of the 1042, 574 staff require specific animal health, biosecurity or other technical skills. This figure only includes staff that are directly deployed to a control centre or the field and does not include staff involved in consequence management, resources for communications, call centres, vaccination teams, community meetings or surge capacity for movement control enforcement. This assessment went someway in describing the skills and capabilities required to fill various roles and where these resources may be drawn from ie. government agencies and external contractors.

In the Infected Premises Operations (3D) work area the assessment suggested that 40 Infected Premises site supervisors, 140 destruction, disposal and decontamination team members (total), 60 gate control officers and 60 administration officers would be required on the modelled number of infected premises. Unlike response activities such as disease investigations, surveillance or vaccination activities where government responders can employ private veterinarians to carry out the work, there is no recognised non-government group that has a well defined capability to carry out all of the 3D activities. Although individuals/groups may become available during a response, these people usually originate from a wide range of backgrounds and the coordination of training and accreditation of these groups prior to an incident has not usually occurred.

To reduce this identified capability gap, it was recommended that DEDJTR conduct a broader capability assessment of employees within their own department with the aim of providing training and accreditation for 70 biosecurity staff as 3D team leaders and another 70 as 3D team members.

The author understands and agrees with the strategy to be upskilling staff from within DEDJTR to fill many of these 3D roles, but also believes there are opportunities to include other government agency staff from outside DEDJTR and private contractors. The NVS 3D Support Service Program is a good example where the employment of private contractors can work. The purpose of this project is to assess known models of employing 3D contractors for emergency animal disease responses, in particular how private contractors are managed by the US National Veterinary Stockpile, and whether this approach could be applied to the Australian context.

1.4 Aim

To investigate best practice for managing contractors in the delivery of destruction, disposal and decontamination activities in an emergency animal disease response

1.5 Objectives

The objectives of the investigation were to:

- analyse the US National Veterinary Stockpile approach to engaging contractors through the 3D Response Support Services Program

- compare the NVS approach to existing Victorian arrangements
- provide an opportunity to discuss 3D preparedness and response priorities with international colleagues

1.6 Limitations of the Investigation

There were a number of limitations identified during the course of the project. These include:

- many of the specific details of the NVS had to remain confidential for reasons of national security
- photos were not allowed to be taken during the course of the NVS Logistics exercise or the Large Scale Decontamination Demonstration
- the investigator was not able to interview any private contractors in their own workplace

Given that the whole concept of the NVS relates to national security this confidentiality arrangement was understood and respected. Critical pieces of information, such as volumes of material stored and their strategic location around the US were not provided. Aside from this issue, the author found USDA – APHIS staff to be very open and honest in their conversations and sharing of their experiences in relation to both the NVS and other emergency animal disease preparedness activities.

1.7 List of interviewees

Interviewee	Organisation	Topic
Lisa Brown	USDA – APHIS	NVS Deployment to HPAI Response
Michelle Colby	Department of Homeland Security	3D Projects - Funding/Priorities
Gordon Cleveland	USDA – APHIS	Radiation emergencies in agriculture
Rosalyn Days-Austin	USDA – APHIS	Response to Iowa Floods
Bob DeOtte	West Texas A & M University	3D Projects/NVS Exercise
Tom Guys	North Carolina Dept of Agriculture	Foam Depopulation Technology
Bob Henderson	IS4S, Atlanta	Washtunnel Demonstration
Darlene Konkle	Wisconsin Dept of Agriculture	NVS Wisconsin Exercise
Michael Linsley	Wisconsin Dept of Agriculture	NVS Wisconsin Exercise
Michael Mayers	North Carolina Dept of Agriculture	Foam Depopulation Technology
Paul McGrath	Wisconsin Dept of Agriculture	Veterinary Services & 3D activities
Lori Miller	USDA - APHIS	Travel Itinerary/3D Projects
Lee Myers	USDA - APHIS	National Veterinary Stockpile
Larry Nelson	USDA - APHIS	NVS Contract arrangements
Doris Olander	USDA - APHIS	3D Projects/NVS Exercise
Kevin Petersburgh	USDA - APHIS	NVS and Iowa Floods
Jack Shere	USDA - APHIS	US Foreign Animal Disease Preparedness & Project Findings
Darrel Styles	USDA - APHIS	3D Projects - Depopulation
Andy Titsworth	USDA - APHIS	National Veterinary Stockpile
Jose Urdaz	USDA - APHIS	USDA Veterinary Services
Rodney White	USDA - APHIS	National Veterinary Stockpile

2. THE NATIONAL VETERINARY STOCKPILE (NVS)

2.1 Interviewing staff from the National Veterinary Stockpile

The author was able to interview key staff from the NVS in both a formal and informal environment over a period of two weeks. Questions put to NVS staff revolved primarily around how the NVS operates and its interactions with 3D contractors. Planned meetings were conducted with Rodney White (NVS Director) and Larry Nelson (NVS Contracting Officer), while informal discussions occurred with Dr Lee Myers (NVS Federal State Liaison), Andy Titsworth (NVS Logistics Operations and Plans) and Lisa Brown (NVS Contracts Administrator).

2.2 The National Veterinary Stockpile (NVS)

The NVS is the United States national repository of critical veterinary supplies, equipment, animal vaccine, and response support services to support an animal disease response. It was established in 2004 as a component of the National Agriculture and Food Defence Strategy under Homeland Security Presidential Directive 9.

Homeland Security Presidential Directive 9 (HSPD-9) directed the Secretary of Agriculture to establish the NVS in order to:

- augment state resources by being capable of deploying within 24 hours sufficient amounts of animal vaccine, antiviral, or therapeutic products to appropriately respond to the most damaging animal diseases affecting human health and the economy
- leverage the work done by the Strategic National Stockpile at the Centre for Disease Control

The mission of the NVS program is to:

- provide veterinary countermeasures, including supplies, equipment, animal vaccines and 3D response support services, that states, tribes and territories need to respond to damaging animal disease outbreaks
- deploy these countermeasures within 24 hours
- assist states, tribes and territories with the planning, training and exercises for the rapid receipt, processing and distribution of NVS countermeasures during an event

The NVS offers many resources including:

- personal protective equipment for on-the-ground responders to guard against infection and other on-site hazards (24 hour push packs)[2]
- anti-viral medications to protect front-line staff
- decontamination supplies to inactivate pathogens (24 hour push packs)
- animal vaccines to quickly protect livestock at risk of infection
- vaccine equipment and supplies (such as needles and syringes, to effectively immunise large numbers of livestock)
- animal handling equipment, including corrals, to safely contain and restrain livestock (portable cattle yards and swine yards)
- equipment for emergency euthanasia and depopulation of animals (Foam Depopulation Units and Carbon Dioxide carts)

[2] Each push pack contains sufficient personal protective equipment and decontamination supplies to support 10 responders changing protective suits six times per day for 10 days. The packs are preconfigured and stored in NVS Logistics Centres ready for deployment. They will generally be shipped first and precede any additional countermeasures, such as animal vaccine, necessary to continue supporting the response.

- assistance in securing outside companies (if needed), to provide trained personnel and additional equipment for large scale depopulation, disposal and decontamination work (3D Response Support Services)
- training and exercising, including planning tools and documents that assist with preparedness activities

States, tribes and territories need a plan to receive countermeasures within 24 hours of APHIS approval to deploy. The written plan should include how to:

1. **request** NVS deployment
2. **receive** the modules of 24-hour push packs
3. **store** materials using warehouse operations
4. **stage** shipments for distribution to field responders
5. **manage** inventory for efficiency and replenishment of resources
6. **distribute** materials to multiple outbreak sites, and
7. **recover** unopened and returnable items to the NVS program

Having these components in a written plan is critical for the most effective and efficient logistical response.

Figure 2. 24-hour push packs with decontamination and PPE supplies

Source: USDA-APHIS

Figure 3,4 & 5. Examples of some of the push pack supplies (spray packs and PPE)

Source: USDA-APHIS

Figure 6. FMD Vaccine transportation box

Figure 7. Simulated FMD Vaccine

Figure 8. Temperature monitors for vaccine

Figure 9. Portable temperature control for vaccines

Figure 10. Vaccine administration equipment

Source: USDA-APHIS

Figure 11. Livestock identification supplies

2.3 The NVS and 3D Response Support Services

In addition to physical countermeasures, the NVS maintains contracts with all-hazards emergency response companies to assist with 3D operations where states do not have sufficient personnel and resources required to complete their mission.

The NVS serves as the single point of contact for 3D contractors. NVS staff will select the best qualified contractor(s) to support the depopulation, disposal and decontamination efforts of an incident command request.

The types of services that 3D contractors can provide are:

- **surge personnel**, fully equipped with personal protective equipment
- **decontamination equipment and mobile teams** to support field responders
- **waste management and disposal**, including carcass and debris recovery, handling and disposal
- **hazardous and infectious material transportation** and access to landfills
- **staging area setup** and operations for distribution of equipment and materials
- **certified operators for special equipment** including forklifts, skid loaders, heavy trucks, foam depopulation units and other assorted equipment
- **special equipment** such as mobile command centres, emergency power and lighting, pumps, pressure washers, satellite terminals and radio communications

The contractor teams are equipped to handle many types of emergencies and provide their own personnel, equipment and safety items for most situations. They are experts in decontamination and disposal operations, including knowledge of the state requirements for transporting and disposing of hazardous materials. Contractors can be quickly mobilised, usually within 24 hours and supply personnel from their own company from multiple places

throughout North America. Some contractors have the ability to deploy up to 600 personnel in three days, 1,000 in one week and more if required.

The 3D contractors receive annual training in agricultural emergency response and the use of NVS equipment. They also participate in the NVS Exercise program which reinforces lessons learnt from previous training activities and responses.

Figure 12. Contractors truck carrying portable cattle handling facilities

Figure 13. Portable cattle yards being used at a NVS Exercise

Figure 14. Foam Depopulation Unit used by 3D contractors for depopulation of poultry

Source: USDA-APHIS

Figure 15. Contractors operating a Foam Depopulation Unit

Figure 16. Carbon dioxide cart for depopulating chickens

Source: USDA APHIS

Another component of this support program includes NVS contracts for emergency transport of samples, supplies and animal vaccine. The contracts are operational 24 hours per day and 365 days a year. These contracts have been executed to transport high priority foreign animal disease samples from the field to the National Veterinary Services Laboratory in Ames, Iowa, facilitating a rapid diagnosis.

2.4 Strategic storage of NVS equipment across the US

In the interest of national security the actual location and full contents of NVS warehouses were not revealed to the author. However, it was highlighted on several occasions by USDA staff that it is critical from a rapid response point of view that NVS equipment is not centralised to a few areas but is strategically placed all around the US. Although having multiple storage locations can considerably increase the overall costs, it also reduces the risk of severe weather or sabotage preventing the quick deployment of resources. Multiple sites in the midwest and along the coast are used as storage facilities for reasons of redundancy, security and proximity to major agricultural areas.

The NVS manage their warehouse facilities using the following principles:

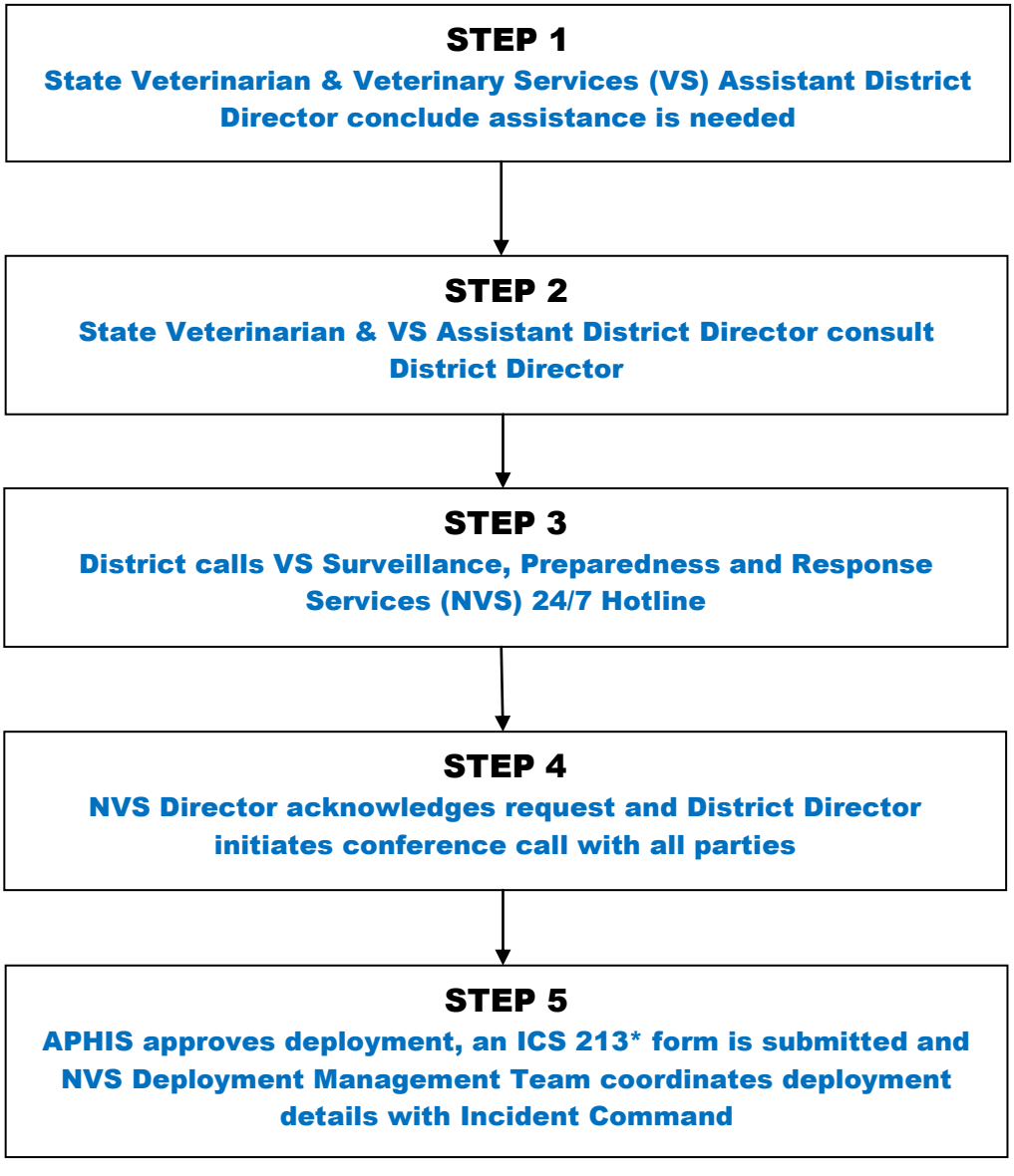
1. maintain inventory at the required levels (reviewed regularly)
2. ensure proper environmental conditions (temperature and humidity)
3. minimise costs (eg. rotate, extend shelf life, use vendors to manage, ensure guaranteed access)
4. maintain important tools ie. supply chain management software

In order to minimise supply risk, reduce product wasteage and ensure rapid access, the NVS manages the procurement of supplies using a variety of methods, including:

1. **purchase and hold** – what they need immediately but are not be able to get from the commercial sector ie. stockpile managed inventory (SMI), which is owned and managed by the NVS
2. **purchase and have vendors hold and rotate shelf items** – vendor managed inventory (VMI), owned by NVS and managed by vendors
3. **contract for guaranteed access to materials** – VMI, owned by NVS but managed by vendors and accessible by NVS and other parts of APHIS
4. **contract for service –** ie. operating Foam Depopulation Units, transportation and disposal of carcases and contaminated materials

2.5 The process for acquiring NVS assistance

There is an official documented process required before the NVS is activated to supply equipment to state responders. The process for accessing NVS supplies can be summarised in five basic steps. These steps are taken after the State Animal Health Official (SAHO) and the Veterinary Services Assistant District Director (ADD) determine that all available resources in the affected state will soon be exhausted. This process is documented in State Emergency Plans.



*The ICS 213 Form provides all the information required by the NVS ie. incident name, date/time/timezone, resource request number, list of supplies ordered (quantity, kind, type, detailed item description, arrival date & time requested, cost) and requested delivery location.

Where 3D Response Services are requested a Statement of Work (SOW) should also be supplied. The Statement of Work should include four parts:

1. describe the situation and why 3D response support services are needed
2. document the types of support required (Depopulation – limited to poultry with carbon dioxide carts or foam units, Disposal – landfill, burial, composting etc, Decontamination – cleaning and disinfection of premises, vehicles, equipment, and other requirements)
3. detail the task to be performed by contractors so that the number of labour hours per day may be determined for each task. Include geographical locations, number of premises, specific job tasks, number of personnel needed, special equipment and skills needed and requirement for any NVS equipment
4. provide the funding source for payment of the services

The **NVS Deployment Management Team** (APHIS Headquarters) will then:

- identify a contractor that is available, trained, and qualified to do the work
- contact the APHIS contract officer and provide the Statement of Work
- convene a conference call of incident command officials and the contractor
- discuss the work and the contractors' ability to respond

The **APHIS Contract Officer** will then:

- require the Operations Section Chief (OSC) to assign a Federal government employee to oversee the contractor's work and sign the daily activity report
- ensure the contractor charges according to the basic ordering agreement rates in the NVS contract
- authorise the contractor verbally or in writing to begin work
- direct the contractor to provide an estimate of the amount and cost of work within a reasonable period, typically a couple of days

The **3D Task Force** will then:

- check in with the planning section resources unit and complete the required information
- report to the Operations Section Chief for task assignments
- the APHIS representative in the finance/administration section pays for the 3D resources and reports the costs

2.6 NVS Contract arrangements with 3D contractors

In order to maintain a state of readiness the NVS has a five year written contract with 3D contractors. This process is managed by the USDA-APHIS Contracting Officer.

The objective is to establish a five year contract with companies having the capacity and capabilities to store, inspect, operate, transport, stage and sustain NVS supplies and equipment ensuring it is operational and deployable at all times. The contractor shall posess general experience in providing emergency response services to successfully respond to a range of agricultural and all-hazards emergencies and demonstrate their ability to maintain highly skilled and trained staff.

The Schedule of Service within the contract includes:

- the maintenance, quality control and storage of government furnished property (GFP)
- repair, reconditioning and reconfiguring of equipment per statement of work
- miscellaneous equipment services (deploy, stage and load equipment, shipping charges)
- attendance at training events (at contractor facility)
- attendance at training events (off-site)
- emergency response services

In summary the Contractor is required to:

- store NVS supplies, equipment and ancillary items
- maintain NVS equipment at 100% operational readiness
- meet all operational and performance standards
- ensure all equipment is accessible for unannounced visits
- be highly skilled, proficient, and trained in use of equipment
- provide response support services – depopulation, disposal and decontamination services
- provide internal assets upon request; dump trucks, skid steers, loaders, tractors, trailers, excavators etc
- properly and safely transport, operate and deploy equipment

The additional responsibilities required for providing 3D response services include:

- the contractor shall demonstrate the ability to provide depopulation, disposal and decontamination services
- contractor vehicles must be in compliance with federal and state department of transportation regulations
- the contractor shall provide a complete list of names of all contract personnel and site managers that may be deployed to a response
- the contractor shall establish procedures to ensure personnel and NVS equipment is capable of deploying within 24 hours
- the contractor shall be responsible for providing own personal protective equipment that is in accordance with the Occupational Safety and Health Administration and also be capable of operating in all levels of PPE
- the contractor shall provide cost estimates as requested within 24-48 hours of the request

3. ORGANISED TRAVEL ACTIVITIES

3.1 Attendance at the Wisconsin NVS Full Scale Logistics Exercise

The author attended a two-day exercise, conducted at the Wisconsin National Guard (WING) Volk Field Air Force Base, Tomah, Wisconsin. The joint NVS and Wisconsin Department of Agriculture Exercise was designed to bring together agencies to test and validate Wisconsin's response plans and the ability of the Wisconsin Supply Unit to logistically respond to a simulated damaging animal disease outbreak in a complex, resource-intensive exercise involving multiple agencies. This initiative was a scheduled training activity for the NVS, adopting the Homeland Security Exercise and Evaluation Program (HSEEP) to plan, conduct and review the exercise.

The specific objectives of the Exercise were to:

- validate Wisconsin's ability to implement portions of the Wisconsin Draft National Veterinary Stockpile Plan
- validate the NVS's ability to respond to a Wisconsin request for NVS countermeasures and vaccine for a damaging animal disease outbreak

The Exercise was based on the following scenario;

[A dairy herd in Clark County, Wisconsin (WI) was diagnosed with FMD and other suspected dairy cattle outbreaks were reported. The WI Department of Agriculture, Trade and Consumer Protection (DATCP) activated its Wisconsin Draft National Veterinary Stockpile Plan, and the WI State Veterinarian and Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) District 3 animal health officials requested NVS assistance. APHIS VS leadership approved the request and deployed NVS countermeasures].

The author participated as an observer and was able to partake in a variety of discussions with exercise facilitators, players and observers ranging from state veterinarians, state emergency management personnel, Logistics Managers, Livestock Industry representatives, Department of Homeland Security and USDA – APHIS staff.

Summary of Exercise After-Action Review Findings

The official summary from the Exercise after-action review was:

"Overall, the WI and NVS Logistics Exercise was a success and brought together members of the WI supply unit to test their ability to set up and operate a logistics warehouse in response to a damaging animal disease outbreak. It also offered a unique opportunity for various organisations to observe the exercise in preparation for future training and response activities.

The exercise was well-structured, organised, and focused exclusively on the supply unit roles and responsibilities, processes and procedures. Participants were able to implement knowledge gained from the online NVS Logistics Warehouse and NVS State IMF training tools, participating in the hands on WI NVS Warehouse Drill, and attending the WI DATCP logistics training.

The players demonstrated teamwork and adapted well to the resource demands placed on the warehouse. The exercise helped DATCP leaders identify gaps in their Wisconsin Draft National Veterinary Stockpile Plan, supply unit operations strengths and areas for improvement, and the need for more focused supply unit personnel training. The exercise also helped the NVS program identify gaps and potential corrective actions to improve its processes.

As the NVS exercise team assists other states, tribes, and territories to prepare for an NVS deployment, it will use the lessons learned from this drill and previous NVS exercises to continue improving the program, and adapting its logistics training and exercise programs to better prepare animal health responders in the future".

The authors observations were:

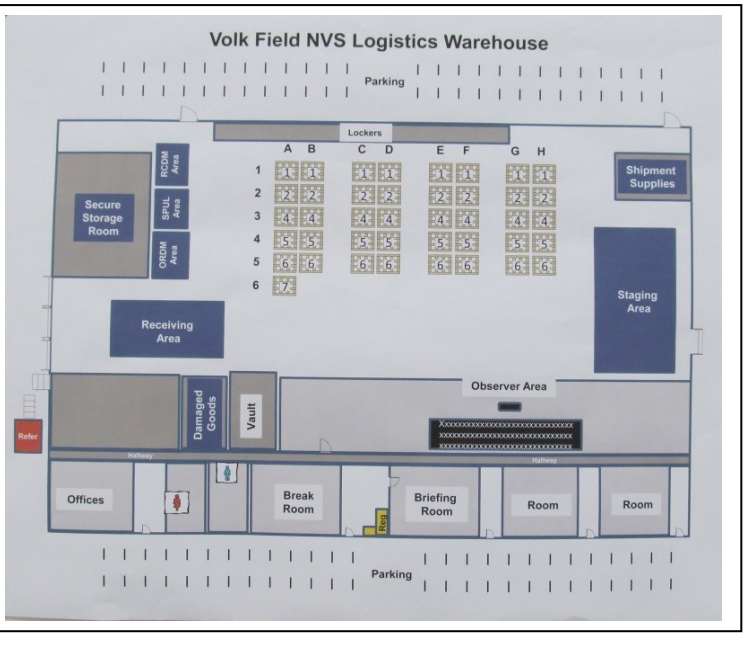
- that the Wisconsin State Department of Agriculture senior management were very supportive of their staff attending the exercise. It was articulated to staff very clearly that it does not matter that they are not in their offices, being at the exercise is exactly where they should be
- that US state and federal agriculture staff are more integrated in their day-to-day work and preparedness activities compared to Australia. This is probably due to the fact that US federal staff are embedded within the states and appear to carry out a more operational function than in Australia
- that the staged structure of NVS training appears to work very well ie. the staff responded very well to the fact that they had completed a drill previously and appreciated a second opportunity to practice the required tasks during the exercise
- that the Volk Field warehouse and associated facilities (including accommodation) provided an excellent site for an Exercise and would present as a very strategic option for a real response
- that the NVS data system for managing inventory appears to be user friendly, allows for multiple warehouse sites and incorporates the addition of local supply sources
- that the type of goods supplied by the NVS ie. personal protective equipment, decontamination equipment, vaccines and ancillary supplies appear to be well thought out for an initial emergency response
- that the design of the NVS supply packs (push packs) allowed for the removal of a side wall, facilitating the easy removal of products without staff having to bend over
- that the labelling inside each of the supply boxes was a simple and effective way of allowing warehouse staff to know where things were located and the relevant details about the product ie. description, number, volume/weight, lot number, shelf-life
- that the method of laying down tape on the warehouse floor and the pre-planned system for the warehouse set-up proved to be practical and effective
- that the systems used for monitoring the temperature of simulated vaccines appeared to be very effective and straight forward to monitor ie. Temp Tale 4, Trans Tracker. Some models provide graphical printouts of temperature fluctuations.
- that the number and variety of exercise inputs put to the participants were sufficiently challenging. Some of these "injects" or inputs included missing documentation, damaged equipment, spilled disinfectant, frozen vaccine and injured staff.
- that the dynamics of the exercise participants (from multiple agencies) appeared to work very well
- that the observers were well catered for by the organisers and were allowed many opportunities to discuss and observe specifics of the exercise
- that the Wisconsin State Department of Agriculture would not be charged for accessing NVS supplies in a real response
- that the private contractors who facilitated the exercise were well drilled at this type of activity and were able to successfully keep the exercise progressing

- that considerable planning goes into the loading configuration of NVS trucks ie. full tri walls at the front of truck and simulated empty ones at the back
- the safety briefing conducted at the start of the exercise was concise and covered all aspects required without being over bearing

Figure 17. NVS truck backing into the warehouse at Volk Field

Figure 18. Push packs being unloaded into pre-determined warehouse configuration

Figure 19. Pre-planned warehouse configuration – Wisconsin NVS Plan



Source: USDA-APHIS

Figure 20. Homeland Security Exercise and Evaluation program

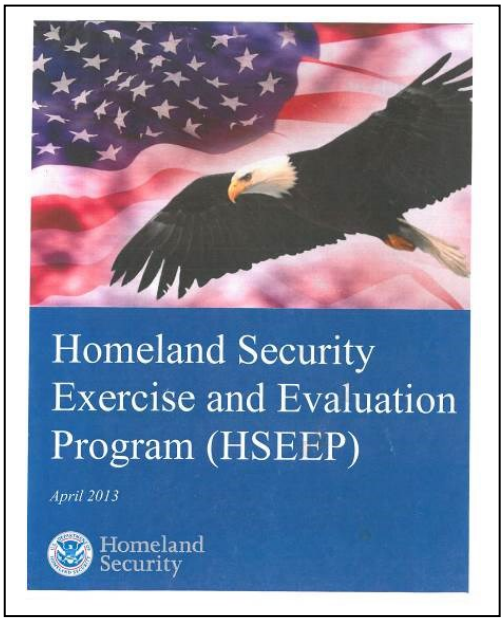


Figure 21. Labelling of compromised vaccine

Figure 22. Monitoring temperature of simulated vaccine

Figure 23. Conducting debrief of daily warehouse activities

Source: USDA-APHIS

The NVS Exercise program works on a continuous improvement cycle, as outlined in the Department of Homeland Security Exercise and Evaluation program.

The improvement cycle was observed first hand at the Wisconsin Exercise through an extensive after-action review process involving all stakeholders. The Department of Homeland Security system uses a progressive multi-year exercise program enabling organisations to participate in a series of increasingly complex exercises, with each successive exercise building upon the previous one until mastery is achieved. Regardless of exercise type, each exercise within the progressive series is linked to a set of common program priorities and designed to test associated capabilities. Different types of exercises that may be included in the multi-year plan include discussion-based exercises (seminars, workshops, table-top exercises, games), drills and full scale exercises.

NVS staff are always looking for feedback from states on ways to improve their methods of communication and their overall level of service.

3.2 Attendance at the USDA Washtunnel Demonstration

The author attended the Washtunnel Decontamination Demonstration which was also conducted at the Wisconsin National Guard (WING) Volk Field Air Force Base.

The demonstration was hosted by a private company called Integrated Solutions for Systems (IS4S) in collaboration with USDA-APHIS with funding from the US Department of Homeland Security through the Small Business Innovation Research Program. The target audience was local, state, and federal emergency management personnel and first responders to chemical, biological, or radiological events.

The purpose of the demonstration was to test and evaluate a non-freezing portable vehicle wash tunnel, a newly-developed technology, intended to more quickly, efficiently, and cost-effectively decontaminate emergency response vehicles exposed to chemical, biological, or radiological contaminants. The objective of the demonstration was to evaluate the non-freezing and chemical delivery aspects of the system and the effectiveness of two specific chemicals in inactivating known pathogens. The non-freezing aspect was assessed using propylene glycol as an additive to the solution, while the disinfectants used were accelerated hydrogen peroxide (4%) and bleach (chlorine-based chemical).

The specific objectives of the demonstration were to:

- demonstrate the non-freezing portable vehicle decontamination technology
- solicit feedback on functionality and effectiveness of the wash tunnel system
- identify capabilities of an ideal decontamination system during field use to ensure the wash tunnel system meets the needs of the response community
- discuss critical aspects of the decontamination process from the responder's perspective to increase field utility of the system

Figure 24. External view of Wash tunnel

Source: Integrated Solutions for Systems (IS4S)

A basic description of the Washtunnel is that it consists of a large bunded plastic ground base covered with an inflatable synthetic frame and overhead tarpaulin, supplied with a chemical delivery system that pumps water/disinfectant from an external reservoir into an overhead gantry that moves back and forward over vehicles as many times as required. The ambient temperature of the tunnel can be increased by lowering the end tarpaulin flaps and blowing in hot air. (See photos below)

Some of the design goals for the project were that the Washtunnel should be:

- lightweight
- relatively inexpensive
- chemically resistant
- have a sealed floor and be able to contain the used chemical
- able to be set-up in a few hours
- operate effectively down to -25 Degrees Celsius
- operable by one person
- have a manual and automatic disinfection system

Through the demonstration, the development team operated the system under cold weather conditions, enabling the team and audience to observe the disinfection of a render haul truck. The plan was to disinfect several other vehicles including a tractor, front-end loader and water tanker, however the inclement weather made this impractical. Because of the challenging weather conditions, in particular the heavy winds, the demonstration had to be suspended for safety reasons.

Figure 25. Rendering truck undergoing disinfection inside tunnel

Figure 26. Top view of rendering truck and chemical delivery system

Source: Integrated Solutions for Systems (IS4S)

Figure 27. Close-up of decontamination infrastructure (support rail and hoses)

Efficacy testing of the disinfectants was carried out by a team of Canadian scientists using pre-innoculated sample discs strategically placed around the vehicle. The testing protocol came from the Canadian Food Inspection Agency and was similar to a recent disinfection trial conducted in that country. The investigator was hoping for a four to six log reduction in the known pathogen and to demonstrate the ability to inactivate bacterial spores as well as viruses.

Figure 28. Testing the efficacy of decontamination using sample discs

Source: Integrated Solutions for Systems (IS4S)

At the conclusion of the demonstration a hot debrief was conducted by the Project Manager to identify what worked well and what could be improved. Participants were given the opportunity to provide feedback on a range of operational aspects. The intention of the project manager is to collate the feedback and then forward onto the developer for further consideration and possible refinement. Due to the project manager being on deployment to the US Highly Pathogenic Avian Influenza Response the final report for the demonstration has not yet been made available to participants.

The author believes that the project has great potential and when further refined will become an effective tool for emergency responders. One major observation was that participants thought that the overall decontamination process would include a high pressure cleaning component that would remove all of the dirt and grease from the rendering truck prior to a final disinfection. This was not the intent of the process, but may become incorporated into the design over time. Although the cleaning of a vehicle is an important component of the decontamination process for dealing with biological pathogens, this may not be as important an issue for chemical and radiological hazards.

The containment of the solution through the bunding and the reduction of aerosols through the overhead protection are key design components. The importance of these measures are hard to quantify in an operational setting, but when using first principles any situation where you can reduce the environmental contamination must be a positive outcome. Recent trial findings from the North Carolina Environment Protection Authority where active spores were found to persist in retained chemical washings following a disinfection process would backup this assessment.

The non-freezing aspect of the demonstration was also very interesting. Although significantly below freezing conditions is not a normal challenge we face in Australia, nonetheless there could be instances where the freezing of water occurs, affecting the ability to deliver decontamination services. The addition of propylene glycol to the water was very effective in its ability to stop the solution from freezing. In addition to this the Canadian research demonstrated that propylene glycol does not interfere with the efficacy of disinfectants.

3.3 Consulting with International 3D technical specialists

During the travel period (25th January – 10th February, 2015) the author was able to consult with a broad range of 3D specialists. The best opportunity for this was through attendance at the NVS Logistics exercise and the Washtunnel Demonstration in Wisconsin. The audience at the demonstration included many 3D specialists from all over the United States. The ability to converse freely with these colleagues on a wide range of topics proved invaluable. Good information exchange occurred both during the daily structured sessions and informally at night.

Following the time in Wisconsin, a short visit to Minneapolis (Minnesota) followed by a week in Washington DC also provided a great opportunity to interview key staff from the NVS and other 3D technical specialists. Formal meetings were arranged with Larry Nelson (NVS Contracting Officer) in Minneapolis, and Rodney White (NVS Director) at the Riverdale Office in Maryland. Meetings were also arranged with other USDA-APHIS staff including Darrel Styles, Lori Miller and Gordon Cleveland.

Discussions with Darrel Styles

Discussions were had with Darrel Styles in relation to many 3D projects. Darrel is the primary USDA-APHIS contact for Destruction/Depopulation. Discussions revolved around several topics including:

- evaluating the use of a CAFS (Compressed Air Foaming System) method for the depopulation and decontamination of diseased poultry in cages
- maintaining 3D contractors capability and confidence when using Foam Depopulation Units
- the proposed infusion of gas (carbon dioxide, nitrogen) into foam depopulation systems and the associated issues
- refining the euthanasia of swine using carbon dioxide gas
- the incorporation of air-pithing in captive bolt systems
- the electrocution of pigs as a euthanasia tool
- removal of euthanised birds from cages in large laying facilities and the effect of autolysis on this process
- a new Virkon product

Discussions with Gordon Cleveland

Responding to the contamination of agricultural products as a result of radioactive emergencies was a foreign issue to the author prior to this travel. This situation is prevalent in other parts of the world where nuclear power plants are part of the landscape. In North America there are seven nuclear power reactors in the United States and 10 in Canada that are within 50km from the US.

Gordon Cleveland (Radiological Program Analyst and Emergency Response, USDA-APHIS) took the time to explain the basics about the types of radioactive risks encountered and some of the practical applications that have been used to reduce the radioactive impact on contaminated foodstuffs, including animals. The bottom line is that there are many practical applications in the field of agriculture that can reduce the requirement to dispose of large volumes of material unnecessarily. A good example of this is when dealing with canola crops that have been contaminated with unacceptable levels of radiation, the seeds can still be pressed for oil in the usual manner and remain safe to the consumer.

Because this is such a highly specialised work area, private contractors do not usually play a role in this type of preparedness or response work. The main government agencies involved in the regulating of and emergency preparedness planning and exercising for the nuclear industry include the Department of Homeland Security, the Environment Protection Authority, the Food and Drugs Administration, Center for Disease Control, the Federal Emergency Management Agency and the Department of Agriculture. Exercising of these agencies is a key preparedness activity undertaken on a regular basis.

Other topics discussed were:

- agricultural response to the Fukushima Nuclear Disaster
- the risks of domestic animals to humans in emergencies ie. in Hurricane Katrina people did not want to leave because of their pets; in radiological incidents pets can become a persistent radiation hazard to their owners
- the decontamination of animals that are destined for the human food chain and associated research
- the Pet Emergency Transportation Act
- Exercise Southern Exposure, 2015
- aerial scanning of radioactive materials
- evacuation, sheltering, decontamination and reunification of pets
- new technologies for reading radioactive levels in cattle
- seafood

Discussions with Lori Miller

Many discussions were carried out with Lori Miller over the course of the two weeks. Lori is the primary USDA-APHIS contact for Carcass Disposal issues and manages a large number of 3D projects, funded by the Department of Homeland Security. She is also one of the USDA representatives on the 3D QUADS Group. Lori was instrumental in helping arrange the author's travel itinerary and was able to provide opportunities that would not otherwise have been available. The author was able to compare notes with Lori on a range of different international initiatives, including topics such as gasifiers, spatial analysis for mass animal burial, logistical infrastructure projects, carcass disposal risk assessments, EPA disinfection methods, Washtunnel and gate decontamination projects and 3D training methodologies. This information sharing was the highlight of the travel.

3.4 Meetings with USDA Veterinary Services and Department of Homeland Security

The author was fortunate to have the opportunity to meet with Dr Jack Shere (Associate Deputy Administrator, USDA-APHIS Veterinary Services) at the Department of Agriculture office in Washington DC. This was part of a small delegation of USDA-APHIS staff to provide an update on the NVS preparedness activities, including the exercise in Wisconsin. The author delighted in the opportunity to be able to talk openly and honestly with Dr Shere about many of the challenges facing agriculture and in particular emergency animal disease preparedness for government veterinary services. The author took the opportunity to praise both the breadth of project work being undertaken by the US in the 3D area and their continued leadership. The author also met with Michelle Colby from the Department of Homeland Security. Michelle is responsible for overseeing the DHS 3D Preparedness Program, which funds much of the USDA 3D project initiatives. Michelle has been a staunch supporter of international 3D preparedness and response activities.

4. RESEARCH ON 3D RESPONSE SUPPORT SERVICES

Currently there are only two companies that have contractual arrangements with the NVS to perform tasks under the 3D Response Support Services Program. These companies are Clean Harbors Environmental Services and United States Environmental Services (USES). Clean Harbors is a large company with many service locations throughout North America, while USES is a smaller company that is focused around the south of the US. Below is a summary of the companies to provide some insight into their emergency response capabilities.

4.1 Clean Harbors Environmental Services

Figure 29. Graphic representation of Clean Harbors services: Source Clean Harbors website

"Emergency management experience, resources and their own land"

Clean Harbors manages over 3,000 environmental emergency responses or disaster recovery operations on land and water throughout North America (USA & Canada) each year. The responses range from cleaning up a single mercury bottle through to cleaning a coastal oil spill from a hurricane. Typical responses include over-the-road incidents, punctured lines, tank overflows, leaking drums, saddle tank spills, through to major and catastrophic incidents such as large pipeline ruptures, ship groundings, tanker truck rollovers and facility releases that can threaten oceans, rivers, streams and lakes, as well as roadways, facilities, and public areas.[3]

Clean Harbors has more than 100 service locations and own over 48 waste management facilities in North America, including seven hazardous waste landfills, two non-hazardous waste landfills, many wastewater/liquid treatment facilities and high-temperature incineration plants. Depending on the nature of the emergency, they can deploy a national response team (including hundreds of experienced 40-hour Occupational Safety and Health Administration certified workers) and mobilise their own Central Command Centres. Command centres are

[3] Clean Harbors website - http://www.cleanharbors.com/

fully equipped with communication and computer equipment, and utilise a satellite link to coordinate all response activities, even in remote locations. Essentially they can provide the manpower, equipment, logistical support, ICS/NIMS integration, and operational oversight to manage any size environmental emergency.

Some of their biological and infectious agent response capabilities include the management of:

- whole building decontamination and disinfection of infectious substances
- weapons of mass destruction decontamination
- suspect chemical agents
- influenzas and communicable diseases (ie. H1N1, meningitis)
- waste removal and disposal
- animal diseases (Avian Influenza) (H5N1)
- USDA 3D contractor for animal depopulation, disposal and decontamination operations
- natural disasters

The fact that Clean Harbors can draw on a large resource base including people, equipment and land is of major benefit as a 3D contractor to the NVS. The ability to be able to dispose of carcases and contaminated materials at their own landfill or waste treatment facilities is a great strength. Below (Figure 31 & 32) are two examples demonstrating the landfill capacity of Clean Harbors. Of particular note with these two facilities is the size of the area permitted for landfill and the necessary buffers of surrounding land to reduce the incidence of public complaints.

Figure 31. Sawyer Landfill, North Dakota

Sawyer Landfill, North Dakota

Size: 1,580 acres (480 acres permitted)
License: to accept non-hazardous industrial wastes, liquids, solids, sludge, hazardous wastes), bulk and containerized wastes
Cells: constructed with three-foot thick layer of engineered clay, triple liner system, leachate collection and removal system and leak detection system. Final disposal location of each load is tracked by a three-dimensional gridding system.
Access: road and rail

Figure 32. Deer Trail Landfill, Colorado

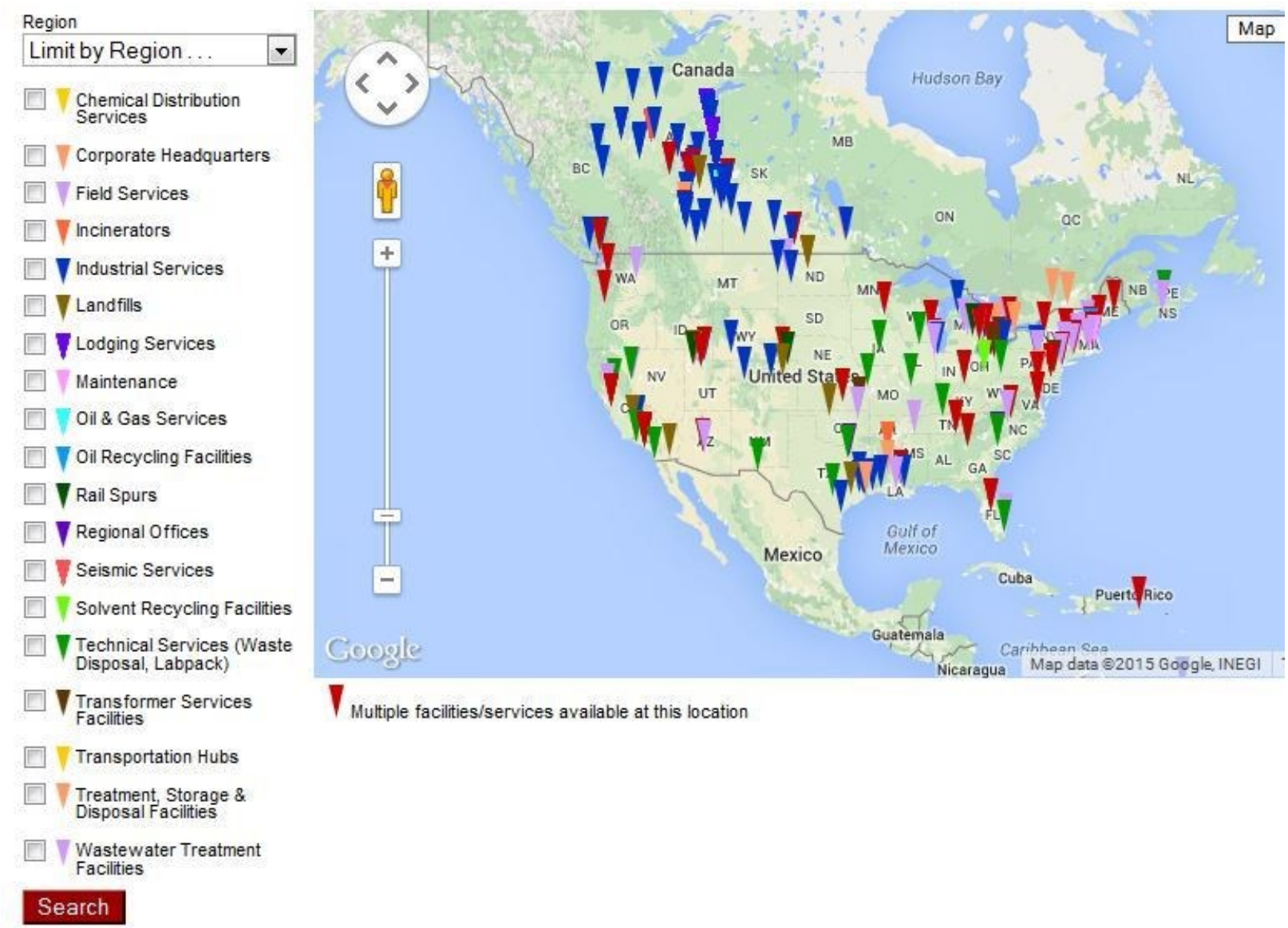
Deer Trail Landfill, Colorado

Size: 5,760 acres (325 acres permitted)

License: to dispose of a wide variety of hazardous and industrial wastes including radioactive materials.
Cells: 2.5 million cubic yards of permitted cell space, sited on the impermeable Pierre Shale formation.
Access: receives waste by truck and also by rail from a trans-loading point located in Sterling.

Source: Clean Harbors website http://www.cleanharbors.com/

Figure 30. **Clean Harbors Service Locations**



4.2 United States Environmental Services (USES)

United States Environmental Services is an environmental contracting firm that specialises in:

1. environmental emergency response
2. in-plant industrial services (tank cleaning, vacuum truck services, hydro-blasting)
3. contaminated site remediation
4. biological, viral and fungal decontamination services
5. demolition
6. environmental and safety training
7. industrial firefighting and industrial hygiene

USES provides the Gulf south region with a comprehensive range of industrial, environmental and maritime services, ranging from routine in-plant cleaning and maintenance to emergency hazardous materials release or oil spill response.

USES describe themselves as a family-oriented company employing a wide array of individuals with diverse backgrounds ranging from those with advanced technical degrees to equipment operators and response technicians. They offer a broad field of services ranging from those that require a high degree of professional and technical expertise to those that require hard, labour-intensive work. The company boasts a strong commitment towards safety, their employees and their families, and customers.

Figure 33. Map of USES service locations

Source: USES website http://www.usesgroup.com

Figure 34. USES Waste collection vehicle

Source: USES website http://www.usesgroup.com

4.3 Deployment of 3D Contractors – real case studies

In discussions with USDA-APHIS staff there were a few examples of where the use of contractors under the 3D Response Support Services program had worked well. These situations have been summarised in case studies below. The first two case studies involve Clean Harbors while the third case includes both Clean Harbors and United States Environmental Services.

4.3.1 Case Study 1 - Midwest Floods of 2008 (Iowa)

"In June 2008 much of the midwestern United States received over 12 inches of rain as several storm systems sequentially impacted the region. The Midwest had experienced wet conditions for several months prior to the precipitation experienced in June; therefore, the June rains fell upon saturated soils resulting in runoff that directly flowed into streams. Resulting stream depths reached historic highs across the Midwest, particularly in many areas of Iowa and southern Wisconsin".[4]

The following is an extract from the testimony of Dr Kevin Petersburgh (APHIS Area Veterinarian in Charge, Iowa), to the Iowa General Assembly, Effects of Flooding on Livestock Industry Study Committee:

"APHIS primary task was to assist with the cleanup of swine carcases on both public and private lands. To support this effort, APHIS arranged services through its National Veterinary Stockpile, which has existing contracts with companies that specialise in depopulation, disposal and decontamination, or 3D services. APHIS contracted with Clean Harbors Environmental Services. Clean Harbors arrived on-scene Saturday, June 21st, the same day they were contacted and began work on Sunday.

Their job was complicated by flood waters that were too deep for vehicles and too shallow for boats with deep hulls. Instead Clean Harbors used flat bottom air boats and cables in the water to corral the carcases and transport them to dry land where they could then be moved to an approved landfill. Despite the hot humid weather, workers wore full personal protective equipment, including respirators because many of the carcases were badly decomposed and the flood waters were assumed to be contaminated with chemicals and sewage. Clean

[4] Iowa legislative services agency, Jan 2009 Effects of Flooding on Livestock Industry Study Committee

Harbors completed their carcass recovery efforts on July 18th, 2008. In 28 days, they removed a total of 371 carcases from public access areas and 1,160 carcases from within confinement buildings. Altogether the carcases weighed more than 83,000 pounds".

Figure 34. A flood affected confinement operation (piggery)

Source: http://www.unifreethought.com/page/2/

Figure 35. Live pigs swimming amongst decomposing carcases

Source:http://www.cnn.com/2008/US/weather/06/18/midwest.flooding.pigs.ap/index.html

Figure 36. Live pigs finding shelter on a shed roof

Source:http://www.theguardian.com/environment/gallery/2008/jun/20/wildlife.conservation

The author had the opportunity to discuss aspects of this campaign with two responders. These discussions included a phone call with Rosalyn Days-Austin (USDA) and a face-to-face conversation with Dr Kevin Petersburgh (USDA-APHIS, Iowa). Their first hand observations were that the use of 3D contractors worked extremely well. This campaign was also described by a NVS Veterinarian as “the first real success under the 3D support services system”.

Information ascertained from interviewees about this campaign include:

- the impact of the flood around Oakville, Iowa, resulted in direct losses to livestock and associated structures including 21 confinement feeding operations (piggeries) inundated because of a levee breach
- many producers were able to evacuate their pigs from threatened areas, saving up to 37,000 head. Swine were observed to be free roaming on shed roofs, levee banks and dead animals floating.
- pigs were euthanised by government veterinarians and then the locations were provided to Clean Harbors for disposal. Clean Harbors performed the cleanup of dead animals on public and private land and disposed of in a landfill facility in Morrison, Illinois.
- Clean Harbors were able to provide the critical infrastructure necessary for an efficient response, albeit in a setting that was a little bit different to their usual emergencies
- one of the major challenges for responders was trying to contact swine producers to obtain permission to access their private property. In this situation the State Agriculture Department identified that there were clear risks to public health and safety and as a result were able to gain a “declaration of immediate threat to public health and safety” to allow removal of property (carcases) from absentee landowners’ properties.
- the major positives of using NVS was that the contractors had already been vetted and clearly understood what the mission was. They already had an

existing contract with the NVS and Clean Harbors provided daily situation reports to the Control Agency.

- one observation made was that some of the contract staff were not familiar with handling live or dead animals and that this made them particularly uncomfortable. In one instance pigs were even observed to be cannibalising on other pig carcases.
- although the contractors may not have been familiar with the cleanup of dead animals, the vehicles and equipment that the contractors provided proved to be exceptional for the task ie. boats and equipment normally used for the bunding of oil in oil spills
- the mental health of cleanup staff was identified as another major issue for active management. At one stage of the campaign a decision to provide a day-off for all staff and put on a BBQ, apparently went a long way in increasing morale and provided an opportunity for some informal debriefing.

4.3.2 Case Study 2 - Low Pathogenic Avian Influenza in Quail (New York State)

Source: Clean Harbors website – Project Abstract

"At the request of a United States federal agency Clean Harbors responded on the 29th June 2007 to one of four bird farms in Ferndale, New York concerning a low pathogenic outbreak of Avian Influenza. A population of quail within a group of 30,000 commercially raised birds were identified to be infected with the virus requiring the depopulation of the entire community of quail raised in a three-storey building. The structure was segregated in two equal sections to raise quail on one side of the building and ducks, which were not infected and not considered within the scope of this project. Health, safety and biosecurity considerations were paramount. All parties agreed that each on-site organisation would be responsible for providing and wearing the appropriate personal protective equipment (PPE) as deemed necessary in each agency or company established Health and Safety program.

Considerations identified during the site walk and tailgate meeting were based on current industry poultry practices and logistics at the site. On-site composting of quail related substances was not an option and no material identified as gross contamination from inside the building was permitted to touch the ground outside the structure. Non-organic items (feeders, heating apparatus etc) inside the building were cleaned and disinfected. Organic items (bedding, litter material, solid/liquid faecal matter) not associated with structural integrity of the building were decommissioned and disposed as debris or waste.

The first step taken was removing the animals and carcases. Then organic and non-organic matter was properly disposed of. The debris and waste were put into different types of storage containers for transportation and disposal. Staged 55 gallon Department of Transportation approved drums were used for containerising quail and egg-related substances, and gross contamination was put into double lined 25 and 30 cubic yard roll off containers.

The final days on this project included complete sanitation of the building and a final walkthrough to ensure all objectives were completed. The entire decontamination of the building took a time span of 32 days".[5]

[5] Clean Harbors, Mar 2015 Emergency Response to Low Pathogenic Avian Influenza contaminated building, >http://www.cleanharbors.com/browse_by_service/emergency_response/

Figure 37. Pumping shed waste into truck

Figure 38. Staff wearing respiratory protection

The author had an opportunity to discuss the lessons learnt with Lori Miller (USDA-APHIS) and review many of the photos from this response. This campaign was reported as another successful response for the NVS and its 3D Support Services. At the time of the response there was some suggestion that the cost of this cleanup was expensive (actual cost withheld). However, in the opinion of the author if you take into account the specialised nature of the incident, the brief provided by the control agency of no materials to hit the ground on the outside of the shed and the fact that staff were required to perform the task with full respiratory protective equipment for 32 days, the author would suggest that the indicated cost was warranted.

Figure 39. Dusty environment inside quail housing

Figure 40. Quail housing after decontamination

4.3.3 Case Study 3 - Highly Pathogenic Avian Influenza (California) January 2015

Source: ProMED-mail

The United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) has confirmed the presence of highly pathogenic (HPAI) H5N8 avian influenza in a commercial turkey flock (134,400 birds) in Stanislaus County, California. This is the first finding of HPAI in commercial poultry during the ongoing disease incident in the Pacific Flyway. No human cases of these avian influenza viruses have been detected in the United States, Canada, or internationally and there continues to be no public health concern. APHIS is partnering closely with the California Department of Food and Agriculture (CDFA) which has quarantined the facility. APHIS and CDFA have initiated an incident command response, and APHIS will assist CDFA in depopulating the remaining birds on the property to prevent the spread of the disease. Birds from the involved flock will not enter the food system".[6]

The author was participating in the NVS Logistics Exercise in Wisconsin when this diagnosis was confirmed. Key members of the NVS were in attendance at the Exercise and were immediately involved in the activation of the required veterinary countermeasures. The NVS response to this situation involved the activation of Clean Harbors as the 3D response support service and the deployment of eight Foam Depopulation Units (four KIFCO Units and four North Carolina Units). Two NVS field staff were also deployed to California and were responsible for overseeing the 3D contractor arrangements. The author was able to discuss practical aspects of the deployment face-to-face with the Director of the NVS and was also given the opportunity to sit in on a National Situation Report teleconference. Discussions with NVS staff indicated that the decision to deploy eight foam units was a good one. Some issues were identified with the capacity of contractors to perform the foam depopulation, but this was countered by having experienced NVS operatives who were experienced in its use, to initiate the field activities.

The author was also able to discuss leassons learnt from the depopulation process with one of the NVS field staff on the ground in California. This provided valuable insights into some of the practical challenges that were faced and the solutions that were provided. Lessons learnt from this response will be directly applied to future Victorian preparedness and response activities. Of particular interest was the fact that one of the Kifco Foam Depopoulation Units was not mechanically operational. This specific issue is highlighted only to reinforce the fact that any specialist machinery such as a Foam Depopulation Unit needs to be properly maintained and that the risks of failure can be reduced by having multiple units available. The ability to discuss the response, the resources that were allocated by the NVS and the rationale behind this was of particular value.

Since this first commercial poultry case there has been a steady increase of infected premises across the US, including as at 3rd June, 2015, 205 cases in 45 million birds in 18 different States.

[6] Source: ProMED-mail, Press release Sat 24, Jan 2015

5. FINDINGS AND DISCUSSION

5.1 The NVS system for employing 3D Contractors

The fact that the NVS has continued since 2004, largely in its current form is probably the biggest testament to its value. From the limited observations made the author would consider that the NVS appears to be an excellent example of how private contractors can be used to successfully provide 3D services in an EAD response. To make a more thorough assessment the author would need to spend time with the 3D contractors in their workplace and be involved in either a full scale 3D training event or a real deployment.

As with the employment of any contractor it is critical that there is a clear scope of work defined in the contract and that there is adequate supervision to ensure that the required standard is being maintained. These factors are critical not just in the face of a response but also in the ongoing maintenance of machinery and equipment and the effective training of contract staff. The importance of monitoring performance against the required contractual standards was strongly reinforced by the Director of the NVS based on his own first hand experience.

5.2 What does best practice look like in the Australian context

Best practice for the Australian situation would be having an existing contract arrangement with a trusted, end-to-end contractor who could effectively provide all destruction, disposal and decontamination services. They would need to have a very large employee base that is well trained and experienced in emergency situations (land and water-based), with the ability to scale up numbers very quickly in the face of an EAD response. They would need to own their own EPA licensed transportation and waste management facilities (landfills, incineration plants, liquid waste treatment), have their own control centre capability and be located in multiple locations around the country. They would also actively manage a yearly training and equipment maintenance schedule.

Due to the unique nature and intermittent occurrence of emergency animal diseases the prospect of having a contractor to fulfil all the requirements of these 3D activities is considered remote. Because incidents are so sporadic, private companies can not base their commercial existence solely on these activities and require a day-to-day revenue stream that is much broader.

The most logical fit for private contractors performing 3D activities lies in the area of disposal and decontamination. There are many large scale waste management companies operating all over Australia that manage their own transportation, waste management facilities and decontamination procedures and would be an excellent fit for this type of biosecurity emergency work.

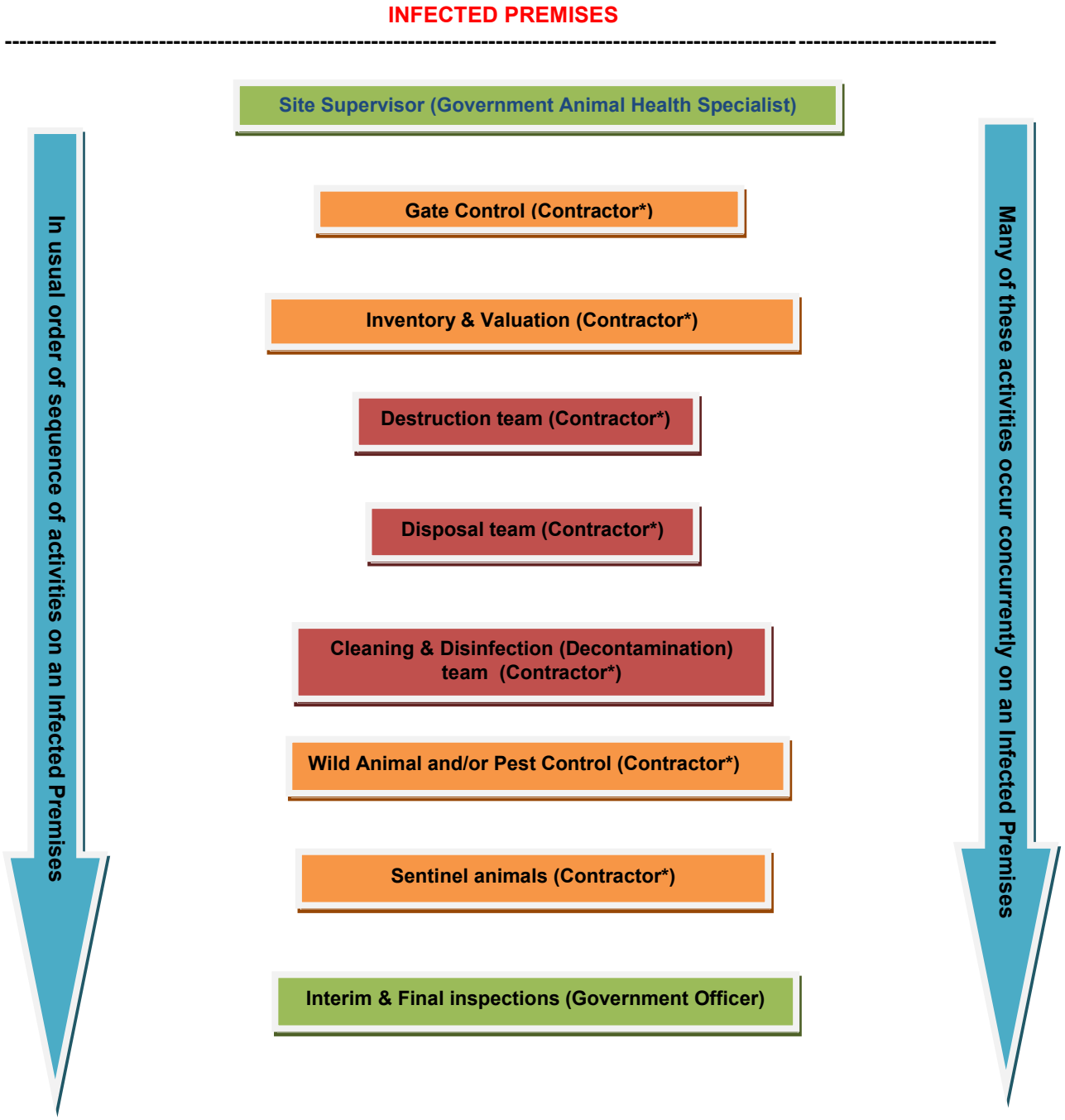
The state emergency services present as an excellent option when it comes to decontamination. Agencies that have staff trained in Hazardous Materials handling and who have the necessary equipment and infrastructure to respond to chemical, biological and radiological threats would be particularly valuable in an emergency animal disease situation, especially where there are issues in relation to human health.

The real outlier activity is the destruction process. Animal health responders highly trained and experienced in the area of emergency livestock destruction would remain the best option for implementing major culling programs, however the use of competent livestock industry contractors, private veterinarians, abattoir/knackery workers, sporting/recreational shooters,

RSPCA officers, shire rangers, Police and the Defence Forces would also be legitimate options.

When faced with the reality of a rapidly expanding animal disease outbreak, with large numbers of affected properties and limited resources, the optimum model for managing an infected premises would probably look like the model below. This model only takes into account the infected premises itself and does not include the configuration of the Infected Premises Operations Management Section at a Local Control Centre.

Figure 42. Example model of resourcing an Infected Premises



Contractor* - could include livestock agent, pest control specialist, livestock industry specialist, private veterinarian, cleaning & disinfection contractor, trained slaughterman, earthmoving contractor

5.3 Discussion

The investigation into the US National Veterinary Stockpile 3D Response Support Services Program has proven to be an effective way of building knowledge within the Victorian State Government. This capacity and capability building is not only due to the project findings but as a result of the professional relationships developed, providing for the on-going sharing of 3D technical information between North America and Australia.

Critical to success of the investigation was the assistance of Lori Miller, a respected colleague who helped facilitate the author's travel itinerary. Through her extensive contacts, Lori was able to ensure the author's participation in the NVS Full Scale Exercise, the Washtunnel Decontamination Demonstration and multiple meetings with key US stakeholders.

In terms of learning and development this project presented an ideal opportunity for the author to continue his journey within the 3D discipline. Exposure to new work areas not considered mainstream in Australia, such as responding to radiological emergencies in agriculture has broadened the author's knowledge base.

Since completing the US travel, the author has been communicating with USDA colleagues, particularly in reference to the 3D response activities associated with the current Highly Pathogenic Avian Influenza outbreak (H5N2 strain) in North America. At the time of finalising this report (3rd June, 2015), the US outbreak continues to unfold with the latest statistics showing 205 infected premises in 18 different States affecting 45 million birds. The affected states include Iowa, Nebraska, South Dakota, Minnesota, Indiana, Illionois, Michigan, California, Kentucky, Washington, Wisconsin, Missouri, North Dakota, Montana, Kansas, Arkansas, Oregon and Idaho.

As the US emerges from this national disaster there will be many "lessons learnt" through formal and informal after-action reviews. Many of these observations will relate to the area of destruction, disposal and decontamination and the activation of the 3D support service contractors through the National Veterinary Stockpile. The author hopes to have the opportunity to discuss many of these lessons with colleagues in the near future.

The main finding from the investigation was that there are contractors in the US private sector that are extremely well resourced to be able to deliver on 3D services in an emergency response involving animals. Despite the author not having the opportunity to talk directly to these contractors, there is sufficient first hand evidence from USDA staff that this is definitely the case. The ability for the USDA to be able to draw on individual private companies to provide up to 600 of their own staff within three days of a response and up to 1,000 in one week is a significant achievement.

Findings from the investigation demonstrate that using private contractors to deliver 3D services can be successful, provided that the process is actively managed, primarily through the use of government contracts and the monitoring of the conditions of these contracts. Despite acknowledgement from staff that the process for negotiating these contracts can be extensive and complicated, it appears that they hold very firm in a response. Having the NVS as the single point of contact for the contract management of the 3D support service appears to be an effective arrangement and reduces the opportunity for scope creep when contractors are deployed. In an emergency animal disease response, scope creep can lead to lack of clarity around the roles and responsibilities of contractors, particularly in the important areas of worker safety and cost. During a response involving the NVS the scope of work for 3D contractors can only be negotiated with a USDA Contracts Officer.

The concept of the NVS 3D Response Support Service is very sound and a strategic solution to supporting jurisdictions who do not have an adequate depth of resources to carry out extensive eradication campaigns. There is no reason why this same system could not be applied in Australia provided there is the political and financial will to make it work. However, the inception of a National Veterinary Stockpile in Australia is not a recommendation of the author as there is a fundamental difference between how Federal and State governments animal health services interact between Australia and the United States. Because of how the Australian Federal and State governments are configured, the more desirable and achievable a position at this point in time is that each of the states should focus on maintaining their own veterinary stockpile resources, in close communication with other jurisdictions and Animal Health Australia. The employment of contractors to participate in the ongoing maintenance of equipment, training and response work for 3D activities should be an important component of jurisdictional preparedness.

A real strength of the NVS 3D Response Support Services program is that the contractors are trained and practised in dealing with real emergencies on a regular basis, even if they are not necessarily related to animals. The frequency at which Clean Harbors and United States Environmental Services are involved in "day-to-day" emergency incidents ensures that they are prepared when the time comes. This experience base is added to by other training activities facilitated by the NVS ie. Foam Depopulation training two times a year.

Using private contractors to perform emergency response work in Australia is not a new concept. The Victorian Animal Health Service has successfully used private contractors in various emergency animal disease responses. These contractors have largely been in the 3D work area but have also included the use of security firms for monitoring illegal movement of animals (Equine Influenza 2009) and the employment of private veterinarians for vaccinating susceptible animals (Anthrax 2007). In the 3D work area some of the more recent responses have involved the use of Cleaning and Disinfection Contractors (2002 Newcastle Disease Response, Meredith), the use of Disposal Contractors for air curtain incineration (2009 Anthrax Response, Kyabram) and the use of Disposal and Cleaning and Disinfection Contractors (2012 Low Pathogenic Avian Influenza Response, Melbourne). These contractor interactions have been very positive and have provided an effective solution to some complex problems.

Although all of the 3D activities have their own challenges, it is the destruction of animals that can highlight the most significant issues. The necessity to destroy animals in a safe, humane, timely and cost effective manner can be a considerable challenge for emergency responders. The community expectation on responders particularly in the areas of animal welfare and public communication are immense. There are many contractors in the animal industries that are experienced and well trained in the methods of euthanasia, however there is often a reluctance for government to use them, largely because of the risks involved in the potential use of firearms and the added possibility of the compromising of animal welfare. This reluctance is often well founded, based on poor past experiences. This integrity and/or confidence issue could be overcome by assessing the suitability of known contractors prior to a response and implementing an ongoing competency based training and assessment program, as it is done in the NVS system. This issue could also be addressed by responders maintaining proper oversight of destruction activities when they are engaging additional staff and having the confidence to intervene where there is poor compliance.

One of the challenges of trying to attract contractors into a program such as the NVS 3D Support Service is the intermittent nature of animal emergencies. Because there can be extensive periods of time between responses, contractors may not be interested in investing their time in negotiating with governments, particularly if the contract arrangements are too onerous and/or complex, or if the financial incentive is just not there. The fact that the NVS currently only has two companies contracted may have something to do with this issue. The

USDA is looking to advertise for another round of Federal Business Opportunities in the near future to see if they can attract more contractors to the program.

Victoria would benefit from further investigating the potential for private companies to become more involved in all of the 3D activities. There are good examples of where it has worked well in the past, but there are large areas for improvement especially in the ongoing training and maintenance of staff and maintenance of response equipment. A good starting point for this may be advertising for an expression of interest from private contractors who believe they can supply the relevant expertise and equipment required to assist with the 3D services in a response. This process could be very similar to the Federal Business Opportunity system in the US. The initiative may or may not identify any suitable applicants, but it could stimulate supply in the open market place through the recognition of a new professional work area that may complement an existing business. There may also be some companies that have the ability to bring groups of people together and be well positioned to supply and/or facilitate the ongoing training of staff in this specialised area.

Victoria would also benefit from investigating what contractors are currently used in other Victorian emergency services agencies. A good example of this is the system where the Department of Environment, Land, Water and Planning employ earthmoving contractors to carry out fire suppression activities in bushfires. The fact they have existing contract arrangements with DELWP means they have undergone a quality control process to gain employment. Another example of this would be the use of environmental engineering contractors such as GHD to assist the Environment Protection Authority in responding to environmental emergencies ie. the Cranbourne Landfill Gas Migration and its effect on the community.

Additional 3D staff could also be found within the broader state government workforce. This is not limited to non-Animal Health DEDJTR staff but also to other government emergency service providers. DEDJTR needs to have a much better understanding of what resources (skills and infrastructure) other emergency agencies posess so that they will know what to ask for in a response. One example of this is the use of HAZMAT operators for responding to incidents that have a decontamination component, however it does not need to be limited to just 3D activities. The worldwide trend of a reduction in government workforces combined with the strategy towards “all hazards, all agencies” emergency management backs up this approach to resourcing. The current drafting of the Victorian State Foot and Mouth Disease Plan which involves multiple state agencies goes some way in trying to establish this type of resource network.

Within DEDJTR the upskilling of members of the Victorian Animal Health Service and other identified staff in the 3D area would also go a long way in increasing Victorian preparedness. This could occur through the more systematic identification of suitable candidates for these roles, followed by a multi-faceted competency based training and assessment program that would increase in complexity over time. This initiative would capitalise on the existing Animal Health service system where staff review their capabilities and learning and development goals on an annual basis.

A major issue identified through the investigation was managing the mental health of staff involved in animal disease responses. This was highlighted by USDA staff and has been the observation of the author over the course of 20 years employment with the Victorian government agency responsible for agriculture. The process of destroying and disposing of animals affects people in different ways and it is important to assess the suitability of both government responders and contractors to perform this work both at the start of a response and at reasonable intervals over the course of any campaign.
As was experienced in the Iowa Floods of 2008 and similarly reported in the 2001 United Kingdom Foot and Mouth Disease outbreak, many contractors despite having the

emergency management experience do not have the constitution for observing or manually handling dead and dying animals. As with any emergency response the importance of matching a person's skills and capabilities with the right role can not be overemphasised.

The investigation could have been improved if there was the opportunity to participate in a NVS Exercise involving 3D contractors or if the author was able to spend time with contractors in their workplace. This would have provided a more in depth analysis on the capacity and capability of the contractors and allowed for more rigorous assessment of their commitment. Unfortunately there were no 3D Support Service NVS Exercises scheduled for the scholarship period so the decision was made to attend the Logistics Exercise. The ability to attend this exercise and discuss the 3D contractor support system with representatives from the USDA and State Departments of Agriculture was still considered to be of high value.

Finally, it is the opinion of the author that the United States are world leaders in the 3D workspace. This is particularly the case when it comes to researching new technologies for improving services and the scientific validation of established techniques. It is obvious that one of their keys to success is the relationships that exist between the livestock industries, government responders, research institutions and private investors. This interaction is not as pronounced in Australia and as a direct result we have much room for improvement. There is still major room for efficiencies in the 3D work discipline especially in the new technology area and the upskilling of the available workforce.

6. RECOMMENDATIONS

1. That Australia continues to liaise with other countries on 3D research priorities and best practice for 3D response activities ie. ongoing involvement in the 3D QUADS group (NZ, USA, Australia and Canada)
2. That the Victorian Animal Health Service investigate what physical resources (land, equipment and staff capability) are available for 3D activities within the Victorian state emergency management agencies and how they can be accessed ie. Hazmat operators for Decontamination services
3. That the Victorian Animal Health Service needs to review its current arrangements for the emergency stockpiling of EAD response equipment
4. That the Victorian Animal Health Service liaise with the Victorian Health Department on how they manage their emergency stockpile
5. That the Victorian Animal Health Service evaluate the use of existing state emergency agency arrangements for the deployment of private contractors in an emergency response ie. the use of earthmoving contractors in bushfires and floods
6. That the Victorian Animal Health Service develop a better understanding of local government arrangements with private contractors ie. existing waste contracts, scope of works, contractor capabilities, rates
7. That the Victorian Animal Health Service liaise with EPA on identifying private companies in the waste disposal industry who have the capacity and capability to be involved in 3D preparedness and response activities
8. That the Victorian Animal Health Service identify private companies in the waste disposal industry who have the capacity, capability and amenability to be involved in 3D preparedness and response activities
9. That the Victorian Animal Health Service become more actively involved in familiarising other emergency management agencies with the consequences and operations of EAD events
10. That the Victorian Animal Health Service liaise more closely with contractors from the intensive animal industries (poultry, pigs, feedlots) to better understand their response capabilities ie. destruction, disposal and decontamination
11. That the Victorian Animal Health Service develop a better understanding of contractor capabilities in the extensive animal industries (cattle, sheep, goats)
12. That the Victorian Animal Health Service review options for large scale decontamination of transport vehicles ie. portable washdown facilities in the mining industry
13. That the Victorian Animal Health Service continue to liaise with EPA on current and emerging options for the large scale disposal of carcasses and contaminated materials involved in an EAD response
14. That the Victorian Animal Health Service continue to actively participate in Municipal Emergency Management Planning Committees and be represented on Regional and State Emergency Management Teams

15. That the Victorian Animal Health Service develop state emergency response plans for other priority diseases using the State Foot and Mouth Disease Plan as a model ie. Avian Influenza

16. That Australia be represented at the 5th International Symposium for Carcass Management to compare 3D information with international colleagues (particularly the "Lessons Learnt" from the US Highly Pathogenic Avian Influenza response)

17. That Australia (Federal and State jurisdictions and industry) procure another Foam Depopulation Unit for the depopulating of poultry and locate it in Western Australia (in addition to the two based in Victoria and South East Queensland)

18. That the Victorian Animal Health Service implement a progressive three year training program for increasing and maintaining 3D response capabilities

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