

## Appendix D

### ON-FARM INCINERATION

The heat generated in conventional bonfires is inadequate to ensure the complete destruction of the chemical compounds used to mould agricultural chemical containers and of any residues that may still be present in empty containers.

Work at Silsoe Agricultural College in the UK has shown that an efficient low-cost incinerator can be built on farm or supplied by a local engineering company.

In building this Silsoe Incinerator it is **CRITICAL** that all dimensions are followed exactly as any deviation will affect the temperature generation and therefore efficiency of the incinerator.

In using the Silsoe Incinerator it is very important that the standard triple rinse technique be used to clean all containers before incineration.

#### 1. Container Preparation

All containers should be thoroughly cleaned and emptied before disposal.

Containers, which held liquids, should be pressure or triple rinsed and drained. They should then be re-sealed, capped and placed in a cardboard case. Containers holding dry materials should be thoroughly emptied and if practical "rinsed" and "drained".

Paper containers should be folded and placed in a cardboard box, or 50kg fertiliser or seed bag. Cleaned containers should then be placed in a dry secure compound prior to disposal.

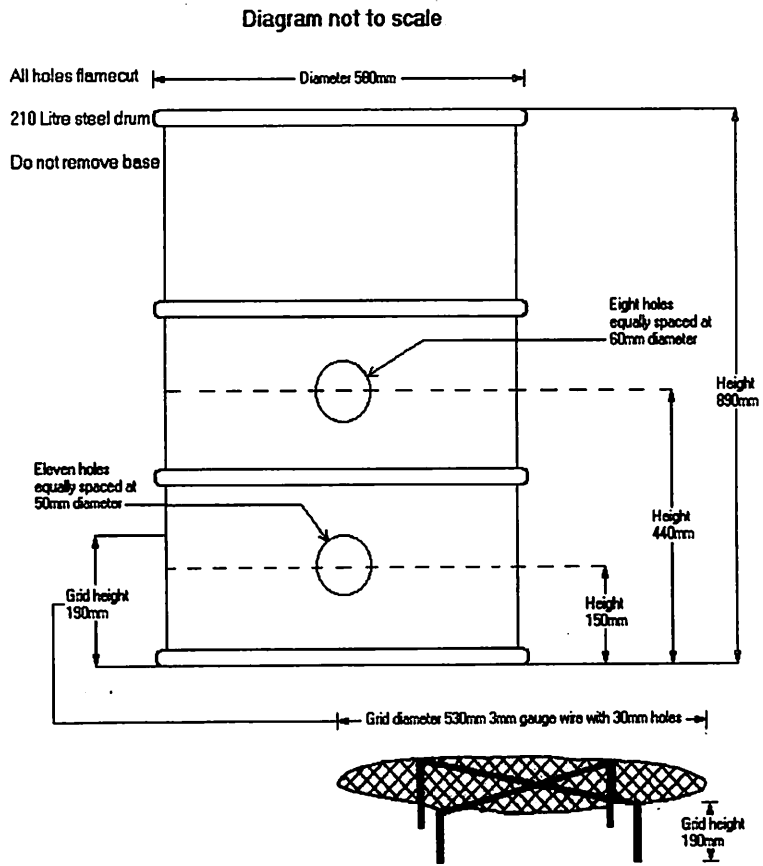
#### 2. Incineration

Independent trials have shown that correctly cleaned containers properly incinerated can be burned efficiently, quickly and safely on farms. Compared with an ordinary bonfire which burns at

approximately 250C, good incineration will produce temperatures of between 800 and 950C, produce little smoke and give a thorough combustion of all the materials with minimal ash and no mess. The gases produced from the fire are similar to those produced by burning pine wood and the remaining ash has no pesticide residues.

Work at Silsoe using a 210 litre steel drum has shown the best design for an efficient low-cost incinerator.

### 3. Incinerator Design



#### **4. Incinerator Placement**

- It is best to burn containers on a little and often basis; it may be possible to burn in or near the place of work although a dedicated site on-farm is preferable.
- Site the incinerator away from roads, livestock, domestic houses, farm buildings, plantations, watercourses and wildlife areas.
- Ensure incinerators are not near to any combustible materials such as wood, straw, fertiliser and the material to be burnt.
- Place incinerators on a firm level surface or concrete hard standing. To make absolutely sure there is no risk of water pollution hard standings should be drained to a separate sump.
- Keep a bucket of water or bowser/water carrier close at hand.
- Best weather conditions are clear calm weather with low wind speeds. Avoid incineration in high winds or in cloudy or overcast weather.

#### **5. Starting Up**

Place a complete cardboard case in the incinerator and open the top to allow access to the plastic containers. Place either a diesel soaked rag or a firelighter in the middle of the cardboard case. Light the firelighter/rag. Within 5 minutes the fire should be going well enough to add further cases.

#### **6. Managing the Incinerator**

Supervise the incinerator at all times. Never leave any fire unattended.

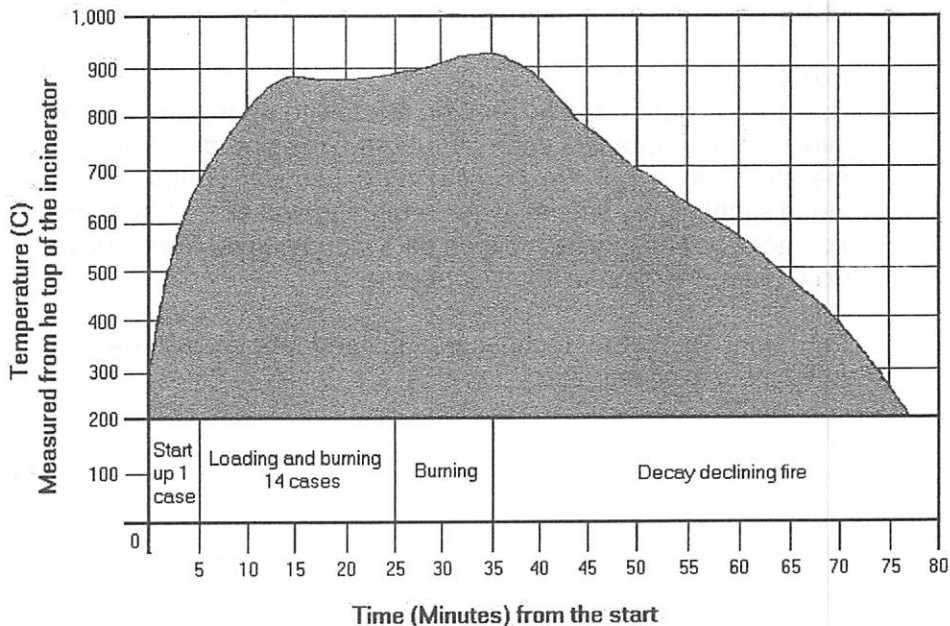
- When the incineration is under way the fire is extremely hot. Take great care when approaching and loading the incinerator.
- When filling the incinerator approach from upwind to avoid the flames and smoke. Avoid breathing any smoke or fumes generated. Thick leather protective gloves may be worn.
- To minimise the risk of dark smoke and for easier handling, add full “cases” of containers. Adding plastic containers alone increases the risk of dark smoke.
- Do not overfill the incinerator, this will tend to decrease its work rate and increases the risk that burning ash/cardboard can fly away. Wait until there is sufficient room to hold at least 90% of the material you are adding. For more information on work rates see below
- Avoid riddling or poking the fire, this should not be necessary and will increase the risk of generating “dark” smoke.

## **7. Work Rates**

Typical work rates are 15 cases per 30 minutes including a 5 minute start up time. After loading the last container, the incinerator will burn vigorously for 5-10 minutes after which it will start to decline. The fire will reduce to glowing embers about 30 minutes after the last case is added. The fire should be supervised at all times but close attention will be needed during the main burn.

For faster burning it is recommended that 2-3 incinerators are run simultaneously; to ensure safe operation they should be placed at least 5m apart.

## INCINERATION PROCESS AND TEMPERATURES FOR BURNING 15 CASES



### 8. Disposal of Ash

The incinerator design keeps the base of the oil drum, this means that ash is retained in the drum and there is no mess. Ash can be removed from the incinerator by turning it upside down. It may then be disposed of either by soil incorporation, burial or through normal waste disposal routes.

The ash produced from incineration of cleaned pesticide containers, using the techniques described in this leaflet has been analysed. The analysis showed, at the limit of determination used (1.0 ppb), that there were no pesticide residues.

## **9. Burning and Smoke Colour**

The main requirements are that a fire should not cause a “nuisance” or create “dark smoke”. Fires should also be situated at least 15m away on the public highway.

### **Smoke Colour**

Dark smoke is generated by burning at a low temperature, and/or burning certain materials such as rubber tyres and diesel oil. An incinerator with a hot fire burning agrochemical container will produce slightly grey smoke at the beginning and end of the burn. Dark smoke will be more visible on dark/cloudy days. Sunny days will tolerate more “smoke” than cloudy days.

Incineration using the techniques outlined above will reduce smoke colour to a minimum.