

# Nutrient Management Act, 2002

## Incineration of Dead Farm Animals

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### Factsheet

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Incineration is an acceptable method of disposing of dead farm animals (deadstock). If done correctly, using the proper equipment, incineration can reduce the carcasses to an inert ash. The poultry industry has long used this method for the disposal of mortalities that occur in regular operation. Units capable of incinerating larger quantities of poultry or large animal carcasses cost more and take up more space. The initial expense of the incinerator, the cost of fuel and the maintenance of the incinerator makes this an expensive option but it has its advantages.

#### WHAT IS INCINERATION?

Incineration is defined as fuel-assisted cremation of animal carcasses. Specially designed on-farm incineration units use fuel, temperature controls and enclosed environments to reach high temperatures and secondary combustion (afterburner on flue) to reduce gaseous emissions. Under Ontario Regulation (O. Reg.) 106/09, Disposal of Dead Farm Animals, *Nutrient Management Act, 2002*, the incineration of carcasses requires an enclosed primary burn chamber capable of sustaining high temperatures for specified periods of time. The incinerator must be equipped with an afterburner (secondary chamber) that reduces particulate and gas emissions, thus reducing odour and smoke. The incinerator must have an Environmental Technology Verification Program (ETV Canada) “verification certificate” certifying that it has a secondary chamber that can maintain the temperatures of the gases entering it for at least 1 second at 1,000°C or 2 seconds at 850°C (Figure 1).

Deadstock must be incinerated until, on a visual inspection, there is no remaining soft animal tissue, bones or bone fragments larger than 15 cm in any dimension, and no remaining other animal matter larger than 25 mm in any dimension.



**Figure 1.** Incinerator designed for small animals.

Operators who own incinerators purchased prior to the implementation of the March 2009 regulation have 3 years to upgrade any units that do not satisfy the above requirements. The 3-year transition period does not apply to horses, goats, sheep, swine or cattle.

Piling carcasses, dousing them with fuel and igniting the pile is not an acceptable method of incineration; nor is feeding them into an outdoor furnace (Figure 2). Homemade incinerators, usually constructed from 45-gallon barrels or other metal drums, are also not permitted. These methods do not adequately control the emission of contaminants into the air and are not permitted under O. Reg. 106/09.

#### ADVANTAGES OF INCINERATION

Using fuel-assisted incineration equipment to dispose of deadstock has definite advantages. A major advantage is biosecurity: high temperature incineration destroys pathogens. This method removes deadstock from public view and reduces the potential for attraction of scavengers and flies.



**Figure 2.** Improper method of incineration.

Modern incineration equipment reduces the carcasses to an inert ash. If properly maintained, the equipment is easy to operate and does not require excessive labour. The operator loads the deadstock into the incinerator and sets the controls for complete burning. The incinerator requires periodic observation, routine maintenance and clean-out of ash.

Incineration is a useful alternative in areas where poor drainage, or close proximity to bedrock, groundwater or surface water prevent burial and composting. The small amount of waste by-products (ash) is easily disposed of by adding it to the manure storage for future land application.

### **TYPES OF INCINERATORS**

Certified, commercially available incinerators are generally the best equipment to ensure proper burn and to avoid creating pollution. Incinerators usually operate on diesel, natural gas or propane. To be in compliance with O. Reg. 106/09, fit the discharge stacks with afterburning devices. Diesel-fuelled incinerators require 4–12 L of fuel per 45 kg of carcass. Large carcasses are more difficult to burn and require more fuel per weight of carcass to reduce them

to ash. A mature cow must be cut into smaller pieces prior to incineration, which increases the labour requirement and the potential for injury to the worker.

When purchasing an incinerator, consider the following:

*Sturdiness:* Choose a unit that is able to operate under heavy loading conditions and withstand high operating temperatures.

*Automatic Controls:* Consider the convenience of a unit that can be loaded, ignited and left to run on a timer.

*Capacity:* Estimate the expected daily mortality rate and consider animal size when calculating the required incinerator's capacity. The incinerator should be able to accommodate normal daily mortality. When heavy, unexpected losses occur, consider using alternative methods of disposal. Selecting an appropriately sized unit avoids overloading and ensures proper operation for a longer period of time. Use the manufacturer's established burn rate (kg/hr) when deciding on the appropriate size of unit.

### **SIZING OF UNIT**

Choose an incinerator sized for the expected loading and animal dimensions. Under the regulation, a maximum of 1,000 kg of dead farm animals can be incinerated in a 24-hr period. Incinerators that are used for incinerating deadstock must not be used to incinerate any other material. A unit for poultry incineration will not require as large a chamber as one used for swine or cattle. Operations that incinerate their mortalities as they occur, rather than accumulating carcasses for less frequent disposal, will require a smaller unit. Furthermore, storing carcasses can result in extra operational costs and increased biosecurity risks.

Estimating mortality volumes for different livestock operations is not an exact science and depends on management skills and practices. Other factors affecting mortality include:

- breed
- disease resistance
- birthing ease, etc.

Table 1 is based on records from livestock operations in North America and can be used for estimating mortality volumes. Estimates can also be made from previous farm records if available.

## LOCATION OF INCINERATOR

Place the incinerator in a location that allows for convenient use. Take care to avoid potential problems such as odour complaints. Locate the unit downwind from operations, farm residences and neighbours. Protecting the incinerator from the forces of nature by placing it on a concrete slab under a shelter can extend the life of the unit. Because of the intense heat that is generated, maintain clearance between the discharge stack and any wooden structure in accordance with the *Building Code*. Any combustible roof parts must be at least 45 cm from the incinerator chimney.

O. Reg. 106/09 requires incinerators to be located:

- at least 15 m from the lot line of the registered parcel of land on which the incinerator is located
- at least 30 m from a highway
- at least 100 m distance from the lot line of land that has an industrial or parkland use
- at least 200 m from the lot line of land in a residential area and from land that has a commercial, community or institutional use
- at least 100 m distance from every livestock housing facility, outdoor confinement area and residential structure that is located on land that is not part of the registered parcel of land on which the incinerator is located

In addition, locate incinerators:

- downwind from livestock housing units, farm residences and neighbours
- in a convenient location for operation

## COST OF OPERATION

The cost of incineration equipment varies among different manufacturers and with incinerator capacity and operational features. Other costs associated with the incinerator are:

- hook-up to the fuel source and inspection
- specialized equipment necessary for handling the deadstock and ash
- construction of a concrete slab and shelter

Some considerations in evaluating the cost of operating incinerators include the burn rate and price of fuel. Incineration costs vary depending on weight, moisture and fat content of the carcasses and the loading capacity of the unit. As the size of the carcass increases, so does the burn time.



**Figure 3.** Installing new parts on a commercial incinerator.

Maintenance costs include replacing expendable parts and grates every 2 or 3 years. The entire unit may require complete refurbishment or replacement every 5–7 years (Figure 3).

## CONCLUSION

Incineration of farm mortalities is an acceptable method of disposal. In the past, more nuisance complaints were generated by improper combustion practices than by any other means of disposal. Follow regulatory requirements and manufacturer's operating procedures for locating and operating the unit, and maintain the units to proper operating specifications. Consider the start-up and ongoing costs of operating an incineration unit relative to other disposal options.

**Table 1.** Estimated Death Losses for Farm Operations in Ontario

Operations and Sizes <sup>1</sup>	Number in Herd/ Flock	Weight Range (kg)	Average <sup>2</sup> Weight (kg)	Number of Dead/Yr	Carcass Weights (kg)	Kg/Unit/Year
<b>100<sup>3</sup> Beef Cow-Calf</b>						
Cows, plus 4% bulls	104	500–770	590	3	1,770	
Stillborn to week-old calves		40	40	4	160	
Calves (week old–7 mo.)	90	40–260	113	4	453	
Replacement heifers (7 mo.–fresh)	15	250–500	333	2	667	
				13	3,050	30.50/cow/yr
<b>1,000 Beef Feeders (1 cycle/year)</b>						
Feeders placed/cycle (7–16 mo.)	1,000	260–568	363	20	7,253	7.25/feeder/yr
<b>100 Dairy Cows (Large-Frame Holsteins)</b>						
Milking age cows	100	522–860	635	3	1,904	
Calves (week old–5 mo.)	20	45–182	91	3	272	
Stillborn to week-old calves		45	45	7	315	
Heifers (5 mo.–fresh)	80	182–522	295	1	295	
				14	2,786	27.86/cow/yr
<b>100 Dairy Goat Does</b>						
Milking age does, plus 4% bucks	104	60–70	63	4	253	
Kids born/year (includes stillborns)	175	5–25	12	15	175	
Replacement doelings (2 mo.–fresh)	13	14–60	29	1	29	
				20	458	4.58/doe/yr
<b>10 Riding Horses</b>						
Medium-framed (1–10 yr; 50% mares)	10	364–635	454	0.2	91	
Colts/fillies (birth–12 mo.)	2	82–364	176	0.2	35	
				0.4	126	12.61/horse/yr
<b>1,000 Breeding Female Mink (not including pelting losses)</b>						
Breeding females, plus 20% males	1,200	1.6–2.2	1.8	24	43	
Kits/year (5 born/litter)	5,000	0.01–2.2	0.74	375	278	
				399	321	0.32/breeding female/yr
<b>100 Breeding Rabbits (Does)</b>						
Breeding does, plus 5% males	105	4.0–5.4	4.5	5	22	
Replacements: 30% (12–22 wks)	32	2.3–5.4	3.33	1	3	
Kits/yr (8/litter x 7 litters/yr x 80% conception)	4,480	0.01–2.2	0.74	672	497	
				678	522	5.2/breeding doe/yr
<b>100,000 Chicken Broilers (6 cycles/year)<sup>4</sup></b>						
Broilers placed/40-day growing cycle	6 x 100,000	0.04–2.2	0.76	24,000	18,240	0.03/broiler/yr
<b>10,000 Broiler-Breeder Hens</b>						
Hens	10,000	2.2–3.5	2.63	800	2,107	
Roosters (10% of hens) <sup>5</sup>	1,000	2.8–4.9	3.5	100	350	
				900	2,457	0.25/breeder hen/yr
<b>10,000 Layer Hens</b>						
Hens (not inc. spent hens, end of cycle)	10,000	1.3–1.7	1.43	550	788	0.08/layer hen/yr
<b>10,000 Turkey Hens (4 cycles/year)</b>						
Hens placed/cycle (day old–to market)	4 x 10,000	0.06–7.87	2.66	2,400	6,392	0.16/turkey hen/yr

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<b>10,000 Turkey Toms (3 cycles/year)</b>						
Toms placed/cycle (day old-to market)	3 x 10,000	0.06-14.8	4.97	3,000	14,920	0.50/turkey tom/yr
<b>1,000 Sow SEW</b>						
Sows and gilts	1,000	136-227	166	72	11,976	
Piglets born/yr (12 born/litter; 2.3 litters/sow)	27,600	1.1-5.5	2.6	4,140	10,626	
				4,212	22,602	22.60/sow/yr
<b>1,000 SEW Weaners (6.5 cycles/year)</b>						
Weaners placed/cycle	1,000	5.5-26.5	12.5	150	1,875	0.29/weaner/yr
<b>1,000 Grower/Finishers (3 cycles/year)</b>						
Grower/finishers placed/cycle	1,000	26.5-120	58	60	3,460	1.15/finisher/yr
<b>100 Meat Ewes</b>						
Ewes, plus 4% rams, and replacements	120	69-100	79	5	397	
Lambs born/year (includes stillborns)	175	5-25	12	17	198	
Feeder lambs (born over the year)	140	25-55	35	3	105	
				25	700	7.00/meat ewe/yr
<b>1,000 Grain-Fed Veal (1 cycle/year)</b>						
Calves placed/cycle (week old to market)	1,000	45-313	134	70	9,403	9.40/grain-fed veal/yr
<b>1,000 Milk-Fed Veal (2.5 cycles/year)</b>						
Calves placed/cycle (week old to market)	1,000	45-215	102	100	10,167	4.07/milk-fed veal/yr

<sup>1</sup> For operations with more than one cycle/year, death losses appear deceptively high (e.g., 100,000 chicken broilers x 6 cycles/year x 4% mortality rate = 24,000 dead birds per year).

<sup>2</sup> Average weights are used as in NMAN software: skewed toward the smaller weights in the range.

<sup>3</sup> Operation sizes are in multiples of 10. Scale up or down as required.

<sup>4</sup> Includes industry standard "2% extra" day-olds delivered to farm.

<sup>5</sup> Does not include spiking with new roosters when older ones are shipped or euthanized because of breeding problems.

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### **Do you know about Ontario's new Deadstock Regulations under the Nutrient Management Act, 2002 (NMA)?**

This Factsheet is for informational purposes only and is not, and should not be, construed as legal advice. In the event of a conflict between this Factsheet and the NMA and/or O. Reg. 106/09, the NMA and/or O. Reg. 106/09 govern. Please review the NMA and O. Reg. 106/09 and, if you have any questions about the application or interpretation of these regulations or have other legal questions, consult a lawyer.

Also consult with the applicable federal legislation (if any) in this area to ensure that you are also in compliance with federal requirements regarding the disposal of farm animals that die on a farm.

For more information on the NMA, call the Nutrient Management Information Line at 1-866-242-4460, e-mail [nman.omafra@ontario.ca](mailto:nman.omafra@ontario.ca) or visit [www.ontario.ca/omafra](http://www.ontario.ca/omafra).

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