

MISC 33

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD

Please use black ink

FAX TRANSMISSION FORM

Date 21.4.89 No. of pages

From STELLA BEAMAN Exeter DO

To MISS J. GARRETT Location Broomfield B. Tolworth T3

Repeat to (a) (b)

(c) (d)

Copies to

MESSAGE:

As discussed.

- Please note that the inference was that the period quoted at 3.3 could be reduced "if God demanded"!

89/04.03/6.1

RIS 787 B

REPORT ON BOVINE CARCASS INCINERATION

To construct a facility to incinerate large bovine carcasses could (excluding land) cost in the region of £275,000.

Its basic purpose should be to accommodate two large cows on a single fork lift truck pallet loaded through a large manual opening door which could take 8 hours to completely destroy the carcasses to a powdered ash, with overnight cooling to permit re-entry and loading the following day. Taking into account loan charges, fuel and labour it could cost £395 to operate daily. If only one animal was to be destroyed it would therefore cost £395 (two would cost £198 each).

Cattle, depending on breed and sex, weigh between 400 and 1100 kg, the common black and white dairy cow being in the order of 550 kg, and while the machine should be sized to accept the physical bulk of two cows or a single large bull, it would be under-utilized in terms of tonnage per hour throughput, approx. 350 kg/hr. Therefore, it could be of advantage to have a secondary means of carcass introduction to the incineration hearth whereby the weight of carcasses can be topped up once the initial charge is partially consumed to the state where self-fuelling is abating and further expensive fuel, usually gas or oil, is required to achieve burn out of the residues.

Provision of a powered ram loading facility could add a further £46,000 to the initial construction cost, permitting further bovine carcasses or veterinary pet carcasses to be introduced. The daily operating cost could be in the order of £434 which, if four carcasses were available, could reduce the cost to £108 per carcass. The £108 carcass cost above makes no allowance for the possible further cost reduction from any revenue effect of pet carcasses received from Veterinary Practices. As an Incinerator only recognises a weight of charge it would make no difference what type of animal is consumed. Therefore if it were burning pet carcasses it would lose that volumetric ability to burn bovine carcasses, but where cattle were not available pets could provide a balancing factor in the overall annual economy of the unit as a total enterprise.

MAFF have stated the current cost to burn carcasses as £250 per tonne (approx. £125 per carcass). To achieve a similar figure it would be essential to have the optional extra carcass loading facility to give the capacity to burn at least 4 animals per 8 hour day or 1000 animals per annum. MAFF have given us to understand that an annual population of 2000 animals will require to be burnt at which point it could achieve £140 to £180 per tonne (approx. £70 to £90 per carcass).

A SCHEME FOR BOVINE INCINERATION PLANT

1. Environmental Considerations

1.1 The County requirements have been formulated for the highest standard of stack emission control contained in any existing legislation and would probably meet any further future foreseeable legislation that could be proposed, both national and European.

These requirements may exceed what a commercial operator would accept as justifiable for his normal method of operation, but they would minimise any criticism levelled that a commercial operator might otherwise consider it economic to endure.

The requirements include:-

- (a) After burning in the range 800 to 1000°C to eliminate smell;
- (b) Gas scrubbing to eliminate smoke - though steam may be emitted;
- (c) Stacks to be fitted with grit arresters.

Whilst such criteria may raise the original cost of constructing such facilities it is intended to demonstrate later that they could lead to economies of operation that might offset part of the initial expense, whilst maintaining the good neighbour policy.

The incinerators considered are generally used for burning pathological wastes and are typically widely used by hospitals and veterinary establishments. The Industrial Air Pollution Inspector for the South West area, in his reports for 1985/6, states that complaints from the public relating to the nuisance from hospital incineration stack emissions appear to cause more problems than for most other industrial incineration processes, hence the need for the highest requirements to limit any emission to the absolute minimum, for despite the best controls emissions will occur and complaints could emanate from these emissions. The smell of uncontrolled burning carcasses is generally nauseous to most people, and bears no relation to that of the 'Sunday roast'.

1.2 Visual Impact

It is considered that the requirement for any carcass incinerator design would be to ensure that the operations relating to the reception, storage and decapitation of diseased carcasses must not be publicly visible and that any part of a carcass could not be removed or interfered with by animals or birds.

1.3 Public Accessibility

It is also considered that the most rigorous conditions would be required relating to site security to prevent members of the public inadvertently, or deliberately for unlawful purposes gaining access to the site either during the period of attended operation or when unattended at night, when carcasses of doubtful condition that might constitute a health hazard may be stored on the premises.

NB - It should be noted that any carcass incinerator installation will suffer where it is a single stream plant. In the event of a breakdown in any part of the facility it may be essential to retain carcasses on site for the period of repair.

2. Civil Constructional requirement

2.1 The Building, at least 4 - 20 x 10m unit

Such a building would allow for:-

- (a) Complete opening of furnace door with full access for HSE purposes all round the plant.
- (b) A main vehicle access door and secondary means of personal exit in case of fire or other emergency.

89/04.03/6.3

DIS 787 B

- 4
- (c) An internal decapitation area and chilled carcass and separated head store with hose down facilities over suitably surfaced walls and floors.
 - (d) A personnel hygiene area with washing and other facilities.
 - (e) An isolated messing area.
 - (f) The building length to accommodate a secondary method of carcass loading by hydraulic powered ram loader.
 - (g) Protection against the ingress of vermin and birds to infected carcasses.

2.2 External Works

To include for:-

- (a) A vehicle wash down area with steam cleaner and drainage to an interceptor trap that also accepts the buildings washings. These washings may be in certain conditions pumped to the Incinerator for 'Steam off' through the gas conditioning or furnaces over-temperature control system.
- (b) High security fencing to protect against public entry to areas of possible infection.

3. Emission

As stated in para. 3.1.2 we are familiar with incinerators of the first simple category. The small carcass incinerator at Hyster waste treatment plant, while of the simple design, has a water system to reduce grit emission and an atomizing air blower to control stack temperature. Despite this it can produce smoke on occasions, and therefore the need to consider the inconspicuous method to further reduce the possibility of emissions, but it would be essential to view any machine in the second category to ensure that the advantages quoted are in fact reliable.

3.1. Loading

Two carcasses could be loaded at one time station on a pallet using a rough terrain type fork lift truck with telescopic boom to place the carcasses directly into the correct position in the hearth. The pallet would be burnt with the carcasses and would promote air circulation beneath the carcasses.

3.2. Main Burner

At least four burners would spread the heat evenly about the furnace area, with automatic controls to bring the furnace to exothermic operation quickly, and by accurately adjusting the temperature controls economic savings of fuel could be achieved. The fuel cost allowed for in these estimates are based upon budget quotations received.

3.3. After Burner

This, in the more sophisticated machines, is placed beneath the hearth such that the floor of the hearth becomes incandescent to burn the carcasses from beneath (so supplementing the main burners burning from above) thereby further economising on fuel. Any body fluids released through the brickwork will drip into this area to be consumed by the flame ensuring sterility of operation.

3.4. The Hearth

Of the incandescent type where the brickwork heated from both top and bottom is white hot, would be flat and about waist high and could therefore be raked to fall into a 'bin', rather than shovelled from a curved floor.

3.5. Gas Scrubbing

Required for smut and grit control and as stated in 2.2 could be used to 'steam off' the disinfected polluted wash down water.

3.6. Secondary method of loading

The provision of a powered ram loader by allowing a single carcass to be loaded at suitable intervals would promote operational economy further whilst increasing daily throughput of carcasses, by avoiding the need to wait for the hearth to 'cool down' for re-entry purposes.

Continuity of operation would also maintain the incinerator at operating temperature so avoiding the 'light up' and 'cool down' periods where smoke and smell tend to be emitted.

Bovine Incinerator - Breakdown of Cost Estimate

		10 year Payback	5 year Payback
<u>Basic Capital Works</u>			
<u>Mechanical</u>			
Incinerator Machine	£ 83,000		
Installation	5,500		
Test	3,000		
<u>Civil</u>			
Building Works Including Fencing	73,000		
Cold room & Monorail system	20,000		
<u>Ancillary equipment</u>			
Rough terrain fork truck	20,000		
	207,500		
Preliminaries @ 8%	16,600		
Contingencies @ 10%	20,750		
Site Super/Admin @ 15%	31,125		
Total Cost	275,975		
Loan charges @ 16.6% 10 yrs	45,812		
Loan charges @ 26.7% 5 yr	75,685		
Loan charge per day @ 200d/yr		229.00	368.42
<u>Operational Costs</u>			
Labour M4 x 8 hr	54.40		
Fuel 550 litre @ 15p	82.50		
electricity	10.00		
water	10.00		
Maintenance	5.00		
Steam Cleaning	5.00		
Op Costs for 8 hr day	66.69	166.69	166.69
Total costs per 8 hr day		395.94	535.11
Cost to Incinerate 1 carcass		395.94	535.11
Cost to Incinerate 2 carcasses		197.98	267.56

I what are the

rather high

89/04.03/6.6

BIS 787 8

Optional Extra

			10 year Payback	5 year Payback
Loan Charges for Basic Cap Works per day		N/T	229.06	368.42
<u>Plant Additions</u>				
Carcass loader			23,000	
Bin Tipper			10,000	
Eurobins			2,000	
			<u>35,000</u>	
Preliminaries	82		2,800	
Contingencies	101		3,500	
Site Super/Admin	52		5,250	
			<u>46,550</u>	
Additional loan charge at 16.6% 1Dyr			7,727.20	
			26.72	
		5yr	12,451.45	
Additional loan charge per day			38.64	62.14
<u>Revised Operating Costs 16 hr day</u>				
Labour M.4 x 16 hour			108.00	
Fuel 770 litres @ 15p/l			115.50	
Electricity			20.00	
Water			30.00	
Maintenance			10.00	
Steam Cleaners			15.00	
Op Costs for 16 Hr day			<u>298.50</u>	
8 hour day			166.63	166.69
Total Costs per 8 hr day			<u>435.73</u>	<u>435.73</u>
Cost to Incinerate 1 Carcase (500kg)			434.39	597.25
Cost to Incinerate 2 Carcasses			217.19	298.63
" " 3 "			144.79	199.08
20 per week/1000pa			106.59	149.31
			84.87	119.45
			72.40	99.54
16 hour day			298.50	298.50
Total Costs per 16 hr day			<u>506.29</u>	<u>729.06</u>
			81.74	124.13
40 per week/2000pa			78.34	91.13
			65.13	81.00
			52.42	72.90
			39.29	66.28
60 per week/3000pa			48.65	60.76

What again

ca/r040189q..142

89/04.03/6.7

015 787 B

3

- may wish to improve on DDC after the 5 years.

Capital grants: - ? from MAFF

↓
↓ costs over the 5 years

Richard to look at CDA

Brian to look at local govt side

f grants pay some of it - reduces cost very considerably

? won - in the way such to conduct out

Way forward

DDC is not responsible for disposal but it a waste disposal authority - - - - - to help

of + other paper - limited role of WDA's

WDA should waste regulating authority

A waste disposal company is no one would be responsible

LA would find contractors to dispose of their waste.

In view of this - a need for private sector

Document - H. v. ... la ...
 pour ...
 ...
 ...
 ...

...

89/04.03/6.10

015 787 B