

Steele County, Minnesota

GUIDELINES FOR EMERGENCY MANAGEMENT

Natural or Man Made Livestock Disaster Response Plan

Adopted by the Steele County Board

23 February 2010

The following guidelines for emergency management were developed to assist staff and administration in the management of emergency operations during a natural or manmade disaster

For more information on the use and application
of these Guidelines for Emergency Management, please contact:

The Emergency Management Director
Mike Johnson
107 West Main Street
Owatonna, MN 55060
(507) 444-2454

I. OVERVIEW

A. Introduction.

The objective of the Steele County Natural or Man Made Disaster (NMMD) Response Plan is to provide Steele County a plan to respond to a fire, tornado, flood or other local emergency. This plan assigns specific roles and responsibilities for a response to a NMMD and outlines county and state interagency cooperation. This cooperation will be essential to responding rapidly to any threat to Steele County's livestock and poultry industry.

II. PURPOSE and SCOPE

The purpose of this plan is to ensure the Steele County Emergency Operations Plan (EOP) includes response to a natural or manmade emergency. This plan would apply to animals that are abandoned or neglected when injured or killed by natural or manmade disasters.

This plan does not apply to a Foreign Animal Disease. Responses to these types of events are the responsibility of the Minnesota Board of Animal Health and Minnesota Department of Agriculture.

This plan does not apply to those diseases proven to be zoonotic (causing human disease such as monkey pox, some forms of Avian Influenza, and many others) as these diseases fall under the primary jurisdiction of county health departments locally and the Minnesota Department of Health at the state level. For these instances, the Board of Animal Health (BAH) and Minnesota Department of Health (MDA) will be supporting agencies available to provide capabilities and resources for their responses when requested.

III. PLANNING ASSUMPTIONS

This response plan incorporates the resources of Steele County along with assistance from State and Federal agencies as well as private industry represented within our county.

IV. AUTHORITIES

A. Local

Steele County will be the lead agency to a local emergency response such as a fire, flood, tornado or other local disaster.

B. State

The Minnesota Board of Animal Health (BAH), Minnesota Pollution Control Agency (MPCA) and the Minnesota Department of Agriculture (MDA) will be supporting agencies for these responses and are available to provide technical and tactical resources for these responses when requested.

V. Policies

- a. Add Emergency Notification Procedure (Addendum A)
- b. Add NIMS Chart (Addendum B)

VI. SITUATION

Steele County has an extensive and varied animal industry and its impact is important to its economic prosperity. This plan is designed to provide direction and guidance in the aftermath of a natural or manmade disaster.

VII. CONCEPT OF OPERATIONS (Steele County Operations Chief)

Incident Action Plan:

NMMD emergency response operations are intended to reduce animal loss while protecting Steele County's natural resources by using the following activities to accomplish these principals. 1) Evaluate the overall situation; 2) Determine scope of area; 3) Incident Action Plan Development; 4) Implementation

A. Coordination and Control

- a. For significant incidents the Steele County Emergency Operations Center will be activated. Once activated, an Incident Command Post will be established.
- b. Depending on the scope of the event, supporting agencies may be involved for technical and tactical assistance.
- c. The Steele County NIMS chart will be used to develop lead authority and public information and reporting.

B. Initial Detection and Assessment

Any of the Steele County Ag Agencies or First Responders may be the first observers of a natural or manmade disaster.

C. Resource Allocation

Local resources will be used to provide personnel and resources to response in the organization of tactical and technical support. The kinds of resources requested may range from agricultural outreach specialists to animal handlers, GIS expertise, excavation

equipment, materials and operators to clerks. How and where resources are used on the incident will be determined by Steele County based on the incident objectives.

D. Implementation Activities

Measures to dispose of animal carcasses will be based on the use of Addendum C. The five options available will be assessed based on land mass area, soil types, water tables, type of disaster, land fill availability, rendering availability, compost material availability, equipment availability and incineration availability. The assessment will include cost, capacity, advantages and disadvantages along with an environmental assessment.

VIII. COUNTY LEVEL AGENCIES ROLES AND RESPONSIBILITIES

Local and/or county government is expected to develop and maintain response plans that include animal issues, both resulting from disasters and due to disease outbreak. Coordination with BAH and MDA will facilitate development of response plans that best reflect State and Federal animal health policy.

A. County Commissioners (CC).

The CC is responsible for developing an adequate emergency response organization inclusive of all local response agencies, capable of providing long-term response and support to emergency situations.

B. County Emergency Management.

The County Emergency Management Director is responsible for

- Activating the local EOC;
- Keeping the CC informed of incidents and providing advice in support of response measures;
- Providing liaisons to affected jurisdictions;
- Coordinating local activities with the state agencies in accordance with this plan;
- Coordinating disaster-related public information
- Coordinating government and private resources including equipment and personnel; and
- Coordinating geographical information technology

C. County Health.

In general, county health representatives are responsible for coordinating activities with Minnesota Department of Health (MDH) in ensuring the health of residents involved in a NMMD incident.

Primary responsibilities include:

- Providing assistance with human health issues involving destruction of carcasses;
- Assisting in providing training for first responders.

D. Law Enforcement.

County Sheriffs may be requested to implement adequate movement control, and other support measures in the exposed zone. Security measures will be required throughout the duration of the emergency.

Law enforcement agents may be needed for:

- Assisting with communications resources;
- Assisting with perimeter and site security/access and implementation of traffic control for access and movement in the quarantine area;
- Visual inspections of animal transports;
- Supporting disposal activities

E. Fire Departments.

Local fire resources may be needed to aid in:

- Decontamination operations;
- Provide water for foaming operations in poultry euthanasia situations

F. Public Works

Local public works departments may provide response for movement control operations by positioning appropriate signage and barriers. Disease eradication measures will require use of heavy equipment. Many environmental issues will be addressed such as the potential for water contamination and location of critical service infrastructures.

Public works personnel may be needed for:

- Providing guidance, equipment and signage for re-routing of traffic in and around the affected area;
- Providing equipment and staff to conduct decontamination operations, if required;
- Assisting with traffic control needs;
- Transporting carcasses, and/or debris;
- Providing information on potential sources of outside resources (i.e. contractors, equipment, sources, and so on); and
- Providing emergency communication.

G. County Attorney

Potential areas of conflict may be anticipated when local governmental officials undertake a comprehensive planning process. However, not all possible contentious issues will be addressed. Involvement of jurisdictional legal counsel in the planning process and their availability during a NMMD emergency will be critical to ensure successful response and recovery efforts.

H. Public Information Officer

It is important that the general public receives a unified message detailing the coordinated measures underway to protect human and animal health, and safe guard the local and state economy.

I. Geographic Information Systems Coordinator

Mapping and tracking animal locations through the county's database. Provide soil and ground water map information. This information will be used to help expedite response and recovery operations.

J. County USDA/FSA

May be responsible for:

- Assessing the impacts of the NMMD on local agricultural producers and agribusiness
- Providing leadership and coordination for all USDA emergency programs at the county level
- Administering local compensation programs to affected producers as authorized by the U.S. Secretary of Agriculture
- Assisting in the valuation of livestock and poultry and delivery of indemnity payments to producers who have animals depopulated due to the event.
- Assists in determining locations of livestock or poultry premises and informing producers of control activities

K. County USDA/ NRCS

May be responsible for:

- Assisting in disposal site selection
- Providing guidance and response support for conservation structures at or near the disposal site(s)
- Assists in the production of GIS data layers and map production

L. Local Department of Transportation

May be responsible for:

- Coordinate resources and serve as liaisons to their state offices
- Determine local resources available and necessary to respond to an incident.
- Perimeter rerouting & logistic support
- Coordinate disposal and disposal resources

M. County Solid Waste Officer

County Solid Waste personnel may be needed to:

- Assist in determining carcass disposal methods and options
- Identify carcass disposal sites
- Assist in determining potential water contamination issues
- Assist in the location of critical service infrastructure

N County Feed Lot Officers

County Feed Lot Officers may be called on to assist in identifying /confirming livestock and poultry disposal sites in the county.

Acceptable methods of large-scale carcass disposal in Minnesota may include burial, composting, or rendering. If burial is the most appropriate method of disposal, it is anticipated that the Minnesota Pollution Control Agency in coordination with county technical experts will identify proper site locations.

O. County University of Minnesota Extension

May be responsible for:

- Assisting in public education
- Providing aid to producer in terms of mental health care as well as physical needs during quarantine
- Serving as a liaison between producers and incident command

P. Others

Local Agricultural Businesses may be called upon to assist as needed.

1. Assist with euthanasia, disposal and cleaning and disinfection
2. Local Veterinarians called upon to Assist in disease notification and prevention

IX. Private Sector

Private interests such as producers, producer organizations, auction markets, slaughtering establishments, and renderers have a significant interest in this response plan. These enterprises will be notified by Steele County or designees when an animal emergency exists. They will be encouraged to actively participate in an emergency response. Their resources and expertise will be indispensable in response and recovery efforts.

Many activities involved in responding and recovering from a NMMD outbreak will be contracted with private enterprise. Contracted activities may include animal appraisal, euthanasia, disposal and cleaning and disinfection..

A crucial role for professional organizations and businesses will involve communication. It is expected that organizations within the agriculture community will actively seek a role in gathering information from Steele County and State authorities, disseminating that information to their members, providing information from members to policy-makers as requested, and providing joint government /industry statements to the media. Professional organizations should have communication rosters and mechanisms in place to accomplish this role. Steele County will notify other organizations as appropriate.

Local stakeholders will play a key role in a NMMD response

A. Trade associations may:

- Provide product expertise;
- Communicate to producers, industry, members of local and state organizations and the public;
- Coordinate messages and media contact;
- Facilitate government and producer contact;
- Primary contact for growers and producers; and,
- Maintain contact lists for notification.

B. Voluntary Agencies.

1. Salvation Army

May be called upon to:

- Provide temporary accommodations and emergency feeding for operations for workers; and
- Provide counseling services for anyone mentally or emotionally affected by the incident.

2. American Red Cross

May be called upon to:

- Provide temporary accommodations and emergency feeding operations
- Provides counseling services for anyone mentally or emotionally affected by the incident.

X. ATTACHMENT

A. Emergency Notification Procedures

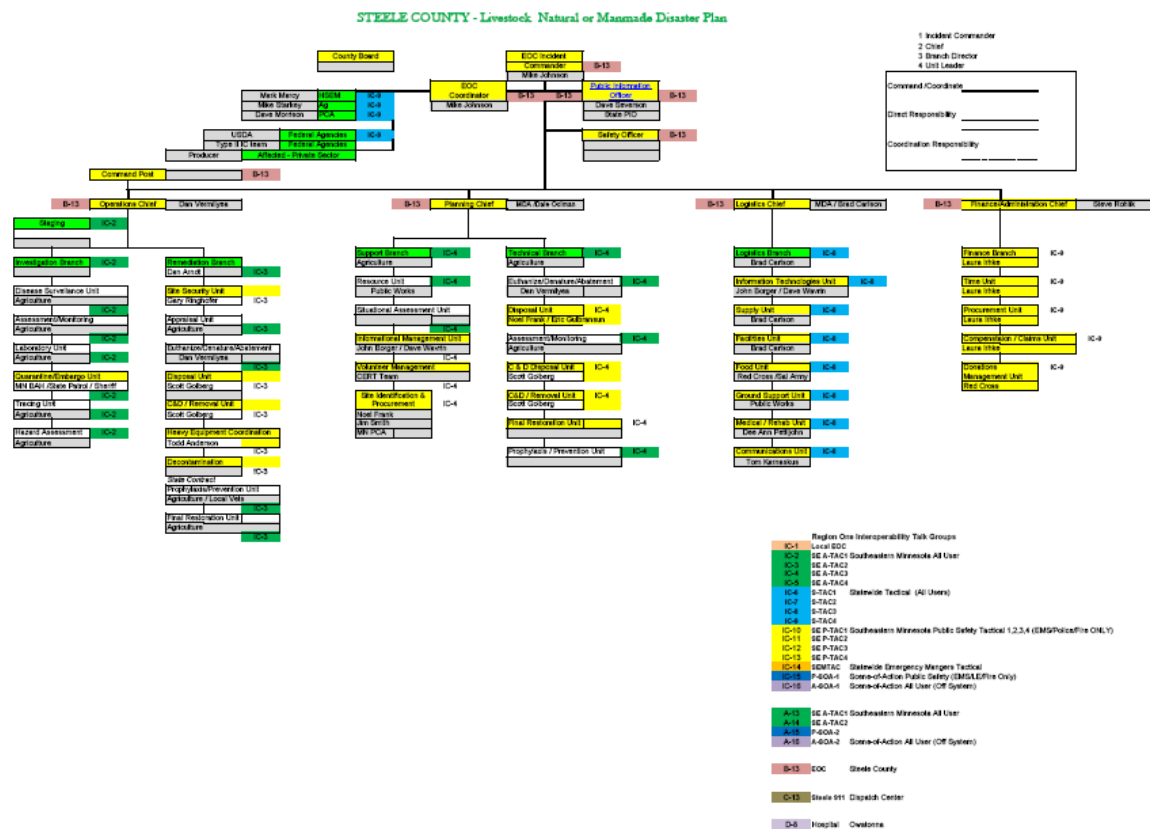
B. National Incident Management System

C. Infectious Disease Outbreak, Man-Made or Natural Disaster requiring Major Carcass Disposal

Addendum A

Revised Date: 6/25/08		Steele County, Minnesota Emergency Operations Center Notification List			
Instructions:		Please provide your emergency contact information for your staff that you would like notified in the cells below. This information will be uploaded into the Emergency Notification Server and will be used to contact you during a disaster when the EOC is activated.			
	Name	Voice1	Voice2	Voice3	Email
Emergency Management Director	Mike Johnson	507-456-0513	446-0449	774-7231	mikej@ci.owatonna.mn.us
EOC Coordinator	Bonnie Hermel	507-257-2155	507-330-3470		bonnie.hermel@ci.owatonna.mn.us
Steele County Board Chair					-
Steele County Coordinator	Dave Severson	444-7431	451-2344		dave.severson@co.steele.mn.us
Steele County Sheriff	Gary Ringhofer	444-3815	451-7521	507-456-7475	gary.ringhofer@co.steele.mn.us
Steele County Chief Deputy	Milo Dahlin	444-3819	507-456-7474	455-9115	milo.dahlin@co.steele.mn.us
Steele County Highway	Anita Benson	444-7670	456-7472		anita.benson@co.steele.mn.us
Steele County Feedlot Officer	Dan Vermilyea	444-7488	507-456-6593	507-437-8457	dan.vermilyea@co.steele.mn.us
Steele County GIS	Dave Wavrin	444-7479	451-5914	456-9284	dave.wavrin@co.steele.mn.us
Owatonna Fire Chief	Mike Johnson	507-456-0513	446-0449	774-7231	mikej@ci.owatonna.mn.us
NRCS	Noel Frank	451-6730 x3			noel.frank@mn.usda.gov
Steele County SWCD	Dan Arndt	451-6730 x3	456-5279		dan.arndt@mn.nacdn.net
Steele County Public Health	DeeAnn Pettyjohn	444-7665	451-8644	612-532-4068	deeann.pettyjohn@co.steele.mn.us
District Veterinarian - BAH	Dale Neirby	507-334-8045	651-238-2220		dale.neirby@bah.state.mn.us
MN Dept. of Agriculture	Mike Starkey	612-201-6286	651-755-2721		michael.starkey@state.mn.us
Extension Service	Brad Carlson	444-7686	507-234-5720	507-521-6012	bcarlson@umn.edu
District Veterinarian - BAH	Brad Peterson	444-2483			brad.peterson@bah.state.mn.us
Agronomy Manager -CVC	Chuck Wagner	451-1230	507-456-4102	507-583-2214	chuckw@centralvalleycoop.com
Steele County Planning & Zoning	Dale Oolman	444-7482	507-635-3532		dale.oolman@co.steele.mn.us
Steele County Environmental Health	Scott Golberg	(507) 444-7477			Scott.Golberg@co.steele.mn.us
Steele County MIS/GIS Director	John Borger	507-444-7466			john.borger@co.steele.mn.us
MN HSEM					-
MN EOC (651) 215-5731					
Mn State Duty Officer					
800-422-0778					
Steele County EOC phones					
507-446-2317					
507-446-2318					

Addendum B



Addendum C

Infectious Disease Outbreak, Man-Made or Natural Disaster Requiring Major Carcass Disposal

The Minnesota Pollution Control Agency (MPCA) has considered their authorities in the disposal of large numbers of animal carcasses due to a catastrophic infectious disease outbreak or man-made disaster or natural disaster. Disposal options are presented and include a description of the activity, regulatory requirements, implementation, cost, capacity, availability and advantages/ disadvantages to the disposal option. In addition, a listing of permitted lined landfills is included. There are other disposal options but they are omitted because they are not suitable for large scale disposal. This information is provided to assist with your planning for agricultural emergencies.

The following carcass disposal options are effective for the protection of public health, the environment, and surviving livestock. As soon as reasonably possible:

1. Dispose of the carcasses in a properly operated compost operation using the guidance found at:
http://www.bah.state.mn.us/animals/carcass_disposal/carcass_disposal.htm.
2. Thoroughly burn the carcasses, or

3. Have the carcasses picked up by a licensed rendering facility, or
4. Bury the carcasses at a depth adequate to prevent scavenging by other animals,

Large amounts of carcasses from a disaster can be disposed of onsite in an expedited manner. Minn. R. 7001.3050 subp. 2F exempts the requirement to obtain a permit prior to waste disposal, in order to immediately dispose of waste in response to an emergency. A permit application must be submitted within 90 days after the exemption. Minn. R. 7035.0400 exempts the solid waste management requirements to expedite the management of solid waste and to prevent, abate, or control pollution in response to an emergency. The MPCA recommends using best management practices discussed in the attached methods. All carcass disposals must be done in a nuisance-free, pollution-free, and aesthetic manner. If the need for large-scale disposal arises from infectious disease, the producer should contact the BAH immediately before proceeding with any transportation or disposal activities.

Minn. R. Ch. 7000.7000 outlines the requirements for the issuance of a variance by the MPCA, which in effect allows the MPCA to step aside in deference to agricultural authorities. Obtaining a variance would require public notice and action by the MPCA Citizen's Board. This process could take up to 90 days. This type of approach may not be appropriate in a time-sensitive situation.

In addition, the MPCA has the authority to issue a "No Action" Letter for waste generated in an emergency that, as ordered by the BAH, needs to be disposed of promptly and in a manner that is in conflict with statutes and/or rules in order to prevent the spread of disease. This authority does not grant the MPCA to allow violation of rules and/or statutes. Rather, it allows the MPCA to use its prosecutorial discretion, and the letter can be used to notify a regulated party that it will not take an action, subject to certain conditions.

Method 1: Composting

Description

Composting of animal carcasses is a natural process by which bacteria and fungi convert organic matter into an organically rich material that may be used as a soil amendment. Its suitability in destroying pathogens is highly dependent on the susceptibility of the specific organism to relatively low temperatures (i.e., under 160F). It will not control the infectiousness of carcasses infected with pathogens able to survive this temperature.

Composting usually requires the construction of a mound of animal carcasses mixed with other materials such as straw and poultry litter, or the use of a specialized closed vessel. Carcasses are allowed to decompose under aerobic (i.e. oxygenated) conditions, which will usually result in a low pH and production of heat and gas as waste products. There are many different types of composting, some of which are more rapid than others. Each type is highly dependent on design and operation. Cost varies greatly depending on the type of composting chosen and the availability of materials (e.g., sawdust or straw needed as cover for windrows) and equipment. There can be significant costs associated with proper monitoring and tending of the process, to assure complete destruction of pathogens.

Cost and Considerations

Success of composting is highly dependent on starting with the proper blend of carbon, nitrogen, and water, and on maintaining the proper moisture, temperatures, and oxygen concentration. Moisture should be kept at about 50 percent. If the moisture content is too high and anaerobic decomposition sets in, the process will stop. The ideal temperature is 68 C or 154 F; this temperature will be reached if the process is properly initiated and maintained. There is a process in most composting systems for oxygenating; this usually involves turning, mixing or aerating the product. If oxygen levels are too low, the process becomes malodorous and inefficient and may not break down the organic matter completely. Use caution before attempting chemical disinfection of carcasses destined for composting, because disinfectants will inhibit the microbial action needed for composting. If disinfection is required, excess applications of disinfectant should be avoided. Keep in mind that composting is not effective in deactivating certain temperature-resistant infectious agents.

Regulatory Requirements

Wastes resulting from agricultural operations are considered solid waste in Minn. R. Ch. 7035. In order to operate a composting facility in Minnesota, a solid waste permit from the Minnesota Pollution Control Agency (MPCA) is ordinarily required.

Composting can be very dusty. Operators will need to be trained on site hazards and the proper use of personal protective equipment. They may need to be medically cleared to wear respirators (OSHA - 29 CFR 1910.134).

Implementation

The Minnesota Board of Animal Health recently updated its web page on carcass disposal, which contains an extended overview of composting carcasses.

(http://www.bah.state.mn.us/animals/carcass_disposal/carcass_disposal.htm) A brief summary of the composting web page is provided below.

- Compost operations must take place on an impervious pad constructed of rot-resistant materials. The pad must be able to withstand the pressures exerted by the motorized equipment.
- The composting must be done under a roof, unless a bulking agent or cover is available to repel water.
- Moisture content of the compost pile should be maintained between 45% and 50%.
- Carcasses and litter should be layered so that carbon: nitrogen ratio is between 15:1 and 35:1. See below for commercial sources of carbon and nitrogen.
- Carcasses must be kept at least six inches from the edge of the compost pile.
- To ensure pathogen reduction, piles must go through two complete heat cycles. The compost pile should reach a temperature of 135 F within 5 days. Once the pile reaches 125 F, turn the compost pile to restart a new heating cycle.
- Either of the following recipes can be used for establishing a compost pile:

	Recipe #1	Recipe #2
Carcasses	100 pounds	100 pounds

Carbon Source	150 pounds of poultry litter	200 pounds of sawdust
Water	4 gallons	10 gallons of water or liquid manure
Time	30 – 90 days/bin	30 – 90 days/bin

Advantages

- ☐ Relatively inexpensive.
- ☐ Easy to set up on-site.
- ☐ May have a product usable for soil amendment when composting is complete.
- ☐ Will deactivate certain pathogens.
- ☐ Raw materials are readily available in farm settings (i.e. sawdust, straw, hay, poultry litter).
- ☐ Does not require burial.
- ☐ Can be done in winter.
- ☐ Can be done with minimal disruption to the community at large (i.e., no large plumes of black smoke).

Disadvantages

- ☐ Will not deactivate heat-resistant pathogens, or break down certain organic chemicals.
- ☐ Can take a significant amount of time for the process to finish, especially in cold weather.
- ☐ Requires operator attention, monitoring, and expertise.
- ☐ Leachate is produced that needs runoff control.
- ☐ May need disposal of the compost if tests show that the pathogens are not deactivated or product is otherwise unusable.
- ☐ May not be practical for large-scale carcass management in a confined area.
- ☐ For some methods specialized equipment is required, such as preprocessing carcasses into fragments.
- ☐ Supply of some types of raw materials such as sawdust may not be readily available due to competition for its use as a fuel.

Method 2A: Air Curtain Incineration

Description

Incineration occurs within a confined chamber or pit. This may be above or below ground level. Both types of incineration use a blower with an air manifold that forms a vortex of air over the fire minimizing the smoke and odor and maximizing heat. Aside from the time necessary for ordering and delivering either system, lead time is necessary to set up equipment.

The above-ground system, also known as a box type burner, is transported on a flatbed trailer and requires a crane to set the unit on the ground. It weighs 21,000 - 50,000 pounds and uses a portable blower and manifold system.

A trench-type system is an air manifold attached to a portable blower. A pit is dug approximately 35 feet long, 8 feet wide and 10 - 15 feet deep. The manifold is placed along a long side of the pit, for use while carcasses and fuel are fed.

Chlorine-based disinfectants (bleach) should not be used on carcasses intended to be disposed of by air curtain incineration as it leads to the production of dioxin and furan in the incineration process.

Capacity

The air-curtain trench system will destroy about 40 tons of animal carcasses per 10-hour day. Thorough combustion requires wood fuel at a rate of 1.6 cords of dry oak firewood per hour. The body fat and moisture content of the carcasses affect the amount of fuel needed and the cycle time.

Implementation

The following issues need consideration when deciding whether to employ this option:

- ☐ Whether upgrading of access roads is necessary to handle heavy equipment.
- ☐ Box incinerators are big and heavy. Crane(s) are needed to load and unload the unit.
- ☐ Backhoes are needed to dig a pit of sufficient size and depth. Lifting equipment (such as a truck-mounted grapple) is needed to load carcasses and wood fuel into the pit.
- ☐ Wood fuel is needed to support combustion of the carcasses.
- ☐ Diesel fuel for equipment and the generator/engine that runs the air blowers.
- ☐ The air curtain incinerator can require 3 to 5 operators per shift, and might run 24/7.
- ☐ Operators will need to be trained on site hazards and the use of personal protective equipment. They may need to be medically cleared to wear respirators (OSHA - 29 CFR 1910.134).
- ☐ A staging area may be needed for decontaminating transport vehicles and personnel.

One landscaping company in Minnesota and the Minnesota Department of Natural Resources hold current MPCA air-quality permits to operate box burners. Also the Minnesota Department of Agriculture (MDA) owns a trench burner. These units may be available for emergency disposal activities.

Regulation

- ☐ An air quality permit application and valid permit is ordinarily required.
 - A solid waste license is required from the county.

Advantages

- ☐ Completely destroys carcasses, along with minimal smoke and odor, if operated correctly. Radiant and convective heat is conserved with good efficiency and if good practices are followed, tissue destruction is more thorough than open burning.
- ☐ Because of the controlled nature of the burn, fuel is used more efficiently, resulting in less fuel needed compared to pyre burning.
- ☐ In most cases, disease causing organisms and organic toxics are quickly destroyed.
- ☐ There is less visual and emotional impact than pyres.
- ☐ Small footprint. Future use of the land employed is not restricted if residue is not buried at the site.
- ☐ Residual ash is of low volume. If pathogens are determined to be deactivated, ash can be incorporated into soils or buried on site.
- ☐ Typically, use not restricted by hydrology or geology of site. However, it may be difficult to construct a proper trench in sandy loose soils or in areas where bedrock is close to the surface.
- ☐ Use is not restricted by weather conditions. Rain may make site difficult for vehicle use, but runoff management is typically not a difficulty.
- ☐ Has been used by natural resource departments in Minnesota and Wisconsin for CWD carcass management, so expertise is available to address logistics and operating concerns. In addition, one State of Minnesota emergency response contractor has conducted practice burns with the unit owned by the BAH.

Disadvantages

- ☐ The box-type air curtain burner is a heavy piece of equipment. Roads must be able to sustain the weight and cranes are necessary to off load it.
- ☐ The air curtain burner system has a fixed maximum capacity, as does any other type of processing equipment. The time to use it must be compared to the time necessary to utilize other options.
- ☐ Relocating the unit requires tear-down, transport and set-up in the new location. This might be a hurdle if many sites are involved in an outbreak.
- ☐ Fuel to sustain carcass incineration must be provided and it can be expensive. If not available on-site, this will need to be brought in from off-site. This is an additional logistics item particularly

since fuel delivery transport will require decontamination before it leaves the site. Do not use treated (CCA) wood as fuel; the resulting ash is extremely toxic. This wood is often tinted green in color but if weathered it may not be easy to identify.

- ☐ A significant amount of operator skill is needed to operate the system. Otherwise it will generate smoke and odor, and disease causing organisms or toxic substances won't be destroyed.
- ☐ Ash will require disposal.
- ☐ Won't be 100% effective in destroying all pathogens, non-organic toxics and radioactive materials.

Availability

Air curtain incinerator above ground units (box units) can be purchased at a cost up to \$100,000. Trench burners are available for approximately \$35,000.

The MPCA is transferring ownership of a portable trench air curtain incinerator to the Minnesota Department of Agriculture. If tasked by the MDA to provide support in disposal of carcasses, the MPCA can access and operate the equipment utilizing a state trained emergency response contractor.

The Minnesota Department of Natural Resources (MDNR) has a box-style air curtain burner. Currently it is stored at Mille Lacs Wildlife Management Area near Onamia.

Websites

Air curtain incinerators: www.airburners.com (photos, specifications, cost information)

Minnesota Department of Agriculture: www.mda.state.mn.us

Minnesota Board of Animal Health: www.bah.state.mn.us

Method 2-B: Uncontrolled Open Burning ("Pyre method")

Description

Incineration of carcasses through open burning is usually accomplished through construction of a pyre. This is fuel intensive. While described in this document because this method is included in USDA guidance, open burning of most materials likely considered for fuel in a pyre is ordinarily prohibited under Minnesota statutes without special permission.

Implementation

Pyres are usually constructed out of coal, straw and wood . Fuel such as diesel or fuel oil is common for ignition. The USDA suggests the following quantity of fire bed material per cow (or per 5 swine or sheep): 3 bales of straw, 3 untreated heavy timbers, 50 lbs. of kindling wood, 500 lbs. of coal (6-8 inch size lumps) and 1 gallon of fuel oil. The fire bed should be constructed with a straw bale base of 3 length-

wise rows of bales about 1 foot apart with loose straw pushed between the bales. Timbers are then placed lengthwise on top of each row of straw and the remaining large and medium sized timbers across the fire bed with 6 to 12 inches of space between them. Next, small kindling wood is placed on top with loose straw spread over it. Coal is then spread evenly, at a rate of 500 lbs. per square yard of surface to make the bed level. Carcasses are placed on top of this on their backs with feet up in an alternate head to tail manner (a backhoe can be used in this placement). Loose straw and fuel oil are spread over this. More fuel (wood/coal) may need to be added with a front end loader as the fire progresses.

Considerations

Open burning of most of the materials that would be considered as fuel for a pyre is ordinarily prohibited by Minn. Stat. 88.171, and will require a variance determination from the Commissioner of the DNR. [see footnote one below]

This method will likely not result in complete deactivation of pathogens compared to other methods of disposal. Under actual conditions (such as documented in the United Kingdom BSE outbreak) it has proven difficult to reach de-activation temperatures throughout the pyre. Because this type of combustion may not result in complete deactivation, management and disposal of ash may require additional safeguards (i.e., would need to be managed as infectious waste even after the effort and expense of a pyre). Ash is easily carried by wind and rain, so the area requiring final site cleanup could be far larger than the immediate burning area.

The amount of wood needed to establish and maintain a pyre is significantly more than that needed to run an air curtain incinerator due to poor combustion and loss of radiant and convective heat. It generates much smoke. This attracts news media representatives and pyre photographs obtained by media from aircraft are likely to be emotionally disturbing. Therefore public perception may be negative when this waste reduction method is chosen. Proper duration of the burn is difficult to judge.

Chlorine should not be used as a disinfectant on carcasses intended to be open burned as it is a dioxin and furan precursor in the combustion process.

Regulation

A DNR Open Burning permit is required.

Implementation

Operators will need to be trained on site hazards and the use of personal protective equipment. They may need to be medically cleared to wear respirators (OSHA - 29 CFR 1910.134).

Advantages

- ☐ Geology and hydrology of site are not limiting factors if preparation is thorough and site cleanup is prompt.
- ☐ Can be done simultaneously on multiple sites since special equipment is not needed.

- ☐ If good practices are followed, it can deactivate most pathogens.
- ☐ Raw materials are readily available.
- ☐ Heavy equipment for pyre construction is readily available.
- ☐ Significantly reduces the volume of carcasses and infected material.

Disadvantages

- ☐ Constant temperature is difficult to maintain across the entire pyre and for the proper amount of time.
- ☐ Local air quality can be significantly affected due to lack of complete combustion or lack of secondary combustion.
- ☐ The large fires in conjunction with the smell, smoke and concern about particulate spread of potential pathogens or toxics will make public perception of this method very negative.
- ☐ Carcasses and other infected or toxic materials will not be completely destroyed and will need to be disposed. This residue will still need to be treated as infectious or toxic waste.
- ☐ Disposal of burn by product (ash) may be difficult due to the amount and weather conditions (i.e. can be easily carried on the wind or washed away by rain).
- ☐ More than one burn may be necessary depending on completeness of first burn and weather.
- ☐ Weather conditions will dictate the burn schedule.
- ☐ Local fire officials will have to be on hand in order to ensure fire safety, that is, that it does not set off a prairie or forest fire.
- ☐ Significant amounts of fuel to sustain carcass incineration must be provided. If not available on-site, this will need to be brought in from off-site. For diseases that can be spread by motor vehicle traffic, this is an additional logistics and quarantine concern since fuel delivery transport trucks will require decontamination before each truck leaves the site.
- ☐ Do not use treated (CCA) wood as fuel; the resulting ash contains extremely toxic metals.
- ☐ Fuel required per animal will be higher than with air curtain incineration.
- ☐ Training of personnel in fire safety and proper use of fire associated personal protective equipment will add time and cost.
- ☐ A significant amount of operator skill is needed to operate the system, or else smoke and odor will be produced, and disease causing organisms or toxics won't be destroyed.
- ☐ Won't be 100% effective in destroying all pathogens, non-organic toxics and radioactive materials. This will hinder disposal of ash.

Method 3 – Rendering

Description

Materials for aesthetic or sanitary reasons are not suitable for human food; it is feedstock for inedible rendering processes. Much of the inedible raw material is rendered using the "dry" method. This may be a batch or a continuous process in which the material is heated in a steam jacketed vessel to drive off the moisture and simultaneously release the fat from the fat cells. The material is first ground, then heated to release the fat and drive off the moisture, percolated to drain off the free fat, and then more fat is pressed out of the solids. At this stage it is called "cracklings" or "dry-rendered tankage". The cracklings are further ground to make meat and bone meal. A variation on a dry process involves finely chopping the material, fluidizing it with hot fat, and then evaporating the mixture in one or more evaporator stages. Some inedible rendering is done using a wet process, which is generally a continuous process similar in some ways to that used for edible materials. The material is heated with added steam and then pressed to remove a water-fat mixture which is then separated into fat, water and fine solids by stages of centrifuging and/or evaporation. The solids from the press are dried and then ground into meat and bone meal. Most independent renderers process only inedible material.

Considerations

- Use caution before attempting chemical disinfection of carcasses destined for rendering. If disinfection is required, excess applications of disinfectant should be avoided.
- Rendering may not be effective in deactivating certain temperature-resistant infectious agents.
- Chlorine-based disinfectants (bleach) should not be used on carcasses intended to be disposed of by rendering as it could lead to the production of dioxin and furan in the rendering process.
- Carcasses or discarded animal parts must be in vehicles or containers that are leak proof and covered. The vehicles also need to be inspected and have a permit, unless the vehicle belongs to the owner of the animal before it died.

Capacity

- ☐ Depending on the animal species and causative agent, rendering plants may be at production capacity severely limiting available plant capacity for the influx of additional carcasses.
- ☐ Some rendering facilities lack the equipment to be able to receive dead stock. These rendering facilities are only assessable via the attached slaughter facility.

Cost

- Rendering is generally more expensive than other carcass disposal processes. The cost of carcass transportation to the rendering site is an additional consideration.
- Although the volume is decreased, the rendered end product may not be suitable for industrial uses and may still need to be disposed of by one of the other carcass disposal methods described in this paper.

Regulation

- Minn. Stat. §53.82
- Minnesota Board of Animal Health Rules 1719.0100-1719.4600

Implementation

Rendering plants operate as for-profit business entities. Procuring in-state and/or out-of-state contracts for rendering services may be time consuming and expensive.

Advantages

- ☐ Recyclable resources: May have a product usable for soil amending, animal feed or industrial uses when rendering is complete.
- ☐ In most cases, disease causing organisms and organic toxics are quickly destroyed.
- ☐ Can be done year-round. Use is not restricted by weather conditions.
- ☐ Can be done with minimal disruption to the community at large (i.e., no large plumes of black smoke).
- ☐ Can be done simultaneously for multiple sites since special equipment is already in place.
- ☐ Significantly reduces the volume of carcasses and infected material.
- ☐ There is less visual and emotional impact than other carcass disposal methods.
- ☐ No footprint.

Disadvantages

- ☐ Biosecurity with carcass pickup. Potential for additional contamination as infected carcasses are transported to rendering facilities.
- ☐ Won't be 100% effective in destroying all pathogens, non-organic toxics and radioactive materials.
- ☐ May need disposal of the rendered product if tests show that the pathogens are not deactivated or product is otherwise unusable
- ☐ A significant amount of operator skill is needed to operate the system. Otherwise disease causing organisms or toxic substances won't be destroyed.
- ☐ Landfills may be located far from the renderer, adding to disposal costs.
- ☐ Procuring in-state and/or out-of-state contracts for rendering services may be time consuming and expensive. Transportation fees may be a significant portion of the cost.
- ☐ The rendering industry has a fixed maximum capacity.

- ☐ Does not allow for the disposal of bedding, housing material, and other infected items.
- ☐ Local community may have concerns.
- ☐ Decontamination (if possible) of the rendering facility/site after processing of contaminated carcasses will be time consuming and expensive.
- ☐ Rain may make carcass pick-up sites difficult for transporters.
- ☐ Not available in all areas.
- ☐ Not available for all species.

Rendering Facilities

Central Bi-Products Company

P.O. Box 319

Redwood Falls, MN 56283
 Don W. Davis
 507-637-2938
 dwdavis@centralbi.com

Central Bi-Products Company

P.O. Box 539
 Long Prairie, MN 56346
 Daryl Brever
 320-732-2819
 Sanimax amx, LLC
 P.O. Box 56
 South Saint Paul, MN 55075
 Tim Kedrowski
 651-451-6858
 tim.kedrowski@sanimax.com

Swift & Company –Worthington

1700 NE Highway 60
 Worthington, MN 56187
 Kevin Schweigert
 507-372-2121
 Kevin.schweigert@swiftbrands.com

Darling International, Inc.

9000 – 382nd Avenue
 Blue Earth, MN 56013
 Mark Zojonc
 507-526-3296
 mzojonc@darlingii.com

Hormel Foods Corporation 1 Hormel Place

Austin, MN 55912
Tim Carlson
1-507-437-5207
ttcarlson@hormel.com

PM Beef Holdings LLC
2850 Highway 60 East
Windom, MN 56101
Jan Vlieger
507-831-2761

Worthington Rendering Co.
24030 Roberts Avenue
Worthington, MN 56187
Sheldon Andrews
507-376-4711

Method 4-A: Burial On-site in a Special-Purpose Lined Landfill

Description

With this disposal option, burial of infected animal carcasses would be done in a trench comparable to a lined landfill that prevents release of waste liquids (called "leachate") to the environment. Collection of leachate is done using simple engineering methods. This disposal option can be best described as a "middle ground" between burial in a permitted lined landfill and uncontrolled on-site burial. A partially engineered landfill/trench could be located on-site or off-site. For use of this disposal option, limited site engineering is done prior to burial. These controls may include items such as: a low permeability soil barrier or synthetic liner barrier to protect the groundwater, a sloped bottom to direct leachate to a sump, a leachate collection system, a tank to store leachate if not recirculated back to the waste and an impermeable cap after completion. Depending on the disease, the leachate may be transported offsite by tank truck, or may need to be solidified and returned to the landfill/trench system.

Regulatory Requirements

Animal carcasses are considered to be solid waste. As such, the development of a solid waste landfill in Minnesota normally requires a solid waste permit from the Minnesota Pollution Control Agency (MPCA). It is also necessary to consult local units of government to determine what local requirements need to be followed.

Operators will need to be trained to handle site hazards and in the use of personal protective equipment. They may need to be medically cleared to wear respirators (OSHA - 29 CFR 1910.134).

Implementation

Once a suitable site is selected, the site needs to be cleared, grubbed and excavated. The construction of a low permeability barrier needs to either be constructed or a synthetic liner needs to be installed (either a

geomembrane or geosynthetic clay liner is acceptable). If the construction of low permeability soil liner is chosen, clay soils will need to be moved to the site and compacted in six inch lifts using a sheepfoot compactor. At a minimum, a two-foot-thick compacted soil liner should be constructed to protect the groundwater from any leachate resulting from the carcass disposal. The soil needs to be compacted to greater than 90 percent of the maximum standard proctor density. A sand drainage layer should be installed over the low permeability liner and sloped to a low area in the liner. From this low point, the leachate may be removed from the disposal area. The carcasses should be covered with soil at the end of the day to prevent scavenging and prevent the spread of the disease. When all the carcasses have been disposed, a low permeability cover system should be installed over the disposed waste to control infiltration of water. This waste needs to be sloped to prevent ponding of water on the cover.

Advantages

- Materials from multiple sites can be hauled to one central facility that is sited for efficiency.
- Carcasses, bedding, housing material and other infected items can be disposed of easily and in a secure facility.
- Design allows for control of leachate with groundwater protection.
- Use of a liner reduces cost of hydrologic site research that would otherwise be required if many disposal sites were used.
- Public acceptance is better for this option than just digging a pit or trench.

Disadvantages

- No active process to deactivate disease. It is containment rather than treatment.
- Lead time and money may be needed to obtain clay or synthetic materials for constructing the liner.
- It may be costly to construct the engineering control structures for this option. (i.e. liner, leachate collection system, pumps, tanks, and cover)
- Permitting and/or local approval may take too much time.
- Legislation may need to be passed that would offer incentives to property owners to take the infectious/toxic materials, if private property is used away from the originating farm.
- Requires a long-term commitment to contain and dispose of the leachate and maintain the site.

Method 4-B: Simple Burial Onsite in Hole or Mound

Description

This option relies on simply digging a hole and burying the carcasses without engineering designed to prevent contamination groundwater. Simple, low-tech steps are required to prevent erosion, scavenging, and nuisance conditions from occurring.

Costs

- Heavy equipment is needed, but is likely to be available locally at competitive rates.
- Operators will need to be trained on site hazards and the use of personal protective equipment (PPE). They may need to be medically cleared to wear respirators (OSHA - 29 CFR 1910.134).
- Maintenance cost of cap and any monitoring wells / lysimeters.
- Possible cost of groundwater treatment system (this could be significant). If a potable well is impacted a substitute drinking water source (e.g., hauled drinking water) could be necessary.
- Possible cost of an alternate option if this fails. The cost of an alternative in this case could be significantly more than if that alternative were implemented initially.
- Special materials may be needed for a cap (off-site clay and/or synthetic liner to prevent infiltration of precipitation).
- Decontamination of all equipment as it leaves the site.

Considerations

Knowledge about the soil type and hydrology is necessary before burial begins. Site conditions must allow for burial with a sufficient distance between the waste and groundwater yet deep enough to allow for a vegetative cap to be placed above the waste. Also, closure and maintenance of the site would be necessary to ensure that environmental impacts are minimized. The site should also allow for a set back of 100 feet from any individual well.

Regulatory Requirements

See Minn. R. Chapter 7035, which contains requirements disposal facilities. These include notification, quantity and type of waste, timeframe, and location requirements. County solid waste requirements generally also apply.

Implementation

The amount of livestock that can be buried is highly dependent on the space. Fourteen square feet of surface area should be allowed for an adult cow carcass. Five adult hogs or sheep can be considered equivalent to one bovine for this purpose. Multiple layers and stacking more than one animal deep should be avoided for large animals.

This option must not be implemented near lakes, rivers, streams, or conduits to water bodies. Carcasses should not be placed within five (5) feet of the seasonal high water table. Bedrock should not be less than ten (10) feet below the bottom of the burial trench, nor should it be used in very permeable soils or soils that contain sand or gravel seams, nor in areas of close proximity to groundwater used for drinking water. Large quantities of buried livestock may negatively and permanently impact the local groundwater aquifer.

Fluid leakage from carcasses occurs fairly rapidly with about 50 percent being produced in the first week after death. For cattle this is expected to average 168 liters total (80 liters in the first week). For sheep the figures are 8 liters total and one liter for lambs. For pigs the total is 12 liters, but pig herds are about 15 percent adults, 40 percent growers/finishers, and 15 percent piglets resulting in about 2,280 liters in the first week for a 1,000-pig herd. Most fluid leakage should finish in two months if putrefaction has progressed normally. Low temperatures, drying by air or submersion in (ground) water will slow down putrefaction rates.

With large carcasses, decomposition gas production must be reduced before burial by making large openings in the thorax and abdomen of carcasses manually, or by crushing them with heavy equipment.

The carcasses should be covered with (3) feet of soil to prevent scavenging. The cap should be vegetated as soon as possible.

Advantages

- This is the quickest option to contain carcasses, bedding, housing material, and other infected items.
- Be implemented under favorable hydrologic, geologic and weather conditions and will lessen chance of disease spread.
- Equipment to implement this option is readily available locally in all parts of the state.
- Can be sized to fit any volume of carcasses at a site (assuming land is available).
- In areas of thin topsoil or short distance to groundwater, a mound may be an option.
- Monitoring wells / lysimeters can be installed later to monitor groundwater impacts and migration potential of biological agent and decomposition products. If necessary, down-gradient treatment trenches can be installed later to address migration.

Disadvantages

- Operators need special training or experience on seasonal groundwater and bedrock identification and general excavating.
- The site of the burial area and a surrounding buffer zone will not be available for agricultural production for many years (~30 years), depending on the disease or toxin.
- Wet soils and wet weather may make excavation and use of the site for disposal very difficult.
- If proper site research is not done, porous soils and/or geology can result in rapid transport of carcass fluids via groundwater, causing release of disease organisms and / or putrefaction products to nearby drain tiles, streams, ponds, or wells, resulting in possible human health problems.
- Bloating of carcasses may force them out of ground and break up the cover if the carcasses are not punctured or otherwise opened, or if the weight and composition of cover is not sufficient. If

carcasses float out of the ground they will be very difficult to handle at that time. This situation will have a very adverse visual and olfactory impact.

- Footprint of burial and a surrounding buffer zone must be isolated from agricultural uses for years to prevent accidental exhumation (i.e. by plows). This must be recorded on the property deed. This may have an adverse impact on future value of the property.
- A soil cap over the burial must be maintained to prevent breach by erosion, settling and/or burrowing animals as well as damage by future human activities at the site.
- May not deactivate or destroy the pathogen.

Method 4-C: Transport to Permitted Lined Landfill

Description

Transportation of carcasses or carcass-combustion ash to a pre-existing landfill (public or private) for disposal in cells already in use, or disposed in newly constructed cells at such landfills.

Costs

Transportation and decontamination costs and landfill tipping fees.

Considerations

It is important to remember that landfill operators have the option of rejecting specific waste types. The state does not order landfill operators to accept certain wastes like carcasses from agricultural emergencies. Be aware that the landfill will have detailed requirements on handling, source of wastes, testing, and record-keeping.

Regulatory Requirements

Minn. Rule ch. 7035 and specific MPCA permit conditions apply to the landfills accepting the waste. Other local regulations may apply.

Advantages

- ☐ Carcasses from multiple disease locations can be hauled to one facility that generally has a large amount of available capacity.
- ☐ Large volumes of carcasses, bedding, housing material, and other infected items can be disposed of quickly.
- ☐ Landfills are closely monitored and regulated so maintenance costs are reduced and are already part of their operating obligations.
- ☐ Landfills are placed in locations that have the proper hydrology and geology to contain the waste.

- ☐ Landfill design allows for control of leachate and gas.
- ☐ Reduced cost of location research, permitting, and development of a new landfill.
- ☐ Public acceptance and perception may be better than methods producing large quantities of smoke.

Disadvantages

- ☐ Landfills may be located far from the producer, adding to disposal costs.
- ☐ Does not deactivate or destroy the pathogen, as landfills are not designed to produce the temperatures typical of aerobic composting.
- ☐ Local community may have concerns.
- ☐ Procuring in-state and/or out-of-state contracts for waste disposal may be time consuming and expensive. Tipping fees may be a significant portion of the cost.

Permitted Lined Landfills in Minnesota

Note: Some of the following facilities have Industrial Solid Waste Management Plans on file that specify the acceptance of certain animal carcasses not known to be infectious, while other facilities do not allow the disposal of carcasses. Phone numbers are provided so that emergency coordinators or waste generators may contact facilities before loading carcasses for shipment.

Landfills Permitted for Disposal of Mixed Municipal Solid Waste

SW-87

Blue Earth County/ Ponderosa Sanitary Landfill
 Scott Fichtner (507) 389-8381
 20028 Gooseberry Lane.
 P.O. Box 3024
 Mankato, MN 56002

SW-89

Brown County Sanitary Landfill
 Jane Starz (507) 233-6640
 21933 County Road 11
 Sleepy Eye, MN 56085

SW-56

Burnsville Landfill Inc.
 Debra Walters (952) 890-3248
 2650 Cliff Rd W
 Burnsville, MN 55337

SW-34
Clay County Sanitary Landfill
Kathy Maher (218) 299-5002
3301 190th St. S
Hawley, MN 56549

SW-143
Cottonwood County Sanitary Landfill
Jan Johnson (507) 831-1342
43979 County Road 22
Windom, MN 56101

SW-376
Crow Wing County Sanitary
Landfill LLC
Doug Morris (218) 824-1290
15732 Highway 210
Brainerd, MN 56401

SW-17
East Central SWC Sanitary Landfill
Eugene Kramer (320) 679-4930
East Central SW Commission
1756 - 180th Ave
(MN Highway 23 & County Road 60)
Mora, MN 55051-9802

SW-74
Elk River Sanitary Landfill
John Kellas (763) 441-2464
22460 Highway 169 Northwest
Elk River, MN 55330

SW-15
Morrison County Sanitary Landfill
Steven Backowski (320) 632-0121
17508 Iris Road
Little Falls, MN 56345

SW-79
Kandiyohi County Sanitary Landfill
Wayne Thompson (320) 231-6216
15650 Highway 71 NE
New London, MN 56273

SW-23
Lyon County Sanitary Landfill
Paul Henriksen (507) 537-6733
2025 - 200th Ave.
Lynd, MN 56157

SW-92
Mar-Kit Sanitary Landfill
Dale Nelson (218) 436-3571
2650 - 290th Ave.
Hallock, MN 56728

SW-11
Nobles County Sanitary Landfill
Eric Joens (507) 376-9218
220th St.
Rushmore, MN 56168

SW-355
Olmsted County - Kalmar Sanitary Landfill
Michael Cousino (507) 285-8231
7401 - 19th St. NW
Rochester, MN 55904

SW-045
Pine Bend Sanitary Landfill
Michael Ayers (651) 450-2155
2495 - 117th Street E.
Inver Grove Heights, MN 55076

SW-124
Polk County Sanitary Landfill
Willard Wilson (218) 435-6501
15674 - 270th St. SW
Crookston, MN 56716

SW-90
Renville County Sanitary Landfill
Marlin Larson (320) 523-3759
32877 County Road 4
Olivia, MN 56277

SW-123
Rice County Sanitary Landfill
Michael Cook (507) 332-6833
3800 - 145th St. E
Dundas, MN 55019

SW-6
Spruce Ridge Resource Management Facility
Mark Reinert (320) 864-5503
12755 - 137th St.
Glencoe, MN 55336

SW-131
Steele County Sanitary Landfill
Scott Golberg (507) 444-7477

9420 - 64th Ave. SE
Blooming Prairie, MN 55917

SW-405
St. Louis County Regional Solid Waste Disposal
Ted Troolin (218) 749-0639
5341 Landfill Road
Virginia, MN 55792

Landfills Permitted for Disposal of Other Solid Wastes
SW-383

SKB Rosemount Industrial Waste Facility
Michael Fullerton (651) 224-6329
13425 Courthouse Blvd.
Rosemount, MN 55068

SW-60
Veolia ES Rolling Hills Landfill Inc.
Christopher Basgall (320) 963-3158
175 County Road 37 NE
Buffalo, MN 55313

SW-580
Vonco II Demolition Debris Landfill
Ian Vagle (763) 428-2242
15301 - 140th Ave. SE
Becker, MN 55308

SW-428
Voyageur Industrial Landfill
Jim Pehl (218) 393-3366
6830 Highway 53
Canyon, MN 55717