

Agricultural Disposal MaTCh Tool

(Matrix, Decision Tree, Checklist)

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FADPreP website to request password: <https://fadprep.lmi.org>

APHIS website for training modules:

http://www.aphis.usda.gov/animal_health/emergency_management/

Carcass Management Options Matrix

Weighting	Criteria	Off-Site Landfill	Rendering	Off-Site Incineration	Composting	Open Air Burning	On-Site Burial
Most Important (x3)	Public Health Risk (1)	9	9	9	9	6	3
	Biosecurity (2)	6	6	6	3	3	3
	Pathogen Inactivation (3)	3	6	9	6	9	3
	Environmentally Sustainable (4)	9	9	9	9	3	3
Important (x2)	Need to Transport Carcasses Offsite (5)	2	2	2	6	6	6
	Volume Reduction (6)	4	6	6	4	6	4
	Availability (7)	6	4	2	4	4	4
	Throughput (8)	6	6	2	4	4	4
	Speed to Implement (9)	6	4	4	4	4	4
	Public Acceptance (10)	6	4	6	4	2	4
Less Important (x1)	Cost Effectiveness (11)	3	2	1	1	1	3
	Efficiency (12)	3	3	3	2	1	2
	Operability (13)	3	3	3	2	1	3
	Regulatory limitations (14)	2	3	2	2	1	1
	Denial of use (15)	3	2	2	2	2	1
Total Points		71	69	66	62	53	48
Average Score		4.7	4.6	4.4	4.1	3.5	3.2

Matrix Explanation

Green technologies were scored 3 points

Yellow technologies were scored 2 points

Red technologies were scored 1 point

Scores were weighted according to the importance of the criteria.

Scores for each column were totaled then averaged to obtain the ranking

Color Key



Ideal



Not Ideal



Not Suitable

Matrix Footnotes

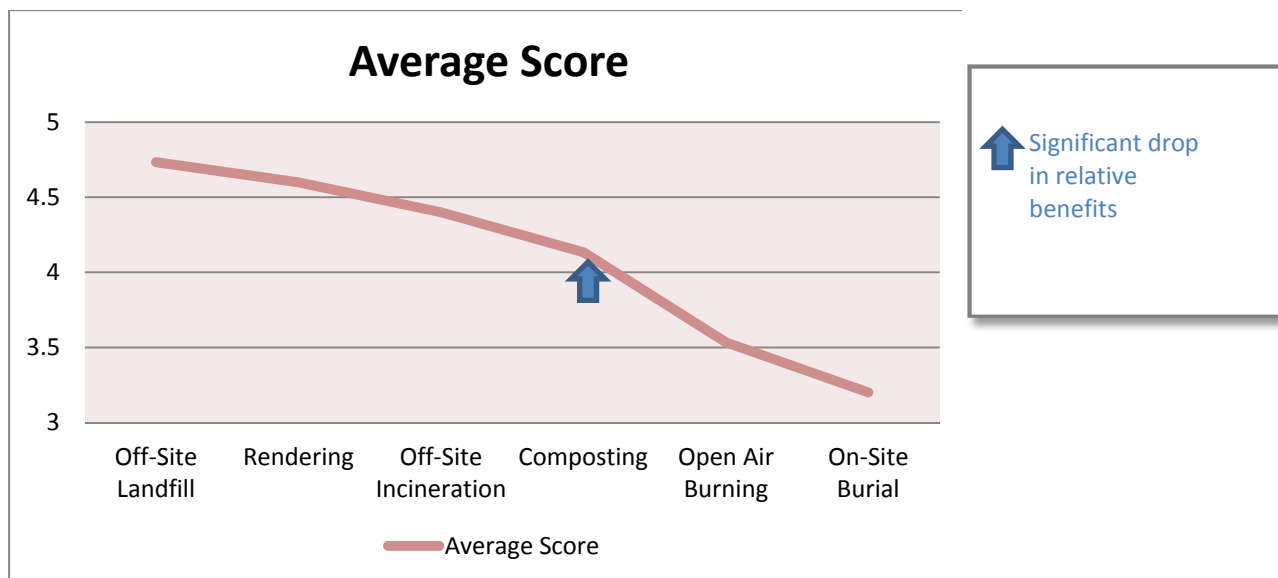
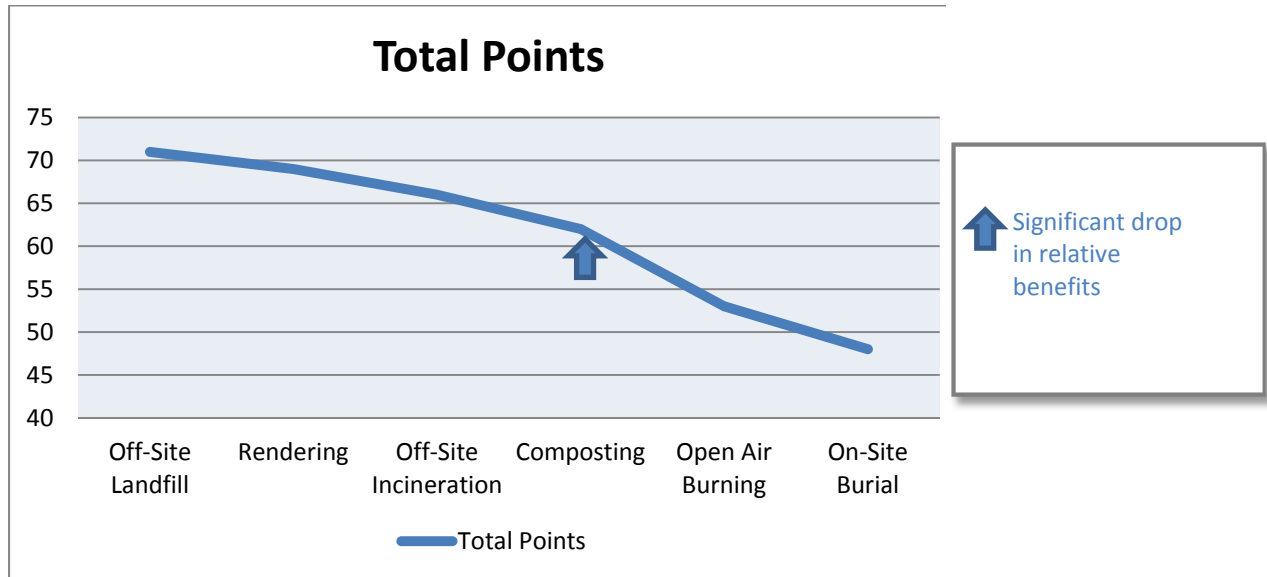
Mobile, new, or innovative technologies are not included in this matrix, but a separate table for such technologies is under development.

Values in matrix may be incident specific.

1. **Public health risk** – based on the UK 2001 human health qualitative risk assessment which excluded composting and mobile technologies. The rankings are consistent with the public health risks tabulated by the United Kingdom (UK) Department of Health (now the Department for Environment, Food and Rural Affairs), in “A Rapid Qualitative Assessment of possible risks to Public Health from current Foot & Mouth Disposal Options, Main Report,” June 2001.
2. **Biosecurity** – if process can be contained and easily disinfected = 3, if process is somewhat contained, but the processing area is difficult to disinfect = 2, if process is not contained = 1
3. **Pathogen Inactivation** – If process completely inactivates pathogen = 3, partial inactivation = 2, no inactivation = 1
4. **Environmental sustainability** – low risk of environmental contamination and useful end product = 3, low risk of contamination or useful end product = 2, risk of environmental contamination and no useful end product = 1
5. **Transport carcasses offsite** – Yes = 1, No = 3
6. **Volume reduction** – process reduces volume of biomass = 3, same volume = 2, increases volume = 1
7. **Availability** – option is widely available = 3, regional or somewhat available = 2, very limited availability = 1.
8. **Throughput** – the amount of biomass that can be processed per day. If >200K lbs/day = 3, between 200K lbs/day - 50K lbs/day = 2, <50K lbs/day = 1. Note: Throughput X Availability = Capacity
9. **Speed to implement** – how quickly can option begin taking first carcasses including obtaining regulatory approval where immediately = 3, <5 days = 2, more than 5 days = 1
10. **Public acceptance** – likelihood of public protests where low = 3, medium = 2, and high = 1
11. **Cost effectiveness** – cost to perform option from K State Carcass Disposal: A Comprehensive Review where <\$100/ton = 3, \$100/ton - \$250/ton = 2, > \$250/ton = 1.
12. **Efficiency** – amount of inputs (utilities, chemicals, fuel, carbon source) to contain and stabilize biomass over a short period of time
13. **Operability** – ease of implementation, for example simple to do, operators readily trained and available

14. **Regulatory limitations** – permits or regulator exemptions would have to be obtained in order to utilize this disposal method
15. **Denial of use** – land or equipment is no longer able to be used for its intended purpose due to disposal method

Matrix Results Graphed



Carcass Management Decision Cycle



Carcass Management Options Checklist

First Option - Can Animal be used for its intended purpose?

- ☐ Consider vaccination as a way to maintain animal health
 - ☐ Consult USDA APHIS Red Book for guidance on stamping out, vaccination to live and vaccination to slaughter options
- ☐ Can livestock and poultry entering the food chain meet food safety requirements? Consult with food safety officials to:
 - ☐ Ensure animals are safe for human consumption
 - ☐ Ensure public acceptance of products
 - ☐ Ensure pathogens are contained
- ☐ If so, send to slaughter or other processing. **If not**, ensure that depopulation methods are compatible with disposal capacity. Consider storage options so depopulation rate does not exceed disposal rate.
- ☐ **Proceed through checklist to select disposal option(s).**

Second Option - Can off-site permitted landfill be used?

- ☐ See a comprehensive list of landfills at <http://www2.ergweb.com/bdrtool/login.asp>.
 - ☐ Logon to the I-WASTE Tool and obtain a password if you do not currently have one.
 - ☐ Enter userid and password.
 - ☐ Choose treatment and disposal facilities button on the lower left.
 - ☐ Enter filter criteria such as “facility type (e.g., rendering, incinerators, or landfill)”
 - ☐ Note that construction debris landfills are not suitable for carcass disposal, and hazardous waste landfills are not necessary unless the carcasses are contaminated with a hazardous material causing them to be classified as hazardous
 - ☐ Enter State or EPA region, and click “View List of Facilities” button.
- ☐ Contact facilities and determine if they will accept your livestock or poultry and meet some or all of your capacity needs.
 - ☐ If there is insufficient capacity, consider fast-tracking expansion of existing landfill or permitting of new landfill for this purpose.
 - ☐ Consider potential environmental and biosecurity concerns.

- ☐ If the landfill will accept the material, arrange for biosecure transport. Consult a qualified waste management professional to:
 - ☐ Determine if any permits are required for transport of infected carcasses.
 - ☐ Determine type of transport vehicles required. If the waste must travel on public roads, it should be transported in closed, leak-proof trucks or dumpsters. Secondary containment may be needed, depending on the type of waste being transported.
 - ☐ Work with disposal group within the Incident Command System to determine how many animals can be depopulated per day and how many trucks will be needed for transport per day, ensuring the rates are about the same.
 - ☐ Pre-identify transport routes to minimize exposure to susceptible premises.
- ☐ If permitted landfilling is an option, see the **Secure Transport** and **Off-Site Treatment/Burial** training modules at www.aphis.usda.gov/emergency_response/tools/aphis_role_emergency_tools.shtml and implement off-site permitted landfilling. **If not,**

Third Option - Is rendering available?

- ☐ See a complete list of renderers at <http://nationalrenderers.org/about/directory> or the EPA database at <http://www2.ergweb.com/bdrtool/login.asp>.
 - ☐ Logon to the I-WASTE Tool and obtain a password if you do not currently have one.
 - ☐ Enter userid and password.
 - ☐ Choose treatment and disposal facilities button on the lower left.
 - ☐ Enter filter criteria such as “facility type (e.g., rendering, incinerators, or landfill)”
 - ☐ Enter State or EPA region, and click “View List of Facilities” button.
- ☐ Contact facilities and determine if they will accept your livestock or poultry and meet some or all of your capacity needs.
 - ☐ If the capacity is less than needed, can the carcasses be stored/refrigerated while awaiting disposal?
- ☐ If so, arrange for storage and transport to rendering facility for disposal. Consult a qualified waste management professional to:
 - ☐ Determine if any permits are required for transport of infected carcasses.
 - ☐ Determine type of transport vehicles required. If the waste must travel on public roads, it should be transported in closed, leak-proof trucks or dumpsters. Secondary containment may be needed, depending on the type of waste being transported.

- ☐ Work with disposal group within the Incident Command System to determine how many animals can be depopulated per day and how many trucks will be needed for transport per day, ensuring the rates are about equal.
- ☐ Pre-identify transport routes to minimize exposure of susceptible premises.
- ☐ If rendering is an option, see **Secure Transport** and **Off-Site Treatment/Burial** training modules at www.aphis.usda.gov/emergency_response/tools/aphis_role_emergency_tools.shtml and implement rendering. **If not,**

Fourth Option - Can off-site incinerator be used?

- ☐ See a complete list of incinerators at or the EPA database at <http://www2.ergweb.com/bdrtool/login.asp>.
 - ☐ Logon to the I-WASTE Tool and obtain a password if you do not currently have one.
 - ☐ Enter userid and password.
 - ☐ Choose treatment and disposal facilities button on the lower left.
 - ☐ Enter filter criteria such as “facility type (e.g. rendering, incinerators, or landfill)”
 - ☐ Enter State or EPA region, and click “View List of Facilities” button.
- ☐ Contact air authorities to verify operations are not in violation of their air permits.
- ☐ If the facilities are compliant, contact them and determine if they will accept your livestock or poultry and meet some or all of your capacity needs.
- ☐ If so, arrange for transport to off-site incineration facility for disposal. Consult a qualified waste management professional to:
 - ☐ Determine if any permits are required for transport of infected carcasses.
 - ☐ Determine type of transport vehicles required. If the waste must travel on public roads, it should be transported in closed, leak-proof trucks or dumpsters. Secondary containment may be needed, depending on the type of waste being transported.
 - ☐ Work with disposal group within the Incident Command System to determine how many animals can be depopulated per day and how many trucks will be needed for transport per day, ensuring the rates are about equal.
 - ☐ Pre-identify transport routes to minimize exposure of susceptible premises.
- ☐ If off-site incineration is an option see the **Secure Transport** and **Off-Site Treatment/Burial** training modules at www.aphis.usda.gov/emergency_response/tools/aphis_role_emergency_tools.shtml and implement off-site incineration. **If not,**

Fifth Option - Is site suitable for composting?

- ☐ Identify a suitable site on premises or in a centralized location in accordance with the checklist items, below.
 - ☐ If off-site consider the need for secure transport
- ☐ Based on the expert opinion of a trained and qualified compost specialist, are the site conditions suitable for composting the number of animals affected?
 - ☐ See USA composting council website for more information on training courses and equipment availability <http://compostingcouncil.org/>
 - ☐ Adequate land area to build compost piles
 - ☐ At least 200 feet from water wells, surface water bodies (lakes, streams, rivers, etc.), sinkholes, seasonal seeps or other landscape features that indicate the area is hydrologically sensitive.
 - ☐ Consider all groundwater pathways including the presence of drain tiles, soil characteristics, depth to groundwater, use of groundwater etc.
 - ☐ Located away from neighbors and/or out of sight.
 - ☐ Located downwind from neighbors and/or houses.
 - ☐ Located away from environmentally-sensitive areas.
 - ☐ Located close to the livestock or poultry facility or have clear access for transport.
 - ☐ Clear of overhead utility lines.
 - ☐ Void of excess water.
 - ☐ Located on a gentle slope (1%-3%) so there will be no water ponding.
 - ☐ Consider the need for an impermeable base and/or protective cover to prevent leachate generation and migration.
- ☐ If the site is suitable, consider the duration of time it takes to fully compost and determine if the following issues can be overcome:
 - ☐ Personnel required to ensure maintenance of pile.
 - ☐ Need for pest management.
 - ☐ Potential for extreme weather (e.g., hurricane) to disturb pile.
 - ☐ Denial of use of land area while carcass decomposes.

- ☐ Grinding of infectious carcasses prior to composting is not recommended unless aerosols are controlled.
- ☐ Final composted material cannot be used on crops and will need to be disposed of.
- ☐ If so, is there a sufficient local supply of carbon source such as wood chips (3 pounds carbon source per pound of biomass)?
 - ☐ Manure from contaminated feedlots can be scraped and used in compost to clean the feedlot as well as provide carbon materials for composting.
 - ☐ Check with local agencies and organizations to determine if stockpiles of carbon source are available (e.g., parks department and landfills). Ensure that the carbon source is free of any pests or pathogens which could threaten local species.
- ☐ If so, have you arranged for the necessary equipment and supplies to be delivered to the site?
 - ☐ Personnel
 - ☐ Composting supplies and carbon source
 - ☐ Personal protective equipment
 - ☐ Personal supplies
 - ☐ Cleaning and disinfecting (biosafety) supplies
 - ☐ Hand tools
 - ☐ Heavy equipment (mid-size skid-steer loaders, tractors with bucket loaders, excavators, bulldozers, payloaders, forklifts, trucks, containers and caps, polyethylene material for lining carcass transport containers)
- ☐ If composting is an option see **Outdoor Composting** training module at www.aphis.usda.gov/emergency_response/tools/aphis_role_emergency_tools.shtml and implement composting. **If not,**

Sixth Option - Is site suitable for open air burning?

- ☐ Based on the expert written opinion of an experienced air quality specialist, will open burning release air pollutants in excess of public health standards?
 - ☐ Consider if proposed site is within an air quality attainment or non-attainment area.
- ☐ If not, does the applicable permitting authority allow open air burning?
 - ☐ Local Fire Department
 - ☐ State Department of Agriculture, Animal Health

- ☐ State Department of Environment or Natural Resources
- ☐ USDA-APHIS
- ☐ USEPA
- ☐ If so, can the permit conditions, such as measures to control the spread of fire, distance to occupied buildings etc. be met?
- ☐ If so, based on the expert opinion of an experienced environmental engineer, are the site conditions suitable for open air burning?
 - ☐ What environmental testing (e.g., water, ash, soils) are required and at what frequency?
 - ☐ How and where would the ash be disposed of?
 - ☐ Are weather conditions (e.g., wind and drought) suitable for open air burning?
- ☐ If so, will burning be publically unacceptable?
- ☐ If so, have you arranged for the necessary personnel, equipment and supplies to be delivered to the site?
 - ☐ Adequate source of combustible material and fuel to keep the fire going. Verify that type of fuel is acceptable to regulatory agencies.
 - ☐ Other equipment including mechanical chains and lifting equipment.
 - ☐ Personnel properly trained in the use of this equipment.
 - ☐ Fire safety equipment also should be readily available.
- ☐ If open air burning is an option, see **On-Site Treatment/Burial** training module at www.aphis.usda.gov/emergency_response/tools/aphis_role_emergency_tools.shtml and implement on-site open air burning. **If not,**

Seventh Option - Is site suitable for on-site burial?

- ☐ Are soils suitable (see USDA NRCS online Web Soil Survey)?
- ☐ If so, based on the expert written opinion of an experienced groundwater hydrologist, will leachate contaminate groundwater in excess of public health standards?
 - ☐ Consider all groundwater pathways including the presence of drain tiles, soil characteristics, depth to groundwater, use of groundwater etc.
- ☐ If not, based on the expert written opinion of an experienced environmental engineer, will the burial site create a stability or explosion hazard from production of methane?

- ☐ If not, is adequate land available for on-site burial?
- ☐ If so, is burial permitted by applicable regulatory authorities? Can permit requirements be met?
- ☐ If so, will land owner accept on-site burial, associated environmental liabilities, and potential loss of property value or use?
- ☐ If on-site burial is an option, see the **On-Site Treatment/Burial** training module at www.aphis.usda.gov/emergency_response/tools/aphis_role_emergency_tools.shtml and implement on-site burial. **If not,**

Eighth Option - Are mobile treatment technologies available for your area?

- ☐ Contact all appropriate mobile treatment technology vendors.
 - ☐ Verify the units are available for deployment to your site.
 - ☐ Verify your ability to meet all site/utility requirements.
 - ☐ Verify units can be fully disinfected after use.
 - ☐ Verify the units have adequate capacity to meet your needs.
 - ☐ If the capacity is less than needed, can the carcasses be stored/refrigerated while awaiting disposal?
 - ☐ Verify the availability of skilled operators and spare parts to keep the units operational.
 - ☐ Verify the unit can be set-up on the site (e.g., the site has appropriate grading)
- ☐ If so, is the technology permitted by the applicable regulatory authorities?
 - ☐ State Department of Agriculture, Animal Health
 - ☐ State Department of Environment or Natural Resources
 - ☐ USDA-APHIS
 - ☐ USEPA
- ☐ If so, can the permit conditions be met?
- ☐ If so, can the technology process byproducts be readily disposed?

If mobile treatment is an option, see **On-Site Treatment/Burial** training module at www.aphis.usda.gov/emergency_response/tools/aphis_role_emergency_tools.shtml and implement on-site mobile technologies. **If not,**

Ninth Option – Can vaccination be used to reduce animal mortalities?

- ☐ If you were unable to find a method of disposal for all animals, re-consider vaccination as way to maintain animal health
 - ☐ Consult Red Book for guidance on stamping out, vaccination to live and vaccination to slaughter options
 - ☐ Consult National Veterinary Stockpile (NVS) for availability of vaccine and equipment
http://www.aphis.usda.gov/animal_health/emergency_management/nvs.shtml
- ☐ If you still need to dispose of animals, return to First Option and repeat cycle until all carcasses can be managed.

Definitions

Biomass is the total quantity or weight of livestock/poultry carcasses and associated biodegradable material requiring management.

Capacity is equal to throughput times availability where throughput is the amount of biomass that can be processed per day per system and availability is the number of systems available.

Composting is a natural biological decomposition process that takes place in the presence of oxygen (air). Composting process control parameters include the initial ratios of carbon and nitrogen rich materials, the amount of bulking agent added to assure air porosity, the pile size, moisture content, and turning frequency. Turning or rotating the compost piles can improve composting rates, but is not recommended when disposing of infected carcasses.

Depopulation (also known as culling, destruction, and/or euthanasia) is a method by which large numbers of diseased and/or suffering animals are killed quickly and efficiently with as much consideration given to the welfare of the animals as practicable. It may be practiced during an animal health emergency, such as a major disease outbreak to eliminate animal suffering or help prevent or mitigate the spread of the disease through the elimination of infected, exposed, or potentially exposed animals. It also serves to remove contaminated livestock from the food supply, protect the nation's agricultural and national economy, and safeguard public health. Animals should not be depopulated until a disposal plan is in place.

Grinding is an operation that reduces biomass particle size. Grinding implies that particles are broken apart largely by smashing and crushing rather than tearing or slicing.

Groundwater is water below the land surface in a zone of saturation.

Leachate is any liquid material that drains from land, waste, or stockpiled material and contains significantly elevated concentrations of contamination derived from the material that it has passed through.

Off-site (Fixed-facility) incinerators include (a) small on-farm incinerators, (b) small and large incineration facilities, (c) crematoria, and (d) power plant incinerators. Unlike open-air burning and air-curtain incineration, fixed-facility incineration is wholly contained and, usually, highly controlled.

On-site Burial in the context of this document refers to excavating a trench or pit into the earth, placing carcasses in the trench, and covering with the excavated material (backfill).

Open-air burning includes burning carcasses (a) in open fields, (b) on combustible heaps called pyres, and (c) with other burning techniques that are unassisted by incineration equipment.

Pathogens are any organism capable of producing disease or infection.

Permitted Landfills are modern Subtitle D landfills that are highly regulated operations, engineered and built with technically complex systems specifically designed to protect the environment and include liners and leachate controls. These landfills are distinguished from older landfills in the U.S. (sometimes

called small arid landfills) which were constructed before Subtitle D regulations were effective, and therefore were not constructed with sophisticated containment systems.

Premises are geographically and epidemiologically defined locations, including a ranch, farm, stable, or other establishment.

Pyres are structures, usually made of wood, for burning carcasses.

Rendering is the process by which purified fat and protein products are recovered from inedible portions of animals by cooking at high temperatures.

Slaughter is the killing of an animal or animals for human consumption.

Stamping out is the depopulation of clinically affected and in-contact susceptible animals.

Waste can be loosely defined as material that cannot be used for its intended purpose.

Vaccination to Live is the depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, without subsequent depopulation of vaccinated animals.

Vaccination to Slaughter is the depopulation of clinically affected and in-contact susceptible animals and vaccination of at-risk animals, with subsequent depopulation of vaccinated animals.