

Audit Checklist: Incinerator Operation

Document Number: 209

1. Purpose

This document provides a checklist to guide managers who must audit incinerator operation to ensure that incinerators are being operated safely, that waste is being treated effectively, that regular maintenance procedures are carried out on time and that any repairs or problems are properly managed or addressed.

2. Scope

Managers should undertake regular checks (inspections) on incinerators; incineration practices; and related logs, records, and reports to ensure that staff are adhering to proper incineration procedures. In addition, there should be periodic audits that are more systematic and often carried out by an independent waste management expert, consultant or company. The auditor should review the logs and records and visually inspect the incinerator and treatment areas at the time of the audit inspection.

This document provides a checklist of the items and issues that an auditor should investigate when auditing incinerator operation.

3. Definitions

Refer to Doc 525: Diesel-fueled Incinerator Operation, Maintenance and Monitoring – Guidance for definitions.

4. Responsibilities

4.1. The management should:

- 4.1.1. Work with the auditor to define the terms and objectives of the audit.
- 4.1.2. Make sure that the auditor has access to all records, incineration area and staff required.
- 4.1.3. Ensure that any recommendations resulting from the audit are implemented without delay.

4.2. Waste treatment staff concerned with the management of the incinerator should:

- 4.2.1. Continue with their tasks as normal during the audit.
- 4.2.2. Answer any questions the auditor has fully and provide any other information that is requested.

5. Materials and Equipment

- Personal protective equipment
 - Gloves – heavy-duty, heat-resistant gloves.
 - Heavy-duty, heat-resistant boots – to protect skin from splashes of hazardous material and/or to protect your feet from items that may be dropped onto them.
 - Overalls/apron – to protect skin and clothes from burns and splashes of liquids. Sleeves should be long and the whole body covered. Plastic aprons should not be used.
 - Masks – to protect against respirable particles.

- Goggles or a face shield – to protect from splashes that could get into the mouth or eyes.
- Helmet – to protect the head from blows and bumps.

6. Hazards and Safety Concerns

- 6.1. Pathogens – handling infectious wastes that have been sent for incineration.
- 6.2. High temperatures – burns from the hot incinerator.
- 6.3. Mechanical – hand and arm injuries from handling the equipment or loading and unloading the waste; from materials falling when the incinerator is loaded or unloaded. Sharps injuries from improperly packaged glass syringes and other sharps materials.
- 6.4. Flames and explosions – always wear eye and face protection when opening the loading door. This will let in extra air and may cause a blowback, where the flame flares up through the door. Flammable liquids can explode if added to the incinerator; ampules and sealed vials can also explode and scatter hot contaminated glass as the air inside them expands in the heat.
- 6.5. Chemical pollutants – incinerators, especially small-scale medical waste incinerators, will emit numerous pollutants: persistent organic pollutants, including dioxins and furans; metals, including lead, mercury, cadmium; and acid gases, such as hydrogen chloride, sulphur dioxide, nitrogen oxides, and carbon dioxide.
- 6.6. Smoke and fumes – inhalation hazard and eye irritation from incinerator emissions, fuel (gas, diesel or kerosene) and chemical wastes. Smoke from incinerators contains the chemical toxins listed above, as well as particulates. Small particles can lodge deep in the lungs, causing lung damage and carrying pollutants with them. Most pollution is usually emitted at start-up and shut-down, so hazardous waste should not be burned at these times.
- 6.7. Ash – this is toxic and environmentally harmful. Small particles can be breathed in and it can cause environmental and food chain contamination if it is not properly disposed of. Ash will often contain sharps such as broken glass, lancets and needles.

7. Procedures

7.1. Audit planning

- 7.1.1. Clearly define audit objectives before beginning audit and report them to facility management.
- 7.1.2. Audit objectives for the facility incineration process can include, but are not limited to:
 - 7.1.2.1. Check that the waste is being properly segregated and incinerated.
 - 7.1.2.2. Check that the maintenance is being carried out appropriately and at the recommended intervals.
 - 7.1.2.3. Make sure safety systems are in place and being adhered to.
 - 7.1.2.4. Check that all incidents have been recorded and investigated, and that actions are taken to prevent a recurrence and reported in terms of organizational requirements.
 - 7.1.2.5. Ensure that legal requirements are complied with.
- 7.1.3. Staff should not have any warning of an audit. If they are able to anticipate one, they may adjust their behavior so the auditor will not get an accurate impression of actual practices.
- 7.1.4. Auditing tips

- 7.1.4.1. Introduce yourself, let people know why you are doing the audit and why it is so important to comply with the audit requirements.
- 7.1.4.2. List the people interviewed in the “comments” column of the checklist including their name and job function.
- 7.1.4.3. List the sample documents checked in the “comments” column, such as training done, reports, etc.
- 7.1.4.4. Check that people understand the reasons for the requirements for safe work, including emergency response and incident reporting.
- 7.1.4.5. Thank those who participated and explain how the findings will be reported and communicated, including the timelines.

7.2. Record review

The auditor may need to refer to the following documents. Copies should be made available.

- 7.2.1. National or regional medical waste treatment guidelines
- 7.2.2. Facility health care waste management policy
- 7.2.3. Facility safety procedures
- 7.2.4. Standard operating procedures and operator’s manual for the incinerator
- 7.2.5. Waste type register
- 7.2.6. Doc 536: Diesel-Fueled Incinerator – Daily Record
- 7.2.7. Doc 537: Diesel Fueled Incinerator – Monthly Record
- 7.2.8. Doc 538: Diesel-Fueled Incinerator Maintenance and Repair Log
- 7.2.9. Collection records where final disposal is off site
- 7.2.10. Facility and/or equipment authorization (such as a permit or a license from the regulatory authorities) and may include permission to dispose of waste, or emit waste gases to atmosphere
- 7.2.11. Accident or incident reports
- 7.2.12. Previous audit/inspection reports

7.3. Physical inspection

Use the attached checklist to conduct the audit at the facility.

8. Reporting and Recordkeeping

- 8.1. The auditor should produce a report including a summary and discussion of the data they have collected and highlight any areas that need improvement.
- 8.2. Audit results should be filed for a minimum of three years or longer if local regulations require, so that any persistent problems can be identified and the effects of any changes can be tracked, and for reference by the regulatory authorities.
- 8.3. Whenever possible, the health care facility should make audit results public if need be.

9. References

- 9.1. U.S. Environmental Protection Agency [Internet]. Hospital/medical/infectious waste incinerators [cited 2013 March 28]. Available from : <http://www.epa.gov/ttnatw01/129/hmiwi/rihmiwi.html>
- 9.2. European Parliament and of the Council of the European Union. Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste. Official Journal of the European Communities. 2000;L332:91-111

10. Related documents

- Doc 525: Incinerator Operation, Maintenance, and Monitoring – Guidance
- Doc 535: Diesel-fueled Incinerator Maintenance and Monitoring – SOP
- Doc 534: Diesel-fueled Incinerator Operation – SOP
- Doc 536: Diesel-fueled Incinerator – Daily Record
- Doc 537: Diesel-fueled Incinerator – Monthly Record
- Doc 538: Diesel-fueled Incinerator Maintenance and Repair Log
- Doc 539: WDU (brick) Incinerator Maintenance Checks SOP and Logs
- Doc 540: WDU (brick) Incinerator Operation SOP

11. Attachments

- 11.1. Incinerator Audit Checklist

Attachment 11.1: Incinerator Audit Checklist

	Item	Yes	No	Comments
A	Records Review			
1	Incineration operation manual available	Yes	No	
2	Waste receipt log available	Yes	No	
3	Incinerator daily record available	Yes	No	
4	Incinerator monthly record available	Yes	No	
5	Incinerator maintenance and repair log available	Yes	No	
6	Logs consistently and clearly filled in	Yes	No	
7	Amount of waste incinerated tallies with the records of infectious waste collected within the health care facility	Yes	No	
8	Incinerator operators' file available for inspection	Yes	No	
9	Identified problems properly resolved	Yes	No	
10	Annual inspection certificate and clearance present (should be posted on the wall)	Yes	No	
11	Emergency numbers posted	Yes	No	
12	Standard operating procedures available	Yes	No	
13	Injury and emergency response procedure available	Yes	No	
14	Regulatory authorizations (permits, consents, licenses, etc.) available	Yes	No	
15	Permit to work (where appropriate)	Yes	No	
16	Procedures in place to minimize, recover, recycle and dispose of residues from the incineration plant	Yes	No	
17	Personnel training files up to date and available	Yes	No	
B	Physical Inspection			
	Waste Holding Area			
1	Storage area clean and tidy	Yes	No	
2	Storage area accessible only to authorized personnel	Yes	No	
3	Storage area protected from pests and insects	Yes	No	
4	Biohazard warning sign in the waste storage area and on waste containers as well as access doors	Yes	No	
5	Storage area properly ventilated	Yes	No	
6	Storage area easy to clean (e.g., tiled or concrete construction)	Yes	No	
7	Water supply for cleaning available	Yes	No	
8	Adequate drainage installed	Yes	No	
9	Infectious waste in robust containers with closed lids	Yes	No	
10	Infectious sharps waste in puncture-proof containers	Yes	No	
11	Waste bags no more than 2/3 full	Yes	No	
12	Sharps containers no more than 3/4 full	Yes	No	
13	Rules on maximum waste storage times complied with	Yes	No	
14	Chemical residues, genotoxic and radioactive waste, inorganic compounds, pressurized containers, halogenated plastics and waste with high content of heavy metals are excluded from materials for incineration	Yes	No	
15	Waste with more than 1% chlorinated or halogenated materials such as PVC are excluded from materials for incineration	Yes	No	
	Incinerator facility			
16	Incinerator in an appropriate location in line with national planning policies	Yes	No	
17	Access restricted to authorized personnel/well trained technician	Yes	No	

18	Odor, noise and vibration within acceptable limits	Yes	No	
19	Firefighting supplies and equipment available	Yes	No	
20	Adequate water is available	Yes	No	
21	First aid and emergency response supplies and equipment available	Yes	No	
22	Adequate PPE available	Yes	No	
23	PPE is in good condition	Yes	No	
Ash disposal area				
24	Operators in charge of removing ash wearing the correct PPE	Yes	No	
25	Ash transport containers covered	Yes	No	
26	Facilities available for the treatment and final disposal of by-products	Yes	No	
27	Ash is properly disposed of	Yes	No	
28	Ash pit is in proper status	Yes	No	
Incinerator operator (PPE and procedures)				
29	Waste is weighed upon receipt	Yes	No	
30	Incinerator is operated according to the manufacturer's manual and relevant SOPs	Yes	No	
31	A temperature of 850°C is achieved in both chambers before waste introduced	Yes	No	
32	If/when waste with more than 1% chlorinated or halogenated materials such as PVC are incinerated, a temperature of 1100° is achieved in second chamber prior to introduction of such waste	Yes	No	
33	Temperature in combustion chamber is managed and maintained appropriately	Yes	No	
34	Incinerator shut-down procedure follows manufacturer's manual and relevant SOPs	Yes	No	
35	Operators in charge of loading waste wearing the correct PPE	Yes	No	
36	Design and handling procedures used to avoid any dispersal of litter	Yes	No	
37	Emissions of dioxins, mercury and other pollutants are monitored regularly	Yes	No	
38	Documented periodic maintenance conducted when necessary, including cleaning of combustion chambers and declogging of air inflows and fuel burners	Yes	No	
39	Staff understand operational procedures	Yes	No	
40	Staff understand safety procedures	Yes	No	
41	Relevant personnel trained, including refresher training	Yes	No	
42	Relevant personnel understand hazards and how to minimize risks	Yes	No	
43	Injury and emergency response procedure is known and understood by all relevant personnel	Yes	No	
44	All operators have had medical exam	Yes	No	
45	All operators have been immunized against hepatitis A, hepatitis B, polio and tetanus	Yes	No	
46	Operators have access to postexposure prophylaxis (PEP)	Yes	No	
Incinerator performance				
47	There is no evidence of cracks	Yes	No	
48	Emission monitoring performance is satisfactory	Yes	No	
49	Combustion efficiency meets operational and safety standards	Yes	No	
50	Emissions of dioxins, mercury, and other pollutants are within recommended limits	Yes	No	