

Specific Fire Risk Assessment

(Desk Top Review)

**Regulatory Reform
(Fire Safety) Order 2005**

Wood Gasification Plant

**Barry Wood Gasification Plant
Biomass UK No.2 Ltd,
Woodham Road,
Barry**

Client- Barry Town Council

**C/o CAPITA
65 Gresham Street
London EC2V 7NQ**

General Details

Report Date

22 May 2017

Prepared By:

GORDON ROLFE

Competent Person



Technical Qualifications:

Fellow of Institution of Fire Engineers.

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A handwritten signature in black ink, appearing to read 'G. Rolfe'.

Signature

Date assessment Issued

31 May 2017

1.0 Property Details

2.0 Scope of Report

3.0 Assessment of Fire Risk

4.0 The Report

5.0 Recommendations



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Section 1 – Property Details

Section 1 – Property Details

Definitions	
Competent Person	A person with specific training, Knowledge and experience to enable him or her to carry out a Fire Risk Assessment in accordance with the requirements of the Regulatory Reform (Fire Safety) Order 2005.
Responsible Person	The person who has control of the premises or is responsible for the management of the premises or the person responsible for a tenants demised area.

Client	Barry Town Council
Address of Property	Barry Wood Gasification Plant, Biomass UK No.2 Ltd, Woodham Road, Barry
Commissioning Officer	Name: Emily Forbes SILCM, Chief Officer (Town Clerk) Contact telephone Number: 01446 704926 Email: emilyforbes@barrytowncouncil.gov.uk
Risk Category (<i>refer to Section 4 of this report</i>)	High This report has been commissioned by Barry Town Council, as an independent Fire Risk Assessment via a desktop review of two submitted documents. The author understands that the Council has no involvement in terms of ownership, operations or financial controls on the site. This fire risk assessment has been made on an inspection of documentation supplied and research documents. An inspection of the site has not been made; the site was in construction stage.

Additional Information	
Item	Comments
Address/site	The site is bounded by Woodham Road and David Davies Road, from the plans submitted access appears to be via David Davies Road.
Documentation supplied	<ol style="list-style-type: none"> 1) Fire Prevention Plan, DOC REF: BUK-E10 (prepared by Sol Environment Ltd dated October 2016). 2) Barry Wood Gasification Facility Permit Application Review, (prepared by Capita, dated April 2017).
Bibliography	<ol style="list-style-type: none"> 1) Health and safety in biomass systems, Design and operation guide; Combustion Engineering Association, 2011. 2) Fire prevention and mitigation plan guidance- waste (Natural Resources Wales: Version 1, May 2016).
Brief Description of property	<p>The Advanced Thermal Treatment (ATT) plant is designed to process shredded mixed waste wood feed-stocks to produce heat to raise steam in a conventional tube boiler for utilisation in a steam turbine for the production of renewable electricity with an export capacity of up to 10MWe.</p> <p>The installation has been designed to process approximately 86,400 tonnes of non-hazardous mixed waste wood per annum.</p>

Additional Information	
Item	Comments
<p>Outline of the key design features of the site (from submitted documents)</p>	<ul style="list-style-type: none"> • Internal fire barriers separating fire areas on site will be a minimum of 2 hours fire resisting rating(FRR), including fire rating any sealing of penetrations; • An automatic fire detection and alarm system will be installed • An automatic sprinkler system will be installed; • An automatic suppression system will be installed; • A suitable number of manual break-glass call points will be installed; • Appropriate first aid fire-fighting equipment will be provided throughout the site; • Planning inspection, maintenance and testing procedures will be established and used to ensure that all fire protection systems can be operated effectively. A component person will regularly test and inspect all fire safety equipment, installations and systems; and • Fire extinguishers throughout the plant and in the control and electrical room areas • The site is secured, fitted with perimeter fencing; • The site is manned at all times; • All mixed wood waste will be stored within the enclosed waste storage building; • All waste storage on site is in accordance with the requirements of TGN 7.01; (since superseded by <i>Fire prevention and mitigation plan guidance- waste (Natural Resources Wales: Version 1, May 2016)</i>). • All main buildings, roadways and externals areas are constructed of impermeable hardstanding; • Site is installed with a sealed drainage system that can be isolated to prevent all releases to controlled water; • The design of the site drainage system allows the recycling of fire water from the site.

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Section 2 – Scope of Report

Section 3 – Scope of Report

Capita Real Estate Consultancy have been instructed to undertake a desktop **Fire Risk Assessment** of the facilities and activities at **Barry Wood Gasification Plant, Biomass UK No.2 Ltd, Woodham Road, Barry**, on behalf of Barry Town Council.

The Regulatory Reform (Fire Safety) Order 2005, imposes a statutory duty on employers to provide reasonable fire safety for all personnel who work within the building or have reason to be within the building, for example contractors, visitors and members of the public.

Employees also have a statutory duty to take care of themselves and others who may be affected by their acts or omissions.

Regardless of whether the assessment is carried out by, for example, staff of an organisation, or by a third-part fire risk assessor, the ultimate responsibility for the adequacy of the assessment rests with the duty holder, namely the person defined as the “Responsible Person” who will be responsible for ensuring that the assessment is carried out, that the fire precautions are adequate and that any recommendations as a result are actioned in the prescribed timescales.

The assessment will prioritise any preventative and protective measures that are deemed necessary to ensure that all fire hazards are reduced to an acceptable level. It will also ensure that the emergency egress from the building is appropriate and available and will make the necessary recommendations to ensure means of escape routes meet the required standards.

The assessment and its periodic review, is a form of underpinning for continued adequacy of fire precautions on an ongoing basis, after compliance with Building Regulations. It is, therefore, essential that assessments are only carried out by a “Competent Person”.

Legal liability may arise on the part of the “Responsible Person” and the fire risk assessor if an assessment is not suitable and sufficient. Large buildings or complex premises will require the assessor to have a high level of knowledge and experience to undertake the assessment and evidence of specialist training and experience, or membership of a professional body, can enable competence to be demonstrated.

The responsible person will ensure that the preventative and protective measures with which the premises is provided are maintained, and that staff are given suitable and sufficient information, instruction and training regarding the hazards identified in their workplace.

The assessment must consider potential fire risks, fire detection, means of escape, fire-fighting equipment, emergency procedures, staff training, the maintenance of fire safety measures and equipment and the risks to people in and around the premises.

This specific duty builds on the general requirements of the Health & Safety at Work Act 1974 to reduce all risks to a reasonably practical level and not unduly expose persons to hazards.

This report seeks to ensure compliance with the Regulatory Reform (Fire Safety) Order 2005, in that the risks to health & safety generated by fire have now been assessed.

Contained in Section 5 are detailed recommendations for items identified as presenting a risk to health & safety from fire.

Section 2- Scope of Report

The recommendations are intended to provide safety from fire by promoting safe aspects of design, construction and management in the following areas:

- Planning and protection of escape routes from any area that may be threatened by fire
- Construction and finishing with suitable materials and embodying fire resistance in the structure
- Segregation of high fire risk/hazard areas
- Fire warning systems and, where appropriate, systems for the automatic detection of fire
- Automatic fire extinguishing systems to limit the growth of fire
- Smoke control measures to maintain the effectiveness of escape routes and to assist fire fighters
- The provision of fire - fighting equipment, whether for use by staff in containing fire in its early stages, or by way of assistance to the fire service
- The provision of reasonable access to the building for the fire service, including facilities for the safe and rapid extinction of fire by the fire service
- Effective management control systems
- The identification of people at risk from fire in or around the premises

It is not possible to make comprehensive recommendations capable of covering every possible risk and an intelligent appreciation of the principles and application of the recommendations of this report is therefore essential.

The fire hazard of a particular type of building and its contents, and the kinds of occupants together with their likely state of awareness and/or distraction, will have a significant bearing on the effectiveness of any fire safety recommendations.

The assessment, observations and recommendations are pertinent to the conditions observed at the time of the inspection.

This assessment should be periodically reviewed by a "Competent Person" to ensure that it is suitable and sufficient and reflects the current fire safety status of the property.

An additional review of this assessment should also be conducted if any of the following occur within the annual review period:

- Alterations are made to the building, including its internal layout
- There are substantial changes made to furniture & fittings, as these may affect escape routes and travel distances
- There are changes to work processes or the way that you organise them, including the introduction of new equipment
- A failure occurs in the fire precautions or fire systems, e.g. fire alarm, detection or sprinklers
- A significant increase in numbers within the building
- The employment of people with some form of disability

The primary aim of the Regulatory Reform (Fire Safety) Order 2005 is to ensure that the "Responsible Person" i.e. owner, occupier, manager or employer adopt a risk assessment approach to Fire Safety.

Section 2- Scope of Report

The Risk Assessment should be proactive and address the following main areas:

- a) **Identify hazards and assess risks** - The inspection carried out on 22 May 2017, and the contents of this report mean that you have now complied with this requirement.
- b) **Formulate and implement control measures to minimise risks** - Procedures covering the areas detailed within this report, e.g. Emergency procedures must be set down as part of the safety procedures for the premises.
- c) **Inform, instruct and train personnel** - All staff must be trained in how to apply the emergency procedures.
- d) **Monitor conditions to ensure that the fire safety measures are being correctly implemented and maintained** - Having implemented the recommendations contained within this report a system of in house regular reassessment should be established in order to ensure continuing compliance. In addition the Risk Assessment should be reviewed annually.
- e) **Notification of changes** - Owners, occupiers, managers or employers should commission a reassessment immediately if there is a significant change which could affect the fire safety precautions as detailed in the original Fire Risk Assessment.

Section 5 of this report details the hazards, which were identified during the desktop review along with the recommendations to reduce the probability, severity and resulting harm of a fire.

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Section 3 – Assessment of Fire Risk

Section 3- Assessment of Fire Risk

As part of the overall risk assessment of the building it should be given a fire risk category, i.e. High, Medium or Low Risk premises. The category of fire risk for any building is determined by the combination of the likelihood of fire and the likely consequences of fire, using a matrix:

Likelihood of Fire Due to Ignition Sources	Potential Consequences		
	Slight Harm ⁴	Moderate Harm ⁵	Extreme Harm ⁶
Negligible ¹	Low	Low	Medium
Possible ²	Low	Medium	High
Possible & a lack of adequate controls ³	Medium	High	High

Taking into account the fire prevention measures observed at the time of this risk assessment, it is considered that the hazard from fire (likelihood of fire) at these premises is:

Negligible		Possible	✓	Possible/lack of adequate controls	
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In this context, a definition of the above terms is as follows:

¹Negligible: Unusually low likelihood of fire as a result of negligible potential sources of ignition.

²Possible: normal fire hazards (e.g. potential ignition sources) for this type of occupancy, with fire hazards generally subject to appropriate controls (other than minor shortcomings).

³Possible & a lack of adequate controls: Lack of adequate controls applied to one or more significant fire hazards, such as to result in significant increase in likelihood of fire.

Taking into account the nature of the building and the occupants, as well as the fire protection and management arrangements observed at the time of this assessment, it is considered that the consequences for fire safety in the event of fire would be:

Slight Harm		Moderate Harm		Extreme Harm	✓
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In this context, a definition of the above terms is as follows:

⁴Slight harm: Outbreak of fire unlikely to result in serious injury or death of any occupant (other than an occupant sleeping in a room in which a fire occurs).

⁵Moderate harm: Outbreak of fire could foreseeable result in injury (including serious injury) of one or more occupants, but it is unlikely to involve multiple fatalities.

⁶Extreme harm: Significant potential for serious injury or death of one or more occupants.

Section 3- Assessment of Fire Risk

The risk assessment of the property revealed that the likelihood of a fire due to ignition sources in the building was **possible** and that the potential consequences could cause **moderate harm** to the occupants, therefore taking into account the fire safety features observed at the time of the assessment Inspection, and using the above criteria's the property has been given the following Risk Category:

Low ⁷		Medium ⁸		High ⁹	✓
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⁷Low Risk

- Where there is minimal risk to people's lives and where the risk of fire occurring is low or the potential for fire, heat and smoke spreading is negligible.

⁸Medium Risk

- Where the outbreak of fire is likely to remain confined or only spread slowly, allowing people to escape to a place of safety.
- Where the number of people present is small and the layout of the workplace means they are likely to be able to escape to a place of safety without assistance.
- Where the workplace has an effective automatic warning system, or an effective automatic fire extinguishing, suppression or containment system, which may reduce the risk classification from high.

⁹High Risk

- Where highly flammable or explosive materials are stored or used (other than in small quantities).
- Where unsatisfactory structural features are present.
- Where permanent or temporary work activities are carried out which have the potential for fires to start and spread.
- Where there is significant risk to life in case of fire.

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Section 4 – The Report

Section 4 – The Report

This report has been commissioned by Barry Town Council, as an independent Fire Risk Assessment. The author understands that the Council has no involvement in terms of ownership, operations or financial controls on the site.

This fire risk assessment has been made on an inspection of documentation supplied and research documents. An inspection of the site has not been made; the site was in construction stage.

This report is made with reference to:-

- 1) Fire Prevention Plan,(FPP) ;DOC REF: BUK-E10 (prepared by Sol Environment Ltd dated October 2016

and

- 2) Barry Wood Gasification Facility Permit Application Review, (prepared by Capita, dated April 2017).

Waste wood management (Source of Fuel)

The ATT plant is expected to receive a *maximum permitted throughput of the site, a maximum (average) of 250 tonnes of mixed waste wood can be accepted onto site per day (assuming deliveries will take place on a 5 days per week basis).*

This assumption falls short of the stated throughput of 86400 tonnes per annum (pg 2 of the FPP).

*Note 253 working days (less weekends and bank holidays) at 250 tonnes per day will leave a shortfall of 2315 tonnes or **10 extra days of delivery** at 250 tonnes per day.*

The waste wood will be received shredded, baled and bagged, with a moisture content of 20%. The waste will be stored within a building, in a maximum pile volume of 2000m³. With an expectation that the plant can consume 86400 tonnes pa, the average use rate is 236 tonnes per day.

The waste wood storage building will be fitted with an automatic fire detection system and fire alarm. The type of detection system is not specified. The waste wood storage building will be fitted with an automatic sprinkler system, the Hazard rating is not specified in the provided documentation.

The EPP and permit review do not state how the waste is moved around site, the presumption is that this is via mechanical bucket loaders and not via blowers/ conveyors or augers.

Wetter fuels (20% moisture rate stated) reduce the risk of dust explosions, however there is a greater risk of anaerobic digestion during storage, with emissions of Carbon Dioxide (CO₂) and Carbon Monoxide (CO). There should be CO and CO₂ monitoring devices within enclosed storage areas.

Note the only reported fatality associated with a biomass system in the British Isles was due to CO build up and asphyxiation in a fuel store. Reference Health and safety in biomass systems, Design and operation guide; Combustion Engineering Association, 2011, (Section 3.2.)

Waste wood arriving on site should be monitored for moisture content and temperature (The previous history and age of the stock is an unknown liability). Stock should be rotated so that the average time on site is 1 month with a maximum of 3 months. Materials are at greater risk of self-combustion if stored for more than 3 months. All piles will be turned regularly to ensure that the anaerobic conditions are avoided and localised warming is dissipated quickly.

No hot loads of waste are to be delivered or processed at the site.

Section 4 – The Report

As the waste is stored within a building there is not a requirement to meet pile size and separation distance standards. *Reference Fire prevention and mitigation plan guidance- waste (Natural Resources Wales: Version 1, May 2016).*

There must be a clear height of 6m between the top of any waste and the ceiling lighting. Waste height indicators must be fitted.

Waste materials must be kept 3m below the level of the sprinklers/automatic suppression sprays.

Housekeeping around the site must be carried out on a regular basis to prevent the build-up of loose waste, dust and paper. All flammable materials such as oils, greases, fuels paints etc are always correctly stored and put back into store after use.

Fire Strategy

The following fire-fighting strategy will be carried out on site:

- Call the Fire and Rescue Service immediately;
- Raise the alarm, initiate evacuation of people on site and ensure all staff and visitors are accounted for;
- Attack the fire if it is safe to do so using the fire extinguishers on site;
- Ensure operators of appropriate machinery are in a safe location to help create fire breaks, under the direction of the Fire and Rescue Service when they arrive;
- Appoint a clearly identified person to liaise with the emergency services on site. They should identify themselves to the Fire and Rescue Service, as soon as the Fire and Rescue Service arrives on site; and
- Ensure access routes are clear.

When the fire has been successfully dealt with then:

- All combusted or partially combusted material will be removed using appropriate and lawful disposal;
- The plant will be safely re-commissioned;
- The cause of the fire will be investigated to ensure that it does not reoccur;
- The sites accident management plan and management system documents will be reviewed and improved where necessary;
- Training requirements for site personnel will be reviewed; and
- It will be assessed what further fire reduction measures are required and any new measures and procedures will be implemented.

Sources of Ignition/ Lightning Protection/ Smoking

All electrical installations must be certified to NICEIC standards. All portable electrical equipment must be PAT tested on a regular basis.

Where explosive atmospheres may be present the electrical installation must comply with BS EN 60079-17:2014.

Lightening protection and cross bonding should include surge protection devices.

Section 4 – The Report

Biomass UK will operate a no smoking policy in all areas of the site, with the exception of suitable designated smoking areas (specifically located externally and situated away from combustible materials).

The designated smoking area will be signposted and supplied with a sand bucket or similar for discarded smoking materials.

It is recommended that the designated smoking area is fitted with an electronic cigarette lighter (<http://ciglow.co.uk/> or similar product).

Staff should be encouraged to leave all ignition devices in their locker in the welfare area. Visitors to site should quarantine ignition devices with in their vehicles.

Bucket loaders used for moving the bales of waste wood around the site must be fitted with appropriate rubber strips to prevent sparks when the bucket comes into contact with hard-standing. The strips must be regularly inspected and replaced if necessary.

All site vehicles will be fitted with fire extinguishers and dust filters.

Undetected fires may smoulder and form long after the processing plant and equipment has been shut down / turned off. Therefore, in the event of a formal plant “shut-down” procedures will be carried out including inspection of the site after work has ceased to reduce the risk of a smoulder being undetected and turning into a fire.

The procedure will address issues such as:

- Over-run of conveyors to ensure that they are as clear of waste as practical;
- Clearance of waste which may have accumulated under equipment;
- Ensuring that any flammable materials such as fuels have been secured;
- A fire watch at least two (2) hours after the end of operations;
- Spread out any waste loads awaiting processing or in reception to ensure that there are no undetected hot items or other materials which could start a fire;
- Check that mobile plant has been moved to a safe distance;
- Check that fire detection systems have been activated;
- Check that security systems have been activated and that gates etc are secure.

Hot work, the following procedures will be carried out when ‘hot work’ (i.e. maintenance / repair) is being carried out on site:

- All staff and contractors will be required to operate under strict ‘*Permit to Work*’ systems and follow safe working practices when undertaking any hot working such as welding and cutting;
- Fire extinguishers will be provided at the scene of any hot work so that they can be used immediately should a fire occur. The extinguishers will be stationed adjacent to the pathway of escape from the work area and not in a place where staff using them could be trapped by fire;
- Any hot work in areas where wastes or other combustible materials are present, a 6m ‘safe’ area will be cleared and all work will be designated as a two-person job: One person doing the hot work and a second acting as a fire watch;
- As far as practical, wastes will be cleared away from the area of any hot work before hot work starts;
- Potentially combustible materials, including mobile plant hydraulic lines, will be covered by a fire blanket and/or damped down with water as appropriate before hot work starts; and
- A fire watch will be conducted at the scene of any hot work at least two (2) hours after hot work has finished as sparks from hot work can smoulder for a significant time period.

Section 4 – The Report

Fire Detection and fire suppression.

The Biomass UK site will be manned at all times with all areas will be inspected on a daily basis to ensure that housekeeping is maintained to a high level and in accordance to NRW Guidance.

All wood waste piles will be inspected to ensure that the sealed bales are maintained in suitable condition.

The site is equipped with automatic fire detection and alarm system, an automatic sprinkler system and an automatic suppression system.

In order to detect and tackle the fire as quickly as possible, portable extinguishers and firehoses are also provided throughout the site to supplement the automated sprinkler systems.

The site is equipped with fire response system with emergency standby water bowsers/fire Tenders.

The site operators and maintenance personnel will carry out regular and programmed inspections in all areas as part of the scheduled maintenance programme and pre-shift inspections.

The site is fitted with CCTV as an additional security and fire control.

The risk of CO poisoning is always present with in a biomass system as the flue gases generally contain higher concentrations than gas oil. Hence the requirement in Building Regulations AD J, 2010 to install a CO monitor in the same room as all solid fuel appliances.

It is recommended that 'Coldfire' (www.hydronavitas.com) is added to all water suppression systems (the %dose rate of Coldfire will be calculated by hydronavitas) This is an environmental friendly wetting agent additive that will significantly reduce the impact of a fire on the site.

Water Supplies and drainage

The basic design features of the site include the following:

- Sealed Drainage Systems: The entire site has been designed such that all water can be contained and retained on site. This design promotes the reuse and recycling of firewater;
- Sealed Site with no uncontrolled surface water drains;
- Segregated waste storage location to minimise the potential for the spread of fires;
- Impermeable floors and roadways;
- Automated fire detection systems and sprinklers.

The above design measures enables the following fire control strategy to be adopted:

- Extinguishing of fires at source through the use of fire hoses, emergency services and fire sprinkler systems;
- Total capture and reuse reducing the amount of firewater run-off generated and protection of controlled water;
- Application of water to cool unburned material and other hazards;
- Separation of unburned material from the fire using sites mobile plant and mechanical shovels;

Section 4 – The Report

- Separation of burning material from the fire to quench it with hoses. In addition the site is supplied with fire hydrant / mains supplies.

The supplied reports do not specify the water supplies held on site. *'A 300m³ of combustible material will normally require a water supply of at least 2000litres a minute for a minimum of 3 hours'* Fire prevention and mitigation plan guidance- waste (Natural Resources Wales: Version 1, May 2016).

The site does not have any surface water drains within the storage or building areas. All of the site drains have the ability to be isolated in the event of an emergency for the purposes of preventing any off site release of fire water or contamination. The following has been designed in the event of a fire:

- An actuated penstock to isolate the surface water drainage system in the event of a fire;
- All fire water will enter the drainage system and overflow into the attenuation tank;
- The fire water will be tested to allow discharge to the surface water connection point;
- If not suitable, all fire water is to be pumped and tankered away to a suitable water treatment facility.

All site surface water drainage systems are ultimately connected to the surface water drainage system and equipped with shut off valves to ensure the site can be isolated in the event of a major fire / incident.

The reports do not specify the capacity/ volume of the drainage system and overflow into the attenuation tank.

Fire Safety Management

All fire safety equipment must be tested and serviced in accordance with the relevant British Standard to the equipment. Records must be kept on site, either in a log book or electronically.

Housekeeping will be included in the routine site inspections and the site will be kept as free from loose/discarded combustible wastes and dusts as practical.

The perimeter fence will be inspected periodically to ensure that the site security has not been compromised.

The gatehouse, controlling the sole access point to the installation, will be manned on a 24- hour basis at all times. CCTV is installed to monitor the external and internal areas of the Installation. This will minimise the risk of vandalism and arson. Thermal cameras will also be fitted in the exterior yard areas to remotely detect thermal activity / fire.

The site operators and maintenance personnel will carry out regular and programmed inspections in all areas as part of the scheduled maintenance programme and pre-shift inspections.

Training and Emergency Planning

The Fire Prevention Plan (prepared by Sol Environment Ltd dated October 2016) will form the basis for the Emergency Procedure Plan. It is noted that several appendices are missing. A designated assembly point must be nominated.

The site manager and fire wardens must receive appropriate training to their roles. Regular staff training and fire drills will need to be organised with the plant employees.

All visitors, contractors and drivers using the site will be required to undergo a safety induction and be made aware of the correct safety and fire prevention procedures to follow whilst on site.

Section 4 – The Report

Means of Escape

The author of this report is unable to comment on the Means of Escape as detailed plans were not available, nor was a site visit available.

Fire Safety Signage

The author of this report is unable to comment on the Fire Safety Signage as detailed plans were not available, nor was a site visit available.

Emergency Lighting

The author of this report is unable to comment on the Emergency Lighting as detailed plans were not available, nor was a site visit available.

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Section 5 – Recommendations

The following recommendations are made on the premise that the auditor has compiled the report following a review of the two documents supplied by Barry Town Council.

- 1) Fire Prevention Plan, DOC REF: BUK-E10 (prepared by Sol Environment Ltd dated October 2016).
 - 2) Barry Wood Gasification Facility Permit Application Review, (prepared by Capita, dated April 2017).
- Waste wood arriving on site should be monitored for moisture content and temperature (The previous history and age of the stock is an unknown liability).
 - There should be CO and CO2 monitoring devices within enclosed storage areas. What arrangements have been made for CO & CO2 monitoring?
 - It is recommended that the designated smoking area is fitted with an electronic cigarette lighter (<http://ciglow.co.uk/> or similar product). Staff should be encouraged to leave all ignition devices in their locker in the welfare area. Visitors to site should quarantine ignition devices with in their vehicles.
 - Undetected fires may smoulder and form long after the processing plant and equipment has been shut down / turned off. Therefore a fire watch at least two (2) hours after the end of operations. Note this is an increase on the stated time of one (1) hour.
 - The following procedures will be carried out when 'hot work' (i.e. maintenance / repair) is being carried out on site: A fire watch will be conducted at the scene of any hot work at least two (2) hours after hot work has finished as sparks from hot work can smoulder for a significant time period. Note this is an increase on the stated time of one (1) hour.
 - The risk of CO poisoning is always present with in a biomass system as the flue gases generally contain higher concentrations than gas oil. Hence the requirement in Building Regulations AD J, 2010 to install a CO monitor in the same room as all solid fuel appliances. *Health and safety in biomass systems, Design and operation guide; Combustion Engineering Association, 2011.*
 - It is recommended that 'Coldfire' (www.hydronavitas.com) is added to all water suppression systems (the % dose rate of Coldfire will be calculated by hydronavitas) This is an environmental friendly wetting agent additive that will significantly reduce the impact of a fire on the site. The product is bio degradable and is able to be discharged into drainage/water courses.
 - The supplied reports do not specify the water supplies held on site. 'A 300m³ of combustible material will normally require a water supply of at least 2000litres a minute for a minimum of 3 hours' Fire prevention and mitigation plan guidance- waste (Natural Resources Wales: Version 1, May 2016). Confirm the water capacity on site available for firefighting.

Section 5 – Recommendation

- The reports do not specify the capacity/ volume of the drainage system and overflow into the attenuation tank, this should be specified.
- A designated assembly point must be nominated.
- The site manager and fire wardens must receive appropriate training to their roles. Regular staff training and fire drills will need to be organised with the plant employees.