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After Action Report:

Rendering Workshop

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Abstract:

The U.S. Department of Agriculture (USDA) and the National Renderers Association (NRA) co-sponsored an Emergency Rendering Workshop in Riverdale, MD, in July 2017. Approximately 60 people representing industry, academia, States, and the Federal government participated. This report details the findings from the workshop, as well as conclusions and recommended future actions. Presenters highlighted the complexity of the rendering process, how rendering produces valuable commodities, and the value of rendering as an option to the United States for carcass management during animal disease outbreaks. Presenters further discussed the magnitude of and strategies for controlling a widespread animal disease outbreak, and how emergency rendering is used in other countries. They also highlighted the importance of coordinated and timely communication with the community.

The participants concluded that biosecurity is the most significant obstacle to emergency rendering, and if carcasses are sanitized before rendering or only non-infected carcasses are rendered, most of the obstacles are eliminated. Limited capacity was another major concern, and the ability to market a quality end-product was significant. Ultimately, the participants concluded, emergency rendering must be conducted in a manner to adequately compensate the renderer, while minimizing costs to the government.

To overcome major obstacles, the participants recommended investigating how to render only non-infected material and how to maintain biosecurity if infected materials are processed. The U.S. Government could develop science-based protocols for emergency rendering, which renderers can use to develop site-specific emergency plans. The U.S Government tests and exercises plans, communicates emergency rendering concepts to consumers in advance of an incident, and develops agreements with the rendering industry and government to minimize uncertainty and risk.

Keywords:
Rendering, Carcass Disposal, Carcass Management, Emergency Response

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After Action Report: Rendering Workshop

July 2017: Riverdale, Maryland

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EXECUTIVE SUMMARY

USDA and the NRA co-sponsored an Emergency Rendering Workshop in Riverdale, MD, in July 2017. Approximately 60 people representing industry, academia, States, and the Federal government participated. The workshop resulted in a comprehensive discussion of obstacles and solutions for the use of rendering during an animal disease outbreak in the United States.

Presenters provided a common operating picture to all participants, including:

- Rendering industry officials described the complex nature of the rendering process and that highly valued commodities are produced from the process.
- USDA presented the need for rendering plants to assist responders during an animal disease outbreak because of the potential for generating vast amounts of waste contaminated with the pathogen of concern and because the rendering process is designed to process the animal carcasses.
- A university professor explained potential outcomes from a widespread animal disease outbreak of foot-and-mouth disease (FMD) in the United States.
- Rendering company representatives shared global practices for processing diseased animals, and shared some techniques practiced in Europe. They also explained how the complex rendering system is vulnerable to upset if off-spec materials are introduced, and how difficult it might be to manage a disruption.
- A USDA national response official discussed outbreak management strategies and how movements from infected zones are tightly controlled.
- An official from the Food and Drug Administration (FDA) discussed how the FDA viewed rendering infected materials and that animal feed must be unadulterated.
- A USDA communications official then discussed an umbrella communications plan that coordinates communication and response in the event of an outbreak.

After the presentations, participants formed smaller discussion groups to consider obstacles to rendering and ideas for overcoming these obstacles. There were nine break-out groups, each with its own note-taker and facilitator, and a detailed record of the discussions, were collected, analyzed and synthesized into this report.

As a result of the analysis, we identified several categories of concerns, including biosecurity, national rendering capacity, finished product marketing, communications/outreach, permits and regulations, transportation logistics, and policy issues.

The most significant category of concern was biosecurity. Pathogens present in infected carcasses will cause problems for farmers staging carcasses at the road for pick up by rendering trucks, for trucks during transport and when off-loading at the plant; for plant operators when receiving materials, and for the rendering process during grinding, cooking, and managing the finished product. The problems continue through the marketing of the finished product, and the resulting economic harm from the loss of domestic and international customers. Not only were there numerous parts of the supply chain affected, but the effects were significant. The majority of obstacles were due to the raw material being infected. Key ideas for avoiding infected raw material included either grinding the material on the farm and adding a chemical or heat

sanitizing step, or rendering only carcasses that were test-negative from a control zone or that resulted from welfare slaughter.

Capacity was another major category of concern because of the potentially vast number of animals that could be generated by a widespread animal disease outbreak. Given that rendering plants routinely run near production capacity, there is little excess for surge unless a plant has been completely shut down due to lack of raw material. In addition, renderers might be unwilling to assist with any excess capacity because of the potential losses to their business from wary customers, heightened biosecurity costs, and reluctance of trained operators to process infected materials. Further, rendering plants are specifically designed to process certain types of material, so attempts to process off-spec material can upset the operation and equipment. Plants would require additional effort to process infected, off-spec material, and economic losses may result. Even if the infected carcasses were ground into a slurry on the farm and sanitized, the rendering plant would still have difficulty processing the material if it had feathers/hides and was not fresh. This area of concern would be mostly alleviated if only non-infected animals were rendered, or if the government invests in constructing disposal rendering plants. However, the cost of constructing and maintaining such plants for an incident that may never occur makes it likely infeasible.

Marketing is another major category of concern. In this context, marketing refers to developing markets for finished product. Premium pet foods are the major source of revenue for rendering companies, and customers are highly averse to quality defects in pet food. It is unlikely that consumers would readily purchase pet food from infected carcasses. Even if the raw material was sanitized on the farm, the presence of feathers/hides and decay would make it unsuitable for premium pet food. However, if renderers can accept sanitized, ground material, the product could be used for lower-value animal feed or fuel, or disposed of at a landfill or other solid waste management facility. The cost-benefit varies based on the profit/loss balance for each plant. This area of concern would be mostly alleviated if only non-infected animals were rendered.

Communications and outreach were a significant category of concern for participants. Rendering companies are dependent on the quality of their product to sustain their market share and profitability. Any hint of sub-par inputs can affect consumer confidence and sales volume. Therefore, companies require robust communications and outreach to assure consumers that their products are safe. This area of concern would be mostly alleviated if only non-infected animals were rendered or if the end-product was used for animal feed or fuel.

Permits and regulations were an area of concern for some participants. If rendering plants accept off-spec or larger quantities of raw materials than usual, the result could be exceedances of discharge permit limits. Mitigation measures may include testing effluents, metering inputs, and/or requesting waivers on permit limits. Rendering more material per day would likely be a concern whether infected or non-infected animals were processed.

Transport logistics was a large category of concern for workshop participants. The concern was mostly related to biosecurity and capacity to haul a potentially large amount of raw material. Grinding and sanitizing the material prior to transport would alleviate this area of concern, as would a policy to render only non-infected animals.

Policy was another area of concern. Renderers articulated a need for clear policy from the government on how rendering would be used and compensated during an emergency because uncertainty increases their economic risk. In order for the government to publish guidance or policy, it would have to work with the rendering industry to test protocols for emergency rendering. Once the tests produce data to support the policy, guidance can be written and the rendering industry can then develop specific emergency plans based on the guidance.
Based on the findings from the workshop, a number of recommendations were suggested as outlined below:

1. Investigate emergency rendering of non-infected material versus infected material.
    a. Grinding on-farm and heat or chemical sanitizing prior to transport, including the role of the National Veterinary Stockpile (NVS) and States in providing pre-staged mobile grinders or mobile rendering plants, and cold or other storage
    b. Render only test-negative animals and those culled for welfare reasons and associated biosecurity requirements, considering the use of pen-side testing and mobile labs, export barriers, storage options, and redirecting of raw product to specific plants
    c. Economics of routine rendering compared with emergency rendering of test-negative animals and emergency rendering of pre-treated materials, including investigating non-pet food outlets for finished product, designating some plants for infected only raw material, and establishing an emergency non-compete program among rendering companies
    d. Risk assessment of routine rendering compared with emergency rendering of test-negative animals and emergency rendering of pre-treated materials,
    e. Biosecurity for rendering infected material and the need for additional testing to assure safety, including additional lab capacity, as well as how to regain free status, and a validated method for inactivating pathogens at the plant
2. Develop, in advance, Federal guidance and protocols for emergency rendering using data from Item 1.
    a. Emergency rendering protocol similar to USDA emergency landfill protocol, including biosecurity protocols. Water supply source, approval to discharge runoff, effect of disinfectants if runoff goes to rendering plant treatment system, and likely persistence of pathogens in the treatment system need to be considered and evaluated. Carcass condition standards should be defined. Consider use of rendering plants co-located with slaughter plants.
    b. Secure carcass management plan similar to Secure Egg Supply plan; determine if Secure Beef Supply Plan includes carcass management.
    c. Emergency rendering guidance from FDA
3. Based on guidance and protocols developed in Item 2, renderers develop plant-specific emergency rendering plans to include carcass collection and receiving protocols, contingencies for accidentally processing infected material, biosecurity practices, checklists for what should be in place prior to an incident, and agreements with environmental agencies on relaxing discharge limits to increase capacity if applicable. Determine if there are existing examples available in States.
4. Train responders and renderers, then test and exercise emergency rendering plans on a regular basis; compensation may be required.

5. Educate consumers and rendering plant customers in advance of an incident about animal disease outbreaks and the role of rendering, including data on pathogen inactivation. Consider how various media will be used, including social media.
6. Develop agreements in advance to include compensation and approval for changes in species from normal operations, different ratio of species, hours of operation, larger volume for throughput, permit modifications, hauling permits, long-term storage of products, and receiving variations (slurry vs. whole animal)
7. Develop deployment plan for workers (if the plant is down, what can be done regarding pay/compensation) – can workers be used elsewhere in plant, can they be used elsewhere in response?

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1 INTRODUCTION

1.1 Background

The Animal and Plant Health Inspection Service (APHIS) is the lead Federal response agency in the event of an animal disease outbreak, such as highly pathogenic avian influenza (HPAI) in commercial poultry flocks, or FMD in livestock. During an outbreak, thousands if not millions of animals may be affected, resulting in large numbers of animal mortalities requiring disposal.

Although historically responders prefer to minimize movement of infected animal remains and dispose of them on-farm, if an infected farm is small and the number of mortalities large, this may be impractical and the carcasses will have to be transported offsite for disposal. The three major offsite disposal options are rendering, landfill, and incineration. In a widespread outbreak, all the available carcass management options may be needed. However, there are logistical, regulatory, operational and other challenges with offsite carcass management, especially rendering.

1.2 Purpose

The purpose of this workshop, sponsored by APHIS and the NRA, was to convene relevant stakeholders who would be involved in the use and approval of rendering during an emergency so the participants could identify obstacles to emergency rendering and discuss ideas for overcoming those obstacles. This information would then be used to take steps to facilitate the use of emergency rendering in the future. This is important because rendering during an emergency is a critical tool to managing animal health crises.

1.3 Objectives

Specific objectives for the workshop included:

- Providing participants a common understanding of the facts and issues to be discussed;
- Identifying obstacles to emergency rendering;
- Discussing ideas for overcoming the obstacles; and
- Through the After Action Reporting process, prioritize the tasks to overcome obstacles and recommend next steps.

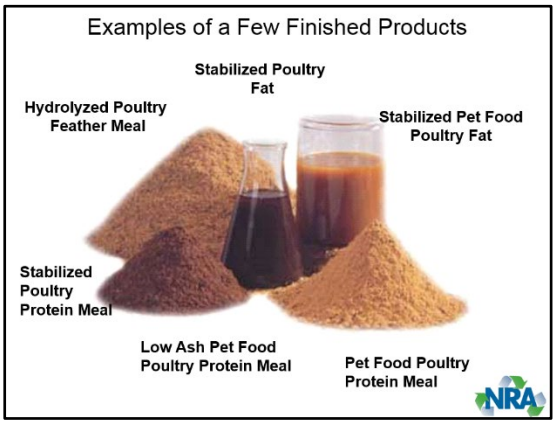
1.4 Workshop Format

The workshop was scheduled from 12:00-5:30 pm on Tuesday, July 18, 2017, and from 7:30 am-12:00 pm on Wednesday, July 19, 2017. As can be seen from Appendix A: Agenda, the workshop consisted of a series of presentations (summarized in Section 2) representing a variety of stakeholder viewpoints, a panel discussion about those viewpoints, and small group discussions (summarized in Section 3) to talk about overcoming obstacles to emergency rendering. The small group discussions were facilitated by an appointed group member, and discussions were documented by a designated note-taker. The Facilitator Guide is included as

Appendix B, and also includes handouts that were provided to each of the nine small groups to further guide discussion. Approximately 60 people attended the workshop.

2 OVERVIEW OF PRESENTATIONS

2.1 Rendering as a Possible Solution for Disposal of Carcasses during a Disease Outbreak, presented by David Meeker of the National Renderers Association and Director of Research at Fats and Proteins Research Foundation

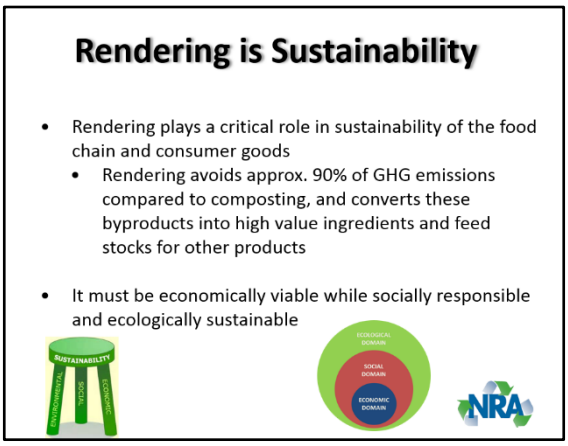


The U.S and Canadian rendering industry is valued at $10 billion, and it helps feed the world's growing population through responsible recycling of animal byproducts. Rendered fats and proteins used for animal feed ingredients replace corn and soybeans from 6.3 million acres of average quality U.S. cropland.

In the United States, 170 facilities process more than 56 billion pounds of animal by-product into usable commodities. In Canada, 10 facilities process more than 6 billion pounds of material. Initial materials collected from animals include offal, bones and fat, blood, and feathers. These can be collected from animals dead on arrival, in transit or on farms, from recalled meat, outdated retail meat, or butcher shop scraps. Materials are processed into highly valued protein supplements for livestock, poultry, pets, and tallow and animal fats for the manufacture of fatty acids and as a source of energy in feed rations. All rendered products in the United States and Canada meet regulatory animal food safety standards. More than 90 percent of rendered products in the United States and Canada exceed these government requirements by following the Rendering Code of Practice, which includes good manufacturing practices, process controls, and training.

Approximately 60 percent of the cattle that die each year in the United States are not rendered, but buried, deposited in landfills, or otherwise left to decompose. Options for addressing this could include providing incentives to render or incorporating the use of fallen animals or livestock that die outside of slaughter facilities, which currently account for less than 4 percent of the all raw material.

2.2 Rendering as a Possible Solution for Disposal of Carcasses during a Disease Outbreak, presented by Tim Guzek, National Renderers Association



The NRA serves as the trade association for the industry, representing 34 independent and integrated packer renderers at 170 rendering plants in the United States. Rendering plays a critical role in sustainability of the food chain and consumer goods by converting byproducts into high value ingredients and feed stocks for other products.

Significant changes in the last year have impacted the industry, including lower prices for soybean and corn crops, sustained low energy prices (biofuels, fuel, and natural gas) and finalization of the Food Safety and Modernization Act.

The rendering industry is exploring new opportunities, including the potential to process diseased animals/birds in case of an animal health emergency. There are a number of questions, concerns, and impacts that still need to be answered and discussed in order for the rendering industry to participate in emergency rendering. These include:

- biosecurity related to liability for potentially spreading disease, transportation of carcasses, handling and processing of carcasses and the disposition of finished products, i.e. fat and protein;
- returning a facility to full commercialization after processing infected animals/birds;
- perception and communication; and
- compensation.

Facilities would need to have an approved plan in place that can be activated and approved in the event of an animal disease outbreak. Should a facility(s) choose to participate in handling diseased carcasses, the NRA commits to working with the facility to develop a plan for bringing it back online and to full commercialization. Once developed, the plan will be submitted to USDA for approval, with the expectation that an approved plan, when followed, would clear and enable the facility to return back to normal operations.

2.3 Rendering During National Disease Outbreak, presented by Jack A. Shere, USDA Animal and Plant Health Inspection Service, Veterinary Services

Dr. Shere spoke about the need for rendering during a national animal disease outbreak. He framed the discussion with a look back at the 2014-2015 HPAI outbreak response. Though rendering was not one of the disposal methods used during the HPAI outbreak, the very limited disposal options that were available highlighted the necessity of having as many options as possible.

By June 2015, APHIS had confirmed HPAI in 211 commercial operations and 21 backyard flocks. To control the outbreak, speed was critical. Disposal of bird carcasses was a major aspect of response, requiring almost 18 percent of the total government response cost, second only to indemnity paid to producers. Not only was disposal expensive, but it was technically challenging to dispose of nearly 50 million birds. During this outbreak, 85 percent of birds were composted, 8 percent were buried, and the remainder were landfilled or incinerated. Landfilling of HPAI exposed or infected poultry was delayed by 6 weeks due to the need for public education and reassurances.

If there was an outbreak of a foreign animal disease at a 50,000-head cattle feedlot, there would be limited disposal options. For example, burying the carcasses on-site would require a 76-mile long trench if the animals were laid end-to-end, or a 64-acre burial pit, not counting the buffer zone around the pit. Simply moving 50,000 cows from the pens to the burial trench would take more than a month working around the clock. The burial pit would generate about 2,400 gallons of liquid discharge per day from the carcasses. If this liquid were to reach a public or private water source, it could raise the levels of nitrogen in the water, making it hazardous to human health.

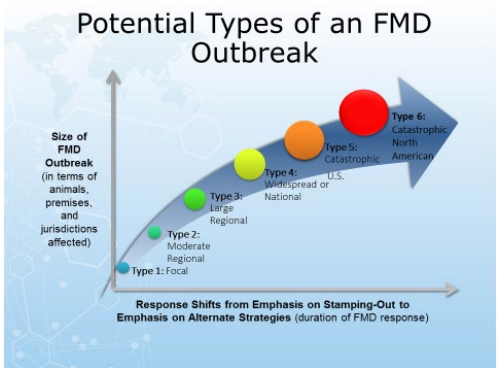
Unlike burial, rendering is a complete process that is highly controlled and results in safe end products that can be utilized for other purposes or disposed of safely. In the case of HPAI, composting birds was the primary means of disposal. However, composting cattle would require significantly more space and resources. While more than 50,000 birds can be composted per acre, for cattle, it is fewer than 250 head per acre.

As a disposal option, Dr. Shere said there are many benefits to using rendering instead of other disposal methods. A single rendering plant can process at least 60 tons of material per day—equal to about 35,000 cattle per month. Rendering is sustainable and ranks high on the Environmental Protection Agency food recovery hierarchy. Additionally, rendering recycles waste into usable products and can produce energy. Rendering also reduces greenhouse gas emissions, which can lead to a reduction in air pollutants. Finally, sustained rendering temperatures of 240- 295°F are more than sufficient to kill bacteria, viruses, and other microorganisms.

So, why aren't we using rendering? Rendered products, like pet foods, have their brands to think about and protect, and they want to avoid a perception that the product is tainted. Public messaging is key to reassuring consumers and providing the facts about product safety.

Additionally, there are technical challenges to overcome. How do we ensure the product doesn't get cross-contaminated in the rendering plant? How do we clean and disinfect the plant if it's used in an outbreak? What standards will have to be met, and how do we verify that they have been met?

2.4 Potential Need for Rendering as a Carcass Disposal Option within Secure Food Supply Plans, presented by Jim Roth, Center for Food Security and Public Health, Institute for International Cooperation in Animal Biologics; College of Veterinary Medicine, Iowa State University



The secure food supply (SFS) plans strive to ensure movement of animals and/or animal products from premises with no evidence of infection for specific foreign animal diseases. The milk and pork supply plans are both focused on FMD. Pork also includes planning for classical swine fever (CSF), African swine fever (ASF), and swine vesicular disease. The poultry plans are focused on HPAI.

SFS plans work toward enabling movement of animals or products from flocks/herds with no evidence of infection in a control area. In these cases, movement of animals is by permit only, and producers may need to manage their animals without moving them for several days to weeks.

Highly pathogenic H5N2 avian influenza in Iowa in 2015 had an estimated $1.2 billion impact on the Iowa economy. In addition, with 31 million birds infected, there were major problems with carcass disposal.

Biosecurity is another component of the SFS plan. Biosecurity can be expensive and inconvenient. However, having a farm infected with a disease would also prove to be expensive and inconvenient. Swine producers already have biosecurity measures implemented on most farms; however, in most cases, these biosecurity measures will help protect against endemic diseases only where we have some herd immunity and lower levels of pathogen shedding. Enhanced biosecurity measures will be needed to protect herds against foreign animal diseases for which there is no herd immunity and levels of pathogen shedding are high.

Jim Roth has developed a document that outlines the phases and types of an FMD outbreak. This document could be applied to all affected species during a FMD response, and is available at http://www.cfsph.iastate.edu/pdf/phases-and-types-of-an-fmd-outbreak.

In his presentation, he discussed the various type of FMD outbreak. Type 5 Catastrophic includes widespread areas of infection involving a large portion of the United States. With too many animals affected to implement or continue stamping out, and lack of sufficient vaccine and resources, the disease would not be eradicated within a year. Thus, there is a transition from an emergency eradication response to a long-term control program, eventually leading to eradication, and perhaps including vaccinate-to-live.

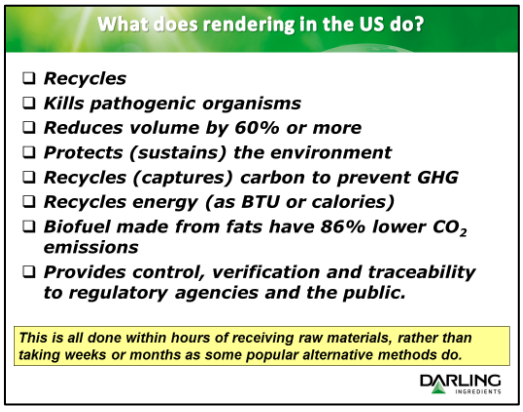
Jim Roth also has written Guidelines for Classification of Phases and Types of a CSF and ASF Outbreak and Response, and he discussed how the types differ. In short, ASF and CSF infect only swine, whereas FMD infects cloven hooved animals. While there will be a delay in the availability of FMD and CSF vaccine, vaccines will eventually be available. There is no ASF vaccine, which increases the importance of rapid detection and aggressive measures to stamp out infected herds. In addition, the virulence of the strains and the ability to detect them will help dictate the extent of the outbreak.

The severity of FMD, CSF, or ASF infection is influenced by several factors, including viral strain, age and immune status, general health, and viral dose. Adult livestock do not usually die from FMD, though mortality may reach 80 percent in some groups of calves and 100 percent in suckling piglets. In lambs, mortality rates range from 5 percent to 94 percent. Most adults recover from acute infection in 2 to 3 weeks, although secondary infections may slow recovery.

Highly virulent strains of CSF virus cause outbreaks with morbidity and mortality rates approaching 100 percent. Mortality tends to be lower in adult pigs, compared to young animals, especially with less virulent strains. For ASF virus, isolates vary in virulence from highly pathogenic strains that cause near 100 percent mortality, to low-virulent strains that can be difficult to diagnose.

2.5 Emergency Rendering – A Global Perspective, presented by C. Ross Hamilton of Darling Ingredients, Inc.

Darling Ingredients is a $3.4 billion company headquartered in Irving, TX. With more than 200 locations across five continents, it renders more than 50 billion pounds of raw materials each year, serving the food, feed, and fuel industries.



The rendering industry focuses on food safety. In 2001, the British government concluded rendering is preferred to incineration, landfill, and burying, based on public exposure to bacterial and chemical hazards.

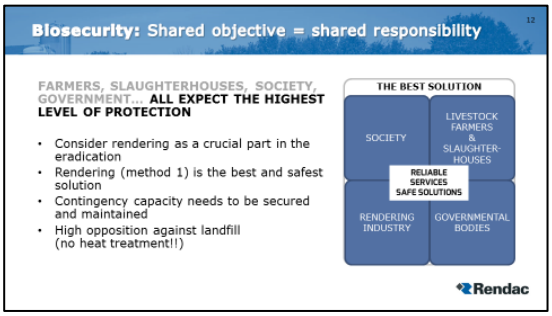
In the United States, rendering offers a quick way to kill pathogenic organisms, reduce volume by 60 percent or more, protect/sustain the environment, capture carbon to prevent emissions of

greenhouse gases, recycle energy, and create biofuel. The process also provides control, verification, and traceability for regulatory agencies and the public.

By contrast, the European model has been redefined in light of regulations to protect against transmissible spongiform encephalopathies. Thus, renderers remove most animal proteins in feed for livestock and poultry and have established three categories of animal byproducts. The processing and documentation for each category of material is in strict accordance with the principles of hazard analysis and critical control points and animal by-product rules.

2.6 Eradication of animal diseases in The Netherlands, presented by Sjors Beerendonk & Pieter Derks, Darling Ingredients International

The Netherlands has 17 million people, 13 million pigs, 4.5 million cows, and more than 100 million chickens. This makes the country vulnerable to animal diseases and makes biosecurity a critical and essential factor.



Rendac is a Darling Ingredients brand introduced to prevent risks for public and animal health. Its rendering plant in Son, Netherlands, is the largest in Europe, processing 900,000 MT per year; 150,000 MT of that is deadstock. Rendac has 73 specialized trucks on the road, making about 630,000 stops annually.

Rendering produces sustainable end products, such as raw materials for cement kilns, biofuels, and green energy.

There is a regulatory framework for collecting and processing deadstock in the Netherlands. The National government is responsible for adequate infrastructure for collection and disposal of animal waste, both in normal circumstances and during animal disease outbreaks. The regulated market is organized through private enterprises, based on a system of permits, and includes tariffs, the obligation for farmers to report deadstock, and the obligation for renderers to collect and process deadstock in accordance with prescribed standards (such as heat treatment).

The Netherlands has learned from outbreaks of FMD, swine fever, and avian influenza. Among lessons learned:

- Don't lose time/always be prepared;
- Animal diseases have a high economic impact;
- Sanitation is a crucial part in the chain;
- Have your contingency capacity available and your contingency plans ready; and
- For biosecurity, shared objectives equal shared responsibility.

According to the speakers, European farmers, slaughterhouses, government, and the public expect the highest level of protection from disease. Considering the high opposition against use of landfills in the country, rendering is considered a crucial part of eradication and the best and

safest solution to dealing with deadstock. Further, farmers are willing to pay for infrastructure and biosecurity standards. Regular tariffs help maintain the standard biosecurity level, an animal health fund (paid by government and farmers) includes costs for specific contingency measures, and national government and European Union (EU) funds finance overall eradication costs during an outbreak.

2.7 Eradication of animal diseases in The Netherlands, presented by Pieter Derks of Darling Ingredients International

Mr. Derks discussed the hygienic collection of fallen stock in the Netherlands. There are 65 routes per day, and collection is done within 1 day of notice and picked up near the public roads from storage containers that are not accessible to birds, rodents, dogs, and cats. Carcasses are taken directly to a processing location.

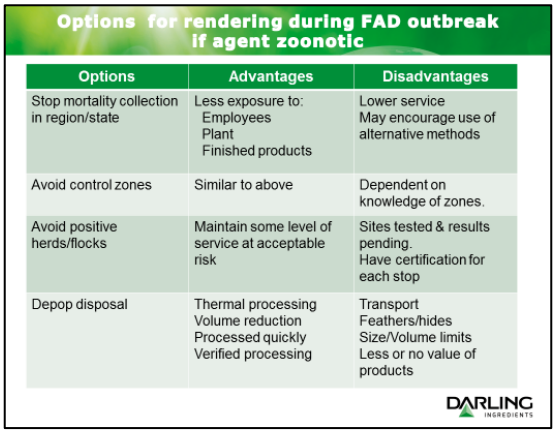
The transports are driven by trained and certified drivers and contain approved containers that are mechanically stable and liquid-tight. The company observes biosecurity measures that prevent the spread of disease or infection—including use of receiving zones, sterilization of equipment, and personal protective measures. There is extra pasteurization capacity for situations of animal diseases.

The key, Derks said, is to prepare infrastructure before there is an animal disease. This includes transport and process capacity, hygienic measures to eradicate animal disease instead of spreading it, and measures to protect the health of the employees.

2.8 Emergency Rendering – A Global Perspective, presented by C. Ross Hamilton, Darling Ingredients

Hamilton said that rendering provides essential services to society. These activities are closely regulated by multiple Federal and State agencies. Because rendered products may be used as feed ingredients, rendering has implemented preventive controls to address hazards and protect the environment.

The use of rendering to dispose of depopulated animals is complex, and it requires planning and understanding before an outbreak.

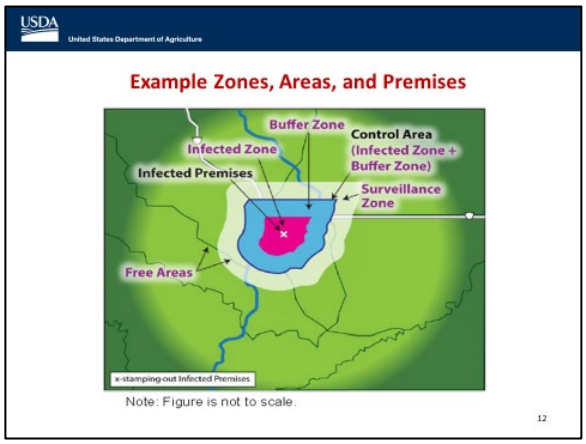


Hamilton then addressed whether rendering can be part of disease eradication efforts in the United States. This will be determined by:

- Risk assessments – dependent on the agent to be eradicated, potential risks to employees, training and safeguards that are utilized, the services or support that are provided, and the availability and use of preventive medications and vaccines.
- The risk to the rendering plant of being labeled as "infected," and the pathway for cleaning and sanitizing the facility to allow it to resume normal operations.
- The potential value of the fat and protein produced, and whether it can be used for biofuel, feed, or fertilizer.
- Transportation and border restrictions.
- Cost recovery, including facility conversion, disposal costs, diversion of routine/contract raw materials to other facilities, operating costs, and cleaning and sanitization.

2.9 Foreign Animal Disease Response Strategies & Regulatory Considerations, presented by Jon Zack, APHIS

To respond to a foreign animal disease (FAD), APHIS and its partners need as many good options as possible. Most likely, these options would be obtained from detailed planning with multiple stakeholders.



State animal health officials have tremendous responsibility (and pressure) for disposal decisions in an FAD outbreak. In fact, all stakeholders need to understand the potential benefits and downsides of any disposal strategies or decisions.

In the event of an FAD outbreak, the key response goals are:

- Detect, control, and contain the FAD in animals as quickly as possible;
- Eradicate the FAD using strategies that seek to stabilize animal agriculture, the food supply, and the economy, and to protect public health and the environment; and
- Provide science- and risk-based approaches and systems to facilitate continuity of business for non-infected animals and non-contaminated animal products.

The overall goal is to allow individual livestock facilities, States, Tribes, regions, and industries to resume normal production as quickly as possible, and allow the United States to regain disease-free status without the response effort causing more disruption and damage than the disease outbreak itself.

There are three key epidemiological principles form the foundation of any FAD response:

- Prevent contact between the disease and susceptible animals.
- Stop the production of the FAD agent in infected or exposed animals.

- Increase the disease resistance of susceptible animals to the disease, or reduce the shedding of the FAD agent in infected or exposed animals.

The response strategy used for the control and eradication of a FAD in domestic livestock or poultry depends on the disease agent, zoonotic potential, the ability to control the agent, economic impact, and the availability of emergency vaccines. The options include:

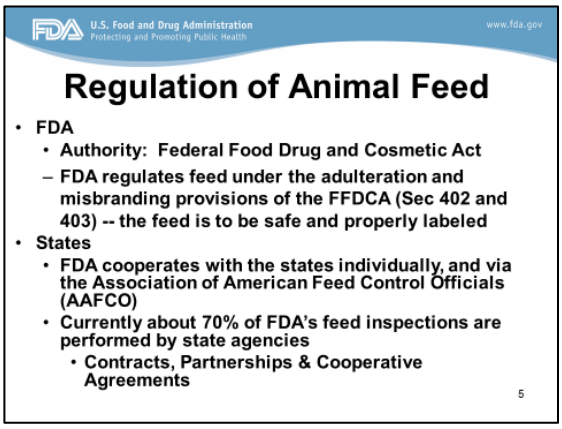
- Stamping-Out – depopulation of clinically affected and in-contact susceptible animals.
- Stamping-Out Modified with Emergency Vaccination to Kill – depopulation of clinically affected and in-contact susceptible animals; vaccination of at-risk animals, with subsequent depopulation and disposal of vaccinated animals; depopulation and disposal can be delayed until logistically feasible.
- Stamping-Out Modified with Emergency Vaccination to Slaughter – depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals; slaughter and processing of vaccinated animals, if animals are eligible for slaughter under USDA Food Safety and Inspection Service (FSIS) authority and rules and State and Tribal authority and rules.
- Stamping-Out Modified with Emergency Vaccination to Live – depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals; no subsequent depopulation of vaccinated animals; vaccinated animals intended for breeding, slaughter, or other purposes live out their useful lives.
- Emergency Vaccination to Live without Stamping-Out – vaccination used without depopulation of infected animals or subsequent depopulation or slaughter of vaccinated animals.
- Manage Outbreak Without Widespread Stamping-Out or Vaccination – used when the disease agent is already widespread prior to detection or when it involves a large number of animals, and when no vaccine is readily available.

Some of the critical activities and tools that are employed to execute response strategies during a FAD outbreak include epidemiological investigation and tracing, biosecurity, surveillance, diagnostics, quarantine and movement control, continuity of business, depopulation and/or vaccination, cleaning and disinfection/virus elimination, disposal options, and public awareness campaigns.

By restricting the movement of infected animals, animal products, and contaminated fomites, quarantine and movement control can be a powerful tool in controlling and eradicating a FAD outbreak. Movement control is accomplished through a permit system that allows entities to make necessary movements without creating an unacceptable risk of disease spread for Interstate and Intrastate commerce. This also affects bilateral trade, with the movement of animal products depending upon certifications required by trading partners.

2.10 Feed Safety Regulation in the United States, presented by Shannon Jordre, FDA Center for Veterinary Medicine

The U.S. feed industry is large and complex, and current regulations provide a great deal of latitude for manufacturers as long as the finished product is safe for its intended use and accurately labeled. Historically, low moisture levels have been the predominant control for microbiological agents in livestock feeds.



However, Jordre said, new Food Safety Modernization Act (FSMA) rules will require feed manufacturers to develop a risk-based approach. Jordre said that rendering diseased animals brings up questions from the FDA, although these concerns are somewhat lessened if the final product is not for feed use. The FDA questions for rendering include:

- What method of euthanasia is used, and does it impact rendering or the safety of the finished rendered product?
- How will the plant control the possibility of post-process microbial contamination?
- How will the rendering plant be decontaminated/disinfected when the outbreak is over?

FDA has a lot of experience working with "typical" rendering operations, with raw materials consisting of slaughter offal and used cooking oil being recycled into feed ingredients. The industry is responsible for producing and distributing safe feed, while the FDA and States have a longstanding partnership that provide rules, guidance, and oversight, and take enforcement action when necessary. (FDA and the State agencies participate in the Association of American Feed Control Officials (AAFCO), which encourages cooperation and uniformity between States.)

There are a number of Federal regulations that apply to feed manufacturing. Section 402 of the Federal Food, Drug, and Cosmetic Act is the baseline, and requires animal feed to be unadulterated. New regulations for animal food adopted under the FSMA are being phased in over the next several years, and are expected to change how feeds are regulated. All facilities subject to the rule will have to conduct a hazard analysis and develop a food safety plan. Based on that review, the operation may need to implement "preventive controls" to address identified hazards.

There are limits to the new preventive controls regulations. Most farms, for example, will be exempt from these regulations. The FDA does not anticipate developing disease-specific feed regulations. So, Jordre said, the new rules are not likely to be the singular factor that reduces or prevents the spread of highly infectious animal diseases in the United States.

2.11 FMD Cross-Species Communications Team, presented by Ed Curlett, USDA APHIS

The FMD cross-species team, which includes the National Cattlemen's Beef Association, National Pork Board, American Sheep Industry Association, the Dairy Management Inc., and APHIS, has 15-plus years of coordinated industry response planning.

The team has focused on creating an umbrella plan that coordinates communication and response in the event of an outbreak. While each of the species organizations have their own crisis plans, the umbrella plan will provide coordination for the industry. Each species will communicate the same messages through their individual channels. The current plan outlines actions for media response, producer communications, social media outreach, monitoring and more. The plan is updated frequently to ensure it is current and useable in the event of an outbreak.

Each year, the group takes on projects that help advance their objectives. For 2017, the team was focused on updating consumer message testing research, broadening stakeholder outreach (including organizations such as Future Farmers of America that are teaching the next generation of first responders and spokespeople), updating the spokesperson list and training.

Consumer research reveals that shoppers want transparency and information on how people and food are kept safe. The public wants direct and easy-to-understand messaging. They want proof of any assertions. Although they appreciate "coordinated" efforts, they want a better understanding of the "how" and "what" of those communication efforts.

3 OVERVIEW OF WORKSHOP DISCUSSIONS

3.1 Findings

Based on notes from each discussion group, there were several categories of obstacles to emergency rendering, including biosecurity, capacity, marketing, outreach, permits/regulations, transport, and policy. The workshop participants identified specific obstacles, and brainstormed ideas to overcome these obstacles. The obstacles and ideas are summarized in a series of tables shown in Appendix C, and discussed below by category. Within each category, there are groups of topics, each with its own specific obstacles and ideas. Some of the discussion points are applicable to multiple sections and may be discussed in several areas.

3.2 Biosecurity

Biosecurity was a primary concern among workshop participants and was the category with the most obstacles of all the categories discussed. Topics within the Biosecurity category included aerosols from grinding, cost issues, general issues, personnel biosecurity, plant biosecurity and vehicle biosecurity. Each topic is discussed in more detail below.

3.2.1 Aerosols

A 2009 Environmental Protection Agency study (EPA, 2009) found that aerosols generated from the rendering grinding process could be deposited on surfaces within the plant, thereby creating a risk of personnel tracking deposited material to other parts of the plant to the final products and to off-site locations. This biosecurity risk could be an obstacle to emergency rendering; however, it may be useful to note that routine mortalities going to rendering may have died of a disease, so there is always a potential pathogen risk, even with routine rendering. To mitigate the risk, participants suggested ideas such as spraying the carcasses with water or foam to minimize aerosol generation during grinding, installing an air purification system for the grinding area and/or entire plant to contain pathogens and reassure neighbors, and to contain the delivery and grinding areas to prevent aerosol movement. One way to accomplish the last idea (to contain the delivery and grinding processes) could be to grind infected carcasses at the farm, transport the material as a slurry, and inject the slurry directly into the cooker, thus bypassing the open delivery and grinding steps and eliminating the biosecurity risk at the plant.

3.2.2 Cost

During the workshop, participants made a number of comments related to costs of implementing biosecurity. First, participants pointed out that existing routine biosecurity measures would likely not be adequate if the renderers picked up infected carcasses and the rendering plant processed them. Collection would be inefficient if trucks could not visit multiple farms on a route, and investment would be needed for additional biosecurity equipment and supplies for trucks and plants. Additional personnel training, personal protective equipment, medical monitoring, decontamination activities, additional storage space, operational changes to meet regulatory requirements, liability insurance or indemnification, and management oversight would also be

needed. The costs of additional biosecurity would need to be quantified and justified to be eligible for government reimbursement.

Participants wondered where the funds would come from, because the rendering industry runs on tight profit margins that could not sustain that type of additional costs. Suggestions included charging farmers at a higher rate for picking up infected carcasses, justifying capital investments by identifying other benefits from the measures, and investigating public-private partnerships. Participants noted that government and industry sometimes hesitate to invest in protective measures until there's an actual outbreak, at which time it is too late. They also suggested that incentives could be established to help overcome reduced profits resulting from processing infected material.

3.2.3 General

A number of general biosecurity comments, questions, and suggestions were offered for consideration during the workshop. One participant pointed out that we know rendering will inactivate FMD, avian influenza, and a host of other pathogens due to the temperatures reached in the process. Also, the intake side of the rendering facility could be (and often is) opposite the outtake side, so a rendering facility could be considered "dirty" on one part of the plant only. Furthermore, there are studies that show how long FMD virus remains in various climate settings. Therefore, in warmer climates, the likelihood of contaminating the clean side might be sufficiently low so extreme biosecurity measures may not be required. This concept should be assessed for risk.

A number of other points were raised related to biosecurity, including:

- Define specific situations when rendering is not advised, e.g. prion infected carcasses.
- Disinfect dairy tankers at farm and at rendering plant if milk will be rendered. Interior of tank would have to go to sanitizing station. Would that create cross contamination?
- Develop emergency rendering biosecurity protocols to overcome limitations of routine measures.
- Review existing standard operating procedures (SOPs). North Carolina has developed a series of decontamination SOPs for farms, feed mills, and other locations, which can be shared upon request.
- Investigate sanitizing deadstock at the farm to reduce rendering industry biosecurity concerns
- Increase training, add equipment and personal protective equipment (PPE).
- Evaluate adequacy of routine plant cleaning protocols; as point of comparison, a rendering plant intake area is less sanitary than intake area of slaughter plant which has to clean daily, as opposed to weekly.
- Develop and publish science-based biosecurity SOPs
- Develop biosecurity protocols for farm, transport and plant based on research findings; perform additional testing to fill gaps; what to do and why to do it; clean plant before first load to make later decontamination easier; phase in implementation of new biosecurity SOPs.
- Determine what type of cleaning will be necessary, and to what level of cleanliness. That may depend on the intended end use of the product, and whether it is intended to be used

as feed or fertilizer, or burned as fuel. Can you prevent cross-contamination of finished product (from raw incoming product), and/or how do you disinfect the plant when the outbreak is over?

- Develop secure carcass management plan. We would need settled policy and a leader to make it happen.
- Integrate biosecurity into routine rendering operations.
- Evaluate existing biosecurity plans to be enhanced for emergency.
- Need SOP/plan at State level (North Carolina-HPAI plan template).
- Use existing rendering plant and run mock scenario to determine costs, justify improvements (full-scale exercise)
- Note that biosecurity/sanitation is the most important part of managing disease.
- Consider that first FMD detections may come at packing or rendering plants; therefore, need to develop rendering and APHIS plans.
- Conduct incident planning/exercises at local/State/Federal level
- Develop plan so plant can go back to commercial production. Same as barns to restock?
- Develop protocol for returning rendering plants to normal operations if designated as an infected premises. Major concern from renderers handling affected material is cleaning and disinfection and quarantine release to regain export approval. How do I get my facility back on line? Government and customers have to sign-off on this process.
- Develop science-based and biosecure protocol that includes at the farm, during transportation, and through the rendering process; then there will be an economic issue (not biosecurity) on the use of the end product.
- Survey regulators and customers for what it would take to return to normal operations.

3.2.4 Personnel

Individual rendering plant workers have multiple roles, so cross contamination is a risk, particularly if individuals move from the grinding end of the plant to the finished product area without using strict biosecurity protocols. Individuals may introduce pathogens to the rendering plant by picking them up from elsewhere and tracking them into the plant. There is also a risk of truck drivers picking up carcasses from infected farms, becoming contaminated, and interacting with plant workers before completing biosecurity protocols.

Although recent increases in rendering plant biosecurity in response to other incidents, such as salmonella in pet food, are helpful, it is unclear if those measures will be adequate during a FAD outbreak, where rendering is used to process infected carcasses. To address this uncertainty, all cross-contamination routes within and outside the plant must be identified. These routes might include personnel movements from the input end to the product end of the plant, personnel movements from offsite to the plant especially for personnel with private livestock, and movements of truck drivers from infected farms to the plant.

Worker safety was identified by participants as the highest priority. Risk to personnel from handling infected carcasses should be assessed, particularly if the pathogen is or could become zoonotic, employees can be monitored to determine if pathogens become zoonotic, and if human-to-human transmission occurs.

Once the exposure routes and risks are identified and assessed, a number of mitigations can be considered. Possible interventions include:

- create a line of separation between input and product ends of plant, including foot baths, using the Dutch system as a model (as part of this system, plant personnel are forced by the plant design to change footwear when going from dirty to clean side);
- totally enclose and automate processes to prevent personnel exposure;
- require people to follow biosecurity protocols when arriving at plant to prevent introduction of pathogens from offsite;
- consider having personnel park remotely and shuttle them to plant in biosecure transport;
- require personnel to change clothes before going home;
- make these processes convenient to workers so the protocols will be followed; and
- upgrade PPE for workers during plant operations.

3.2.5 Plant

According to participants, U.S. rendering plants are typically old and not designed for biosecurity; even new plants may lack biosecurity features. Participants doubted that current routine biosecurity practices would be adequate during an outbreak, but at least one Minnesota plant has improved biosecurity recently. That plant could be contacted to understand how they amended their practices. Good plant practices include a number of critical control points, but it is unclear if those control points are adequate for high biosecurity needs, given, for example, that insect vectors can easily travel from the raw to finished sides of the process. Improved biosecurity practices can be incorporated into routine operations, but the challenge is to ensure compliance over time.

It was suggested that one individual or a small team could be assigned responsibility for biosecurity at each rendering plant. Existing plants can be inspected to identify areas for biosecurity improvements. Inspectors can use a checklist, which could be developed by rendering industry personnel in collaboration with USDA. The areas for improvement can be addressed by the rendering plant owners, and expensive upgrades could be funded through public/private partnerships, with a consideration to return on investment. A line of separation must be established between input and product ends of the plant so all personnel working at the input end must follow biosecurity protocols before moving to the product side. A validated method for inactivating pathogens at the plant must be developed and implemented to show that it's protective of human and animal health.

Rendering plants can be upgraded using the Netherlands plants as a model for how they are enclosed and automated. The Netherlands has three levels of biosecurity procedures: 1) standard (daily); 2) scaled up (outbreak in neighboring country); and 3) full scale (ongoing outbreak within the Netherlands). These measures include dirty/clean side entry/exit procedures for trucks going in and out of the facility. Plants can be pre-inspected for biosecurity prior to receiving the first infected load. Dutch workshop participants invited U.S. participants to visit their plant in the Netherlands to see biosecurity measures in action.

In the transportation lot, trucks for on-farm mortalities can be separated from slaughter plant offal trucks to minimize cross contamination by having designated unloading areas for each type

of delivery. The delivery area for farm deadstock must provide for vehicle decontamination and other biosecurity measures. The existing truck wash capabilities at some plants can be incorporated into the carcass delivery area. The yard tractor can get a clean trailer when returning to the plant (e.g., have dirty and clean yard tractors). Biosecurity could be enforced at rendering plants like it is for infected farms, if needed.

An alternative to processing both infected and routine materials at a single plant could be dedicating a single plant to processing only infected material. This alternative would minimize cross-contamination risks. The dedicated plant could be required to demonstrate their ability to maintain strict biosecurity controls.

Another topic of concern for workshop participants was the potential designation of a rendering plant as an infected premises, and when it would occur. There were also concerns expressed about when a rendering plant can be reopened, especially for export. Would trading partners accept rendered products from cleaned-up plants? Rendering industry officials worried this designation would adversely impact their ability to return to full production of high quality products. USDA pointed out that poultry production facilities that were designated as infected premises during 2015 HPAI response activities have returned to full production of food for human consumption. Poultry operations achieved release from quarantine by inactivating the virus at the facility using wet cleaning, dry cleaning, and/or heat and/or chemical disinfection. Surface wipe samples were analyzed to verify that viruses were inactive. Poultry farms then had a 21-day fallow period to further ensure pathogen inactivation. It was unclear if rendering plants would also have to undergo a fallow period, and how often the plant would have to be disinfected. Participants suggested heat could be an effective approach for disinfecting rendering plants. Wet cleaning and disinfection could prove challenging due to grease on facility surfaces. Research would be needed to develop and validate protocols at rendering plants. It was also suggested that finished products could be tested for presence of pathogens to ensure product safety and research using wipe samples could be done to determine pathogen persistence, both with and without virus elimination.

An alternative to pathogen inactivation could be preventing pathogen release at the plant and avoiding designation as an infected premises. If carcasses are ground at the farm, pumped into tanker trucks, and transported as a slurry to the rendering plant, then injected directly into the cooker, it would be a closed system with no uncontrolled release of pathogens at the plant. The risk management decision to grind near the farm versus at the rendering plant needs to be carefully considered. If grinding does create aerosol plumes that are of a concern, grinding in a farm-dense area near other premises may lead to more local area spread compared with a few employees whose clothes and shoes become contaminated at a rendering plant and who may or may not have contact with livestock or poultry when they return home. Further research into this method and risk assessments are needed to evaluate feasibility. In addition, it may be necessary to develop a rendering continuity of operations plan.

3.2.6 Vehicles

The single greatest concern for biosecurity and emergency rendering was related to render haul vehicles and the possibility that the vehicles could serve as fomites to spread pathogens.

Workshop participants had numerous ideas for mitigating vehicle biosecurity risks, particularly in the areas of movement management, truck design, and truck cleaning and disinfection.

3.2.6.1 *Movement Management*

Participants suggested assigning an individual or small team to be responsible for managing vehicle biosecurity, with the goal of establishing simple, repeatable procedures and processes for drivers, at the farm, and at the rendering plant.

If the trucks are kept clean and arrive at the farm clean, they will be easier to disinfect. Dedicated deadstock trucks can be designated, and they can disinfect between farms. Different trucks that don't pick up deadstock can provide service to slaughter houses processing healthy animals. Drivers can use pre-determined routes or alternative roads can be identified to handle separate rendering traffic. If independent peddlers are used for transportation, they will have to comply with the standards. It was also suggested that incentives for driver biosecurity should be investigated as well as ways to minimize delays from additional biosecurity measures, such as adding trucks from unaffected areas or automating the vehicle wash process.

Deadstock can be picked up at designated locations, instead of individual farms, with disinfection between visits. Deadstock can be brought to the road so a render haul vehicle doesn't have to enter the farm. Culled animals can be taken directly to rendering without transferring them at a centralized location. Risks of various deadstock movement approaches can be assessed in the future.

At the rendering plant, measures could be established to avoid cross-contamination at the scale area. Truck drivers should be enabled to deliver loads without entering non-biosecure areas of the rendering plant lot. Drivers could drop the full trailer and pick up a clean trailer for the next load, rather than dumping the load at the rendering plant and going back out with the same trailer.

3.2.6.2 *Truck Design*

Truck beds should not leak and can be lined to ensure further containment of liquids. Trailers can be leak tested and designed with rubber seals and tie-downs. The trailers can be tested with water to ensure they don't leak before they are dispatched to pick up deadstock. Trucks should be covered, and every truck should have sanitation devices. Preference for low-pressure sprayers as opposed to high pressure washers to minimize aerosols is recommended. The Dutch model can be considered, using "calamity containers", which are a combined containment and transport, similar to a sealed roll-off container. Trucks should be designed for easy disinfection of vehicle surfaces, tires, and cranes. Lined containers can also be considered for rapid decontamination.

3.2.6.3 *Truck Cleaning and Disinfection*

A number of suggestions were made by participants for cleaning and disinfection of rendering vehicles. For example, trucks can be washed, the cab cleaned, and trailer leak tested prior to

deployment, then cleaned and disinfected again after picking up the deadstock before leaving the farm. Drivers should limit the need to exit the cab and cell phones can be kept in zipper bags that can be disinfected. We should also develop effective methods for disinfecting the transport vehicles, including wheels and grappler, or use dumpsters that eliminate contact with carcasses. Every truck should include low-pressure sanitation systems, or have undercarriage wash systems available at the farm.

We should develop an emergency rendering vehicle decontamination standard and ensure strict compliance during a response. The standard should consider the water supply source, approval to discharge runoff, effect of disinfectants if runoff goes to rendering plant treatment system, and persistence of pathogens in the treatment system.

3.3 Capacity

3.3.1 General

Another major category of concern reported by workshop participants was rendering capacity in the United States compared to the number of livestock that might be affected during a widespread outbreak. A recent study by USDA and the U.S. Department of Homeland Security (DHS 2016) found there is inadequate carcass management capacity in all major livestock regions of the United States, especially rendering and associated cold storage. According to rendering industry officials, there are 170 rendering plants nationally listed with the NRA, but current facilities in the United States are at 90 percent capacity. Participants estimated a typical plant could process 80 cattle or 40 tons per hour, although it would depend on the condition of incoming material and ambient air temperatures. Renderers require fresh material for their process. It was unclear if decayed, pretreated, or bagged materials could be rendered. Carcass condition standards should be defined and methods/protocols developed in advance of an emergency to meet those standards. Pre-inspection of carcasses prior to transport to rendering may be useful. In the EU, slaughter plants are used for depopulation, and parts are then sent to rendering, often at an on-site rendering plant. The practicality of this approach in the United States should be investigated.

It might be possible to increase the speed of rendering plants if the product will go to landfill. Plants could operate additional days per week, or run additional shifts. However, there are a limited number of qualified operators, and personnel shortages could be a constraint during a surge. If plants operate more hours per day than normal, they will generate more waste per time than normal, potentially causing discharge permit limits to be exceeded. This will be discussed in more detail in the Permits/Regulations section. Also, some rendering capacity may be hidden in the sense that one processing line within a plant could come off-line, providing emergency rendering services without significantly disrupting routine rendering flow. This would require some excess or redundant capacity in cookers and dedicated processing lines to handle the added material. Infrastructure improvements may be needed for this approach, which leads to the question of how upgrades would be funded. Subsidies might be needed for capital and operating costs, which would be high due to increased biosecurity.

A grant program could be developed to encourage the rendering industry to develop redundant capacity and biosecurity capability at new or remodeled rendering facilities in high-risk production areas. This might help overcome the rendering industry's reluctance to risk the marketability of their brand if they assist the government with emergency rendering. The Netherlands provides funds for aspects of rendering to overcome this obstacle.

In addition to logistical and operational limitations, capacity is also limited by the type of plant, its ability to process certain species of animals/animal products, whether it will be dedicated to infected material or not, as well as the plant's location. For example, a plant that is designed to accommodate poultry will not be able to accommodate cattle unless equipment is modified. One participant suggested investigating use of separate temporary augers to feed materials into cookers in the case where cattle need to be processed in a poultry or swine plant.

Regarding processing of infected materials, it was suggested that one option is to use the limited rendering capacity for non-infected materials that cannot be sent to slaughter, either inside or outside a control zone, and use other carcass management methods for known infected materials. The non-infected animals could be test-negative animals in a control zone or non-infected animals culled for welfare purposes. Pen-side testing methods should be developed to speed this process. DHS should be contacted to determine if they have access to mobile labs.

Is important to make the distinction between the managed or permitted movements from Monitored premises into commerce (i.e., animals or flocks from Monitored premises appear clinically normal and are not known to be infected) versus the disposal of animals from Infected or Dangerous Contacts Premises. The Secure Food Supply plans were developed to prevent the destruction of animals or product due to unnecessary movement restrictions and have become part of the Red Book – at least for poultry.

Processing of non-infected materials from a control zone may still face export restrictions. Barriers to export in this case should be evaluated and modified appropriately. There may also be bottlenecks with trucks or staging areas for materials to be rendered. Cold storage may also be in short supply. It is possible that rendering plants in a control zone may shut down due to lack of routine business, and those "mothballed" plants could be reactivated to process infected materials. This would depend on specific circumstances at the time of the incident. Another idea was to pre-approve certain plants around the country for use during emergencies, which could speed response. The Netherlands has had success with this approach, as they are able to quickly shift from routine to infected rendering when needed. Advance contracts with cold storage warehouses can be developed to store infected material awaiting rendering, and other warehouses can be contacted about storing finished product that may have limited markets during an incident. However, it may be useful to note that the scale of livestock production in the Netherlands is much smaller than in the United States. Further, Europeans in general, and some countries specifically, may accept far more regulation and intervention from their governments than Americans, so these issues should be factored into the analysis. Also, recent studies and exercises have found a lack of cold storage availability for emergency carcass management.

It is unclear if rendering will be useful for milk disposal. There are few rendering plants near dairy farms, although according to dairy industry personnel, the distance to the rendering plant is

less important than the availability of milk tankers and drivers to transport milk from infected cows to a rendering plant. Permitting to move milk from an infected farm is also a major obstacle. Because of the high water content in milk, much energy (high fuel cost) is required to remove it, so it may be better to take milk to ultra-pasteurization or a dried milk plant. There is precedent for using dried milk plants during other responses.

Another approach might be mobile rendering plants that are transported to infected premises. The current number of mobile rendering plants is unknown, and the feasibility of developing this capacity is also unknown.

3.3.2 Economics

Emergency rendering capacity is limited not only by operational and logistical constraints, but also by economic constraints. For example, competing renderers might take advantage if another plant becomes infected. The NRA could help develop an emergency non-compete program to address that concern. It was noted that even if renderers agree not to compete in an outbreak situation, customers may still refuse to buy products made from outbreak materials. It may be useful to note that in response to H1N1 in 2009, pork prices initially dropped, mapping with demand, but as prices dropped demand reversed.

Besides competition issues, workshop participants expressed concern about downtime for biosecurity and virus elimination measures, loss of business and down-time from lack of routine source materials, no work for employees, damage from cleaning and disinfecting or wear and tear on equipment, and loss of product value if they cannot make premium pet food. In order to absorb those costs, renderers would have to be adequately compensated, or run the risk of going out of business. Renderers will need incentives to engage in emergency rendering, but if it is too costly, government may choose less expensive alternatives. Additionally if a plant is in an infected area, renderers wondered if there would be compensation or incentives for taking infected material. Diverting materials from one plant to another, heightened biosecurity measures, and longer hours would increase emergency costs above routine rendering costs, as well. These extra costs need to be estimated. Consequence assessment and other economic studies could help determine how much the government should actually pay the rendering industries in regards to incentives. For example, if rendering is quicker and reduces the extent or duration of the outbreak, the government may be better off paying more of an incentive compared to cheaper disposal options.

In addition, a process for establishing agreements, contracts and reimbursements needs to be established and implemented. Memoranda of Understanding (MOU) or contingency plans should be developed to address this, similar to the existing USDA emergency landfill protocol. Another idea is to create market incentive by publishing a request for proposal for emergency rendering services, and let renderers compete for the work.

Some ideas for addressing these issues include the NRA seeking support of State and Federal legislators for funding emergency rendering costs. As a point of comparison, the Netherlands has three levels of contractual arrangements: 1) a national rendering contingency plan, 2) service

level agreements, and 3) specific contracts for specific situations. The United States may benefit from developing similar plans/agreements.

3.3.3 Labor

Most jobs at the rendering plant require skilled workers with specialized training. Plants usually run two shifts with or without weekends, depending on the plant. Training additional personnel to work additional shifts or operating hours would take time and resources. Personnel could be shifted from other plants, and overtime pay offered, but worker fatigue could become a problem, increasing potential safety risks. Exposure to heat is also a factor in rendering plants.

Employee safety and training were identified as a major concern by workshop participants. Although employees work with bacterial-containing carcasses every day, there are potential differences when working with infected animals sent for emergency rendering. First, employees may have increased concern about personal exposure risk due nature of the infected animal even if the pathogen of concern is no more harmful than pathogens they handle daily.

Also, some pathogens, such as avian influenza, although not currently affecting humans in the United States, could re-assort genetically to form a strain which not only infects humans, but could potentially pass from human-to-human easily. That genetic change could create a serious public health threat, so efforts to prevent it, such as protecting workers with vaccination and PPE and monitoring them for flu-like illness, are extremely important. Anti-viral medications can also be considered prophylactically or if flu-like symptoms develop. In 2015, the Centers for Disease Control and Prevention (CDC) and the Occupational Safety and Health Administration (OSHA) developed guidelines for landfill workers accepting avian influenza-infected poultry. Those guidelines can be modified, in collaboration with State and Federal public officials, to address rendering plant employees.

Increased training for emergency rendering would be needed and could include PPE use and biosecurity measures, along with background on the concepts and regulations that govern the need for PPE and biosecurity. The rendering plant Safety Officer can be enlisted to lead the training development and delivery effort. Topics to include in a training program might include: specific hazards to be expected during emergency rendering; differences between routine and emergency rendering; sources of increased risk, such as at the grinding step of the process; OSHA and CDC rules and regulations; donning and doffing PPE; fit testing; medical monitoring; added heat stress from PPE; protecting private livestock; and alternatives to PPE, such as administrative controls. Employees must also be trained to strictly adhere to biosecurity protocols, and be advised of penalties for failing to follow the protocols. As a point of reference, FSIS offers virtual reality training modules, which enable students to “see” plants in 3D through special goggles. A similar approach can be considered to deliver emergency rendering training.

3.3.4 Operations

A number of operational factors can affect rendering capacity. Specifically, some plants are integrated into slaughter plants for human food production, some plants are designed to process poultry with feathers, and other plants are designed to process large animals with hides. The

equipment installed in each type of plant varies, with differing operations and maintenance requirements and associated operator skills. All plants have contracts with their customers to provide routine rendering services.

It may be difficult to use rendering plants integrated with slaughter plants for emergency rendering because those plants are designed to be an extension of the food production line and are not set up to accept deliveries from external sources. In addition, the slaughter plants may be unwilling to accept infected carcasses for fear of creating a human food safety risk. The potential to use slaughter plant renderers for emergencies should be investigated further to determine feasibility.

Another operational challenge to emergency rendering is the type and size of material going to various types of rendering plants. In the EU, slaughter plants are used for depopulation and then parts are sent to renderers. In the United States, in the case of infected cattle, hides may not be removed during emergency rendering because of advanced carcass age or to speed processing. However, if hides are not removed, they can wrap around mechanical parts and damage the equipment. Feathers and wool can also cause malfunctions if the plants are not designed for those materials. Dairy cows or other large animals might require processing with a pre-breaker before entering the grinders. However, pigs could go to a plant that normally processes cows. In some facilities, adding a second temporary auger might facilitate the process. It is likely that some materials for emergency rendering will be delivered in specialized biocontainment bags, which could be rendered if the finished product goes to disposal, but not if the finished product will be animal feed. In order to overcome these differences, capabilities and limitations of each plant could be inventoried and a plant could be pre-approved to accept specific waste streams. The feasibility of rendering waste feed can be assessed during this process.

If a rendering plant processes infected materials, the plant will likely become an infected premises, and routine operations will not be conducted. Once a rendering plant agrees to accept materials for emergency rendering, the rate of materials coming to the plant for processing may exceed the rate of rendering requiring temporary storage to preserve raw materials to ensure the most beneficial end product. An option for temporary storage includes short, lower temperature pre-cooking in small batches to slow degradation. However, in most cases, plants try to meet critical control point quality standards outlined by the Code of Practice. These standards call for high temperatures to fully separate fat and protein.

Appropriate standards for emergency rendering are needed. These standards could include the minimum requirements for emergency processing, whether or not the finished product should be ground, and whether the finished product needs to be tested to ensure pathogens of concern are inactivated. Sufficient laboratory capacity would be needed to support this aspect, and additional storage space would be needed for the finished product while the test results are pending. The standards should include guidance on how to release the plant from infected status. Pilot projects or exercises may be useful for developing practical, validated protocols.

If existing rendering plants are unable to process infected materials for whatever reason, another approach may be to establish one or more dedicated rendering plants, either fixed or transportable. This would require significant investment and could be accomplished through a

public/private partnership. It could also be accomplished in appropriate locations by creating municipal rendering plants similar to existing municipal wastewater treatment or solid waste management facilities. However, the cost of constructing and maintaining such equipment for an incident that may never occur may make this an impractical option.

3.4 Marketing

A major obstacle to emergency rendering is marketing the end product. The highest value product is animal feed, especially premium pet food. Poor quality raw materials will likely affect the value of the product directly. A variety of marketing aspects were discussed during the workshop, including production of feed, alternatives to feed, the cost-benefit of various products, effects on exports, hides, and lost revenues. Each of these topics is discussed in more detail below.

3.4.1 Premium Feed Products

According to a participant from the Netherlands, routine farm deadstock is not used for pet food in the country. Pet food requires high quality inputs in order to get a high price for the product. Nevertheless, participants asked about the standard for raw materials to go into pet food. What material will regulators allow to ensure a safe product? Is the Food Safety Modernization Act risk based analysis and National Renderers Association data on inactivating AI (or other agents) sufficient to demonstrate safety?

If pathogen inactivation data is insufficient to assure safety, risk assessments and product testing could be used. In fact, pet food producers might require data before accepting the rendered product. However, if additional testing is required, then availability of lab capacity will also need to be quantified and the analytical test method validated. Product requirements and quality standards should be investigated with pet food manufacturers.

Even if risk assessments and product testing demonstrate safety, some premium pet food companies still may not want to use product from infected materials to protect their brand from negative public perception. It may be helpful to develop an education program to help overcome this concern. Also, there may be companies with less brand sensitivity who would consider the product; this should be investigated. An incentive program, or indemnification, could also be considered. Ultimately, if emergency rendering is to be successful, losses to industry must be minimized.

During and after the 2015 HPAI outbreak in the United States, the demand for rendered product declined because buyers were concerned about safety of poultry meal, and there were fewer birds in production to consume the meal. That resulted in excess inventory, which requires flat or silo storage. Flat storage may be limited in some areas. After 6 weeks, sales returned and the backlog decreased. It may be beneficial to identify extra warehouse space in advance.

It may be possible to export to some countries as long as the product is not from within the control zone. It may be feasible to process uninfected animals within the control zone if APHIS

permits the movement, or it may be possible to divert healthy livestock and routine mortality to rendering and dispose of infected material by other means.

3.4.2 Alternatives to Premium Feed

Although premium pet food is the highest value rendered product, other products also have value. The value of rendered products, from highest to lowest, is:

- Premium Pet Food;
- Animal feed/fertilizer;
- Energy;
- Cement Kiln, Composting or Landfill Daily Cover; and
- Disposal (could be negative value if have to pay).

If renderers are unable to continue selling their product as premium pet food and must produce lower-value products when assisting the government with emergency rendering, they may have to be compensated for the loss in value, or otherwise subsidized, as is done in the Netherlands. During the workshop, the rendering industry offered to develop estimates for emergency rendering so the government would have an idea of the cost if emergency rendering is needed. In addition, high-value diversion options, such as green energy, should be investigated to minimize the need for government subsidies.

Specifically, a detailed market analysis is needed to determine the current supply, demand, and price for premium pet food and animal feed. Identifying locations of existing plants and the markets they serve can be a first step to determine which plants might be available to assist with emergencies in each region. The analysis should consider how increased supply and reduced demand, especially if export markets close, will cause prices to drop, determine the cost to increase biosecurity and safely collect and process infected material, and determine the value of emergency rendered product, in light of loss of premium customers' revenue due to reallocating rendering plant resources to processing infected material (price differential). The government may need to buy and landfill or compost protein meal if it has no value in commerce. In past outbreaks, compost was initially shunned, but later recognized as a desirable soil amendment. It's possible that rendered product might also be found acceptable (eventually).

Some questions to consider include:

- Will government compensate renderers for lost income if product goes to disposal instead of pet food or if routine customers are diverted?
- Will renderers contract with Federal government, State government, or private companies?
- How much will renderers be paid for loss of business, loss of product, and downtime?
- When will renderers be paid?
- Will a disaster declaration be required to institute emergency rendering?
- Is insurance available? If not, how can it be made available?

The solution needs to be economically feasible for renderers and cost effective for the government. Parties can develop an advance agreement for operating rendering plants at a loss or break even. The agreement should have a clear destination for the finished product, because if

infected materials are rendered, markets for finished products are limited. The resulting data from a detailed market analysis will help determine the true cost to the rendering industry. From this, the cost to the government per pound of input can be calculated, and cost/benefit to the renderers as well as government can be considered.

Another option is designating some plants as non-feed plants that only produce fertilizer, energy, or materials for reuse or disposal. Such plants would have to be identified in advance of an outbreak and agreements established for how to use the plant during an emergency. In addition, the receiving operations would also have to be identified and engaged in advance to determine acceptance requirements and capacity at cement kilns, landfills, and co-generation plants. The receiving operations may want assurances that the material is safe for their use, which may require development of risk assessments. SOPs will be needed for how to deliver the rendered product to receiving operations. These challenges may be minimized if the rendered product is composted at the rendering plant premises; this would have to be evaluated.

Export markets are likely to be affected if there is a high-consequence animal disease outbreak, including exports of rendered products. SOPs will be needed on how to clean up a plant after emergency rendering so international trade status can be restored. Will the process be same as restocking of livestock operations after an outbreak? Will trading partners accept products from cleaned-up rendering plants like they do when farms are cleaned up after an outbreak? Additional details on product trade will be needed in order to do risk assessments to keep trade open.

Overall, there is a lack of information on/or criteria for: verification of pathogen reduction, sensitivity of testing, what parameters will be used to verify safety of pet food, livestock feed, and other products, such as hides or other by-products. Currently, hides are sent to other countries for tanning, but it is not known if that will continue in case of an outbreak. The disposition of hides, if markets (domestic and international) will not accept them, needs to be evaluated. Although mobile labs might be used to speed testing of material, it is likely that revenue from hides will be lost when export markets stop accepting the product. Efforts are needed to develop markets for products from infected material, whether the product goes to animal feed, fuel, or other end uses.

3.5 Outreach

Workshop participants identified public messaging, education, and outreach as critical to the success of an emergency rendering program. This was due to common negative perceptions about rendering from previous outbreaks where rendering trucks were implicated in the spreading of the outbreak. Although lessons were learned from past experiences, future use of emergency rendering must be managed to prevent recurrence. Sound biosecurity protocols with strict enforcement, coupled with public education about the protocols, can help mitigate negative perceptions.

Public perception and trust is very important to rendering facilities. During the 2015 HPAI outbreak, customers refused to take poultry meal from contaminated birds, but after fear died

down, customers again accepted poultry meal. Meanwhile, meal had to be stored long term, resulting in an added expense to renderers.

Participants noted the public might have a strong negative reaction to moving infected carcasses in their neighborhoods. The public may have better acceptance if carcasses are managed in a closed system, as compared to open piles of carcasses awaiting transport, or carcasses being transported in open top tarped roll-offs. As was discussed in Section 3.4 Marketing, many renderers produce premium pet foods with recognized brands. It is imperative that maximum reasonable effort be made to protect the brands from negative perceptions in order to maintain strong sales. Participants identified several approaches to outreach that may facilitate successful emergency rendering, including advance education, suitable message content, consistent messaging among response organizations, science-based guidelines, respected sources of information, targeting messages to particular audiences, and expanded use of social media. Each approach is discussed in more detail, below.

3.5.1 Advance Education

In order to effectively convey the message that rendered products are safe, stakeholders must be educated on animal diseases and how rendering affects those diseases. Transparently explaining the rendering process is important, including what it is, how it works, what products are generated, and how it is beneficial. Early consumer involvement, perhaps through focus groups, was suggested. In addition to educating the public about rendered products, it is also important to educate rendering plant owners and operators about the disease risks, disease management, and industry recovery. The Cross Species Working Group is a network of experts who have expressed a willingness to assist in the educational aspects. This effort should be started immediately.

3.5.2 Message Content

Participants all agreed the most important message to send to the public is that rendered products are safe. The rendering industry participants in the workshop stated that the concept of rendering as a form of recycling is readily understood and appreciated by the public generally. However, the technical nuances may be difficult for lay people to grasp, so a simplified overview of rendering may be useful. However, it is important to emphasize public transparency so people do not think information is being hidden. Using the best science available in messaging will aid in public acceptance. In particular, messages about which pathogens are destroyed can be very useful, and related research should be published. If additional data is needed, testing can be performed on hardier pathogens to ensure maximum pathogen destruction, and highly protective standards can be developed based on this data. It is also important to communicate the focus on highest and best uses, as illustrated in the Food Recovery Hierarchy at www.epa.gov/foodrecoverychallenge.
Until a few years ago, rendering was the “invisible industry” and renderers preferred to avoid public attention. Today this is changing, and the rendering industry is now communicating more openly about sustainability and recycling aspects of the business to audiences such as the Cross Species Working Group and agriculture alliance networks. If renderers are able to assist with

emergency response in the future, continuity of agricultural business and promoting rural community economic health will be another good news story for the rendering community. NRA is currently working on literature covering naturally recycled proteins, public education and awareness, and sustainable recycling, as well as virtual rendering plant tours. All of these efforts are progress in promoting pubic and community acceptance.

In addition to educating the general public, pet food companies and others within the processing and distribution system need information. NRA has developed a slide set to educate this group. In addition, fact sheets from the Center for Food Safety and Public Health about animal diseases and food safety are available.

Participants also suggested that professional communicators could be employed to help craft suitable messages, help select information to include in messaging, and help with timing of publication. For example, do you want to communicate about products in animal feed to the general public in advance of an outbreak? Do you want to communicate it at the time of an outbreak? The Netherlands communicates two simple messages:

1. 100 percent guarantee completely disinfected, and
2. Sustainable, being used as energy.

3.5.3 Consistent Messaging Among Organizations

Workshop participants recommended consistent messaging from all sources. Multiple sources publishing the same information to the public and stakeholders promotes public confidence in the veracity of the information. Consistency is facilitated when the messaging is based on peer-reviewed scientific data. The messages can be developed in advance, and reviewed by partners to ensure consistency.

3.5.4 Science-Based Guidelines

Credible outreach communication depends on science-based content. Participants agreed factual education and analysis is import in developing and nurturing community and public trust. Federal and State government, industry, and academia can collaborate to educate and share information, thereby improving the quality and acceptance of messages. A specific need for consistent and scientifically-based standards in the area of biosecurity in rendering facilities was identified by workshop participants. National standards would facilitate a high level of quality and confidence in the event of an emergency. Further, such standards would support public confidence and trust that the outbreak is being professionally controlled and any required clean-up is being done using scientifically based techniques and practices. These guidelines should include and explain how transportation is being handled safely, that the rendering process is safe and effective, and that the businesses, contractors, and others involved in the process are being monitored to ensure compliance. Further, messaging must convey that the rendering process is known to be safe, and the material is being effectively disinfected to protect public health, the environment, and the food chain.

Science-based guidelines would mitigate many attributes of negative public perceptions. Some negative perceptions may include concern for human health and welfare impacted by moving

infected animals, open handling of offal, and the welfare of infected animals. However, through education and an awareness program based on proven science, these negative perceptions can be effectively managed. The rendering process, like recycling, should be emphasized as a proven, sustainable technology.

3.5.5 Respected Information Sources

Presenting a positive image of the response is critical during a crisis. Information during an outbreak must be presented from credible and respected sources or consumer confidence can be diminished, resulting in public outcry and an increase in regulatory and scientific scrutiny. Risk communication should be transparent, auditable, and based upon the most current and scientifically accepted practice. Individual human risk perception is the real hurdle to address in public health and safety. As a result, consumer and public confidence can be more effectively managed by presenting information from coherent, consistent, and respected authorities.

Respected information sources identified during the workshop included USDA, State and Federal environmental agencies, public health agencies, OSHA, FDA, the U.S. Department of Transportation, FSIS, laboratories , and the multi-State partnerships. Participants also stated research shows that the public responds favorably and will readily accept assertions when endorsed or supportive by at least three different citations, references, or authorities. This reinforces the necessity of unified, consistent, and science-based messaging.

3.5.6 Targeted Messaging

Risk communication is vital during a response and must be managed by trained and experienced personnel. Information presented should have a targeted audience in mind and be clear, concise, and direct, with fully factual information. Information is time sensitive and should be tailored to the needs of the target audience. For example, in the initial phase of discovery of an outbreak of HPAI or FMD, information must be disseminated quickly to the immediate area and stakeholders affected. Continued messaging on a regular and consistent basis scan alleviate many concerns. People immediately want to know if their personal safety and health has been compromised and/or is at risk. Concurrently, additional relevant messages can be disseminated to surrounding areas. According to workshop participants, proactive communications have been shown to provide better outcomes than reactive communications, even if information is negative or sensitive. This can be facilitated by preparing unified messages in advance of an incident.

Workshop participants identified the need for consumer education at various levels. Although universities and trade groups may be trusted sources of information, technical concepts must be explained in plain language. It was suggested that published research articles, laws, regulations, and industry acronyms and practices be put into plain language in advance so the information is available during an incident.

3.5.7 Expanded Use of Social Media

Currently, social media is a powerful component of communication. Social media includes platforms such as YouTube, Facebook, and Twitter. Workshop participants noted that social

media can quickly spread false information, but it can also quickly spread factual information. Staying ahead of social media is a real challenge in today's environment. One way to overcome that challenge is to create an advance plan for how social media will be used during an incident.

3.5.8 Communication

Clear and concise communication among stakeholders is a necessity during an emergency, and can be implemented through State response plans. Communication from the worker level through executive and senior management needs to be defined, transparent, and exercised often. Some topics that should be addressed include the impact of emergency declarations, lines of authority and coordination among emergency operations centers (local, State, Federal), Joint Information Centers, and responders. Communications plans and exercises must be created and implemented in advance for these types of incidents.

3.6 Permits/Regulations

Management of infected material from an animal disease outbreak response involves compliance with numerous Federal and State regulatory requirements. The intended purpose of the regulatory oversight is to ensure consistency and protection of human health, animal health, and the environment. Routine rendering is subject to these types of regulations on a daily basis, but emergency rendering may affect permit conditions or require additional protective measures. The following subsections address controls, standards, testing, permit violations, and regulatory waivers that may be unique to emergency rendering.

3.6.1 Controls

Managing the process of emergency rendering involves a systematic approach to ensure strict biosecurity and protection of human health and the environment. Workshop planners and participants analyzed the rendering process to identify steps where potential cross contamination or contaminant releases could occur. Each step was then evaluated to determine where controls may be needed to mitigate contamination or control pathogen spread. Some on-farm management controls were identified to prevent biosecurity risks during transport and rendering, such as isolation of infected animals, on-farm biosecure carcass grinding and/or disinfection, and vaccination to prevent disease. Movement of infected animals from a quarantine area would require a permit from State or Federal veterinary health authorities. The preferred approach of animal health officials is to manage infected materials on farm whenever possible. If that is not possible, then managing infected material within the control zone is the next best choice. Movement of infected material outside a controlled zone is used only when absolutely necessary. This tiered management approach aims to minimize risk of pathogen spread.

If responders wish to move infected materials to a rendering plant, the plant may be required to implement some additional controls and precautions beyond those normally required of their routine operations. Prior to making this decision, it was suggested that regulatory agencies be contacted to verify that the plant maintains strict regulatory compliance.

Routine rendering operations may generate air emissions, solid waste and wastewater discharged to sludge or lagoon systems. The plant may be required to meet specific emission/discharge limits for a variety of pollutants. Sometimes, those limits are met by restricting the amount of material processed per day. If higher than normal amounts are processed, the emissions/discharge limits may be exceeded, and the facility may have to request a variance from their routine permit limits or implement additional controls, such as enhanced air filtration, water treatment, or effluent/emissions testing to ensure safety for the community and to maintain public trust. In some cases, there are requirements to process raw material within specified time periods to minimize odors. Each waste stream may be perceived as a threat for exposure or cross contamination and should be evaluated further to quantify the risk and identify any mitigations.

3.6.2 Data/Standards

In addition to environmental and biosecurity regulatory requirements discussed in the previous section, there are also existing FDA safety standards applicable to pet food, animal feed, and cosmetic products. If infected animals are rendered, consumers may have concerns about contaminated products. Data from a recent study at Clemson University demonstrated rendering inactivates HPAI. However, it was unclear if data is available for other pathogens such as FMD. The need to collect this data should be evaluated and documented.

FDA stated during the workshop that the same FDA rules would apply to emergency rendering and resultant products as apply to routine rendering, participants had questions, and an FDA emergency protocol might be useful to assist renderers in that situation. Participants had questions about what additional processes the FDA or other agencies would require to prevent cross contamination, and if any additional verification or validation testing would be required to ensure product safety and that no operational cross contamination occurs.

3.6.3 Testing

Workshop participants had many questions about how to return a rendering plant to normal operations after it processes infected materials. FDA may have sanitation requirements related to animal feed production, but it was unclear how such requirements might apply after emergency rendering. It was also acknowledged that APHIS would view the rendering plant as an infected premises, so the plant would also have to adhere to APHIS virus elimination requirements. There were a number of questions related to the APHIS process, and if environmental (surface) samples would be collected in the rendering plant similar to the protocols in animal production facilities. If so, participants asked if there would be difficulty analyzing the samples because of the grease on rendering plant surfaces. There were also questions about the World Organization for Animal Health (OIE) 21-day fallow period requirement, and if it would apply to rendering plants. Workshop participants suggested a protocol should be drafted to address the plant clean-up requirements.

3.6.4 Violations

Rendering facilities operate within established guidelines prescribed under transportation, environmental, FDA, and OSHA regulations. Facilities have constraints on water and air

discharges to the environment. During emergency conditions, it is possible the input to a facility will be greatly increased over routine levels, resulting in additional air emissions and wastewater discharges, which could exceed permit limits in terms of both quantity discharged and pollutant levels. Processing animal species different than normal can also impact emissions/discharge characteristics, potentially exceeding permit limits. This may cause Notices of Violations to be issued by regulatory agencies, unless the facility requests waivers or exceptions in advance of an emergency. In addition, because State and county requirements vary, each facility has unique challenges in complying with them. It will be difficult to identify what it would take to get waivers from each State and each media: air, water and waste. In the event disinfectants are used for cleaning and disinfection of the plant, the disinfectants may also affect discharge quality. Rendering plants should develop emergency operations plans to include virus elimination, potential emissions/discharge exceedances, and mitigations for the exceedances, whether permit exceptions or in-house treatment prior to discharge.

3.6.5 Waivers

One way of mitigating potential permit violations is to establish a process with regulatory agencies in advance of an emergency to acquire emergency waivers should the need arise. Through that process, rendering plants can identify potential flexibilities and how they can be used, understand lead time to obtain a waiver, what aspects would be relaxed and by how much, whether an emergency declaration by the State or Federal government is required, and what the emergency standards would be. Public health will still be important, so that must be factored in. Establishing the process in advance will expedite response in an emergency. In addition to rendering plant emissions/discharge limit exceptions, road weight limits may also need to be increased. This is likely to require an emergency declaration. If multiple States are involved, it is essential that inter-State agreements be established in advance, because they will be more complex and require more time to develop. Ultimately, waivers will have to protect human health and the environment, so requirements might be relaxed, but not eliminated.

3.7 Transport/Logistics

3.7.1 Avoidance

One way to solve infected carcass transport and logistics challenges is to grind and sanitize carcasses on the farm and avoid transporting infected material. Options to facilitate this include rendering on the farm for feed, precooking/treating the infected carcasses on the farm to inactivate pathogens prior to transport, or transporting in a closed system involving grinding carcasses into a slurry, pumping the slurry into a tanker truck, hauling to the rendering facility, and pumping directly into the cooker.

Any of the above options could be viable, but each presents challenges and concerns that need to be investigated. There is some precedent for mobile rendering on a small scale in Kentucky for chickens, but that technology probably would not have the capacity for large scale events or large animals. A question posed during participant discussion was whether or not State or Federal Government could purchase or subsidize large mobile rendering units. The mobile units

could generate pellets for fuel, which would not have to meet the same standards as feed or other commodity uses. This should be further evaluated.

Onsite management, such as grinding carcasses to reduce volume, has significant potential benefits as well as unique challenges. Grinding will make transport more efficient and cost effective. A 30-yard roll-off container can carry about 10,000 pounds, but a 10,000 gallon tanker truck can carry up to 50,000 pounds. Transport weight limits can be raised if there is a State or national emergency declaration.

The process of grinding and pumping into a tanker may address the potential of cross contamination from airborne particles during transport but might generate significant volumes of liquid waste. The process would have to be designed to contain aerosols and liquids. The material could also be heated or chemically treated (e.g., addition of citric acid) to inactivate pathogens, but study is needed to determine how much citric acid would be needed, if citric acid will damage rendering equipment and if it will affect marketability of the finished product. However, if onsite grinding and treatment is determined to be feasible, it could eliminate a majority of obstacles to emergency rendering, as well as many other disposal options.

3.7.2 C&D/Transfer

Biosecurity risk may be significant during transportation and transfer of infected material, and in general there is government, industry, and public concern about moving infected material off the infected premises. During normal operations, rendering vehicles may visit 20 farms/stores in a single day, which creates a risk that infected material could be contacted at one location and transported to numerous other locations unknowingly. Ways to mitigate this risk include requiring rendering vehicles to clean and disinfect between stops, avoiding transfer stations during an outbreak, or having decontamination stations at transfer locations. Normally, rendering vehicles are washed once at the end of each day. Alternatively, trucks could be required to segregate stops by going to a single location, returning to the rendering plant, disinfecting, and going to the next location, but this would increase transport costs and reduce efficiency. In addition, truck drivers could be trained to stay in their trucks, to clean and disinfect their truck, and to ensure strict biosecurity. Drivers could be instructed to take antivirals, but the level of authority to implement this must be defined. All these approaches would increase rendering transport costs. Government subsidies might be required to facilitate transport biosecurity, and standard protocols would have to be developed for these processes.

Another approach is to establish a biosecure transfer station at each farm where infected materials could be safely deposited into biosecure trucks for transport to a rendering plant. This might be implemented by using dedicated tractors on the farm to move infected material to the render haul vehicle pick-up point. Transport across State lines is likely to be problematic.

3.7.3 Capacity

Capacity in the context of this section refers to the number of functional rendering trucks available, the number of trained and licensed drivers, the load weight limit of each truck, and the

distance from the affected farm to the rendering plant, to calculate the pounds per day of infected material that can be moved to rendering. The greater the distances, the larger the herds, the smaller the weight limits, and the scarcer the trucks and drivers, the lower the capacity.

Increasing the number of trucks and drivers would increase capacity, but each farm will have physical constraints on the number of trucks that can be loaded, disinfected, and dispatched per day, so more trucks and drivers may not solve the problem. Therefore, it may not be possible to move a large herd to rendering in a reasonable amount of time. It is estimated that 40,000 head of cattle would require 1,000 truckloads to move the whole carcasses.

Even if a large number of trucks could be loaded at a farm, the trucks and drivers may not be available because they are currently widely distributed across the Nation. Dispatching trucks to high-priority locations would have to be optimized. The fleet can be divided so some trucks are dedicated to infected animals and other trucks are dedicated to non-infected material. Even if the trucks are available, they may have to be fitted with bio-zip type liners and covered with secure tarps to ensure biosecurity, but those materials could become scarce. The National Veterinary Stockpile does stock these items, but they would likely run out in a widespread outbreak. In addition to the liners and covers, personnel to conduct disinfection, equipment (including PPE), and supplies will be needed, and there will be challenges with collecting and managing run-off and aerosols.

In order to address these concerns, the amount of infected material requiring transport can be minimized by avoiding stamping out, by only rendering test-negative herds or welfare culled animals, or by grinding and treating the carcasses on the farm so they will be non-infected for transport. Assistance can be requested from other federal agencies such as the U.S. Army Corps of Engineers or EPA for personnel resources, because they are both identified as support agencies to USDA under the Homeland Security Presidential Directive 9, Emergency Support Function 11. Logistical concerns for managing an animal disease outbreak is a critical element that needs to be proactively discussed and communicated among stakeholders. Critical control points can be identified and resolved in advance and published in planning documents.

3.7.4 Routing

Routing infected material from an infected premises to rendering poses a number of issues. Public opposition is often voiced as “not in my back yard” or through my neighborhood. Rendering vehicles may be refused passage across State lines, even with appropriate movement permits. Transport routes must minimize potential exposure of healthy herds and meet all the necessary transportation and permit requirements of Federal and State regulations, especially weight limits. Mapping acceptable transport routes to avoid susceptible animal facilities (and premises perceived at risk, such as agriculture equipment manufacturers, for example) might be a challenge in dense animal agriculture areas, although some regions have already done this.

According to a University of Minnesota Transportation Risk Assessment, there is a very low to negligible risk of spreading FMD to susceptible herds along the transport route if specific packaging protocols are followed. If carcasses are ground and treated at the farm and transported as non-infected in enclosed tankers, special routing should not be required for pathogen spread

purposes, but public perception may still result in routing restrictions. Preplanning and advance communication with stakeholders can minimize opposition to requests for waivers or exemptions from regulations. Developing advance interstate movement agreements can speed the process, although the agreements will need to be maintained over time.

3.7.5 Standards/Limits

In order to maximize safety and efficiency when responding to an animal disease outbreak, the emergency rendering process must meet strict biosecurity standards while it is quickly implemented. Although routine rendering practices are well documented, emergency rendering protocols are not. Workshop participants identified a number of requirements to consider when developing emergency rendering protocols.

First, the rendering vehicles should be highly biosecure, similar to the Netherlands self-contained units or the new Simmons trailer, which costs approximately $50,000 (2017 U.S. dollars). Prior to use, vehicles can be leak tested and checked for leaks again after loading. USDA has a protocol for safely hauling carcasses with lined roll-off containers. Ideally, hauling capacity should be maximized. One way to do this is to grind the carcasses and pump the slurry into tank trucks for transport.

Prior to loading, temporary storage may be needed, and it should be covered and contained. Drivers should be required to inspect trucks, and report any problems that must be repaired before moving. There should also be a communication plan for all transport, as well as emergency and spill response plans for use during transit. Road weight limits must be observed or increased by the jurisdiction. Drivers must be appropriately licensed and trained. Driving hour restrictions must be observed or lifted by the jurisdiction. These waiver requests can be prepared in advance in cooperation with the permitting agency. The conditions under which waivers can be granted should be outlined and responsible officials identified in advance. USDA has developed plans for moving various commodities during an outbreak (e.g., Secure Egg Supply Plan). USDA could develop a similar plan for Secure Carcass Management.

3.7.6 Logistics

Emergency rendering will require careful management during an animal health emergency. Participants suggested integrating renderers, environmental regulators, and recipients of end-products (e.g., landfills, cements kilns) into the Incident Command Structure and exercising the roles in advance.

If demand drops and a surplus of rendered product occurs, testing would most likely be needed to move the finished product to storage. USDA's Center for Epidemiology and Animal Health may be able to assist and determine statistically valid sampling methodologies and valid sampling procedures for movement. Other management techniques discussed and recommended by participants included planning for product disposition prior to an outbreak (for example, advance coordination and acceptance from a local cement kiln). Participants also suggested rendering plants should have emergency operational plans in place, to include waste discharge management and product quality control. In addition, the plan should address returning the plant

to normal operations, virus elimination costs, and the potential for 2 weeks or more downtime to verify virus elimination through receipt of confirmatory test results.

Participants posed other logistical questions, including what infrastructure is needed to stand up an independent rendering capability in the event of an outbreak? Rendering infrastructures are similar in the sense they all need access to waste water treatment and solid waste management facilities. Is an independent rendering facility feasible or realistic? Could a rendering facility be solely dedicated to manage outbreaks in the United States?

3.8 Policy

Based on feedback from workshop participants, policy discussions among USDA, FDA, EPA, and other appropriate Federal agencies are needed to assist industry in planning. Policies should consider industry needs and address when rendering will be used, whether or not infected materials will be processed, how to release plants from quarantine if they become infected, and how finished product will be managed. Government guidance is also needed to establish testing protocols and other requirements, such as fallow period, to return the plant to normal operations.

In order to develop national guidance, participants suggested USDA conduct a pilot study with partners from industry to develop tools, techniques, and programs that can be universally adopted and accepted. Once guidance is published, the rendering community can develop emergency rendering plans. The plans can be exercised as a form of training.

Operators will need to be trained on different operating conditions during emergency rendering. This may include additional medical surveillance or biosecurity measures. The public and local responders can be engaged in the training to increase awareness and acceptance of rendering as a safe and sustainable method for assisting emergency response. Emerging technologies, such as mobile labs, pen-side testing, and mobile grinders can be tested and evaluated during exercises to gain data to inform science-based policy.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Overall, the workshop provided a comprehensive discussion of obstacles and solutions for the use of rendering during an animal disease outbreak in the United States. The participants included knowledgeable individuals representing industry, State and Federal government, and academia. They generously shared their insights for the purpose of improving the U.S. ability to efficiently and effectively respond to animal disease outbreak emergencies.

The workshop presentations served to provide a common operating picture to all participants. Rendering industry officials described the complex nature of the rendering process, and how highly valued commodities are produced from the process. USDA presented the need for rendering plants to assist responders during an animal disease outbreak because of the potential for vast amounts of infected waste to be generated, and because rendering is designed to process such waste. A university professor explained potential outcomes from a widespread animal disease outbreak of FMD in the United States. Rendering company representatives shared global practices for processing diseased animals and provided some techniques which are practiced in Europe. They also explained how the complex rendering system is vulnerable to upset if off-spec materials are introduced, and how difficult it might be to manage a disruption.

A USDA national response official discussed outbreak management strategies and how movements from infected zones are tightly controlled. An official from FDA discussed how the FDA viewed rendering infected materials, and that animal feed must be unadulterated. A USDA communications official then discussed an umbrella communications plan that coordinates communication and response in the event of an outbreak.

After the presentations, participants formed smaller discussion groups to consider obstacles to rendering and ideas for overcoming the obstacles. There were nine break-out groups, each with its own note-taker and facilitator, who provided a detailed record of the discussions which were then collected, analyzed, and synthesized into this report.

Analysis identified several categories of concerns , including biosecurity, national rendering capacity, finished product marketing, communications/outreach, permits and regulations, transportation logistics, and policy issues.

The most significant category of concern was biosecurity. Pathogens present in infected carcasses will cause problems for farmers staging carcasses at the road for pick up by rendering trucks, for trucks during transport and when off-loading at the plant, for plant operators when receiving materials, and for the rendering process during grinding, cooking, and managing the finished product. The problems continued to marketing the finished product and the resulting economic losses from reduction of domestic and international customers. Not only were there numerous parts of the supply chain affected, but the effects were significant. The majority of obstacles were due to the raw material being infected, so if the raw material was non-infected, the majority of obstacles would be eliminated. Key ideas for avoiding infected raw material included either grinding the material on the farm and adding a chemical or heat sanitizing step or

only rendering non-infected carcasses that were test-negative from a control zone or resulting from welfare slaughter.

Capacity was another major category of concern because of the potentially vast number of animals that could be generated by a widespread animal disease outbreak. Given that rendering plants routinely run near capacity, there is little excess for surge unless the plant is completely shut down due to lack of raw material. In addition, renderers might be unwilling to assist with any excess capacity because of the potential losses to their business from wary customers, heightened biosecurity costs, and reluctance of trained operators to process infected materials.

Furthermore, rendering plants are specifically designed to process certain types of material, so attempts to process off-spec material can upset the operation and equipment. There would be significant effort required to process infected, off-spec material, and likely economic losses from doing so. Even if the infected carcasses were ground into a slurry on the farm and sanitized, the rendering plant would still have difficulty processing the material if it had feathers/hides and was not fresh. This area of concern would be mostly alleviated if only non-infected animals were rendered, or if the government invests in constructing disposal rendering plants. However, the cost of constructing and maintaining such plants for a low probability event makes it likely infeasible.

Marketing is another category of concern. In this context, marketing refers to markets for finished product. Premium pet foods are the major source of revenue for rendering companies, and the customers are highly averse to quality defects in the pet food. It is unlikely that pet food from infected carcasses would be readily purchased by consumers. Even if the raw material was sanitized on the farm, the presence of feathers/hides and decay would make it unsuitable for premium pet food. However, if renderers can overcome issues accepting sanitized, ground material, the product could be used for the lower-value animal feed or fuel, or disposed at a landfill or other solid waste management facility. The cost-benefit varies based on the profit/loss balance for each plant. This area of concern would be mostly alleviated if only non-infected animals were rendered.

Communications and outreach were a significant category of concern for participants. Rendering companies are dependent on the quality of their product to sustain their market share and profitability. The introduction of low quality inputs can affect consumer confidence and subsequently reduce sales volume. Therefore, robust communications and outreach are required to assure consumers that the products are safe. This area of concern would be mostly alleviated if only non-infected animals were rendered, although it might be a better use of the protein if the non-infected animals go to slaughter rather than rendering.

Permits and regulations were an area of concern for some participants. If rendering plants accept lower quality or larger quantities of raw materials than usual, the result could be exceedances of discharge permit limitations. This is not an issue, even with increased processing, if the tested effluents fall within regulatory requirements. The exceedance issue could be mitigated by metering inputs, and/or by requesting waivers on permit limits. This would likely be a concern whether infected or non-infected animals were processed.

Transport logistics was a significant area of concern for workshop participants. The concern was mostly related to biosecurity and capacity to haul the potentially large amount of raw material. Grinding and sanitizing the material prior to transport would greatly alleviate this area of concern, as would a policy to render only non-infected animals if the non-infected animals cannot go to slaughter.

Finally, policy was another area of concern. Renderers articulated a need for clear policy from the government on how rendering would be used and compensated during an emergency because uncertainty increases their economic risk. In order for the government to publish guidance or policy, the government would have to work with the rendering industry to test protocols for emergency rendering. Once the tests produce data to support the policy, guidance can be written and the rendering industry can then develop specific emergency plans.

4.2 Recommendations

Based on the findings from the workshop as documented in this report, a number of next steps have been identified.

1. Investigate emergency rendering of non-infected material versus infected material.
    a. Grinding on-farm and heat or chemical sanitizing prior to transport, including the role of the National Veterinary Stockpile and States in providing pre-staged mobile grinders or mobile rendering plants, and cold or other storage.
    b. Rendering only test-negative animals and those culled for welfare reasons and associated biosecurity requirements, considering pen-side testing and mobile labs, export barriers, storage options, and redirecting of raw product.
    c. Evaluating economics of routine rendering compared to emergency rendering of test-negative animals versus emergency rendering of pre-treated materials, including investigating non-pet food outlets for finished product, designation of some plants for infected only raw material, and establishing an emergency non-compete program among rendering companies.
    d. Assessing risk of routine rendering compared to emergency rendering of test-negative animals versus emergency rendering of pre-treated materials.
    e. Implementing biosecurity for rendering infected material and the need for additional testing to assure safety, including additional lab capacity, as well as how to regain free status; and a validated method for inactivating pathogens at the plant .
2. Develop, in advance, Federal guidance and protocols for emergency rendering using data from Item 1.
    a. Emergency rendering protocol similar to USDA emergency landfill protocol, including biosecurity protocols. Water supply source, approval to discharge runoff, effect of disinfectants if runoff goes to rendering plant treatment system, and likely persistence of pathogens in the treatment system need to be considered and evaluated. Carcass condition standards should be defined. Consider use of rendering plants co-located with slaughter plants.
    b. Secure carcass management plan similar to Secure Egg Supply plan.
    c. Emergency rendering guidance from FDA.

3. Based on guidance and protocols developed in Item 2, renderers develop plant-specific emergency rendering plans to include carcass collection and receiving protocols, contingencies for accidentally processing infected material, biosecurity practices, checklists for what should be in place prior to an incident, and agreements with environmental agencies on relaxing discharge limits to increase capacity.
4. Train responders and renderers, then test and exercise emergency rendering plans on a regular basis.
5. Educate consumers and rendering plant customers in advance of an incident about animal disease outbreaks and the role of rendering, including data on pathogen inactivation. Consider how various media will be used, including social media.
6. Develop agreements in advance to include compensation and approval for changes in species from normal operations, different ratio of species, hours of operation, larger volume for throughput, permit modifications, hauling permits, long-term storage of products, and receiving variations (slurry vs whole animal).
7. Develop deployment plan for workers (what can be done if the plant is down regarding pay/compensation) – can workers be used elsewhere in plant, can they be used elsewhere in response?

APPENDIX A: AGENDA

RENDERING FOR EMERGENCY CARCASS MANAGEMENT WORKSHOP
July 18/19, 2017; Riverdale, MD

Sponsored by USDA Animal and Plant Health Inspection Service
In collaboration with the
National Renderers Association

Workshop Objective: To identify obstacles to using rendering in an outbreak response and methods to overcome those obstacles.

DAY ONE: Tuesday, July 18th

12:00 **Box Lunch and break service provided courtesy of National Renderers Association**

12:30 **HOUSEKEEPING,** Bob DeOtte, West Texas A&M University

WELCOMING REMARKS, Jack Shere, Deputy Administrator, APHIS Veterinary Services

PRESENTATIONS

- Rendering as a Possible Solution for Disposal of Carcasses during Disease Outbreak – Part I, David Meeker, National Renderers Association
- Rendering as a Possible Solution for Disposal of Carcasses during Disease Outbreak – Part II, Tim Guzek, Sanimax and National Renderers Association
- Rendering during a National Disease Outbreak, Jack Shere, Deputy Administrator, APHIS Veterinary Services
- Applications of Rendering as Exercised in Secure Food Supply, Jim Roth, Iowa State University
- Networking Break
- Emergency Rendering – a Global Perspective, Ross Hamilton, Sjors Beerendonk, and Pieter Derks, Darling Ingredients
- Response Strategies and Regulatory Considerations, Jon Zack, APHIS
- Feed Safety Regulation in the United States, Shannon Jordre, FDA
- Public Messaging, Ed Curlett, APHIS

PANEL DISCUSSION WITH ALL SPEAKERS

5:30 **SUMMARY AND WRAP UP,** Bob DeOtte

DAY TWO: Wednesday, July 19th

7:30 **Continental Breakfast and break service courtesy of National Renderers Association**

8:00 **REVIEW OF PREVIOUS DAY,** Bob DeOtte

SMALL GROUP DISCUSSIONS

- Review of Ground Rules, Bob DeOtte
- Review of Scenario, Bob DeOtte
- Facilitated Small Groups, All

REPORT OUTS, Note-takers

12:00 **CLOSING REMARKS,** Bob DeOtte

APPENDIX B: FACILITATOR GUIDE

RENDERING FOR EMERGENCY CARCASS MANAGEMENT WORKSHOP
July 18/19, 2017; Riverdale, MD

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National Renderers Association

Workshop Objective: To identify obstacles to using rendering in an outbreak response and methods to overcome those obstacles.

Facilitated Discussion Guidelines

1. **Introductions:** Ask participants to briefly introduce themselves (i.e. name and affiliation).

2. **Identify one participant to conduct the report out**. Facilitator may consider asking someone individually that he/she knows would represent the group, or asking for a volunteer. (Note: ensure this is completed before discussion so the individual can adequately capture the high level discussion points. The note-taker may be able to support this, however the note taker will be taking more detailed notes than needed for the report out)

3. **Reiterate the intended goal and outcomes for the facilitated discussions**:
    a. The goal of the facilitated discussions is allow more in-depth discussions regarding the:
        i. Identify obstacles to rendering
        ii. Brainstorm ideas for overcoming obstacles to rendering in an emergency outbreak, including but not limited to: studies, agreements, planning, education, or outreach,

    b. Explain flow chart and topic list: Participants will use the flow chart provided in their packets that outlines the most significant concerns identified from the survey for the five phases of the rendering process, as well as the list of topics provided in this guide to facilitate brainstorming.

    c. Facilitator should monitor time and allow for approximately 20-25 minutes per discussion topic. Feel free to take a 10-minute break after the first 50 minutes.

    d. Facilitator should work with note taker to be sure points are captured and that we don't paraphrase or change comments without participants' consent.

4. **Note taker should type all notes and send them by July 26th to**:
    a. Scott.W.Moore@aphis.usda.gov
    b. Lori.P.Miller@aphis.usda.gov

5. Assumptions and Ground Rules

a. **We will <u>not</u> be discussing whether or not to transport carcasses** at this workshop.
   i. Transport doesn't just apply to rendering; have to transport for landfill, incineration or other carcass management options.
   ii. A University of Minnesota risk assessment found that if infected material is packaged properly it poses low to negligible risk of infecting healthy farms.
   iii. Transport of infected carcasses was safely performed during 2015 avian influenza outbreak.
   iv. The topic has been the subject of several other workshops in past few years.
   v. General comments on transport will be noted and moved to parking lot, but discussion will be limited.

b. For the purposes of the facilitated discussion, we will **assume the animals are infected with a foreign animal disease** such as FMD for large animals or HPAI for poultry and that quantities are too large to manage on-farm.

c. When we break out into discussion groups, the facilitator will **guide participants through the flow chart in the folder, and review the major obstacles** that were identified in the survey.

d. **We will be brainstorming ideas for overcoming the obstacles**; the first rule of brainstorming is don't find fault with ideas. Later we may prioritize, but for today **there are no bad ideas**.

6. FOCUS: How can we overcome obstacles to rendering?

SAMPLE SCRIPT FOR BEGINNING DISCUSSION:

Let's look at the diagram in your folder. It shows each phase of the rendering process, from the time the animals are on the farm, until they are loaded into a truck and transported to the rendering plant. The diagram then address potential obstacles at the rendering plant, during and after processing, and concerns with the finished product.

The obstacles listed under each phase are the concerns most often identified by survey respondents.

As you can see, the biggest concerns at the farm were…during transport…during processing, etc.

…Now that we've looked at the major obstacles identified for each phase of the rendering process, let's focus on the 5 major themes that came out of the survey comments. The five themes were:

- Biosecurity
- Economics
- Logistics
- Operations
- Outreach.

We will spend about 20 minutes on each topic, and I'll read you the list of comments for each topic to get the discussion started. For Biosecurity, the obstacles were identified as….

How can we overcome these obstacles? Bring up any ideas you can think of, and how they could be implemented… [Discussion begins.]

Most Significant Concerns Identified in Survey Results – Facilitator Prompts

Biosecurity (20 minutes)

- Employee safety, especially if pathogen is zoonotic (how to protect rendering plant employees from exposure to pathogens)
- Cross contamination (inside and outside the plant, as well as from farm to farm)
- Pathogen survival (will pathogens survive rendering process?)
- Increased biosecurity measures (what biosecurity measures will be needed? How can they be enforced?)
- Vehicle standards (do vehicles need to be leak-resistant, lined, tarped, etc.?)
- Routing (do vehicles need to be routed away from healthy herds?)
- Aerosols and worker safety (if aerosols are generated at grinder, will it affect workers, spread the outbreak or contaminate the environment? How to overcome?)
- Additional vehicle decontamination takes more time (how to minimize impact?)

Logistics (20 minutes)

- Rendering is an important tool (it's not if we will used rendering, but how can we use rendering)
- Optimize number of vehicles (too few slows response; too many can overwhelm plant)
- Use of rendering fleet (already leak-resistant and covered; are they available?)
- Capacity of rendering fleet (how many are available under what circumstances?)
- Safety of rendering fleet
- Vehicle standards (do vehicles need to be leak-resistant, lined, tarped, etc.?)
- Condition of material (what if it takes a long time to deliver carcasses?)
- Number of plants (are there plants near production facilities? How far is too far? Can numbers be increased? How?)
- Availability of mobile plants (do they exist? Where are they? How many? Do we need more?)
- Plant throughput and capacity (how much material can the plant process, given their routine customers?)
- Exceedance of plant permit limits (how can this be avoided or negotiated?)
- Outlets for MBM if not used in commerce (landfill? Composting? Cement kiln?)
- Cost/benefit vs other methods (what makes rendering expensive? How can costs be saved?)

Economics (20 minutes)

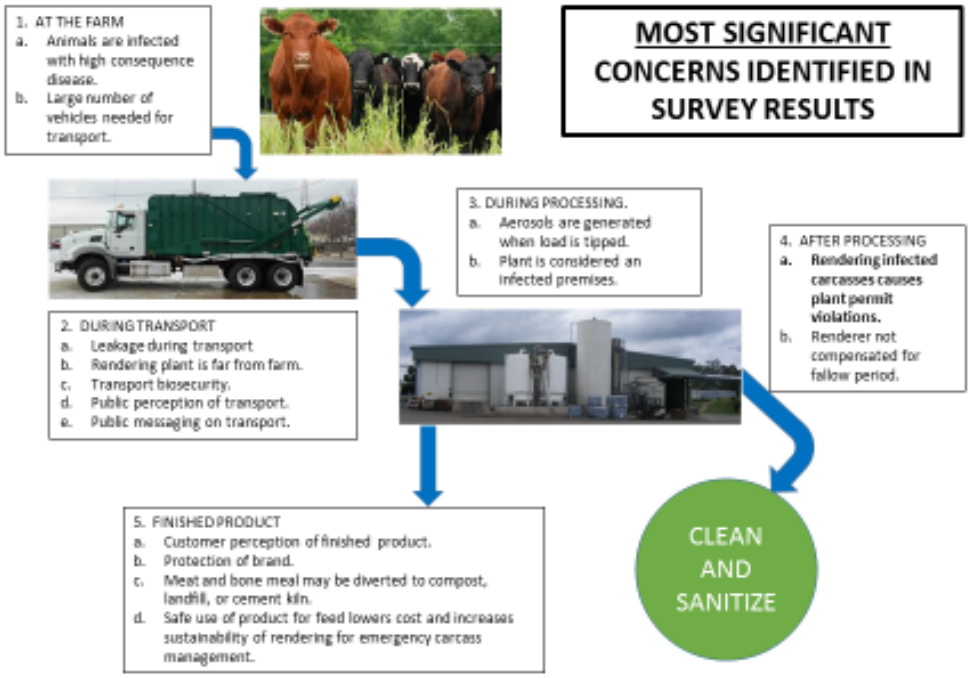
- Export market access (will rendering infected carcasses affect trade status? How?)
- Plant status as infected or not (will plant become an infected premises? Why?)
- Protection of brand (how can renderers assist the emergency yet retain brand integrity?)
- Ability to use product in feed/pet food (harder to ensure safety, but may me more profitable)
- More profitable to continue normal ops than support emergency
- Business uncertainty (how can renderers accept infected material if they don't know what the result will be?)
- Would plants be fully compensated?
- Companies can't afford to lose revenue (rendering runs on narrow profit margins)
- If plant is in control zone, equation may change (if renderer is shut down because there is no production in their area, they may be more willing to participate in emergency because they'll have no other revenue)
- Disincentive if not fully compensated
    - Benefits to company of emergency rendering (are there any?)
    - Emergency rendering likely to add additional challenges for renderers

Operations (20 minutes)

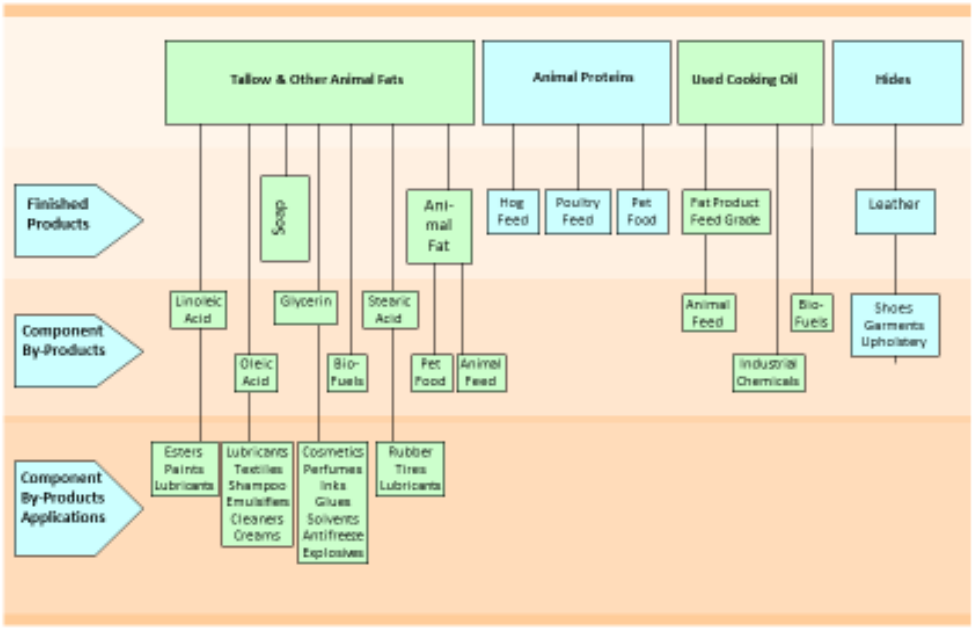
- Emergency rendering could overwhelm capacity
- Performance standards for emergency rendering (reach certain temperatures?)
- Continuous vs batch processing (is one preferred over other? Why?)
- How to decontaminate plant afterwards
- How to return to normal operations (is there an FDA or other standard?)
- Quantify and mitigate aerosol generation (are aerosols at grinder significant?)
- How to minimize delays to normal operations (fallow period? Regulatory hurdles?)
- May have backlog of product with no outlet (how to manage?)
- Need contracts/MOUs with response organizations in advance
- How to manage biosecurity/cross contamination prevention
- Plan approved by regulators in advance?
- Plants must continue to provide service to routine customers; how to manage requirement?
- Pathogen inactivation (what temperatures have to be maintained to inactivate pathogens?)
- Need advance agreements with landfills, etc. if disposal of product is required.
- If rendering capacity overwhelmed, consider other carcass management options.
- Special permits for emergencies; plan in advance
- Minimize regulatory delays and approvals to return to normal operations
- Why would rendering plant become an infected premises with fallow period if it doesn't house live animals?
- Lower revenue from landfilling product instead of selling as feed would be disincentive
- Risk of rendering infected animals (do we need an exposure assessment?)

Outreach (20 minutes)

- Executive decision-making based on perception (if rendering is safe, how to educate decision-makers?)
- Customer acceptance of product (how to assure customers and the public product is safe?)
- Public perception of transport and rendering (how to assure public it's safe?)
- Safety of transport, processing, end product (what is the scientific basis for assuring safety?)
- Renderers may not be willing to participate for many perception reasons
- Producers need assurances for routine services (assurance that rendering vehicles will not be source of cross-contamination)
- Distorted social media broadcasts (how to counteract false reporting?)
- Good biosecurity and good messaging
- Consistent message from all sources



Products Derived from Rendering



APPENDIX C: CATEGORIZED SUMMARY OF GROUP DISCUSSIONS

Biosecurity
Aerosols are generated during grinding.
• Spray carcasses with water or use a foam to decrease aerosolization.
• Install air purification system to contain pathogens and reassure neighbors.
• Contain delivery and grinding areas to prevent aerosol movement.
Cost
• Determine in advance who will pay for increased biosecurity measures to pick up infected deadstock from farm.
• Consider cost of doing one-location pick-ups rather than picking up at multiple locations and returning to the plant at the end of a route.
• Justify capital investments for biosecurity by identifying other benefits to offset cost; demonstrate economic benefit.
• Capital investment will be required for transportation equipment, plant capacity and disposal of finished product. Consider public/private partnership to have these resources available.
• In many cases, it is hard to get government/industry to invest in increased biosecurity/ countermeasures until they actually see the impact of an outbreak.
General
• Disinfect dairy tankers at farm and at rendering plant if milk will be rendered. Interior of tank would have to go to sanitizing station. Would that create cross contamination?
• Develop emergency rendering biosecurity protocols to overcome limitations of routine measures.
• North Carolina has list of decontamination process for avian influenza. At farm. At feed mill. Etc. SOPs are developed and may be useful.
• If deadstock were treated to inactivate virus at farm, would renderers be willing/able to process as uninfected?
• Increase training, add equipment, PPE.
• Rendering plant intake area is less sanitary than intake area of slaughter plant which has to clean daily, as opposed to weekly.
• Need science based biosecurity SOPs on shelf (top priority).
• "develop biosecurity protocols for farm, transport and plant based on research findings; perform additional testing to fill gaps; what to do and why to do it; clean plant before first load to make later decontamination easier; Phase in implementation of new biosecurity SOPs. • What type of cleaning will be necessary, and to what level of cleanliness? That may depend on the intended end use of the product, and whether it is intended to be used as feed or fertilizer, or burned as fuel. Can you prevent cross-contamination of finished product (from raw incoming product), and/or how do you disinfect the plant when the outbreak is over?
• Develop secure carcass management plan; need settled policy and leader to make it happen. Need to conduct a functional exercise and actually test theories on moving carcasses. Could be in conjunction with EPA. This would be part of the basic science research.
• Integrate biosecurity into routine operation.
• Evaluate existing biosecurity plans to be enhanced for emergency.
• Need SOP/plan at state level (NC HPAI plan template).
• Use existing rendering plant and run mock scenario to determine costs, justify improvements (FSE).
• Biosecurity/sanitation most important part of managing disease.

• First FMD detections may come at packing or rendering plant, therefore need to develop rendering and APHIS plan.
• Do incident planning/exercises at local/State/Federal level.
• Need plan so plant can go back to commercial production. Same as barns to restock?
• Major concern from renderers handling affected material: C&D and quarantine release to regain export approval. How do I get my facility back on line? Government and customers have to sign-off on this process.
• To make this work today: needs to be science based and biosecure from one end to another. At the farm, during transportation, rendering process and then have economic issue (not biosecurity) on the use of the end product. Survey regulators and customers for what it would take to return to normal operations.
People
• People at rendering plants do many different roles so there is the opportunity for cross contamination. • Risk of cross-contamination during and post-processing finished product while the rendering plant is actively engaged in processing affected carcasses
• Define cross contamination routes. Can't go from receiving area to the back end of the plant. Interested plants may begin to figure out line of separation and buffer area now. Can the US use Dutch system? • Have foot baths. • Increases in biosecurity from other reasons (salmonella) will help. • Totally enclosed and automated such as in the Netherlands. • Concern about cross contamination coming and going from plant (bringing disease from home or bringing disease home) reverse biosecurity. • Shuttle employees so their personal vehicles don't come to plant.
• Perform human health risk assessment for handling zoonotic diseased carcasses.
• Monitor workers to determine if HPAI or other disease becomes zoonotic. Consider employee exposure and human-to-human transmission.
• Upgrade worker protections and/or PPE if zoonotic; protect workers from zoonotic diseases.
• Establish line of separation for entering/leaving premises.
• Cross contamination with private livestock of workers.
• Change clothes before going home, or coming in to work. Clean line of separation in plant. Employees social contacts, cohabitation with others in livestock industry.
• Worker safety highest priority (see Capacity Section).
• Consider truck drivers and the interaction between the drivers and workers in the rendering plant.
• Make things convenient for workers (less likely to break biosecurity: i.e. port-a-potty for contractors), train often, and check that proper biosecurity practices are being followed.
Rendering Plant
• Assign person to be responsible for rendering plant biosecurity.
• U.S. plants are old and are not built for biosecurity. Even newest plants are not biosecure. Not designed for that.
• Look at Netherlands model to see how their plants are enclosed and automated.
• Separate farm dead trucks from offal trucks at rendering plants.
• Have designated load in/ load out areas for each type of delivery. • There will need to be biosecure receiving and unloading capabilities at rendering facilities.
• Use truck wash facilities at rendering plant.
• Establish line of separation between input and output parts of process.
• Develop protocol to sanitize plants.
• Investigate conditions when plant becomes infected premises. • Heat plant to C&D and inactivate pathogens. • How can plant avoid being classified infected premises? Risk assessment? It's a closed system.
• Stop Movement Orders for disease control; what if rendering plant is in control zone? Continuity of operation for rendering is important.

• Currently don't have a protocol for C&D/Virus Elimination/quarantine release for rendering plants. Surfaces can become coated with fat, which may require aggressive cleaning to decontaminate. How do we take rendering facilities from contaminated to clean so they can return to normal business operations? If limit areas where infected material is handled, then entire plant may not require decon.

• Will there be a fallow period for plants accepting product following the final clean-up process? Environmental testing requirements to gauge/confirm effectiveness of clean-up?
• Lab testing to verify freedom of disease for all products for plant to return to normal operations.
• Decontamination of plants:
  ○ What SOPs are needed?
  ○ Line of separation and environmental testing will be needed to return to operations.

• Basic science research to be confident plant is adequately decontaminated is lacking; government could play a role in funding or conducting that research.
Rendering Plant (continued)
• Will plant be decontaminated between loads or continue weekly (as is standard practice now)?
• Will plant pass PCR/virus isolation testing with and without C&D? Perform study.
• Biosecurity; normal day to day inadequate, but challenges can be overcome as they have in MN plant.
• Enhanced biosecurity will remain a challenge to ensure over time.
• Encourage making better biosecurity part of day-to-day process.
• Evaluate existing plants for biosecurity and upgrade to address gaps; perhaps develop a checklist, and voluntary audit teams. Develop public/private partnerships to fill gaps.
• Biosecurity is biggest bang for buck; biosecurity investment has huge payback.
• U.S. officials can visit Dutch plant.
• Netherlands – 3 levels of procedures: 1) standard (daily), 2) scaled up (outbreak in neighboring country), 3) full scale (ongoing outbreak within the Netherlands). Dirty/Clean side entry/exit procedures for trucks going in and out of rendering facilities.
• Possibility that rendering plants could get "designated" to handle infected materials – after having demonstrated they have, or can put, processes in place to address additional biosecurity concerns?
• Yard tractor to get a clean trailer when returning to the plant (can have dirty and clean side yard tractors).
• Can we disinfect effectively to ensure public and livestock health?
• Are current quality control points adequate?
• There is no research to show rendering plant can be reopened, such as for export; why would it be different than infected farms? Would trading partners accept rendered products from cleaned-up plant? They accept from cleaned-up barns...APHIS doesn't test end product, they just do wipe samples of surfaces within facility. Product shouldn't have to be tested because it's been cooked to kill pathogens. Are there even test methods available?
• Could have strict enforcement like on farms of buffers and line of separation in rendering plants
• Pre-inspect plants for biosecurity before delivering first load of infected carcasses to ensure good compliance
Trucks
Trucks may serve as fomites to spread pathogens
• Conduct full scale exercises to identify vulnerabilities, document findings, collaborate with EPA or universities
• Assign person to be responsible for managing vehicle biosecurity.
• Keep clean trucks clean, and be sure trucks arrive at farm clean so they are easier to disinfect.
• Look at processors moving to and between farms to see if more biosecurity is warranted
• Account for trucking delays due to extra time for disinfection or employ automated wash systems.
• Consider adding trucks from unaffected regions to compensate for delays.
• Have dedicated deadstock trucks that disinfect between farms.
• Pick up deadstock at a designated location, instead of at individual farms, and wash trucks between visits.
• Take culled animals directly to processing, without transfer.

• Bring deadstock to road instead of letting truck enter farm.
• Enable truck to deliver load without entering non-biosecure areas of rendering plant lot.
• Prevent cross-contamination at scale area.
• Have different trucks that don't pick up deadstock provide service to slaughter houses processing healthy animals (offal).
• Ensure independent "peddlers" comply with standards.
• Look at incentive (payment basis) by load or by hour if by load may be incentive to cut corners.
• Create new roads to handle separate rendering traffic (considered in PA and addressed through Routes and Ports in TX).
• Pre-determine routes.
• Establish simple, repeatable procedures and processes for the drivers, at the farm and at the rendering plant.
• Protocols for drivers: drop trailer and pick up a clean trailer for the next load; have different areas in the plant (front end versus back end).
Truck Design
• Ensure trucks don't leak and/or are lined; Leak test trailers: have rubber seals and tie downs; test with water to make sure they don't leak (dyes i.e. fluorescein, can be used to verify).
• Ensure trucks are covered.
• Have sanitation devices on every truck, giving preference to low-pressure as opposed to high pressure washers which can spread aerosols.
• Calamity containers – combined containment and transport (similar to roll-off container concept?). • a. Decon is built into trucks, tires, and cranes • Use lined transport containers (Netherlands "contingency containers").
Truck cleaning and disinfection
• Pressure wash first (prior to deployment) and the second stage of cleaning post farm pick up (wash at the farm prior to departing; could pressure wash at the property)
• Leak test during decontamination prior to deployment from the plant
• Clean cab before truck leaves the plant (try to limit drivers needing to exit the cab); cell phones could go into a plastic bag or container that could be decontaminated.
• Disinfect dairy tankers at farm and again at rendering plant. Interior of tank would have to go to sanitizing station. Would that create cross contamination?
• Develop effective method(s) for disinfecting the transportation vehicles i.e. wheels and grappler that picks up the carcasses, or use dumpsters that eliminate contact with carcasses.
• Account for trucking delays due to extra time for disinfection or employ automated wash systems.
• Have sanitation devices on every truck, giving preference to low-pressure as opposed to high pressure washers which can spread aerosols, or have undercarriage washes available at farm.
• Need adequate water supply and approval to discharge runoff; will disinfectants affect on-site wastewater treatment process? Will disease persist in wastewater?
• Determine standard trucks must meet to prevent spread of pathogens.
• Ensure trucks meet that standard.

CAPACITY
CAPACITY
• Need to define quantity of surge capacity likely needed, then evaluate available capacity in the region. Possibly through tabletop or full scale exercise with major production states.
• Based on experience with outbreaks in other countries, slaughter and rendering plants may be mothballed as business declines due loss of export markets and decreased domestic demand for product. Mothballed plants could be opened to handle affected material – contracted to government? There are some plants that are idle that could be used for this purpose. However, mothballed plants are soon cannibalized. It might be cheaper to build new, especially considering how long the plant has been out of service and not sanitized.
• Current facilities are at 90 % capacity. • Current facilities are run at or near capacity; need more surge capacity.
• One million pigs rendered in 11 days.
• May be able to increase speed of processing if the material is going to landfill (can be a wetter product).
• Can renderers accommodate extra inputs?
• Operate additional days per week. Rendering in phases; non infected, from infected zone but not infected, infected. • First two would work domestically, but not always with export, like China. • Plants tend to be specialized. Only a few plants in TX snowstorm could take deadstock. Some plants grind spent hens. • Need more surge workers.
• Quantify: how much capacity is available where? Logistical Infrastructure report
• NRA lists 170 rendering plants nationally.
• Rendering is not available near many dairies at any time.
• Distance from dairy to rendering not as much an issue as availability of vehicles and personnel to transport infected materials. Permitting around infected animal product transport is big issue.
• What to do with contaminated milk? Can milk be rendered? Might be able to take some, but wouldn't pasteurization be better? Rendering would require additional heat (and fuel cost) to evaporate water. For TB response, TX sent milk to powder plant.
• Pasteurizing kills most pathogens, but transporting raw milk to pasteurization is concern unless colostrum pasteurization equipment at the dairy farm could be used.
• Some rendering capacity hidden; ability for one processor to come off line; this would require some excess or redundant capacity in cookers and dedicated lines to handle the added capacity. How to get infrastructure in place?
• Mobile plants – do they exist? Are they possible solution? Would need hook ups to multiple utilities – waste water treatment, electricity, etc. Does not exist yet – but would be useful to have.
• Predesignate regional rendering plants around country or develop mobile rendering capability for smaller response.
• Netherlands able to shift to contagious situation immediately.
• Do we need a subsidy to get this excess capacity built? To get it in place and operate it. To safely conduct rendering of highly infective carcasses, there would need to be dedicated capacity to do that.
• Develop an incentive program to assist members of the rendering association through grants to develop redundant capacity and biosecure capability at new or remodeled rendering facilities in high risk production areas, to justify that capacity and encourage them to participate in animal disease rendering at the request of regulatory agencies. If the government agencies need the rendering industry to participate it would make sense to assist the industry in developing the capacity to safely assist in this process. (The Netherlands government pays in a cost to share for the buffer space from farmer cooperative). • Need to have mobile cold storage units available on-farm and at the rendering plants. • There may be excess container storage when exports are halted.
• Investigate regional disposal rendering or mobile rendering. Dedicated plant for emergency rendering investigated in advance.
• Support growth of disposal rendering.
• Bottlenecks with trucks or staging area (limited capacity/hour of plants in the United States).
• Is there space capacity at rendering plants?

- How to handle surge capacity? Where to store excess product? Potentially contract warehouses until final outlet determined. Based on 2016 DHS study, there is little excess storage capacity in Midwest beef cattle region.

ECONOMICS

- Competing renderers might take advantage if a plant becomes infected; NRA help develop emergency non-compete program.
- Non-compete environment; renderers may be in non-compete, but customers might still say they're not using incident materials in their product.
- Concern about downtime for virus elimination.
- Loss of business, loss of product, down time compensation.
- Income from response activities (carcass processing and rendered product sales/disposal must compensate for downtime for C&D during recovery period.
- Employee loss of work or revenue-business interruption insurance?
- How to compensate renderers.
- Program to replace equipment that may be damaged during the final C&D process; damaged equipment will need to be repaired or replaced at government cost.
- Problem of shifting capacity, such as away from pet food to other products. How to keep company in business when they shift.
- If capacity is diverted, how is it compensated?
- Emergency rendering would cost more, so how to compensate render co.
- Government lease rendering plant then hire rendering personnel to run it during response, then clean, disinfect, and return to company.
- Work with State and Federal legislators
- Three levels contractual arrangements in Netherlands:
  - National rendering contingency plan.
  - Service level agreement.
  - Specific contracts for specific situations.

LABOR

Employee safety and training:

- Extrapolate what has been done with landfill employees for safety guidelines. Involve CDC and State public health from beginning.
- Teach proper PPE donning and doffing before outbreak, OSHA. Other diseases such as E. coli or Campylobacter may cause public health risk even if disease (such as FMD) is not zoonotic.
- Could do what is being done with Secure Milk Supply. Train and certify plants prior to the outbreak. The certification could be validated on an agreed upon schedule.
- Zoonoses – State public health and CDC, make sure to engage early on, recommend vaccines, track and follow Influenza-Like Illnesses, offer Tamiflu for those in disposal industry.
- Who supplies PPE to industry? Through cooperative agreements? Who provides fit testing?
- Have training programs established for new/temp employees -surge capacity.
- PPE for employees – how does it apply to rendering plant employees? Heat exposure? Perception of moon suits?
- Lots of regulations that apply from OSHA, guidance from CDC. Renderers already wear some level of PPE, but it's just an apron to keep blood off clothes. Lots of rendering company employees have livestock.
  - Just in time training for upgraded PPE.
  - Use existing protocols as a basis then upgrade.
  - Renderers are used to working with dead stuff, so hard to convince them that this deadstock is different.
  - Is there a lot of turnover for people at grinder who will have knowledge?
- Aerosol – when it's a risk and not. May only need PPE at grinder.
- Or maybe don't need PPE if have administrative and engineering controls like grinder containment or limited access.

• Is there a difference between normal rendering operations and rendering for disease control? What is required for PPE, who will enforce it, is special training needed? • Employees are working with bacterial-contaminated carcasses every day, how does this differ from normal operations? What do routine mortalities die from? How do you address any fears or questions of the rendering plant employees regarding the diseases? It would be important to establish procedures for handling the material as it comes in and goes out, and for employees to follow the procedures. • Be safe and don't move disease around. • Plant safety officer familiar with occupational health and safety (designated as the point person); could require an additional person. • Identify critical points (hazards) – HACCP Plan; renderers may already have this. • Fatigue.
• Overtime costs.
• Most jobs at the rendering plant require skilled workers with specialized training. Plants usually run 2 shifts +/- weekends. Training additional personnel to work additional shifts or operating hours would take time.
• Personnel could be shifted from other plants, and overtime offered.
• How do you ramp up labor? Don't have trained people sitting at home waiting to work. Working long hours, team member safety become an issue. Heat in plant an issue especially if you have to add PPE.
• Workers handle zoonotic diseases every day; FMD or HPAI not really a big difference, from practical standpoint.
• Need training modules for rendering plant employees on what to do if handling/rendering diseased animals. • FSIS using virtual reality to train; wear goggles and ""see"" plants in 3D; form team to prepare training materials.
• Do plants have adequate personnel to accommodate extra work? Will temporary help need to be hired?
• Can plants go to 24-hour per day operation (3 shifts)? Are there enough employees? Can they be shifted from other regions? Plants may have to go down for cleaning and maintenance periodically.
OPERATIONS
• Different plants are set up to process different types of animals.
• Plant should immediately institute a cleaning prior to arrival of first load (build up can inhibit disinfection later).
• Equipment maintenance.
• Renderers don't want to shift routine operation to emergency – investigate reasons.
• Under contract to process routine.
• Can renderers connected to slaughter plants be used during emergency? If so, under what circumstances? Not set up to accept outside materials.
• Hide is removed because it could affect equipment.
• Can send pigs to cow plant, but not poultry because of feathers. • If don't remove hides, rendering will be harder and more costly. • Can sheep be rendered? Is wool a problem?
• What about hides and wool from processing sheep? Very few plants accept
• Dairy cows are Big animals; 1800 pound average; 1500 pounds per lactating cow; plant would need pre-breaker
• Plants usually run at night. Double shifts could cause permit violations.
• Do plants need to meet certain quality standards? Rendering plant would ensure critical control points are met; 95 percent of plants comply with voluntary code of practice. Under FSMA need to follow code of practice. Operational standards call for high temps to separate fat and protein.
• If wanted to, they could not grind finished product but hard to handle.
• How to get back to normal ops.
• Government could lease plant from owner operator and operate through completion of process, and restore it before returning it to owner.
• Is it possible to precook with small batch cooker to slow degradation during storage?
• If protein going to landfill or composting, then biobags can be rendered with carcasses.
• May need to test products to ensure safety (free of disease), then need additional warehouse space to store until results come back; need adequate lab and technician capacity, as well.

• Contaminated feed; can it be rendered after farm has been depopulated? Corn, hay, alfalfa, not much grains.
• If so, would product be useful? Would material interfere with rendering?
• What to do with dead animals that are awaiting processing? Pre-cooking, low temp pre-processing? How to manage it? Similar to manure processing in TX?

MARKETING
ALTERNATIVES TO FEED
• Divert test-negative herds from control zone, welfare culls, and farm dead program to rendering and dispose of infected material by other means or use as fuel source. If the product is from within the control zone, then there should be alternative uses for that material. • Should a decision matrix be developed for this type o thought process?
• Reach out to cement plants to inquire about their ability to take rendered product.
• Cement Kilns-what is the current capacity and is there a need for more (very low-cost now and in outbreak it would drop precipitously).
• Reach out to landfills to take MBM or other "unusable" product, how will plants be indemnified?
• Rendering for landfill · o May reduce biomass, but you are essentially paying twice and moving product twice, to move material to landfill – would be more beneficial to find uses that provide some value. o Need to clarify the regulatory framework to determine what non-landfill uses for end-products (renewable energy, meat & bone meal, fertilizer, etc. – something with a positive added value). o Then determine what consumer market will tolerate – outreach also needed in this area.
• Value from highest to lowest: Pet food premium; Animal feed/fertilizer; Energy; Pay to dispose negative; Dutch system has government infrastructure to support disposal rendering like municipal waste management in United States.
• Explore other markets for protein meal: cement kilns, co-generation plant? Composting? • Government may need to compensate renderer for product that cannot be marketed. May need to subsidize for low $ value rendered product. • Fat can be used for fuel in the plant, or can be sold for biodiesel. Use of the material as energy sources seems to be a smart choice for fats, oils, grease and the resulting sludge. It separates people from contact with any of it. Fats and grease also have good beneficial nutrients. • Produce more fertilizer if feed perceptions are an issue.
• If can't get rid of product then shouldn't produce it.
• Can we create new demand/new product streams from the rendering facilities? Could the rendering facilities use biofuels produced within their rendering stream to become energy neutral?
• Netherlands – Category 1 & 2 materials (dead animals, offal/BSE risk materials) – fat – used for energy for plants, or purified and used as biodiesel. Protein is sold to energy producers and they make green fuel for it. Water is processed and discharged. Procedures would be the same during an outbreak situation, assuming customers are willing.
• If you worked with U.S. rendering plant whose only out products are energy wouldn't have problem with marketability of product.
• Identify high value diversion options.
• Biodigestors could be used for product then into bioenergy. • Bioenergy or landfill as option for rendered products that can't be sold for normal purposes. • Can burn MBM; good carbon or can go to cement kiln (did with BSE in UK, Japan).
COST ANALYSIS
• Analyze market for animal feed, supply/demand/price.
• Gap: What would it really cost to do emergency rendering? Cost to government per pound of input?
• Include losses to industry from downgrading product quality • Detailed case study of disposal rendering costs.
• Address cost/benefit.
• Cost to pick up animals in Netherlands is ~ $17, then processing is ~$1.50 per pig.
• Do a full analysis of how rendering could assist in a disease outbreak (use IA state model info from presentation on first day).
• Increased supply and reduced demand, especially with closed export markets, will cause prices to drop. Cooking inactivates virus; it's perception issue.

EXPORTS
• Export markets problem with FMD.
• Will trading partners accept rendered products from cleaned-up plant?
• They accept meat from cleaned up farms.
• Need more info on product trade in order to do risk assessment to keep trade open.
FEED
• A pet food company with less brand sensitivity may still use rendered product. Find low hanging fruit- which industry would take product? i.e. chicken feed during FMD.
• Would feed industry even take the product?
• Economics; indemnification.
• Pet food producers might require testing to prove safety.
• Pet food producers may reject product from infected animals; could initiate education program.
• Would FSMA, risk based analysis, NRA data on inactivating AI (or other agents), keep product moving?
• Demand for rendered product declined during and after 2015 HPAI outbreak because buyers were concerned about safety of poultry meal, and there were fewer birds in production to consume the meal.
• Will need to have storage (flat or silo) or be able to dispose of finished product, since demand for protein meal will inevitably decline initially in an outbreak. (limited availability of flat storage capacity in Minnesota, for example). Amount of storage needed will depend on duration of reduced demand
• Lack of demand for product resulted in overstock of poultry meal which exceeded storage capacity.
• After 6 weeks, sales returned and backlog decreased.
• How can we ensure and prove that the product has negligible risk of being contaminated? Risk assessment? Data?
• Pet food industry may have difficulty switching suppliers.
• Investigate with pet food companies.
• Possible additional product hold times creating need for additional warehousing capacity.
• Potential trade restrictions; how to address in terms of risk assessment?
• Need to be able to support extra test requirements with lab capacity (human and equipment resources).
• Caution using PCR because it could still pick up DNA fragments, causing false positive results-use for screening but not to confirm freedom from disease.
• 2015 HPAI and impact on rendering – ended up with product that had no market for some time because of HPAI fears.
• What is the disposition of the product? What will regulatory agency allow?
• EXCEPT – U.S. plants processing dead animals don't focus on energy because outlets to feed are more profitable.
• Farm deadstock not allowed in pet food.
• Beef cattle ration includes rendering tallow; would dairy take tallow from infected rendering batches? Dairies to take tallow but it's less than 1 percent of ration; dairy possibly could use it, but public perception/customer perception may not want it. More of a market pressure.
• Check definitions for what standard material must meet to go into pet food. • Investigate how to minimize losses to industry. • Possibility to export to some countries as long as the product wasn't from within the control zone. May be able to process uninfected animals within the control zone if APHIS permits the movement. Need: work on the science and continue working with market partners. Could have verification for testing, certificate of analysis for feed companies to consider accepting product.
• Pet food requires high quality inputs to get high price for product. Export market of edibles more valuable than rendered product. Minimum losses would be between $350 and $500 per try ton to downgrade from edibles to fuel.

HIDES
• Lacking information on/or criteria for: pathogen free verification, sensitivity of testing, what parameters will be used pet food, livestock feed, other products such as hides or export by products, will hides still be sent to Mexico, China or elsewhere for tanning?
• Disposition of hides if markets (domestic and international) will not accept them? • Use mobile labs to speed testing of material. National Guard may have capabilities.
• Losing revenue from hides when export markets stop accepting product
LOSSES
• Value of rendered product? Loss of premium customers' revenue due to reallocating rendering plant resources to processing infected material (price differential).
• Government may need to buy and landfill protein meal if it has no value in commerce. In past outbreaks, compost was initially shunned, but later recognized as a desirable soil amendment. Possible that rendered product might also be found acceptable (eventually)? Will government have to compensate renderers for lost income if product goes to disposal instead of pet food?
• Who compensates renderers?
• Renderers need to be paid for loss of business, loss of product, downtime.
• Solution needs to be economically feasible for renderers, including for surge capacity.
• Don't have markets for additional product.
• MOU for operating at a loss or break even? Have clear destination for finished product. If render infected, what are end products and where do they go?

OUTREACH
ADVANCE EDUCATION
• Public education on what is safe needs to be started now. Cross species working group has offered to help.
• Educate all stakeholders about diseases now; need public education and awareness of rendering
o Educate public on rendering; What it is. Products, Benefits
• Get consumers involved early in planning.
• Communicate risks to renderers related to HPAI and FMD – disease, management, recovery.
CONTENT
• Need to increase public's awareness that rendering is recycling – that message plays well.
• Make material available if people want to look at it. NRA working on this information. o naturally recycled protein. o public education and awareness. o sustainable; recycling; virtual rendering plant tours.
• Difficult for public to understand. Maybe general public doesn't need to know everything about the rendering industry.
• Consumers don't want to think you are hiding anything.
• Perhaps we need to focus on communicating and informing pet food companies and other folks within the system. • NRA has developed a slide set on rendering in general that can help food industry people understand that process.
• Use CFSPH fact sheets for education (if NOT zoonotic disease, ensure employees and public know that and educate public).
• Is rendering safe?
• Until a few years ago, rendering was the 'invisible industry' and renderers wanted to keep a low profile with the public.
• This is changing, and rendering industry is creating messages about sustainability and recycling aspects of the business. Participating in outbreak response and recovery and continuity of agriculture business and rural community economic health is another aspect that can be part of the message.
• Recent years, renderers want to talk more about what they're doing, cross species working group, agriculture alliance networks. APHIS is partner as stated by CVO. Renderers have good technical messages, but also have to manage consumer trust.
• Messaging should use best science available. Use best science available in messaging
• What does rendering kill and not kill? Publish research on what rendering kills/doesn't kill. Base render standards on hardy organisms.
• Consult with professional communicators – how do you communicate this message to the public? Do you want to communicate products in animal feed to the general public? In advance? At the time?
• Netherlands – two messages: • 100% guarantee completely disinfected • Sustainability, being used as energy
• We will need to convince people that the outbreak is being controlled, and that the clean-up is being done using safe techniques and practices. Including explaining that transportation is being handled safely, the rendering process is safe and effective; and that the businesses, contractors, and others involved in the process are being monitored and are not taking shortcuts. Beyond that, that the rendering process and is known to be safe, and the material is being decontaminated – for public health, the environment, the food (or fertilizer – and fertilizer is used to produce food) being produced.
• Risk communication: be transparent; must be auditable and measureable; based on best available science. Need spokesperson who is trusted.
• Public information person can have data processing (temp & time).
• Green messaging: reduce reuse recycle (positive message "heroes").

CONTENT (continued)
• Public perception> Can we assure people that everything is done with the highest attention to public and animal health.
• Dead animals cannot enter the food chain – PERIOD. Farm deadstock not allowed in pet food. (Verify if this is just true in Netherlands, or if it's also true in United States).
• Risk perception vs real risk.
• all stakeholders expect highest level of protection.
• Each part of risk incident plan needs educate/???/communications messages.
• What to do about neighbors objecting to rendering infected materials in their community?
• Need science-based rationale; what to do and why for public buy-in to adhere to process - focus groups?
• Can start now: o NRA working on virtual rendering plant tour. o Stress sustainability, recycling.
• Producers suffer most in outbreak
• Rendering (and other disposal) better than letting animals suffer, having heaps of dead animals, or pictures of burning/burial (best to process out of sight)
COORDINATION OF MESSAGES
• Ultimately the market controls what is acceptable
• APHIS will mirror FDA message. FSIS should mirror same.
• Consistent messaging is possible but messaging products need to be developed outside of emergency. See attached multi-agency Ebola waste guidance that was vetted through several government agencies and the industry. Consistent messaging Q&A appendix contained.
• If consistent messaging not possible, need good social media presence able to respond immediately (gov't and companies).
• Strong coordinated messaging from Feds and renderers (need to work together to develop guidance).
EXAMPLES
• BSE issue in 2003 (cow who stole Christmas); Export containers cancelled; referred to as "mountain." USDA helped by talking about it, assuring public, didn't have mass panic, had markets back within a month. Safeguards in place. There was concern, but it was addressed. Subsequent BSE detections were hardly discussed.
• HPAI; was messaging a factor in poultry/egg production?
NEGATIVE PERCEPTION
• How to resolve perception and past epi implicating rendering routes in disease spread?
• Outreach and branding important.
• Perception; if consumer sees open handling of offal, will be less accepting than seeing closed system.
• People's reaction to moving infected animals.
• What is solution to public opposition? Messaging? Vermont sheep example.
RESEARCH
• Determine what consumer market will tolerate – outreach also needed in this area.
• Will it be going into pet food market? Fish feed for non-human consumption?
• What does the pet food industry think about this? What do their customers think about this?
• We need to make sure that there is consistency among the technical staffs (scientists) within industries and executive decision-makers. Depending on who the rendering plant provides routine services to, they will need to be notified that an outbreak could affect those services. We discussed conducting focus groups with average level consumers and then build up to the industry and decision makers.
• Research shows that public wants three points of proof, like research citations, for each assertion, but they need to be in lay language
• Do research to demonstrate what it does and doesn't kill.

SOCIAL MEDIA
• Social media is making public education difficult.
• Stay ahead of social media-regulatory agencies and the industry must think ahead.
SOURCE
• Universities and some trade groups may be trusted, but how do you take a scientific and emotional topic like this and put the message into plain language? You may need to explain published research articles, laws and regulations, and industry and regulatory practices in plain language.
• Cross Species Working group (communicators) are ready and eager to support the rendering industry with messaging.
• Leverage organizations that have trust on risk communications/public perception.
• Perhaps universities and industry associations rather than government? Leverage those groups. Reference Commodity Checkoff programs as an example.
TARGET AUDIENCE
• USDA, State environmental, EPA, public health/OSHA, FDA, DOT, laboratory including a PPI, FSIS, Multi-State partnership
• Governor or PIO for a State, State veterinarian (will there be vaccination options, is it livestock or poultry?) Industry (livestock/poultry as well as feed industry), rendering/NRA, animal rights groups, consumers, trade groups, export brokers and exporters.
• Outreach to small farmers with numerous species: cross species spread.
• How to educate decision makers?

PERMITS/REGULATIONS
CONTROLS
• Air purification system? To keep from aerosolizing pathogen and calm fear of neighbors in area.
• Water purification? Effluent testing? Also to show neighborhood is not being contaminated during the processing of infected materials.
• Some plants have activated sludge or lagoon systems.
• Be sure plants used for disposal are vetted first to be sure they're in good compliance.
• APHIS prefers to keep infected animals on farm > move off farm within control zone > move outside control zone.
• Infected animals must stay in control zone or need permit to be transported out.
• Need permitted movement of deadstock from infected farm to keep rendering open as an option.
DATA/STANDARDS
• Clemson data shows rendering kills HPAI; need for FMD, etc.?
• FDA - how might they allow use of rendered product into animal feed? Questions could come up from public about is it safe to use those products. Additional processes that FDA would require to prevent cross contamination? Additional verification steps that renderer would have to take?
TESTING
• FDA regulations on cleaning.
• Environmental testing requirements to gauge/confirm effectiveness of clean-up?
• APHIS requirements for fallow period.
• Environmental testing requirements to gauge/confirm effectiveness of clean-up?
VIOLATIONS
• Plant operating permit limitations.
• If maintain same species of deadstock as routinely processed, emergency processing is not likely to impact outputs significantly as long as amount processed remains similar.
• Water permits restrict the amount of water that can be released from the plant. Air quality permits restrict quality and quantity of air emissions from the plant.
• If plant is running at higher capacity, more water and air emissions will be generated. Will need cooperation from regulators to modify permits.
• Need emergency ops plan for plant to include C&D, like what to do with additional wastewater, and could it be handled by in plant treatment plant? Would disinfectants upset treatment system?
WAIVERS
• How long would it take to increase regulatory permit limits? Throughput? Emissions?
• What regulatory flexibilities are available?
• Will we need to suspend or alter regulations for renderers during an emergency? Who decides and under what authority? Begin discussions now with appropriate agencies. Could permit conditions be reduced in some cases by negotiating with regulators? States should have waiver system in place on discharge limits, highway weight limits, before emergency.
• Governor would need to declare an emergency before increase permit limits. Sometimes there are political reasons not to declare an emergency. Air quality. Odor. Water. Throughput.
• Can regulatory limits (road weight, surface water discharge, etc.) be waived or relaxed?
• Still have to protect public health.
• Hard to get permit for increased throughput at plant.
• Relates to air/water discharges, so need declared state of emergency.

TRANSPORT
AVOIDANCE
• Render on farm for feed.
• Grind carcasses on-farm. Put slurry in tankers, pump from tanker into rendering plant (closed system – reduces risk of feathers or other material contaminating the route to the plant or the reception area of the plant.)
• Another option is to grind on farm, mix with a carbon material (Dearborn 2012), put product in dump trailers, cover with tarp, C&D, and transport to a power plant, composting, or landfill.
• Deteriorated condition of deadstock.
• Precook on farm with mobile units?
• Kentucky had a mobile rendering plant. It was for backyard chickens. Way too small to be helpful during an outbreak. Cookers are massive.
• Government could invest in large mobile units. Is that possible? • Mobile plant could generate pellets fuel. Fuel use is not as restrictive as food and other uses. Can units that routinely process manure be used to process carcasses during an emergency?
• Pre-grind to reduce volume? Treat? Find out amount of citric acid needed to treat, and what effect on rendering process. • If treated prior to leaving farm, does that resolve all problems? • Governor emergency declaration to ease transport weight limits. • Can grind animals at farm, pump into tanker, and haul to rendering plant? That would avoid open transport and feathers blowing around. • In HPAI 2015, customers refused to take poultry meal from contaminated birds, but after fear died down, customers again accepted poultry meal. Meanwhile, meal had to be stored. Renderers need to be compensated for long-term storage.
C&D/TRANSFER
• Many of these questions can be answered with an exercise(s).
• Transportation to landfill and transportation to rendering is different. Biosecurity risk great.
• Complete segregation of facilities may be critical. State and Federal resources will need to help with cleaning and disinfection stations, etc.
• Transport vehicles: all render trucks have to be washed after unload at end of each day; route may hit 20 farms/stores. Also have transfer stations. Have some biosecurity that could be ramped up, but they need assistance and maybe NRA needs to develop standard protocols. Varies by company.
• Avoid transfer stations during outbreak. Or could use as containment area.
• Truck drivers can't get out of truck. "Require" drivers and other transportation personnel to also take Tamiflu? Vehicle biosecurity – teach transportation personnel during peacetime about diseases and how to clean and disinfect, SOP's so they are prepared when the time comes – what standards are already in place?
• Lots of concern about moving infected material off the farm.
• Could set up transfer station at a farm to a biosecure truck for transport to a regional facility. It is a challenge to transfer product across State lines.
CAPACITY
• Logistical challenges in places like KS to move feedlot to rendering; need 1000 truck trips if stamping out is used.
• Render fleet spread out over numerous locations, so may not be lots of render haul vehicles.
• Optimize number of vehicles.
• Concern about surge capacity of carcass containers and biobags: transport/handling liners, covers, bags, availability of materials.
• NVS should be able to acquire and contract enough transport equipment and drivers (at least it was not a bottleneck in Iowa, which was a severe test to that capacity).
• Water to disinfect trucks that pick up offal, and how to manage runoff; put animals in biozip bags and take to rendering plant.

• 40,000 head of cattle would be 1,000 trucks (equivalent to median size feedlot in TX and KS). Even if they existed, logistics would be a nightmare.
• Stay vigilant of FMD surveillance. Keep number of animals to depopulate to a minimum.
• What is fleet capacity?
• Can fleet be split diseased and not? Divert one set of trucks for infected.
• Would need many trucks.
• Can requisition from Army Corps?
• are critical control points appropriate? Identify and resolve.
ROUTING
• If plant across State line, may need special permits.
• How to overcome restrictions on interstate movement.
• Advance agreements to move interstate.
• Mapping acceptable transport routes to avoid susceptible animal facilities (and premises perceived at risk, such as agriculture equipment manufacturers, for example) might be a challenge in dense animal agriculture areas.
• Is careful routing really necessary.
• Not In My Back Yard
• Truck load limits are issue. Routing needs attention; is it really needed? Why, if it's truly transported safely?
STANDARDS/LIMITS
• Simmons folks have new truck that is likely more biosecure. Trailer is around $50,000. Self-contained units like Netherlands would be useful. • Leak test trailers"
• Renderers blamed for spreading outbreak with their vehicles, whether it was true or not.
• Limited supply of render haul vehicles.
• Develop standards so more common vehicles can be safely used; refer to DOT standards. • develop methods to increase capacity to haul to rendering, increase safe storage prior to transport.
• Drivers have inspect trucks before leave and have to report and fix before moving.
• Need communications plan for use during transport.
• What sorts of environmental reviews would EPA require to move animals off farm to rendering plant? e.g., spilling a load enroute, and having to remediate the spill. Brownfields site. Need to have spill response ability.
• State limits on route and weight.
• Waiving weight limits would not be a problem. • Need to have a plan to get weight limit, driver licensing, other limiting factors, and hours restrictions lifted immediately. This has to be ready to go. Is State the authority that would waive? Under what conditions? • Need governor declaration? National declaration?

OTHER
COMMUNICATION
• During an outbreak all information through the Joint Information Center (JIC).
• Plant and regulators could be integrated into incident command so variances can be expedited.
• In some States, rendering isn't part of their response plan, and some States don't have any rendering plants – need to reach out to rendering companies within each state and discuss how they can be included in plans for FMD and HPAI
• Consider having State/local regulators that issue permit be incorporated into ICS structure (would be available to make changes to permits as needed quickly); preferably a single person at a level in the State/local agency who would be able to cover both air and water permit area issues/concerns.
COMPENSATION
• An FMD outbreak would severely strain our export markets. Additionally, at every step of the rendering process, we discovered challenges in "who was going to compensate"? States? Federal Government? We discussed that if the facility was in a control zone they may be incentivized to take infected carcasses.
• How would renderers be paid, and on what basis?
• Is disaster declaration needed? Is there insurance available? If not, how can it be made available?
• Renderers depending on the scope of the depopulation; if regular materials are being diverted the plant will need some compensation for loss of profits from this.
• Impact to plant's operation; additional requirements for biosecurity and safety (set up ingress and egress and decontamination areas); site and facility modifications may be required.
• APHIS doesn't pay farms for down time after outbreak gone but before they can restock.
• Renderers need to be paid for loss of business, loss of product, down time; how can routine and surge rendering be made economically feasible?
COSTS
• Biosecurity costs better justification with detailed breakdown of what is required for enhancements (biosecurity plan…include costs); extra personnel may be required, medical clearance and PPE (use training and acquisition).
• Don't try to cut costs on biosecurity; but for gov't need justifications.
• APHIS could do analysis for costs (detailed case study) – would help justify some of the biosecurity recommendations.
• Capacity 2 loads/hour on average (80 cattle /hour)for plants (where will the backlog be: farm or plant).
• Capacity depends on source (from farm vs slaughter plant) and condition and environmental factors (temp).
• How much would it cost/hour to kill if needed, process, divide into products and clean the plant to handle a clean line. Labor, fuel, transportation, quality control, permits, access to trucks and disinfection of the plant and trucks.
• Minimizing delays to normal operations: Plants should have normal and emergency plans implemented. Must consider the effects on other operations during an outbreak e.g., wastewater treatment plants. We discussed potential quality concerns associated with the delays in getting the carcasses to rendering and how they could be addressed.
ECONOMICS
• Economics; more bang for the buck if invest in preparedness rather than response.
• During HPAI in MN, turkey raw materials dropped; demand for meal to feed turkeys dropped; need for bone meal storage increased; demand resumed after fears died down.
• Having plan in place in advance with costs to include cleaning and returning a plant to normal operations (down time pending virus isolation…2 weeks for testing and retesting may be required).
• Cleaning versus replacement required? Cleaning is possible may need to disassemble.
• Costs of disinfectant and or thermal inactivation for disinfection options (be sure to look at the costs of heating the plant up).
• Trade restrictions?

GENERAL
• What's the concentration of rendering facilities in the U.S. and what markets are they serving?
• Are there diseases and situations where rendering should not be considered.
• Need to understand non-food uses, so know options available during outbreak. If there aren't any, this may not be an economically viable option without government subsidies.
• Ensiling – is ensiled product renderable?
• Foreign material contamination concerns need to be addressed.
• Educate allied industries on reimbursements, agreements, and contracting now.
• Important to choose highest and best uses.
• We will likely need to use all of the disposal methods and tools that are available for an outbreak.
• Is rendering really sustainable.
• US needs rendering as an option.
• Learn from EU.
• Prepare now, don't' wait.
• Why do we overproduce so we have to export? When overproduce, worse for disease management.
• Supply and demand; we produce more than we consume to meet export demands. There's a market for meat, and producers are in the business of selling the meat.
• Normally, animals going into rendering died of unknown illness; may be concerns with FAD.
• Next steps: need project management team, conduct several research/planning projects, future workshops?
• Biosecurity is powerful investment.
• Food protein production issue.
INCENTIVES
• What is incentive for renderers? How to incentivize?
• Needs to be economically feasible/beneficial for companies to participate.
• Or, create the market incentive by putting out a contract for capacity in an emergency situation?
INFRASTRUCTURE
• What infrastructure would you need to stand up independent rendering capacity in the face of an outbreak? Federal solely vs public-private partnership?
• Dedicated rendering plant?
• In EU, national government responsible for adequate infrastructure for waste management, including animal waste.
• Rendering is infrastructure similar to municipal waste water, landfill, incineration, and water treatment.
LOGISTICS
• Rent yard tractors for use at the premises (multi day use); logistics would work better if handled at the level of the farm… (under ICP coordination). • Renderers need to be integrated into the ICS structure during the response (at the level of ICP). • Finished product going to another facility, need to have these end users in the ICS structure too. • USDA contracted warehouses (storage sites) could be used for post-rendering product storage to allow more time for disposition decisions. • Products fats and protein…good uses available for fats; may need to have time to identify market/disposition for highest returns. • Testing likely needed to move MBM to storage; need to determine how to get a valid sample (virus isolation would be needed)….statistically valid sampling (CEAH may be able to determine how much sampling is needed). • Cross contamination can be minimized via biosecurity plan (raw material side versus finished product side separation). • Establish pathway for product disposition of the product prior to an outbreak (e.g., cement kiln agreement in advance and what requirements would need to be met for product acceptance).

- Carcasses maintenance (cold storage prior to go to renderers); in EU slaughter plants used for depopulation and then parts sent to renderers; would also address carcass piece size that can be processed at the rendering plant (some can handle entire carcasses others cannot); would increase the capacity rate and surge at rendering plants.
- Can a second auger be added to some plants to facilitate processing?
- Some slaughter facilities have the ability to render on site.
- Mass diversion of what would normally go to the slaughter plant.
- Don't want dead stock trucks going from farm to farm (maximize on farm disposal for smaller animals i.e. calves).
- Pre-inspection should be done prior to accepting first load of carcasses.
- Welfare depopulation animals may also need to go to rendering too; disinfection of plants needs to be addressed (could potentially segregate welfare d depopulation animals versus infected animals).
- Pen side testing (encourage development) for ante mortem testing to allow for movement to slaughter or for welfare depopulation going to rendering; buffer zone application would likely be most useful.
- DHS has purchased portable/mobile labs…perhaps these could be used for rapid screening/testing activities?
- Operational inspection prior to approval for processing infected carcasses; look at compliance record to make sure the company has not be violating.
- Local gov't permits are variable; several have requirement for processing within 24 hours to address concerns regarding odors.

MOUs

- Could draft MOUs, contracts or contingency plans be developed and put in place, in advance of an outbreak to facilitate disposal rendering, in case it is necessary and/or determined to be viable?
- Contracts in advance would be helpful; long term customers are priority…will need them post outbreak.
- Renderers draft plan that will work for them, then government can review, assist.
- Netherlands – has plan, which is an agreement (not a rule or a regulation) on how things will operate during an emergency situation.

PILOT TESTS

- Pilot on local/regional basis?
- Opportunity for a pilot project here to test some of these ideas.
- Pilot project or regional effort – need study phase and design phase, but need industry at table willing to participate. It would be good for USDA to capitalize on that willingness and set up a group.

POLICY

- Uncertainty is a challenge.
- No policies from FDA or USDA for resumption of normal business, or disposition of processed (infected product) – how do renderers maintain continuity of business?
- Potential solution: Need rational plan and policies for how process will work during an outbreak and how facility will "recover" after an outbreak.
- What will happen to renderers if they assist?
- Multiple factors that need to be considered: incentives (economics), recovery policies, movement of product, regionalization (how to move products between states that are or are not infected).
- At this time FDA does not know what they will require for hygienic restoration.
- FDA expectations regarding disposition of products and facility recovery time.
- US has used process like this to move egg products, but generally on an individual flock basis.
- Netherlands has a market for rendered product that can be ramped up during an outbreak – we don't know what we would do in U.S. with rendered product from infected animals.
- Netherlands isn't sure customers will continue to buy product from infected animals, but if it is downgraded to fertilizer, government compensates the difference in price.

RESISTANCE
• If there's an outbreak in Montana, no other States are going to want to move carcasses from Montana to a rendering facility in that State, but a Montana renderer would have an incentive to work with infected animals since they aren't moving in animals from other States.
• What are the obstacles for the rendering community and what it would take for them to participate?
• All methods of disposal have their problems – with rendering, you are taking private companies and putting them in a position where they have a lot of uncertainty about the risks they will experience in terms of disposition of product, return to normal processes, profitability, etc. Until we can answer some of these questions, it is unfair to ask them to help us out, although renderers will be in the same predicament as producers if the US has a foot and mouth disease or similar outbreak. Need answers from FDA, EPA, and USDA on many things. "FDA will tell you what you can't do, not what you can do." You can plan in advance and they will approve it, but if tests don't demonstrate you have completely eliminated the virus at the end of the outbreak, they will still shut you down.
• At beginning of an outbreak – producers will suspend rendering pickups to avoid disease spread.
RISK
• Different approaches per state based on value offered by rendering and other disposal options available. Remove as much risk as possible, as far in advance as possible, for the companies.
• Renderers are business entities, everything is sized for what they are designed for – they have environmental permits, air quality permits, waste water treatment permits etc. – and scaling up has costs, requires coordination with environmental agencies and it is unclear if the capability is already built into existing plants. Can we scale up current facilities? Or do we need to build excess capacity to address these challenges?
• On the business side (and government side, for planning), how do you justify the time and expense of maintaining your plan, the equipment, the overhead, etc….when you may or may not need it – you may never need it, but you'll have to maintain the ability for a long time.
SOPs
• Develop SOP for logistics of accepting carcasses-regulations, transportation, communications, C&D, testing, etc.
• Can't develop emergency rendering protocols at time of emergency.
• Secure carcass plan for both SOP's during and showing disease free after the outbreak.
• More pre-incident planning.
• Additional and ongoing training and supplies for biosecurity for ramp up. • Improved communication among stakeholders, including producers, transporters, NGOs, animal welfare, small farms. • Develop biosecurity plans for pre-rendering (farm, transport), rendering, and post-rendering partners. • What to do if plant accidentally processes infected material. • What assistance can NVS provide or states provide, such as pre-staged mobile grinders, cold or other storage; exercise with States. • Work with environmental agencies on relaxing discharge limits to increase capacity (advance risk assessments?) • Determine how to make economics work, like outlets for MBM other than pet food. • Increase other feed products. Additional testing to assure safety; additional lab capacity? Ramped up incoming C&D. • How to get free of infected status (similar to farms?) • Develop secure carcass management plan.
• How to make rendering a key component of response; once a few exercises are conducted, we'll know more and be able to provide more options and guidance. exercises/trainings should include: • Transportation Exercise(s) Transport from farm Transport to Rendering Facility Transport for off-site Composting • Rendered Product to Power Plant as Fuel • Plant Certification • Worker PPE Training

• Prepositioned plans for certain types of emergencies? Perhaps on a pilot level?
• Set up State-Federal-industry working group to address high level questions and come up with a plan – need actual program management to keep them on track.
• Is there any way to make some minor changes in the way the livestock industry does things to facilitate rendering?
• Develop agreements in advance. Should consider changes in species from normal ops; different ratio of species; hours of operation, larger volume for throughput; permit modifications; hauling permissions; receiving variations (slurry vs whole animal).
• Deployment plan for workers (what can be done while the plant is down regarding pay/compensation) – can workers be used elsewhere in plant, can they be used elsewhere in response? They still need a paycheck.
• Plant should develop checklists too for what should be in place prior to an incident.
• Renderers develop a plan to address questions.
• Entire supply chain needs procedures, practices.
UNCERTAINTIES
• Renderers need to understand how long it will take them to get a disease free certification post-outbreak so they can calculate the cost-benefit of participation; also aren't disease free while working with infected carcasses, so can't continue normal business operations at the same time.
• Minimize uncertainties.