FICHTNER
Consulting Engineers Limited

KRONOSPAN

CHIRK WOOD BASED PANEL PRODUCTION FACILITY

FIRE PREVENTION PLAN

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1 INTRODUCTION

Kronospan Limited (Kronospan) has been operating a wood-based panels manufacturing facility, currently employing around 650 people, at their site in Chirk, North Wales (the Facility) since 1971.

Kronospan is the global leader in the production of wood-based panels with some 40 sites globally. Chirk is the sole UK site, primarily focussed on supplying the domestic market with a wide range of locally manufactured raw and added value products. The site has developed so that it is able to derive the benefit of vertical integration with a range of related industrial processes ranging from raw board production to producing laminate flooring for retail sale.

Natural Resources Wales (NRW) published guidance titled '*Fire Prevention & Mitigation Plan Guidance – Waste Management*' in August 2017 (herein referred to as the FPP Guidance). The guidance applies to Operators of facility's which store '*any amounts of combustible waste materials including (but not limited to 1): … wood & wood composites (planks, boards, pallets, crates, sawdust, shavings & chips*'.

As set out in section 2.1.4, of the Supporting Information, the Facility receives a mix of virgin wood, and 'exempt' and 'non-exempt' waste wood for the manufacture of particle board. Therefore, it is understood that the requirements of the Guidance apply to the Facility.

The purpose of this document is mainly to detail the provisions which have been included into the design and operation of the relevant aspects of the Facility to prevent the occurrence of fires. Where applicable, details of policies and operational procedures are provided.

This document and the measures to mitigate the risk and impact of fires within the facility have been (and will continue to be) developed in accordance with the requirements of:

(1) Environment Agency guidance 'Fire prevention plans: environmental permits', dated November 2016;

(2) Building Regulations – Approved Document B (Fire Safety); and

(3) Insurer's requirements where structures or equipment fall outside published guidance or recommended practice.

2 SITE LOCATION AND DESCRIPTION

2.1 The Site

The Kronospan site (the Site) extends to around 40 Hectares and comprises a number of large industrial process buildings housing the main manufacturing processes, storage areas for raw materials, warehouse buildings for manufactured products, together with other facilities associated with a discrete manufacturing business.

The western perimeter of the Kronospan site is formed by the Shrewsbury to Chester railway. Improved railway siding facilities have been constructed within the Kronospan site to enable an increased volume of timber to be imported by rail. The Shropshire Union Canal is located to the west of the railway line. Water is abstracted from the canal for use in the manufacturing process. The eastern perimeter of the site is formed by Holyhead Road (B5070). An earth bund, planted with trees, has been developed along the eastern perimeter of the site in order to reduce the visibility of the site operations from neighbouring properties on Holyhead Road.

A sewerage pumping station and one property, owned by Kronospan, are located to the immediate north of the site. To the immediate south of the site is the Mondelez factory and the Chirk recreational ground.

The main residential area of Chirk is located to the east of the site with residential properties lining the majority of the eastern side of Holyhead Road. Chirk town centre is located approximately 500m to the south east of the site.

The wider area beyond the urban settlement of Chirk is dominated by agricultural fields and woodland. Chirk Castle and its grounds are located to the west of the site, beyond the Llangollen Canal.

A site location plan is presented in Appendix A.

2.2 Summary of Site Operations

As stated above, the facility is regulated for the manufacture of panel board. The manufacturing process is a significant consumer of virgin wood (log and wood chips) and waste wood. Virgin wood and waste wood is received into the logyard for storage prior to processing/manufacturing. The virgin wood and waste wood are then processed into panel board.

In accordance with the FPP guidance, those activities which are for the '*storage of … materials or wastes that are … combustible liquids or gases*' are excluded from the requirements of the FPP. Therefore, for the purposes of this FPP, the following processes/activities have been excluded, as they combust natural gas fuels which are excluded from the requirements of the FPP guidance:

- K1;
- K5;
- K6;
- GT1;
- GT2;
- Engine 1;
- Engine 2;
- Engine 3;
- Engine 4; and
- Engine 5.

2.3 Site Plans & Drawings

The following plans are included in Appendix C:

- Installation boundary drawing;
- site drainage plan;
- Fire prevention plan receptors drawing; and
- Site wide provisions of water for fire-fighting.

Wind roses showing the direction of the prevailing winds for the facility for 2013 to 2017, as taken from Shawbury, are presented in Appendix B.

2.4 Receptors

In accordance with the requirements of the Fire Prevention Guidance, the receptors in relation to the Fire Prevention Plan are as per the following table:

Table 1: Sensitive Receptors

Receptor Name	Designation	Location at Point Closest to Installation Boundary		Approximate Distance from Installation Boundary (m)
		X	Y	
Maes-y-Waun	Residential	329074	338157	53
Rhosywaun	Residential	328993	338676	55
Colliery Road	Residential	329069	337877	280
Station Avenue	Residential	328876	337733	389
Llwyn-y-cil	Residential	327984	338086	431
Afon Bradley Farm	Residential	328394	339485	532
Lodge Farm	Residential	329168	339548	665
Highfield Farm	Residential	329747	338667	762
Co-operative Food	Workplace	328959	338624	2
Industrial Estate	Workplace	328350	338263	27
Mondelez	Workplace	328440	338122	40
Chirk Leisure and Activity Centre	Workplace	329284	338345	278
Saw Mill	Workplace	327596	338890	881
Chirk Community Hospital	Hospital	329358	338975	462
Chirk Infant School	School	329158	338426	156
Chirk Court	Care Home	329045	338274	32
Chirk Castle	Protected Habitat (SSSI)	328023	338053	443
River Dee and Bala Lake	Protected Habitat (SSSI and SAC)	329186	337366	806
Chirk Railway Station	Railway Station	328470	337816	343
Chirk Marina	Watercourse	328525	339488	513

A drawing showing the location of the receptors shown in Table 1 is presented in Appendix C.

3 FIRE PREVENTION

3.1 Biomass Storage

Biomass, including roundwood, slabwood, peeled chips, sawdust, and recycled fibre (RCF), is received into the Log Yard via rail or roadway.

The log yard has dedicated storage areas for the different timber products. Some areas of the log yard are covered with hardstanding. All incoming timber is stored on the hardstanding, except for the logs of roundwood, which are either stored on hardstanding or areas of unmade ground.

Peeled chips, sawdust and RCF from road vehicles are off-loaded on hardstanding, and using a bucket loader the pile of offloaded material is pushed into designated storage bays to ensure that each stock pile is managed to a maximum height of 10m.

At the time of writing this report, there are ongoing proposals for modifications to the layout and operation of the Log yard. Some of these arrangements, including the installation of dedicated silos for the storage of pre-processed materials which are currently in commissioning.

Roundwood is unloaded from forestry trailers by the trailers own integrated log grab, or by the site's log grabs. The roundwood is either placed directly into storage rows from the vehicle, or progressed directly into panel board production.

3.2 Storage duration

The biomass within the storage silos will be constantly used by the manufacturing process. Therefore, the retention times within the site will typically only be a few days.

3.3 Monitoring of Fuel Storage

Visual inspections of the biomass stockpiles within the Log yard will be undertaken by Log Yard operatives to identify any smoulderings within the stockpiles.

3.4 Actions to limit self-heating

The Facility has a very high consumption of biomass. Therefore, the stockpiles and biomass storage areas are regularly turned to supply the board manufacturing process. This regular turning of the stockpiles and biomass silos helps to prevent the formation of hotspots. Turning helps to release heat that may built up in the stockpiles.

3.5 Seasonality

There will be seasonal variations on the biomass received, due to the nature of the climatic conditions within the UK.

It is expected that during the winter months, the biomass will have a higher moisture content as it will have been stored externally prior to processing and transfer to the Facility. Whereas, during the summer months, the biomass will have a lower moisture content.

However, it is not anticipated that the changing moisture content of the biomass will result in any additional fire risk.

3.6 Arson or vandalism

Security measures are in place to prevent access by members of the public and unauthorised persons; thereby preventing the risk of arson attacks or vandalism on the Facility. The Facility is bounded by security fencing and the perimeter monitored using CCTV. Pedestrian access points employ turnstile access systems. A barrier is present at the entrance and exit to site to control vehicular access. There is a gatehouse at the Facility which is manned 24 hours per day (including security guards during night-time hours). Only authorised visitors are permitted to enter the site.

The Facility is operational and manned 24 hours, 7 days a week, with the CCTV system recording and available for real time review as required. The shift team leaders are responsible for security on the site, including delivery vehicles as they access and travel around the site.

Emergency procedures have been developed for the Facility. The procedures detail the response to a number of different emergency situations on site, including unauthorised personnel on site.

3.7 Plant and equipment failure

Operating and Maintenance Manuals (O&M Manuals) have been developed and are available on site for each of the panel board manufacturing areas. The O&M Manuals set out detailed operating and maintenance instructions for all the plant and equipment on site that requires maintenance.

Kronospan has maintenance procedures and work instructions to cover all plant and equipment. In developing the work instructions the risk of fire is considered and appropriate activities are incorporated to reduce the risk of fire in the manufacturing areas.

As part of the maintenance system Kronospan retains records of all maintenance undertaken and any corrective actions taken.

3.8 Infrastructure and site inspections

Regular site inspections are undertaken. Records of these inspections are retained on-site. Inspections are carried out on an ongoing basis, but as a minimum an inspection of the operational areas of the Facility is carried out during every operating shift with maintenance work instructions raised for any items identified which require maintenance.

These systems are checked as part of the planned maintenance regime as required in the detailed operating manuals for each piece of equipment.

3.9 Electrical faults

The risk of electrical faults associated with the Facility is minimised by ensuring that only suitably qualified electricians are allowed to undertake any maintenance activities upon electrical installation.

Electrical installations within the Facility have been designed and installed to comply with the relevant British Standards for the design and installation of electrical equipment and supplementary bonding/earthing.

Electrical equipment is periodically checked and maintained as part of the planned maintenance regime as required in the detailed operating manuals for the process equipment within the Facility.

3.10 Ignition sources and hot works

A site wide hot work procedure is operated to ensure all hot works are carried out in a controlled manner. Training in the hot work permit system is provided by the site fire prevention department.

Hot works can only be undertaken by trained personnel. There needs to be two persons to carry out all hot works - 'the hot work doer' and a 'fire watch'. When hot work is being undertaken both persons must be present. The fire watch has to have the fire precautions stipulated in the permit to hand in case the hot work gets out of hand. The fire watch is there to prevent it escalating into a fire incident. The hot work permit issuer must have assessed the risk involved with carrying out the hot work and applied the most suitable fire precautions to prevent the hot work escalating into a fire incident.

Once the hot work has been completed, the site must be checked 30 minutes after cessation of the hot work and the fire watch would date and time this inspection and sign off the completed permit. The hot work can then be closed down by signing it off in the book from which it originated.

There are areas on site which are designated as hot work permitted areas. These have been arranged so that hot work can be undertaken in these areas as a 'normal activity' without the need for a hot work permit. The hot work permit system is used for work carried out outside of these hot work permitted areas. A hot work permit will be required for all areas associated with the storage of biomass.

3.11 Industrial heaters

Industrial heaters are provided within manufacturing areas to provide appropriate working conditions for the staff within those areas. Industrial heaters are not provided within the external log yard or the biomass storage silos.

3.12 Hot Exhausts

Monitoring is undertaken to detect signs of fires from dusts settling on hot exhausts.

Regular cleaning of manufacturing areas will prevent the build-up of dust on hot surfaces. Periodic high-level cleaning will remove any build-up of dust at a higher level than can be reached from the ground.

3.13 No smoking policy

The Facility has adopted a no smoking policy and enforces a total ban throughout the operational and office areas of the site. In addition, there are significant restrictions regarding the permitted smoking locations in place within the Kronospan boundary. External areas designated for smoking within the installation boundary are identified, with suitable facilities provided for staff.

3.14 Heat and spark prevention

A review under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) has been completed for the Facility, and any risk areas identified on zoning drawings.

Naked sources of ignition will be controlled on site through a hot work management system. This system will cover both staff and contractors on site. The system will also include requirements for the site to train and authorise 'hot work risk assessors' for the purposes of eliminating, reducing and managing the risks associated with hot work.

As part of the hot work management system, the potential for sources of ignition to cause fires will be managed in accordance with the Hot Work procedures, refer to section 3.10.

3.15 Gas bottle and other flammable items

Site rules restrict the storage of flammable materials and gas bottles inside biomass storage areas. Regular safety inspections are undertaken throughout the Facility to ensure that flammable materials are not stored within areas which are dedicated for the storage of biomass.

3.16 Fire watch

Operational staff are briefed on the need for monitoring for the early signs of fires.

A weekly inspection of the condition of all fire detection and suppressions equipment and fire related matters is made. The results of inspections are recorded in a pro forma report, which is collated by the site representative responsible for fire.

3.17 Smoke/heat/flame detectors

All areas of significant business importance, such as substations and switch rooms, are protected with inert gas suppression systems. All electrical rooms have smoke detection installed, which are linked to the main site fire alarm system.

4 MANAGEMENT AND STORAGE OF COMBUSTIBLE MATERIALS

4.1 Incompatible/hot loads

The manufacturing process will not result in any hot loads.

The Facility will follow good practice in waste segregation and storage activities during periods of maintenance.

4.2 Waste acceptance

The Facility will receive biomass materials which are classified as 'waste'. On this basis waste acceptance procedures are in place for the receipt of waste biomass materials at the Facility. These procedures form part of the operating procedures for the Log Yard.

Any loads of biomass which are delivered to the Facility but are not suitable for the manufacture of panel board are rejected by the Facility. In this instance, the loads are reloaded onto the vehicle and returned to the supplier.

4.3 Pile Size and Separation distances within the Log Yard

Apart from the storage of roundwood, wood chip, RCF, sawdust and boiler fuel within the Log Yard, there will not be any other stockpiles of biomass stored within the Facility. RCF, sawdust and boiler fuel will typically only be stored in external stockpiles during extended shutdown periods, such as Christmas and summer shutdown periods for the sawmill.

The roundwood is placed directly into storage rows from the vehicle. The logs are stacked on support logs to ensure stability of the log piles.

Stockpiles of wood chip, RCF, sawdust and boiler fuel within the Log Yard will be maintained with a minimum separation distance of 2.8m this is the length of roundwood which forms the compound walls.

The stockpiles of woodchip, RCF, sawdust and boiler fuel will be maintained to a height of up to 10m. This volume of woodchip, RCF, sawdust and boiler fuel is required to fulfil the demand for feedstock required for the manufacturing of board within the Facility.

4.4 Fire walls

A drawings showing the location of all fire walls within the Facility is presented in Appendix C.

4.4.1 K1

K1 boiler does not lie inside an ATEX classified zone. The nearest zone is approximately 50 metres away and is the Kronoplus dust filtration system area. The walls surrounding the K1 boiler are not fire walls.

4.4.2 K5

K5 boiler is not located inside an ATEX zone. The closest ATEX zone is for the SL and CL silos located on the roof, some 35 metres away from K5 Boiler. Separation from the particleboard production line is achieved by the 90 minute rated firewall which separates the K5 boiler from the particleboard forming station. The particleboard band weigher ATEX zone is approximately 40 metres away from K5 boiler on the opposite side of the fire wall.

4.4.3 K6

The K6 boiler is located approximately 25 metres away from the SL silo ATEX zone. K6 boiler is at ground level and the SL silo is located on the roof. K6 Boiler is separated from the Particleboard press band weigher by a 120 minute rated firewall.

4.4.4 GT1 and GT2

The gas turbines are located within an industrial steel framed building.

4.4.5 Engine 1 – 5

The gas engine building houses five identical gas engines situated side by side separated by a 30 minute rated fire wall. All five engines are located in a purpose made building with walls of fire rated composite panels with a 60 minute rating and concrete roof of 90 minute rating.

4.4.6 K7 Boiler

The K7 boiler is an external plant and is not located within a building. The K7 boiler is not surrounded by fire walls.

4.4.7 K8 Boiler

The K8 boiler is an external plant and is not located within a building. However, the walls to the Refiner buildings to north of the K8 boiler are installed as 240 minutes fire walls. Furthermore, the walls installed to the south of the K8 boiler are installed as 90 minute fire walls.

4.4.8 Log Yard

The Log yard is an open storage area for roundwood, wood chip, RCF, sawdust and boiler fuel. There are no firewalls within the Log Yard.

4.5 Quarantine areas

Any incoming materials which are not suitable for manufacturing are rejected by the Facility. In this instance, the loads are reloaded onto the vehicle and returned to the supplier. Therefore, there are no designated quarantine areas within Log Yard.

4.6 Storage within buildings

All biomass feedstocks associated with the board manufacturing process will be stored externally within the Log Yard or within biomass storage silos within the Log Yard. Therefore, there will not be any storage of biomass feedstock within buildings, unless it is being processed within the board manufacturing process.

4.7 Active fire fighting

Initial responsibility for active fire-fighting at the Facility is with the Fire Prevention Department which manages the Occupational Fire Brigade (OFB). The OFB has 37 members, 2 of which are retained fire and rescue services personnel, and a fully equipped foam Fire Appliance. The OFB is operated under a shift system. On each shift there are up to 8 trained brigade members. Whilst OFB members have dedicated jobs within the board manufacturing process, on the activation of the site fire alarm they will report to the fire station.

4.7.1 Fire prevention standards

Where appropriate, the Facility has been designed and operated in accordance with the following fire prevention and detection standards:

- LPC Rules for automatic sprinkler installations;
- VdS standards;
- BS EN 671: Fixed fire-fighting systems;
- BS 5266: Emergency Lighting;
- BS 5446: Automatic Fire Alarm Systems;
- BS 5839: Fire Detection and Alarm systems for buildings;
- ISO 6182: Fire Protection – Automatic Sprinkler Systems;
- ISO 6183: Fire protection equipment – Carbon Dioxide systems;
- CIBSE Guide Volume E, Fire Engineering, 2003;
- BS 5306: Fire extinguishing installations and equipment on premises;
- BS 5588: Fire precautions in the design construction and use of buildings (only in as much as referred to in the Building Regulations);
- BS 9999 - Code of Practice for Fire Safety in the design, management and use of Buildings; and
- Building Regulations.

4.7.2 Fire detection systems

All work places within the Facility have been designed, where practicable, with arrangements for detecting and giving warning in case of fire. Fire detection systems have been included in the design of the process plant at the Facility.

All fire detection systems are regularly checked and maintained by suitably competent persons in accordance with the manufacturers recommendations.

The following section sets out the fire detection systems installed at the Facility. For the purposes of this report, the board manufacturing areas have not been considered, as this material is not considered to be waste.

4.7.2.1 K1

The fire detection systems are installed in accordance with the Loss Prevention Council (LPC) standards. The boiler operation is linked to the fire alarm system and the boiler is automatically shutdown on activation of the zone fire alarm.

The K1 boiler is fitted with temperature monitoring of the thermal oil pump bearings.

4.7.2.2 K5

The fire detection systems are installed in accordance with the Loss Prevention Council (LPC) standards.

The K5 boiler is fitted with temperature monitoring of the thermal oil pump bearings.

4.7.2.3 K6

The fire detection systems are installed in accordance with the Loss Prevention Council (LPC) standards. The boiler operation is linked to the fire alarm system and the boiler is automatically shutdown on activation of the zone fire alarm.

The K6 boiler is fitted with temperature monitoring of the thermal oil pump bearings.

4.7.2.4 GT1 and GT2

The fire detection systems are installed in accordance with the Loss Prevention Council (LPC) standards. The turbine operation is linked to the fire alarm system and the turbines automatically shutdown on activation of the Turbine Fire Protection system.

4.7.2.5 Engine 1 – 5

Engines 1-5 are installed within a Vortex gas and fire detection system. Gas detection systems are installed within the Engine building. The fire detection systems is linked to the fire alarm system, which will activate if there are elevated levels of carbon monoxide.

4.7.2.6 K7 Boiler

The K7 boiler is installed with flame and temperature monitoring systems. The boiler solid fuel feeding point includes a temperature monitoring system to identify elevated temperatures within the fuel feed system. The Compressor and Thermal Oil Pump rooms for the K7 boiler includes flame and smoke detectors which are in a two-line coincidence to enable early detection of a fire within these areas. In addition, the thermal oil sumps are protected by flame detectors.

4.7.2.7 K8 Boiler

The K8 boiler is installed with flame and temperature monitoring systems. The boiler solid fuel feeding point includes a spark and temperature monitoring system to identify elevated temperatures within the fuel feed system. The Compressor and Thermal Oil Pump rooms for the K7 boiler includes flame and smoke detectors which are in a two-line coincidence to enable early detection of a fire within these areas. Furthermore, heat detectors are installed in the transformer compounds (2 of).

4.7.3 Fire suppression systems

Fire suppression systems have been included in the design of the Facility. The following section sets out the fire suppression systems associated with the storage and handling of fuels and wastes within the Facility. For the purposes of this report, the board manufacturing areas have not been considered, as this material is not considered to be waste.

4.7.3.1 K1

The K1 boiler is protected by a sprinkler system installed in the room containing the boiler. The boiler room is served by a fire pump installation containing one diesel and one electric pump set, supplied and installed by SPP Pumps. Both pumps have a nominal flow rate of 4,829 litres/min.

4.7.3.2 K5 and K6 boilers

The K5 and K6 boilers are protected by a sprinkler system installed in the room containing the boilers. The boiler rooms are served by a fire pump installation containing two diesel and three electric pump sets, supplied and installed by SPP Pumps. Both pumps have a nominal flow rate of either 2,900 litres/min or 3,813 litres/min.

4.7.3.3 GT1 and GT2

The GT1 Turbine is protected by a sprinkler system installed in the room containing the turbine. The turbine hall is served by a fire pump installation containing two diesel and three electric pump sets, supplied and installed by SPP Pumps. Both pumps have a nominal flow rate of either 2,900 litres/min or 3,813 litres/min.

GT 1 and GT2 both have a Turbine Fire Protection system fitted to them for added fire protection.

The common turbine control room is equipped with an inert gas protection system.

4.7.3.4 Gas Engines 1 – 5

The Engines have been installed with a water sprinkler system. Inert gas protection systems are installed in the low voltage Control Room and high voltage switch room.

4.7.3.5 K7 Boiler

The solid biomass fuel handing systems are installed with a semi-automatic/manual deluge system. In addition, the gas burners have a deluge system.

The Compressor and Thermal Oil Pump rooms are installed with a water based deluge fire extinguishing system with a foam mixing agent with a flow rate of 12.5mm/min. The thermal oil pumps area is protected with a foam fire fighting system with a flow rate of 800 l/min.

The walking floor fuel feed system is provided with a sprinkler system with a flow rate of 5 mm/min.

4.7.3.6 K8 Boiler

The solid biomass fuel handing systems are installed with a semi-automatic/manual deluge system. This system can be initiated from 2 positions. Either in the K8 boiler house or from the main boiler control room in the pre-production drier control room.

The Compressor and Thermal Oil Pump rooms are installed with a water based deluge fire extinguishing system with a foam mixing agent with a flow rate of 12.5mm/min.

4.7.3.7 Log Yard

The biomass silos within the Log yard are protected by an automatic spark detection and suppression systems, the system is subject to VdS standards and are subject to a programme of ongoing inspection. Each of the 6 big silos is equipped with fire suppression nozzles both inside and outside of the silos. The external fire suppression nozzles assist with cooling down the individual silo after operating the deluge system for each silo.

As well as the fire suppression system there is a manual deluge system for all the main equipment.

In addition to deluge system, eight fire hydrants are strategically located around the Log Yard. These have been located to provide provision of firewater to the full area of the Log Yard and rail unloading sidings. The hydrants are labelled with yellow "H" signs to identifying their location.

Whilst there are not any automated fire detection systems within the Log Yard, it is understood that stockpiles within the Log yard would only begin to smoulder after a prolonged period of time. Due to the high stock rotation within the Log yard, this does not occur. In the event that a smouldering was identified, a bucket loader will be used to remove the surrounding stockpile to prevent any spread of the fire. The smouldering area is retained in its location, as opening it up can result in full ignition of the smouldering. Small sections of the smouldering stockpile will then be removed to a designated nearby area using a bucket loader. The on-site fire team and fire appliance/fire hydrants will smother the smouldering stockpile in fire water to extinguish the ignition risk within the stockpile.

4.7.4 Provision of firewater

The facility has been designed to include dedicated fire suppression systems with suitable provisions of water for fire-fighting. A plan showing the site wide provisions of water for fire-fighting is presented in Appendix C.

4.7.4.1 K1

The K1 boiler has a fire water supply tank. The fire water supply tank has a capacity of 400m^3 with a refill rate of 210 litres/ min. Fire pump capacity for the fire pumps at the Kronoplus area are as follows:

- Diesel 1 pump, nominal flow rate of 3800 litres/min @ 6.8 bar; and
- Electric 1 pump, nominal flow rate of 3800 litres/min.@ 6.8 bar.

A fire in the K1 boiler room would be expected to be extinguished within 30 minutes with the engineering systems in place, the fire prevention equipment and resources at hand.

Additional fire water could be applied from the site Fire Appliance if necessary, refer to section 4.7.

4.7.4.2 K5 boiler

For the K5 boiler, the amount of available water in the fire water supply tank is 1000m^3 with a refill rate of 617 litres/ min. The fire pump capacities for the fire pumps in the middle road pump house are:

- Diesel 1 pump, nominal flow rate of 3813 litres/min @ 6.8 bar;
- Diesel 2 pump, nominal flow rate of 2900 litres/min @ 6.8 bar;
- Electric 1 pump, nominal flow rate of 2900 litres/min.@ 6.8 bar; and
- Electric 2 pump, nominal flow rate of 3813 litres/min @ 6.8 bar.

A fire in the K5 boiler room would be expected to be extinguished within 30 minutes with the engineering systems in place, the fire prevention equipment and the resources available.

Additional fire water could be applied from the site Fire Appliance if necessary, refer to section 4.7.

4.7.4.3 K6 boiler

For K6 boiler, the amount of available water in the fire water supply tank is 1000m^3 with a refill rate of 617 litres/ min

Fire pump capacity for the fire pumps in the middle road pump house are:

- Diesel 1 pump, nominal flow rate of 3813 litres/min @ 6.8 bar;
- Diesel 2 pump, nominal flow rate of 2900 litres/min @ 6.8 bar;
- Electric 1 pump, nominal flow rate of 2900 litres/min.@ 6.8 bar; and
- Electric 2 pump, nominal flow rate of 3813 litres/min @ 6.8 bar.

A fire in the K6 boiler room would be expected to be extinguished within 30 minutes with the engineering systems in place, the fire prevention equipment and resources available.

Additional fire water could be applied from the site Fire Appliance if necessary, refer to section 4.7.

4.7.4.4 GT1 and GT2

The fire water supply for GT1 and GT2 is common and is fed from a valve located in the K8 boiler manifold room, which is outside the scope of this FPP. The water supply to this manifold room comes from the main site pump house which has 1000m^3 capacity of water available. Therefore, for the gas turbines the amount of available water in the fire water supply tank is 1000m^3 with a refill rate of 617 litres/ min.

The Fire pump capacities for the fire pumps in the middle road pump house are:

- Diesel 1 pump, nominal flow rate of 3813 litres/min @ 6.8 bar;
- Diesel 2 pump, nominal flow rate of 2900 litres/min @ 6.8 bar;
- Electric 1 pump, nominal flow rate of 2900 litres/min.@ 6.8 bar; and
- Electric 2 pump, nominal flow rate of 3813 litres/min @ 6.8 bar.

A fire in the gas turbine building would be expected to be extinguished within 30 minutes with the engineering systems in place, the fire prevention equipment available and resources available.

Additional fire water could be applied from the site Fire Appliance if necessary, refer to section 4.7.

4.7.4.5 Engine 1 – 5

The fire water supply is common for all five engines and is fed from a valve located in the K8 boiler manifold room, which is outside the scope of this FPP. The water supply to this manifold room comes from the main site pump house which has 1000m^3 capacity of water available. Therefore, for the gas engines the amount of available water in the fire water supply tank is 1000m^3 with a refill rate of 617 litres/ min.

The fire pump capacities for the fire pumps in the middle road pump house are:

- Diesel 1 pump, nominal flow rate of 3813 litres/min @ 6.8 bar;
- Diesel 2 pump, nominal flow rate of 2900 litres/min @ 6.8 bar;
- Electric 1 pump, nominal flow rate of 2900 litres/min.@ 6.8 bar; and
- Electric 2 pump, nominal flow rate of 3813 litres/min @ 6.8 bar.

A fire in the gas engine building would be expected to be extinguished within 30 minutes with the engineering systems in place, the fire prevention equipment available and resources available.

Additional fire water could be applied from the site Fire Appliance if necessary, refer to section 4.7.

4.7.4.6 K7 Boiler

Fire water for the K7 boiler (and other processes within this area) will be provided by the Fire fighting pump house system. There are three fire water tanks, which will have the following capacities:

- Tank 5(a) - 800m3;
- Tank 4 - 350m3; and
- Tank 5(b) - 800m3.

The fire pump capacities for the Fire fighting Pump House Areas are:

- Diesel Fire Fighting Pump, nominal flow rate of 15.66 litres/min @ 10 bar;

- Diesel Fire Fighting Pump, nominal flow rate of 15.66 litres/min @ 6.8 bar; and
- Electric pump (x6), nominal flow rate of 475 litres/min/pump.@ 10 bar

4.7.4.7 Log Yard

Fire water within the Log Yard will be provided by three dedicated fire water tanks within the Log Yard which will supply the fire hydrant system and also water abstracted directly from the Canal or water collected within the lagoons.

4.7.4.8 Facility Wide Firewater Provision

The provision of water for firefighting across the Facility is presented in the Table below:

Table 2: Facility wide Firewater Provision

Location and Water Source	Firewater Tank Capacity [m³]	Process Area for Fire Water Provision
Kronoplus Sprinkler Pump House Area 18	Tank 6 - 400 m³	Kronoplus, Area 18 Sprinkler System
Main Sprinkler Pump House Area 5	Tank 2 - 500 m³ Tank 3 - 500 m³	Sprinkler- and Spark suppression Systems, Main Production Areas: 3-16
Minimax Minifog System Area 7	Tank 8 - 210 m³	MDF 1. MDF 2 Chip Board Press Protection
Water model Fire fighting Pump House Areas 4,5,6,7,8,9,10,11,12,13, 14	Tank 5(a) - 800m³ Tank 4 - 350m³ Tank 5(b) - 800m³	
Pre-production fire pumps Area 7 / 8	Tank 7 - 110m³	Area 7, deluge systems
Lagoon Water	No.9 – 2,022m³ No.10 – 2,022m³	Fire Engine
Canal Water, Tanks, North of Area 15	Tank 11 - 30 m³ Tank 12 - 60 m³ Tank 13 - 15 m³	Fire Engine
Canal Water, West of Area 15	Direct Suction Point	Fire Engine
Works Hydrants		Area 1,3,8 only

Taking the above into consideration, it is concluded that there is over 7,800m^3 of firewater provision provided at the Facility. In addition water for fire fighting will be available to be abstracted from the adjacent canal, with a direct suction point provided.

4.7.5 Fire hose reel and riser system

Buildings and built-up areas on site are covered by an extensive network of fire hose reels which provide comprehensive cover to allow fire fighting capability in each area from two different zones. Where appropriate and necessary, higher level structures and difficult to access areas are provided with a mix of wet and dry riser systems to assist in fire-fighting operations. A drawing which shows the location of the fire hose reels and risers is presented in Appendix C.

Each department has a Fire Marshall. The Fire Marshall is responsible for checking the fire-fighting equipment is checked by the departmental fire marshal on a weekly basis and a report submitted.

4.7.6 Fire hydrant and mains

A fire hydrant network is in place throughout the Facility with fire hydrants being strategically located throughout the site. The fire extinguishing equipment is checked by the departmental Fire Marshalls on a weekly basis and a report submitted.

4.7.7 Fire extinguishers

Fire extinguishers are located at numerous places throughout the Facility, particularly on major pedestrian routes and near the exit doors from individual zones. A drawing which shows the location of the fire extinguishers is presented in Appendix C.

The fire extinguishing equipment is checked by the departmental Fire Marshalls on a weekly basis and a report submitted.

4.7.8 Containment of fire water

Each of the combustion plant has its own arrangements for the containment of water from firefighting. The arrangements for the containment of fire water are presented below.

4.7.8.1 K1

The run off from a fire at the K1 boiler would be isolated in the loading bay area with all attempts made to prevent the fire water from entering the storm water system. This water would be transferred off site to a suitably licenced waste management facility.

If the water did enter the storm water drainage system it would be contained in one of the in site lagoons number 1 or 2. This quantity of water could be isolated from the other lagoon, thus preventing any contamination of surface water discharging from the site. If this occurred, Penstock "A" would be closed to prevent the contaminated fire water being discharged into the Afon Bradley.

The fire water could be removed from the lagoon via a tanker and transferred off site to a suitably licenced waste management facility.

4.7.8.2 K5 boilers

The run off from a fire at the K5 boiler would be isolated in the middle road. This water can be prevented from entering any of the site drainage systems. This water would be transferred off site to a suitably licenced waste management facility via road tanker.

4.7.8.3 K6 boilers

The run off from a fire at the K6 boilers would be isolated in the collection pit at the West end of the middle road. The water would fill this pit and then collect in the middle road. This water can be prevented from entering any of the sites drainage systems. This water would be transferred off site to a suitably licenced waste management facility via road tanker.

4.7.8.4 GT1 and GT2

The run off from a fire at GT1 and GT2 would be isolated on the Logyard to the North and East of the gas turbine halls. This water can be prevented from entering any of the sites drainage systems. This water would be transferred off site to a suitably licenced waste management facility via road tanker.

4.7.8.5 Engine 1 – 5

The run off from a fire in the Engine 1-5 building would be isolated on the Logyard to the North and West of the Engine 1-5 building. This water can be prevented from entering any of the sites drainage systems. This water would be transferred off site to a suitably licenced waste management facility via road tanker.

4.7.8.6 K7 Boiler

The run off from a fire at the K7 boiler would be isolated in the collection pit at the West end of the middle road. The water would fill this pit and then collect in the middle road. This water can be prevented from entering any of the sites drainage systems. This water would be transferred off site to a suitably licenced waste management facility via road tanker.

4.7.8.7 K8 Boiler

The run off from a fire at the K8 boiler would be isolated in the collection pit at the West end of the middle road. The water would fill this pit and then collect in the middle road. This water can be prevented from entering any of the sites drainage systems. This water would be transferred off site to a suitably licenced waste management facility via road tanker.

4.7.8.8 Log Yard

Run-off water from a fire with the Log Yard will be contained within the hard standing within the Log Yard and the Lagoons. In the event of a fire within the Log Yard, the discharge from the Lagoons into the Afon Bradley will be isolated to prevent the discharge of potentially contaminated fire water being discharged into the Afon Bradley. This water will be sampled and analysed. If it is suitable to be discharged to the Afon Bradley, it will be discharged into the Afon Bradley in accordance with the requirement within the EP. If the effluent is not suitable for discharge it will be transferred off site to a suitably licenced waste management facility via road tanker.

4.7.9 Contingency during the incident

Site wide emergency procedures for the facility have been developed by Kronospan. The Emergency Procedures include, but are not be limited to, the following considerations:

- Fire precaution and fire-fighting procedures;
- Emergency planning and training of staff;
- Training and instruction;

- Maintenance and testing of safety equipment;
- Communications with local stakeholders who may be affected by a fire at the site;
- Arrangements for cleaning relevant areas of the site following a fire incident; and
- Steps to be taken prior to the site recommencing operations.

All staff and contractors are trained in the emergency response procedures for the Site. Where specific responsibilities are given to specific staff, such as the OFB, training will be provided to those employees. Training records in the emergency response procedures for all staff and contractors will be retained on-site.

The effectiveness of the emergency response procedures will be reviewed following any emergency incidents on-site. Where appropriate the procedures will be updated and staff trained in the updated procedures.

Appendix A – Site Location Plan

Appendix B – Wind Rose

Appendix C – Site Plans

C.1 Installation boundary drawing

C.2 Site drainage plan

C.3 Fire prevention plan receptors plan

C.4 Site wide provisions of water for fire-fighting

C.5 Site wide provisions of fire hose reel and risers

C.6 Site wide provisions of fire hydrants and mains

C.7 Fire walls

C.8 Sprinklers

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