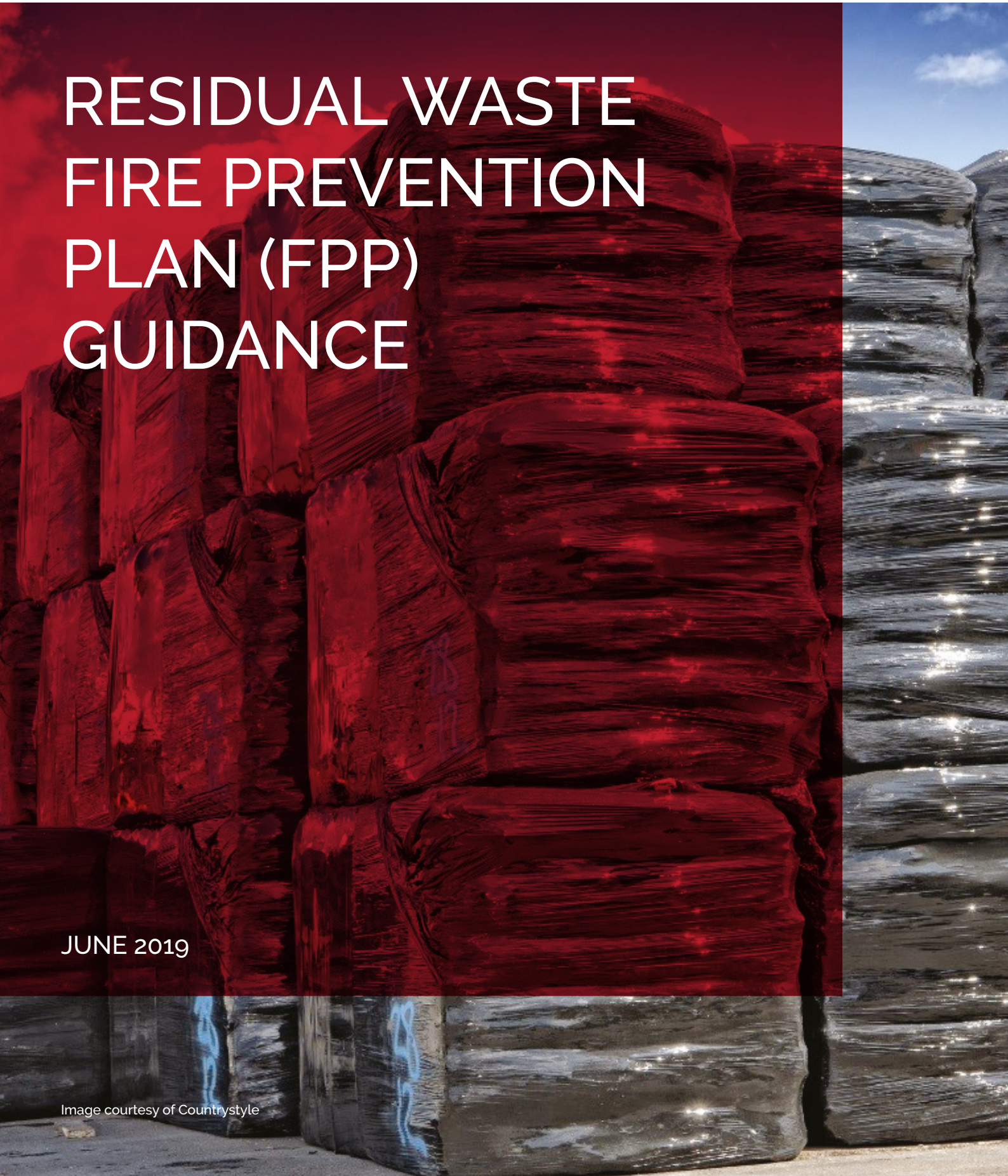
RDF INDUSTRY GROUP

RESIDUAL WASTE FIRE PREVENTION PLAN (FPP) GUIDANCE

JUNE 2019



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Introduction

This document has been compiled by the RDF Industry Group to provide advice on the development of FPPs. Members who were compiling FPPs had found that there was a lack of guidance that was specific to the sector. This guidance draws on the experience of members who operate permitted sites to share good practice with regards to fire planning for sites accepting residual waste. It is structured to follow the Environment Agency's (EA's) guidance on the subject, and each section begins by outlining what the regulatory guidance requires (**in bold text**), before going on to provide discussion and advice on how waste operators can comply with these requirements and manage their overall fire risk.

FIGURE 1: HOW THE EA'S FPP GUIDANCE SECTIONS CORRELATE TO SECTIONS IN THIS GUIDANCE

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This document:

- explains the rationale behind regulatory decisions;
- provides suggestions, hints and tips for developing your FPP;
- poses questions you may want to consider regarding your site; and
- gives examples based on the experience of those working in the waste management industry.

This document provides advice on what you ***could*** do, but does not tell you what you ***should*** do, as this is dependent upon the context of your own specific site.[1]

This guidance is intended to be used in the development of FPPs for residual waste, including baled and loose residual material and refuse derived fuel (RDF). However, elements of this guidance will apply to all FPPs generally, regardless of the specific waste types being managed on site. For more information on how RDF is produced and stored, see the Group's Code of Practice. The Code of Practice also includes further detail on the contracts that RDF producers should have in place with off-takers. RDF producers will have different processes in place depending on their specific supply chain; some will produce and store onsite, some will store at ports and some will haul very frequently so have minimal storage.

It is also important to note that the views and policies held by individual insurers may be different to those presented here. You should engage with your insurer early on in the FPP process.

Image courtesy of Seneca

1 The RDF Industry Group is not responsible for decisions or actions taken on the basis of the content of this guidance. Following this guidance is not a guarantee that an FPP will be approved.

1 Fire Prevention Plan Objectives

The EA guidance requires you to develop an FPP which meets the following three objectives:

1) minimises the likelihood of a fire happening;
2) aims for a fire to be extinguished within four hours; and
3) minimises the spread of fire within the site and to neighbouring sites.

The requirement for an FPP should be viewed as an opportunity to review the fire risks on your site and implement measures (physical and procedural) to minimise the impacts if a fire occurs. An FPP should be able to be used as a standalone document available to all staff, to embed fire safety into normal working practices. A robust FPP will help to ensure business continuity. The EA does not expect you to protect against every eventuality but to undertake a realistic assessment of your site. Your FPP should be proportionate to your site risk. When determining risk, you should take into account factors such as:[2]

- throughput at your site;
- amount of storage at any one time;
- operational procedures;
- location (e.g. risk of arson); and
- waste composition (e.g. risk of self-heating).

If you can fully follow the FPP guidance and meet the three objectives, it is likely your FPP will be approved with minimal update requests from the EA. However, for many sites (especially pre-permitted sites) there will be aspects of the guidance which cannot be adhered to. In these instances the guidance should be thought of as 'good practice' and you can propose alternative measures but they must still meet the three objectives of the EA guidance.

If you wish to include evidence or details in your FPP which are confidential, these can be added as an appendix and on request the EA will omit these details from the published file when the application is made.

The objective to extinguish a fire within four hours is based upon the premise that this is a safe period of time for which people can shelter from a fire before toxicity levels in the air become too high. Where possible measures should be in place to extinguish a fire in less than four hours.

2 Using Your Fire Prevention Plan

Your FPP should be a live document which manages and controls your fire risk and should therefore reflect the current situation on your site.[3] You should incorporate it into your site operations and procedures.

The EA wants to see a standalone document. If your FPP refers to documents outside of the FPP these must be included in the appendices.

Your FPP should be embedded in daily site operations. As a minimum, annual drills/testing of your FPP should be conducted to ensure it remains fit for purpose and your staff know how to prevent fires on site and how to respond if a fire occurs. This will also help to identify if there are any shortfalls in your FPP which need to be addressed. Again, this will help to ensure business continuity.

Staff working in the waste management sector may not have English as their first language or may be working on short-term or temporary contracts. It is important that appropriate training is provided to all staff (e.g. in the employees' first language, or short targeted training sessions to provide only essential information) so staff understand the fire prevention and mitigation measures to be used on site and how to react if a fire incident occurs.

2 This is a non-exhaustive list.
3 You should inform the EA of any significant changes to you FPP, as it may require a reassessment.

3 Activities at Your Site

The EA requires you to provide details of all the activities that take place on site. This includes: material tipping, sorting, processing and collection, as well as operational activities such as vehicle maintenance.

You should provide a description of the activities that occur on site and explain where they take place. It is also worth clearly setting out in a table:

- what combustible materials are accepted on site;[4]
- how much is received each day and each year;
- how much is stored at any one time;
- what form the waste is in; and
- how it will be processed on site.

If your site experiences seasonal fluctuations in the required volumes of material storage, it would be beneficial to illustrate the flow of material by month. This will allow the EA to see the expected peak times and the anticipated volume of material to be stored during this period. Undertaking this exercise will also allow you to consider additional measures you may need to implement to mitigate the additional fire risk during periods of high material storage volumes (e.g. additional pile monitoring, sheltering materials from direct heat).

If your main off-takers are Northern Europe incinerators, it is likely that demand for your material will reduce during the summer months; however, material from your suppliers may continue to arrive at the same rate. Figure 2 provides an example of how you could illustrate the profile of your material storage to the EA.

FIGURE 2: EXAMPLE MATERIAL STORAGE PROFILE

	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Material In	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Material Out	2000	1000	1000	1000	1000	1000	1000	2000	3000	3500	4000	3500
Stock on Site	**0**	**1000**	**2000**	**3000**	**4000**	**5000**	**6000**	**6000**	**5000**	**3500**	**1500**	**0**

Image courtesy of Seneca

You should also include a waste acceptance procedure, detailing the procedure followed if:

- a hot load is deposited; or
- a load contains contamination which may provide an ignition source.

Your waste acceptance procedure should also consider where the material comes from and therefore its composition and what ignition or fire risks this poses. This could be material which provides a spark if damaged (such as batteries or flares), material which self-heats (such as paper or wood) or material which accelerates the rate of fire spread (such as oily rags or organic material) due to it breaking down and generating heat and methane. If you use a trommel to remove organic waste when processing RDF, mention this in your FPP as it will help to reduce your fire risk.

4 See EA guidance for a full list of materials that are considered combustible.

Your waste acceptance procedure should also include fire checks as the material is deposited. These checks can either be made visually or through the use of thermal scanners. The procedure should also acknowledge the limitations of these methods to see into the pile and how this will be mitigated against (e.g. using further visual or thermal checks as the material is moved into the pile and/or regularly turned).

If you do store hazardous materials on site you will need to make sure they are properly contained (in a locked cage or sealed container) and you are aware of where they are stored. During a fire incident, if you store combustible materials on site but cannot demonstrate to the fire service you know where they are and that they are stored correctly, then (if there is no risk to life) they are likely to choose to take a defensive stance rather than attacking the fire. This is due to the life risk hazardous materials can cause to fire fighters. In this instance the fire is likely to spread and cause more damage to your site and the neighbouring environment.

To allow the local fire service to develop a more informed approach to tackling an incident on site, it is advised that you engage with the fire service when developing your FPP to discuss the risks and hazards associated with your site and operation. If required, following this engagement the fire service can record site specific information on their internal systems which could inform the firefighting tactics on the site and help with early resolution of an incident.

If you experience seasonal variation in the quantity of material received on site, include details of how you manage this. For example, do you increase the rate at which you process the material or do you increase your stockpiles? If the latter, have you considered the additional risk this presents on the site and what measures have you introduced to overcome this?

4 Site Plans and Maps

The FPP guidance requires you to include scaled site plans. A full list of what should be included is in the latest EA guidance.

The purpose of providing site plans and maps is so that EA officers and fire fighters attending the site during an incident are able to familiarise themselves with the surroundings and understand the different risks around the site. This information is likely to be used to inform the firefighting approach to a fire incident on site.

The EA list of items to include in site plans should not be thought of as exhaustive, and if you have any site specific features which would influence a firefighting approach these should also be included. For example, if you have powerlines crossing the site these should be included in your plans, as in this scenario it may be unsafe to use firefighting jets to attack the fire and smoke from the fire could become charged, potentially causing a risk to life. It is also recommended, if you have powerlines on site, that minimum clearance heights and distances are maintained to minimise the risk of a fire on site. These distances should be confirmed with the National Grid.

Your maps can be presented as one detailed 'emergency plan' or a series of plans which are clearly labelled to show what information they include. If you have buildings on your site you must also include an internal layout of these facilities.

5 Sensitive Receptors

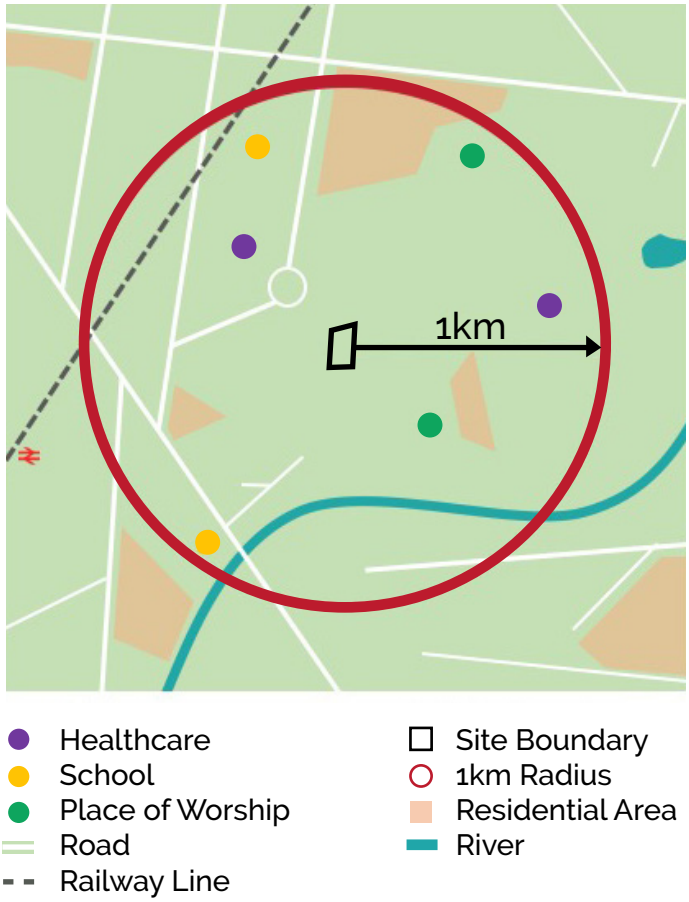
The EA guidance requires you to produce a map showing all sensitive receptors within a 1km radius of your site that could be affected by a fire. A full list of types of sensitive receptors is available in the EA guidance.

The purpose of the sensitive receptor map is to know who is a sensitive receptor to your site and how vulnerable they are to the impacts of a site fire. It should look at the following receptors (see EA guidance for full list):

- social (housing, schools, hospitals, places of worship, etc.);
- economic (workplaces, industrial areas, shops, etc.);
- environmental (rivers, woodlands, boreholes, etc.).

Undertaking a mapping exercise is one way you could identify sensitive receptors within 1km. Once you know who your sensitive receptors are you should consider their proximity to your site and the action you will need to take if a fire breaks out. For example, if your site is located near to a railway line, in the event of a fire the line may need to be temporarily closed due to reduced visibility. If you are able to present this information to the fire service on arrival at the site, they can take the appropriate steps to communicate with the appropriate stakeholder.

FIGURE 3: EXAMPLE OF A SENSITIVE RECEPTOR MAP



It is valuable to have identified which receptors are higher risk and the measures which could be used to communicate with each receptor. For example, if you share a boundary with a site dependent on air conditioning units, it will be important for you to notify these sites as soon as a fire starts on your site so they are able to shut off the fans to prevent any damage to their equipment or a reduction in air quality inside their buildings.

6 Managing the Common Causes of Fire

The EA's FPP guidance requires you to understand the common causes of fire and the measures you can take to reduce the risk of a site fire occurring.

The easiest way to address this section of the guidance is to use a table. Appendix 1.0 details the common causes of fire specified by the EA (such as arson, self-heating, contamination, electrical faults, etc.) and additional guidance on the information that you should look to provide in your FPP. If you do not have a risk present on site, (for example, you do not undertake any hot works), you should clearly state 'hot works are not undertaken on site'.

As well as the list identified by the EA, it is also important that you consider additional potential ignition sources which are specific to your site. A good place to start is to take each of your site activities in turn and assess the risks they present and the control measures/procedures you have in place to mitigate against these risks.

One potential cause of fire which operators processing residual waste should be aware of is fluff and dust. Excessive build-up of dust around electrical equipment such as trommels may increase the fire risk, as can waste becoming stuck within moving machinery parts, creating fiction and therefore heat. Regular inspections and clean-downs of processing lines will help to mitigate this risk. Depending on your throughput, this might be appropriate to do every day (especially at the end of a shift) or at the end of a working week.

Before residual waste is processed, you should also consider checking for the presence of batteries in the waste stream, which, if damaged by machinery, could be an ignition source.

7 Material Storage Times

The EA FPP guidance requires you to specify the maximum storage time for all material on site and the stock rotation procedures in place to demonstrate how you are preventing material from self-combusting.

This section of your FPP should be used to quantify the risk of material storage on site. If you want to make the case that you are low risk, demonstrating you have low material storage times, good stock rotation and are preventing heating from chemical reactions and contamination is key. A simple approach to demonstrating risk level is to include a table detailing each material stream, how long it will be stored on site and how it will be managed whilst on site.

Combustible material stored on site for less than three days (72 hours) will present a lower risk than material stored for longer periods as it is less likely to self-combust. However, material stored for shorter periods of time still presents a fire risk for a number of other ignition sources (see Appendix 1.0) such as contamination (e.g. batteries), arson and damaged plant or electrical equipment. If you have a lot of sensitive receptors within close proximity of the site, or a key sensitive receptor, you may wish to reduce the

time and quantity of material you store on site, as the longer you store material and the larger the pile, the higher the risk of self-ignition.

You should consider the composition of your waste and how this might affect your storage processes, including storage times. Waste with a higher biodegradable content, such as waste from municipal sources rather than from commercial and industrial sources, may have an increased risk of bale degradation over time.

Your site should operate on a first-in first-out basis. This could be as simple as tipping the newest material at one end of the pile or bay, with the oldest material being shipped out from the other end of the pile or bay. However, you will need to include details of how this is managed on site and what evidence is available to demonstrate the procedure is correctly applied.

The longer you store baled material such as RDF on site, the greater the possibility that the integrity of the bale could be compromised, for example, through the introduction of oxygen which increases the likelihood of self-combustion. To improve the integrity of bales, a 'cross wrap' system should be used, which has been specifically designed to seal waste bales for storage (this system wraps the bales from all sides and angles to allow plastic layers to overlap and prevent waste escaping). Also, if you know you will be storing bales for a longer period of time you should consider improving the quality of wrap to reduce the risk of the bales breaking down, for example by increasing the thickness of the wrap used or the number of layers of wrap. Before doing this, you should check any contractual commitments you have with your material off-taker in relation to bale wrapping.


Image courtesy of Biffa

Evidence of material storage duration may include documents on site detailing when waste arrives and leaves the site. If you have on site processing, documentation might include boards detailing the date the material was input in to each bay and when it arrived on site. For bales you may choose to tag each bale after wrapping to be able to monitor how long each has been stored on site.

If you store material in bays, have you considered how you would make sure all of the oldest material was always removed? For example if it remained after a shipment, would you separate it and make sure it was included in the next shipment, if so, do you have the space to do this?'

The EA guidance states that you must not store combustible material for longer than six months.

Material storage time limits relate to the total storage time from the point of production. You should be informed as to how 'old' the material is when it comes to your site as it will reduce your storage times (see box below). For example, if the material is directly delivered from source to your site, the storage clock starts on arrival. However, if the material is stored on another site for three weeks prior to arriving at your site the total amount of time that material can be stored is reduced. You should also consider any additional storage time that is required after the material leaves your site.

It is important to understand where your waste has come from and how old it is. For example, if you are producing RDF for export, it may be a week old when it arrives on your site and require dockside storage for two weeks prior to shipping. This would reduce your site storage time without monitoring to nine weeks, or with monitoring to 23 weeks (see section 8 for details on monitoring). You may also wish to include additional contingency to account for delayed shipments (such as due to bad weather) to prevent exceeding the three or six month storage limits.

If you have any periods of time where the site is not operational but material is still stored you will need to have procedures in place to make sure the site is still checked, pile storage times are adhered to and if piles are stored for longer than three months that appropriate monitoring is in place and being checked.

8 Monitoring and Temperature Control

The EA guidance requires you to show how you will control heat within your material piles to prevent self-combustion.

If your piles are *within* the maximum pile sizes of the guidance and you store the material on site for less than three months, then there is *no* requirement for monitoring to take place. If you have larger material piles, the material is stored for longer than three months or you store high risk materials within an area with lots of sensitive receptors, then you will need to have a temperature monitoring programme in place.

If you are storing material between three and six months you will need to consider different approaches to temperature monitoring. For loose piles, a temperature probe could be used.

If you want to include pile turning to control material temperature on site have you made sure you have enough space on site to do this? This could be achieved either by increasing operational space or having big enough bays/pile storage areas to allow turning to occur.

Due to the nature of baled RDF, regular surface temperature monitoring should show as any self-heating within the pile as a small but measurable temperature change at the surface within 24 hours. Probing RDF bales for temperature monitoring purposes is not recommended, as it may introduce oxygen to the pile and actually increase the risk of self-combustion.

You will need to determine a trigger temperature which, if reached, instigates the need for the bale to be moved to the quarantine area, split open and the material allowed to cool before being re-processed and re-wrapped. If the temperature within the bale is below the trigger temperature then the bale should be re-wrapped to prevent oxygenation. The trigger temperature used should be one prior to combustion occurring, 50°C is commonly used as a lower threshold trigger temperature for waste.

You will need to consider how you will access bales which have already been stacked. For both loose and baled material you need to be able to provide a sample which is representative of the whole pile (approximately 10%).

9 Waste Pile Management

The EA sets out maximum pile sizes and volumes by each material stream. The aim of these restrictions is to limit the scale of a fire if one occurs and to reduce the risk of self-combustion.

The EA restriction on pile length and depth is to limit the amount of fuel available within each pile and to allow the fire service sufficient access to all areas of the piles during a fire incident. The restriction on pile height is to reduce the risk of mass self-heating within a waste pile. The taller a waste pile, the more the material becomes compacted allowing a build-up of heat within the material. As there is less airflow to dissipate the heat, the temperature can continue to rise to the point of self-ignition.

Also, the larger the material pile is, the longer it will take a deep seated fire to break the surface, meaning it is likely to have spread further and be more challenging to extinguish.

When calculating the volume of material in a pile, this should be based on the amount of 'fuel' available if a fire breaks out. It is not the total volume of space but the volume of material. This can be calculated using an accurate bulk density of your material to better determine the total volume of space your pile can occupy.

If you want to store as many RDF bales as possible in a compliant pile (450m^3) then you should consider the following.

Assuming each bale measures 1.2m x 1.5m x 0.75m and weighs 1000kg you can store 333 bales in each compliant pile. In reality you will have minor irregularities in your bale shape and want to include handling space when stacking. This may increase the store dimensions for each bale to 1.4m x 1.8m x 0.8m.

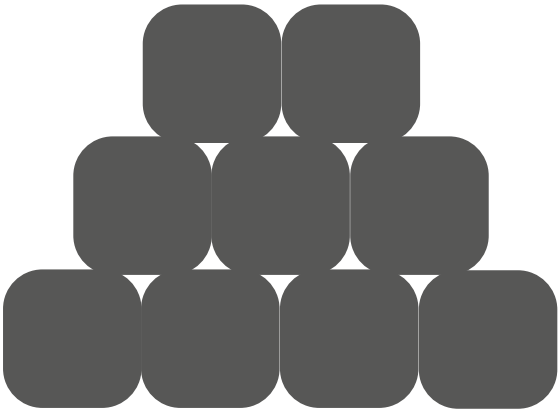
If looking at space volume alone, this should reduce the number of bales you could store to 223. However, you have not increased the quantity of fuel, just the space required around each bale. Therefore you can still store 333 bales in each pile, but now the pile will occupy more space but still conform with the 450m^3 volume of material limit.

Where possible you should adhere to the maximum waste piles included in the EA guidance. If you are able to reduce the pile sizes further, you will lessen your fire risk as well as potentially reducing the amount of water that would be required to tackle a fire if one occurred.

It may be possible to exceed the maximum pile sizes or volume in certain circumstances, for example if your site is rural with very few sensitive receptors nearby. If you wish to do this you must include alternative measures to reduce the overall site risk and have suitable procedures in place to make sure you operate on a first-in first-out basis, and that you do not exceed the prescribed storage times. In these instances, time could be an alternative measure: you could increase the fire resistance of bay walls to provide longer protection. There will be some situations, e.g. a site in an urban area with a high number of sensitive receptors, where the EA will not permit you to store in excess of the maximum pile sizes even if you implement alternative measures as the site is deemed to be a higher risk.

If you are storing bales on site, you should consider the benefits of stacking bales in an interlocking formation (see Figure 4) over a column formation. Fire tests undertaken on behalf of the WISH (Waste Industry Safety and Health) Forum found that interlocking bales reduced how quickly a fire spread and also reduced the maximum burn temperatures obtained as flame vortexes were not able to form in the same way as in column-stacked bales. Full guidance around this topic can be found in WISH's WASTE-28 Guidance on Reducing Fire Risk at Waste Management Sites.

FIGURE 4: INTERLOCKING BALES



The restrictions the EA have placed on pile height are to reduce the risk of site fires. The higher your waste pile, the greater level of compaction that occurs within the pile. This can raise the internal temperature of the pile, increasing the likelihood of self-combustion.

Image courtesy of Indaver

10 Preventing the Spread of Fire

The EA requires you to prevent the spread of fire on site. It provides two options, one of which needs to be used between combustible material piles, flammable materials, buildings and the site perimeter:

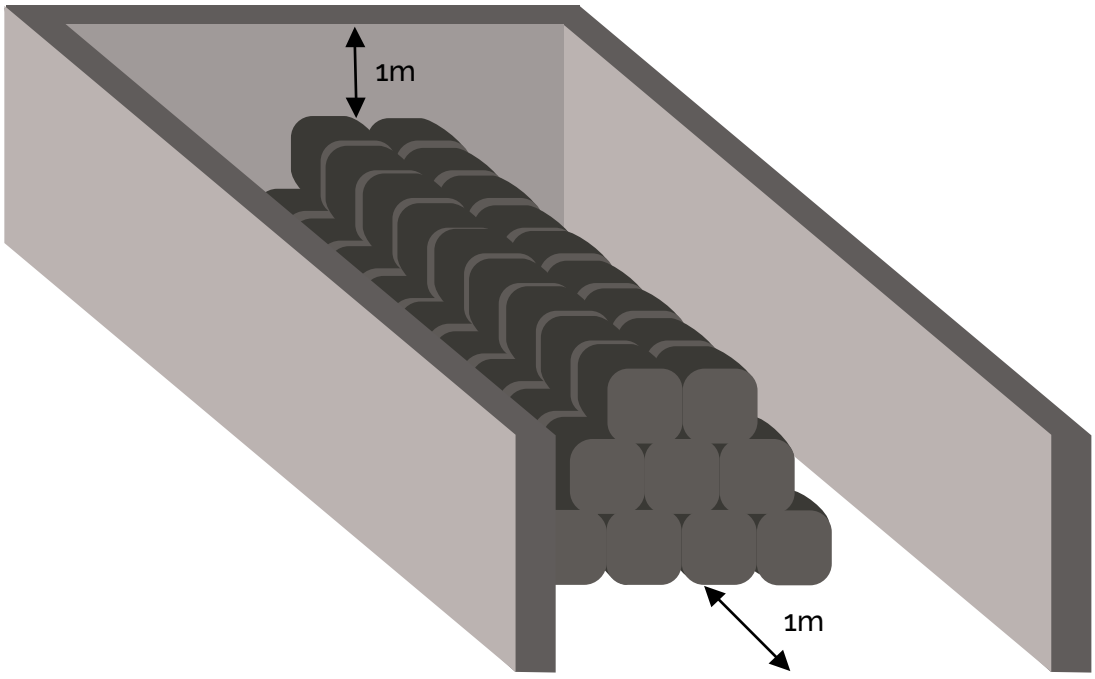
- **six metre separation distance on all sides of a pile; or**
- **firewalls with at least two hours fire resistance.**

The separation distances specified by the EA vary to those in the WISH guidance, as the latter's guidance is focused on mitigating against the heat radiation from a fire to reduce the spread of fire between piles and/or buildings, whereas the EA guidance is to ensure sufficient firefighting access with the aim of extinguishing the fire within four hours.

If you propose to use firewalls on site they should be stable, of sound integrity and able to offer thermal cooling. There should be at least one metre of clearance between the top of the material pile and the vertical height of the wall, and also between the foot of the material pile and front end of the bay wall (i.e. the freeboard space), to help to limit fire spread during an incident.

When considering the layout of piles or bays on site you also need to consider perimeter access. If you want to store combustible material up to your site boundary you could use firewalls to prevent the spread of fire beyond your boundary. Alternatively, you could leave six metres of clearance, and this separation distance could include an access road; the space does not necessarily have to be empty, it just needs to be clear of ignition sources and combustible material.

FIGURE 5: CLEARANCE DISTANCES BETWEEN WASTE PILES AND FIREWALLS



If you have existing bay walls on site but you are not aware of their fire rating, then first speak to the EA about this, as where the specification is not known it is possible to estimate the resistance from the type and thickness of concrete alone. There are also companies that can undertake retrospective grading of the existing concrete to assess suitability. This can prevent the need for investment in new firewalls on site. It may also give you the option of re-coating the concrete to increase the walls' fire resistance in line with the guidance requirements.

It is unlikely the EA will approve your plan if you do not achieve the required separation distances or use appropriate firewalls.

If you have a port side storage facility which does not have the space to meet the minimum six metre separation distance, it may be possible to store the RDF elsewhere prior to export. The RDF can then be brought to the site before shipment, and be stored for a minimal amount of time (a matter of days or a week) with separation distances shorter than six metres. In this instance it is important that suitable access around the material piles is maintained so if an incident were to occur the fire service could gain access to the material to tackle a fire.

You would need to document shipping schedules and provide contracts to demonstrate the short storage time. There are also measures such as pre-threading through straps in the pile of bales which can speed up the loading of the ship.

11 Quarantine Areas

The EA guidance requires a quarantine area to be located on site that can accommodate 50% of your largest waste pile.

If you already have a quarantine area on site that you use for isolating contaminated loads, if large enough and with the right clearance procedures in place, you can use the same area during fire incidents.

Your quarantine area is also required to have six metre separation distances around the pile perimeter. It may be more efficient on your site to use firewalls on one, two or three sides of the quarantine area to reduce the land-take required to provide the necessary separation.

If you intend to use your quarantine area for dousing or dampening down material, you will need to think about drainage for the area and making sure any water is stored or feeds into the foul drainage on site rather than the rainwater drainage system. If your site normally discharges foul water directly to the sewer, during an incident you may need to hold any firewater on site until the fire service has been able to obtain consent from the sewage company to discharge firewater. In some instances, discharge to sewers may not be possible and the firewater will need to be pumped and tankered from the site for disposal.

In certain circumstances it is possible to not have a quarantine area on site. If you want to propose this solution to the EA you will need to include details to explain why your site is low risk and also what alternative measures you are going to introduce to mitigate against not having a quarantine area. If you are using bay walls, you could consider increasing the fire resistance rating to prevent neighbouring material requiring movement.

Space is at a premium on some sites. Some alternative methods to using a single, dedicated quarantine area include:

- Having a number of smaller quarantine areas located around the site, as long as collectively they can still store 50% of your largest waste pile and would be easily accessible during a fire incident (and within daily operations, if you intend to use them to isolate contaminated loads or monitor hot loads).
- You may have large areas of your site used for fleet parking and be able to establish an agreement with a neighbouring site to move your fleet to an area of their site in the event of a fire, clearing space for a quarantine area. If you are opting to use an area that needs clearing, you must be able to realistically clear it within one hour of a fire starting. You will need to consider how many members of staff such a measure would take to implement.
- Your quarantine area for use in the event of a fire can be located outside of the building that you normally use to store waste.

It is also worth bearing in mind that if you have a fire on site, your site will not be accepting or transferring any further material until the fire is extinguished. This could 'free-up' spaces that you would generally have to keep clear for operational movements.

12 Fire Detection

The EA guidance requires you to have procedures in place to detect a fire in its early stages so its impact can be minimised. The detection system should be proportionate to the nature and scale of your operation and its associated risks.

This FPP requirement relates to the detection of a fire, or early signs of a fire. It does not relate to heat detection equipment or pile temperature monitoring that may be used on site to detect when a pile may need to be turned. The earlier you can detect a fire on site, the earlier it can be extinguished reducing the impacts of the incident.

Extinguishing a fire in its early stages reduces the impact on the environment, the demand on local fire service resources and is likely to limit the damage caused by the incident, thus improving your business continuity.

You can propose to use a system that is accredited by a scheme other than the United Kingdom Accreditation Service (UKAS). In this instance you will need to provide evidence of the equipment's suitability to be used on your site. For example, if the system has worked in a very similar situation, then it is likely to be suitable. If you want to use an alternative accreditation, it is likely to take longer to 'approve' your FPP than if you opt for a UKAS system. However, providing you can supply appropriate evidence, it is likely it will be approved following discussions.

13 Fire Suppression

The EA guidance requires you to install a fire suppression system if you store waste in a building. The suppression system should be proportionate to the nature and scale of your operation and the associated risks.

If material is not stored on site for longer than 72 hours and you have no automated processing, your site is likely to be of a lower risk status and may not require an automated suppression system. A full assessment should be undertaken that also accounts for the activities undertaken on site. It is also recommended that you liaise with your insurance providers when deciding on the suppression system to be used on site to understand their requirements. It is possible that their requirements are different to, or more specific than, those in the EA's FPP guidance.

When investigating the suppression system for your site, you should think about the objective of installing a suppression system. If you intend to use it to suppress a fire to allow active firefighting to be undertaken, making sure access can be safely gained to the building in the event of a fire, then a sprinkler system may be suitable. If you intend to try and extinguish a fire, including deep seated fires, a deluge system may be more appropriate. Please note that a sprinkler system is unlikely to fully extinguish a fire within a waste pile; however, it may prevent fire spread if activated soon after the fire ignites.

You also need to take into account water supply at your site and if there is sufficient water to use in your proposed system. It may be that you need storage tanks on site or to consider a system that uses less water. This could include foam systems (see Figure 6), but it is also worth considering UKAS accredited systems as these can often use less water. Similarly to the detection system, if you wish to use an alternative accreditation scheme you will need to provide evidence that it is appropriate for use on your site and meets an equivalent or higher standard than UKAS.

As well as fixed systems, such as deluge or sprinklers, you may also want to consider portable water cannons, as these offer flexibility on site. Again you will have to be able to demonstrate how the water supply will be provided for such equipment and the time it will take for the equipment to be deployed.

FIGURE 6: EXAMPLE OF STORAGE SPACE REQUIRED FOR FOAM SUPPRESSION SYSTEMS

Image courtesy of Cawleys

14 Firefighting Techniques

The EA guidance requires you to design your site and FPP to enable active firefighting. This does not mean your staff have to fight the fire but that the resources or equipment must be available at all times to fight a fire.

You should consider improvements you could make to your site layout to enable active firefighting to take place. This can include spacing around material piles, or allowing sufficient space to allow firebreaks to be implemented. You should also consider if you want to train your staff to be able to support the fire service in the event of a fire (this can be part of an alternative measure). Once in attendance at a fire, the fire service will take control of the operation and may, if it is safe to do so, ask staff to move material on site to support the firefighting operations. You should consider having arrangements in place for staff to attend the site out of hours to support the fire service during an incident. The final consideration is appropriate equipment: do you have on site fire resistant material handlers, floodlights, etc. or can you obtain these from a hire company 24 hours a day at short notice?

When developing your firefighting approach you should seek to engage with your local fire service to understand how they would fight a fire on your site. This will give them the opportunity to discuss the resources available to the service and update their predetermined attendance records so they are able to deploy the necessary equipment as soon as they are alerted to a fire incident on site. If you do engage with the fire service you should include details of what is agreed within your FPP.

15 Water Supplies

The EA guidance requires you to provide 2,000 litres of water a minute for each 300m³ of waste in your largest waste pile for three hours.

This section of the guidance requires you to take a pragmatic approach to the amount of water than can be supplied to your site during a fire incident. There are many advantages to knowing how much water you will be able to obtain if a fire occurs.

When establishing what method you will use to fight a fire it is sensible to engage with your local fire service. They will be able to provide details of what equipment is available and what their preferred approach for tackling a waste fire is.

To calculate the amount of water you require, use the volume of fuel in your largest waste pile. For example, if your largest waste pile contains 900m³ you will have to be able to supply 6,000 litres of water a minute to your site, and over three hours this equates to 1.08 million litres of water. This is a flow rate of 100 litres per second.

It's worth considering if you can reduce the size of your largest waste pile to reduce the water requirements in the event of a fire. Operationally this can have limitations, but it could reduce your water requirements to a more suitable level. If you reduced a 900m³ waste pile by 15% (135m³), you would lower the amount of water needed to 5,100 litres a minute and 918,000 litres for three hours. This may be more manageable to supply and contain on site as fire water.

Even if you are able to reduce some of your pile sizes, it may be difficult to secure the water requirements needed. Options to consider to try and obtain as much water as possible are:

- Ascertain if there are any public or private fire hydrants located on or near to the site. Your local fire service should be able to help identify firefighting water sources and their suitability for use. They may also be able to provide flow tests for any public hydrants in close proximity to your site to identify how much water is likely to be available during an incident. If it is a private hydrant, ownership will need to be identified, a flow rate test undertaken and you should also check there are the correct connections in place for the fire service to use the hydrant. Maintenance and the specification of private hydrants can vary significantly.

- If hydrants are not available in close proximity to your site or cannot deliver the water requirements, you could consider:

  - Installing storage tanks or lagoons on site which can supply some water. If you propose this solution you will need to ensure you have the appropriate connections to allow the fire service to use these reserves. It may also be necessary to install filters to make sure any material within the lagoon/tanks which could affect the fire service's pumps are removed.

  - Installing a firewater recirculation system with pumps and filters. How suitable this solution is will depend on the activities you undertake on site and the materials you store. If this method is suitable on site, it should be acknowledged that there is a limit to the number of times water can be recirculated before it becomes too contaminated to use. The fire service should advise whether this is an approach they would be happy to use on site and how many times the water can be realistically recirculated.

- Work with your local fire service to establish what alternative firefighting techniques they can offer. Agreement in advance of a fire will allow the fire service to update their 'pre-determined attendance' to make sure they bring the correct equipment when arriving on site, increasing the likelihood of being able to undertake active firefighting more quickly. They could offer solutions such as using sprays instead of jets which can significantly reduce water demand.

- You could also choose to talk to the EA about using a foam suppression system. Foam suppression systems can reduce the water requirements on site significantly, however, they do contain chemicals that would need to be contained and prevented from entering the natural environment.

- Whatever system you opt for, the EA would like to see a breakdown of the amount of water you can supply (even if it is below the minimum requirement) and evidence of proof of supply wherever possible.

16 Managing Fire Water

The EA guidance requires you to contain fire water run-off to prevent environmental pollution.

Ideally your fire water containment should be considered alongside fire water supply as any water used to control a fire will have to be stored on site prior to disposal.

It is unlikely your sewage disposal company will allow you to discharge firewater during an incident. Therefore, you need to establish how you will contain fire water on site, how you will prevent it entering the foul or rainwater drainage systems and how eventually you will dispose of the firewater.

In terms of containment you could use flood gates, drain covers, and shut off valves to contain the water within an impermeable area of the site. You could also look to increase kerb height around your site to maximise on surface water storage, or install overflow tanks to hold the fire water. Using overflow tanks could provide the opportunity to trickle feed your firewater to the sewage company over an agreed period of time as they are unlikely to be able to accept high volumes of water at any time.

Foam systems use significantly less water than water only systems. Foam could be considered to knock down the flames during an incident, however, it is unlikely to extinguish a large fire. Using foam to fight a fire also presents different challenges in terms of disposal.

Can you get agreement from the utility company of what they are willing to accept in terms of pH and volumes? Agreement may not be possible until the water has been tested following an incident. If this is the case, do you have an alternative approach to disposal – such as being tankered off site by a licenced contractor?

Image courtesy of Countrystyle

Appendix 1.0 Common Causes of Site Fire

TABLE 1: POTENTIAL IGNITION SOURCES, RISKS AND CONTROL MEASURES

Potential Ignition Source	Risk on Site	Control Measures/ Procedures
Arson	Combustible materials stored on site are potentially at risk from arson. It is possible that the site could be broken into outside of operational hours and an act of vandalism causing an ignition source or an act of arson committed.	What security fencing do you have installed around the site perimeter? Do you have procedures in place to regularly check the fence integrity and repair it if damaged? Do you have CCTV on site, can you provide the specification, what areas of the site does it cover and what are its operational hours? If something is detected on the CCTV out of hours what is the procedure that is followed? When the site is closed is there any guarding in place? Do security guards on site have a duty task list which includes undertaking fire checks? Are there any measures in place to check these are taking place (e.g. security tag systems)? What close-down procedures do you have at the end of each working day, including checking the site is secure and a fire watch is undertaken? Do you have intruder alarms on site? If so, do you have the specification of the system? If the system triggers what procedures are followed?
Plant and Equipment Failure	A fault or electrical failure in the on site plant could provide an ignition source.	Is all plant on site fitted with fire extinguishers? Are portable fire extinguishers located throughout the site? If so, can you describe or show where these are on a plan? Has any of your purchased or hired plant got an integrated suppression system? Are there any early detection systems installed on plant or around the site? What are the servicing arrangements for your plant and equipment? Do you conform to the manufacturer's instructions or have your own programme? If you hire plant what are the maintenance arrangements? Do you undertake daily checks to make sure there is no material trapped within the equipment or plant that could cause a fault? If trapped material or a build-up of dust/material is identified what are the clean down processes followed (e.g. blowing, wetting or clearing build-up of dust/material)? Do you have daily procedures to check for plant and equipment defaults? What action do you take if a fault is identified (again specify if this if different for owned and hired plant)? What evidence of your procedures taking place do you keep? Service receipts, hire agreements or fault logs for example. Do you store mobile plant over six metres from combustible material when not in use? If this is not possible, consider alternative measures such as introducing plant/equipment shut-down procedures to reduce the risk of material ignition.

Potential Ignition Source	Risk on Site	Control Measures/ Procedures
Electrical faults	Electrical equipment, such as heaters and lighting, located on site could cause an ignition source.	Is all electrical equipment stored at least six metres away from combustible material? If electrical equipment is stored within six metres of combustible material consider alternative measures such as not leaving it on when no staff are present and having procedures in place to make sure the last person leaving an area checks all electrical equipment is off before exiting the area. Is all electrical equipment regularly tested (at least three times yearly) by an external expert? What is the maintenance procedure in place? Do you have copies of testing certificates or maintenance reports?
Discarded smoking materials	Combustible materials could be ignited through discarded cigarettes or other smoking material.	Ideally your site should be designated as a non-smoking site. If smoking is permitted on site the dedicated smoking area should be at least six metres away from the storage of any combustible material streams or waste operations. All smoking materials should be safely disposed of in a suitable, sealed container.
Hot works	Hot works undertaken on site could provide an ignition source due to sparks or residual heat in the material being treated.	Do you undertake hot works on site? If so, do you have procedures in place for activities to take place over six metres away from combustible materials? Do your procedures also include a fire watch for at least an hour after hot works have been undertaken? If you are not able to undertake hot works more than six metres away from combustible material what alternative measures can you use? Could you place a fire blanket over the material within six metres to reduce the risk of material ignition? Is it possible to relocate the combustible material until the hot works are complete?
Industrial heaters	Industrial heaters on site could present an ignition source.	If you use industrial heaters on site, where are they located and how frequently are they used? These should always be located at least six metres away from combustible waste where possible. If industrial heaters are used within six meters of combustible material you will need to put in place alternative measures to mitigate the fire risk. You could consider using fire blankets over the material, altering the direction of heat flow from the units, staff monitoring etc.
Hot Exhausts	Dust that has settled on exhausts and engine parts could cause an ignition source.	Do you undertake regular visual checks throughout the day to check for dust build up? If staff identify a build-up of dust what action do they take (e.g. removal of dust, cleaning of equipment)? Could you introduce fire watches throughout the day by a member of staff, e.g. banksman?
Ignition Sources	Naked flames, space heaters or furnaces used on site could cause an ignition source.	If you use and direct ignition sources on site these should be located over six metres from combustible material. Similarly to industrial heaters, if this is not possible, you will need to have alternative measures in place such as using fire blankets, increasing the frequency of your fire watches and not leaving the ignition source unattended.

Potential Ignition Source	Risk on Site	Control Measures/ Procedures
Batteries in ELV	Not applicable to RDF operations	N/A
Leaks and spills of oil and fuels	There is the potential for fuel/ oil to leak from site vehicles or fuel tanks.	What procedures do you have on site for addressing an oil or fuel spill? Where are your spill kits stored on site? If staff identify a spill what action do they take? If you have fuel or oil tanks on site are these bunded? Do you have procedures in place for checking container integrity regularly and clearing the surrounding storage area?
Build-up of loose combustible waste, dust and fluff	Build-up of loose combustible waste, dust and fluff on site could cause an ignition source.	How do you prevent the build-up of loose waste, dust and fluff around the site and on plant and electrical equipment? Do you undertake site inspections throughout and at the end of the day? What action is taken if a build-up of material is identified? Who is responsible to making sure the site is clean?
Reaction between wastes	A reaction between incompatible or unstable wastes could provide an ignition source.	What action do you take to prevent a reaction between materials within the same waste pile? Do you store materials as single streams? What procedures do your staff follow if contamination is identified within a load or waste pile? For example is the contamination removed to a quarantine bay for separate disposal?
Self-combustion	Chemical reactions within a waste pile could lead to self-combustion.	How is your site operated to reduce the risk of material self-combusting? Do you have a high turnover of material? If material is stored on site for more than a few days do you have pile temperature monitoring and turning procedures in place appropriate to the risk? If you intend to turn piles have you checked there is sufficient space on site for pile turning to take place? What mitigation measures do you have in place if a pile does self-combust? Are you using separation distances or firewalls? State the maximum time that combustible materials will be stored on site (this helps to show your level of risk, the lower the better).
Deposited hot loads	Hot loads being deposited within a bay or container on site could cause an ignition source.	Do your waste acceptance procedures include checking for hot loads? Do staff undertake additional visual checks for fire, hot loads, smoke and signs of smoulder in the waste piles throughout the day? What action do staff take if a hot load is identified? Do they isolate the material within the pile or move the material to the quarantine area? How long do they monitor the hot load for? What do they do if the pile ignites?

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