Briefing 14/30 August 2014

Reducing Fire Risk at Waste Management Sites (Fire Control Guidance – Consultation Draft)

To: All Chief Executives, Main Contacts and APSE Contacts in England

For information only to Scotland, Northern Ireland and Wales

Key Issues

"*This guidance is intended as an umbrella. It gives general advice which will be applicable to a wide range of waste management and similar sites which handle wastes. It applies to sites where more than 50 cubic metres of solid combustible waste material is stored at any one time*".

This report offers guidance on:-

- Safe internal and external storage of wastes
- Assessments, plans and technical standards
- Fire safety in waste reception, waste treatment and waste processing

1.0 Introduction

The consultation draft of the 'Reducing Fire Risk at Waste Management Sites' guidance was published on 27th June 2014 and was prepared by the Environmental Services Association with input from the Environment Agency, the Health and Safety Executive, the Health and Safety Laboratories, the Chief Fire Officers Associations and several insurers; it is endorsed by all of those bodies as well as the Waste Industry Safety and Health Forum. It is not intended as a comprehensive guide to fire safety, instead it provides general advice for waste management sites; in the future, sector-specific and technology-specific fire control guidance will be produced as an addendum to the general document.

For advice on fire safety, the guidance recommends contacting your local Fire and Rescue Authority as a first port of call and also your insurer as they often employ in-house technical experts.

The full consultation draft can be accessed by clicking here.

2.0 Overview of the Guidance

This guidance only applies to sites that store more than 50 cubic metres of solid combustible waste at any one time, and excludes: landfill sites, composting sites, waste to energy plants, hazardous/special waste treatment and transfer facilities, waste management sites which fall under Control of Major Accidents Hazards Regulations and some aspects of end of life vehicle operations. It is intended to supplement the legal requirements for sites controlled under: Local Acts of Parliament, Regulatory Reform (Fire Safety) Order 2005 and all other applicable legislation.

The consequences of a major fire in a waste management facility are wide-ranging and consideration should be given to the safety of staff, the wider public and the environment through firewater-caused contamination and the financial implications through damaged property, raised insurance premiums and court claims when doing an assessment of your site/s.

Assessments, plans and technical standards

It is important to note that different regulators (e.g. your local Fire and Rescue Authority, Health and Safety Executive, Environment Agency and the Scottish Environment Protection Agency) and insurers will have their own standards (e.g. you may achieve a human health regulatory standard that your insurers are not content with due to business interruption issues), and you should seek to involve them in your fire management assessments.

Assessment and plans

An assessment of the fire risks at your site is required by most fire legislation. In general, this involves identifying the location of combustible and/or flammable materials on the site and identifying the location of potential ignition sources then putting in place physical and procedural controls and measures should a fire occur. Your assessment should also include who and/or what may be harmed by a fire and any subsequent consequences; you may also be subject to conditions in your environmental permit or waste management licence such as storage limits or maximum waste input. It is recommended that you seek specialist guidance for some of the more technical aspects of fire management. The UK Government has produced a guide on how to go about producing fire safety risk assessments for factories and warehouses that can be accessed by clicking here.

Technical standards

The following technical standards apply to specific aspects of fire control: British Standards, European Standards, Insurance industry standards and Building Regulations; these are inherently complex, so contact your local Fire and Rescue Service for assistance in this area if you do not hold in-house specialist competence in technical standards.

Fire control guidance

Whole site considerations

Table 1 below shows the general issues across the whole site that you will need to consider when preparing an assessment of your fire safety procedures. Each of these issues is covered in greater detail in the guidance document and have been summarised below.

Table 1: List of whole site issues for consideration

- Protection of human life
- Housekeeping and dusts
- Heavy mobile plant
- Hot works
- Water supplies
- Firewater
- Location and neighbouring sites/businesses/environment
- General ignition sources and precautions
- Fire detection, alarm and suppression systems – general
- Non-waste facilities on site
- Fire appliance access

Fire management starts with the protection of human life which will include considerations for on-site staff, contractors and visitors before moving onto wider concerns such as local residents, the environment and important neighbouring premises such as schools, hospitals and main roads; the location of the site and the proximity of important and high-risk premises (e.g. gas storage facilities) will determine the level of fire controls that must be put in place. Consultations with your local Fire and Rescue Service are recommended.

There are many processes that can reduce the risk and likely severity of a fire, the most important of which include:-

- Ensuring all visitors, contractors and drivers are fully briefed on the correct safety and fire prevention procedures whilst on site

- Keeping general ignition sources at least 6 meters away from combustible/flammable materials

- Regular inspections and cleaning of electrical equipment to identify faults and remove dust

- Implementing formal close-down procedures that includes a fire watch for smouldering waste

- Evaluating the site's likely available water supply in the event of every different type of likely fire

- Considering all hot works a two-person job (one working, one watching for sparks) and providing fire extinguishers at the scene

- Fitting heavy mobile plant with fire extinguishers and considering specialist coatings for shovels/blades to minimise spark generation

Firewater

Firewater is another important whole site consideration when it comes to fire control, as contaminated water can have considerable environmental and financial consequences if not properly controlled and disposed of. Here are some suggestions to deal with the problem of firewater: storing all waste on impermeable, fire resistant surfaces; installing containment facilities for firewater run-off; and consulting on alternative fire-fighting methods to reduce the production of firewater. The best fire-fighting process for your site will depend on a range of factors including the risks posed to people, the environment and property, the type of waste and how it is stored as well as the availability of containment facilities.

Fire detection, alarm and suppression systems – general

It is important that all fire detection, alarm and suppression systems are installed and maintained to relevant standards and must be regularly checked and tested. Multiple approaches to the detection and suppression of fires are recommended. All systems must be part of the design risk assessment, and it is recommended that larger sites should have a separate fire strategy document; it is also recommended that both large and isolated sites should have permanently occupied remote monitoring of fire alarms. If at any time your systems are non-functioning, you should inform your insurer, your local Fire and Rescue Service and implement additional controls (e.g. an after hours fire watch).

Non-waste facilities on site

It is recommended that any non-waste facilities on your site should be kept at least 10 metres away from most waste stacks unless they are suitably contained, and that their fire detection and alarm systems should be connected to the overall system; non-waste employees should receive fire extinguisher training.

Fire appliance access

It may be necessary to consult with your local Fire and Rescue Service to ensure they have unobstructed access to your site and meet the minimum access requirements below in Table 2.

Table 2: Fire and Rescue Service vehicle access requirements

Type of FRS appliance	Min width of road (metres)	Min width of gateway (metres)	Min clearance height (metres)	Min weight restriction (tonnes)
Water tender	3.7	3.2	3.7	12.5
High reach vehicle	3.7	3.2	4.0	24

Waste reception

This section is aimed at the temporary storage of wastes in reception typically not exceeding 72 hours prior to treatment and/or transfer to another site. Wastes stored for longer time periods are covered in the section below titled 'waste storage'.

The receipt of hot loads and loads with hazardous materials are one of the main causes of fire in reception areas, so it is of importance that employees in the area are trained to look for signs of fire and are aware of the appropriate actions to take; other considerations include prioritising the processing of higher-risk loads, spreading out received wastes to aid the identification of suspect loads and the provision of an emergency area for any suspect loads.

Table 3 below shows the most common options for fire detection systems in enclosed and external reception areas. Additional considerations include whether or not systems should be programmed to be active only during non-operational hours and installing break-glass points at enclosed reception exit doors. Note: for large facilities, you should seek competent advice on the best option/s of detection for your site.

Table 3: Fire detection options for enclosed/external reception areas
Fire detection options for enclosed reception areas
● Aspirating fire detection system ● Spark, infrared or ultraviolet detection ● CCTV visual flame detection systems ● Flame detectors ● Linear wire heat detection (but, should be located away from potential damage by mobile plant) ● Manual break-glass points at all exit doors
Fire detection options for external reception areas
● Camera detectors over external reception bunkers

Detailed in Table 4 below are the different fire suppression options to consider for your reception area, many of which are dependent on the design and layout of your site, having access to a fire hydrant or other appropriate water supply and the proximity of recycling/recovery equipment such as shredders to the main processing area. Consideration should also be given to: fire spread in sites that have direct feed into processing areas, to the provision of passive/automatic smoke vents to assist with fire fighting and to safe waste capacity and waste storage height in your risk assessment.

Table 4: Fire suppression options for reception areas	
Fire suppression options for reception areas	
● Manual open deluge system ● Deluge system ● Mobile foam trolley ● Hose reel systems	● Water cannon ● Sprinkler systems ● Foam additive to sprinkler/deluge systems

Waste treatment and processing

While this guidance cannot cover all technologies used, the most common types of equipment and risks in processing are considered below. Electrical faults, friction from slipping conveyors/damaged or worn/bearings and motors, and direct heat from drive motors and other specific items of equipment are all considered to be general ignition risks in processing. Shredders, for example, have a high risk of ignition due to friction and/or metal-on-metal contact, water deluge/sprinkler systems are recommended in shredder housings or at conveyer outputs; this is important as conveyors have the ability to carry a fire rapidly through a plant, so fire alarm/detection systems should be connected to plant control systems to halt conveyor movement and prevent this kind of fire spread. Trommel screens can aerate wastes, resulting in a smoulder becoming a full fire. De-dusting systems may pose dust explosion risks and thus should be subject to DSEAR assessments, may require hazardous area classification and should be subject to maintenance from a specialist electrical contractor with knowledge of DSEAR compliant systems. Mains/electrical plant rooms should be enclosed, constructed to appropriate fire resistance standards, supplied with suitable extinguishers and fitted with vision panels in all doors; thermal imaging cameras can be of use to detect electrical faults. Control panels should be either in enclosed rooms or constructed to a suitable IP (protection) standard to prevent dust ingress.

In processing areas, housekeeping needs to be of a high standard. Hydraulic systems can generate a lot of heat, and due to the flammable nature of hydraulic oil, present a significant fire risk if not properly maintained; these hot spots can be detected through the use of thermal imaging cameras, and can be used as part of regular inspections. The installation of fire suppression systems at/above hydraulic power packs, at platform level under picking cabins and at roof level (sprinkler systems) should be considered where appropriate; it is also recommended that fire extinguishers are provided at balers, picking cabins, control rooms and similar areas. It is also recommended that you consult with your insurer to ensure they are content with your choice of fire suppression systems.

Processing areas should be fitted with appropriate fire detection/alarm systems; the options available include: aspirating fire detection, spark/infrared/ultraviolet detection, CCTV visual flame detection and flame detectors. This includes mains/plant rooms and picking cabins (which should be fitted with fire alarm break-glass points at exit doors). All fire detection and alarm systems should be connected to plant control systems to halt automatic movement in the plant when activated. It is important to consider the separation between processing, waste storage and reception areas either by distance or by constructed barriers to minimise the risk of fire spread. As a significant number of processing area fires occur after working hours, you should consider formal close-down procedures using the issues outlined in Table 5.

Table 5: Formal close-down procedures - Issues for consideration
● Over-run shredders, conveyors, screens etc to ensure they are as clear of waste as practical ● Shut-off and lock-off of electrical power and other electrical items such as heaters ● Clearance of accumulated waste under equipment ● Ensuring any flammable materials have been secured ● A one hour minimum fire-watch after the end of operations ● Spread out wastes awaiting processing to aid detection of items which could start a fire ● Check that mobile plant has been moved to a safe distance ● Check that fire detection and security systems have been activated and that fences and gates are secure

Waste storage

For information on temporary waste storage, refer to the 'waste reception' section above. Many waste management sites store combustible wastes such as paper, cardboard, plastics, baled and wrapped SRF/RDF, loose wood and tyres. There are many considerations for storing these kinds of wastes.

The calculation of your site's maximum safe storage capacity is an important consideration for the prevention of fires; this will depend on the different types of waste stored and their levels of fire risk, the type and configuration of storage (e.g. internal/external? bunker/enclosure storage?), the seasonal variations in demand and/or supply and any restrictions on the amounts permitted and storage times in your site's permit/licence or other regulatory permissions. This maximum capacity should be compared with waste inputs and processing capacity, and should inform your management system to ensure your site never exceeds this maximum safe capacity.

Frequent visual inspections of stored waste are recommended for external storage at least once a week, although some sites have fitted camera type detectors where practical. For internal storage, the same fire detection options outlined in Table 4 for reception and processing areas are applicable here. For specialised storage systems such as silos, other fire detection systems such as combustion gas sensing equipment may be suitable; you should seek competent advice if this applies to your site.

It is also recommended that you seek competent advice on fire suppression systems in internal, external and specialist storage areas; the most common options are for internal storage areas are outlined in Table 4. For external storage areas, consideration should be given to whether it is necessary to have on-site fire hydrants, drench, sprinkler or other systems in place.

Some materials can spontaneously combust under certain conditions when stored for prolonged periods; generally, the smaller the particle size, the higher the risk. Maximum storage times for combustible waste are shown in Table 6.

Table 6: maximum storage times for combustible waste	
Combustible waste type	**Maximum storage time on site**
Non-shredded or similarly treated wastes (that is wastes whose particle size has not been reduced) and larger particle size wastes	6 months
Baled and compacted wastes (if kept for longer you may wish to break the bales and re-bale to reduce risk)	6 months
Shredded and similarly treated wastes (that is wastes whose particle size has been reduced) and smaller particle size wastes	3 months
Combustible fines and very small particle size wastes	1 month

Internally stored wastes

While waste is generally stored outside rather than inside, some waste sites store baled and other wastes inside buildings either in walled bunkers (or similar) or in the open. Competent advice is recommended for sites with very large quantities; the necessary measures will depend on the type of building, the type of waste, the storage height of waste, the existing fire precautions and the limits set in your site's environmental permit or similar regulatory permission. General guidance on storage limits and stack height is outlined in Table 7 below; these may be exceeded safely by, for example, installing enhanced fire suppression systems, but you should seek competent advice to justify this.

Table 7: Synopsis of internally stored wastes stack sizes and separation distances		
Max individual stack area (metres^2)	**Max guidance stack height**	**Min separation distance between stacks**
100m^2	5m	5m

Many waste storage areas inside buildings are enclosed (e.g. three sided walled structures); this does not remove the need to consider the amounts of waste stored in any one stack/location and, typically, they should not exceed a 100 metres^2 floor area. Your chosen setup should make it simple to achieve a full stock rotation to remove older wastes from bunkers/bays, have high/thick enough walls to stop fire spread from heat radiation, and should be made of non-combustible materials. Temporary wall/side structures should be considered closely before implementing, inspection/checking processes should be put in place to ensure wastes are properly enclosed and do not exceed height limits and competent advice should be taken on fire spread by convection. Generally, internal storage areas should be kept away from potential ignition sources and stock should be rotated out of these areas as frequently as practical.

Externally stored wastes

External storage has its advantages, such as: available space, cost compared to internal storage, and fires may be easier to fight due to likely better visibility and easier access; it also has many disadvantages, including: fire suppression equipment is harder to fit and are likely to be less effective, volumes of waste stored are generally much larger and thus can be more prone to fires due to a lack of proper separation between stacks. It is recommended that non-bunkered/enclosed waste stacks are separated from buildings by a minimum of 10 metres. Detailed guidance on maximum stack size/separation distances for waste stacks can be found in Appendix 1 of the guidance document.

You should include arson/vandalism and security arrangements in your fire assessment for external storage, and if necessary, you should consider enhancing your site security arrangements. Additionally, it may be relevant for you to consider the ignition risks posed by neighbouring premises.

Enclosing/bunkering externally stored wastes is an option for your site, but it's important to consider the effect this will have on achieving a full stock rotation, the correct type of material used to enclose the stockpile, the effect on stock capacity, the ability to ensure segregation of materials, the effect on the prevention of fire spread between stacks and the ability of the Fire and Rescue Services to fight or contain the fire. If you decide to enclose/bunker some/all of your external waste, you will need to ensure the walls are high/thick enough to stop fire spread from heat radiation and maximum stack heights are enforced to stop waste from spilling out.

If you use open stacks as storage, it is important to consider whether to turn or not turn your open stacks. Regular turning is recommended, as this allows excess heat to dissipate and may reduce any local areas of high moisture; alternatively, this can cause a fire as it allows oxygen to enter the stack. It is recommended that the detection and management of hotspots is included in your accident plan/site procedures. Open waste stacks should be regularly monitored for temperature build-up, as combustible stacks will become more prone to self-combustion as time passes.

Appendices

In the main guidance document, there are several appendices that go into greater detail on waste management and point to further reading. Here is a short summary of each appendix:

- **Appendix 1: Managing external storage stacks**
  - this appendix includes a breakdown of the max individual stack height/stack length and width/stack volume/stack area and min separation distance between individual open stacks for each different waste material, as well as guidance on the recommended layout of stacks.

- **Appendix 2: Producing an accident/emergency plan**
  - this appendix breaks down what should be included in your accident/emergency plan, what the map of your site should show and any disaster recovery measures as appropriate.
- **Appendix 3: Checklists**
  - this appendix allows you to make a simple and outline assessment of your fire management based on a range of issues and considerations.
- **Appendix 4: Useful links and further reading**
  - this appendix provides links to useful documentation.
- **Appendix 5: Glossary**
  - this appendix provides an explanation of the different technical terms used in the guidance.
- **Appendix 6: Cover letter**
  - this appendix is the cover letter issued during consultation on this guidance.

3.0 APSE Comment

APSE welcomes this publication and the important contribution it will make to improving the safety and security of waste management sites from fire risk. Fires involving combustible wastes have many direct and indirect consequences for workers, third parties and the environment through smoke inhalation and the release of airborne/water-based pollutants, as well as the significant financial consequences to councils through property damage and business interruption, reputational costs, civil claims and clean-up costs.

Whilst APSE recognises the valuable contribution to new forms of energy from waste we have previously highlighted in APSE direct news and at APSE advisory groups the importance of considering fire safety issues. This guidance although currently in draft form will be a useful tool in assessing and minimising fire risk.

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