Fire prevention plan consultation

Summary of consultation responses and decisions

September 2016

We are the Environment Agency. We protect and improve the environment.

Acting to reduce the impacts of a changing climate on people and wildlife is at the heart of everything we do.

We reduce the risks to people, properties and businesses from flooding and coastal erosion.

We protect and improve the quality of water, making sure there is enough for people, businesses, agriculture and the environment. Our work helps to ensure people can enjoy the water environment through angling and navigation.

We look after land quality, promote sustainable land management and help protect and enhance wildlife habitats. And we work closely with businesses to help them comply with environmental regulations.

We can't do this alone. We work with government, local councils, businesses, civil society groups and communities to make our environment a better place for people and wildlife.

Published by:

Environment Agency
Horizon House, Deanery Road,
Bristol BS1 5AH
Email: enquiries@environment-agency.gov.uk
www.gov.uk/environment-agency

Further copies of this report are available from our publications catalogue:
www.gov.uk/government/publications

or our National Customer Contact Centre:
T: 03708 506506

Email: enquiries@environment-agency.gov.uk.

Contents

1. Introduction

We published guidance on fire prevention plans, on GOV.UK in March 2015 (Fire prevention plan guidance v2). It built upon the original guidance, TGN 7.01 which was published in October 2013.

The aims of our fire prevention plan (FPP) guidance are:

- minimise the likelihood of a fire occurring
- aim for a fire to be extinguished within 4 hours
- minimise the spread of fire within the site and to neighbouring sites

When we published the guidance in March 2015, we said that we would undertake a full external consultation.

2. How we ran the consultation

The external consultation ran from 26 November 2015 until 4 March 2016, and asked 21 questions regarding specific measures contained within the guidance. We had 161 responses.

The consultation was divided into 3 sections, which covered:

- general considerations and the need for the guidance
- standards in the guidance we considered should remain unchanged
- standards in the guidance we considered should be amended

The consultation invited views on our proposals to enable the local community, environment and critical infrastructure to be protected from emissions that are generated during waste fires. We have now considered the responses and have revised the guidance where we consider it appropriate. The guidance balances the need to minimise these impacts on people and the environment caused by fires, whilst also enabling economic growth.

We sought the views of trade associations, emergency responders, businesses, other regulators, the public, community groups and non-governmental bodies.

The process was mainly through an e-consultation although hard copies were made available when requested. All responses are publically available. As is standard practice, the identity of individual respondents is kept confidential.

3. Summary of responses to the consultation questions and our responses

The next section of the document summarises the responses to the consultation questions, our considerations and the decisions that we have arrived at. In some cases we have revised the guidance.

Question 1: Do you agree with our approach for a maximum acceptable duration for sheltering to be 3 to 4 hours?

Of the 161 respondents, 116 (72%) replied to this question and of those; 27 replied 'yes', 73 replied 'no', 16 replied 'don't know' and 138 respondents provided comments (irrespective of whether or not they had answered the question).

The majority of respondents from business and trade associations did not support the objective to limit the duration of sheltering to 4 hours. However in reviewing the comments, it was also apparent that there was significant misunderstanding around whether this was achievable and also why it was necessary. In contrast, the majority of other organisations and emergency responders supported the objective to reduce the maximum duration of sheltering.

Some respondents stated that the burn time is dependent on the nature of fire, the waste involved and the weather. Another respondent commented that empirical data indicates that it takes 24 hours to burn 1 tonne of plastic.

Another respondent commented that it was unclear if the measures specified in guidance would achieve the 3 to 4 hour aim. Another suggested that the Waste Industry Safety and Health forum (WISH) 'waste fire burn tests' may provide useful data in respect of this question and that it would be beneficial for updates to the document to be postponed until the test results have been reviewed, assessed and consulted on with industry.

Several respondents suggested that the objective should not be applied to all sites and should be risk-based. Others commented that local circumstances and the discretion of the attending fire officer should be taken into account.

Public Health England (PHE) provided a comprehensive and detailed response to this specific question which states:

"**We agree but consider the 3-4 hour objective to be an aspirational target for active firefighting, rather than representing a time at which sheltering strategies will become ineffective at protecting the wider public near to a site.** It is important to make this distinction in the guidance too, when it is issued.

PHE has reviewed factors affecting the effectiveness of sheltering and carried out research examining the ingress of external pollutants into buildings. Sheltering is effective at reducing exposure to short-term peaks in concentration. However, sheltering can become less effective over time if outdoor concentrations remain high, as indoor concentrations tend towards outdoor concentrations in the absence of attenuating factors (such as deposition, filtration and sorbtion).

For any given property, the effectiveness of sheltering will depend on factors such as its distance from the incident, incident characteristics, meteorology and dispersion of smoke, building characteristics, ventilation behaviour and so on. People nearby who are at immediate risk from a spreading fire and smoke will be relocated by the emergency services early in an incident. Short-term exposures to smoke tend not to pose an immediate risk to public health over a wide area during waste fires, but health effects are a function of exposure concentration and exposure

duration, and it is important to minimise both. During prolonged fires, shelter advice must be reviewed according to the level of risk and to ensure that advice remains reasonable.

PHE supports the EA's objective of sites having measures in place to reduce incident durations to a maximum of 3-4 hours with active firefighting. In an ideal world, incident durations would be as short as possible. In practice and considering the prolonged durations of some past waste fires, 3-4 hours is an ambitious target particularly for existing waste sites but it would significantly reduce typical burn durations. It also represents a time period over which continued sheltering is likely to be both feasible and remain effective for the majority of the potentially affected population in typical fire scenarios. Achieving this objective would significantly reduce the potential impacts associated with fires at waste sites".

Our response

We agree with the comments from PHE. One of the primary objectives of the guidance is that in the majority of cases, sites are designed and operated in such a way as to enable active firefighting to be undertaken. Where there are sensitive receptors in the vicinity of the site, the aim is to extinguish any fire within 4 hours.

Whilst burn time is undoubtedly affected by a number of factors including those identified, and a relatively small quantity of plastic if left to burn could take a day to completely combust, these comments do not take into account active firefighting. The objective is to enable active firefighting to be employed safely and effectively in the majority of cases, in order to extinguish the fire at the earliest opportunity, and thereby minimising the impact on the surrounding community.

In later questions we will discuss the importance of enabling active firefighting in order to extinguish fires as quickly as possible, and also explain the benefits of applying water to reduce the concentration of both acid gases and particulates within the smoke. These compounds have the potential to cause health effects if inhaled by members of the public that may be in the vicinity of a fire. Smoke can also affect critical infrastructure and neighbouring businesses.

In our response to the next question we have provided an extract of incident data collected over the last 3 years. This demonstrates that if the pile sizes stored on site are within the maximum volumes and dimensions specified in the guidance then the fire has been extinguished within 4 hours in the majority of cases. Where pile sizes have been larger than those specified in the guidance, the fires have taken longer than 4 hours to extinguish. In some cases the duration of the incident has been as long as 2 months, during which time smoke has been affecting the surrounding community.

We continue to keep our incident data under review and we will continue to use this to inform any future revisions of the guidance.

We will await the outcome of the WISH fire tests and once these results have been interpreted and analysed by an appropriate independent expert, we will review the findings alongside our existing data and current research. The analysis of the results of the WISH fire tests are not expected before October 2016. We did not consider it appropriate to delay reviewing and revising our guidance until then. We will consider the results of the WISH fire tests when available and propose further changes to our guidance if appropriate.

In our response to question 19, we consider the comments in relation to making the guidance more flexible and risk based. We examine the suitability of alternative measures and also describe situations where a departure from the relevant objective may be appropriate.

Question 2: Do you agree with the presumption that active firefighting should be the preferred option and that all sites should be operated in a manner that allows for active firefighting?

Of the 161 respondents, 115 (72%) replied to this question and of those; 54 replied ‘yes’, 52 replied ‘no’, 9 replied ‘don’t know’ and 109 respondents provided comments (irrespective of whether or not they had answered the question).

The respondents supporting and opposing this measure were very closely matched.

Those respondents that supported the need for active firefighting recognised that early extinguishment of a fire is likely to minimise the impact on human health and the environment.

Other respondents commented that the Fire and Rescue Service (FRS) should make the decision for a site specific firefighting technique at the time of a fire or as part of a site specific risk assessment. This assessment should take into account other factors at the time such as weather, the type of waste on fire, location and that in some situations, the application of water may make the smoke from a fire worse.

Some respondents suggested that if there were no sensitive receptors in the vicinity of the site then other options could be considered.

We also received a substantial number of comments that we should not expect an operator to put themselves or their employees in danger by undertaking a job they are not trained for and that operators should focus on fire prevention rather than how to extinguish a fire.

A number of respondents also asked for a full definition of ‘active firefighting’ and what actions were expected of an operator and what was the responsibility of the FRS.

Concerns were also raised about sites not having the appropriate infrastructure to allow for active firefighting without causing potential harm to the environment through fire water.

Our response

We agree with the views of the majority of respondents in that unless there are exceptional circumstances, sites should be designed and operated in such a way as to enable active firefighting.

We believe that active firefighting will be undertaken by the FRS. We also agree with respondents that active firefighting is not something that site personnel should be expected to undertake and that their own health and safety is of paramount importance. We have made this clear in our revised guidance. In a limited number of circumstances and under the direct supervision of the FRS, site plant and personnel may support active firefighting, but this is not something that would be expected in the majority of fires and the health and safety of site personnel must always take precedence.

We consider that active firefighting means having the resources to enable a fire to be fought, including plant, staff, available water supply, and financial resources. These resources must be available immediately in the event of a fire.

Active firefighting is used to describe a variety of techniques are used together or separately to extinguish a fire. The following are inclusive but not exhaustive:

- applying water to cool unburned material and other hazards
- applying compressed air foam
- separating unburned material from the fire using plant, for example loaders and excavators
- separating burning material from the fire to quench it with hoses or in pools or tanks of water
- suffocating the fire using soil, sand, crushed brick or gravel

In extreme weather conditions or during certain complex incidents, the FRS may adopt a controlled burn. However, the purpose of the guidance is to ensure the site is operated and managed in a way that reduces the frequency of fires and if they occur enables active firefighting.

The data we have on waste fires since 2009 demonstrates that active firefighting is a frequently used approach, in approximately 80% of waste fire incidents. This data is provided in appendix 2.

We recognise that there may be a few sites which do not have sensitive receptors in the vicinity of the site and therefore it may be appropriate for the operator to consider providing an assessment to justify a departure from the objective of extinguishing the fire within 4 hours. Even where that is possible there should be a FPP for the site to ensure the risks of a fire starting are reduced. When it might be possible to take a different approach to that set out in the guidance will be covered in more detail in our response to question 19.

Question 3: Do you agree that the fire prevention plan must be a standalone document, so that it is very clear what has been approved and also exactly what risk control measures will be followed on site?

Of the 161 respondents, 116 (72%) replied to this question and of those; 53 replied ‘yes’, 52 replied ‘no’, 11 replied ‘don’t know’ and 108 respondents provided comments (irrespective of whether or not they had answered the question).

The respondents supporting and opposing this measure were again very closely matched. Those that supported the need for the FPP to be a standalone document thought that a separate document would help prioritise fire prevention, be beneficial to emergency services and other organisations during a fire and help embed fire prevention into daily operations on sites making operators proactive rather than reactive.

One respondent stated that the Regulatory Reform (Fire Safety) Order 2005 (RRO) already covered many of the aspects and sites compliant with the RRO should not need a FPP as well. However, other respondents noted that the requirement for an approved FPP should not be confused with the requirements under the RRO for a Fire Safety Risk Assessment as they are distinct and separate.

One respondent raised concerns about operators losing flexibility where changes to plans need approval.

Other respondents also commented about the consistency of the approval process and whether it should be solely the responsibility of the FRS, although this was not supported by the FRS replies. Other respondents thought that approval should involve the Environment Agency (EA), FRS, local authority and PHE.

We also received comments that the plan should be easily accessible, easy to use and be readily available during an incident. Whereas other respondents believed that a standalone document could result in duplication and a large unwieldy document.

Other comments believed that the requirement was not consistent with other guidance such as BREF and the Control of Major Accident Hazards (COMAH), where a Major Accident Prevention Policy covers more than just fire.

Our response

We agree with the majority of respondents in that the FPP requires approval and should be a standalone document.

We consider that in doing so, it is clear what measures and controls have been approved as satisfactory in order to prevent fires and where fires do occur, to enable the majority to be tackled through active firefighting, with an aim of extinguishing within 4 hours.

We appreciate that other parts of the management system are more flexible and the operator is able to change these without our approval. However, in the case of managing waste fires, we consider this requires a clearly defined and approved plan. We also believe that waste fires have a significant impact on people and the environment and have become a high profile issue that this requires separate and specific attention.

It's worth noting that other elements of the management system also require approval, including odour management plans and noise and vibration management plans.

Since October 2013 when the original guidance was published, we have adopted a common approach to assessing FPPs. As a result of the representations made in this consultation and the changes we intend to make, we have provided training to more of our staff as part of an ongoing programme of professional development.

Where appropriate, we also consult with others and this includes FRS, local authority, Health and Safety Executive (HSE) and PHE, when assessing FPPs.

Question 4: Do you agree that these are appropriate sensitive receptors and that those with 1km should be identified in the fire prevention plan?

Of the 161 respondents, 107 (66%) replied to this question and of those; 70 replied ‘yes’, 28 replied ‘no’, 9 replied ‘don’t know’ and 98 respondents provided comments (irrespective of whether or not they had answered the question).

A significant majority of respondents including FRS, local councils, professional bodies, local resilience forums and half of the waste companies that responded agreed with the sensitive receptors listed and that those within 1km should be identified in a FPP.

Many respondents supported the sensitive receptors identified and made comparisons with work already undertaken in respect to odour, noise and dust management plans, and that an operator should have already assessed risks from a health and safety perspective and as an insurance requirement.

However some also stated that assessing the possible impact on sensitive receptors and identifying the key irritants and contaminants would be an excessive burden with the cost out weighing the benefits.

We received comments on the 1km distance. While some agreed with the distance others suggested that 1km was not far enough, or that although it is good to set a distance operators should also consider if there are sensitive receptors just beyond that distance.

Suggestions were also made that the specific distance should be based on the size of the site or the types of waste. Comments were made that for human or environmental receptors, 1km may be correct but for infrastructure such as pylons or utilities the distance should be less. Comments were also made that sensitive receptors should consider vertical hazards such as flight paths if a site is near an airport, offices, crèches, agricultural premises with livestock and emergency services facilities such as ambulance, fire and police stations. Clarification was asked for in terms of identifying structures such as roads, in terms of the road designation and capacity.

We also received comments that the FRSs were unlikely to use the information during an incident, however these views were not supported by the FRS respondents who supported the sensitive receptors report if it was readily available. Suggestions were made to include further details such as contact numbers for human sensitive receptors and water abstraction permit holders.

Our response

We agree with the significant majority of respondents that sensitive receptors as a minimum within 1km of the site, should be identified in a FPP. In the case of critical infrastructure such as pylons, we will clarify that this requirement extends to within the immediate vicinity of the site only. For the purposes of assessing the potential impact on smoke on flight paths we consider any airport and flying schools within 5km should be identified.

We consider that operators and those preparing FPPs should have a level of knowledge and understanding of the common combustion products and their potential impacts on human health. We consider that it is appropriate for operators to have a basic knowledge of asphyxiants, irritants and complex molecules produced from various different types of waste and also the likely effect of incomplete combustion, which may occur during building fires or smouldering combustion. We also believe that a better awareness of both the effects of different types of fires and the local topography on smoke plume behaviour would be useful in understanding the potential impact of a fire on a local community. We would recommend that operators and those preparing FPPs have a good working knowledge of the toxicity of combustion products. Information is available in the paper 'a toxicological review of the products of combustion'[1] (www.gov.uk/government/publications/combustion-products-a-toxicological-review).

Whilst in some cases it may be appropriate for a FPP to contain contact details for human sensitive receptors and water abstraction permit holders, we consider that this may also conflict with data protection in so far as the FPP is a publically available document. For sites located in urban areas, this may also be very burdensome, quickly become out of date without continual maintenance, and be of little advantage during a fire.

Question 5: Do you agree a quarantine area of the size specified in the FPP guidance is required?

Of the 161 respondents, 115 (71%) replied to this question and of those; 32 replied ‘yes’, 75 replied ‘no’, 8 replied ‘don’t know’ and 112 respondents provided comments (irrespective of whether or not they had answered the question).

The majority, 65% of respondents, did not support the requirement. However, FRS and local resilience forums agreed with the need to have a quarantine area.

From the comments of those who did not support the requirement, the key themes included moving burning waste is dangerous to staff and plant, the volume should relate to the largest load, and this was only suitable for larger sites and size and availability needs to be dynamic and flexible to take into account changing waste types and volumes.

Some respondents believed that the operator should detail how they will contain fire and move material instead.

[1] A toxicological review of the products of combustion, J C Wakefield HPA-CHaPD_004 February 2010

Others recognised that keeping the quarantine area clear at all times and also making sure that staff were fully trained and knew how to make the best use of the quarantine area was essential.

Some respondents recognised the need to consider water supply, run-off, moving vehicles when locating quarantine area and that having multiple smaller areas may be better on some sites.

A number of respondents mentioned that operators may not be able to accommodate or afford to have that much empty space on their site.

Our response

We have taken into account the comments received and have decided that the requirement for a quarantine area will remain. However taking account of our experience of active firefighting and the way it can be carried out, we will reduce the capacity and separation distance so that the quarantine area must be designed to hold 50% of the largest pile on site and with a separation distance of 6m.

We also recognise that moving flaming waste is dangerous and this is not something that we intend to happen, however the quarantine area is designed to be used to isolate waste. For example, by moving un-burnt waste from around that which is on fire and also to lay out and cool or quench smouldering waste. These activities, when requested, will usually be undertaken under the supervision of the FRS and the safety of site personnel is priority.

We have made it clear within the guidance that operators may propose alternative measures to the standard quarantine area. This could include multiple smaller and more flexible quarantine areas, if that approach can be justified. However it must be clear to everyone on site which areas have been designated and that they are kept clear at all times, and that the areas are appropriately located.

The need for a standard quarantine area, or suitable similar measures is supported by BRE Global in their recent peer review of our guidance. A copy of their report can be found in appendix 1 of this consultation response document. Within the report it states “The benefit of having a quarantine area, used in conjunction with a separation distance, not only allows material that is burning to be spread out and extinguished, but also enables unburnt material to be placed there at the early stages of a fire to reduce the overall fuel load of the pile burning, resulting in a smaller fire and reduced burn time. However, removing either burning or unburnt material must only be undertaken if safe to do so under supervision of the fire service”.

There are additional comments in relation to the combined purpose of the standard 6m separation distance and the quarantine area in our reply to question 6.

The comments regarding commercial impact on sites will be picked up as part of our work to review the Business Impact Target (BIT). We recently carried out a survey inviting operators to submit the costs involved in implementing the requirements of the FPP guidance. We received 56 responses who completed the full survey and over 140 partial responses. The information provided is to be used to assess the costs and benefits of the changes we have made to the guidance.

We have met with the Defra economists who are assisting us with this assessment, and they have provided us with a timetable for when it will be completed. Due to the complexities and range of variables involved, we will have to deliver this by a phased approach.

We are required to carry out a cost-benefit analysis (BIT) in relation to changes to our guidance made during this parliament, following the introduction of the Small Business, Enterprise and Employment Act 2015 (https://www.gov.uk/government/publications/better-regulation-and-the-business-impact-target-enterprise-bill-factsheet). The original FPP guidance v2 and its predecessor, TGN7.01, were both introduced prior to the current parliament, which excludes them from the scope of this exercise. We have confirmed this exclusion with the Regulatory Policy Committee (RPC).

We are aware that there will be a number of operators who will have chosen not to follow the predecessor guidance, despite our expectation that they should. Therefore the costs and savings of implementing FPP v3 will vary. However we have to follow the scope of the BIT and assume compliance with FPP v2 as the baseline.

We have been advised that it may take approximately 3 months to complete both phases. The qualitative assessment has been completed and we intend to submit our completed quantitative assessment to the RPC in October. If necessary we will propose further revisions to the guidance at that time.

We have also discussed this with the RPC (who are responsible for scrutinising the analysis), and representatives have agreed that the approach we are taking with this is the right one and will ensure we produce a robust and accurate assessment.

We also intend to continue with a phased implementation plan for existing sites which we hope to complete over the next few years. The phasing will be based on risk and the need to adopt a level playing field across all activities storing combustible wastes.

Question 6: If a quarantine area was not a requirement of a fire prevention plan, then do you consider site specific separation distances derived using bespoke heat flux calculations are appropriate?

Of the 161 respondents, 103 (64%) replied to this question and of those; 39 replied ‘yes’, 36 replied ‘no’, 28 replied ‘don’t know’ and 100 respondents provided comments (irrespective of whether or not they had answered the question).

This was clearly a mixed response and some respondents, by their own admissions, did not feel able to comment fully on the appropriateness of using calculations to replace the requirement of to have a quarantine area.

Of those who did not support the use of site specific calculations to determine separation distances, common themes included a preference for the standard separation distance and quarantine area, acknowledged difficulties in accurately assessing waste types in mixed waste loads, the variable impact from wind speed and direction, and the need to take into account other contributory causes of fire spread such as lighted brands (glowing or flaming embers).

Others who did not support the use of site specific calculations stated that the calculations themselves were not simple or straightforward, and to carry out the calculation and also determine their suitability would require appropriate technical knowledge. Another respondent who did not agree with enabling operators to propose bespoke (calculated) separation distances went on to comment that it would place an additional burden on operators in securing someone who was appropriately qualified to carry out the calculations and also the additional time taken to have this work undertaken in support of a permit application or as part of compliance.

Those in support of the ability to derive site specific pile separation distances cited common themes which included, confirmation of the benefits of the proposal being site specific and a good idea providing the calculations were clear and transparent.

Another respondent commented that this would allow for the properties of each waste type to be considered and relevant separation distances to be given. The type of plastic they specialised in has been classed as the same fire risk as compost, RDF and fragmentiser fluff, despite the flash ignition of their waste being 390^0C. Heat flux calculations would allow for realistic fire management instead of the bulking together of very different waste groups for the sake of simplicity.

Comments were also made that a designated quarantine area would be preferable to relying solely on increased pile separation distances derived by bespoke heat flux calculations. Since even with

bespoke pile separation distances it may be difficult to maintain strict adherence to required clearances between piles at all times due to the fluid nature of waste transfer sites. Variables such as the manner of waste storage (loose or baled), quality of stacking, waste quality and weather conditions can contribute to poor housekeeping and provide fire links between piles. Therefore fire spread between piles may still be possible and for that reason it is suggested that provision of a quarantine area would be still be beneficial from a firefighting perspective.

Our response

We have taken a number of factors into account in arriving at our decision and we support the majority of respondents. In certain circumstances operators should be allowed to use appropriate calculations to derive site specific separation distances.

The standard 6m separation is only effective when it is used in conjunction with a quarantine area and also where the piles are stored in accordance with the maximum dimensions set out in the guidance. It is highly likely that a proposal to store waste in piles which are larger than the dimensions set out in the guidance will require the adoption of a number of additional risk control factors, including greater separation distances.

We noted that not everyone has understood the purpose of the generic separation distance and quarantine area, secondly that there is a diversity of views from respondents and thirdly, commissioning an appropriately qualified person to carry out the bespoke calculations may be expensive.

We have retained the generic separation distances and use of quarantine area, but have also enabled operators to use bespoke heat flux calculations if they choose to do so as a suitable alternative measure.

We also wish to clarify that the purpose of the generic separation distance is not to prevent fire spread in all circumstances. It is a standard distance between piles based on recognised heat flux models, to facilitate access, and to enable active firefighting to take place from all sides of the pile, or row.

The generic distance of 6m is also designed to provide a small window of time (likely to be less than one hour) at the start of an incident, before the fire has fully developed, during which unburnt or burning waste can be quickly and effectively moved into the quarantine area. This offers the ability to further separate or isolate wastes during an incident in order to provide an effective means of preventing fire spread and reduce the duration of the fire.

Additionally, as the incident progresses, the quarantine area can be used to decant burnt waste for cooling down and quenching with water as necessary.

As part of the FPP assessment process we will expect the operator to demonstrate that they have sufficient time and resources and plant required to carry out effective separation and isolation. This will be particularly critical for larger sites where the quarantine area may be some distance from all piles. The explanation will also include an assessment of the time taken to contact operatives and for them to attend site, as they may be required to do this during an incident which takes place outside normal working hours.

If an operator wishes to propose the use of bespoke separation distances on their site, then advice and guidance on appropriate methods to use should be sought from us at the earliest opportunity.

The comments regarding commercial impact on sites will be picked up as part of our work to review the BIT, which is explained in our response to question 5.

Question 7: Do you agree with the limit on storage duration of combustible waste to reduce the risk of self-combustion?

Of the 161 respondents, 105 (65%) replied to this question and of those; 54 replied ‘yes’, 37 replied ‘no’, 14 replied ‘don’t know’ and 123 respondents provided comments (irrespective of whether or not they had answered the question).

One respondent stated that limiting the storage duration to 3 months does not stop self-heating as this depends on degradation. Self-heating can occur within a week, and therefore the requirement for temperature monitoring should also be carried out during the initial storage period, not just after 3 months has elapsed. Another suggested that over 3 months is inappropriate as wood fines (small particle sized wood usually from the chipping and screening process) can self-heat in days, and biodegradable waste (compost and food waste) should only be stored for a maximum of 30 days to prevent self-combustion and odour.

Another respondent confirmed that evidence suggests that deep seated fires are due to storage for inappropriately long periods without being rotated. Whereas several respondents queried what evidence is there for the storage durations.

Many respondents commented that operational controls on storage duration are imposed by the permit conditions.

Others pointed out that sites which are not well managed need controls, whereas those that are good performers don’t actually need to stockpile waste for long durations. Whereas some respondents who processed wood claimed that flexibility is needed due to seasonality factors and that the storage durations imposed are unworkable when taking into account time stored at other sites.

A few respondents asked for a definition of combustible and also to clarify what is meant by self-combustion. One respondent queried whether storage durations applied equally to both internal and external storage.

Some respondents thought that storage duration should be waste type specific and others queried specific issue with tyres, plastics and end of life vehicles (ELVs)

One respondent asked if they give the Environment Agency a business plan, does it remain confidential.

Our response

We agree with the majority of respondents that limiting the maximum storage duration to 6 months for all combustible wastes is appropriate. We also consider that the maximum storage duration should apply whether storage takes place in a building or in the open.

Self-combustion occurs when wastes which are capable of self-heating are stored in a manner where the rate of heating is greater than the rate of heat loss. The science behind this is described in thermal ignition (or explosion) theory. It is based on the idea that progressive heating raises the rate at which heat is released by the reaction until it exceeds the rate of heat loss from the pile. Eventually a specific ignition temperature is achieved at which point the waste will self-combust. Both safe pile sizes and storage dimensions relating to various particle sizes, and safe storage durations can be determined from calculations and estimations. More explanation of thermal ignition theory can be found in our response to questions 10 and 12. The peer review of our guidance by BRE Global can be found in appendix 1 and this gives a comprehensive explanation of self-combustion, including a range of isothermal test results.

The storage duration will determine whether or not a pile which is capable of self-heating can go on to self-combust. The longer the storage duration then the greater the likelihood that combustion is achieved.

Storage duration works in combination with other risk factors which include:

- smallest dimension of a pile (usually pile height)
- particle size

For high or medium risk scenarios, the time to ignition could literally be a matter of a days. If a hotspot, heat source or additional heating (processing) occurred, in these medium or high risk wastes then the time to ignition could further be reduced to a matter of hours.

There is a strong interdependency with the other risk factors given the above. So for particle size and pile height combinations which give rise to anything other than low risk, a corresponding reduction in storage duration from say 3 months to 3 weeks, would reduce the overall risk of self-combustion and be a valuable risk control measure. Clearly reduction in storage duration is a valuable risk reduction measure which could be used on its own or in combination with other measures.

We therefore recognise that 6 months is a maximum storage duration and that a significantly shorter duration is more appropriate for some types and forms of waste.

The peer review of our guidance by BRE Global (appendix 1) recommended that the maximum storage duration for wastes which can undergo self-heating, should not exceed 3 months and therefore for these wastes, we intend to keep the maximum storage duration under review.

Many respondents commented that operational controls on storage duration are imposed by the permit conditions, however this only relates to some permits, often standard rules permits, rather than older or bespoke permits.

We also consider that 6 months maximum storage duration can take into account any seasonality which is believed to occur in certain waste streams, particularly wood. However recent research commissioned by Defra found that whilst there was significant seasonality in green waste, there was no discernable seasonality in the generation of waste wood. We have also noted that there is an increase in the number of biomass power stations either on line or being built in the UK. The UK plants are also being developed to provide power, rather than large scale heating schemes. Therefore the requirement for biomass will be far more consistent month on month than we have historically seen from the heat and power plants of northern Europe, which have shown a significantly increased demand during cold winter months.

We consider that by placing a maximum storage duration on all combustible wastes (not just those which are at risk of self-combustion) will deter excessive stockpiling and speculative market trading.

In response to the request for a definition of combustible wastes, we have provided advice to our officers to assist operators with clarification where this is requested. The advice will be based on EWC codes, and where necessary additional clarity can be provided on a site by site basis.

Where appropriate we have also reflected the comments raised in respect of certain specific waste streams and we have clarified the position regarding the duration of storage for compost within the guidance.

For operators that are providing evidence of contracts to demonstrate multiple outlets then they can request that this information be treated as commercially confidential.

Question 8: Do you agree that a suitable water supply needs to be available for firefighting?

Of the 161 respondents, 117 (73%) replied to this question and of those; 94 replied ‘yes’, 16 replied ‘no’, 7 replied ‘don’t know’ and 103 respondents provided comments (irrespective of whether or not they had answered the question).

There was overwhelming support for this proposal and for the provision of a suitable water supply to enable firefighting to take place. Many respondents suggested that the appropriate supply, storage and firefighting techniques should be tailored to the size and risk of the site and take into account factors such as seasonal variants and type and volume of waste stored, and that EA officers should have guidance on this and be flexible. Also there was considerable mention of other options, including: foam, gas, material for smothering. As well as alternative water supplies; such as boreholes, dirty water storage, rainwater capture, re-circulation, their own fire engine and nearby water bodies. There were several comments that suggested the FRS should decide or approve suitability. It was also raised that Insurance companies require a suitable water supply for firefighting before offering insurance.

A number of respondents shared concern over the cost, availability and suitability of water supply, especially those in rural locations. A few respondents suggested the requirement could put them out of business. In relation to hydrants there was concern that they are not under their control and not guaranteed quantities of water. There were statements of support that water supply is critical to tackle fires, especially in rural locations and that access to those supplies is vital, even if it’s an off-site source. There were also a number of comments stating that FRS should not be solely relied on and that adequate planning and staff training are needed.

There was a suggestion to have 2 supplies, one for initial firefighting and a second for the FRS to use. It was also pointed out that couplings need to be FRS compatible.

Other specific points raised were that the storage is a waste of a natural resource, it is unrealistic, unreasonable, problematic and very costly. Also that a definition of ‘suitable’ is needed and that the guidance should not rely on ‘worst case’. Also if a fire is caught quickly enough, FRS equipment is all that should be needed.

There was also mention of other guidance and requirements such as: The Confederation of Fire Protection Association - Europe (CFPA) and the National Fire Protection Association (NFPA 850[2]) (for energy from waste incinerators).

Our response

We agreed with the overwhelming number of respondents in that suitable water supplies must be available in the majority of cases to support firefighting. In the guidance we describe suitable water supplies and also the minimum volume of water considered necessary. These details have been extracted from 'Fire Safety for Tyre Sites' (Home Office, 1995). This is one of the most detailed and up to date research papers available. Respondents did not identify other relevant research.

In our response to question 19, we consider the comments in relation to making the guidance more flexible and risk based. We examine the suitability of alternative measures and also describe situations where a departure from the relevant objectives may be appropriate.

[2] This recommended practice outlines fire safety recommendations for gas, oil, coal, and alternative fuel electric generating plants, including high voltage direct current converter stations and combustion turbine units used for electric generation

We agree that there are options for cooling or suffocating fires, including foam, gas, and soil-type materials for smothering. We have included this within the guidance where we describe what may constitute active firefighting.

However, it is also important to recognise the benefits of using water (where appropriate) as this has an additional benefit of reducing the impact on the public from emissions to air. Many of the combustion products in smoke which are irritants and asphyxiants are acid gases and as such have a reasonable solubility in water. In addition, water spray can reduce air concentrations of certain complex molecules including particulates. Essentially the water spray is acting as a gas and particulate 'scrubber'.

The comments regarding commercial impact on sites will be picked up as part of our work to review the BIT, which is explained in our response to question 5.

Question 9: Do you believe that wherever possible firefighting water should also be prevented from entering surface or groundwater?

Of the 161 respondents, 117 (73%) replied to this question and of those; 107 replied 'yes', 6 replied 'no', 4 replied 'don't know' and 95 respondents provided comments (irrespective of whether or not they had answered the question).

The overwhelming response was to support the proposal that wherever possible firewater should be prevented from entering surface or groundwater. Respondents recognised that fire water can be highly polluting and that this can also lead to long term problems. However others made reference to the fact that aiming to achieve the objective of all fires being extinguished within 4 hours in order to minimise the impact on the public may mean that there is more likely to be an impact on the water environment.

Other respondents made reference to the need to involve water companies, where there was likely to be a discharge to foul sewer or a requirement to tanker away firewater post-incident. One respondent also drew attention to the protocol for the disposal of contaminated water and associated wastes at incidents (www.water.org.uk/publications/water-industry-guidance/disposal-contaminated-water-october-2012).

Other respondents described practical steps that could be taken to recirculate water, where containment tanks could also be fitted with FRS compatible couplings to enable this to happen. It was also noted that losses through evaporation means that often there is not a requirement to contain large volumes of firewater.

Some respondents believed that all sites require sealed impermeable drainage under their permit and therefore there should be no additional requirement to control fire water run-off within the FPP. However others noted that not all sites require a concrete footprint under their permit, and some standard rules permits only require hardstanding, which enables fire water to soak into the underlying ground. This is particularly true for sites storing de-polluted ELVs and scrap metal.

Others commented that upgrading to total containment would be prohibitively expensive and impossible in some locations, retrofitting requirements may be particularly difficult on existing sites, and that providing containment for every scenario is an unreasonable financial burden

Other respondents described the need to review source-pathway-receptor on a site specific basis and that where appropriate fire water should be contained at source in accordance with the CIRIA guide on containment systems for the prevention of pollution (C736), specifically section 4 (http://www.ciria.org/Resources/Free_publications/c736.aspx).

Our response

We agree with the overwhelming number of respondents in that wherever possible fire water should be prevented from entering surface or groundwater. We recognise that aiming to achieve the objective of all fires being extinguished within 4 hours in order to minimise the impact on the public may on occasions lead to an increase in risk to the environment. However we do not see it as an 'either or'. The FPP should aim to protect both.

On existing sites, where the permit currently allows hardstanding, then as part of the FPP we would expect the operator to assess the potential effect of fire water on:

- the local groundwater and surface water bodies
- any well, spring or borehole within 50m used for the supply of water for human consumption, including private water supplies

The FPP must set out how these receptors will be protected, where applicable. This may include an assessment of source-pathway-receptor and to also explain any likely attenuation capacity within the ground beneath the site. We would then expect to compare the likely impact from air emissions with the corresponding impact to the water environment from firewater run-off.

In our response to question 19, we consider the comments in relation to making the guidance more flexible and risk based. We examine the suitability of alternative measures and also describe situations where a departure from the objective of extinguishing a fire within 4 hours may be appropriate.

The comments regarding commercial impact on sites will be picked up as part of our work to review the BIT, which is explained in our response to question 5.

Question 10: Do you agree that these measures should be required (preventing self-combustion)?

Of the 161 respondents, 101 (63%) replied to this question and of those; 57 replied 'yes', 26 replied 'no', 18 replied 'don't know' and 92 respondents provided comments (irrespective of whether or not they had answered the question).

A clear majority of respondents were in favour of the proposed measures to control the risk of self-combustion. Although some thought that the measures should form permit conditions, in addition to storage times and volumes as defined in some standard rules permits.

The majority of respondents recognised that self-heating wastes should be managed and that the proposed parameters were sensible, based in science and reality.

Others made specific reference to the need to monitor the temperature and moisture content of piles, when storage exceeded 3 months. They commented that the difference between the surface and 1m into pile can vary by 30 degrees.

In addition a shorter stock rotation was preferable to monitoring to prevent self-combustion. Others noted that it was impractical to use a probe to monitor the core temperature of a compacted bale.

Another common thread was the reference to the form of storage. Some believed that bulk unchipped wood could not self-heat because of the low density and significant air flow through the pile. Others suggested the need to differentiate between fraction sizes, for example fines, chip and pre-crush. Others commented that the EA's focus on self-heating is flawed as main risk of fire.

Respondents also noted that taking into account the storage at other sites is unworkable.

Others cited practical issues with the application of the measures which included reference to probing beyond 1m is difficult, manual monitoring not safe in all locations, in-built sensors are

easily damaged, thermal imaging only reads surface temperature, piles are not uniform or homogenous - they are mixtures of fraction sizes, and hotspots can occur.

In addition a number of respondents recognised that monitoring of surface temperatures does not provide sufficient early indication of potential fire risk deep in a pile. By the time elevated temperatures are detected on the surface, self-combustion will have become established and there will be a deep seated smouldering fire. Whereas, one respondent commented that the EA refers to a probe or other device and yet when the operator invested in a heat detection system, the EA did not acknowledge the system when assessing their FPPs.

Other respondents commented on the specific nature of certain waste streams including ELVs and compost. Some believed that ELVs don't self-combust and there are other more important risk factors, including short-circuiting batteries or spills and leaks of flammable fluids. Another respondent commented that an ELV Depollution Campaign would help address awareness of the risk of self-combustion. One respondent also believed that there is no evidence that whole tyres or coarse shred will self-combust.

Some respondents asked for further guidance on the frequency of monitoring and appropriate triggers for temperature and moisture content.

Final comments related to the competency of EA officers to assess all this data.

Our response

We agree with the clear majority of respondents that the measures to control the risk of self-combustion are appropriate and therefore have been included within the revised FPP guidance. We recognise that some measures may already form permit conditions especially in standard rules permits, but many don't.

The majority of combustible wastes can self-heat although they do so by different mechanisms. There are certain wastes, for example ELVs, where self-combustion is not considered to be a risk and therefore the risk control, including monitoring do not apply.

Many wastes undergo self-heating, but not all wastes will go on to self-combust. The 3 key risk factors which determine whether or a not a pile of waste will self-combust are the:

- smallest dimension of the pile (usually pile height)
- particle size
- storage duration

The 3 key risk factors also exhibit a strong interdependency, and collectively contribute to the overall risk of self-combustion.

The particle size will also determine the critical temperature; this is the temperature required to initiate thermal runaway. The smaller the particle size then the lower the corresponding critical temperature. If all particle sizes <150mm are excluded from a waste pile, and the dimensions are in accordance with those set in the guidance, then the corresponding critical temperature will be relatively high. So high as to preclude self-combustion, unless a foreign object, heat source or localised hotspot is introduced into the waste mass.

From the BRE Global report (appendix 1), it can be seen that the critical temperature will be much lower for a pile including wastes with a particle size <30mm than is the case for the same size of pile created from wastes including those with a particle size of 70mm.

For the majority of wastes, preventing self-combustion requires control of a variety of factors which can influence the rate of self-heating. The factors we can control include:

- the temperature within the pile in order to prevent thermal runaway
- the form or particle size of the waste
- cooling waste after any treatment process, which can give rise to hotspots or raised temperature of the waste during storage

- the smallest dimension of the pile

We recognise that whilst it would be highly unlikely for railways sleepers to self-combust, unprocessed wood can. Unprocessed wood contains a variety of different types of wood, in various states of degradation and in various particle sizes and forms. The result is a heterogeneous mix, and when stored in a pile can give rise to hotspots and differential rates of self-heating.

Where the smallest critical dimension of the pile is 4m or more, then for many wastes this pile is of a sufficient size to achieve self-combustion. In this scenario, if the temperature of the core of the pile is left uncontrolled, then this can lead to thermal runaway. This is the point at which the rate of heat generation has overtaken the rate of heat loss, such that without intervention, the temperature of the pile will continue to rise until the point of ignition is achieved. Therefore unless wastes have undergone screening and separation of particle size or specific forms of waste, then the risk of self-combustion can still be present in unprocessed or heterogeneous wastes.

We recognise the practical issues identified by respondents and we would expect these to be addressed through the FPP for the site. Where the operator stores compacted baled waste then we would expect to see the bales being regularly rotated during storage to enable all to achieve a consistent rate of heat loss. For bales stored in excess of 3 months, then we would expect to see a representative number of bales being broken open so that the core temperature can be immediately measured. Where manual monitoring is not considered safe, then the storage times or pile sizes may need to be adjusted to reflect this.

For clarity, we do not believe that thermal imaging of the surface of a pile of stack of bales is an appropriate method of detecting temperature changes in order to control self-heating. Thermal imaging can be used to detect fires at the point when they break through, or are very close to the surface. We have not seen any scientific evidence to suggest that thermal imaging can be used as an effective method of controlling self-heating several metres below the pile surface, and respondents to the consultation did not identify any relevant research.

We note the comments in relation to specific waste streams and we consider that with the exception of active compost, we should seek to prevent self-heating in appropriate waste streams, including wood and tyres.

Our officers have recently received additional training and guidance on the practical assessment and application of control measures to prevent self-combustion. This is part of an ongoing process of professional development. We are confident that our officers have the capability to assess the data provided in relation to assessing self-combustion risk as part of the requirements of a FPP. In response to the request for further guidance on monitoring and trigger temperatures, our officers can provide advice and guidance upon request.

Question 11: Do you agree with the proposed content of a site plan?

Of the 161 respondents, 106 (65%) replied to this question and of those; 78 replied ‘yes’, 22 replied ‘no’, 6 replied ‘don’t know’ and 84 respondents provided comments (irrespective of whether or not they had answered the question).

There was a clear majority of respondents that recognised that specifying the contents of the site plan was a good idea. Some went on to propose additional content for the site plan, including: location of services (electricity and gas), location of sensitive receptors, prevailing wind direction, penstocks, access routes, rendezvous points, 24hr contact details, a breakdown of hazardous materials on site, and minimal level of suppression equipment (for example hoses and extinguishers). Following COMAH guidance was suggested as a starting point.

A number of respondents referenced specific content that needed clarification or definition, such as combustible waste, regular changes of pile layout, the terms ’quarantine’ and ‘optional’.

Several comments talked about on-site changes and how that would affect the plan; for example seasonal wastes, equipment movements, stockpile layouts (which if the plan is to scale are not necessary). It was suggested that minor or seasonal changes should not require approval as it would be time consuming, mixed with concern that changes for a good reason could result in non-compliance.

Some questioned the relevance of certain content, including: wheel wash, weighbridge, stockpiles, CCTV, boundary fence details, mobile equipment (which is constantly moving) and anything outside the site.

A number of responders suggested that having a site plan is duplicating a requirement they already have through their Management System. One suggested it would be reasonable to allow its provision through a number of plans.

Other specific points raised were that some of the content is too lengthy, complex and 'techy' and that certain elements were not necessary or practical including a quarantine area and separation distances. As well as specific content being difficult to get hold of, especially at the pre-application stage, for example wind rose data. A pre-operational condition was a suggested way forward.

One comment suggested detailed plans haven't helped get FPPs approved and that the FRS wouldn't use it in an emergency.

Our response

We agree with the majority of respondents in that the guidance should specify the minimum content of the site plan contained within the FPP. We also recognise the additional suggestions regarding content which in most cases we would consider to be best practice and a helpful addition to the plan.

We note that some respondents referenced specific content that needed clarification including 'combustible waste', regular changes of pile layout, and 'quarantine area'. These have been clarified within our response to other questions.

With regards to on-site changes including seasonal wastes, equipment movements, stockpile layouts, we agree that minor changes should not require revisions and approval. We would suggest that for the avoidance of doubt, that an operator identifies all of the optional layouts and then explains at what point in the year, or under what conditions each of the site plans will be appropriate.

It is important that when we assess the suitability of an FPP that we consider all material facts that includes the location of the wheel wash, weighbridge, stockpiles, CCTV, boundary fence details, mobile equipment.

Whilst we recognise that having a site plan may duplicate a requirement they already have through their Management System, if the plans already exist then providing us with an additional copy should not be an onerous requirement. We agree that the details required on the site plan may be provided through a small number of existing plans, if they are to scale and show all of the appropriate features.

We appreciate that some specific content for example, wind rose data may appear to be an unusual request and more challenging to get hold of at pre-application stage. However as part of a recent step change in regulation, we are now undertaking more scrutiny of proposed waste activities at the permitting stage. This will ensure that only the most competent operators and those with a satisfactory FPP will receive a permit.

If we approve a FPP, we will do so on the assumption that the plan is an accurate plan of the site layout, or in the case of a new site accurately represents the way the site will be laid out.

Question 12: Do you agree with the maximum prescribed pile sizes?

Of the 161 respondents, 117 (73%) replied to this question and of those; 22 replied ‘yes’, 75 replied ‘no’, 20 replied ‘don’t know’ and 132 respondents provided comments (irrespective of whether or not they had answered the question).

It was clear that respondents held very strong views on this topic, with a high proportion of respondents from the waste industry objecting to the pile sizes. Whereas organisations that participate in emergency response were generally supportive.

Those respondents who did not support the pile sizes raised common themes including, the apparent lack of science or evidence, they are restrictive and could make businesses unviable, the description of mixed unprocessed waste is too general or vague. In addition, some commented that particle size and the physical state of storage (baled or loose) are in fact key determinants to managing risk of fire (and not limited solely to the consideration of waste wood). If the EA was minded to pursue the proposed approach to table 1, clarification would be needed around the definitions of various waste types.

A number of respondents did not believe that there is a link between pile size and risk of self-combustion. Others commented that lots of sites have not had fires and therefore shouldn’t be impacted by the guidance.

In addition, comments specific to refuse derived fuel (RDF) and solid recovered fuel (SRF) stated that there should be a differentiation between a stock pile of material ready to be baled and wrapped, and wrapped bales. Time limitation on the storing of wrapped bales would be a far more suitable control, suggesting a 3 week limitation, after which the bale should be broken open and re-processed.

Comments specific to ELVs mentioned that vehicle dismantlers don’t normally store ELVs in ‘piles’. Usually there is no stacking at all, but sometimes they are stacked 2 high in an orderly manner prior to depollution. They may also be systematically ‘racked’ for longer-term storage (to facilitate reusable parts recovery) prior to or after depollution. Baled, crushed or flattened depolluted ELVs may be stacked.

Some respondents made specific reference to compost. One respondent stated "the inclusion of compost (typically with over 50% moisture content) in the same category of waste types as plastics, rubber and tyres and WEEE appears illogical. Compost is less likely to self-combust. Similarly the inclusion of paper, cardboard, textiles, metal & unprocessed wood in the same category appears perverse. The only fraction of compost that poses a significant fire risk is that of ‘the ‘oversize’ fraction and this is where most compost fires occur. It is not necessary to control the size of active compost which is in the process as this is regularly monitored for temperature as part of the PAS 100 compost certification scheme or permit and good practice requirements".

Another respondent opposing the stack sizes believed that the guidance is not sufficiently flexible. Stating "the prescribed pile sizes raise questions of practicality in the port environment, requiring as they do a significant area of quayside to be taken up. We believe that it would be possible to allow different pile configurations that would give the same level of protection and access for firefighting and the guidance needs to be flexible enough to accommodate this."

Many respondents made reference to the 2,000m^3 pile size from the WISH guidance, which is based upon Confederation of Fire Protection Associations in Europe (CFPA E No. 32:2014 F).

Whereas another reply commented that if table 1 pile sizes (of the consultation document) now only applies to waste stored in the open, the implications are that the size and layout for indoor piles will need to be designed by qualified persons and that this may result in increased cost to the operator. It is also acknowledged that building construction, roof height and size can vary, but it would be beneficial to operators and enforcing authorities to have basic guidance regarding indoor pile sizes for the most common types of building utilised as waste transfer stations. WISH

guidance for indoor piles appears to indicate maximum pile sizes which are 75% that of outdoor piles.

In addition, the current maximum tyre pile volume (450m^3) appears to be less conservative than other guides, which allows the potential for much larger fires. General Guidelines for Rubber Tyre Storage (Built Environs Section Guidelines No. 13) - South Australian Fire Authorities (2014) recommends total volume of tyres contained in a pile not to exceed 360m^3. Home Office and Scottish Guide - Fire Safety for Tyre Sites (1995) recommends a maximum stack volume of 300m^3. The maximum height of a tyre pile size in table 1 of FPP (v2) is currently 5m, which appears to be less conservative than other guides. With taller piles there is the potential for reduced pile stability. Guidelines for bulk storage of rubber tyres (Fire & rescue NSW (2014) stipulates general height limit of 3.7m for tyre piles. NFPA 1 Fire Code (2015) although allowing potentially larger tyre pile size it recommends a limit of 3m height to 'new' tyre piles and 6m for 'existing' tyre piles. The UK Waste Tyre Mgt. Best Practice: handling of Post Consumer Tyres - Collection & Storage (2006) gives guidance that the height of shredded tyre should be less than 4m.

Our response

We recognise the need to clarify the objectives for the pile sizes and also to evidence the data and methods used to derive them. The pile sizes have been devised both to reduce risk of self-combustion of waste and to enable active firefighting to extinguish a fire within 4 hours. In reply to the comments made by some respondents regarding the perceived lack of a link between self-combustion and pile size, a short summary is provided below.

A modest heap of wood chip piled up is known to exhibit self-heating tendencies. If the pile is not too large, the temperature inside will rise by maybe 10 to 50^{0}C, then, given typical ambient air temperatures in this country, will slowly drop back down. In a small pile of waste then the pile dimensions (critically pile height) will be insufficient for sustain thermal runaway. The self-heating that occurs will be matched by the overall heat loss from the pile and therefore the pile temperature will drop back down. In small piles the critical temperature will be much greater than for larger piles of the same waste and whilst self-heating will occur, the temperature required to achieve thermal runaway is not going to be reached.

However, with a very big pile of the wood chip if heaped together, then the temperature inside will rise slowly at first, then start to accelerate very rapidly. The material will be the hottest in the inside. It will start to smoulder rapidly and the smoulder front will advance through the material. Finally, flaming may break out when the smoulder front reaches the outside surface. In other cases, the entire pile may be consumed by smouldering and flames will not appear'. Other combustible wastes that self-heat will behave in the same way as wood chips.

Where we have been made aware of the outcomes of fire investigations, many have cited self-combustion as the likely cause. Research into self-combustion has been undertaken for many years, and can be related to the principles of thermodynamics including Fourier's law of heat conduction and the relationship between heat generation (through self-heating) and heat loss to the surrounding environment.

The development of thermal ignition theory and the various models which can be used to predict the likelihood of self-combustion, have been reviewed by Wang et al (2006)[3]. The most well-known models are Semenov, Thomas and Frank Kamenetskii models. These models can be used (within constraints) to predict self-combustion, perhaps the most useful for waste piles is the Frank Kamenetskii model. It is based on the idea that progressive heating raises the rate at which heat is released by the reaction until it exceeds the rate of heat loss from the area. Eventually a specific

[3] Wang, H Dlugogorski, BZ and Kennedy, EM Tests for spontaneous ignition of solids materials. Flammability testing of materials used in construction, transport and mining pp385-442 Woodhead Publishing Ltd Cambridge

ignition temperature is achieved at which point the waste will self-combust. Safe pile sizes, storage dimensions and storage durations can be determined from the calculations. In thermal ignition theory we also know that the specific ignition temperature for waste is reduced when the dimensions of the pile are increased, for example bigger piles can increase the likelihood of self-combustion by effectively lowering the self-ignition temperature of the waste.

There are also a variety of research papers available which have explored self-heating and self-combustion within a variety of waste streams.

As described in our response to question 10, there are 3 key risk factors which determine whether or not a waste which is capable of self-heating, will go on to self-combust. These factors are:

- particle size
- storage duration
- smallest dimension of the pile (usually pile height)

These risk factors also exhibit a strong interdependency.

The smallest dimension of the pile (usually the height) will determine whether or not the pile can sustain thermal runaway and it also determines the temperature required to initiate thermal runaway. Thermal runaway is the point at which the rate of heat generation has overtaken the rate of heat loss and the temperature within the pile will continue to rise, and if left uncontrolled, will achieve combustion. Small piles of waste (those with a height of less than 1.5m) are highly unlikely to achieve thermal runaway at typical outside ambient temperatures, simply because the insulation capacity of the pile is insufficient. The sustained rate of heat generation is not greater than the corresponding rate of the heat loss. So whilst self-heating occurs even in small piles, the pile dimensions are insufficient to sustain thermal runaway. As a consequence the pile will warm up and then cool down, rather than sustaining a continued rise in temperature.

Critical temperature is the temperature required to initiate thermal runaway. The relationship between pile height (assuming it's the smallest dimension) and critical temperature is expressed in thermal ignition theory, such that taller piles lead to a corresponding lower critical temperature.

BRE Global has carried out a peer review of our guidance and this includes comprehensive assessment of self-combustion and the associated risk factors. A copy of their report can be found in appendix 1.

In the response to question 1, we explained that in the majority of cases, it is important that waste fires can be extinguished within 4 hours. The response also mentioned the current research on sheltering. So in recognising the limitations around feasibility of sheltering for the most vulnerable members of the local community, we can describe the potential impact of waste fires both on the environment and also the local community. So whilst our regulatory guidance seeks to minimise the impact of emissions from waste fires on the local community, the frame of reference for both WISH guidance and CFPA E No. 32:2014 F focuses on an appropriate degree of practicability and safety for fire fighters and means of escape for workers.

We understand that the WISH guidance seeks to bring fire under control within 24 hours, whereas we would commonly categorise a fire of this nature and scale as a serious or significant incident based upon the impact on the local community and the environment. Indeed, one of our key corporate scorecard measures is to reduce the number of serious and significant incidents, and in order to achieve this target, we need to minimise both the scale and duration of waste fires.

Since 2005 there have been between 10 to 20 serious or significant waste fires each year, as recorded in the table below. We assess the environmental impact (on the environment, people and property) of an incident and classify it between category 1 and category 4. Serious or significant incidents are defined as category 1 and 2. The implementation of our guidance seeks to reduce both the number and scale of waste fires over the coming years and therefore reduce the impact on local communities, the surrounding environment, and nearby critical infrastructure.

Table 1 - Number of waste fires and categories 2005 to 2015

	EA incident category	Not regulated by EA	Regulated by EA	Total per category	Total number of waste fires per year
2015	1	3	1	4	262
	2	0	11	11	
	3	43	145	188	
	4	15	44	59	
2014	1	0	3	3	309
	2	3	16	19	
	3	52	187	239	
	4	8	40	48	
2013	1	0	6	6	273
	2	1	12	13	
	3	41	168	209	
	4	10	35	45	
2012	1	0	1	1	260
	2	4	12	16	
	3	36	164	200	
	4	3	40	43	
2011	1	1	3	4	337
	2	6	19	25	
	3	46	188	234	
	4	8	66	74	
2010	1	1	6	7	282
	2	2	9	11	
	3	43	188	231	
	4	8	25	33	
2009	1	0	8	8	280
	2	4	14	18	
	3	42	190	232	
	4	3	19	22	
2008	1	0		0	230
	2	2	9	11	
	3	39	157	196	
	4	1	22	23	
2007	1	0	2	2	

	2	3	15	18	231
	3	42	146	188	
	4	2	21	23	
2006	1	0	1	1	323
	2	11	11	22	
	3	72	194	266	
	4	1	33	34	
2005	1	1	2	3	290
	2	15	10	25	
	3	61	172	233	
	4	6	23	29	

Since 2009, a multi-agency service has provided an assessment real-time air quality monitoring, sampling and modelling data during major incidents. We chair this service, known as an Air Quality Cell (AQC). The AQC includes colleagues from Public Health England, Met Office, Food Standards Agency, Health and Safety Laboratory and local councils.

The role of the AQC is to assess the impact of an incident on the local community particularly in relation to the impact on public health. The AQC advises the multi-agency co-ordination groups as to the most appropriate methods to manage the incident, taking into account these impacts. The AQC has been involved in the analysis and interpretation of air quality data in over 28 major incidents, since 2009, many of which have been waste fires.

Table 2 - Air Quality Cell activation history 2009 – 2016

Year	Number of times the AQC was activated
2009	3
2010	7
2011	3
2012	1
2013	6
2014	4
2015	2
2016	2

Table 3 - Waste types involved in incidents where the AQC was activated

Waste type	Number of times the AQC was activated
Mixed household, commercial and industrial	10
Refuse derived fuel	2
Tyres	8
Compost	1
Wood	2
Plastics	3
Non-wastes	2

The assessment of the potential impact on human health begins with an understanding of the common combustion products found within smoke. These can be grouped into 3 categories:

- asphyxiants can cause dizziness, disorientation, confusion, fainting, nausea, and vomiting - the most common asphyxiants generated during waste fires include carbon monoxide and hydrogen cyanide
- irritants can cause coughing, runny nose, stinging and watery eyes, sore throat and breathing difficulties - the most common irritants generated during waste fires include NOx, SOx, hydrogen chloride, ammonia, acrolein, phosgene and formaldehyde
- complex molecules which can cause health effects as recognised carcinogens and mutagens and particulates are complex molecules, which can worsen the effects of respiratory illness or heart and lung disorders - the most common complex molecules generated during waste fires include persistent organic molecules such as dioxins, furans and particulates (PM10 and PM2.5)

Epidemiological studies on the health effects of PM10 have shown that adverse impacts on health can be seen even at very low levels. These include increased daily deaths, increased admissions to hospital from patients suffering from heart and lung disorders and a worsening of conditions in those with asthma.

Very large particulates can be seen as soot, whereas smaller particles are described as PM10 or PM2.5, denoting the size of the particle in microns. The smaller the particle size then the further they are able to travel into the lungs. Particulates which are below 10µm are able to pass through the upper respiratory tract and can be deposited within the airways. Particles below 2.5µm in size may be respired deeper within the lungs and can be deposited within the alveoli. Unlike the acid gases and organic irritants, their effect on the human body is reviewed in terms of an average exposure period such as 24 hours.

The World Health Organisation produce guideline levels[4] for particulates (PM10). The 24 hour average guideline value is 50µg/m^3, above which you would expect to see an increase in adverse health effects. The range of health effects is broad, and are predominantly linked to the respiratory and cardiovascular systems.

The impact of both asphyxiants and irritants can be assessed using Acute Exposure Guideline Levels (AEGLs). These levels have been derived by our counterparts in America, who have a similar regulatory role. The Environmental Protection Agency (US EPA) publish AEGLs for a wide variety of chemical including the majority of common combustion products. These represent

[4] WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide, *Global update 2005,* Summary of risk assessment

threshold exposure limits for the general public and are applicable for exposure periods ranging from 10 minutes to 8 hours.

There are 3 guideline levels:

- AEGL 1 is the airborne concentration expressed as parts per million or mg/m^3 of a substance above which it is predicted that the general population, including susceptible individuals could experience notable discomfort, irritation or certain asymptomatic non-sensory effects - however the effects are not disabling and are transient and reversible upon cessation of exposure
- AEGL 2 is the airborne concentration expressed as parts per million or mg/m^3 of a substance above which it is predicted that the general population, including susceptible individuals could experience irreversible or other serious, long lasting adverse health effects or an impaired ability to escape
- AEGL 3 is the airborne concentration expressed as parts per million or mg/m^3 of a substance above which it is predicted that the general population, including susceptible individuals could experience life-threatening health effects or death

For many acid gases, exposure to just a few parts per million or mg/m^3 for a relatively short duration, for example 10 to 60 minutes can be harmful. Below are the current AEGLs for the asphyxiant hydrogen cyanide, and the irritant hydrogen chloride. More information on AEGLs can be found at https://www.epa.gov/aegl.

Table 4 - Acute Exposure Guideline Levels (AEGLs) for hydrogen cyanide

Hydrogen cyanide (ppm)					
	10 minutes	**30 minutes**	**60 minutes**	**4 hours**	**8 hours**
AEGL 1	2.5	2.5	2.0	1.3	1.0
AEGL 2	17	10	7.1	3.5	2.5
AEGL 3	27	21	15	8.6	6.6

Extract from US Environmental Protection Agency http://www.epa.gov/aegl/hydrogen-cyanide-results-aegl-program

Table 5 - Acute Exposure Guideline Levels (AEGLs) for hydrogen chloride

Hydrogen chloride (ppm)					
	10 minutes	**30 minutes**	**60 minutes**	**4 hours**	**8 hours**
AEGL 1	1.8	1.8	1.8	1.8	1.8
AEGL 2	100	43	22	11	11
AEGL 3	620	210	100	26	26

Extract from US Environmental Protection Agency http://www.epa.gov/aegl/hydrogen-chloride-results-aegl-program

Typically these concentrations are monitored during an incident in locations which are frequented by the general public and up to approximately 1km from the incident site. The data collected from the AQC responses since 2009 demonstrate that these combustion products can be present at concentrations such that the general population, including susceptible individuals could experience irreversible or other serious, long lasting adverse health effects.

The pile sizes reflect the need that in the majority of cases, a fire needs to be extinguishable within 4 hours and they have been derived in part from our incident data.

As part of its routine response to incidents we collect and record information in the National Incident Recording System (NIRS). We record many thousands of incidents each year of which 250 to 300 relate specifically to waste fires. This information includes incident duration, type and quantity of waste, emergency response and initial impact. Some of this information is stored in free

text fields, which can also contain sensitive data and is therefore not publically available. We do however publically share redacted and non-sensitive incident data in a variety of ways.

For the purposes of evidencing data in this consultation response, we have taken an extract of the incident data which is specific to waste fires, which has been anonymised with sensitive information removed. Appendix 2 contains an extract of the data used to confirm that the pile sizes set out in the guidance can be extinguished within 4 hours using active firefighting. Clearly many of the fires that we have attended in the last few years have continued for many hours, and the incident duration show a positive correlation to the volume of waste in the pile. In the majority of cases we can evidence active firefighting and significant resources being applied to bring these fires under control. The data also indicates that where pile sizes are within the maximum volumes set out in the table of the guidance, the fires have been able to be extinguished within 4 hours.

As part of the revision, comments relating to the need for greater specificity regarding individual waste streams and particle sizes have also been taken into account, including those relating to ELVs, compost and tyres. As part of the review, greater scrutiny will be placed on the smallest pile dimension, which in the majority of cases is expected to be the height of the pile. We will also consider work on specific waste streams which has taken place in other countries, particularly the information relating to tyre pile sizes.

We recognise that some respondents asked for greater clarity around piles sizes for storage of wastes in a building. The maximum pile sizes within the guidance apply both to storage in a building as well as storage in the open. This approach was supported by BRE Global in their review of our guidance (appendix 1).

Regarding the outputs from the WISH fire tests, we will consider the findings from these tests once the data has been interpreted and analysed by an appropriate independent expert. We can then take an informed decision as to whether the FPP guidance requires a further revision. We don't expect this information to be available until October 2016 at the earliest.

In recognition of the need for the revised guidance to be more risk-based and site specific, we consider proposals for bespoke pile sizes as suitable alternative measures. Advice and guidance should be sought from us at the earliest opportunity, in order to ensure that appropriate calculations and methods are used to determine bespoke pile sizes.

A number of respondents commented on the strong inter-relationship between pile sizes and storage durations and so, any bespoke calculations to determine pile size, will also take into account proposed storage duration.

We also acknowledge that storage in a building is something which requires designing and specifying by an appropriately qualified person. In addition, the design of suppression systems often favours the limitation of fire spread, and may therefore, not be able to extinguish deep seated fires. However, if the measures set out in the guidance are followed, the risk of a deep-seated fire will be considerably reduced, resulting in most incidents involving surface fires. These are more likely to be extinguished by suppression equipment.

Building fires present additional health and safety issues for both operators and emergency responders. Building fires, which in the initial stages at least, will be ventilation controlled, present an additional hazard in relation to the likely combustion products in the smoke. Due to the reduced air environment, there is likely to be incomplete combustion and therefore the products of combustion, if inhaled, are likely to be more toxic, than if the same waste were to undergo complete combustion in a freely ventilated environment.

The BRE Global report which includes a comprehensive peer review of our guidance (appendix 1) concluded that the general principles for fire prevention and mitigation of fires in waste stored in buildings would include that:

- waste pile sizes and separation distances no greater than for outdoor areas
- if the building is heated this could affect the potential for self-heating of the waste and should be taken into account when assessing self-heating risks
- escape routes, fire exits, alarm points and fire extinguishers are kept free from waste

- electrical equipment and heaters are kept free from waste, including dust and packaging materials
- waste storage areas should be fire compartmented away from office areas
- waste storage areas should have some means of clearing smoke from the building, such as opening skylights or roller shutter doors, to aid firefighting

Further guidance is given in the DCLG document 'Fire Safety risk assessment - factories and warehouses[5]

The comments regarding commercial impact on sites will be picked up as part of our work to review the BIT, which is explained in our response to question 5.

Question 13: Do you agree with the measures proposed for waste separation?

Of the 161 respondents, 113 (70%) replied to this question and of those; 31 replied 'yes', 66 replied 'no', 16 replied 'don't know' and 101 did not tick a box but provided comments.

It was clear that respondents held a range of mixed views on this topic, with many respondents from the waste industry objecting to the standard separation distances. Whereas organisations that participate in emergency response were generally supportive and some respondents provided detailed explanations of why the separation distance was considered too small in some circumstances.

Common themes from respondents that did not support the standard separation distance included, the need for separation to be determined on a site specific basis especially where operators wished to propose larger piles and correspondingly larger separation distances. In addition, many respondents felt that ELVs and composting required waste stream specific separation distances. Other respondents suggested that fire walls should be used instead of separation distances.

Respondents also made specific reference to existing guidelines for tyre storage and noted that a 6m spacing between tyre stacks 100m^2 and 3m high (300m^3) will not prevent fire spread. Whereas others invited the EA to justify the assertion that a 6m separation distance would help limit the spread of fire between piles during the initial 30 to 60 minutes. Clearly, a range of other factors would likely influence the rate in which a fire spread including waste types, physical characteristics of waste and storage configuration.

The comments regarding commercial impact on sites will be picked up as part of our work to review the BIT, which is explained in our response to question 5.

Some respondents welcomed proposals to reduce the separation distances between stacks of WEEE and also to remove the requirement for 20m separation distance between groups of 16 piles.

[5] Fire Safety Risk Assessment. Factories and warehouses. Department for Communities and Local Government, 2006

Our response

We have taken a number of factors into account in arriving at its decision. Firstly that not everyone has understood the purpose of the generic separation distance and quarantine area, secondly that there is a diversity of views from respondents and thirdly, commissioning an appropriately qualified person to carry out the bespoke calculations may be expensive.

So we propose to retain the generic separation distances and use of quarantine area. In addition, we will enable operators to use bespoke heat flux calculations if they choose to do so in order to calculate site specific separation distances, and consider the use of fire walls as an alternative in order to reduce the separation distances where appropriate.

We also wish to clarify that the purpose of the generic separation distance is not expected to prevent fire spread in all circumstances. It is a standard distance between piles based on recognised heat flux models to facilitate access and to enable active firefighting to take place from all sides of the pile, or row. The generic distance of 6m is also designed to provide a small window of time (likely to be less than one hour) at the start of an incident, during which unburnt or burning waste can be accessed and moved into the quarantine area. This offers the ability to further separate or isolate wastes during an incident in order to provide an effective means of preventing fire spread and reduce the duration of the fire.

The BRE Global report which included a comprehensive peer review of our guidance (appendix 1) concluded that “from radiation calculations we have undertaken, for example from our work for the Home Office on tyres dumps[6], wood chips piles[7] and bales of stored RDF[8], 6m seems a reasonable separation distance. However, it should be noted that under certain conditions certain materials could still ignite even with a 6m separation distance, e.g. a strong prevailing wind may result in a flame leaning over to directly impinge on material resulting in direct ignition, or some sensitive material receptors may ignite from a relatively low irradiance level even at 6m. So 6m will not necessarily stop fire spread in all situations and specific radiation calculations should be conducted for the specific materials stored as part of the fire safety management plan”.

We note the comments specifically in relation to ELVs and compost, and proposes to make the FPP guidance more specific in this respect in the revised version. In addition, we are reviewing the appropriateness of the generic separation distances for tyres and rubber and proposes to amend the corresponding maximum pile sizes in order to take into account the latest guidance on tyre storage.

If an operator wishes to propose the use bespoke separation distances on their site then advice and guidance on appropriate methods to use should be sought from us at the earliest opportunity.

The comments regarding commercial impact on sites will be picked up as part of our work to review the BIT, which is explained in our response to question 5.

---

[6] Home Office Report on Fire safety for tyres sites 1995

[7] BRE Global Client Report. Fire Spread Analysis. BRE Global Report No. 136540. Jack Moody Recycling Ltd. October 2014

[8] BRE Global Client Report. Radiant Heat Calculations – Fire Booms. BRE Global Report No. P105031-1000. Terraconsult Ltd. June 2016.

Question 14: Do you agree that a suitably designed and constructed fire wall can provide adequate separation between piles while enabling fire to be actively fought within 3 to 4 hours?

Of the 161 respondents, 105 (65%) replied to this question and of those; 61 replied ‘yes’, 16 replied ‘no’, 28 replied ‘don’t know’ and 94 respondents provided comments (irrespective of whether or not they had answered the question).

Many respondents suggested the use of fire walls would be an appropriate means of reducing the space which would otherwise be taken up by separation distances between waste piles. However, several suggested that the guidance wasn’t sufficiently clear that this was an acceptable approach and it was requested that the guidance explicitly confirm that firewalls can replace the specified separation distances.

A recurring theme amongst the responses was that each site is different and firewalls are not always practical, so their use should be determined on a site by site basis, and not be a blanket requirement. Respondents wanted flexibility and suggested alternatives such as water curtains.

Some respondents referred to the fire resistance rating specification of firewall, suggesting that this must be taken into account if they were to stop fires spreading whilst ensuring it is extinguished within 4 hours. Others, however, questioned the efficacy of firewalls, and also highlighted some of the unintended consequences of installing them, including the fact that they may restrict access to the waste in the event of a fire, hindering the FRS’s ability to fight it. Others questioned the link between firewalls and extinguishing a fire within 4 hours.

Some wanted guidance on the specification of fire walls, whilst others recommended the FRS or insurance companies should provide the advice.

Other respondents were concerned about the costs associated with installing fire walls.

Our response

Firewalls can be an effective means of preventing fire spreading, thereby limiting its scale. In doing so, the time it takes to extinguish any fire should also be limited, subject to other controls being in place as explained below. Firewalls can therefore play an important part in achieving the aim of extinguishing a fire within 4 hours

We will therefore make clear in the revised guidance that firewalls may be used to replace the specified separation distances. However, their use is optional.

However, it was also evident that there are risks and potential unintended consequences of installing firewalls, particularly where they are used to form bays for the storage of waste. They may hinder access to the waste in the event of a fire, especially where it is deep-seated and there is a need to remove waste from within a bay area using heavy plant. Reference was also made to the relative height of the walls compared to the waste, to ensure there is sufficient freeboard to prevent flames igniting adjacent piles. Consequently, we have set out in the guidance as to how these risks must be addressed.

There will clearly be a cost to installing firewalls, but this may be offset by the increased available space for waste storage on site as a consequence of reducing the area taken up by separation distances between waste piles.

Question 15a: Do you think we should specify minimum standards for fire walls in the FPP guidance?

Of the 161 respondents, 100 (62%) replied to this question and of those; 43 replied ‘yes’, 36 replied ‘no’, 21 replied ‘don’t know’ and 93 respondents provided comments (irrespective of whether or not they had answered the question).

A variety of views were expressed in response to this question. Suggestions were submitted not only in relation to the standards of firewalls, but also on who is suitably qualified to design and install them. The latter is addressed in Q15b.

On the minimum standards, respondents made a number of suggestions. Some said they would welcome guidance, but it was clear that they wanted the standards to be evidence-based and approved by an appropriate third party, rather than devised by us. A relevant British Standard was referred to, as were building regulations on fire safety. Others suggested they should simply be an appropriate height and thickness.

Several respondents highlighted the potential additional costs associated with us specifying minimum standards.

Our response

We agree with the majority of respondents and we have specified the minimum standards for firewalls within the guidance. For firewalls to be effective, they must be appropriately designed and manufactured. Purpose-built firewalls are constructed to achieve a specific fire-resistance rating, which reflects the time limit for which they will retain their integrity in the event of a fire.

The BRE Global report (appendix 1) identifies that there is not a British Standard associated with purpose built firewalls. It concludes:

“BS EN 13501-1:2007+A1:2009. is not the correct standard – this is for classifying materials which have been tested to the various reaction to fire tests and is intended for wall linings to stop excessive and rapid spread of flame.

If the intention is for bay walls to resist fire (radiative heat and flaming) then better to specify a fire resistance period of say 120 minutes. I imagine the material used for such bays will be concrete and so they should be able to meet 120 minutes”.

This is the revised approach which we have adopted in the guidance.

This requirement may result in additional costs as such products may attract a premium, and will be more expensive than those without a specific fire resistance rating. However, this must be balanced against the need to ensure the firewalls are effective. It would also be a false economy for operators to invest in cheaper but less or ineffective products.

Question 15b: If you do not think that we should include minimum standards for fire walls do you think that the design should be left to an appropriately qualified person from the ‘Red Book’ and the Loss Prevention Certification Board?

Of the 161 respondents, 68 (42%) replied to this question and of those; 33 replied ‘yes’, 35 replied ‘no’ and 89 respondents provided comments (irrespective of whether or not they had answered the question).

There was generally a low level of response to this question. A range of suggestions were put forward in respect of who is appropriately qualified to design firewalls. It is clear that there are a number of organisations or professions which may be sufficiently qualified or competent to design them.

Some respondents suggested that in specifying only those certified by the Loss Prevention Certification Board, we are ruling out others who may be equally well qualified and competent.

Other suggested it is not necessary to hold any qualifications in order to design or install firewalls and it is sufficient that they simply have experience and knowledge.

Our response

Whilst there was some support for this measure, there was a wide range of alternative organisations or professions suggested as suitable for designing firewalls. The consensus appears to be that specifying a contractor approved by the Loss Prevention Certification Board (LPCB) is too restrictive and rules out many other appropriately competent or qualified people. We also recognise that there are alternative accredited certification bodies to the LPCB.

However, the person installing and maintaining the firewalls must be competent to do so in order for them to be effective. Specific consideration must be given to a number of factors, including adequately sealing any joints in the walls and that between the base of the wall and the ground.

Question 16: Do you agree that storage within a building presents additional challenges and that we must require all buildings to have an appropriately designed and installed detection and suppression system?

Of the 161 respondents, 100 (62%) replied to this question and of those; 54 replied ‘yes’, 36 replied ‘no’, 10 replied ‘don’t know’ and 94 respondents provided comments (irrespective of whether or not they had answered the question).

Most respondents agreed that internal storage poses unique challenges. This included the fact that waste in a building increases the risk to personnel during firefighting.

Some also commented that the requirements should be based on an operator’s ability to provide evidence of proportionate assessment of risks by competent and qualified persons.

Comments also mentioned that the requirements from insurers often included sprinklers and that whilst these may control fire spread, they may not extinguish deep seated or subsurface fires. Deep seated or smouldering fires can only be extinguished by digging out and hosing to cool and quench the wastes, this would need to be carefully managed and supervised by FRS.

One respondent suggested that the next phase of WISH tests may offer some practical solutions to the unique set of challenges posed by storage in a building.

Several respondents mentioned the need to consider cost implications and effectiveness of suppression system. Whilst others suggested that suppression system may be unnecessary and too costly.

Other specific comments described benefits of certain types of detection system and that this should be encouraged, since early detection was the key to controlling the incident and being able to quickly extinguish the fire.

Some highlighted that with short term storage, small volumes and open faced sheds, the requirements for a detection and suppression system may not be necessary. The majority of

respondents were in favour of requirements being based on risk assessment and taking into account ‘where reasonably practicable’ especially when trying to retrofit existing buildings.

Some respondents wanted clarification on the definition of ‘a building’ and some questioned the EA’s competency to assess a detection and suppression system.

One respondent commented that under Regulatory Reform (Fire Safety) Order 2005 (RRO) that it would be very difficult to ask for a building to be fitted with sprinklers if there is adequate means of escape, however the EA may stipulate this as part of their regulatory control. Whereas detection was already a requirement under the RRO.

Other specific comments believed that the use of 'Red Book' and LPCB, whilst appropriate for large sites, could be prohibitively expensive for small sites.

Respondents said relevant insurance requirements state that automatic fire detection should be installed in all buildings in accordance with BS 5839 covering smoke, heat, and flame detection. Fire protection for waste biomass power and CHP plants should be installed in accordance with NFPA 850. A preferred fire detection system for some internal biomass stores is off-gas monitoring in the head space above the storage pile and monitoring of the temperature in this head-space. Fire Alarms and Detection systems could comply with BS5839-1 for commercial buildings. Installation of a fire alarm system should also comply with BS7671.

Others recognised that a person who designs fire suppression systems will be able to say what is appropriate and the limitations of the sprinkler system. A properly designed suppression system in locations where practical reduces the volume of fire water to be contained.

Our response

We agree with the majority of respondents in that fires in a building present a unique set of challenges and that we should be expecting the majority of sites to have appropriately designed and installed detection and suppression systems.

In our response to question 19, we consider the comments in relation to making the guidance more flexible and risk based. We examine the suitability of alternative measures and also describe situations where a departure from the relevant objectives may be appropriate. This will take into account smaller sites and those who store very small quantities of waste for a short period of time.

The comments regarding commercial impact on sites will be picked up as part of our work to review the BIT, which is explained in our response to question 5.

Since October 2013 when the original guidance was published, we have adopted a common approach to assessing FPPs. As a result of the representations made in this consultation and the changes we intend to make we have provided training to more of our staff. Where appropriate, we also consult with others and this includes FRS, local authority, HSE and PHE, when assessing FPPs.

Question 17: What do you consider to be appropriate qualifications for someone designing the storage layout and detection and suppression system within a building?

109 respondents provided comments.

Some respondents suggested that the FRS should determine whether the storage layout, detection and suppression system would be capable of extinguishing a fire within 4 hours, to ensure that the system is fit for purpose.

There was also a number that suggested an engineer (fire or buildings system) or fire safety management qualification, or one with appropriate knowledge and experience of the industry. Others suggested someone with NEBOSH qualifications, or a risk assessor with the institution of fire engineers.

One respondent questioned whether the EA officers had such qualifications.

Respondents also believed that in some circumstances specialist consultants, competent architects, chartered surveyors, insurance assessors with experience of the waste industry may be suitable.

One responder suggested that 'appropriate qualification' was difficult to define and some suggested no qualifications were required for storage layout, whilst others were happy with 'appropriately qualified' or simply the operator or any competent person. Whilst another suggested they should be linked to the risk of the site.

A number talked about having an appropriate industry 'standard' rather than qualifications, including specific British Standard reference numbers, whilst one suggested that a lot of fire and heat detection systems are designed on the continent so it would be impossible for the EA to impose restrictions to accommodate international standards.

Several comments referenced 'Red Book' and LCPB qualifications, with a suggestion they review applications on behalf of the EA. However, another respondent believed that 'Red Book' does not list people with any waste experience.

Many also suggested that insurance or third part accreditation would be preferable, or someone covered by insurance. Others suggested using a combination of people listed above to assess the design.

Our response

We agree with the majority of respondents that where applicable, the design, installation and maintenance of all suppression equipment must be covered by an appropriate third party certification scheme. This will be assessed on a case by case basis. We also recognise that insurance companies can provide effective advice on the appropriate system and installer.

In our response to question 19, we consider the comments in relation to making the guidance more flexible and risk based. We examine the suitability of alternative measures and also describe situations where a departure from the relevant objective may be appropriate. This will take into account smaller sites and those who store very small quantities of waste for a short period of time.

Since October 2013 when the original guidance was published, we have adopted a common approach to assessing FPPs. As a result of the representations made in this consultation and the changes we have made to the guidance, we are providing ongoing training to more of our staff.

Where appropriate, we also consult with others and this includes FRS, local authority, HSE and PHE, when assessing FPPs.

Question 18: Do you agree with the general measures to minimise fire risk?

Of the 161 respondents, 99 (61%) replied to this question and of those; 58 replied 'yes', 29 replied 'no', 12 replied 'don't know' and 88 respondents provided comments (irrespective of whether or not they had answered the question).

Most respondents thought that the measures were generally sensible. Several also commented that in a lot of circumstances not all the 11 potential causes will be relevant to a site, and that this should be made clear in the FPP.

Key themes included installing a fire detection system, where respondents felt that reducing the risk of arson and vandalism or other security measures were more appropriate. However, others felt pleased that it had been recognised that the majority of fires are exacerbated by slow detection. With several people commenting that out of hours cover and fire detection systems are key mitigations.

Respondents noted specific issues with fitting of bucket strips to minimise sparks when machines moved on hard surfaces in so far as they can wear out very quickly.

Another respondent noted that cleaning and maintenance should include removing the build-up of loose waste in and around mobile plant.

Others felt that the risk control measures should be site specific and not one size fits all, with clarity on what is mandatory and was is suggested.

Our response

We agree with the majority of respondents that the general precautions to minimise fire risk are sensible.

In our response to question 19, we consider the comments in relation to making the guidance more flexible and risk based. We examine the suitability of alternative measures and also describe situations where a departure from the relevant objectives may be appropriate. This will take into account smaller sites and those who store very small quantities of waste for a short period of time.

Question 19: Do you agree with the approach indicated above about the acceptable areas for deviation from the minimum standards?

Of the 161 respondents, 104 (65%) replied to this question and of those; 23 replied ‘yes’, 67 replied ‘no’, 14 replied ‘don’t know’ and 96 respondents provided comments (irrespective of whether or not they had answered the question).

One respondent made reference to the S2 exemption, which allows the storage of 450m^3 of WEEE for 6 months and suggested that all requirements should be the same to prevent confusion.

We would agree that whilst the FPP guidance is primarily aimed at permitted sites, we would also recommend the objectives of the guidance to be met by all sites storing combustible wastes, including exempt sites.

Other respondents commented that plans should be site specific to reduce the risk in the immediate vicinity. Pile sizes, separation distances and quarantine areas were common measures where respondents felt that site specific solutions were most appropriate.

We agree that site specific measures may be appropriate and we are proposing to set out a tiered and risk based approach. This tiered approach is:

- if you follow the guidance and meet the standards set out in it your FPP is likely to be approved
- you may propose alternative measures to meet the objectives of the guidance, which are to:
    - minimise the likelihood of a fire occurring

    - aim for a fire to be extinguished within 4 hours
    - minimise the spread of fire within the site and to neighbouring sites
- you may set out a justification why because of the location and lack of impact on any sensitive receptors it is not appropriate to extinguish a fire within 4 hours

Alternative measures

In this section we set out some examples you might consider when proposing alternative measures to those set out in the guidance. Any alternative measures you proposes must meet the 3 objectives of the guidance.

Such alternative measures may include much shorter storage durations to offset larger pile sizes. Where pile size could be an issue then perhaps having an automated suppression system fitted to suitably designed, watertight storage bunker may also be an option. Another option would be think about the dimensions of a pile and offsetting increases in length and width by reducing the height.

Similarly, separation distances could be reduced or replaced by suitably designed fire walls, and increasing the number of outlets for waste could help reduce storage times and to enable the throughput to be managed more expeditiously.

As discussed in question 16, storage in a building presents a series of complexities and additional hazards. Therefore it may be more effective to store higher risk and processed wastes in the open.

The objective is to enable active firefighting to take place such that a fire can be extinguished within 4 hours

In some instances, we also recognise that it may not be necessary to enable a fire to be extinguished within 4 hours if, for example, your site has no sensitive receptors which can be affected during a fire. We believe that in such circumstances, an operator can provide an assessment of why they believe that they do not need to meet the relevant objectives. The basis of the assessment would include an examination of impact on the area around the site, given a series of fire scenarios on the site. This impact assessment is likely to be in the order of 2 to 3km from the site and will be dependent on an explanation of the relationship with topography and other local features.

You will still be required to have a FPP setting out the steps taken to reduce the likelihood or frequency of a fire.

Other matters raised in response to question 19

Other respondents noted that alternative measures and departure from the objectives seem sensible as long as EA officers and the national FPP assessment team apply these in a consistent manner.

We agree and our assessment procedure has been reviewed to accommodate the revisions to the guidance. In addition, during the summer a series of additional training events took place in order to ensure that officers within each area are confident and capable of assessing plans in a consistent and accurate manner.

We also intend to address the comments made in relation to defining the term active firefighting. We agree that it would be wholly inappropriate to expect operators to actively manage anything other than small, localised fires. The intention is that in the majority of cases, where the local FRS are in attendance, that water supplies will be available to assist in active firefighting. However, where appropriate, other methods may also offer an effective solution with the aim of enabling the fire to be extinguished within 4 hours. In all circumstances, we would expect the FRS to supervise safe extinguishment of the fire, where site plant, machinery and personnel may be engaged in a supporting role.

One respondent posed the question - If a fire is not extinguished within 4 hours then who is liable for non-compliance? The permit condition associated with FPPs requires there to be an approved plan and for the site to be operated in accordance with that plan. The plan is designed to enable a fire to be extinguished within 4 hours, but there could be a number of reasons why that does not happen in a particular case. Providing the plan has been complied with it, is unlikely that we would treat a fire burning for longer than 4 hours as a non-compliance. Any enforcement action we take would be in line with our Enforcement and Sanctions Statement and Guidance (https://www.gov.uk/government/publications/environment-agency-enforcement-and-sanctions-statement).

Question 20: Any other comments that respondents wished to make

There were 141 comments made by respondents in response to this question. The common topics included the impact on business, the need for the guidance to be more site specific, proportionate and to take into account certain operational nuances relating to individual waste streams. We consider that these comments have already been considered in our responses to previous questions.

In this section we will focus on the remaining comments from respondents, which have not already been addressed in the previous questions. Our reply is given in response to each of the specific issues.

Comments were received in relation to the legal status and enforceability of the guidance

The guidance is non-statutory and therefore has no direct legal standing. However it is regulatory guidance. We have provided it to assist operators in preparing their FPP. We will use it to assess whether to approve a FPP. Where an operator does not currently have a permit condition requiring a FPP your permit will be reviewed in line with a phased implementation plan, which is described below.

We are in the process of implementing the phased plan to bring all 7,000 permitted sites storing combustible wastes into compliance with the guidance. We are aiming for this to be complete within the next few years. We have started with the sites which we consider pose the most significant risk. We also require an operator to submit a FPP for approval before a new permit can be issued, and in some cases before a permit can be varied or transferred.

We may require an operator to manage their site in compliance with the guidance, and we can take enforcement action to require this even, if when there is no specific FPP condition in the permit.

Should the FPP be a requirement for FRS to regulate and enforce, and mention was also made of the duplication of fire documentation, in order to comply with the requirements of FPP and also Fire Safety Risk Assessments

The 'Cutting Red Tape Review of the waste and recycling sector' (https://www.gov.uk/government/publications/waste-and-recycling-sector-cutting-red-tape-review) highlights the potential overlap or duplication between different regulators in this area and sets the following action for the government to “explore opportunities with business to reduce overlap or duplication with obligations imposed by other organisations such as the Fire and Rescue Service, insurance companies or the Health and Safety Executive". We are currently working to streamline

any regulatory overlap with our colleagues in FRS and HSE. We anticipate this work will be completed by September 2016.

Your local FRS is the enforcing authority for premises that fall under The Regulatory Reform (Fire Safety) Order 2005 (RRO).

This legislation applies to the workplace and places duties on the 'responsible person', normally the employer. There are a number of specific duties, but the overarching obligations of the responsible person are:

- take such general fire precautions as will ensure, so far as is reasonably practicable, the safety of any of his employees
- in relation to relevant persons who are not his employees, take such general fire precautions as may reasonably be required in the circumstances of the case to ensure that the premises are safe

In summary, it is the operator's responsibility to ensure they keep safe its employees and others whilst on its site.

A specific requirement of the RRO is that you carry out a Fire Risk Assessment and produce an Emergency Plan.

Some of the information in your FPP will help you demonstrate that you have met some of the requirements of the RRO and can be included in the Fire Risk Assessment and Emergency Plan. This process can be assisted if you liaise with both us and FRS during the development of your FPP.

The HSE cover specific risks and legislation relating to health, safety and welfare such as Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) and Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR).

In addition, both FRS and HSE have an interest in the WISH forum, which is an association formed of organisations committed to improving health, safety and welfare performance of the waste management and recycling industry.

The approach in FPP guidance should be consistent with WISH guidance

We engage with WISH and have shared with them our revisions to the FPP guidance. However there is an important distinction between regulatory guidance and best practice. In addition, WISH is closely allied to the HSE and FRS and is therefore primarily aimed at ensuring the health and safety of people on site and ensuring that they and the FRS personnel are suitably protected during a fire on site.

We has a different role. We have to protect the environment and people living in local communities. This can include reducing the impact on local infrastructure caused by emissions from a fire.

We believe our guidance should clearly set out the aims and objectives of what needs to be achieved.

The EA needs to consider how to avoid issues or poor management or abandonment when phasing in new requirements

There are several strands of work in progress at the moment which are aimed at addressing poor management. We are currently working with Defra to support the Government on a number of possible proposals.

There is no data provided about the number of significant fires annually in proportion to the number of operating permits, type of waste involved, or the relationships between site fires & OPRA scores

There are between 250 and 300 waste fires at regulated site in England each year and this figure has been reasonably stable for the last 10 years. The majority of these are at permitted sites. Of these 10 to 20 each year are categorised as serious or significant. The categorisation not only takes into account the impact on the local community, environment and infrastructure but also the amount of resources that have been deployed and the corresponding burden on taxpayers.

When we analyse the results of these incidents there is no obvious correlation to Opra scores, so there is no evidence that sites in poor compliance bands (DEFs) are more likely to have fires or that serious or significant fires only occur at sites in poor compliance bands. The waste streams most likely to be involved in fires are mixed wastes and RDF, wood and scrap metals and ELVs. Those waste streams that are most associated with serious or significant fires are wood, tyres and RDF. However, fires occur across all sites dealing with combustible waste and there is no reason to restrict the application of FPPs generally to only specific types of sites. In our revised guidance we do take account of and explain our approach to sites dealing with different types of waste.

The gases and fumes produced by wood piles are carcinogenic, toxic and highly poisonous, yet on a number of occasions I have seen fires that have burned for days causing untold environmental effects and there has been little or no communication during these incidents that recognise their toxicity or hazard

We agree and it is something that we want to help improve. We've all seen media statements which suggest that because the waste is non-hazardous, the smoke must be too, or that it's only smoke. Over the coming months we will be trying to raise awareness through our own communications campaign and media feeds to explain that all smoke is toxic. Inhaling smoke from a waste fire can be harmful to all members of the public especially those that are in the most vulnerable groups. Vulnerable groups include children, pregnant women, the elderly, and those with existing heart, lung and respiratory problems or are immuno-compromised.

Sheltering indoors during a fire is a necessity, and through improving fire prevention and management we can significantly reduce the impact of waste fires on our local communities.

4. Next steps

Responses from this consultation have been used to inform the latest version of the fire prevention plan guidance (FPP v3), which was published on GOV.UK on 31 July 2016.

Individuals who wish to follow up their responses, or points made within this document, in more detail are welcome to contact us:

Environment Agency

Horizon House

Deanery Road

Bristol

BS1 5AH

email enquiries@environment-agency.gov.uk

5. Appendices

1. Review of Environment Agency Fire Prevention Plan, BRE Global Ltd, August 2016

This document can be found at https://www.gov.uk/government/consultations/fire-prevention-plan-review.

2. Summary of Environment Agency Incident data 2012 to 2016

The following data summarises data taken from our National Incident Recording System and other records produced during or following a waste fire.

Date	Waste type	Quantity or volume of waste	Duration (hours)	Firefighting tactics
28/09/2012	Wood	25,000 tonnes	336	Active firefighting
11/11/2012	Wood chip	20,000 tonnes	>120	Controlled burn
30/11/2012	Compost and wood waste	1684m^3	4824 (201 days)	Active firefighting, then controlled burn, then active firefighting
11/01/2013	Household	30m^3	4	Active firefighting
02/02/2013	Household	15m^3	3	Active firefighting
14/02/2013	Wood	300m^3	8	Active firefighting
18/03/2013	Mixed waste	1,200 tonnes	177	Active firefighting
03/04/2013	Household	30m^3	2	Active firefighting
22/05/2013	Mixed waste	1,200 tonnes	12	Active firefighting
23/05/2013	End of life vehicles	10 vehicles	2	Active firefighting
09/06/2013	Household	30m^3	<1	Active firefighting
16/06/2013	Refuse dervied fuel (baled), plastic and cardboard	4,930 tonnes	1224 (51 days)	Controlled burn then active firefighting
27/06/2013	Mixed waste	50 tonnes	9.5	Active firefighting
07/07/2013	Mixed recycling & WEEE	1,200m^3	34	Active firefighting
11/07/2013	End of life vehicles	30m^2	6	Active firefighting
16/07/2013	Mixed waste	50 tonnes	<2	Active firefighting
09/08/2013	Mixed waste	100 tonnes	<24	Active firefighting
23/08/2013	Household	30m^3	<1	Active firefighting
24/08/2013	Household	30m^3	<4	Active firefighting

03/09/2013	Mixed waste	50 tonnes	12	Active firefighting
03/09/2013	Mixed waste	15 tonnes	2	Active firefighting
25/09/2013	Mixed waste	4,500m^3	30	Active firefighting
25/09/2013	Mixed recycling	300 tonnes	10	Controlled burn
23/10/2013	Tyres	150 bales	96	Controlled burn
01/11/2013	Metal	750 tonnes	> 17	Active firefighting
03/11/2013	Framentiser fluff	5,000 tonnes	9	Active firefighting
10/11/2013	Compost	200 tonnes	5	Active firefighting
11/11/2013	End of life vehicles	10 vehicles	2	Active firefighting
15/11/2013	Mixed waste	1,000 tonnes	13	Active firefighting
27/11/2013	Wood, mixed plastics, refuse derived fuel	750 tonnes	>168	Controlled burn
04/12/2013	Metal and plastic	10 tonnes	10	Controlled burn
10/01/2014	Household	30m^3	1	Active firefighting
14/01/2014	Commercial	100 tonnes	4	Active firefighting
16/01/2014	Tyres	15,000 tonnes	>2000 (>13 weeks)	Controlled burn
19/01/2014	Mixed waste	30m^3	3	Active firefighting
23/02/2014	Mixed waste & plastics	3,000m^2	>7	Controlled burn
25/03/2014	Household	30m^3	<1	Active firefighting
03/04/2014	Household	30m^3	1.5	Active firefighting
14/04/2014	Household	30m^3	3	Active firefighting
14/04/2014	Paper	20,000 tonnes	3.5	Active firefighting
28/04/2014	Metal	30m^3	2	Active firefighting
06/05/2014	Mixed waste	Several thousand tonnes	48	Controlled burn
10/05/2014	Mixed waste	600 tonnes	>6	Active firefighting

16/05/2014	Tyres	400 tyres	15	Active firefighting
18/05/2014	Metal	300 tonnes	7	Active firefighting
20/05/2014	Household	30m^3	1	Active firefighting
21/05/2014	Green waste	30m^3	<1	Active firefighting
02/06/2014	Wood	7,000 tonnes	336	Active firefighting
05/06/2014	Wood	100 tonnes	3	Active firefighting
09/06/2014	Household	615m^3	34	Active firefighting
20/06/2014	Metal	150m^3	11	Controlled burn
21/06/2014	Metal	750 tonnes	24	Active firefighting
03/07/2014	Metal, plastic and wood	300m^2	5.5	Active firefighting
10/07/2014	Cardboard	220 tonnes	6.5	Active firefighting
15/07/2014	Mixed waste	800m^3	36	Active firefighting
16/07/2014	Metal	1m^3	2.5	Active firefighting
21/07/2014	Mixed waste	>8,500 m^3	1344 (56 days)	Controlled burn
27/07/2014	Wood chip	500 tonnes	5	Active firefighting
31/07/2014	Mixed waste	400m^3	2	Active firefighting
04/08/2014	Refuse derived fuel	2,000 tonnes	120	Active firefighting
06/08/2014	Metal	1,250m^2	2	Active firefighting
11/08/2014	Mixed waste	10 tonnes	4	Active firefighting
13/08/2014	Mixed waste	60 tonnes	1	Active firefighting
18/08/2014	Wood	500 tonnes	204	Controlled burn
06/09/2014	Mixed household, commercial and industrial	80 tonnes	6	Active firefighting
09/09/2014	compost	1,000 tonnes	> 48	Active firefighting
20/09/2014	Mixed waste	30m^3	1.5	Active firefighting
30/09/2014	Compost oversize	6,000 tonnes	>7	Active firefighting

05/10/2014	End of life vehicles	5,000 tonnes	9	Active firefighting
06/10/2014	Wood chip	200 tonnes	2	Active firefighting
12/10/2014	Mixed waste	200m^3	2.5	Active firefighting
25/10/2014	Wood chip	20 tonnes	2.5	Active firefighting
06/11/2014	Mixed waste	10 tonnes	2	Active firefighting
06/11/2014	Mixed waste	100 tonnes	4	Active firefighting
06/11/2014	Green waste and wood	600m^3	> 24	Controlled burn
07/11/2014	Mixed waste	3,000 tonnes	6	Active firefighting
07/11/2014	Green waste	100 tonnes	>14	Active firefighting
13/11/2014	Wood	30,000 tonnes	672	Controlled burn
18/11/2014	Mixed waste	1,000m^3	36	Active firefighting
06/12/2014	Mixed waste	200 tonnes	96	Controlled burn
06/12/2014	Compost and compost oversize	>300 tonnes	168	Active firefighting followed by controlled burn
20/12/2014	Refuse derived fuel, trommel fines and mixed waste	1,950 tonnes	72	Active firefighting
25/12/2014	Mixed waste	19m^3	3.5	Active firefighting
30/12/2014	Household	615m^3	6	Active firefighting
07/01/2015	Wood chip	2,400m^3	120	Suffocated with soil
14/01/2015	Wood chip	40,000m^3	120	Active firefighting
24/01/2015	Batteries	6m^3	16	Active firefighting
14/02/2015	Mixed waste	400 tonnes	10	Active firefighting
10/03/2015	Metal and household waste	100 tonnes	1.5	Active firefighting
10/03/2015	Mixed waste	40m^3	1	Active firefighting

19/03/2015	End of life vehicles	100 vehicles	2	Active firefighting
29/03/2015	End of life vehicles	90 vehicles	7	Active firefighting
31/03/2015	compost	800 tonnes	72	Active firefighting
04/04/2015	mixed waste	300 tonnes	12	Active firefighting
07/04/2015	Mixed waste	500m^3	5	Active firefighting
09/04/2015	End of life vehicles	2,000 tonnes	17.5	Active firefighting
11/04/2015	End of life vehicles	61 vehicles	9	Active firefighting
12/04/2015	compost	5,000 tonnes	192	Controlled burn
13/04/2015	Metal	1,000 tonnes	9	Active firefighting
15/04/2015	Wood	10 tonnes	1	Active firefighting
17/04/2015	Plastic	200m^3	2.5	Active firefighting
27/04/2015	Mixed waste	500 tonnes	24	Active firefighting
27/04/2015	Metal	120 tonnes	5.5	Active firefighting
29/05/2015	WEEE (small appliances)	30m^3	6	Active firefighting
31/05/2015	Mixed fines	>6,200 tonnes	1344	Controlled burn
16/06/2015	End of life vehicles and tyres	200m^3	3	Active firefighting
17/06/2015	Mixed waste	200 tonnes	10	Active firefighting
27/06/2015	Mixed waste	2,000 tonnes	43	Active firefighting
01/07/2015	Wood chip	196m^3	5	Active firefighting
02/07/2015	Trommel fines	575m^3	28	Active firefighting
03/07/2015	Tyres	60 tonnes	120	Active firefighting
07/07/2015	Refuse derived fuel	4,000m^3	336	Active firefighting
18/07/2015	Paper, card, plastics	500m^3	312	Active firefighting (including demolition of building)

21/07/2015	Metal	1,000m^3	> 4	Active firefighting
23/07/2015	Mixed wastes, carpet, wood	2,000m^3	~24	Active firefighting
05/08/2015	End of life vehicles	25 vehicles	3.45	Active firefighting
11/08/2015	Wood	20 tonnes	12	Active firefighting
03/09/2015	Mixed waste	7,500m^3	< 4	Active firefighting
13/09/2015	End of life vehicles	50 vehicles	<6	Active firefighting
27/09/2015	Wood and mixed waste	20 tonnes	6	Active firefighting
17/10/2015	Wood	1,600 tonnes	120	Active firefighting
18/10/2015	Metal	7,200m^3	19	Active firefighting
20/10/2015	Tyres and end of life vehicles	2 tonnes of tyres and 10 vehicles	<4	Active firefighting
06/11/2015	Green waste and wood	>2,400m^3	48	Controlled burn
07/11/2015	Mixed waste	80 tonnes	17	Active firefighting
18/11/2015	Compost and compost oversize	400 tonnes	216	Controlled burn
04/12/2015	Refuse derived fuel (loose)	600 tonnes	72	Controlled burn
05/12/2015	Compost	10 tonnes	6	Active firefighting
07/12/2015	Wood	100m^3	1.5	Active firefighting
22/12/2015	End of life vehicles	200 vehicles	24	Active firefighting then controlled burn
23/12/2015	Mixed waste	8 tonnes	< 2	Active firefighting
26/12/2015	Mixed waste	200 tonnes	>12	Active firefighting
18/01/2016	Wood and small amount of plastic	400 tonnes	120	Controlled burn
20/01/2016	Mixed waste	<1 ton	< 2	Active firefighting
31/01/2016	Mixed waste	20m^3	1.5	Active firefighting
05/02/2016	Mixed waste	2,500m^3	21	Active firefighting

06/02/2016	Metal	2,500m^3	18	Active firefighting
17/03/2016	Metal	30m^3	1	Active firefighting
26/03/2016	Mattresses and mixed waste	2,000m^3	20	Active firefighting
28/03/2016	Mixed waste	385m^3	3	Active firefighting
29/03/2016	Metal, mixed plastics, rubber, framentiser fluff	800 tonnes	96	Active firefighting
31/03/2016	Metal	3,000m^3	32	Active firefighting
09/04/2016	WEEE and metal	30,000 tonnes	>12	Active firefighting
16/04/2016	Plastic	10,000m^3	672	Controlled burn
17/04/2016	End of life vehicles	30 vehicles	1.5	Active firefighting
27/04/2016	Mixed waste	200 tonnes	20	Active firefighting
09/05/2016	End of life vehicles	120 vehicles	4	Active firefighting
16/05/2016	Wood	Several thousand tonnes	>48	Active firefighting then controlled burn
19/05/2016	Mixed household, commercial and industrial	3,000m^3	~7	Active firefighting
05/06/2016	Household	<1 ton	<1`	Active firefighting
05/06/2016	Mixed household, commercial and industrial	200m^3	3	Active firefighting
21/08/2016	Refuse derived fuel	Several thousand tonnes	960	Controlled burn

Would you like to find out more about us or about your environment?

Then call us on
03708 506 506 (Monday to Friday, 8am to 6pm)

email
enquiries@environment-agency.gov.uk

or visit our website
www.gov.uk/environment-agency

incident hotline 0800 807060 (24 hours)
floodline 0345 988 1188 (24 hours)

Find out about call charges: www.gov.uk/call-charges

Environment first: Are you viewing this on screen? Please consider the environment and only print if absolutely necessary. If you are reading a paper copy, please don't forget to reuse and recycle if possible.

LIT 10504