Energy from Waste, Combined Heat and Power Facility

North Yard, Devonport

Environmental Permit Appliction (Application EPR/WP3833FT/A001)

Accident Management Plan
May 2011

Prepared for

MVV Environment Devonport Ltd

Revision Schedule

Accident Management Plan
May 2011

Rev	Date	Details	Prepared by	Reviewed by	Approved by
01	Feb 2011	Initial Draft	**Caroline Culley** Consultant	**Angela Graham** Principal	**Mike Nutting** Associate
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The methodology adopted and the sources of information used by URS Scott Wilson in providing its services are outlined in this Report. The work described in this Report was undertaken between May 2009 and April 2011 and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

Where field investigations are carried out, these have been restricted to a level of detail required to meet the stated objectives of the services. The results of any measurements taken may vary spatially or with time and further confirmatory measurements might need to be made after any significant delay in issuing this Report.

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1 Report Context

Scott Wilson Ltd has been commissioned by MVV Environment Devonport Ltd (MVV hereafter) to prepare an application for an environmental permit for an Energy from Waste, Combined Heat and Power Facility located at Devonport Dockyard, Plymouth (Devonport EfW/CHP hereafter).

Within the Site, as defined in planning terms, and the Installation, as defined in permitting terms, the proposed facility will comprise:

- Tipping Hall;
- Waste Bunker Hall with Waste Handling Cranes;
- Bale Store/Baling System;
- Turbine Hall with Steam Turbine Generator;
- Boiler House with Grate, Boiler and Ancillary Systems;
- Flue Gas Cleaning System and Chimney;
- Air Cooled Condensers;
- Water Treatment Plant;
- Bottom Ash Handling System.
- Administration Block; and
- Workshop and Stores

This report has been prepared to support an application for an environmental permit and details the accident management arrangements proposed for the facility. The report should be read in conjunction with the other supporting application reports and risk assessments.

2 Summary

2.1 Introduction

This section provides evidence of the existence of relevant emergency preparedness and response arrangements to the standard indicated by the Environment Agency *"Guidance for the Incineration of Waste"* (EPR 5.01).

2.2 Regulatory Context

2.2.1 Environmental Permitting Regulations

The Environmental Permitting Regulations require that an operator maintains an accident management plan for each installation permitted, and implements it in the event that an accident occurs. The plan must take into consideration:

- Events or failures that could damage the environment;
- Assess how likely they are to happen and the potential environmental consequences; and
- The actions needed to both minimise the potential causes and consequences of accident.

2.2.2 Control of Major Accident Hazards (COMAH) Regulations

Due to the nature of the processes, waste types accepted and maximum storage volumes and times at the facility, neither the Control of Major Accident Hazards (COMAH) Regulations 1999 nor the 2005 amendment were found to apply to the facility.

2.3 Demonstration of Best Available Techniques

Table 2.1: Demonstration of Best Available Techniques (BAT)

BAT Consideration	Site Justification
1. Hazard Identification	• A formal review of the proposed processes and systems has been undertaken to identify potential hazards to the environment that are posed by the installation. The approach employed has been developed using relevant EA guidance (e.g. H1, EPR 5.01, etc.) • The hazard identification process is summarised in Section 3.
2. Risk Assessment	• The potential risk associated with the identified hazards has been completed by considering: a. Frequency of occurrence b. Nature and quantity of substance released c. Pathways and receptors involved d. Environmental consequence of the event e. Overall risk and its significance to the environment f. Control and mitigation measures needed to prevent or reduce the risk • The risk assessment approach is summarised in Section 4 and the risk assessment is presented in Appendix A
3. Risk Reduction Techniques	• Risk reduction techniques to be employed are discussed in Section 5 and have been developed with reference to the appropriate standard. These include:

BAT Consideration	Site Justification
	a. Substance inventory b. Raw material management procedures c. Appropriate storage considerations d. Automated process control system e. Physical protection measures f. Secondary containment g. Overfill protection h. Security arrangements i. Incident reporting and investigation procedures j. Defining roles, responsibilities and lines of communication k. Safe shutdown procedures l. Emergency procedure arrangements m. Spill control techniques and procedures n. Personnel training o. Fugitive release control p. Plant redundancy q. Containment of contaminated waters
4. Emergency Plan	• An emergency plan has been developed that details the actions required in the event of an emergency – this plan will be subject to routine testing for ongoing effectiveness

3 Identification of Potential Hazards

3.1 Introduction

This section outlines the potential hazards associated with the operational activities and processes at the Devonport EfW/CHP facility. When undertaking the identification exercise, reference has been made as appropriate to:

- Environment Agency *"Guidance For The Incineration of Waste*" (EPR 5.01);
- Environment Agency Horizontal Guidance Note H1 - *"Environmental Risk Assessment for Permits"*; and
- Environment Agency *"A Practical Guide to Environmental Risk Assessment for Waste Management Facilities."*

3.2 Hazard Identification Process

The hazard identification process draws on:

- MVV's experience in respect of the planning, design, build, development and operation of similar EfW processing plants in Europe; and
- The experience of URS/Scott Wilson in preparing permit applications and undertaking assessments of similar operations and waste management activities.

Assessments take into account environmental, as well as health and safety hazards, and will be developed further as detailed design, construction and commissioning of individual items of plant within the facility, and associated processes, occur.

Hazard areas that have been considered include:

- Transfer of substances (e.g. filling or emptying of vehicles or vessels);
- Vessel overfilling;
- Emissions from plant or equipment (e.g. leakage, over-pressurisation, blocked drains, etc);
- Failure of containment (e.g. physical failure or overfilling of bunds or drain sumps);
- Failure to contain fire-waters;
- Wrong connections in the drains;
- Incompatible substances allowed to come into contact with each other;
- Unexpected reactions or runaway reactions;
- Failure of main services (e.g. power, water);
- Operator error; and
- Vandalism.

Separate assessments have been completed in respect of the potential risks associated with the proximity to the local Naval base, and these are discussed further in Section 3.4 with relevant reports appended to this document (refer to Appendices B through E).

3.3 Potential Hazardous Events

A list of potential hazardous events has been developed by identifying scenarios for the various events at the facility, and these are shown in Table 3.1, along with the anticipated pathways and receptors.

Table 3.1 Hazardous Events

Potential Hazardous Event	Pathway	Receptor
1. *Material Delivery (Raw Materials, Waste)*		
Major vehicle accident – leading to a significant loss of reagents	• Air • Water • Land	• Staff • Public
Waste material loss from delivery vehicle	• Air • Water • Land	• Staff • Public
Delivery of non-permitted waste	• Air • Water • Land	• Staff
Silo (PAC / urea / Sodium Bicarbonate) overfills	• Air • Water • Land	• Staff
Dust release during discharge into silo (PAC / urea / Bicarbonate)	• Air • Land	• Staff
2. Waste Storage		
Inappropriate waste storage for incoming waste streams	• Water • Land	• Staff • Public
Fire in reception hall, waste bunker hall or bale-store area	• Air • Water	• Staff
Fugitive release during transport of waste (cranes/conveyors)	• Air • Water	• Staff
3. Raw Material Storage		
Fugitive release from storage silo (PAC / urea / Bicarbonate)	• Air • Water • Land	• Staff • Public
Fire/explosion in PAC silo and handling system	• Air • Water • Land	• Staff • Public
Rupture of PAC/ Bicarbonate /Urea silo due to accidental damage or spontaneous rupture of tank	• Air • Water • Land	• Staff • Public
Uncontrolled release of bicarbonate from mixing tank/ container	• Air • Land • Water	• Staff • Public
Uncontrolled release of Urea from mixing tank/container.	• Air • Water	• Staff
4. *EFW Combustion Process*		
Fire in furnace feed chute/hopper	• Air • Water	• Staff
Back flow of combustion gases into feed chute	• Air	• Staff
Furnace exhaust temperature falls below 850^{O}C.	• Air	• Local habitat
Pressure surge in combustion system	• Air • Noise	• Staff
Leak of gas oil (support fuel)	• Air • Water	• Staff • Public
Fire due to ignition of gas oil (support fuel)	• Air • Water	• Staff • Public

5. *Steam System/Power Generation*		
Steam leak to process building/atmosphere	• Air • Noise	• Staff
Steam safety valve operates	• Air • Noise	• Staff • Public
Leak of lube or seal oil from turbo-alternator	• Water • Land	• Staff • Public
Major vibration due to rotating machinery being out of balance	• Noise	• Staff • Public
6. *Abatement System*		
Significant leak of flue gas to air before abatement (e.g. due to over-pressure, material defect, corrosion)	• Air • Land • Noise	• Staff
Fire/explosion in fabric filter	• Air • Water • Noise	• Staff • Public
Failure of main exhaust fans	• Air	• Staff
Emission limit values exceeded	• Air • Land • Water	• Public • Local habitats
7. *Ash Handling and Disposal*		
Failure of ash discharger water seal	• Air • Water	• Staff
Fire Risk	• Air • Water	• Staff
Overflow of water from ash quench	• Water	• Staff
Spillage of bottom ash	• Air • Water • Land	• Surface or groundwater • Staff
Spillage of APC residue	• Air • Water • Land	• Surface or groundwater • Staff
8. *General Site Issues*		
Ineffective firewater containment	• Water	• Surface or groundwater
Flood Risk	• Water	• Surface or groundwater
Wrong connection in drainage system	• Water	• Surface or groundwater
Main services failure	• Air • Water	• Staff • Public
Contamination carried onto highway	• Water • Land	• Public
Operator Error	• Air • Water • Land	• Staff • Public
Site Security Breach resulting in vandalism/plant damage/accidental releases	• Air • Water • Land	• Staff • Public • Surface or groundwater
Failure of odour control system	• Air	• Staff • Public
Fire/explosion risk	• Air • Water • Land • Noise	• Surface or groundwater • Public • Staff
Release of effluent before monitoring checks have been completed	• water	• Surface or groundwater
Equipment or plant fire (e.g. cabling faults)	• Air • Water	• Staff • Surface or groundwater

3.4 Other Potential Hazards

Due to the proximity of the facility to the Naval Dockyard, discussions and assessments have been completed with the MOD to ascertain any potential risk from the proposed operations. To date the following assessments have been completed:

- A Warships in Harbour (WIH) Risk Assessment;
- Nuclear Safety Case Risk Assessment;
- Helicopter Flight Path Risk Assessment; and
- An Explosives Ordnance Risk Assessment.

Although the above documents are subject to ongoing review and update by the MOD, in liaison with MVV, the general conclusions from the assessments were that:

- There are no areas of the site that lie within the explosive licensing arcs;
- The facility is outside the MOD's dockyard explosive safeguarding zone, and as such no additional measures are required for building design; and
- No restrictions on the proposed EfW/CHP have been identified as a result of any of the above assessments.

Copies of the relevant assessments are provided in Appendices B to E (note – only the first page of the Explosive Ordnance Risk Assessment is shown due to the sensitivity of report – access to the full report by the Environment Agency will need to be sought in writing).

4 Risk Assessment

4.1 Introduction

This section outlines the approach taken to assess the risks associated with the hazards identified in Section 3 above. When undertaking the identification exercise, reference has been made as appropriate to:

- Environment Agency *"Guidance For The Incineration of Waste*" (EPR 5.01);
- Environment Agency Horizontal Guidance Note H1 - *"Environmental Risk Assessment for Permits"* (April 2010); and
- Environment Agency "*A Practical Guide to Environmental Risk Assessment for Waste Management Facilities*".

4.2 Risk Assessment Methodology

The risk assessment has been completed by considering each of the hazardous events identified in Table 3.1 above in terms of:

a) Frequency of occurrence;

b) Nature and quantity of substance released;

c) Pathways and receptors involved;

d) Environmental consequence(s) of the event;

e) Overall risk and its significance to the environment; and

f) Control and mitigation measures needed to prevent or reduce the risk.

The risk assessment methodology has been developed using a scoring mechanism, whereby scores are assigned to:

- The probability of the hazard occurring without the use of protective measures;
- The consequences of the hazard to the environment or human health; and
- The effectiveness of the control/mitigation used to prevent the hazard occurring.

The scoring system used for the assessment is shown in Table 4.1 below.

Table 4.1 Risk Assessment Scoring System

Frequency of Occurrence		
Frequency	***Comment***	***Score***
Never	Incident occurs once every 100 to 10,000 years	1
Very Unlikely	Incident occurs once every 10 to 100 years	2
Unlikely	Incident occurs once every 1 to 10 years	3
Somewhat Unlikely	Incident occurs at least once per year	4
Fairly Probable	Incident occurs at least once per month	5
Probable	Incident occurs at least once per week	6

Consequence of Hazard to Environment or to Human Health		
Consequence	***Comment***	***Score***
Minor	• On-site nuisance only no outside complaint • No breach of permit	1
Noticeable	• Nuisance noticeable off-site • Potential for 1 – 2 complaints • Reportable breach of permit • Minor plant damage • Health and safety 'near miss'	2
Significant	• Severe sustained nuisance • Significant plant damage • Injury requiring on-site medical treatment • Major breach of environmental permit • Numerous public complaints	3
Severe	• Hospital treatment required for injured persons • Site evacuation required (partial or full) • Partial plant shutdown required • Replacement of part of plant • Hazardous substance release to water course with ½-mile effect • Off-site emergency services involved • Regulator (EA/HSE) involved	4
Major	• Hospitalisation of injured persons • Public warning and off-site emergency plan implemented • Serious toxic effect on local protected habitat • Widespread but temporary damage to land • Significant fish kill over a 5 mile range • Full plant shut-down required • Regulatory prosecution likely	5
Catastrophic	• Major airborne release requiring evacuation of local population • Plant shutdown for longer than 1 week • Partial or full rebuild of plant • Significant contamination of land and/or water sources requiring significant	6
Effectiveness of Mitigation		
Mitigation Factor	***Comment***	***Score***
Non-existent	• No mitigation in place	1
Ineffective	• Some minor controls in place but mitigation not achieved	2
Partly effective	• Basic controls in place and hazard partly mitigated but significant residual risk remains	3
Effective	• Basic controls in place and hazard mitigated to an acceptable level although moderate level of residual risk may exist	4
Very effective	• Processes fully controlled (basic/advanced) and hazard mitigated to recognised standard. Some minor residual risk may remain	5
Entirely effective	• Processes fully controlled to level in excess of recognised standards. Hazard mitigation entirely effective and no residual risk remains	6

4.3 Risk Assessment Conclusions

A copy of the completed risk assessment for the facility is provided in Appendix A – this summarises the evaluation of unmitigated and mitigated risk. For each hazardous event identified the main controls and mitigation measures to be employed is summarised on the risk assessment table.

The general approach to risk reduction and management is discussed further in Section 5.

5 Risk Reduction and Management

5.1 Introduction

This section outlines the approach taken to reduce and manage the risks associated with the hazards identified in Section 3 above. When undertaking the identification exercise, reference has been made as appropriate to Environment Agency *"Guidance for the Incineration of Waste*" (EPR 5.01).

5.2 Process Design Considerations

The detailed design of the facility is being carried out by MVV's plant designers and engineering personnel, who have wide operational experience with the planning, design, build and operation of similar facilities. The detailed assessment of safety risks which will be carried out during the detailed design will examine issues such as:

- The use of emergency shutdown systems and electrical trips;
- Gas, fume, dust and liquid detection;
- Fire fighting systems;
- Containment of releases; and
- Emergency escape.

5.2.1 EfW Health and Safety

The aim of plant operation at the facility is to limit operator exposure to waste materials through the storage of waste within an enclosed bunker hall and bale-store, and to exclude operatives from this area during normal operations. All waste from the bunkers will be loaded into the combustion chamber feed hoppers or baling hoppers by an overhead crane which can be operated manually or in semi automatic or automatic modes, the advantages of which are:

- Restricted operator access to areas in contact with waste to periods of maintenance;
- Locating operators in the control room where they can monitor and control all the elements of the plant; and
- Remote operation from the control room using CCTV and direct visual observation avoids operator exposure during normal operation.

The plant will operate under the requirements of OHSAS 18001 and the operation and maintenance manual will include a section that sets out the basic health and safety operating procedures used during plant operation which comply with the above standard.

5.2.2 Plant Redundancy

In respect of management of 'accident risk', the facility has been designed with redundancy measures for unplanned events already in place in order to mitigate potential impacts on site operations and the surrounding environment, which include the:

- Provision of additional storage to manage ongoing waste reception during periods when the EfW is unavailable due to scheduled or unscheduled outages. The waste bunker to be provided at the facility has the capacity to store a maximum 10 days throughput, with a further 18 days storage capacity provided within the bale-store area. MVV proposes that the waste bunker area will normally contain a minimum of 3-5 days worth of waste/fuel, to

cover short periods of non-delivery, or short-term shutdowns whether planned or unplanned. For mid-term storage, e.g. plant shut-downs exceeding the storage capacity of the waste bunker, waste will be baled and retained within the bale-store;

- Retention of critical spare parts on site to ensure a fast response to plant breakdown. Non-critical spares will be of a proprietary nature available from more than one supplier to facilitate delivery within 1 working day;
- Provision of two cranes to handle the waste in the waste bunker, each of which is designed to handle the full throughput capacity of the facility including allowances for mixing of waste and bunker management,. This will provide in-house contingency in the event of a failure of one of the cranes, whereby the remaining crane will be able to continue to operate and maintain the facility at normal throughput.. An auxiliary crane is available to carry out repair works as well as remove blockages in the waste feed hopper;
- For common plant and equipment, such as the turbine, it is expected that any repairs can be implemented in a prompt manner, calling on contracted specialist maintenance engineers when necessary, and the key spares held on-site or by manufacturers when required; and
- In unlikely event that material cannot be treated at the facility, then excess waste will be transported to nearby landfills or other suitable outlets, which may be available, as and when the need arises. The Operator has already held such discussions with SITA and Local Authorities on this subject. Waste will continue to be accepted from the WCAs at the tipping hall and will be loaded into bulk-haulage vehicles and/or skips for removal off-site.

5.3 Business Management System

5.3.1 Integrated Management System

The management system at the installation will comprise an Integrated Business Management System (BMS) which will be designed to comply with:

- BS EN ISO 9001:2000 – Quality Management Systems;
- BS EN ISO 14001:2004 – Environmental Management Systems; and
- BS OHSAS 18001:2007 – Occupational Health and Safety Management Systems.

It is intended that the system will be assessed by an appropriate certifying body accredited by the National Accreditation Council for Certifying Bodies. A plan for accreditation of the system will be prepared during mobilisation and will be achieved during the first 18 months of service commencement. This integrated system will provide a structured system that meets defined standards and includes formal accident risk management arrangements.

5.3.2 Definition of Roles, Responsibilities and Lines of Communication

In terms of mitigating and controlling site operational impacts during normal and abnormal periods of operation, MVV has a clearly defined operational structure including statements of core responsibilities for each role and defined lines of communication. This structure is based around:

- Support from a number of shared centralised functions, including Finance, Safety, Health and Environmental, Human Resources and Engineering which will provide support as appropriate to the overall MVV project team as well as to individual facilities; and

- Assigning environmental responsibility for individual operations throughout the site management and operational structure, and throughout the management system as a whole. The Health, Safety and Environment Manager will be responsible for ensuring implementation of the IMS.

5.3.3 Operational Control Procedures

Facility management will maintain a series of operational, maintenance and emergency procedures that will be designed to cover:

a) Waste pre-acceptance, acceptance and treatment, to ensure compatibility between materials being stored, transferred, treated or disposed of within the facility;

b) Procedures detailing the handling of accidents, incident and non-conformances, including the raising of alarms/reporting, the specific action required at the time to control/mitigate effects and the final recording of information relating to the event – such procedures will include communication with relevant internal and external bodies, details of individual responsibilities and roles, as well as clear guidance on the specific action required;

c) Procedures detailing operational and maintenance requirements for all main items and areas of plant, including the recording of relevant information, the action required and the reporting of defects;

d) A series of safe shutdown procedures will be available to ensure that individual plant and relevant process operations can be quickly and safely shut down, and isolated, in the event of an incident or accident occurring; and

e) Spill control procedures, and associated physical measures, are in place to ensure that in the event of spillage, prompt action may be taken to control and mitigate the release - these procedures include the provision for directing spill material back to an appropriate storage vessel where it will be held for treatment.

5.3.4 Emergency Response

An emergency response plan will be developed as part of the IMS system, in order to ensure risks are mitigated. This plan is discussed in more detail in Section 6 and will be subject to routine audit and review.

5.3.5 Incident and Accident Investigation

MVV will implement a near-miss/incident/non-conformance reporting system to encourage the reporting of all accidents and incidents with health and safety or environmental implications. The system will also be used to report any unusual occurrences. Examples of what may be recorded include:

- Office or site accidents, minor or otherwise;
- Near misses – “almost tripped over…”;
- Unsafe loads delivered to site – e.g. poor loading and/or sheeting;
- Non-conforming waste;
- Regulatory non-compliances;
- Spillages;
- Problems with contractors, drivers and visitors; and

- Off-site complaints.

Site management will review the reports as appropriate, and identified corrective or other action will be recorded.

As part of the IMS, a procedure will be developed for the management of incidents and non-conformances, and will define the requirements for the:

- Reporting of incidents/accidents;
- Mitigation measures to be taken while dealing with the incident/accident;
- Recording of the incident/accident and subsequent investigation requirements; and
- Identification, implementation and recording of relevant corrective action required to prevent a recurrence.

5.3.6 Audit and Review

In relation to the ongoing effectiveness of existing site control measures, a routine assessment will be completed and this includes:

a) All containment areas, drains, tanks, pipelines and interceptors will be inspected for defects and corrective action taken as a matter of priority to remove accumulations or repair damage – any material that has been found to have accumulated will be tested and then directed to an appropriate storage vessel before treatment in the process;

b) Routine maintenance checks on plant and equipment to ensure ongoing plant effectiveness; and

c) Monitoring of emissions to ensure ongoing effectiveness of SBCR, bag filter and acid gas scrubber operation.

Effectiveness of all on-site controls will be verified through internal audits undertaken by independent dedicated auditors.

5.4 Training, Instruction and Information

5.4.1 Induction

All new employees will follow a detailed induction schedule that is set up in order to cover the main informational and administrative requirements of their new roles. The induction is not only designed to create a welcoming atmosphere, it is also designed to provide them with a thorough grounding in the safety requirements and emergency management arrangements of the post.

5.4.2 Ongoing Training

All employees will be provided with additional ongoing training that relates to both their specific job and identified training needs. This training will include ongoing refresher training in respect of emergency planning and response.

5.4.3 Method Statement Briefings

Method statement briefings will be given to relevant personnel to ensure that they are made aware of the specific risks and hazards associated with their particular activity. Briefings will be delivered in the same way as toolbox talks, and will be recorded as such in the site records.

5.4.4 Posters and Site Notices

Simple posters and project specific site notices will be displayed in strategic locations around site in order to raise and maintain general environmental and safety awareness on site and remind the workforce of their individual responsibilities.

5.4.5 Bulletins

Environmental bulletins will be issued regularly to inform employees of current environmental issues and changes and updates to legislation.

5.4.6 Vendor Appraisal Meetings

All sub-contractors will go through a process of vendor appraisal. A key requirement of this process will be a 'start up meeting' with the sub-contractor, prior to work taking place on-site.

The meeting is intended to provide an ideal forum for information exchange, and an opportunity to discuss issues such as methods of work, environmental hazards, and control measures to be implemented.

5.5 Physical Control Measures

5.5.1 Material Storage

An up-to-date schematic plan, showing the current material type designation for each storage tank or silo will be maintained on-site. Each storage tank or silo will be equipped with a level monitoring device, linked to overfill alarms in the automated control system. Storage silos will be vented through vent filters.

5.5.2 Physical Protection Measures

Physical on-site arrangements have been designed to maintain a high level of operational efficiency, whilst ensuring that appropriate accident/incident issues have been taken into consideration. These physical arrangements include, but are not limited to:

a) Designated storage arrangements for specific material types will be constructed in accordance with relevant standards, and all vessels and pipelines will be appropriately signed;

b) Physical 'bump' barriers will be placed adjacent to tanker off-load points, to minimise the risk of damage to containment and storage arrangements during vehicle manoeuvring – on-site operators will be available to supervise vehicle movements where necessary; and

c) The facility will be constructed to ensure that all liquid containing tanks are located within dedicated containment areas, each capable of taking 110% of the tank volume in line with current storage guidelines – in addition, the relevant floor areas will be designed as effective containment areas, promoting material flow to dedicated drains or sumps in the event of spillage;

5.5.3 Containment Provision

'Tray' containment will be provided from drums and other small containers of water treatment chemicals and general lubricants. These will be held in designated stores at the workshop, thus there will be no exposure to rain. Trays will be inspected daily by site-operators to prevent overfilling.

5.5.4 Overfill Protection

All storage silos (e.g. APC residue, PAC, urea and sodium bicarbonate) will be equipped with level monitoring equipment which shows tank fill level both adjacent to the tank, and on the automated control system.

Additionally, silos are equipped with over-pressure protection in the event that problems occur during filling.

For materials such as PAC, urea, sodium bicarbonate and APC residue, all discharge to and from the storage silos will be completed in accordance with approved procedures. Discharge will cease immediately in the event of a leak or an overfill alarm sounding.

5.5.5 Security Measures

Security and emergency procedures will be established as integral parts of the IMS. The main security provisions will be:

- Access points to the facility will be protected by lockable steel security gates, and an adjacent notice board will clearly display the opening hours of the site – the main access gate will be secured outside of opening, i.e. waste delivery, hours;
- Site boundaries will be protected by 2.4m high security fencing and will be inspected on a weekly basis – any defects identified will be made secure immediately, and permanent repairs will be undertaken as soon as practicable;
- Where appropriate, all building doors will be closed and secured outside of facility opening hours. The facility will continue to be operated and supervised 24 hours per day. The site will be monitored at all times from the control room by strategically placed CCTV cameras. This will help prevent unauthorised access to the operational areas;
- Access to operational areas of the building will be controlled by means of an electronic key card system;
- In the event that evidence of unauthorised access and/or vandalism is identified, the matter will be reported to the Technically Competent Person responsible for the site who will then take the appropriate action; and
- All visitors will have to sign a visitor's book at the weighbridge when they arrive on-site.

5.5.6 Fugitive Release Control

The need to pay continuous attention to housekeeping in order to minimise emissions is recognised, and as such a high priority is given to housekeeping instruction and supervision.

With respect to the proposed processes, consideration has been given to the following in order to maintain good standards of housekeeping:

- Prevention of recurring spillages by effective sealing around individual items of plant within the facility;
- Design-out potential spillages across the facility;
- Maintain local exhaust ventilation (LEV) plant where it is required to a high efficiency; and
- Removing all 'one-off' unavoidable spillages as soon as possible.

In addition, operating practices and inspections of individual items of plant throughout the facility will help minimise fugitive emissions. The overriding operational philosophy to be used at the facility will be to prevent releases and spillages.

The following design features will assist the management of the environmental risks associated with the processes proposed for the Devonport EfW/CHP facility:

- Ensuring all waste deliveries and loads being removed from site are covered;
- Enclosing material transport systems where possible;
- Fast-acting roller shutter doors on waste reception hall and all other doors are kept closed when access not required;
- Maintaining a slightly negative pressure within the reception building; and
- The provision of a separate shutdown exhaust system for use during plant shutdowns.

5.5.7 Signage and Traffic Control Systems

Signage and traffic control systems will be implemented so as to ensure that no vehicles, which can reasonably be expected to use the facility under normal operating conditions, will queue on the public highway. This includes refuse collection vehicles (RCVs), street cleaning vehicles, heavy good vehicles (including bulk-haulage vehicles) or other vehicles that the WCAs may occasionally operate.

Site operatives will ensure that operational/ delivery vehicle movements occur outside any areas accessible by the public.

Visitors to the community/educational area and main offices will be directed by signage, via a by-pass lane, to the car park adjacent to the main offices. Operatives and service vehicles will also be directed through the access barrier near the weighbridge office to avoid queuing through the weighbridge complex. RCVs and bulk transporters will be directed by signage and road markings to the weighbridge facility.

Site staff will assist with RCV and bulk transporters manoeuvring during busy periods. Extra staff can be brought in at short notice to assist in sustained busy periods.

5.5.8 Safe Manoeuvring and Discharge by Refuse Collection Vehicles

Safe Systems of work will be developed, based on risk assessments, as part of the IMS. These safe systems of work will ensure effective and safe traffic management.

From the site entrance, all vehicles will be directed to pass over the weighbridge. The Weighbridge Operator controls the number of vehicles that are on-site at any time, and will direct drivers to the appropriate area or waste reception hall bay.

Tipping hall supervisors will be employed to monitor and if necessary supervise vehicle movements in the tipping hall. If necessary, vehicle drivers will be asked to wait in a designated safe area if the facility is particularly busy, until other vehicles have moved out of the tipping area. This will:

- Provide a safe environment for all who both work at the facility and who are visiting;
- Minimise turn-around times for delivery vehicles; and,
- Limit congestion within the building.

Permanent road signs and markings will be in place to guide and direct traffic.

5.6 Operational Control Measures

5.6.1 Automated Process Control

The EfW/CHM treatment processes, and associated handling equipment, will be controlled via automated control systems. These systems will be programmed with:

- Micro-processor control;
- Optimum plant operating criteria;
- Process control monitoring capability (temperature, pressure, flow, emissions, etc);
- Critical alarm levels for specific plant (both high and low level); and
- Process trips and interlocks.

CCTV will be installed at key points, and will be used to ensure that control room operatives and supervisors have good visual feedback on all areas of the plant. A separate historical data logging system stores all process data in a database and is used for analysis purposes.

The automated system is backed up by manual supervision from fully trained process operators. The plant operators will interact with the control system via the human machine interface (HMI) in the control room. The HMI presents all important process data, including flue-gas emissions on multiple redundant monitor screens.

5.6.2 Safe Shutdown

An independent emergency shutdown system (ESD) forms part of the automated control system, and this ESD will take control during emergency situations in order to secure the plants operation in a 'safe state' to avoid risk to humans, the environment and the equipment within it.

The ESD will be backed up by a series of plant emergency, safe shut-down, procedures that can be followed by process operators.

5.6.3 Plant Reliability

Process reliability is a key issue, because of the need to treat waste, and supply electricity and heat continuously. One of the main features to aid reliable plant operation will be the implementation of a preventative maintenance regime.

A computerised system will automatically generate work order cards which will prompt maintenance technicians to service, maintain and calibrate equipment. In addition, regular, planned outages will allow major items of plant and equipment such as the turbine generator to be inspected, maintained and repaired. This will be on a rolling programme.

This high standard of maintenance will enable the facility to operate as designed, and will help to minimise the probability of all types of accidents, including those with potential environmental consequences.

5.6.4 Inspection and Testing

A routine inspection and testing programme will be implemented for all safety-related equipment and protective devices. The programme will encompass equipment such as lifting devices, emergency breathing apparatus, fire fighting equipment, first aid supplies, and gas

detectors. The programme will be designed to demonstrate the correct operability of the equipment, its availability for use in an emergency and its physical condition with regard for future use. Routine walk-through inspections will be conducted through all areas of the plant.

The inspections will seek out any potential or current safety hazards, including permanent equipment and building features, safe clearance violations, and tool failures.

Inspections will typically include, firstly, a general facility and equipment review covering:

- Fire hazards;
- Safety equipment;
- Housekeeping;
- Machine safeguards;
- Equipment warnings and signs;
- Personal work habits;
- First aid supplies; and
- Chemical handling

Secondly, inspections will typically include a records audit covering:

- Safety meeting reports;
- Safe clearance logs;
- Insurance reviews;
- Safety manual updating; and
- Chemical safety information files.

All inspections will be followed by a written report of the findings and recommendations where necessary.

5.6.5 Raw Material Management

An inventory of raw materials, and details of their relevant characteristics, will be maintained on-site, based on:

a) Pre-acceptance checks that will provide details of the composition of materials likely to be received and accepted at the facility – this information enables the facility to co-ordinate load arrivals and reception to maintain an efficient operation and to minimize the risk of unacceptable loads or unexpected reactions taking place;

b) Waste acceptance and treatment sampling/analysis provides detailed information on the composition of materials that are currently present on-site – this information is essential for ensuring that material segregation is effective, the treatment process is optimised and no unacceptable reaction changes are occurring, as well enabling the quarantining and/or rejection of waste which could give rise to an unacceptable reaction within the process; and

c) The above analytical information is retained within the facility's records system, and can be utilised in conjunction with final material and effluent analysis to determine the final fate of any particular materials.

5.7 Fire Risk Management

MVV will carry out a detailed fire risk assessment of the facility, as well as of individual operations on-site, at the design stage, taking into account all health, safety and welfare issues, protection of the environment and the requirement for business continuity. This will include reviewing best-practice and recommendations from fire investigations on similar facilities, and other related best practice industry guidance. This fire assessment will cover both the construction and subsequent phases. This assessment will be undertaken prior to the Works commencing in order to minimise the risk of delay to the facility arising from construction fires. MVV will discuss the requirements of the local fire department and these will be incorporated, alongside the outputs from the detailed fire assessment, into the subsequent design fire strategy in order to minimise both the cause of fire occurring and the subsequent impact of any fire..

5.7.1 Fire Prevention and Control

The design and construction of the Plant will comply with the following requirements in respect of Fire Protection & Fire Fighting systems:

- The design will follow the guidance of Building Regulations Approved Document B 'Fire Safety', and the Regulatory Reform (Fire Safety) Order – RRO 2005;
- All fire protection and detection products, systems and services will be provided by suppliers and contractors included on the Loss Prevention Certification Board's List of Approved Fire and Security Products and Services. Their design, manufacture and installation will be carried out by companies having achieved the LPCB Quality systems certification;
- Fire protection systems will be designed and installed generally in accordance with National Fire Protection Association (NFPA) 850 – Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter Stations, and in particular Chapter 9 - Alternative Fuels; BS EN 671 'fire precautions, extinguishing systems'; BS 5306 and BS 558 'fire precautions in the design and construction of buildings' and BS EN 14604 'smoke detection';
- All fire alarm and detection systems will be installed in accordance with BS 5839, Part 1 - 2002 and subsequent amendments to give level P1 coverage in accordance with the Loss Prevention Council (LPC) Rules for Automatic Fire Detection and Alarm Installations for the Protection of Property;
- The fire detection, protection and alarm systems will also comply with the Building Control, Fire Officer's and the Insurer's reasonable requirements; and
- All construction materials including insulation will be non-combustible, in line with the insurer's requirements. MVV will ensure that all workmanship and manufacture swill meet or surpass all relevant British, European or equivalent International industry recognised standards and guidance.

5.7.2 Specific Design Measures

The following information provides an overview of the particular design features that have been incorporated into MVV's design of the facility with regards to mitigating the risk of fire and managing any fire that might occur.

The design will allow for the quarantine, management and treatment of vehicles arriving on-site with a smouldering load or vehicle fire.

Special features of MVV's approach are:

- Infra red detection camera continuously scanning the waste bunker surface to provide early identification of hot spots;
- Water Deluge system for the waste bunker and bale-store to rapidly extinguish hot spots/fires that may develop in the bunker.
- Nitrogen blanketing system for the fabric filter; and
- Inert gas extinguishing system to reduce the oxygen content down to 10% (without danger to personnel) inside the electrical switchgear building.

5.7.3 Fire Compartments

Subject to the location of key equipment, the facility will be segregated into fire compartments. For example, certain specific Fire Compartments, such as the waste bunker and the boiler house, will be separated from each other by fire barriers with a minimum of 2-hour fire resistance rating, by spatial separation or by other approved means. Fire compartments include, but are not limited to, the following areas/ buildings of the plant:

- Waste tipping hall, waste bunker, and bale-store, including shredder and baling machinery;
- Boiler house, including residue silos and fabric filter;
- Turbine hall (including lubricating oil storage, pumping and filter units);
- Electrical / Switchgear building;
- Water treatment building;
- Stair towers;
- 11/33 kV Oil Transformer station;
- Urea storage and pumps;
- Fuel oil storage and pumps;
- Workshop and Storage;
- Flammable liquid storage;
- Emergency diesel container;
- Fire pump room with foam storage;
- Administrative and visitor building; and
- Weighbridge office.

For each of these fire compartments, a fire risk assessment will be carried out by MVV to identify appropriate fire detection and protection systems, in association with appropriate civil work design principles, to control risk of fire propagation, spread of fumes and smoke and fire water flooding. In addition, it will serve to maintain the integrity of dedicated fire partition walls in the event of fire. 2 hour fire protection will be provided to all buildings, rooms and structures around the waste bunker, bale-store and tipping hall.

5.7.4 Fire Protection

The complete fire alarm system will include a fire detection system and a central control panel, which will be located in the central control room. The central control panel will report, as a minimum, the status of all fire pumps, the designated fire in the furnace and the fire detection and protection systems. The central control panel will allow a rapid identification of the location of any fire, with the alarm initiation device and location displayed at the control panel. The central control panel will allow print-outs of alarm listings, plans with fire brigade access routes, hazard points, etc.

Fire detectors will be fitted throughout the plant in sufficient numbers to cover all areas of risk, and a fire detection and protection system will also be fitted above the diesel fire pump. MVV will use VESDA (very early warning fire detection) air sampling systems, which will be utilised where appropriate in the plant. The plant will have sufficient audible alarm units installed so that in the event of an evacuation being required they can be heard in all areas, the sound level of the units being set at least 5dB above the ambient levels. Hose stations designed in accordance with BS 9990 Standard for the Installation of Standpipe, Private Hydrants, and Hose Systems, will be provided at strategic positions within the plant for fire fighting in fire risk areas.

5.7.5 Fire Protection in the Waste Bunker, Tipping Hall and Bale-store

These areas are at greater fire risk and protection measures are detailed below:

- All partition walls and floors around the tipping hall and the baling hall will be 2 hour fire rated;
- Smoke and heat ventilation systems will include natural ventilation at the roof;
- Fire detection will be provided by infra-red detection and by heat detectors to avoid issues due to excessive dust and moisture levels; and
- Fire fighting measures in accordance with NFPA 850 will include:
    a. Automatic water spray system;
    b. Water cannons connected to foam reagent system for waste bunker area that can be controlled remotely from the control room or via local manual operation from a mobile control panel;
    c. Water spray system above the waste feed hoppers;
    d. Manual fire hoses;
    e. Fire water reservoir and fire pump system located beneath the tipping hall; and
    f. Foam tank beside the tipping hall.

5.7.6 Personnel Competence

Site personnel will be trained in the use of fire fighting equipment, breathing apparatus where necessary, and first aid. Supervisors will ensure that certificates of competence are maintained up-to-date. All personnel will also be trained in the emergency procedures for the facility, including raising the alarm, recognising an alarm, managing off-site emergency services and site evacuation procedures.

6 Emergency Management Plan

6.1 General Principles

The Operations Manager will work with the Health, Safety and Environment Manager to draw up a specific Emergency Plan for the facility to deal with foreseeable emergencies. This will include arrangements and facilities for first aid, fire, and explosion, together with other arrangements needed to deal with emergencies effectively. The principal aim of the plans will be to protect the health and safety of people and allow business continuity.

Although the site does not fall within the COMAH regulatory regime, the facility accident management plan will still reflect the broad principles of the COMAH guidelines, in that:

- Major accident hazards have been identified;
- The measures necessary to prevent major accidents and to limit their consequences for people and the environment have been taken;
- Adequate safety and reliability have been incorporated into the design, construction, operation and maintenance of the plant; and
- An on-site emergency plan will be developed.

6.2 Emergency Plan

An accident management plan will be developed, describing the techniques which will be implemented to minimise the risks posed to the environment. Activities affecting the health and safety of operatives, contractors and visitors will be separately managed in compliance with H&S regulations and the Contractor's H&S policy.

Environmental accident prevention will be managed within the overall site health, safety, quality and environmental management programme. Management, and procedures relating to emergency preparedness and response, will be documented within an Emergency Procedures Manual contained within the IMS.

The objectives of the Emergency Plan will be to minimise

- Injuries and risk of injuries to affected and unaffected personnel and the public;
- Risk of health effects to staff and the public;
- Distress to staff and the public;
- Short and long term impacts upon operations and the provision of the Service:
- Impact upon third party property;
- Damage to the Contractor's property; and
- Adverse impacts on the environment.

The Emergency Plan will achieve the above objectives by applying an appropriate response to any emergency as quickly as possible and by informing appropriate members of MVV's management team, the Emergency Services, the Ministry of Defence, the Authority, other Relevant Authorities, and any other relevant stakeholders.

The individual elements of the emergency plan are outlined below.

6.2.1 Staff Training

MVV's Emergency Plan will be implemented so that all staff are aware of, trained in and conversant with, the following:-

- Identifying a potential Emergency;
- Knowing what to do in the case of an incident;
- Planning for evacuation and safe re-entry;
- Knowing who to contact in the event of an Emergency;
- Locating plans for Emergency equipment;
- Identifying and initiating operational contingency arrangements;
- The procedure to close or isolate part or all of the facility;
- Obtaining emergency help for casualties including first aid arrangements;
- Procedures for the notification, documentation, and assessment of response to Emergencies and mishaps; and
- A programme of inspection, maintenance and upgrading of emergency equipment, and personnel training.

6.2.2 Emergency Notification

The Shift Supervisor (or nominated deputy in their absence) will be responsible for notifying an emergency and acting as the Incident Controller. MVV will adopt the following outline emergency notification procedure:

a) Raise the alarm;

b) Use the Emergency Contact List to notify:
    - Emergency services;
    - Plant control room;
    - Key MVV staff (including the Operations Manager and Health, Safety and Environment Manager);
    - Authority key contacts;
    - HM Naval Base key contacts;
    - MVV senior management; and
    - Environment Agency

c) Keep key contacts informed of the progress of the incident;

d) Maintain emergency status until advised by the emergency services that the incident is resolved; and

e) Once resolved a 'closing report' is issued to key contacts.

6.2.3 Emergency Procedures

The emergency procedures will be maintained within the facility Operations Manual and adequate stocks of suitable equipment retained at the facility. Procedures will be present for managing all reasonably foreseeable incidents, including:

- Fire or explosion;
- Material spillage or fume release; and
- Personal injury and evacuation of casualties.

In the event of an accident or incident taking place, plant personnel will implement the actions detailed in the facility emergency procedures, which will detail:

- Reporting the incident/raising the alarm;
- Contacting relevant MVV personnel and management;
- Contacting relevant external emergency services/ regulatory bodies when required;
- Taking appropriate corrective or mitigating action;
- Site evacuation; and
- Recording the details of the incident and action taken.

Typical scenarios that may need to be addressed include:

- Fire – specific details for raising the alarm and action to be taken in the event of a fire are detailed in the emergency control procedure. Physical measures for control on site include fire alarms, smoke alarms, fire extinguishers, demarcated fire exits, emergency lighting and fire hydrants. Consideration has also been given to the provision of intrinsically safe equipment, such as flange static bonding, use of flashing alarms lights in noisy areas, intrinsically safe torches which can be used in the event of material spillage scenarios and alternative means of raising the evacuation alarm (e.g. loudspeaker) should the main system fail. In the event of a fire, all fire waters can be contained on site in static storage vessels or mobile vacuum plant, and subsequently directed back through the process or to sewer in the (rare) instance of a complete site failure;
- Spillage control – this includes minor and major (i.e. >205 litre) spillages both on and off the site. The procedure details the specific actions required for spillage containment and removal. It is supported by a number of physical measures such as absorbent materials, booms, drain protection, and temporary sealants. The majority of all spilt materials can be contained and treated through the site processes, following testing of the material's composition. In the event of an off-site spillage, failure of a tanker on-site or in the event the material cannot be treated through the process, then liaison with relevant external parties including the Environment Agency, HSE or other waste/water treatment facilities;
- Power cut - these are generally due to faults external to the facility and can occur without notice. If a power cut occurs, the facility can operate in island mode to ensure that power supply is not lost. Once over, the plant would be restarted and emissions controlled through normal restart procedures; and
- Vandalism – the site has a secure boundary and access will be prevented by lockable gates, as required. In addition, the site is monitored by the CCTV which can guard against unauthorised access. Any unauthorised persons found on the site will be challenged and removed - if necessary the police will be informed.

6.2.4 Emergency Shut Down

In case of an emergency shut down of the Facility, the feeding of the grate will be stopped in a controlled manner to minimise the production of adverse levels of emissions. Any remaining exhaust air will be drawn through the APC System and cleaned. The boiler will then be shut down in accordance with the shut down procedure shown in Appendix F**.** This procedure, coupled with the plant design, will ensure that the impact of any emergency shut down is minimised and an efficient return to normal service delivery can be achieved.

6.2.5 Emergency Plan Outline

The Emergency Plan to be implemented for the project will include the following sections:

1. Scope -outlining the purpose of the plan, for whom it is intended, what circumstances are covered by it, and where it applies to;
2. Alarm and Emergency operating centre – identifying the location which will be used to co-ordinate a response in the event of an on site emergency;
3. Emergency incident – giving a description of what constitutes an emergency incident and a description of the alarm signal;
4. Responsibilities in the event of an emergency – detailing who is responsible for issuing an alarm signal and the procedure for doing so;
5. Annexes to the emergency plan;
6. Emergency contacts and telephone numbers;
7. Emergency incident action plan;
8. Checklist for managers;
9. Checklist for shift supervisors;
10. Incident report form; and
11. Any relevant internal directives.

An example plan from other MVV plants is provided in Appendix G.

6.2.6 Emergency Contacts

MVV will maintain an emergency contacts telephone list located at appropriate highly visible positions within the facility and will also provide a copy of the list to the Authority. The list of emergency contacts will be updated to reflect changes in staff or procedural changes and updated lists will be circulated. The list of emergency contacts will include the following:

- Key MVV and Authority staff who will be involved in any Emergency, including out of hours contact details;
- Emergency services, including specialists;
- Authority key contacts;
- WCA core contacts (where appropriate);
- HM Naval Base key contacts;
- Environment Agency;
- All managers and supervisors;

- MVV's senior management;
- Relevant maintenance services operatives; and
- Computer maintenance services operations;

MVV will ensure that the core staff are available to provide emergency coverage at all times including periods of sickness, holidays or non-availability by virtue of other job responsibilities.

6.2.7 Fire Safety Plan

A Fire Safety Plan for the facility will be drawn up and notified and agreed with the relevant authorities. The Fire Safety Plan for the operational period of the contract will be agreed prior to the commencement of the service and implemented from the Services Commencement Date.

The Fire Safety Plan will include procedures for:

- Emergency actions in the event of a fire;
- The management of fires on site;
- Testing of fire safety equipment;
- The use of personal protective equipment;
- Regular inspection of the facilities;
- Good housekeeping; and
- Record-keeping.

Appropriate risk assessments will be undertaken and safe operating procedures developed and implemented to reduce the risk of fire on-site. Arrangements for staff training will be included in the Fire Safety Plan including plans for regular training reviews and updates. The Fire Safety Plan will be continually reviewed and will be updated annually and following any fire related incident to reflect experience and at the request of the Fire Safety Officer or other relevant statutory body.

6.2.8 Incident Investigation and Reporting

Accidents/incidents/near misses will be reported and investigated in line with the defined IMS procedures.

Reports will be reviewed by the Operations Engineer or senior management, as appropriate, and corrective or other action taken recorded. All reports will be reviewed on monthly basis by senior management and 'lessons learnt' will be communicated to site-personnel via the internal briefing system.

All emergency incidents involving fire or material release (fume/ spillage) will be reported to the Environment Agency as soon as practicable. A written report of the nature of the incident, its causes and any remedial action taken will be presented to the EA within two weeks of any such incident being closed-out.

6.2.9 Contingency Tipping Arrangements

In the event that the incident at the facility requires alternative tipping arrangements to be made available, then the contingency tipping arrangements will be instigated.

The contingency arrangements are designed to ensure that WCAs are provided with continuity of service and the contingency tipping arrangements for the facility will be summarised on a table that will be held in the site-office. The table will include details of the location and address of the alternative tipping facility, together with an outline of the licence conditions and opening times. Where more than one alternative tipping location has been identified for a WCA, the waste would be diverted to the most appropriate site from areas within any one WCA.

Discussions have already been undertaken with third parties (e.g. Biffa) in respect of securing relevant contingency provision at alternative sites.

6.2.10 Continued Validity of Plan

The IMS will include procedures for checking the continued validity of the emergency plan, and associated contingency arrangements.

The effectiveness of the site controls are reviewed at least annually, during the audit process, but are also verified during the accident/incident investigation to ensure that the site system remains effective.

The Emergency Plan will be updated by the Health, Safety and Environment Manager annually and to reflect any changes in operational practices, relevant staff changes or following an emergency as necessary to support continuous improvement.

Appendix A Accident Risk Assessment

Appendix B Warships in Harbour Risk Assessment

Appendix C Nuclear Safety Case Risk Assessment

Appendix D Helicopter Flight Path Risk Assessment

Appendix E Explosives Ordnance Risk Assessment

Appendix F Boiler Shut Down Procedure

Appendix G Example Emergency Plan