MOTT MACDONALD

Afan IED Permit Application

Accident Management Plan

September 2024

This page left intentionally blank for pagination.

Mott MacDonald
4th Floor
Mountbatten House
Grosvenor Square
Southampton SO15 2JU
United Kingdom

T +44 (0)23 8062 8800
mottmac.com

Afan IED Permit Application

Accident Management Plan

September 2024

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	06/07/2022	Olivia Ellson / Natalia Cunningham	Shannon Stone	Anita Manns	First Draft
B	18/10/2023	Olivia Ellson / Natalia Cunningham	Shannon Stone	Anita Manns	Amendments made on receipt of Sch 5 and update of containment options
C	10/05/2024	Amelia Luk	Shannon Stone	Anita Manns	Second draft
D	19/09/2024	Amelia Luk	Shannon Stone	Anita Manns	Amendments for resubmission

Document reference: 100123523_MSD_AMP_AFA_September 2024

Information class: Standard

Contents

1 Introduction

1.1 Overview

This Accident Management Plan (AMP) has been prepared by Mott MacDonald, for the Dŵr Cymru Welsh Water (DCWW) who are applying for a variation to an environmental permit for the Afan Sludge Treatment Centre (STC) in line with the requirements of the Environmental Permitting Regulations 2016, as amended ('the EP Regulations') and NRW guidance 'How to Comply with your Environmental Permit' v8 Oct 2014. The AMP covers environmental accident management techniques, training information and emergency procedures.

The AMP and the procedures in the Appendices are live documents and subject to regular review (at least annually or more frequently should an incident occur).

1.1.1 Environmental Management System

DCWW have an Environmental Management System (EMS) Policy. In line with the EMS Policy, the Afan STC will be operated in accordance with the DCWW Quality Management System (IMS).

DCWW have established and maintained documentation that defines and describes how the IMS is established, implemented, and maintained in accordance with ISO 9001:2008 and ISO/IEC 17025:2005 and monitoring emissions to air, land and water (MCERTS) Standards.

The system is structured on the organisation's strategic business areas, business processes and customer requirements.

DCWW has not established an ISO 14001:2004 for Afan WwTW, although the ISO 14001 guidelines are observed and followed at the Site and DCWW will extend the scope of accreditation to include it, where applicable.

The EMS is not integrated with the IMS at present. However, certain system procedures and operating procedures are shared by both systems.

Demonstrable procedures are outlined in the DCWW Environmental Policy dates April 2020 and the Site Operating Manual and IMS.

Scope of the Environmental Management System

The SP (1) 01 - Master Asset List contains all IMS sites and shows all certified Environmental (ISO 14001) sites.

Environmental Aspects and Impacts

EN (2) 01 - Environmental Aspects and Impacts Register

Consideration of environmental aspects covers, not only 'operational' activities, but also the auxiliary operations such as maintenance. Also included are abnormal situations such as shut down, start up, emergencies and special project trials.

The starting points for environmental aspects is the initial environmental review and this is a systematic examination of the company's activities to identify associated issues and includes:

- Operation or process activities – each operation is listed and evaluated as to the actual or potential impact that it has on the environment (positive or negative). Operations are broken into significant activities.

- Emissions and discharges – for each operations, process or activity, emissions/discharges are identified by the environmental media to which discharges occur, e.g. ambient air, controlled waters, or land.
- Pollutants – for each emission source, the pollutants of concern are identified.
- Use of raw materials – the use of all materials, including raw materials and types of energy fuel is examined, quantified, and classified as unavoidable, preferred, and avoidable use.
- Nuisance – all other effects, caused by the organisation's activities, such as noise, vibration, odour, steam, dust etc. are considered.

Each environmental aspect is carefully analysed to identify the actual affect it has, or may have, on the environment. While most impacts cause pollution directly or indirectly, it is recognised that some company activities may have effect on the environment. These are considered separately as a special case, as even small benefit may be significant and warrant attention.

The impacts for each environmental aspect are determined by reference to records of measurements, monitoring, surveys, reports, legislations, and codes of practice.

Environmental Procedures Overview

EN (3) 02 – Waste Management

This procedure defines waste management principles and guidance for the legal disposal of waste. This procedure goes into specific detail of the handling of Hazardous and Non-Hazardous Waste including the use of a Hazardous Internal Waste Transfer Form – ENF005 and the reporting of Fly Tipped Waste.

EN (3) 03 – Delivery Handling and Storage of Oils and Chemicals

This procedure defines in general terms the duties and responsibilities involved with the receipt and handling of chemicals, oils and fuels. This procedure goes into detail about the normal and abnormal operations of the delivery/receipt/handling of chemicals and oils and states the requirements of regulations around the storage of fuel and oil, both for fixed tanks and mobile bowsers.

EN (3) 04 – Environmental Incidents – Near Miss

This procedure defines the requirements necessary to deal with and report environmental incidents and must be used in conjunction with the DCWW Emergency Incident Response Handbook available from Senior Managers. This procedure gives examples of possible causes of incidents and explains the appropriate corrective and preventative actions to be taken.

EN (3) 05 – ISO AND EP Sites

This procedure applies to sites that hold ISO 14001 certification. However, the procedure itself will be extended to apply to all IED permitted sites, whether or not they are accredited under ISO 14001. It details what is included with a Site Initial Environmental Review and Local Site Environmental Management Plans, along with waste management, role responsibilities and information on the Annual Review – ENF 008.

An overall review of the IMS takes place every 12 months, and on other occasions as required, by Senior Management. There is a regular programme of audits covering all aspects of the IMS and EMS; they are included on the Internal Audit Programme operated by the Business Assurance team and audited by the Environment Agency (EA) on a frequent basis. In addition, the EMS and IMS are subject to audit by the inspection and certification company SGS (for accreditation purposes) every 6 months.

DCWW produces an annual report on environmental performance and where required attend local action group meetings.

One of the key tasks for DCWW during the permit determination process is the development of the management system arrangements for the STC Site to cover all STC operations as well as the quality and environmental aspects.

DCWW update their Asset Management Policy Statement, Environmental Policy Statement, Heath Safety and Wellbeing Policy Statement, Information Security Policy Statement, and Quality Policy Statement on a routine basis.

1.1.2 Accident Management Plan

The Site operates under a set of site-specific Emergency Procedures which is incorporated into DCWW's Environmental Management System (where applicable) to prevent and manage environmental related accidents. The Emergency Procedures includes an inventory of substances stored at the site, details on storage facilities, inventory of pollution prevention equipment (spill kits and fire extinguishers), inventory of waste and storage capacities, contact details of internal contacts, national and regional (where appropriate) contact details of emergency services and environmental regulators. The Emergency Procedures are distributed to key staff, to supervise the implementation of the Plan, and shared with external contacts (emergency services and the NRW). The Emergency Procedures are accompanied by a site plan that identifies the locations of designated storage areas (and their maximum storage capacity), location of spill kits and fire extinguisher and storage locations and hazards posed by chemical substances.

The Emergency Procedures reference procedures to comply with environmental legislation and protect the environment and human health in regard to potential accidents:

- Spill prevention and management, and operation of safety valves
- Procedure for recovering spilled product
- Procedures for the prevention of overfilling vessels, management of plant and equipment failures
- Fire prevention and responses to fires, including fire water containment procedures
- Security measures to prevent unauthorised access, arson and vandalism
- Competence, training and awareness requirements
- Monitoring and measurement requirements
- Record keeping procedures for the recording of incidents, accidents and near misses
- Emergency procedures to notify relevant authorities, emergency services and neighbours

1.2 Roles and Responsibility

The Site Manager has overall responsibility for reviewing the processes on the site to minimise the risk of accidents and reduce the impact of any accidents should they occur. This document is reviewed annually, but the review process is ongoing as part of the regular performance monitoring for the site. In the case of an emergency, key contacts and communication details are listed in Table 1.1.

Table 1.1: Key contacts and communication in the case of an emergency

Contact	Office Hours	Out of Hours
Dŵr Cymru Welsh Water (DCWW)	0800 052 0130 (Water emergencies) 0800 085 3968 (Sewer flooding & sewerage emergencies)	0800 052 0130 (Water emergencies) 0800 085 3968 (Sewer flooding & sewerage emergencies)
Natural Resources Wales (NRW)	0300 065 3000 (24 hours)	0300 065 3000 (24 hours)

Contact	Office Hours	Out of Hours
NRW Incident Hotline	0300 065 3000	0300 065 3000
Emergency Services	999	999
Local Police	999	999
Local Hospital	Neath Port Talbot Hospital – Minor injuries only - 01639 862160 Morriston Hospital – A&E - 01792 702222	999
Local Authority Emergency Planning Department	Neath Port Talbot Emergency Planning Team 01639 686409	01639 686409
Borough Council	Neath Port Talbot County Borough Council 01639 686868	01639 686868
Electricity Company	National Grid (electricity) 0800 6783 105 (power cut)	National Grid (electricity) 0800 6783 105 (power cut)
Framework Waste Contractor	Biffa Waste Management 0800 307307 Geneco (screenings and grit only) 01225 524560	Biffa Waste Management 0800 307307 Geneco (screenings and grit only) 01225 524560
Specialist Spill Clean Up Contractor	Geo Pollution Technologies 01656 741 799	01656 741 799

1.3 Site Location

Afan STC is situated within Afan WwTW, which is located within Port Talbot. The site is fully enclosed within the Tata Steel UK industrial works at Port Talbot, and surrounded to the north, east and south by steel manufacturing process plant. Access to the site is only through private roads by arrangement with Tata Steel. To the west, the final effluent from the treatment works is discharged into the Bristol Channel.

Site address: Afan WwTW, Phoenix Wharf, Harbour Road, Port Talbot, SA13 1RA (NGR SS 76061 87329).

Figure 1.1: Afan STC Site Location

Emissions Ref	Emissions Points	Assets Ref	Assets	X	Y
A10	Whessoe Valve (Gas Holder)			276099	187297
A1	CHP Unit 1	1	CHP Unit 1	276139	187358
A2	CHP Unit 2	2	CHP Unit 2 (not in use)	276136	187364
A3	Boiler Unit 1	3	Boiler Unit 1	276141	187356
A4	Boiler Unit 2	4	Boiler Unit 2	276137	187362
A5	Flare Stack	5	Biogas Flare Stack	276069	187311
A6	Digester Unit 1	6	Digester Unit 1	276099	187275
A7	Digester Unit 2	7	Digester Unit 2	276118	187286
A8	OCU Carbon Filter	8	OCU Carbon Filter	276161	187353
A9	OCU Sulphuric Acid Scrubber	9	OCU Sulphuric Acid Scrubber	276172	187358
S1	Liquor Return Well to Sewer	10	Liquor Return Well	276163	187347
M1	Liquor Monitoring Point				
		11	Raw Sludge Import Hoppers	276134	187333
		11	Raw Sludge Import Hoppers	276135	187322
		12	THP Feed Silo	276150	187336
		13	Thermal Hydrolysis Plant (THP)	276150	187306
		14	Belt Presses x 3	276173	187319
		15	Indigenous Sludge Silo	276145	187345
		16	Gas Holding Tank	276088	187294
		17	Digested Sludge Holding Tank	276135	187304
		18	2 x Centrifuges	276157	187362
		19	Cake Storage Bays	276194	187328
		20	Carbon Filter	276101	187301
		21	2 x Condensate Traps	276098	187297
		22	1 x Condensate Trap	276136	187332

2 Process Description

2.1 Incoming Wastewater and Sludge

The Site provides sewage treatment for the catchment area of Port Talbot, Aberavon, Neath and Briton Ferry. Flows from the outlying Abbey, Baglan, Marlas and Kenfig, and Newbridge Road pumping stations arrive at the Afan WwTW headworks, which is located across the road from the main WwTW. There is also a high-level overflow located on the inlet from the Abbey SPS rising main, the overflow has a screen and allows emergency and storm flows to discharge.

Indigenous and imported sludge is treated at the Afan Advanced Aerobic Digestion (AAD) Facility. Surplus activated sludge is pumped to a sludge treatment building where it is mixed with a polymer solution, centrifuged and pumped along with imported sludge to the Cambi AAD process for further treatment.

2.2 Wastewater Treatment (for context only)

The screening plant is capable of treating up to 2423 litres/second of raw sewage. Screenings are transferred through a launder channel (300mm wide, 400mm deep and approximately 11m long) to a twin-screw conveyor to transport screenings to a screening handling plant. Flows are processed through three (2 duty, 1 standby) Parkwood escalator type screen with 6 mm perforated plate screening elements.

Each reversible 5.5kW DOL screening washer/compactor can treat a maximum volume of 22m^3/hr and are complete with disinfected final effluent wash water connection at 1 litres/sec at 3Bar g to wash, dewater and compact the screenings. Run-off from the washing and dewatering run under gravity back into the adjacent inlet channel.

It is possible for flows in excess to approach the grit plant, however the flow to treatment is limited by the duty of the sequencing batch reactors (SBR) inlet pumps. Grit is removed in a Jones and Attwood "Jeta" grit trap. Grit removed in the grit trap is separated in a grit classifier and stored in a skip for removal from site. Liquor separated from the grit in the classifier is returned to flow upstream of the grit plant.

Following de-gritting the sewage passes to the SBR inlet pumping station then is fed to the SBR's via the SBR inlet distribution chamber. The 900 mm diameter pipe feeding the inlet distribution chamber splits at a low level and rises through two vertical 900mm-diameter bell-mouths into the distribution chamber, as the level rises in the distribution chamber the flow will bypass over weirs formed in the concrete construction. There are eight electrically actuated weir penstocks in the inlet distribution chamber, one for each SBR basin. These operate in conjunction with individual SBR basins depending on the cycle/stage that the SBR is in at that particular time. When an SBR basin is in decant cycle the penstock is closed, no de-gritted sewage passes to a basin that is decanting supernatant water.

The outlet from the distribution chamber is by means of 8x 500mm diameter, ductile iron pipes. Each outlet feeds one SBR basin and the flows sequence is through a selector zone onto the pre-reaction zone and then the main aeration zone.

Penstocks on the outlet of the distribution chamber pass the influent to a selector zone within the basin prior to entering the pre-reaction zone and then the main aeration zone. The intermittent cyclic extended aeration system mode (ICEAS) mode is the current operating mode of the SBR's. In ICEAS mode, filling is constant throughout the cycle, the Inlet penstock remains open at all times and effluent is allowed into each on-line basin continuously.

Air is delivered into each basin using a diffuser grid arrangement that covers the entire floor of each basin including the pre-react, selector and main aeration zones.

A single submersible sludge return pump returns from return activated sludge within the main aeration basin to the pre reaction zone.

The same submersible sludge return pump pumps from surplus activated sludge within the basin to the surplus activated sludge tank.

The sequential batch reactors (SBRs) work on a cyclic processing principle. Influent, which enters the basins, undergoes either a 4-hour or 3-hour processing cycle depending on the flow into the works. The clarified liquor flow leaving the SBR plant is intercepted at the SBR outlet pumping station. Clarified liquor flows up to 1402 litres/sec (depending on the operating mode) is pumped through the works outlet chamber to the existing Afan headworks sea outfall system.

At the works outlet chamber, part of the flow is directed to the industrial water storage tank for use in the various treatment processes at the treatment works.

The sludge is pumped to Afan AAD.

Two water systems are provided, one providing industrial water (using final effluent), to the AD plant and one providing service water (using potable water).

The industrial water system provides wash water for the inlet works (grit classifier and inlet screen) and water for site hose points.

2.3 Sludge Treatment

Surplus activated sludge (SAS) is transferred from 1 No. 400m^3 SAS tank to 2 No. centrifuges, where the first dose of polymer is added. The thickened sludge is then pumped into 1 No. 100m^3 indigenous cake silo where it is pumped into 1 No. 600m^3 thermal hydrolysis plant (THP) feed silo. The THP feed silo also receives thickened sludge cake from 2 No 40m^3 imported cake silos/hoppers. From the THP feed silo, sludge is pumped into 1 No THP travelling through 1 No. 42m^3 pulper where it is heated to 100ºC with steam. The sludge is then fed to 1 of 4 No. 13m^3 reactors, Steam is injected into the reactor to increase pressure and temperature to approximately 6 barG and 165ºC, the steam pressure in the reactor is maintained for 20-30 minutes. The sludge then enters 1 No. 42m^3 flash tank, where the temperature is decreased to 100ºC. The THP conditions the sludge using pressurised steam. Steam condensate and gases are either recaptured back into the THP process or captured in the foul gas drum and discharged into the digester. Treated sludge from the flash tank is diluted to 10%DS using disinfected final effluent at ambient temperature and pumped through two coolers, where it is cooled to approximately 40C before entering the 2 No. 4250m^3 digesters (retention time minimum 13 days).

After the minimum retention time, the sludge is transferred via gravity into the post digested sludge tank (PDST). From here is it pumped up to 3 No. belt presses. Polymer is added to the sludge stream which feeds into the sludge prior to entering the belt press. Digested sludge is dewatered to 26 – 30% dry solids before being transferred to 1 No cake barn (consisting of 3 bays) and left to mature for 4 days. After which time is it taken away to be spread to land or quarantined off-site if it has not met the required pathogen limits.

The biogas generated during digestion is stored in 1 No. 2000m^3 double membrane gas holder. The gas is then passed through a siloxane removal plant which regenerates daily for 4 No. hours starting at midnight. Emissions from the filter are discharged via a 4m stack. The biogas is used in 2 No. CHP engines for electricity generation, which supplies the digestion plant and for recovering heat, to maintain digester temperature. The Site has 2 No. boilers (one for each

CHP) which are dual fuel. Any excess biogas is flared off via the on-site waste biogas burner (flare stack) during CHP downtime or emergencies which impact on the use of the CHPs.

CHP engines are fitted with engine jacket which is filled with water to cool the engine. The heat from the engine jacket water is then transferred to the hot water system, and used mainly to pre - heat dilution water for pre - hydrolysis stages, and pre - heat boiler feed water. Other uses of the low temperature heat include heating service water (disinfected final effluent) for the belt presses polymer system, and heating the buildings.

A portion of final effluent from the works is used in the sludge treatment plant to replace the need for potable water. The required amount of final effluent is pumped through a set of duty/ standby 300µm filters to reduce suspended solids contents before re - using it as cooling water for sludge coolers to cool hydrolysed sludge. Heated final effluent, returned from sludge coolers, is sent to the following places: (1) undisinfected final effluent tank, (2) passed through UV reactors to a disinfected final effluent tank and (3) final effluent outfall chamber.

Contents from the undisinfected final effluent tank (capacity of 5m3) are re - used as (1) dilution water for pre - hydrolysis process (pre - heated using LTHW/FE heat exchangers), and (2) irrigation water for odour control unit No.1 and No.2.

Heated final effluent used to produce disinfected final effluent is filtered to 100µm before passing through UV reactors for disinfection. A pair of duty/duty UV reactors is installed to kill the bacteria in the final effluent to produce disinfected final effluent with a total coliform concentration of less than 100mpn/100ml (95%percentile). The disinfected final effluent is then stored in a 5m^3 disinfected final effluent tank and used in (1) belt press washwater system, (2) belt press polymer make - up and carrier water system, (3) post hydrolysis dilution, (4) foul gas cooler, and (5) wash down hoses.

All sludge treatment activities are undertaken in enclosed buildings or tanks. The site also has two odour control units (OCUs) to mitigate the risk of odour. One extracts from the cake import hopper, the indigenous cake silo, the THP feed silo and the centrifuges. using a carbon filter system. The other which extracts odorous air from the belt press and cake bays and comprises a sulphuric acid scrubber. Media life and condition is reviewed on a regular basis although it is anticipated that media should last a minimum of two years.

All condensate from the CHP exhausts, flare stacks and biogas along with any other liquid waste or effluent will be discharged to the liquor return well and back to the adjacent Afan WwTW and will undergo treatment through the works before being discharged under an existing water discharge permit.

Refer to 100123523_ProcessDiagram_AFA September 2024 for a schematic of the sludge treatment process and for the 100123523_SiteLayoutPlan_AFA September 2024 for the site layout and location of the sludge treatment assets.

The IED permit includes the following assets:

- 2 No. Digesters (4250m^3 each)
- 1 No. Post digested sludge storage tank (PDST) (500m^3)
- 1 No. Gas bag holder (2000m^3)
- 1 No. Indigenous sludge silo (100m^3)
- 1 No. Thermal Hydrolysis Plant (THP) feed silo (600m^3)
- 1 No. THP (comprising 1 No. flash tank 42m^3, 1 No. pulper 42m^3 and 4 No. reactors 13m^3 each)
- 2 No. Imported cake silo (40m^3 each)

- 2 No. Centrifuges (SAS thickening – pre-digestion)
- 3 No. Sludge thickeners (belt presses – post-digestion)
- 2 No. Odour control units (1 No OCU (1) for the raw sludge silos in the import area and 1 No. OCU (2) for the belt press room (not in use))
- 1 No. Cake barn (with 3 No. cake bays, 4-day retention time, approx. 450m^3 total cake bay storage capacity, covered by barn)
- 2 No. Boilers (input of 3.9MWth each)
- 2 No. CHP (input of 3.745MWth each)
- 1 No. Biogas flare stack (1,500m^3/hr max)

The Site includes two CHP units and two dual fuel boilers, operating since 2011, these are permitted under EPR/ZP3032KQ. The CHP units have an input of 3.745MWth each, and the boilers have an input of 3.9MWth each. Therefore, the Site falls within the scope of the Medium Combustion Plant Directive (MCPD) since the thermal rated inputs are both greater than 1MWth. The CHP unit and boilers will not be required to meet MCPD requirements until 2030 because they are each existing medium combustion plants (MCP).

3 Accident Management Techniques

3.1 Loss of Containment

3.1.1 Gas Escape

Loss of containment of gaseous materials at the STC could result in the escape of biogas or other gases to the atmosphere around the site. In order to minimise the potential for accidental releases of gas from the Plant the following measures have been adopted:

- The Gas Holder is a double membrane consisting of an inner and outer membrane of double- sided PVC-lined fabric. The stored gas is contained within the inner membrane. The space between the inner and outer membranes is filled with air under pressure by duty/standby blowers, which run continuously. The exterior dimension of the gasholder remains constant.
- All pipework at the site used for the transfer of gaseous products has been manufactured to the appropriate British Standard using appropriate grade materials and all pipe joints and seals are also designed to meet the required British Standard;
- Regular monitoring of storage vessels, pipework and gas levels is undertaken to ensure no fugitive emissions are being released;
- Storage vessels and pipework are subject to regular visual inspection to ensure the structural integrity of the system remains uncompromised;
- All staff with responsibility for the handling or transfer of gaseous materials receive appropriate training for their role; and
- All staff on site receive training in site emergency procedures as listed in Appendix A, and the actions to take in the event of discovering a gas leak as part of their mandatory site induction training.
- The gas system has safety pressure release valves, which are designed to prevent over pressurisation of the system. Gas emissions from this point are monitored on telemetry with immediate call-out of staff to remedy.
- A waste gas burner is incorporated to deal with excess biogas and is the first point of relief for excess gas or pressure.

In the event of a loss of containment of gaseous materials at the site the Emergency Gas Plan will be followed. Preventative measures incorporated into normal operations include a risk assessment in accordance with the Dangerous Substances and Explosive Atmosphere Regulations 2002 (DSEAR) that will be periodically reviewed and updated against the latest DSEAR regulations and guidance to ensure best practice is adopted at the Plant. Drawings of the site zone classifications are presented in Appendix B.

3.1.2 Liquid Escape

Failure of the liquid containment systems at the STC could potentially lead to reagents and effluents discharging to surface waters and ground waters in proximity to the site. Potential risks associated with this have been reduced through the implementation of the following measures:

- The storage vessels for all liquid materials for sludge treatment on-site are double skinned or bunded to 110% capacity and have been manufactured to the required British Standard using appropriate grade materials.

- All pipework at the site used for the transfer of liquids has been manufactured to the appropriate British Standard using appropriate grade materials and all pipe joints and seals are also designed to meet the required British Standard.
- Regular monitoring of storage vessels, pipework and fluid levels is undertaken to ensure no fugitive emissions are being released.
- Storage vessels, bunds and pipework are subject to regular inspection by site operational and maintenance teams to ensure the structural integrity of the system remains uncompromised.
- Spill kits comprising suitable materials for the containment of liquid spills have been placed appropriately throughout the site for the use of all staff.
- Site surfaces surrounding liquid storage areas and transfer pipes are constructed of impermeable material and equipped with appropriate drainage structures to prevent escape of fluids to surface waters or groundwaters.
- All staff with responsibility for the handling or transfer of liquid materials receive appropriate training for their role.
- All staff on site must receive training in site emergency procedures and the actions to take in the event of discovering a liquid spillage and the use of spill containment measures as part of their mandatory site induction training.
- COSHH Data Sheets are provided in Appendix C for all raw materials stored on site.

3.1.3 Material Storage

All chemical tanks and stores must be clearly labelled and marked with appropriate warning signs and all delivery points must be kept locked except when in the presence of a Works team member.

The levels of raw materials are checked and recorded. Diesel levels are checked monthly and recorded in WOF 002m (Monthly Checklist of Routine Activities).

During deliveries of material to site, special care is taken to ensure that all storage tank levels and contents are checked in order to prevent the accidental overfilling of tanks or the inadvertent mixing of substances. Specific measures are in place for the discharging of sludge from delivery tankers to reduce the risk of overfilling of the tank and spillages during discharge.

The following are requirements for deliveries on site:

- Each direct delivery must be checked for the correct quality and strength and to ensure that no damage etc. has occurred in transit.
- Supplier's Advice Notes must be checked, to ensure that the goods match the documentation, and then signed.
- Retained copies of Supplier's Advice Notes are filed in the Reception Building.
- All chemical deliveries must be supervised by nominated personnel as detailed on the current list.
- Chemical deliveries must be recorded and must include a declaration that they conform to the required standard, either on the delivery note, or as a separate certificate of conformance
- Appropriate training is provided to personnel involved in receipt and handling of deliveries and specific procedures for the filling of tanks have been developed within the Plant management systems.

Details of the raw materials and process chemicals held on site and their storage arrangements are provided in Table 3.1 below.

Table 3.1: Raw materials, volume and storage arrangements

Description of raw material and composition	Maximum amount stored	Annual throughput	Description of the use of raw materials	Storage
Diesel	4,500 litres	2,000 litres	Used for mobile plant on site and boilers.	Bunded tank
Lubricant oils	2,000 litres	1,500 litres	For lubrication of CHP engines and machinery.	Waste oil tank
Poly (Cationic Polyacrylamides) (FloPam FO4440 and FloPam FO4808SSH)	35 tonnes	140 tonnes	Used as flocculant to enhance thickening and dewatering processes. Amount ordered depends on centrifuge use.	Powder: poly building not in a bund Liquid: within a bund
Antifoam	200 litres	50 litres	Used in digesters to prevent foaming	
Grease	200 litres	100 litres	Used for lubrication plant and equipment	
Tannin	1,000 litres	3,000 litres	Boiler water treatment	Bunded tank and intermediate bulk container (IBC)
Activated carbon	0.36 tonnes	0.072 tonnes	360kg of carbon media across both siloxane filters. Media is changed every five years	
Sodium Hydroxide	1,000 litres	10,000 litres	Used for the boiler water treatment and pipework cleansing	Bunded tank and IBC
Sulphuric Acid	1,000 litres	0 litres*	Used for the OCU acid scrubber process	None currently stored on site as OCU is not in use

* Sulphuric acid was originally used in the OCU but currently the OCU is out of action, so annual throughput is 0 litres.

3.1.4 Odorous Emissions

Odour control systems are installed at Afan WwTW and operate in the following areas:

- Odour Control Unit No.1 comprises a biological filter and a carbon polishing filter in series, and 2 odour extraction fans. The 2 odour extraction fans are fixed speed fans and operate as duty/standby. Disinfected effluent is used to irrigate the media in the biological filter unit. Odour Control Unit No.1 extracts malodorous air from:
  - 2 cake import hoppers
  - 1 indigenous cake silo
  - 1 THP feed silo
  - 2 existing centrifuges
- Odour Control Unit No.2 comprises a sulphuric acid scrubber that takes air from belt press and cake bay area and 2 odour extraction fans. The 2 odour extraction fans are fixed speed and operate as duty/standby. Disinfected effluent is used to irrigate the media in the biological filter unit. Odour Control Unit No.2 takes malodorous air from
  - 3 belt presses
  - 3 cake bays

Regular inspection of site storage facilities and pipework is undertaken to ensure that the structural integrity of the system remains intact in line with the Afan STC Odour Management Plan (OMP).

Regular site inspections and sniff checks are undertaken by the site team to ensure that no significant fugitive emissions of odour likely to cause pollution of the environment, adversely impact human health or significantly reduce the amenity of the local area are present. In the event of an accidental emission of odorous material from site storage facilities or pipework, the source of the emission will be isolated, investigated and, if required, operation suspended until the source of the emission has been sealed.

3.1.5 Vandalism and Unauthorised Access

Vandalism and unauthorised access to plant infrastructure and work areas has the potential to result in:

- Damage to plant infrastructure and equipment
- Increased risk of injury to personnel
- Uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to the environment

Operations and Maintenance (O&M) activities at the STC occur on a continuous basis and high levels of site security are maintained to prevent unauthorised access to plant infrastructure and work areas. In light of this the potential for vandalism is considered to be effectively minimised. The following measures have also been adopted as security measures:

- All visitors to the Tata site must sign in at the visitors centre and also obtain a vehicle pass to allow access through the main gate security barrier.
- On arrival at site, visitors must sign the visitor's book located in the entrance to the AAD office building and also announce their arrival to staff in the control room located on the first floor.
  - Mess Room
- The site is manned 24/7, with continuous monitoring undertaken.
- CCTV is installed across the site.
- Fencing has been erected around the site boundary to prevent unauthorised access.
- Lighting has been incorporated to provide increased visibility and deter intruders.
- Warning notices have placed at site access points.
- Regular inspections of the perimeter fencing are undertaken to identify areas of damage and maintenance is undertaken where required.

3.1.6 Physical Protection Measures

The site has been designed to include protection of structures to minimise accident / incident issues. Potential risks associated with this have been reduced through the implementation of the following physical protection measures:

- All pipework at the site used for the transfer of gaseous products has been manufactured to the required British Standards using appropriate grade materials and all pipe joints and seals are also designed to meet the required British Standard; and
- Storage vessels and pipework are subject to regular inspection, by the site team to ensure the structural integrity of the system remains uncompromised.

- Construction of a secondary containment bund, to 110% of the volume of the largest tank, to prevent the escape of sludge from the site during the unlikely event of a catastrophic tank failure.

3.1.7 Overfilling of tanks

During deliveries of material to site special care is taken to ensure that all storage tank levels and contents are checked in order to prevent the accidental overfilling of tanks or the inadvertent mixing of substances. Appropriate training is provided to personnel involved in receipt and handling of deliveries and specific procedures for the filling of tanks will be developed within the quality and environmental management system (QEMS) for the site.

The volume of material in the receiving tanks will be measured and recorded manually prior to filling.

In the event of a spillage of polluting substances, the site's spillage procedure will be followed (Appendix A). Absorbent material contained within the spill kits provided on site, will be used to clear the spillage. Relevant management will be informed of the incident as soon as possible. The management informed of the spillage will be responsible for notifying the relevant authority (NRW or the HSE), if required. The used materials will be removed and stored in suitable containers prior to authorised disposal to a licenced waste management facility.

The Installation will incorporate impermeable paving with self-contained drainage.

3.1.8 Fire

Operational activities at the STC are such that the potential for fire and explosion exists. However, the local Fire Service has not carried out any risk assessment investigations on site. Potential hazards arising from fire and explosion at the Plant include:

- Uncontrolled release of pollutants from equipment, plant and infrastructure;
- Uncontrolled release of pollutants from material stores; and
- Loss of containment of contaminated firewater.

Fire extinguishers are placed throughout the STC and operations staff are trained in their use for escape purposes only in order to minimise the risk to life posed by fire and explosion. However, the emergency policy is to evacuate the building in the event of a fire. Staff are informed during induction of the emergency procedures at the Plant to be followed in the event of fire incidents at the site. There is automatic gas escape and fire detection equipment installed which initiates a shutdown of processes if activated.

The site is able to manage fire water runoff by diverting, where appropriate, water to the storm tanks or inlet works for treatment through the adjacent WwTW.

A Fire Prevention Plan is not required for the site, as the biowaste process on site is wet anaerobic digestion. However, fire prevention and environmental fire risk assessment procedures are provided in the EMS and H&S manual. Emergency procedures for fire or smoke on any part of the plant are included in Appendix A.

3.2 Post-incident Review

Following the occurrence of any incident identified above, the incident will be logged within the company health and safety system and a review of the incident response and applicable emergency procedure will be undertaken. This review will assess:

- The cause of the incident;
- The effectiveness of the response measures;

- The effectiveness of the emergency response management team;
- Lessons learned;
- Recommendations for improvement.

If appropriate, the findings of this review process will be escalated and will inform immediate or future investment decisions and planning and revisions of the Accident Management Plan.

3.3 Contingency plan during clean up

The DCWW emergency plan covers various scenarios relating to both gas and sludge release.

This contingency plan would not be used in isolation, but in conjunction with DCWW company wide emergency planning procedures, incorporating our Bronze, Silver and Gold emergency response procedures which are in place for medium and major disaster recovery situations. It sets out how DCWW would plan, maintain and respond to a major release of sludge from a digester.

Once the containment area is constructed, it will be possible, in the unlikely event of a catastrophic failure of a digester, to contain any sludge and either retreat through our existing de-watering equipment and or use tankers to remove sludge from site to our other AAD facilities.

The timeframe for clean up is highly dependant on many factors, such as how much has been released and as mentioned above how much we can re-treat through our existing equipment. The containment report allows for 3-4days to clear the sludge and clean the site after a total failure scenario and this is considered achievable by DCWW. The site is manned and monitored 24/7/365, therefore, in the event of any incident occurring on site, DCWW would be able to respond, assess and manage the incident in a timely manner.

The biological treatment process will remain protected by isolating the return liquor pumping station as outlined in the emergency plan. Surplusing of activated sludge will be suspended until the pumping station can be recommissioned or alternative arrangements put in place, such as tankers to support the removal of sludge and/or firefighting water.

The digesters at Afan were emptied and internally inspected last year (2022) by an independent structural engineering company and were found to be in very good condition. Ongoing monitoring of the digester condition will continue with the undertaking of two yearly thermal imaging drone technology, which has been very successful and accurate. Daily visual inspections are undertaken by staff as part of their daily checks and digester performance data is produced daily, which is reviewed and monitored by staff and Marches Biogas who are experts in digester health and performance. Therefore, DCWW are confident that there are robust management checks in place to prevent and identify any potential short or long term issues, which could lead to any failure of the assets.

4 Risk Assessment Methodology

The risk assessment has been undertaken by identifying hazards and source-pathway receptors and assigning a probability of exposure and a severity of consequence. These are assigned as described in Table 4.1 and Table 4.2 and are based on the generic risk assessments used for standard rules "SR2008 No19[1]", applicable to anaerobic digestion operations including use of the resultant biogas.

The probability and severity scores are then combined within a matrix to give an overall magnitude of the risk. This matrix is shown in Table 4.3 and is intended to illustrate the general approach to scoring.

Risks are categorised as either low, medium or high; this ranges from being a nuisance in some instances to potential health risks in others.

Table 4.1: Severity Index

Severity of harm	Severity index
Impact to people or designated receptor	
Impact to non-designated receptor	
All other impacts	

Table 4.2: Probability Index

Severity of harm	Severity index
Impact to people or designated receptor	
Impact to non-designated receptor	
All other impacts	

Table 4.3: Magnitude of risk

Magnitude of risk	Probability index		
Severity index	**Low**	**Medium**	**High**
Low	Low	Low	Medium
Medium	Low	Medium	High
High	Medium	High	High

[1] Natural Resources Wales (2018) Standard rules SR2008No19_250kte – non-hazardous sludge biological, chemical and physical treatment site. [online] Available at: https://naturalresources.wales/media/696605/sr2008-no19-non-hazardous-sludge-biological-chemical-and-physical-treatment-site-v60.pdf Accessed May 2024

Table 4.4: Accident risk assessment table

Data and information				Judgement				Action (by permitting)	
Receptor	**Source**	**Hazard**	**Pathway**	**Probability of exposure**	**Consequence**	**Magnitude of risk**	**Justification for magnitude**	**Risk management**	**Residual risk**
All surface waters close to and downstream of the Site.	Tank failure, spillages of digestate and/or liquids including oil Damage to drainage system. Spillage of raw materials or sludge/liquor during delivery/storage Contaminated run off from cake storage e.g. containing suspended solids.	Acute or chronic effects to aquatic life, contamination and deterioration of water quality.	Direct run-off from the Site across ground surface, via surface water drains, ditches etc. Indirect run-off via the soil layer Transport through soil/groundwater then extraction/ abstraction at borehole or intake.	Low	Medium	Low	The Bristol Channel is adjacent to the Site and the nearest sensitive receptor. However, the potential for spillage from digestion tanks and storage vessels is considered low and processes on-site are generally contained. Potential for leaks from digestion tanks, storage vessels/bays and drainage system which may cause contamination or deterioration of surface water quality. Permeable ground surfacing currently surrounds the digesters. Site infrastructure and hardstanding are generally in a good condition. Quantities of liquids and raw materials stored on Site are generally low.	The site drainage plan is documented and all staff are trained in the event of emergency or accident. Impermeable surface and secondary containment, in the form of constructed bunds or portable bunds, is in place around storage areas of all wastes and raw materials and surrounding the STC and WwTW. All transfer of digestate and material takes place under supervision and with flow rate control. All tanks undergo a delegated inspection regime and the process parameters are monitored and understood by site operatives. Digestion tanks are built to an appropriate standard. Raw materials and liquids/chemicals are stored in suitable locations on-site and are appropriately bunded. Activities are managed and operated in accordance with the EMS. Spill procedures are in place. All spillages are recorded in the site diary including actions taken. Site Manager ensures the programme of Planned Preventative Maintenance is implemented effectively to minimise the probability of equipment malfunction. Control of substances hazardous to health (COSHH) assessment undertaken for all raw materials. All condensate from the CHP, flare stacks and biogas system discharges into a sealed system and are returned to the head of the works. The condensate is clean, uncontaminated water and is small in quantity. Contaminated surface water is recirculated back to the head of the works. The stormwater drainage of potentially contaminated areas from within the Site boundary is recirculated into the head of the works. Regular inspections of the site drainage systems and other equipment are undertaken, with any repairs and maintenance carried out if necessary. All complaints and other incidents are recorded in the site diary including actions taken. An AMP will be implemented and followed to further reduce risks if incidents occur.	Low
Groundwater, land and surface water	Spillage of liquids, contaminated rainwater run-off from waste e.g. containing suspended solids.	Chronic effects: contamination of groundwater, requiring treatment of water or closure of borehole or	Transport through soil/groundwater then extraction at borehole or intake.	Low	Medium	Low	Potential for leaks from digestion tanks and storage vessels. Site infrastructure and hardstanding is generally in a good condition. Quantities of	All sludge treatment processes are covered or enclosed. A CIRIA 736 risk assessment was undertaken by Mott MacDonald Bentley (MMB) in 2020. The following assets were assessed during this risk assessment: • cake import area	Low

Data and information				Judgement				Action (by permitting)	
	Sludge/liquid spillages as a result of loss of tank/pipe integrity/ carelessness during transfer or overfilling	closure of abstraction intakes. Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality. Pollution of water or land.					liquids stored are generally low. The Blown Sands superficial aquifer underlying the Site is designated by the Environment Agency as a Secondary A aquifer. The Marine Beach Deposits are classified as a Secondary Undifferentiated aquifer. The South Wales Middle Coal Measures formation is designated as a Secondary A aquifer. Quantities of liquids stored are generally low.	• thermal hydrolysis plant (THP) feed silo • THP • digesters; and • digested sludge holding tank The risk assessment concluded that the probability and risk of failure from the assessed tanks is very low and any associated loss of inventory volume would be contained within the adjacent hardstanding area. Existing impermeable hardstanding and vehicular barriers mitigate the risks from loss of containment. Spill kits are available near some of the chemical storage. All transfer of digestate and material takes place under supervision and with flow rate control. All primary tanks undergo a delegated inspection regime and the process parameters are monitored and understood by site operatives. Site Manager shall ensure the programme of PPM is implemented effectively to minimise the probability of loss of tank/pipe integrity. Activities to be managed and operated in accordance with the EMS. Spill procedures are in place. All spillages are recorded in the site diary including actions taken. All condensate is discharged into a sealed system and returned to the head of the works. An AMP will be implemented and followed to further reduce risks if incidents occur.	
Groundwater, land and surface water	Damage to drainage system	Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality. Pollution of water or land.	Transport through soil/groundwater then extraction/ abstraction at borehole or intake.	Medium	Medium	Medium	Presence of pipework below ground. There is no leak detection of underground pipework on the Site.	Site Manager ensures the programme of PPM is implemented effectively and inspections are carried out frequently to minimise the probability of damage to the drainage system. Activities to be managed and operated in accordance with the EMS. An AMP will be implemented and followed to further reduce risks if incidents occur.	Medium
Groundwater, land and surface water	Flooding of Site	If waste is washed off site it may contaminate natural habitats downstream.	Flood waters	Low	Medium	Low	Permitted waste types are sludges/bio-solids, which may contain pathogens, so any waste washed off site will add to the volume of the local post-flood clean up and may be hazardous to human health.	The drainage network sends water to the head of the works for treatment. There are no direct potentially contaminated discharges to controlled surface waters. Activities are managed and operated in accordance with a management system and management plans and procedures implemented, including (but not limited to) the removal and clean-up of spilled waste material, including sludge, cake etc. and other pollutants (this may also include removal of used spill kits and mobile bunds) before these could enter any flood waters if an event was to occur.	Low
Local human population, domestic properties, site offices.	Spillage of odorous materials including oils, fuels, chemicals.	Nuisance, loss of amenity.	Air transport then inhalation.	Low	Medium	Low	Local residents and staff often sensitive to odour. Waste processes on-site are generally conducted within sealed units.	Procedures for dealing with spillages are covered in the EMS. The Site Manager shall ensure all relevant staff are appropriately trained to use the spill kits and that all spillages are cleaned up immediately.	Low

Data and information				Judgement				Action (by permitting)	
	Failure to clean up spillages. Contaminated spill equipment not disposed of appropriately.						Accidental major spillages are unlikely to occur and cause an odour nuisance/	All areas of the Site are to be cleaned regularly; Site Manager to oversee regular cleaning schedule, all staff trained on importance of good housekeeping and site cleanliness. All spills are recorded in the site diary including actions taken.	
Local human population and / or livestock after gaining unauthorised access to the installation.	All on-site hazards: machinery, tanks, wastes and vehicles.	Bodily injury Risk of drowning	Direct physical contact.	Low	Medium	Low	Potential injury to on-site personnel as a result of vehicle movements or equipment malfunction or misuse. Direct physical contact is minimised by activity being carried out within enclosed digesters, so a low magnitude risk is estimated. Access to storage tanks is probable with a risk of drowning. Contact with waste is minimal with exception of leaks or spills from unloading of tanker and transfer of filter cake.	Overall management of the site is overseen by an experienced member of staff holding an appropriate Certificate of Technical Competence (CoTC) awarded by the Waste Management Industry Training and Advisory Board. This competent person delegates responsibilities to appropriately experienced and trained site operatives throughout the operating hours. DCWW is currently working on an accredited Competency Management System under the Competent Operator Scheme to replace the need to have WAMITAB qualified staff to cover the technical competent management requirements. DCWW hopes to have this completed in the next 6 months. All operational staff are fully trained in the site operating procedures and safety and environmental management procedures and are kept up to date on changes. Training includes awareness raising of the potential on-site hazards and health and safety measures to adhere to. Preventative measures will be under continuous review as part of the EMS procedures. Activities are managed and operated in accordance with the EMS – this includes site security measures to prevent unauthorised access. No maintenance work or contractor is permitted on-site without a suitable permission to work and qualification. Activities are managed and operated in accordance with the EMS. Lighting is provided at all reception facilities to give good visibility at all times of the day and night. The Site is manned 24 hour, 365 days a year. Key sludge treatment and wastewater treatment activities undertaken within enclosed systems. Vehicle movements around the site vary depending on what activities are being undertaken. Cake is stored undercover. Cake is removed from site frequently during specific land spreading windows – typically throughout the summer months. Waste is removed as required. Therefore, frequent vehicle movements are typically undertaken only by site staff and maintenance contractors.	Low
Local human population and local environment.	Explosion of biogas and AD causing the release of polluting materials to air	Respiratory irritation, illness and nuisance to local population. Injury to staff, fire	Air transport Direct run-off from site across ground surface, via	Low	High	Medium	Emissions to air, land or water may cause harm to and deterioration of air, land or water.	Although biogas is flammable, risk of direct physical contact is minimised by activity being carried out within the sludge treatment works and in containerised units or locked buildings.	Medium

Data and information				Judgement				Action (by permitting)	
	(smoke or fumes), water or land	fighters or arsonists/vandals. Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land. Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality.	surface water drains, ditches etc. Indirect run-off via the soil layer Transport through soil/ groundwater then abstraction.				Smoke and fumes may cause irritation, illness or nuisance to local residents and site staff. An explosion could cause injury to local residents and site staff from flying debris. Permitted waste types limited to sludges and liquids.	The key sludge treatment and WTW processes are undertaken within enclosed systems such as the AD and biogas systems. Activities are managed and operated in accordance with the EMS, H&S and O&M manuals – this includes site security measures to prevent unauthorised access. No maintenance work or contractor is permitted on-site without a suitable permission to work and qualification. Fire detection equipment is installed in the CHP containers and the boiler building which activates an alarm on detection of a fire. Slam shut valves on biogas lines will automatically close on detection of a fire to prevent any fuel being supplied to the CHP engines or boilers. The EMS includes procedures relating to maintenance and inspection of bunding of tanks.	
Local human population and local environment	Explosion of pressurised tanks due to equipment and/or process failure.	Respiratory irritation, illness and nuisance to local population. Fatality/injury to staff, fire fighters. Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land. Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality.		Low	High	Medium	Emissions to air, land or water may cause harm to and deterioration of air, land or water. Smoke, fumes and material released from tanks may cause irritation, illness or nuisance to local residents and site staff. Impact from the tank explosion may cause external damages to other equipment, buildings located close to the epicentre of the explosion.	Site Manager shall ensure the programme of Planned Preventative Maintenance (PPM) is implemented effectively to minimise the probability of fire through faulty plant and equipment. All equipment is checked and calibrated as per the manufacturer's instructions. The THP process operates at high temperatures (up to 160 degrees) and high pressure (6 bar). All plant and materials are designed for this environment and fail safes are in place to prevent over heating or over-pressurisation of the system. Emergency operating procedures are in place and detailed in the Site's Operational Continuity Plan. An accident management plan is part of the EMS and includes measures for security, fire and spill management. Training and regular toolbox talks are given to operatives on-site and all operators and staff understand their role in an emergency. The EMS includes procedures relating to maintenance and inspection of tanks. Smoking only permitted in designated areas. An AMP will be implemented and followed to further reduce risks if incidents occur.	Medium
Local human population and local environment	Accidental fire causing the release of polluting materials to air (smoke or fumes), water or land. Equipment failure	Respiratory irritation, illness and nuisance to local population. Injury to staff or fire fighters. Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land. Acute or chronic effects to aquatic	Air transport Direct run-off from site across ground surface, via surface water drains, ditches etc. Indirect run-off via the soil layer Transport through soil/ groundwater then abstraction.	Low	High	Medium	Emissions to air, land or water may cause harm to and deterioration of air, land or water. Smoke and fumes may cause irritation, illness or nuisance to local residents and site staff. Although biogas is flammable, risk of direct physical contact is minimised by activity being carried out within the sludge treatment works and in containerised units or locked buildings.	The key sludge treatment and WwTW processes are undertaken within enclosed systems such as the AD and biogas systems. Activities are managed and operated in accordance with the EMS, H&S and O&M manuals including, fire and spill management. Fire detection equipment is installed in the CHP containers and the boiler building which activate an alarm on detection of a fire. Slam shut valves on biogas lines will automatically close on detection of a fire to prevent any fuel being supplied to the CHP engines or boilers. A Fire Prevention Plan is not required to be submitted for the permit application as the biowaste process on site is wet anaerobic digestion. However, fire prevention and environmental	Medium

Data and information				Judgement				Action (by permitting)	
		life, contamination and deterioration of land and water quality.					Risk of accidental combustion of waste is minimal. Permitted waste types limited to sludges and liquids.	fire risk assessment procedures are provided in the EMS and H&S manual. Smoking is only permitted in designated areas. Firewater is diverted through the drainage system to the head of the works to be contained on site and treated through the wastewater treatment system. Training and regular toolbox talks are given to operatives on-site and all operators and staff understand their role in an emergency. The EMS includes procedures relating to maintenance and inspection of bunding of tanks, spills and environmental incidents. Site Manager shall ensure the programme of Planned Preventative Maintenance (PPM) is implemented effectively to minimise the probability of fire through faulty plant and equipment. All equipment is checked and calibrated as per the manufacturer's instructions. Emergency operating procedures are in place. An AMP will be implemented and followed to further reduce risks if incidents occur.	
Local human population and local environment.	Arson and/or vandalism causing the release of pollution materials to air (smoke and fumes), water or land	Respiratory irritation, illness and nuisance to local population. Injury to staff, fire fighters or vandals/arsonists. Potential for uncontrolled release of fugitive emissions of gaseous, liquid or solid materials to air, water or land. Acute or chronic effects to aquatic life, contamination and deterioration of land and water quality.	Air transport Spillages and contaminated firewater by direct run-off from site across ground surface, via surface water drains, ditches etc. Indirect run-off via the soil layer Transport through soil/ groundwater then abstraction.	Low	High	Medium	Emissions to air, land or water may cause harm to and deterioration of air, land or water. Smoke and fumes may cause irritation, illness or nuisance to local residents and site staff. Although biogas is flammable, risk of direct physical contact is minimised by activity being carried out within the sludge treatment works and in containerised units or locked buildings. Risk of accidental combustion of waste is minimal. Permitted waste types limited to sludges and liquids.	The key sludge treatment and WwTW processes are undertaken within enclosed systems such as the AD and biogas systems. Activities are managed and operated in accordance with the EMS, H&S and O&M manuals – this includes site security measures to prevent unauthorised access, fire explosions and spill management. No maintenance work or contractor is permitted on-site without a suitable permission to work and qualification. Fire detection equipment is installed in the CHP containers and the boiler building which activate an alarm on detection of a fire. Slam shut valves on biogas lines will automatically close on detection of a fire to prevent any fuel being supplied to the CHP engines or boilers. A Fire Prevention Plan is not required to be submitted for the permit application as the biowaste process on site is wet anaerobic digestion. However, fire prevention and environmental fire risk assessment procedures are provided in the EMS and H&S manual. Firewater is diverted through the drainage system to the head of the works to be treated through the wastewater treatment system. Training and regular toolbox talks are given to operatives on-site and all operators and staff understand their role in an emergency. The EMS includes procedures relating to maintenance and inspection of bunding of tanks, spills and environmental incidents. Site Manager shall ensure the programme of Planned Preventative Maintenance (PPM) is implemented effectively to minimise the probability of fire through faulty plant and equipment. All equipment is checked and calibrated as per the manufacturer's instructions. Emergency operating procedures are in place.	Medium

Data and information				Judgement				Action (by permitting)	
								Adequate firefighting measures are implemented on-site. Regular inspections of the boundary fencing and buildings are undertaken to ensure that these have not been compromised and continue to prevent easy access to the Site. Repairs are undertaken in accordance with the EMS requirements.	
Local human population and local environment.	Operator Error	Pollution to air, land, surface water and groundwater and human health	Air transport Direct run-off from site across ground surface, via surface water drains, ditches etc. Indirect run-off via the soil layer Transport through soil/ groundwater then abstraction.	Low	Medium	Low	Possible contamination to air, land, groundwater and surface water.	Activities to be managed and operated in accordance with the EMS and management plans and procedures implemented. All equipment is checked under preventative maintenance plans and is checked and calibrated as per the manufacturer's instructions. Overall management of the site is overseen by an experienced member of staff holding an appropriate Certificate of Technical Competence (CoTC) awarded by the Waste Management Industry Training and Advisory Board. This competent person delegates responsibilities to appropriately experienced and trained site operatives throughout the operating hours. All operational staff are fully trained in the site operating procedures and safety and environmental management procedures and are kept up to date on changes. Training includes awareness raising of the potential implications of failure to control operations and the potential impact on the environment. Preventative measures will be under continuous review as part of the EMS procedures. Emergency operating procedures are in place. Senior site-based management have direct responsibility for implementing risk management measures. An AMP will be implemented and followed to further reduce risks if incidents occur.	Low

5 Competence and Training

Staff at the Installation have the competency to manage and operate activities without causing pollution. Competency is ensured through the appropriate training of all staff, covering:

- Awareness of the regulatory implications of the Environmental Permit and AMP for the activity and their work activities.
- Awareness of all potential environmental effects from operation under normal and abnormal circumstances.
- Awareness of the need to report any deviation from the Environmental Permit.
- Prevention of accidental emissions and action to be taken if accidental emissions occur.

All staff are aware of the implications of activities undertaken including the operation of the Site. Staff have clearly defined roles and responsibilities. Skills and competencies necessary for key posts are documented and records of training needs and training received for these posts maintained.

All DCWW Wastewater Treatment Works Operators are put through rigorous training to ensure competence for the role. Initially all operatives will complete a Level 2 Wastewater Treatment Processes Programme which is 9-days' duration. This consists of units from the Certification and Assessment Board for the Water Industry (CABWI) Diploma in Water Engineering with written assessments and covers all basic aspects of the wastewater process. Six to twelve months later, the Operators will complete the Level 3 Competent Operator Programme.

An "Advanced Digestion – Technical Operator" Knowledge and Skills Framework has been developed to identify all the relevant training required for the role. Through monthly one to ones with line managers and the annual Performance Management Review Process it is ensured that operations staff can demonstrate the knowledge and skills identified or are put forward for further training to develop the competency, if needed.

Training in the actions to be taken in the event of an accident or emergency is provided to all Operator and Contractor staff working on site as part of their mandatory site induction procedure. All staff are required to demonstrate their understanding of the AMP, and the actions and procedures contained therein, prior to undertaking any activities on-site. It is the responsibility of the site manager to ensure that all staff members have received this training.

Regular installation drills are undertaken to ensure that all staff are aware of the actions to be taken in the event of an accident or emergency and those staff with specific responsibilities are fully versed in their duties.

Copies of the AMP are available for the review of all staff.

DCWW has an accredited Competency Management System under the Competent Operator Scheme. The Scheme will develop technical competency courses and skills to demonstrate that personnel have the appropriate technical skills and knowledge to manage the activities undertaken. The CMS was independently audited by LRQA and was accredited in March 2023 in which the Afan site was visited. A copy of the CMS certificate is presented in document reference 100123523_MSD_CMS Cert_AFA September 2024.

6 Distribution and Revisions

Master copies of the AMP are made available to all staff as part of their induction package and available on Sharepoint (DCWW Document system) for staff to review.

Review of the AMP will be undertaken following any accident or emergency or after a period of not more than every three years; whichever is the sooner. It is the responsibility of the site manager to ensure that this review is carried out. Should a need for earlier review be identified, e.g. following an incident, a change in working practices or equipment at the Installation, this shall be undertaken by the Installation EMS Manager.

7 Health and Safety

DCWW has a comprehensive H&S management system. This includes numerous instruction and guidance procedures. All staff are trained in elements of H&S appropriate to their role.

All operations within the works are subject to the provisions of the Dwr Cymru/Welsh Water Health and Safety Manual.

Safety equipment such as breathing apparatus, gas bottles, and harnesses is located at the Afan STC. Personal gas detectors are carried on Company vehicles.

The training records are held electronically within the SAP HR module and are administered by the Training Dept.

8 Non- Compliance Procedures

Routine operation of the installation is subject to the conditions of the site permit which details various requirements for actions and reporting for both routine and non-compliance.

The permit sections include:

Section 1 - Management of Installation

General management of the site, including handling and disposal of wastes

Section 2 Operation of Installation

General operation of permitted activities and improvements

Section 3 Emissions and Monitoring

Routine monitoring of all emissions (e.g. odour), including annual reporting of specified point emissions (e.g. various specified exhaust gases from CHPs)

Section 4 Records and Reporting

An important section that includes the reporting of non-compliance with any permitted element. The major elements of concern would be

1. Loss of containment of gaseous substance
2. Loss of containment of liquid substance
3. Equipment / plant failure causing loss of gas or liquid – inclusive of routine emissions monitoring.

Any losses or failures to comply with these areas require immediate notification to the Natural Resources Wales, followed by “Schedule 6, Part A Notification” by email or paper means. The Part A must be submitted within 24hrs of detection of failure. “Part B” notification would then follow giving supporting information as soon as practicable.

Handling of the incidents on site will be in line with relevant internal incident and accident procedures. These are all subject to audit via internal and external audit protocols.

A. Emergency Response Procedures

The following Hazards are addressed in specific Emergency Response Procedures (ERP) which will be located at each Emergency Control Centre. These will be updated and others added as appropriate.

- Fire
- Explosion
- Pollution
- Flooding
- Road traffic accident impact or collision
- Collapse of a structure or building
- Sludge spillage
- Chemical spillage/leak
- Diesel spillage/leak
- Overfilling vessels
- Plant and equipment failures
- Containment failure
- Failure to contain firewater
- Incorrect connection leading to releases to drains and other systems
- Incompatible substances coming into contact

In the event of one or combination of the following incidents occurring, the actions listed in the relevant ERP must be followed.

Issue Number & Date	Details of Change
Issue 10, 18th January 2021	Annual review of procedure All amendments highlighted in yellow. Section 4.1 - Updated to reference the new environmental aspect and impacts register and process. Section 4.2 – Updated to reference the PR19 – Performance Commitments. Section 5 – Reworded to reflect the process.
Issue 11, 22 October 2021	Section 5 – removed ENF 006 Form and replace with the requirement to email information to the DCWW Permitting Inbox for Fly Tipping.

4.0 Generic Environmental Management System – IMS Team

All aspects of the generic environmental management system are controlled and maintained by the IMS team.

4.1 Aspect and Impact Register

To understand DCWW's environmental impacts EN (2) 01 - Aspect and Impact Register has been developed and is maintained for our activities. The Register details all aspects of our activities and their potential impact on the environment, providing guidance, detailing how the aspects and impacts have been identified, scored and controlled.

Once the Aspects have been identified they are graded using the Significant Environmental Aspects Risk Rating Matrix. The matrix applies a simple traffic light system, Red signifying those aspects that have a greater impact on the environment, reducing severity to Amber then Green. Aspects and Impacts graded Red and Amber are considered significant and targets will be set to track, monitor and improve performance. These are held centrally in our PR19 – Performance Commitments.

Performance commitments are reported monthly to DCE to monitor progress.

4.2 Environmental Performance Commitments

IMS (1) 02 DCWW Performance Commitments is derived from the PR19 – Performance Commitments and address significant aspects and impacts. The performance commitments set targets to reduce impacts on the environment. These are monitored and controlled by business areas and reviewed by the IMS Team during Management Reviews.

4.3 Scope of the Environmental Management System

The SP (1) 01 - Master Asset List contains all IMS sites and shows all certified Environmental (ISO 14001) sites.

5.0 Environmental Procedures Overview

EN (3) 02 – Waste Management

This procedure defines waste management principles and guidance for the legal disposal of waste. This procedure goes into specific detail of the handling of Hazardous and Non-Hazardous Waste

including the use of a Hazardous Internal Waste Transfer Form – ENF005 and the reporting of Fly Tipped Waste.

EN (3) 03 – Delivery Handling and Storage of Oils and Chemicals

This procedure defines in general terms the duties and responsibilities involved with the receipt and handling of chemicals, oils and fuels. This procedure goes into detail about the normal and abnormal operations of the delivery/receipt/handling of chemicals and oils and states the requirements of regulations around the storage of fuel and oil, both for fixed tanks and mobile bowsers.

EN (3) 04 – Environmental Incidents – Near Miss

This procedure defines the requirements necessary to deal with and report environmental incidents and must be used in conjunction with the DCWW Emergency Incident Response Handbook available from Senior Managers. This procedure gives examples of possible causes of incidents and explains the appropriate corrective and preventative actions to be taken.

EN (3) 05 – EMS Sites Only

This procedure applies to sites that hold ISO 14001 certification. It details what is included with a Site Initial Environmental Review and Local Site Environmental Management Plans, along with waste management, role responsibilities and information on the Annual Review – ENF 008.

6.0 Records

6.1 Records

Record	Reference	Retained by	Retention Period
Hazardous Waste Internal Transfer Note	ENF 005	EMS File at location / Intranet	3 years
Annual Review	ENF 008	EMS File at location / Intranet	3 years

6.2 References

	Reference	Document Ref
1	Aspects and Impacts Register	EN (2) 01
2	Waste Management	EN (3) 02
3	Delivery Handling and Storage of Oils and Chemicals	EN (3) 03
4	Environmental Incidents – Near Miss	EN (3) 04
5	EMS Sites Only	EN (3) 05
6	Master Asset List	SP (1) 01
7	Performance Commitments	IMS (1) 02

1.0 Purpose and Scope

This procedure defines waste management principles used within the organisation and provides guidance on legal requirements for the disposal of waste.

This procedure applies to all sites, offices and business areas within DCWW.

2.0 Contents

3.0 Record of Change

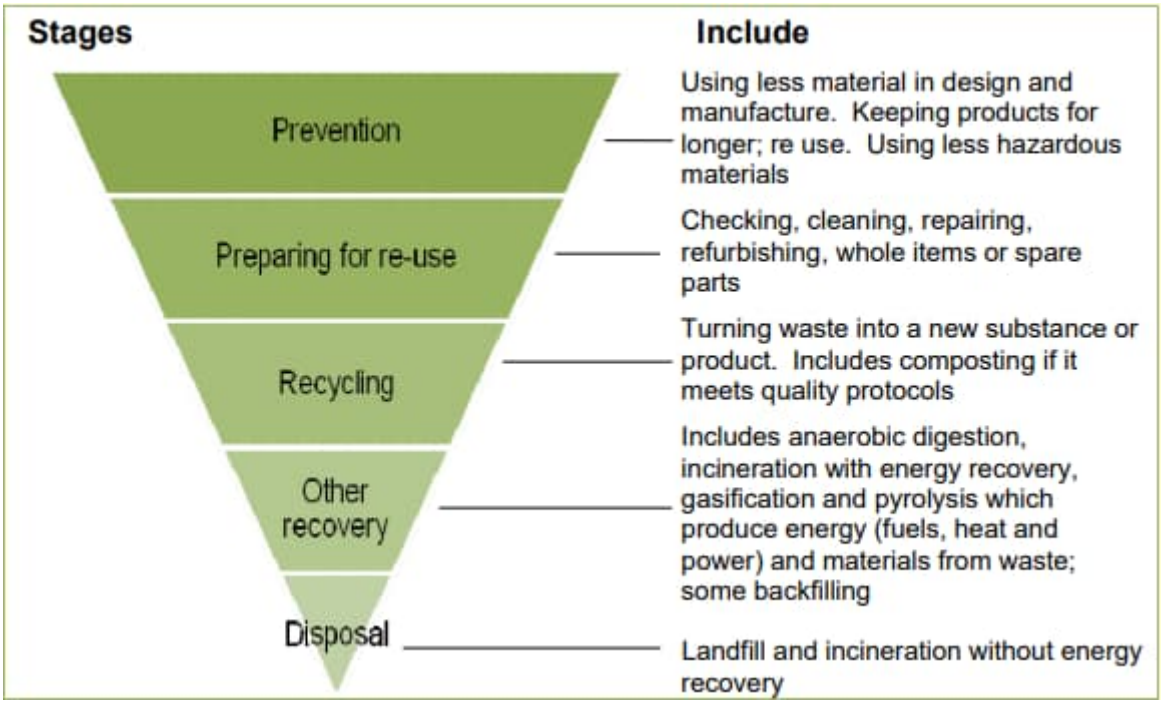
Issue Number & Date	Details of Change
04, 14th March 2016	Section 4.1 & 4.2 amended so that non-hazardous waste doesn't have to be locked and covered but hazardous waste does. Section 4.2 now includes a link to the list of Hazardous Waste Sites. Section 6.2 is new.
05, 10th April 2017	Section 4.2 amended to state that only sites in wales need to apply for a waste hazardous producer code. Section 6.2 enhanced with further references.
06, 12th October 2018	Procedure Reviewed. Minor administrative amends included hyperlink updates.
07, 18 January 2021	Annual Review of procedure Section 5 – Link to NRW useful information removed as website has been removed

Issue Number & Date	Details of Change
08, 22 October 2021	Section 5 – Remove ENF 006 and replace with the requirement to report to the DCWW Permitting Inbox.

4.0 Waste Management

Waste management includes the storage, collection, transportation, and disposal of waste. DCWW must apply duty of care to all waste generated by our activities and has responsibility for waste until its final disposal.

Each site must manage its waste streams in accordance with legal requirements, which involves identification of opportunities to reduce the quantity of waste, identification of waste types, waste segregation and correct disposal. Each site must apply the waste hierarchy as follows;



The main classifications of waste include:

1. Non-hazardous waste e.g. mess room waste
2. Hazardous Wastes – e.g. waste oil
3. Waste Electrical and Electronic Equipment (WEEE)

4.1 Non - Hazardous Waste

To ensure good management of waste produced on site, it is important to maintain good housekeeping. Wastes must be:

1. Segregated according to their classification. For example do not mix mess room waste with grit and screening.
2. Labelled.
3. Placed within the correct storage containers.
4. Located in an area that is secure (from vandalism).
5. Removed from site using approved waste carriers and waste transfer notes must be retained for 2 years.

In order to minimise pollution all waste skips must be stored on an impervious surface (e.g. hardstand).

Examples of non-hazardous waste includes:

- General Waste – Plastic/Paper/Cardboard
- Metal/Wood
- Screenings & Grit

4.2 Hazardous Waste

Hazardous waste is dangerous or potentially harmful to our health and/or the environment. Hazardous waste can be liquids, solids, gases and could be cleaning fluids, pesticides or the by-products of manufacturing processes. Contaminated materials must be disposed of using an approved waste contractor.

The Hazardous Waste Regulations defines hazardous waste as waste that appears on a list drawn up by the European Commission known as the European Waste Catalogue (EWC).

DCWW has registered the main sites as producers of hazardous waste (deemed to produce more than 500kg of hazardous waste per year). These are found by checking the list of Hazardous Waste Sites, or in the NRW public register here. Please note this is only for sites in Wales, this is not a requirement for sites in England, regulated by the EA. Alternatively, you can contact the IMS.Team@dwrcymru.com.

Hazardous Waste must be:

1. Individually segregated i.e. WEEE must only be stored with WEEE.
2. All hazardous waste containers must be labelled.
3. Small quantities of hazardous waste may be transported to named sites for disposal. These movements must be covered by the DCWW Internal Hazardous Waste Form – ENF 005.
4. If hazardous waste is in liquid form, the total quantity stored must not exceed 23,000 litres.
5. Hazardous waste must not be stored on site for a period longer than 12 months.
6. All hazardous waste must be stored in a secure area and skips must be covered and lockable.
7. All hazardous waste must be removed from site using licenced hazardous waste carriers and the transfer notes must be retained for 3 years.

In order to minimise pollution all waste skips must be stored on an impervious surface (e.g. hardstand).

Examples of Hazardous Waste include:

- WEEE (Electrical Waste)
- Fluorescent Tubes
- Batteries
- Oil contaminated items such as oily rags
- Waste Oils

4.3 Removal of Waste from Site

To comply with The Controlled Waste Regulations, Hazardous Waste Regulations and the Waste Regulations (England and Wales), sites producing waste must:

1. Ensure that all waste carriers used are DCWW approved contractors which are procured through SRM.
2. Ensure that Waste carriers are EA/NRW licensed carriers (licences are available from the EA website, NRW Website and internal Waste Carrier List).
3. Ensure that the site to which the waste is being transferred is permitted to accept the waste being transferred.
4. Duty of care records must be kept for all wastes leaving site. A Controlled Waste Transfer or Consignment Note must accompany each lift of waste. However, if the same non-hazardous waste is to be transferred from same site to the same disposal site by the same carrier, a single note can be used to cover all loads over a period not exceeding 12 months. The note must detail the amount, the type of waste, the origin, the disposal site, the carrier, registration, EU waste code, date of transfer, SIC Code, the signature of 2 parties and a declaration that the hierarchy of waste (see section Error! Reference source not found.) has been applied.
5. Keep all records for the prescribed period amount of time:
    - Hazardous Waste = 3 years
    - Non-Hazardous Waste = 2 years

    Note: Records must be available for inspection and kept in an orderly manner.

4.4 Waste Transfer Notes

It is the responsibility of DCWW to retain the correctly filled out waste transfer notes. Once these are signed for they are legally binding documents. For waste removed from sites, the Waste Transfer Notes must display:

- The correct Standard Industry Code (SIC code)
- *Potable Operational Sites = 36.00*
- *Wastewater Operational Sites = 37.00*
- The waste management hierarchy statement
- The Waste Carriers License Code of the waste carrier
- The collection and disposal address' (this for traceability)

If the waste removed from site is Hazardous, the Waste Transfer Notes must also display:

- The Hazardous Waste Producer Code for the DCWW site (if applicable)
- The European Waste Catalogue (EWC) Code of the waste removed.

Please see the Waste Transfer Note Briefing Document for information on what a Waste Transfer Note is, why they are required and an example of a correctly filled out Waste Transfer Note.

5.0 Fly-Tipped Waste

Fly tipping is the "the illegal deposit of any waste onto land i.e. waste dumped or tipped on a site with no licence to accept waste. It includes general household waste, larger domestic items, garden refuse and commercial waste e.g. rubble, clinical waste and tyres. There is an increased amount of "liquid wastes" and "hazardous waste" fly-tipped as a result of changes to the Landfill Regulations restricting these types of wastes from most landfills. There are several pieces of legislation relating to fly-tipping including the Clean Neighbourhoods and Environment Act 2005 and the Environment Protection Act (EPA) 1990, ss.33, 34 and 59.

It is the occupier's responsibility to deal with the fly tipped waste unless its originator can be traced. The following activities are considered best practice to deter fly tippers:

1. Do not allow non-business waste to be disposed of at site – this is also fly tipping.
2. Keep the areas surrounding the edge of the site clear
3. Where possible, keep site gates closed to prevent access to fly tippers.
4. Take pictures and record details of any fly tipped waste.
5. Arrange removal quickly to discourage further tipping.
6. Report any instances of fly tipping to the DCWW Permitting Inbox. Please include the location, details of Fly Tipping and photos if possible.

IMPORTANT SAFETY NOTE: Consider safety first – ensure you are not putting yourself or others at risk in handling any waste found. Do not open packages/containers. Do not move the waste if you suspect hazardous materials could be present – seek advice from the agencies below or report to your Line Manager as appropriate.

Waste may be removed by the local authority or removed by a registered waste carrier and disposed of. DCWW is a registered waste carrier and if it is safe to do so, it is permissible to transport controlled, non-hazardous waste direct to a licensed site for disposal. Written agreement should be obtained from the appropriate authorities prior to any removal – since the waste is "evidence".

Prosecution can only be brought by the local authority, the Environment Agency or the police. The relevant authority should be encouraged to prosecute as a successful prosecution means costs can be recovered by the landowner, or occupier, from the person(s) who deposited the waste, and discourages further fly tipping.

Waste resulting from fly tipping must be disposed of as described in section 5.0 of this procedure.

6.0 Records

6.1 Records

Record	Reference	Retained by	Retention Period
Hazardous Waste Internal Transfer Note	ENF 005	EMS File at location	3 years

6.2 References

	Reference	Document Ref
1.	European Waste Catalogue	EWC
2.	Environment Agency Public Register	EA Website
3.	Waste Transfer Note Briefing Document	WTN Briefing Document
4.	Hazardous Waste Sites	Hazardous Waste Sites
5	NRW Public Register	NRW Website

All records are retained as per document control and retention procedures.

1.0 Purpose and Scope

This procedure defines in general terms the duties and responsibilities involved with the receipt and handling of chemicals, oils and fuels.

Most chemicals and oils are classified under a European Agreement (ADR) as 'Dangerous Goods'. The UK Regulations giving force to this Agreement are concerned with regulating the transport of Dangerous Goods. 'Transport' also includes the delivery and unloading part of the transport chain. The DCWW 'Carriage of Dangerous Goods - Policy, Guidance and Procedure HSP701' provides further guidance. There are requirements in the regulations that staff handling dangerous goods receive training appropriate to their duties and responsibilities.

Potable Operations must read this procedure in conjunction with PO (3) 09 Chemical Deliveries.

This procedure applies to all sites and offices that are within DCWW.

2.0 Contents

3.0 Record of Change

Issue Number & Date	Details of Change
04, 28th May 2015	Section 4.2 – Secondary Containment Systems & Section 5.4 – Spill Kits are new sections on this procedure.

Issue Number & Date	Details of Change
05, 14th March 2016	Section 4.2 – amended to state that integrity checks on permanent bunds and necessary and alarms to be tested every 12 months. Section 6.1 & 6.2, extra records & references added.
06, 11th October 2019	Section 1 updated. Potable Operations must read EN (3) 03 Delivery Handlin and Storage of Oils in conjunction with PO (3) 09 Chemical Deliveries an Testing.
07, 18 January 2021	Section 1.0 – Reference to ADR and Health and Safety HSP 701 Section 5.0 – Amendment to regulations, removal of reference to EA Section 5.4 – Amendments to the Spill kit requirements. Section 7.0 – Amendment to References
08, 17 January 2022	Annual review – updated hyperlinks

4.0 Receipt, Storage and Handling of Chemicals and Oils

4.1 Delivery/Receipt/Handling – Normal Operation

All chemicals used must be obtained from approved (generally framework) suppliers. Chemicals stored on Operational sites are recorded locally. All bulk chemical, oil and fuel deliveries must be supervised by persons who have been trained and are 'authorised'. Only employees have access to keys to open locks for chemical delivery points – keys are not issued to contractors and must not be given to delivery personnel. All bulk chemical delivery points must be clearly labelled and secured by a lock, or locking arrangements equivalent to specified standard. All chemicals and oils must be stored in such a way that will not give raise to a pollution incident should a container leak (e.g. bund/spill tray).

1. Before formally accepting delivery, the Authorised Person must:

   a) Ascertain that the correct goods are unloaded by comparing the relevant information on the transport document (delivery note) with the information on the package, container, tank, or vehicle.
   b) Carry out a visual inspection to check that packages are free from damage and are correctly labelled to correspond with the details on the transport document.

2. When deliveries are made to sites, details of the correct type and grade of chemical are located in the Works Operating Manual or Site Handbook.
3. The Authorised Person ensures that the delivery is placed in the designated storage area.
4. When bulk chemicals are delivered, the Authorised Person ensures that sufficient capacity to accept the delivery volume is available in the receiving tank.
5. Immediately following the unloading of the tank, vehicle or container, delivery points, valves, inspection points and storage areas shall be made secure.

4.2 Secondary Containment Systems

- For Potable, Chemical, oils, fuel stores, tanks, bunds and associated pipe work must be visually inspected weekly. For Waste, these must be inspected monthly and kept clear of rainwater and debris. This inspection may be undertaken weekly at high risk sites, this will be defined locally.

- Details of inspections carried out at Operational Sites are recorded either on Local Bund Inspection Forms or on AGA2.
- Any defects identified are reported to the Process Specialist / Production Manager / Operations Supervisor and recorded in the Works Diary.
- Integrity checks are necessary on permanent bunds. This will be achieved through the installation of bund alarms to ensure any leaks are identified.
- Bund alarms must be dynamically tested every 12 months and the results recorded.
- Any spillages into bunded areas must be removed immediately and disposed of in compliance with procedure Waste Management EN (3) 02.
- Any chemical storage tank taken out of service for refurbishment/renewal must be tested for 24 hours with water prior to being filled with chemical/ oil/ fuel.

Potable Requirements: If any standing water (typically rainwater for outside bunds) is found in the bund before emptying this must be tested for a number of parameters. Only if these are found to be within the parameters stated below can the bund be emptied to the environment;

- pH must be between 6 and 9
- Chlorine must be less than 0.05mg/l
- No unusual odour present
- No unusual colour present.

The emptying of bunds on a potable site must be recorded in the POF 007 together with the parameters mentioned above. If the parameters above are not met then the contents must be disposed of using an approved waste contractor following procedure Waste Management EN (3) 02.

If outside bunds do not fill with rainwater (especially after heavy rainfall) then these must be inspected as it is likely they will be leaking. If found to be leaking complete an ENF 007 – Environmental near miss form on the Assure Portal and a risk raised within Investment Manager System to resolve.

4.3 Delivery/Receipt/Handling – Abnormal Operation

Where chemicals delivered are outside of their specification (e.g. the delivery note does not match the order specification), the delivery must be refused. The First Line Manager is informed and the procurement department is informed. In the event of a spillage, site-specific emergency procedures must be followed if these are available and robust.

4.4 Incident Reporting

Any incident taking place involving the handling, unloading or storage of chemicals must be reported as soon as practicable using the company incident reporting form on Assure.

5.0 Oil and Fuel Storage

In Wales, The Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016 apply. The Regulations require anyone who stores more than 200 litres of oil in Wales to provide more secure containment facilities for tanks, drums, Intermediate Bulk Containers (IBCs) and mobile bowsers, to prevent oil escaping into the environment. In England, The Control of Pollution (Oil Storage) (England) Regulations 2001 apply, however there are some differences in requirements.

Oils of any kind are included in these regulations: petrol, mineral oil, heating oil, lubricating oil, vegetable oil, paraffin and kerosene. Waste oil is exempt and is covered by the Hazardous Waste Regulations.

Oil stored in a container situated within a building or wholly underground, is also exempt from these regulations, however necessary precautions to prevent pollution/contamination to the environment should still be applied.

5.1 General Requirements of the Regulations

1. Has a capacity of not less than 110% of the containers capacity. If there is more than one container within the system, not less than 110% of the largest containers storage capacity or 25% aggregate storage capacity, whichever the greater.
2. If a drip tray is used as secondary containment system for drums, the drip tray must be able to hold 25% of the total volume of the drums.
3. Be located (or other steps must be taken) to minimise any risk of damage by impact (e.g. traffic).
4. Its base and walls must be impermeable to water and oil must not be penetrated by any valve, pipe or other opening which is used for draining the system.
5. If any fill or draw off pipe penetrates its base or any of its walls, the junction of the pipe with the base or walls must be suitably sealed to prevent oil escaping from the system.
6. Any valve, filter, sight gauge, vent pipe or other equipment ancillary to the container (other than a fill pipe or draw off pipe or, if the oil has a flashpoint of <32°C, a pump) must be kept within the secondary containment system.
7. Where a fill pipe is not within the secondary containment system, a drip tray must be used to catch any oil spilled when the container is being filled with oil.

5.2 Fixed Tanks

For fixed tanks, the following shall apply:

1. Sight gauges must be properly supported and fitted with a valve that must be closed when not in use.
2. Fill pipes, draw off pipes or overflow pipes must be located (or other measures must be taken) to minimise any risk of damage by impact, as far as is reasonably practicable. If above ground, pipes must be supported.
3. The tank must be fitted with an automatic overfill prevention device if the filling operation is controlled from a place where the tank and any vent pipe are not observable.
4. Any screw fitting or other fixed coupling that is fitted and is in sound condition must be used when the tank is being filled with oil.

Where oil from the tank is delivered through a permanently attached flexible pipe:

1. The pipe must be fitted with a tap or valve at the delivery end which closes automatically when not in use
2. The tap or valve must not be capable of being fixed in the open position unless the pipe is fitted with an automatic shut off device
3. The pipe must a) have a lockable valve where it leaves the container which is locked shut when not in use; and b) be kept within the secondary containment system when not in use.

Pumps must be:

1. Fitted with a non-return valve in its feed line.
2. Positioned to minimise any risk of damage by impact.
3. Protected from unauthorised use.

Permanent vent pipes, taps or valves through which oil can be discharged must be:

1. Within the secondary containment system.
2. Arranged to discharge the oil vertically downwards and be contained within the system.
3. In the case of a tap or valve, it must be fitted with a lock and locked shut when not in use.

5.3 Mobile Bowsers

1. Taps or valves permanently fixed to the unit through which oil can be discharged to the open must be fitted with a lock and locked shut when not in use.

2. Where oil is delivered through a flexible pipe which is permanently attached to the unit; a) the pipe must be fitted with a manually operated pump or with a valve at the delivery end which closes automatically when not in use and b) the pump or valve must be provided with a lock and locked shut when not in use, the pipe must be fitted with a lockable valve at the end where it leaves the container and must be locked shut when not in use.

5.4 Spill Kits

- Spill kits must be available on site and near where bulk chemicals/oil/diesel is stored.
- Spill kits must be stored indoors or protected if stored outside and the condition of the kit checked monthly as per SAP Work Manager Task list.
- In the event of a partially used and/or damaged spill kit a replacement must be ordered (where appropriate).
- For potable sites - a minimum of 2 x 60 litre capacity chemical spill kits and 2 x 60 litre capacity oil spill kits must be kept at all sites with bulk storage.
- For waste sites - spill kits will be deemed necessary following assessment of question 25 of the Workplace Inspection Form (WP02). A minimum of 1 x 60 litre capacity chemical spill kit must be stored for sites with bulk storage of chemicals and 1 x 60 litre oil spill kit must be stored for bulk storage of diesel/oil if deemed necessary.
- All operational staff must be made aware of and familiar with the site emergency procedures. If applicable, all site staff must be aware of the spill information sheet for the use and disposal of emergency spill equipment which shall be placed alongside spill kits.

In the event of an incident, initial action should be to:

- Assess the situation for any health and safety risk. If deemed unsafe contact your unit manager for further instruction
- Consult the site emergency procedures and, if it is safe to do so, identify and take measures to address the source of contamination/spill/leak
- Consult the COSHH data sheets and contain the area/spill
- Inform relevant managers and external parties
- If the incident is large scale, contact the Unit Manager and authorised waste contractors to assess and deal with the incident.

All actions must be in line with health and safety guidance so that individuals are not exposed to undue risk.

The secondary impacts of spills should be contained by ensuring that:

- PPE, equipment and tools should be disposed of or decontaminated.
- All contaminated materials such as absorbents, rags should be securely stored and disposed of appropriately. Any waste resulting from an incident must be disposed of as per EN (3) 02.

All paperwork resulting from the incident must be completed and retained on site ENF 005, Waste Transfer Notes and H&S Assure (if necessary)

6.0 Records

Record	Reference	Retained by	Retention Period
Delivery Note		Site/Catchment Office	3 Years
Works Diary	WOF 007/POF 007	Site	3 Years
Hazardous Waste Internal Transfer Note	ENF 005	EMS File at location/Intranet Local Documents	3 Years
Workplace Inspection	WP02	File at location/Intranet Local Documents	3 Years

7.0 Reference Documents

Document	Document Reference
Waste Management	EN (3) 02
Spill Information Sheet.	Spill information sheet
H&S Workplace Inspection Form	WP02
PO (3) 09 Chemical Deliveries	PO (3) 09
Carriage of Dangerous Goods	(ADR)
The Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016	
The Control of Pollution (Oil Storage) (England) Regulations 2001	

1.0 Purpose and Scope

This procedure defines the requirements necessary to deal with and report Environmental Near Misses for operational activities. For an incident considered a 'Silver' or 'Gold' or 'Major' according to DCWW's Emergency Planning refer to the DCWW Incident Response Manual.

This procedure applies to all operational activities; on operational and non-operational sites both on and off Dwr Cymru's land ownership.

2.0 Contents

3.0 Record of Change

Issue Number & Date	Details of Change
Issue 04, 13th January 2014	Minor updates include reference to the NRW and the inclusion of the Near Miss Reporting phone line for environmental near misses
Issue 05, 28th May 2015	This procedure has been rewritten to incorporate the recording of Environmental Incidents for the Capital Partners.
Issue 06, 14th March 2016	All references to Capital Partners have been removed. Followin collaborative working with the Environment Team the procedure has bee revised to improve incident/near miss reporting for biodiversity issues a well as operational issues. Section 4.0, 7.0, 9.2 & 10.0 are totally re-writte or new and some additions have been added to section 1.0, & 6.0.
Issue 07, 10th April 2017	Section 5 – Amended to identify only sites with the ISO 14001 scope need emergency procedures. Reference to infozone changed to intranet throughout the document.

Issue Number & Date	Details of Change
Issue 08, 3rd January 2018	Section 7 – Amended to include WATPOL reference. Reference to infozone changed to intranet throughout the document.
Issue 09, 18th January 2021	Annual Review of Procedure. Changes highlighted in Yellow.
Issue 11, 17 January 2022	This procedure has been rewritten to provide guidance for reporting of Environmental Near Misses only. Any reference to Environmental Emergency Incidents requiring emergency or non emergency response has been removed.

4.0 Definitions and Guidance

A near miss as defined by HSP 802 – Incident Reporting Investigation procedure is 'an unplanned event which did not result in injury, illness or property damage but had the potential to do so'. Environmental examples of these would be a spillage of oil from a damaged hose that was dealt appropriately using spill kits in accordance with EN (3) 03 - Delivery, Handling and Storage of Oils and Chemicals procedure, or discovery of a protected species (e.g. great crested newts or bats). The routine maintenance of operations can either discover or disturb biodiversity which is defined as the variety of plant and animal life in the world or in particular habitats, e.g. a grass verge within an operational site, or a retention pond.

5.0 Local Environmental Emergency Procedures

Each operational site within the ISO 14001 environmental scope will have a set of specific emergency procedures on site and in the Local IMS folders on Source to cover Environmental Emergency Incidents. These ensure there will be an appropriate response to unexpected or accidental incidents. Procedures are established, implemented and maintained to:

- Identify potential accidents and emergency situations.
- Respond to accidents and emergency situations.
- Prevent or mitigate the environmental impacts that may be associated with them.
- Procedures will be reviewed, particularly after occurrence of an incident.

Emergency procedures on operational sites within ISO 14001 scope are periodically dynamically tested. Tests are recorded on ENF 003 – Testing Emergency Procedures and held on site or in the site Local Documents area on the Intranet.

6.0 Reporting of Environment Near Miss Guidance

Environmental Near Misses must be reported via the Assure Portal by selecting and completing the 'Environmental Near Miss Form (ENF 007).' Any remedial action that can't be addressed immediately will be addressed by the Site Supervisor through Assure. If there is any impact on the watercourse then a WATPOL (NOF 030) must also be completed.

All outstanding 'Environmental Near Misses' will be monitored on a monthly basis by the Site Supervisors, who will arrange a review of local environmental emergency procedures if required.

7.0 Reporting route

The table below indicates reporting routes for various incidents:

Incident	Form	Reporting Route
Environmental/ near miss (as defined above)	ENF 007 - Assure	Assure Portal
Health & Safety accident or near miss (report of any injury or dangerous occurrence) as defined in H&S procedures	N/A	Assure Portal or Near Miss Hotline/SmartHub Risk Team
Potential Pollution of the environment	NOF 030 - WATPOL	SmartHub Risk Team and EA/NRW (Environment Agency/Natural Resources Wales)

8.0 Records

8.1 Records

	Record	Reference	Retained By	Retention Period
2.	Testing Emergency Procedures	ENF 003	EMS file at location/ Intranet Local Documents	3 years
3.	WATPOL	NOF 030 - WATPOL	Pollution Information Advisor	7 years

8.2 References

	Reference	Document Ref
1.	Waste Management	EN (3) 02
2.	Delivery, Handling and Storage of Oils and Chemicals	EN (3) 03
3.	Wastewater Environment Team Internal Guidance	Intranet
4.	Incident Reporting Investigation	HSP 802
5.	Reactively Responding to potential customer reported pollution	NO (3) 26
6.	Incident Response Manual	N/A

ISO Scope and Permitted Sites

EN (3) 05 - Level 3 Procedure

1.0 Purpose and Scope

This procedure defines in broad terms the principles of Environmental Management on Operational Sites, Offices and business areas included in the scope of the DCWW Environmental Management System. This procedure provides guidance with regard to identification of site specific environmental impacts and the development of emergency procedures and waste management plans.

This procedure applies to all sites, offices and business areas that are included in the scope of the Environmental Management System. If your site is ticked under the scope of ISO14001 in the IMS Asset List or has an Environmental Permit then you must comply with this procedure. If your site is does not fall under either of the above, then it is encouraged that this procedure is followed, where appropriate.

2.0 Contents

3.0 Record of Change

Issue Number & Date	Details of Change
	New procedure issued on the 28th May 2015
02, 16th July 2015	Section 4.2 – Training, added to the procedure.
03, 14th March 2016	Section 7.0, amended to reference site Waste Management against EN (3) 02 Waste Management, as this is a requirement of all sites.
04, 10th April 2017	Section 4.1.6 – change made due to legislation that all air conditioning units need to be leak tested and supporting guidance.
05, 18th January 2021	Annual Review of the Procedure

06, 31st March 2021	Section 4.1. updated to include reference to desktop reviews of environmental assessments to update existing EMPs, where an additional activity takes place. Section 5.3 updated

4.0 Site Environmental Management System – IMS Team

4.1 Site Initial Environmental Review & Site Environmental Management Plan

Each operational site and business area included in the scope of the EMS (see SP(1) 01 – Asset List) will be subject to an Initial Environmental Review that will be undertaken by the IMS Team. Initial reviews include a description of the site/business area, a summary of activities and an aspect and impact assessment to determine negative and positive site environmental impacts that need management. Following on from the Initial Review, Environmental procedures are developed, including an Environmental Management Plan that lists specific objectives and tasks for completion by the Compliance/Ops Co-ordinator/Ops Supervisor. (In the event of capitol works on site, the Initial Environmental Review can take the guise of a desktop review of environmental assessments provided to the regulator as part of the planning/environmental permit application/decision process.) This plan is created by the IMS Team. The Environmental Management Plan is subject to review based on the outcome of the ENF008 – Environmental Annual Review. The Environmental Management Plan will be held on the Intranet and shall include reference to the following;

4.1.1 Waste Management

Each business area included in the scope of the EMS is to manage its waste streams and it is our duty to correctly describe our wastes. The Hierarchy of Waste Management must be applied to all waste management activities. The Local Management Procedure must include:

- A list and description of all wastes produced at site
- Reference to the Hierarchy of Waste Management
- A description of the disposal routes (e.g. to landfill or recycling)
- The name of the waste carrier for each classification of waste.
- The location of the site waste management area & the location of any other skips.

4.1.2 Pollution Prevention and Control

Each Local Environmental Management Procedure should include a plan for preventing pollution. Details should include:

- Details of possible sources of pollution: to air, land and water
- Details of pollution prevention activities
- Details of pollution control activities
- Details of the location of spill kits (this may be displayed in the Site Emergency Plan)
- Details of any maintenance or routine checks and their frequency that assist with pollution (Available in SAP)

4.1.3 Resource Management

In some cases, the use of resources would have been identified as a significant environmental impact and therefore, the Local Environmental Management Plan shall include reference to how this is managed. Examples of resources include: paper, chemicals, equipment and materials. Guidance will be included in the Environmental Review.

4.1.4 Energy Management

This is controlled by the Energy Team who manages DCWW's energy production and usage.

4.1.5 Positive Impacts

In some cases, where there are positive environmental impacts from site operations, these should be made reference to in the Local Environmental Management Plan to show how this is managed. Examples of positive impacts include: Solar Panels, Wind Turbines, Hydroelectricity, Gas to Grid through Advanced Anaerobic Digestion etc.

4.1.6 Other factors to be considered;

- Conservation Areas
- Invasive and protected Species
- Any other site specific Environmental impact not covered
- Air Conditioning Units must be leak tested. The guidance can be found here: Guidance for Stationary Refrigeration & Air-Conditioning.

4.2 Training

Each operational employee working on a site certified to ISO 14001, must have completed the IMS Environmental E-Learning package. E-Learning must be refreshed every 3 years or as part of the induction for a new starter. Records of the training will be held within the corporate training database.

5.0 Site Environmental Management System – Compliance/Ops Coordinator

A breakdown of requirements can be found in section 0 which details the responsible person for each record. The Compliance/Ops Coordinator is responsible for all aspects below; however, these could also be carried out by a 'Responsible Person' as would be in non-operational areas.

5.1 Site Environmental Emergency Procedures

Emergency procedures are developed for each EMS site to ensure that any environmental risks are managed and controlled. The environmental risks are identified during the Site Initial Environmental Review and this document will confirm whether emergency plans are required.

It is important that the Emergency Procedures are communicated to all staff (recorded locally) and contractors working on site. Emergency Procedures must be held on the Intranet.

5.2 Briefing and Testing of Environmental Emergency Procedures

Each manager must ensure that all staff are effectively briefed in the use of site-specific emergency procedures.

Emergency Procedures must be tested to ensure that they are fit-for-purpose. It is required that an aspect of the Site Emergency Procedures (e.g. spillage, fire, explosion etc.) are dynamically tested at least annually on all sites which identify the need to have them. A record of these tests and any follow-up actions are to be detailed on ENF 003 – Record of Dynamic Testing and located in the sites EMS file or on the Intranet.

Emergency procedures are bespoke to its respective site. During the annual dynamic testing of emergency procedures site must select a different scenario each time. For example, if in year one a dynamic test involves spillage scenario, the following year a different scenario should be used, perhaps fire. Examples of scenarios can include;

- Fire or smoke on any part of the site/equipment
- Oil Chemical Spillage
- Personal Accident/Injury
- Explosion
- Electric Shock
- Tank Failure

The list is not exhaustive.

6.0 Site Annual Environmental Review

An annual review (ENF008) is undertaken of the EMS at each site/business area by the Compliance/Ops Coordinator. A break-down of this process is available in section 9.0 which shows the process flow.

The purpose of the Annual Review is to:

1) Assess whether Local Plans and procedures have been implemented and maintained
2) Assess whether further aspects and impacts are applicable (e.g. if there has been a change in working practice or process therefore impact to the environment)
3) Close off existing actions and update the Environmental Management Plan

During the Annual review, the compliance/ops Coordinator will assess the site/business area using form ENF 008 – Annual Environmental Review and forward to the IMS team. In the event of an identified change, the IMS team will assess the impact, ensuring appropriate controls are in place to mitigate the risk and update the Environmental Management Plan.

6.1 Annual Environmental Review Tracking

As part of the review process the IMS Team will track each EMS site regarding their reviews and issue prompts to ensure that all the above requirements are met within the specified timelines.

7.0 Waste Management

Each EMS site must have a Waste Management Plan that includes details of the types of waste produced at site, how wastes are segregated, stored and removed from site.

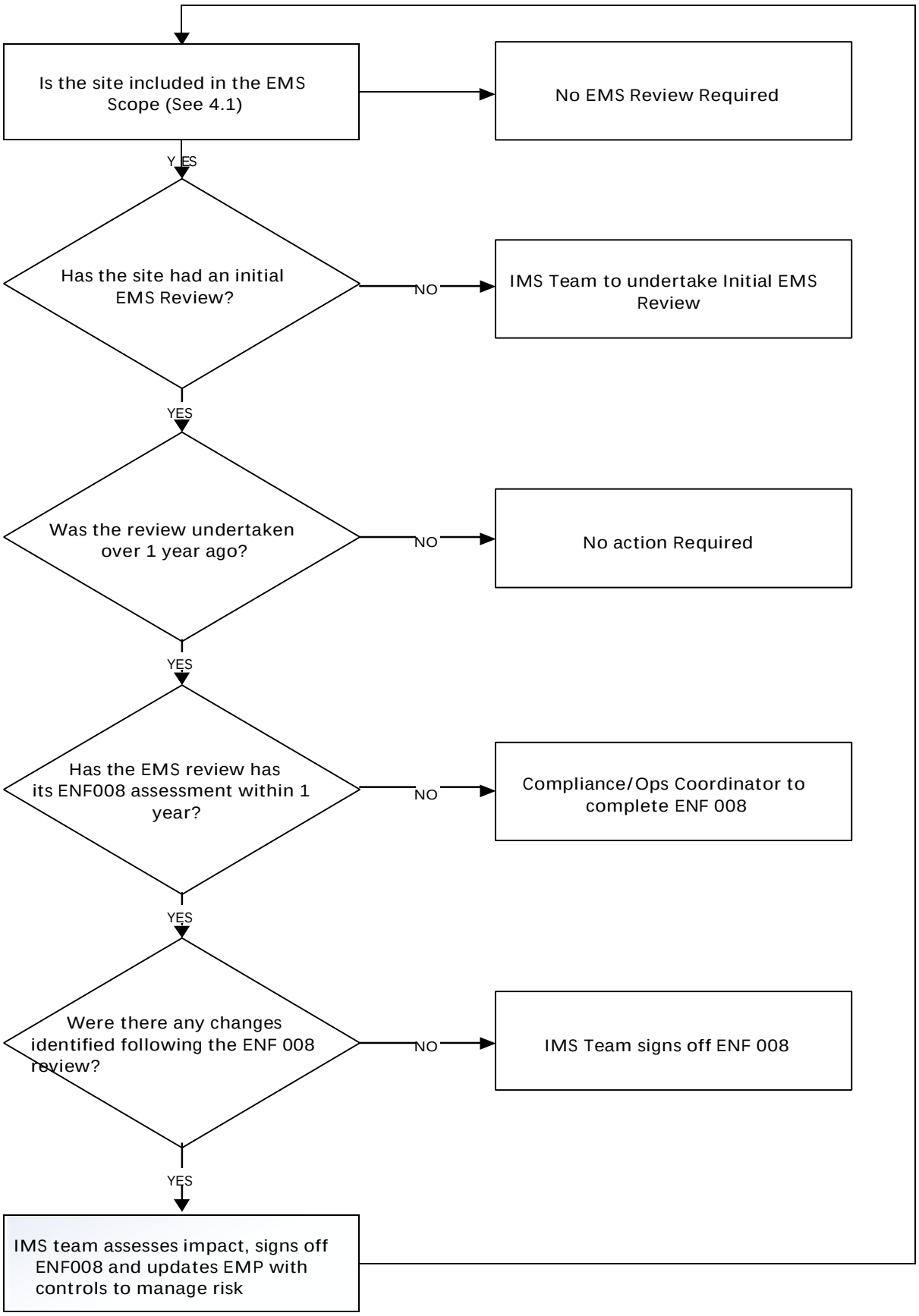
Procedure EN (3) 02 – Waste Management, must be followed with regards to the handling, storage and removal of waste and hazardous waste, from operational sites. Section 4.0 discusses the Waste Management Hierarchy, section 4.1 discusses the requirements for Non-Hazardous Waste, section 4.2 discusses the requirements for Hazardous Waste, section 4.3 discusses the removal of waste from site and section 4.4 details information about Waste Transfer Notes. The Waste Management procedures applies to all operational sites as it is not a ISO14001 requirement to segregate and dispose of waste correctly, it is the requirements of legislation.

8.0 Records maintenance

Document or Record	Created/Updated/ Maintained By	Responsible for Review

Site Initial Review	IMS Team	IMS Team
Site Environmental Management Plan (Section Error! Reference source not found.)	IMS Team	IMS Team
Site Emergency Procedures (Section 5.1)	Compliance/Ops Coordinator/IMS Team	Compliance/Ops Coordinator/IMS Team (when required)
ENF 003 – Testing of Emergency procedures (Section 5.2)	Compliance/Ops Coordinator	Compliance/Ops Coordinator (Annually)
ENF 008 – Annual Environmental Review (Section 6.0)	Compliance/Ops Coordinator/IMS Team	Compliance/Ops Coordinator/IMS Team (Annually)
Waste Transfer Documents (Hazardous/Non-Hazardous)	Compliance/Ops Coordinator/Waste Carrier	N/A

9.0 Appendix 1 – Environmental Review Requirements



1.0 Emergency Procedures

1.1 Dwr Cymru Welsh Water (DCWW) Operational Procedures

All environmental incidents occurring on site, including near hits/misses should be reported on form ENF007 to the site Supervisor, Catchment manager and quality systems manager in accordance with DCWW's IMS Procedures.

All health and safety related incidents, including near hits/misses should be reported to the health and safety department via the New Assure portal reporting system.

1.2 Site Specific Procedures AFAN WWTW.

1.2.1 FIRE OR SMOKE ON ANY PART OF THE PLANT

Fire detection systems are installed on site.

Actions:

1 **Raise the Alarm**, Tackle the fire **only** with the correct fire equipment and **only** if it is safe to do so. IF IN DOUBT- GET OUT –then:

2 Call the fire services on 999, stating the site address as

Afan Waste water Treatment works, Phoenix way, Harbour Road, Port Talbot. SA13 1RA.

Also give the O/S Grid Reference: **SS76870302**

3 Leave the area by the **nearest exit**: Do not stop to collect clothing or belongings.

4 Proceed by the shortest route to the **fire assembly point** located outside the main building and await roll call.

5 The names of any personnel not accounted for at the roll call and any other information as necessary must be given to the Senior Officer of the emergency services immediately upon his/her arrival at the scene.

6 Inform your line manager at the earliest opportunity.

7 Complete and forward an ENF007 to the manager and the quality systems manager, on the day of the environmental incident/near miss.

Roll call

1 The person in charge of the workforce will ensure that they are all accounted for.

2 The person in charge of any group of visitors will ensure that they are all accounted for.

1.2.2 OIL / CHEMICAL SPILLAGE

In the event of a MINOR spill, or one that will not enter the watercourse, or present an immediate fire/pollution hazard:

1 See the relevant COSHH data sheets for details regarding contact with the substance spilled, cleanup/disposal and PPE requirements. These are on Infozone.

2 Use the Spill Kit's provided at various locations around the site (refer to site plan), to contain the spill immediately. An Instruction Sheet is contained in the kit that details what type of absorbents is appropriate for which circumstances.

3 If considered necessary, stop production and:-

4 Inform line manager as soon as possible, giving details as to type and quantity of oil/chemical spilled. The line manager will inform other authorities such as the Natural Resources Wales as appropriate.

5 Complete and forward an ENF007 to the manager and the quality systems manager, on the day of the environmental incident/near miss.

6 **All waste will be disposed of in line with appropriate legislation and company policy**.

In the event of a MAJOR spill, or one that will enter the watercourse, or present an immediate fire/pollution hazard:

1 Stop production immediately (if appropriate).

2 See the relevant COSHH data sheets for details regarding contact with the substance spilled, cleanup/disposal and PPE requirements. These are on Infozone.

3 Contain oil/chemical as best as possible using the spill kit's provided at various locations around the site (refer to site plan).

4 In the case of a **fire** hazard, smother substance using the appropriate fire extinguisher.

5 Inform line manager as soon as possible, giving details as to type and quantity of oil/chemical spilled. The line manager will inform other authorities such as Natural Resources Wales as appropriate.

6 Complete and forward an ENF007 to the manager and the quality systems manager, on the day of the environmental incident/near miss.

7 **All waste will be disposed of in line with appropriate legislation and company policy**.

1.2.3 PERSONAL ACCIDENT / INJURY

Actions:

Dependent upon the seriousness of the injury, either:-

a. call **999** and ask for the Ambulance Service
State address as:-

Afan Waste water Treatment works, Phoenix way, Harbour Road, Port Talbot. SA13 1RA.

Also give the O/S Grid Reference: **SS76870302**

Or:- b. Go to the nearest (24 hour) Accident and Emergency Unit at the following hospital:-

Morriston Hospital Tel 01792 702222656

Or:-

c. If the injury is only minor (e.g. minor cut or abrasion), and there is a competent and currently certified First Aider on the site, the injury can be treated utilising the First Aid kit on site or company vehicle.

In all cases

Report the accident initially to your site Supervisor / catchment manager to co-ordinate the incident, and will fill in the required form on the New Assure portal system and forward to Accident DCWW in accordance with DCWW's Health and Safety Procedures 802, a copy of which can be found on the Infozone

1.2.4 FIRST AID KIT

These are located as follow:-

Mess Room/Boiler room/Lab/Belt Press room and Operator vehicle

1.2.5 EXPLOSION

1 In the event of an explosion all personnel must evacuate the area immediately.

2 The emergency services must be called immediately on 999 giving the location of the site as:-

Afan Waste water Treatment works, Phoenix way, Harbour Road, Port Talbot. SA13 1RA.

Also give the O/S Grid Reference: **SS76870302**

Personnel must go to the **fire assembly point** located in the car park situated in front of the main office building and await roll call.

3 The names of any personnel not accounted for at the roll call must be given to the Senior Officer of the emergency services immediately upon his/her arrival at the scene.

4 The DCWW Catchment Manager must be informed of the full details as soon as is practicable in the circumstances. He / She will assume control and will co-ordinate actions in accordance with DCWW's emergency procedures.

5 Complete and forward an ENF007 to the catchment manager and the quality systems manager, on the day of the environmental incident/near miss.

1.2.6 ELECTRIC SHOCK

In the event of an accident involving electric shock, the following actions should be taken:

1 If the power has not tripped automatically isolate power locally.

2 If for any reason it is not possible to isolate the power locally then shutdown main source of power in HV room located in main building.

3 Summon the emergency ambulance service on 999 giving the location as follows:

Afan Waste water Treatment works, Phoenix way, Harbour Road, Port Talbot. SA13 1RA.

Also give the O/S Grid Reference: **SS76870302**

4 The injured person can only be removed from a live electricity source if rescue personnel are equipped with:
   a. heavy duty rubber gloves and
   b. dry rubber footwear and/or
   c. dry rubber or thick non-conductive matting and/or
   d. dry, bare timber and/or other non-conductive material.

5 If it has been possible to remove the injured person from the live source, first aid resuscitation treatment must be rendered without further delay by a competent First Aider and continued until the arrival of the emergency paramedics

6 If the power source is still live, isolate the area to prevent access by any other personnel

7 The accident must be reported to the DCWW Line manager as soon as is practicable, who will fill in the required form on the New Assure portal system and forward to Accident DCWW in accordance with DCWW's Health and Safety Procedure 802 , a copy of which can be found on the Infozone.

Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTIONS Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR CONTAINING AND CONTROLLING DIGESTER EMERGENCIES		ISSUE: DATE:

These instructions deal with different types of emergencies, classified into three levels of severity (where appropriate). These levels are SLIGHT, MODERATE and SEVERE. The instructions are intended to be a step by step guide to help operators take the right action in emergency situations.

These instructions are written with the best possible technical input, but the reality of any given emergency will be different, and responding staff are required to make their own risk assessments, using the instruction sheets as guidance for identifying potential hazards
They are intended to help operators to bring the AD facility into as safe a condition as possible in the event of an emergency.
They are not intended to provide detail on full recovery from an emergency. This must be assessed on a case by case basis.
Where PPE is referenced, this means the equipment required to be worn under site rules & induction.

How to use these instructions:
On each sheet, follow the instructions in order. This is important as some actions are dangerous if done out of sequence:

Classify the emergency: Look at the situation and determine its severity and the appropriate course of actions
Prepare: Take a step back. Think about where people need to be kept away from, and what the hazards the emergency is creating. Think about who should be contacted before any remedial action is taken. An emergency equipment store exists on site, and should be used appropriately as the situation demands.
Contain: Depending on the severity of the emergency, this section gives guidance on measures to stop the situation from getting any worse.
Control: Measures to bring the situation under control directly, or control the area around the emergency. Consolidate:
Actions to take once the situation is under control. Actions which start the site on the road to recovery.

The term "site supervisor" is used throughout these instructions to refer to the person responsible for the site at the time of the incident. DCWW policy is that during normal working hours the this is the duty Site Supervisor (Digester Safety Controller). Outside of working hours, telephone SmartHub, and ask for the Bronze Level Manager.

DCWW internal contacts

Duty	Name	Contact Number
Site Supervisor		
Site Supervisor		
Smart Hub		
Logistics		
CHP team		

Specialist support is called for in some instructions. The below contacts are identified as willing and able to provide suitable support to this site

Marches Biogas	0333 207 9991	Mechanical, electrical, biological and process problems (24 hr)

Specialist external agencies must be contacted in some instances. Their contact details are below:

Fire Brigade (TATA Steel fire & emergency)	
Ambulance Service	
Natural Resources Wales	0345 988 1188
Health and Safety Executive (for RIDDOR reporting):	http://www.hse.gov.uk/riddor/report.htm

Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTIONS Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR CONTAINING AND CONTROLLING DIGESTER EMERGENCIES		ISSUE: DATE:

These instructions deal with different types of emergencies, classified into three levels of severity (where appropriate). These levels are SLIGHT, MODERATE and SEVERE. The instructions are intended to be a step by step guide to help operators take the right action in emergency situations.
These instructions are written with the best possible technical input, but the reality of any given emergency will be different, and responding staff are required to make their own risk assessments, using the instruction sheets as guidance for identifying potential hazards in accordance with exsisting DCWW digester safety procedures
They are intended to help operators to bring the AD facility into as safe a condition as possible in the event of an emergency.
They are not intended to provide detail on full recovery from an emergency. This must be assessed on a case by case basis.
Where PPE is referenced, this means the equipment required to be worn under site rules & induction.

How to use these instructions:
On each sheet, follow the instructions in order. This is important as some actions are dangerous if done out of sequence:

Classify the emergency: Look at the situation and determine its severity and the appropriate course of actions
Prepare: Take a step back. Think about where people need to be kept away from, and what the hazards the emergency is creating. Think about who should be contacted before any remedial action is taken. An emergency equipment store exists on site, and should be used appropriately as the situation demands. Inform the relevant senior personnel

Contain: Depending on the severity of the emergency, this section gives guidance on measures to stop the situation from escalating.
Control: Measures to bring the situation under control directly, or control the area around the emergency.
Consolidate: Actions to take once the situation is under control. Actions which start the site on the road to recovery.

The term "site supervisor" is used throughout these instructions to refer to the person responsible for the site at the time of the incident. DCWW policy is that during normal working hours the this is the duty Site Supervisor (Digester Safety Controller). Outside of working hours, telephone SmartHub, and ask for the Bronze Level Manager.

DCWW internal contacts

Duty	Name	Contact Number
Site Supervisor	Leon Jones	07881 014417
Digester controller	Keith Harris	07920 849778
Smart Hub		
Logistics	Jo Mallett	07392 282629
CHP team		

Specialist support is called for in some instructions. The below contacts are identified as willing and able to provide suitable support to this site.

Marches Biogas	0333 207 9991	Mechanical, electrical, biological and process problems (24 hr)

Specialist external agencies must be contacted in some instances. Their contact details are below:

Fire Brigade (TATA Steel fire & emergency)	
Ambulance Service	
Natural Resources Wales	0345 988 1188
Health and Safety Executive (for RIDDOR reporting):	http://www.hse.gov.uk/riddor/report.htm

Page

BIOGAS

This site produces biogas by a biological process. The production of biogas can only be stopped over a period of days by significant process intervention. Biogas is present on site in the concrete digester headspaces, the green double membrane gas holding sphere and the connecting pipes and equipment. The risks associated with biogas are described below. See Potentially Explosive Atmospheres drawing of site for detail.

TOXIC

Hydrogen Sulphide is present in biogas in harmful quantities. It is harmful through inhalation and is an eye irritant. Where gas leaks or releases may be present personnel must wear a personal gas monitor and evacuate the area if it alarms.

FLAMMABLE

Biogas contains methane (40-60%) and is therefore flammable when mixed with air. Where biogas leaks or is vented from the process controls must be in place to prevent sparks or other sources of ignition.

ASPHYXIANT

Where biogas is vented in large quantities it will displace the oxygen from the atmosphere local to this release. Where gas leaks or releases may be present personnel must wear a personal gas monitor and evacuate the area if it alarms.

SLUDGE

Sewage sludge contains many bacterial and viruses which are harmful to human health. Avoid direct contact with sludge and digestate. Do not ingest. If contact occurs, wash immediately with water and soap. If flu like symptoms occur after exposure to sludge, consult a doctor and alert them that you are at risk of Weil's disease.

HOT WATER

Hot water is present on site, operating at 70-90 deg. C, 1-3 bar(g). Systems are fitted with pressure relief devices. If water is released from the system, direct contact must be avoided until it has had time to cool.

<u>PPE & other equipment requirements:</u>

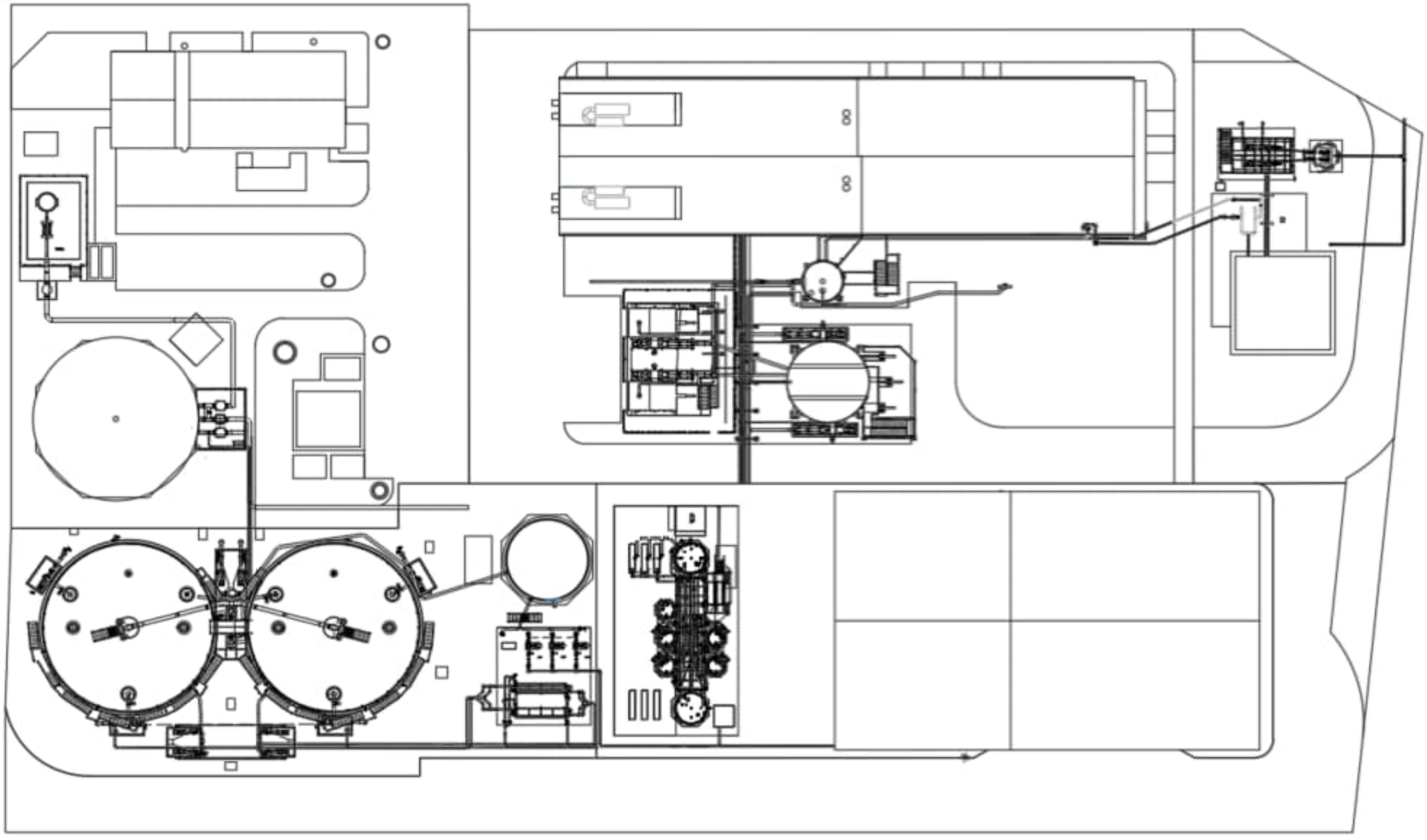
Steel toe cap boots
High visibility vest, jacket or similar
Bump cap/hard hat
Gloves
Personal gas monitor (CH4, H2S, CO, O2)
Eye & ear protection must be readily available

Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTIONS Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY EQUIPMENT REGISTER		ISSUE: DATE:

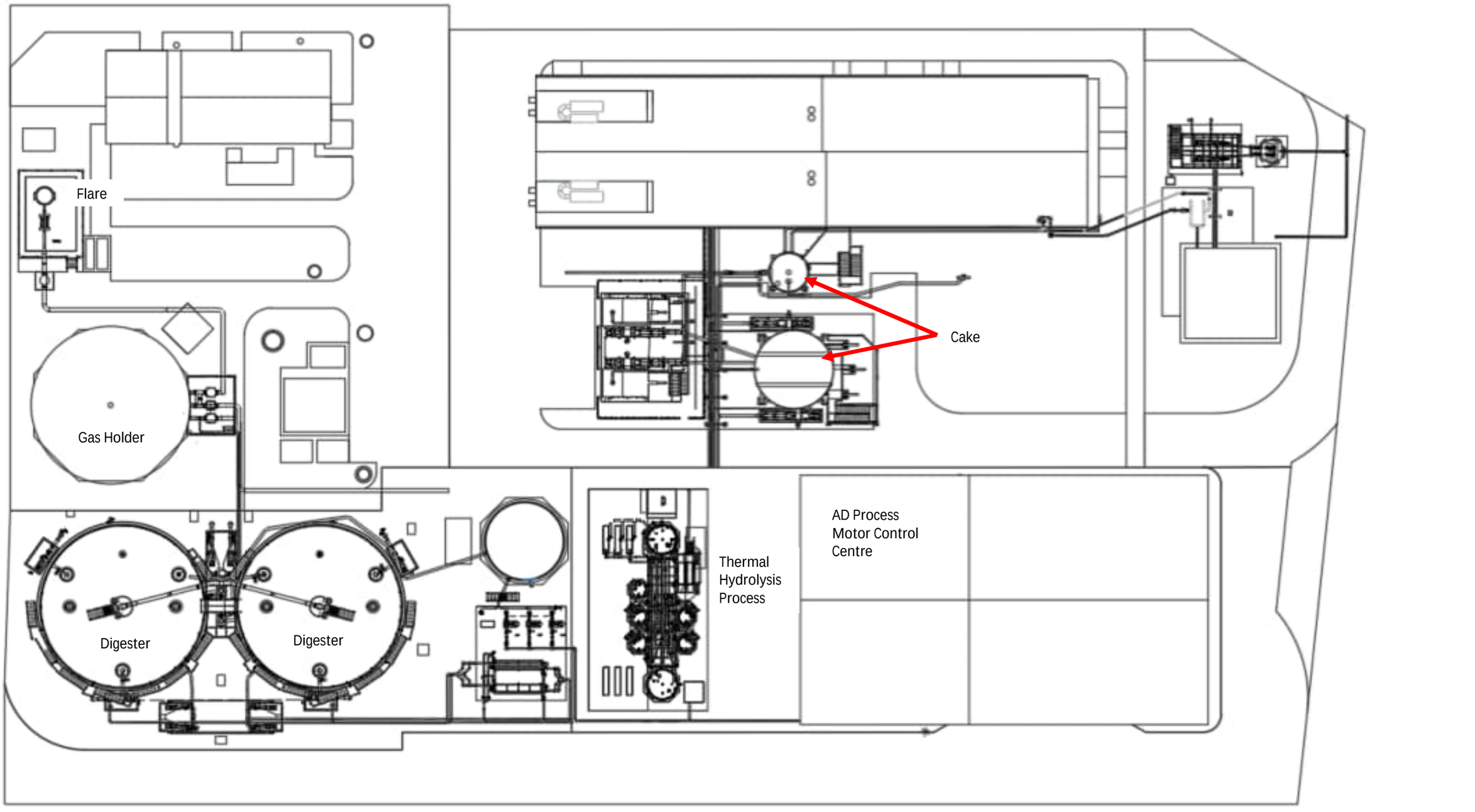
The following equipment is recommended to be held on site. It is held in a dedicated store unless noted. Locations of equipment are shown on the site layout plan overleaf.

Equipment	Checked: all present & functional Date	 Signed
ATEX rated torch & batteries		
Cones / barriers		
100m barrier tape		
Fire extinguisher (CO2, Digester control panel room)		
Fire extinguisher (CO2, Boiler Room)		
Marker pen		
4 x 20m water hoses		
Gaskets, 2 off each: 80 mm 100 mm 150 mm 200 mm 250 mm 300 mm		
6 x lock off padlocks, tags & keys		
Sandbags		
1 full bottle Leak detection fluid		
Gas Analyser (calibrated & on charge, held in site office)		
3 x "authorised access only" signs & zip ties		
3 x Spill Kits		
1 x spare personal gas monitor (Calibrate & on charge, held in site office)		
Rope Ladder (2 m)		

Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
SITE LAYOUT DRAWING SHOWING CRITICAL LOCATIONS		ISSUE: DATE:



Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
AD PROCESS FLOW DIAGRAM		ISSUE: DATE:



DIGESTER SAFETY INSTRUCTION
Afan WWTW

EMERGENCY INSTRUCTIONS FOR

MECHANICAL DAMAGE

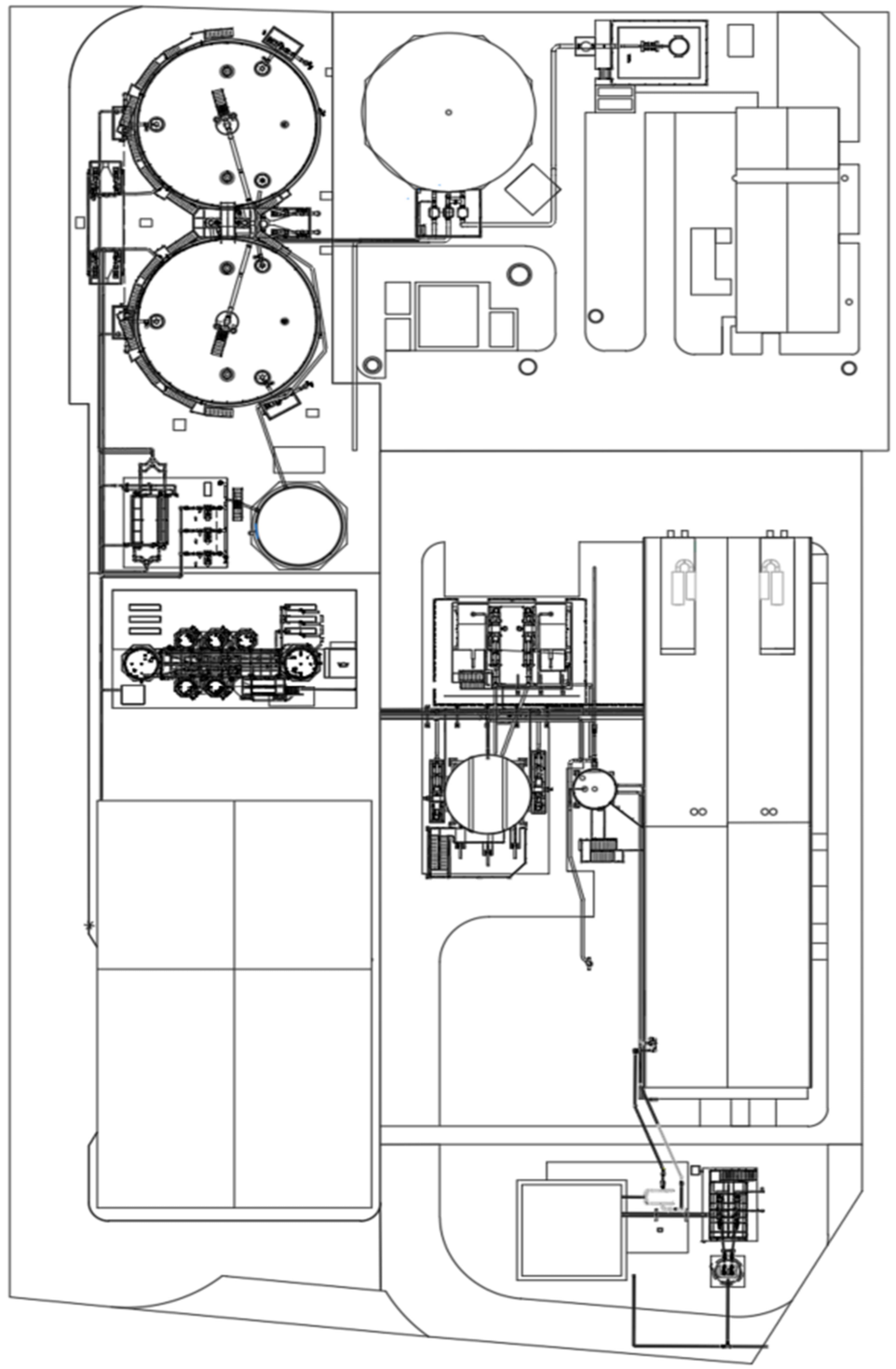
ISSUE:
DATE:

PREPARE	
EVACUATE:	Clear people from the area. If the damage is a vehicle strike, turn the ignition off and leave the vehicle in situ. Equipment and machines to be turned off/made safe as staff leave the area.
ASSESS THE RISK:	Is there a fire, or the risk of fire? Identify the equipment damaged; is it sludge, gas or water equipment? Is there risk of the damage becoming worse? Could a sludge release also release gas?
COMMUNICATE:	Call the emergency services if required to deal with casualties, fire or risk of fire. Call site supervisor and report the situation. Note, Call TATA steel for Fire service.
GATHER EQUIPMENT:	Assess the situation, and gather equipment appropriately

CONTAIN	
ACTIONS	Make suitable isolations as far as is safe and practical (valves and isolators) See emergency action sheet for relevant system(s) damaged and take actions accordingly Only remove vehicles or other equipment from the area once necessary isolations have been made, in case the removal makes the leak worse.
ADVICE	Be aware of potential complex issues due to damage to more than one system. If in doubt, evacuate the area, maintain a safe distance and call for aid. Contain any spilt sludge as far as possible without compromising safety. Inform Silver manager and digester controller

CONTROL	
ACTIONS	Be prepared to act as point of contact for emergency services, vehicle drivers, subcontractors etc. while the site is being evacuated and made safe and until a site manager can take over co-ordination responsibilities.
ADVICE	The Silver manager will declare a silver or gold incident if deemed necessary and refer to the DCWW digester safety procedures

CONSOLIDATE	
ACTIONS	Establish a clear understanding of what happened in the lead up to the damage occurring. Gather eyewitness reports and any relevant process information. This information will be required to put in place any measures to prevent a recurrence of the incident. It may also be information required by a Health and Safety Executive inspector, in the event that an investigation is deemed necessary.
ADVICE	Site supervisor and Digester controller will provide advice on next steps



Site layout drawing to assist with action planning and exclusion zone identification

Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR	**FOAMING**	ISSUE: DATE:

PREPARE

EVACUATE:	Evacuate the digester rooves. Stop access to the rooves until foaming has stopped. Reduce feed to the affected digester
ASSESS THE RISK:	Is the wash water running as intended? Has the ultimate pressure relief valve lifted? Are the digester mixers operational and performaing as per design? Refer to the DCWW digester safety procedures
COMMUNICATE:	Call the site supervisor as well as the digester controller and alert them of the incident. Alert site staff the digesters are foaming.
GATHER EQUIPMENT:	Personal gas monitor, barrier tap and ensure wash water is available to clear any foam residue afterwards.

Foam Box

The installation of the foam boxes and foam traps should reduce the risk associated when a digester has a foaming incident. The foam boxes operate like so:

1) A conductivity probe detects foam entering the foam box. This will alarm on the SCADA of a foam incident.
2) This triggers the solenoid for the spray valve to open, spraying water in to the box. This will reduce destroy the foam.
3) If the rate of foaming persists, it will flow over weir where it will flow down the overflow pipe.
4) When the conductivity probe does not detect foaming, the solenoid shuts.

Ultimate Pressure Relief

If foaming keeps persisting and the foam box is unable to the cope with the rate of foam, then the ultimate pressure relief valve will open.
This operates by:

1) A conductivity probe detects foam. This will alarm on the SCADA of a foam event.
2) This triggers the solenoid for the sprat valve to open, spraying water in to the digester and in to the overflow catchment pot.
3) When the pressure from the foam is great enough, the valve will be forced open. Foam will flow out of the valve and down the overflow pipework.
4) The ultimate pressure relief valve will close, once the pressure has been relieved and foaming has subsided.

POST FOAMING

Once the foam event has stopped, the following checks need to be made to ensure the system is safe:

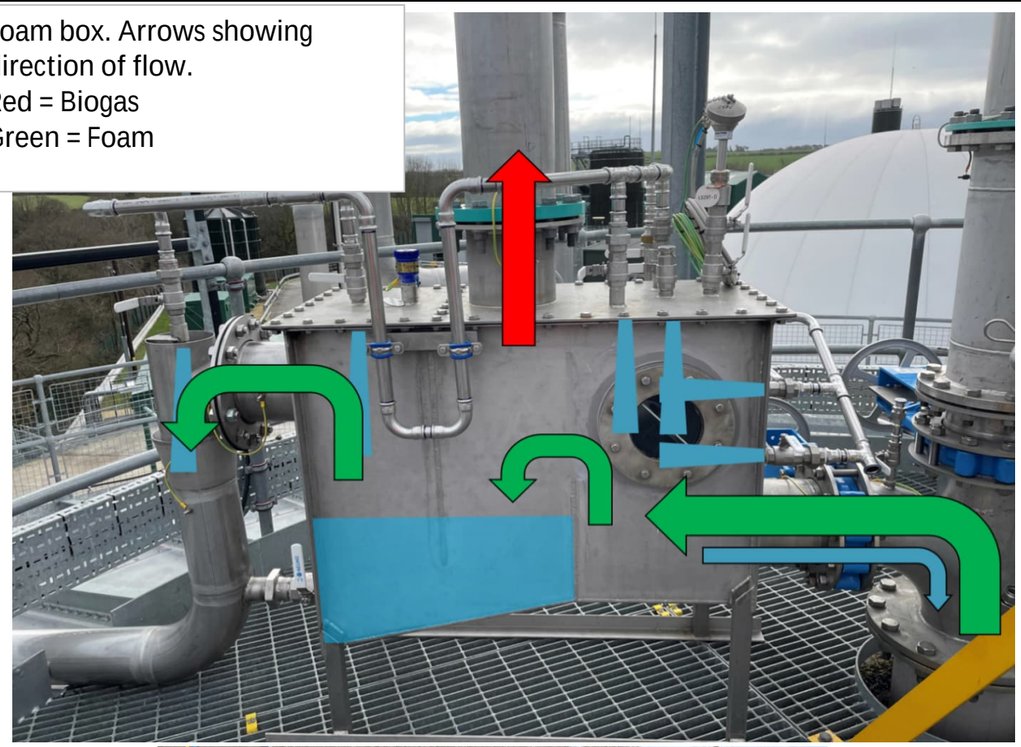
1) The foam box water trap is full of water. If it is not, the level alarm in the box will alarm there is no gas seal.
2) The U-bend on the water trap is full of water.
3) The overflow pipework on the foam box and the foam trap is clear of any residual foam.
4) The ultimate pressure relief valve has sealed shut.

Regular checks / maintenance

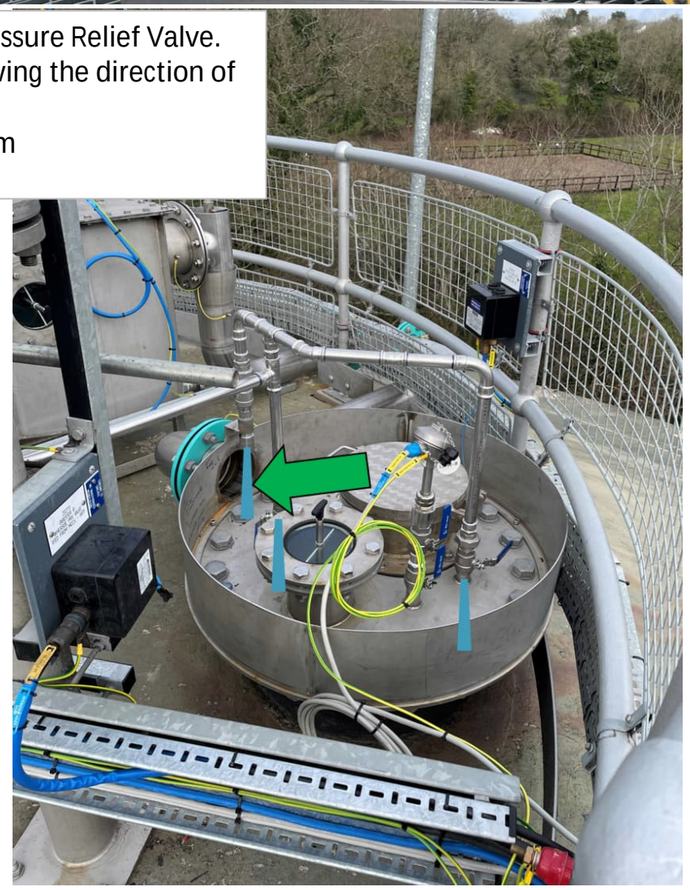
The foam box and ultimate pressure relief valve should reduce the risk associated with a foam event. However regular maintenance should be done to ensure the system works. Common checks should be:

1) Regular cleaning of the level instruments to prevent spurious signals.
2) Check the spray water is not blocked.
3) Ensure the overflows are clear of debris, so foam can overflow out of the digester.

Foam box. Arrows showing direction of flow.
Red = Biogas
Green = Foam



Ultimate Pressure Relief Valve. Arrows showing the direction of flow.
Green = Foam



Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR	FIRE	ISSUE: DATE:

CLASSIFY THE EMERGENCY		
	Boiler House / CHP	Other equipment
MEASURE:	Built in Fire Alarm Operational	Fire visible

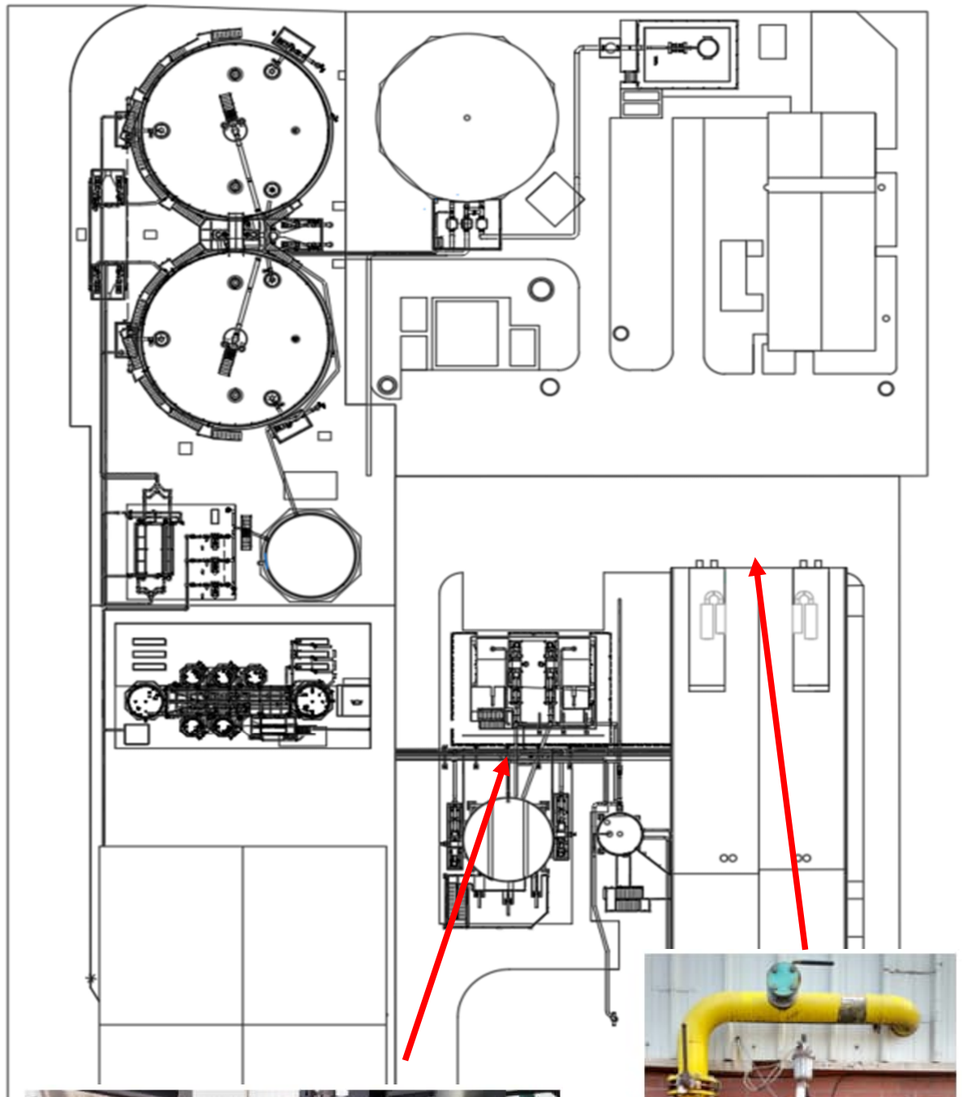
PREPARE	
EVACUATE:	Entire Anaerobic Digester compound area.
ASSESS THE RISK:	How large is the fire? What equipment is affected? What equipment is likely to become affected?
COMMUNICATE:	Call the fire service, saying "This is Welsh Water Sewage Treatment works at Cog Moors. Please be advised that there is a gas fire or explosion risk on this site." Inform Bronze manager
GATHER EQUIPMENT:	

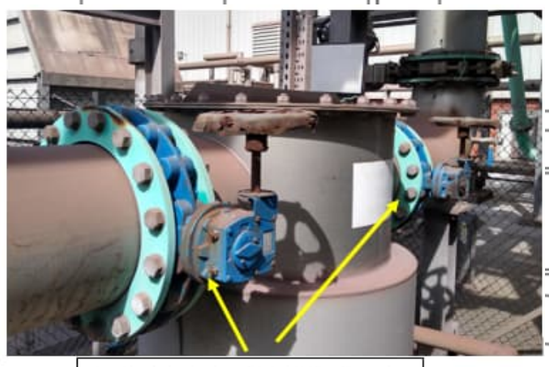
CONTAIN		
ACTIONS	Observe Surplus Gas Burner. Report its operation to Bronze level supervisor. Stop all feed to the digesters Restrict access to site Isolate liquor return pumping station	IF SAFE turn off affected & nearby equipment at the control panel. IF SAFE, run flare in hand at local control panel. Turn off feeding, boilers and CHP Close actuated isolation valves. IF SAFE close Manual Safety Shut Off Valves
ADVICE	As part of general site awareness, invite local fire brigade to site so they are familiar with the site, risks and gas safety shutoff valve location	If fire suppressant or water is used ensure that all liquids can be contained and treated on site

CONTROL	
ACTIONS	Be prepared to assist fire service with site knowledge, specifically gas pipe routes and explanation of how the gas holder works. Establish exclusion zone around digester site, authorised personnel (fire service etc.) access only. Inform Digester controller and Silver manager
ADVICE	Inform TATA and NRW

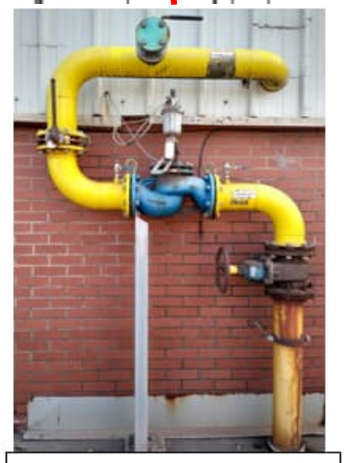
CONSOLIDATE	
ACTIONS	Once the fire is extinguished, establish with the fire service the extent of the heat affected area and identify any further isolations which should be made or equipment which will need to be investigated. Determine the extent of damage to processing capability. Contact logistics and advise on deliveries.
ADVICE	The digester controler and sludge scientist should make relavent assessments in line with DCWW digester procedures

Site layout drawing to assist with action planning and exclusion





Biogas Manual Safety Shut Off Valves

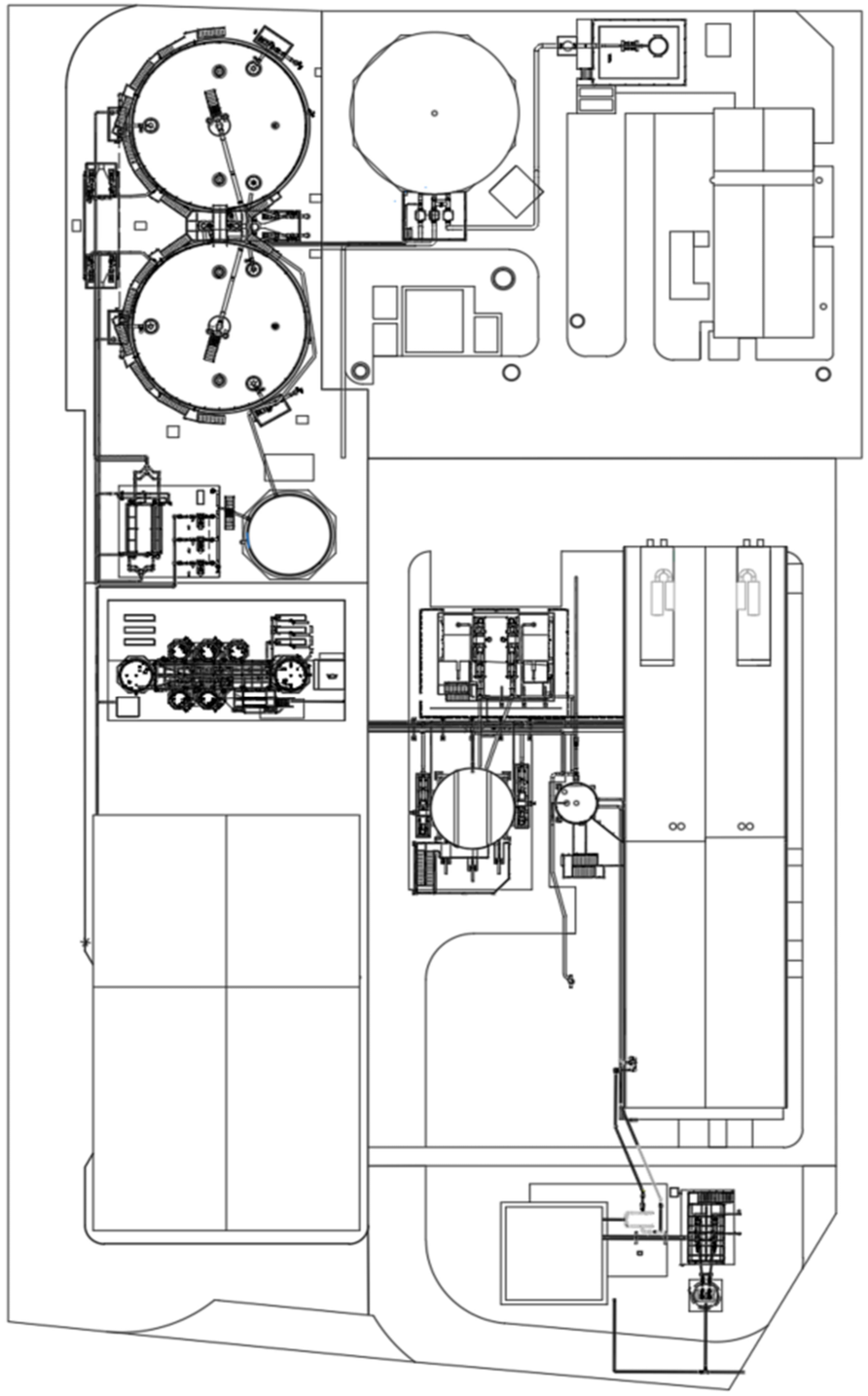


Natural Gas
Manual Safety Shut Off Valve

Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS TO	# LIGHTNING	ISSUE: DATE:

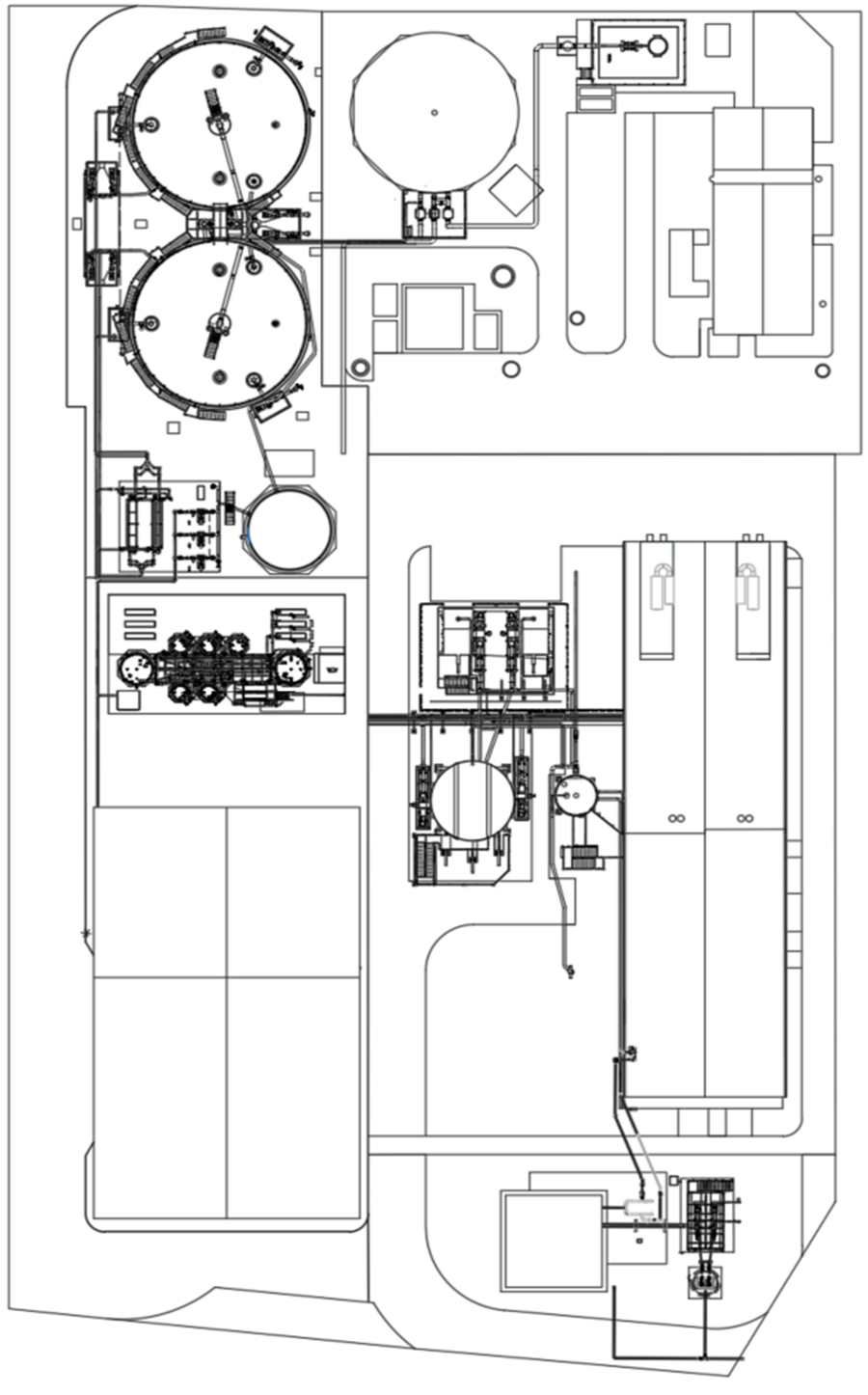
	CLASSIFY THE EMERGENCY
MEASURE:	Storm Warnings on weather forecast or observation of storms.
	PREPARE
EVACUATE:	Entire Gas Holder area. Prevent access to the digester rooves. Maintain a safe distance from lightning conductors.
ASSESS THE RISK:	Has lightning struck site? If so, where? What systems are still operable?
COMMUNICATE:	Call site supervisor to alert them of the situation. In the event of a strike call logistics and cancel deliveries.
GATHER EQUIPMENT:	Assess the situation and gather necessary equipment to stop access.
	CONTAIN
ACTIONS	In the event of a strike to digesters: Run the surplus gas burner in manual so the gas holder level drops. Stop feeding to the digesters to reduce biogas production.
ADVICE	
	CONTROL
ACTIONS	Inform Bronze manager
ADVICE	Be prepared for site power loss in the event of a severe lightning storm.
	CONSOLIDATE
ACTIONS	The digester controller and sludge scientist should assess the operation of the digesters
ADVICE	Refer to the DCWW digester safety procedures

AD plant drawing to assist with action planning and exclusion



Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS TO	# POWER FAILURE	ISSUE: DATE:

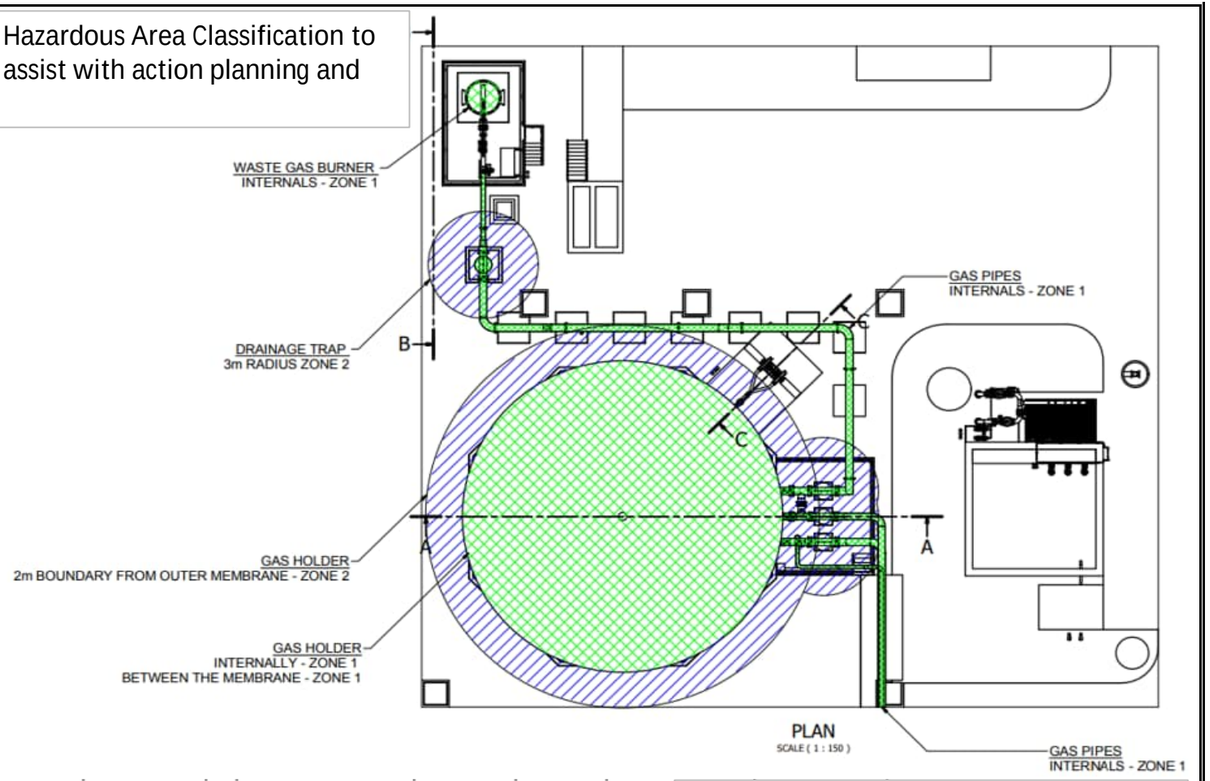
	CLASSIFY THE EMERGENCY
MEASURE:	Brownout (power dips but recovers) or blackout?
	PREPARE
EVACUATE:	Evacuate the digester rooves
ASSESS THE RISK:	Is it just a few drives? Is the whole site affected? Is the surrounding area without power?
COMMUNICATE:	Call site supervisor and Bronze manager via mobile to alert them of the situation. Call cake import contractor and suspend all cake deliveries.
GATHER EQUIPMENT:	PPE & gas monitor, cones & barrier tape
	CONTAIN
ACTIONS	In the event of brownout, maintain surveillance of SCADA and equipment, be prepared to re-start equipment as necessary. In the event of blackout, ensure all staff are accounted for and prepare for clean-up & recovery works
ADVICE	Be prepared for intermittent power, or for a blackout to follow a brownout. Ensure all staff are accounted for and sudden darkness has not led to injury.
	CONTROL
ACTIONS	When electricity is available to site, manually restart critical drives. Focus on restarting the gas holder air fans and the surplus gas burner to prevent the uncontrolled release of biogas, and the mixing pumps to control/prevent foaming.
ADVICE	When site power goes out and mixing stops, foaming is more likely to occur. The foam should be relieved via the foam box and the ultimate pressure relief valve. As instrumentation will be down assume the digesters will be foaming.
	CONSOLIDATE
ACTIONS	Check totalisers on meters to ensure SCADA has captured the correct feed in to digesters and other process critical data.
ADVICE	Inform the digester controller once normal operation has resumed Refer to the DCWW digester safety procedures



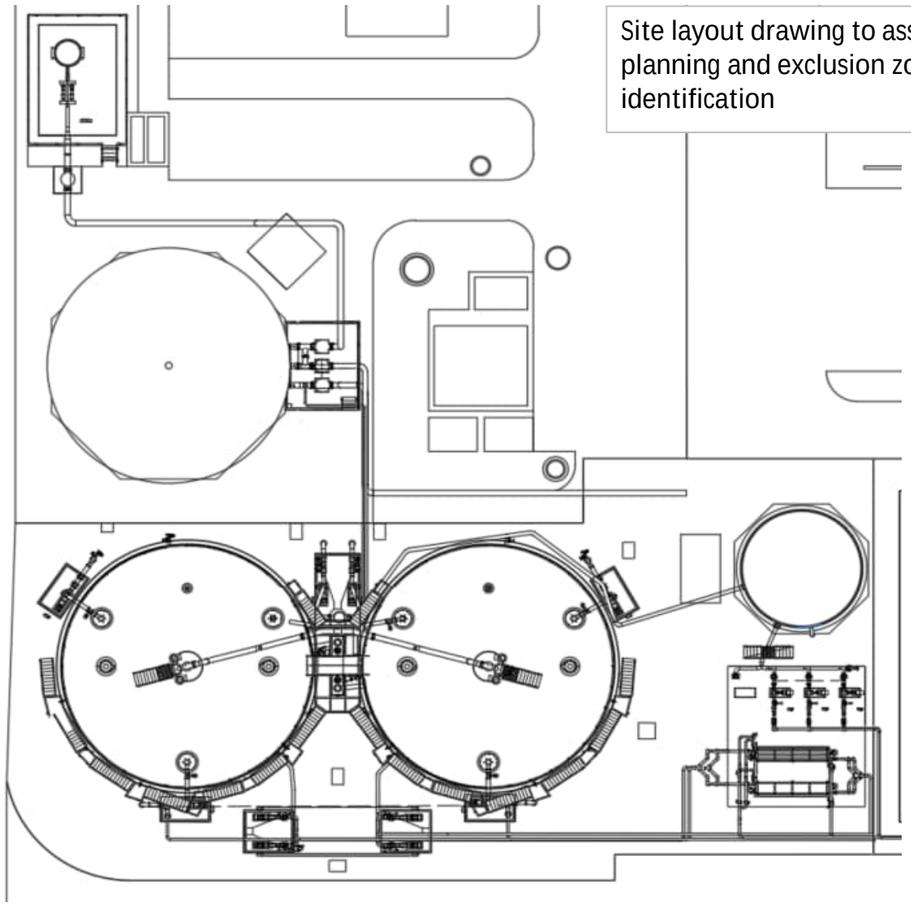
Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR	GAS HOLDER CONDENSATE POT BLOWOUT	ISSUE: DATE:

CLASSIFY THE EMERGENCY	
MEASURE:	HMI shows Gas Holder Low Level, Gas Holder Methane detector is not in alarm state Equipment not running or failed. Low Level Switch alarms Possible smell of biogas, wet area around a condensate pot
PREPARE	
EVACUATE:	Gas Holder compound
ASSESS THE RISK:	What direction is the wind blowing in? (approach pots from upwind)
COMMUNICATE:	Alert Site Supervisor and Bronze managerof blowout and intended action. Confirm wind direction and estimated duration of gas release.
GATHER EQUIPMENT:	Personal Gas Monitor. Water supply available. Hoses from emergency equipment store
CONTAIN	
ACTIONS	Use SCADA/MCC isolations to shut down: CHPs, Boilers, Flares. Isolate Digester Gas take offs- beware of venting biogas.
ADVICE	Isolating digester gas take offs will rapidly result in biogas venting. Ensure safe evacuation from area as soon as valves are closed. Gas Holder compound/pit is likely to have significant Biogas/H2S presence.
CONTROL	
ACTIONS	Turn off Gas Holder air fans. Using a personal gas monitor and maintaining a safe escape route, assess the blow out from outside of the pit. Identify which pot has blown. Prepare water hose. Option 1: Wait for Gas Holder to vent through blown trap/reach equilibrium with remaining liquid. Enter pit and isolate blown trap. Refill with water from hose. Once full, restart air fans. Option 2: From outside the compound, aim the hose to fill the blown trap. Once pot is sealed, Isolate from gas system. Turn on air fans. Fill pot completely.
ADVICE	Seek advise from the Bronze manager if a schedule 5 notification is required Refer to the DCWW digester safety procedures
CONSOLIDATE	
ACTIONS	Return system to normal operation- introduce digesters back to the gas system and return equipment to automatic operation. Investigate and remedy possible causes for pot losing containment. Against the names below, create a tally of number of times a pot has blown. For repeat incidents, call specialists to examine the installation and instigate remedial actions. Digester Gas Take Off Flare Line CHP & Boiler Line

Hazardous Area Classification to assist with action planning and

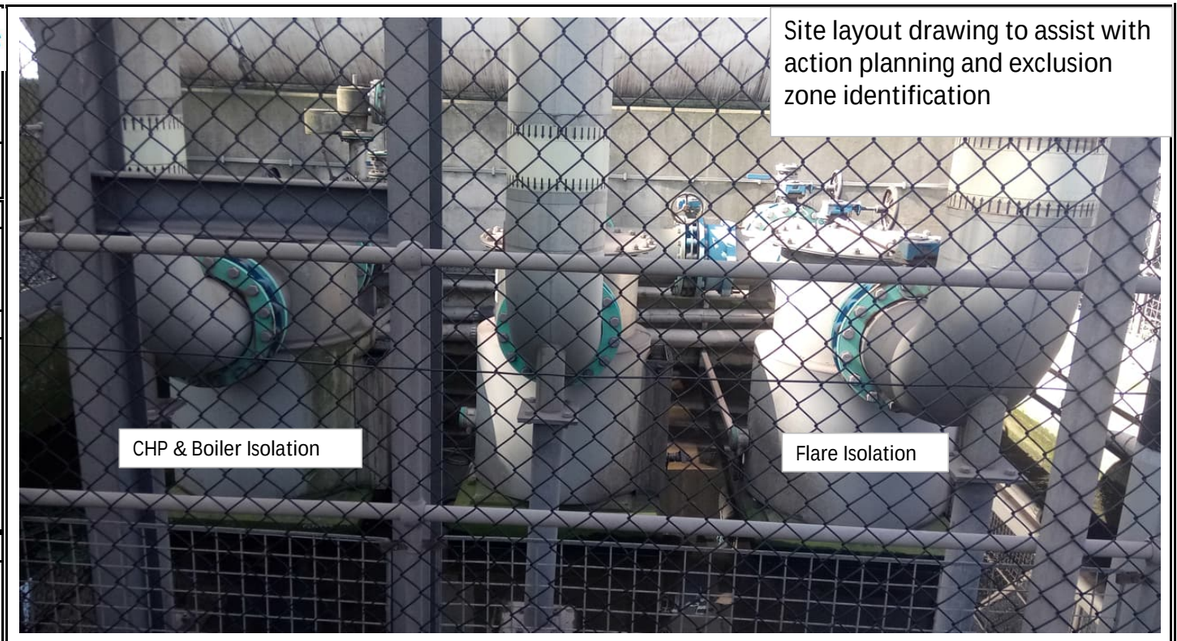


Site layout drawing to assist with action planning and exclusion zone identification

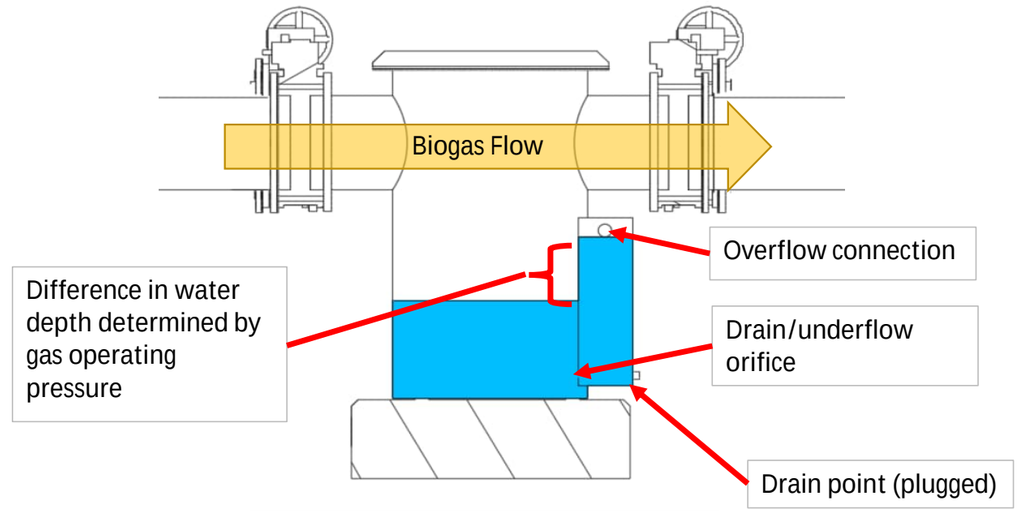


Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR	CHP OR FLARE CONDENSATE POT BLOWOUT	ISSUE: DATE:

CLASSIFY THE EMERGENCY	
MEASURE:	HMI shows Gas Holder Low Level, Gas Holder Methane detector is not in alarm state Equipment not running or failed. Level Switch alarms. Possible smell of biogas, wet area around a condensate pot. Daily checks.
PREPARE	
EVACUATE:	Area around blown condensate pot
ASSESS THE RISK:	What direction is the wind blowing in? (approach pots from upwind)
COMMUNICATE:	Alert Site Supervisor and digester controller of blowout and intended action. Confirm wind direction and estimated duration of gas release.
GATHER EQUIPMENT:	Personal Gas Monitor. Water supply available. Hoses from emergency equipment store
CONTAIN	
ACTIONS	Use SCADA to shut down affected equipment (Flare or CHPs and boilers). Isolate upstream (at Gas holder). Use lock-offs as necessary at MCC.
ADVICE	Approach with caution as biogas may still be venting. Be alert for audible & visual clues such as splashing/bubbling.
CONTROL	
ACTIONS	Re-fill condensate pot with water until overflow level is reached. Check other condensate pots. Re-open isolation valves. Check that water seal is holding. If it isn't, check area for mechanical damage.
ADVICE	
CONSOLIDATE	
ACTIONS	Inform line manager that system is no longer venting and is in recovery. Return equipment to automatic operation. Monitor gas holder level to ensure that it rises, and that equipment re-starts appropriately.
ADVICE	Against the names below, create a tally of number of times a pot has blown. For repeat incidents, call specialists to examine the installation and instigate remedial actions. Flare CHPs/Boilers



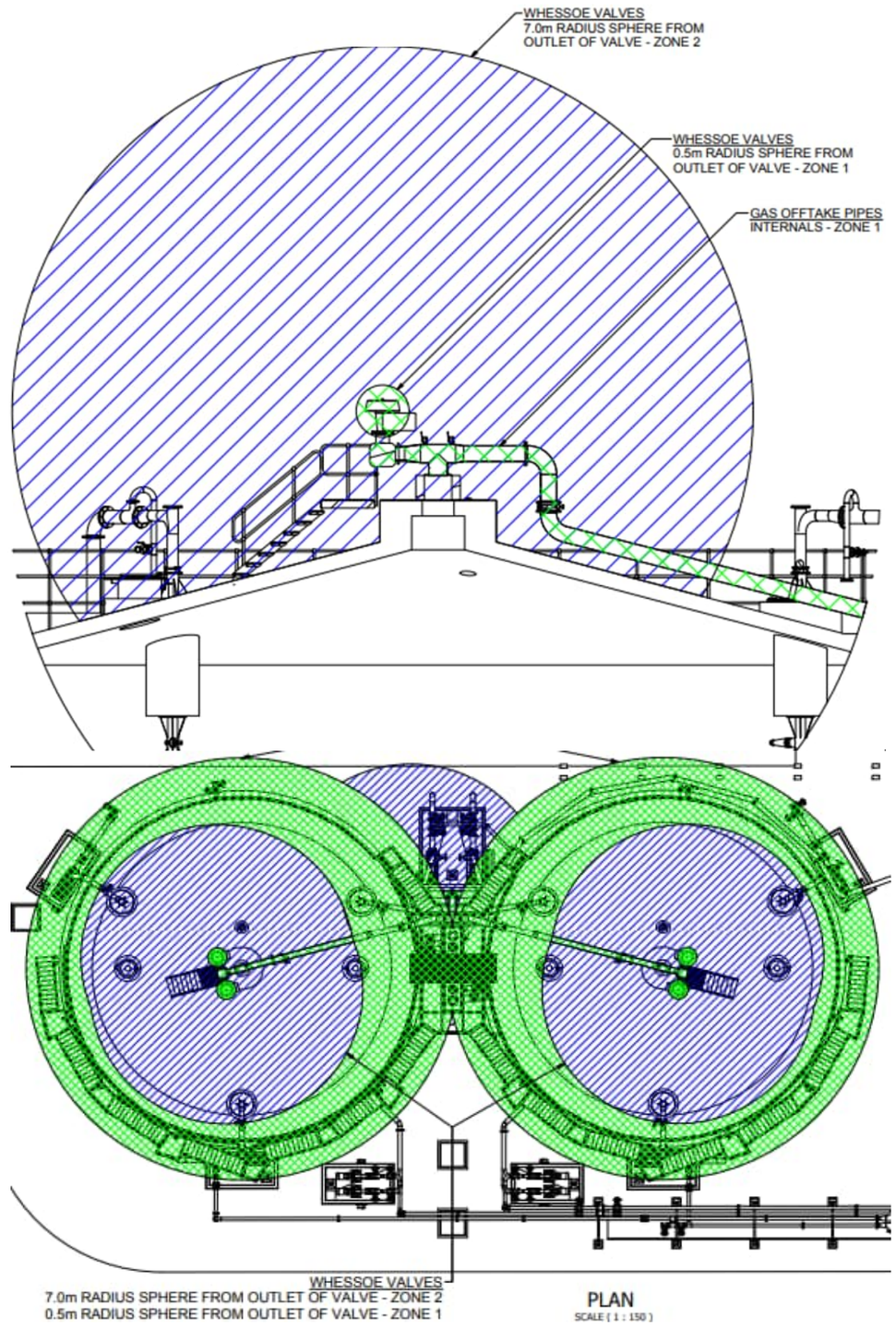
Site layout drawing to assist with action planning and exclusion zone identification



TYPICAL CONDENSATE TRAP DETAIL

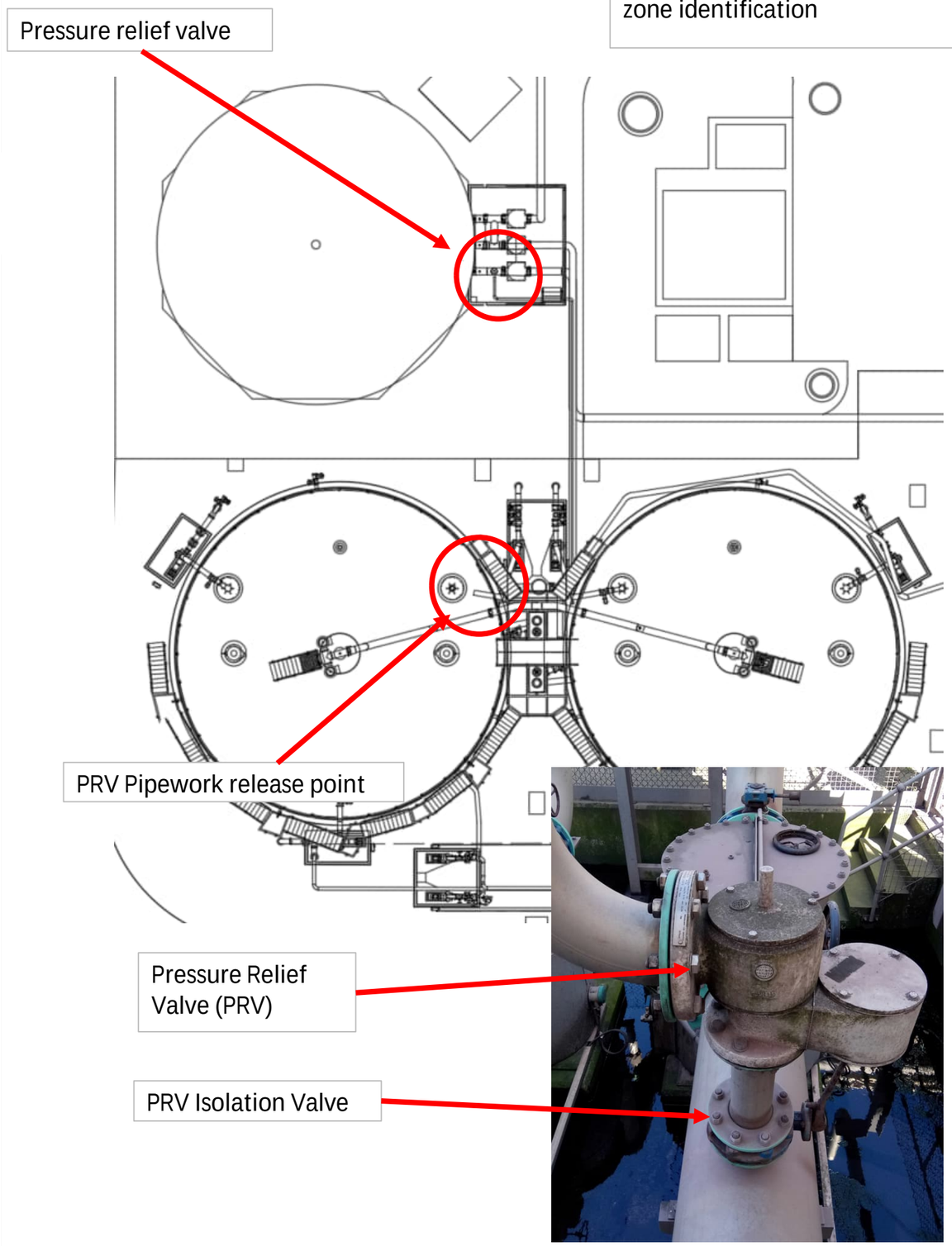
Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW		marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR DIGESTER PRESSURE RELIEF VALVE (PRV) LEAK Please note: the below assumes the gas holder is NOT at high level. If it is, then the valve operating is part of normal operation. Refer to site O&M manuals.			ISSUE: DATE:
	CLASSIFY THE EMERGENCY		
	SLIGHT	MODERATE	SEVERE
MEASURE:	Personal gas monitor alarms at 0.5 m.	Personal gas monitor alarms at 1 m.	
		PREPARE	
EVACUATE:		Digester Roof	
ASSESS THE RISK:		Wind strength & direction- strong wind will make a release safer, but will mask a big release.	
COMMUNICATE:	Inform Site supervisor, Digester controller and Silver manager		
GATHER EQUIPMENT:	PPE & gas monitor,		
	CONTAIN	CONTAIN	CONTAIN
ACTIONS ADVICE	Suspend feed to the digester	Ensure other PRV is online, then isolate leaking PRV. UNDER NO CIRCUMSTANCES MAY BOTH PRVs BE ISOLATED SIMULTANEOUSLY. Approach and operate valve from upwind.	
	CONTROL	CONTROL	CONTROL
ACTIONS ADVICE	Monitor biogas system pressure, if it drops to below 20mbar, treat as moderate.		
	CONSOLIDATE	CONSOLIDATE	CONSOLIDATE
ACTIONS ADVICE	Call statutory maintenance team and arrange for valve servicing to be brought forward.	Call statutory maintenance team and request intervention ASAP	

Digester PEXA drawing to assist with action planning and exclusion zone identification



Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW		marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR GAS HOLDER PRESSURE RELIEF VALVE (PRV) LEAK Please note: the below assumes the gas holder is NOT at high level. If it is, then the valve operating is part of normal operation. Refer to site O&M manuals.			ISSUE: DATE:
	CLASSIFY THE EMERGENCY		
	SLIGHT	MODERATE	SEVERE
MEASURE:	Valve operation audible	Biogas system pressure drops to below 20 mbar	Biogas System pressure drops to below 10mbar
	PREPARE		
EVACUATE:	Digester roof		
ASSESS THE RISK:	Wind strength & direction- strong wind will make a release safer, but will mask a big release. Use personal gas monitor on a rope to assess atmosphere in condensate pit.		
COMMUNICATE:	Inform Site supervisor, Digester controller and Silver manager		
GATHER EQUIPMENT:	PPE, gas monitor, rope, key for locked off butterfly valve.		
	CONTAIN	CONTAIN	CONTAIN
ACTIONS ADVICE		Isolate PRV from biogas system	Isolate PRV from biogas system.
	CONTROL	CONTROL	CONTROL
ACTIONS ADVICE	Monitor biogas system pressure, if it drops to below 20mbar, treat as moderate.		Shut down Biogas consumers (Flare, CHPs, Boilers) Wait for biogas pressure to increase back to normal operating pressure.
	CONSOLIDATE	CONSOLIDATE	CONSOLIDATE
ACTIONS ADVICE	Call statutory maintenance team and arrange for valve servicing to be brought forward.	Call statutory maintenance team and request intervention ASAP	Resume normal system operation (PRV isolated). Call statutory maintenance team and request intervention ASAP

Site layout drawing to assist with action planning and exclusion zone identification



DIGESTER SAFETY INSTRUCTION
Afan WWTW

Dŵr Cymru Welsh Water

marches biogas
anaerobic digestion engineering

EMERGENCY INSTRUCTIONS FOR

BIOGAS LEAKS DETECTED ON DIGESTER ROOF

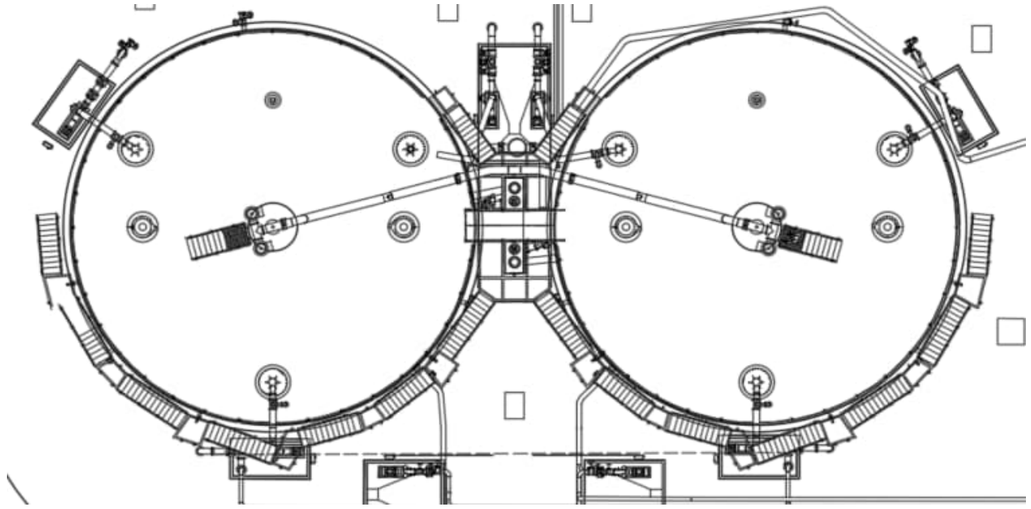
ISSUE:
DATE:

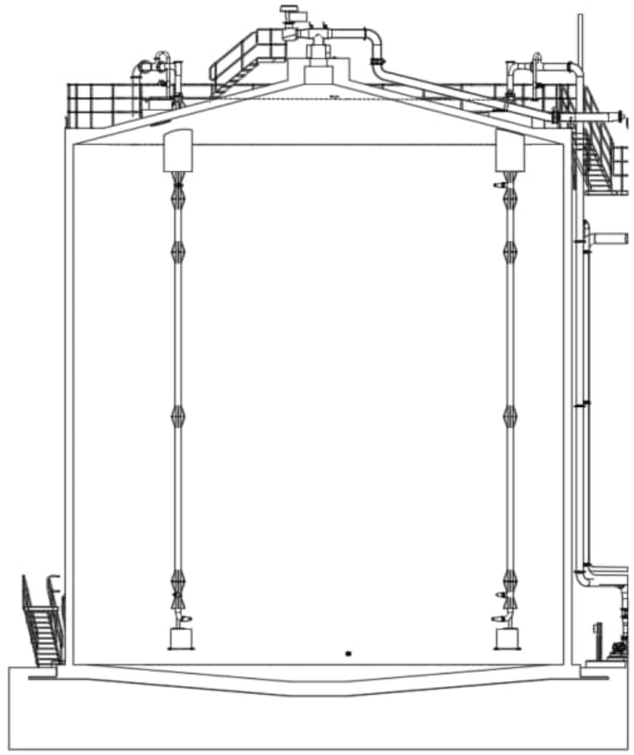
CLASSIFY THE EMERGENCY			
	SLIGHT	MODERATE	SEVERE
MEASURE:	Personal gas monitor can be triggered by leak. Bubbles observed in wet weather.	N/A	Personal gas monitor alarms at 1 m.
PREPARE			
EVACUATE:	Digester safety controller	Restrict all staff	Restrict all staff & evacuate
ASSESS THE RISK:	Is the release identifiable/visible? How big is it? Could the wind conditions have masked the size of the release?		
COMMUNICATE:	Inform Site Supervisor, Digester controller and Silver manager		
GATHER EQUIPMENT:	Personal Gas Monitor. Leak Detection Fluid. Marker pen.		Authorised access only sign
	CONTAIN	CONTAIN	CONTAIN
ACTIONS	Mark leak location. Monitor leak size.		Stop feeding this digester. Restrict access to digester roof
ADVICE	Use Leak Detection Fluid to monitor leak. Use a rod or pole to reach suspected leak locations which are out of reach from the installed access.		
	CONTROL	CONTROL	CONTROL
ACTIONS	Consult specialists, it may be possible to reduce the severity of the leak by reducing the system operating pressure.		Schedule repair works. This may require digester decommissioning to allow repair from the inside. Contact Logistics: Drop sludge imports by 50%
ADVICE	A number of technology providers exist who may be able to assist. However, live repairs onto the outside of tanks are difficult to achieve safely and effectively. Caution recommended.		
	CONSOLIDATE	CONSOLIDATE	CONSOLIDATE
ACTIONS	Use the space below to record leak alarm distances and dates. If these deteriorate rapidly, treat as severe.		

Leak	Alarm distance	Date

Site layout drawing to assist with action planning and exclusion zone identification

Use diagram below to show approximate leak location

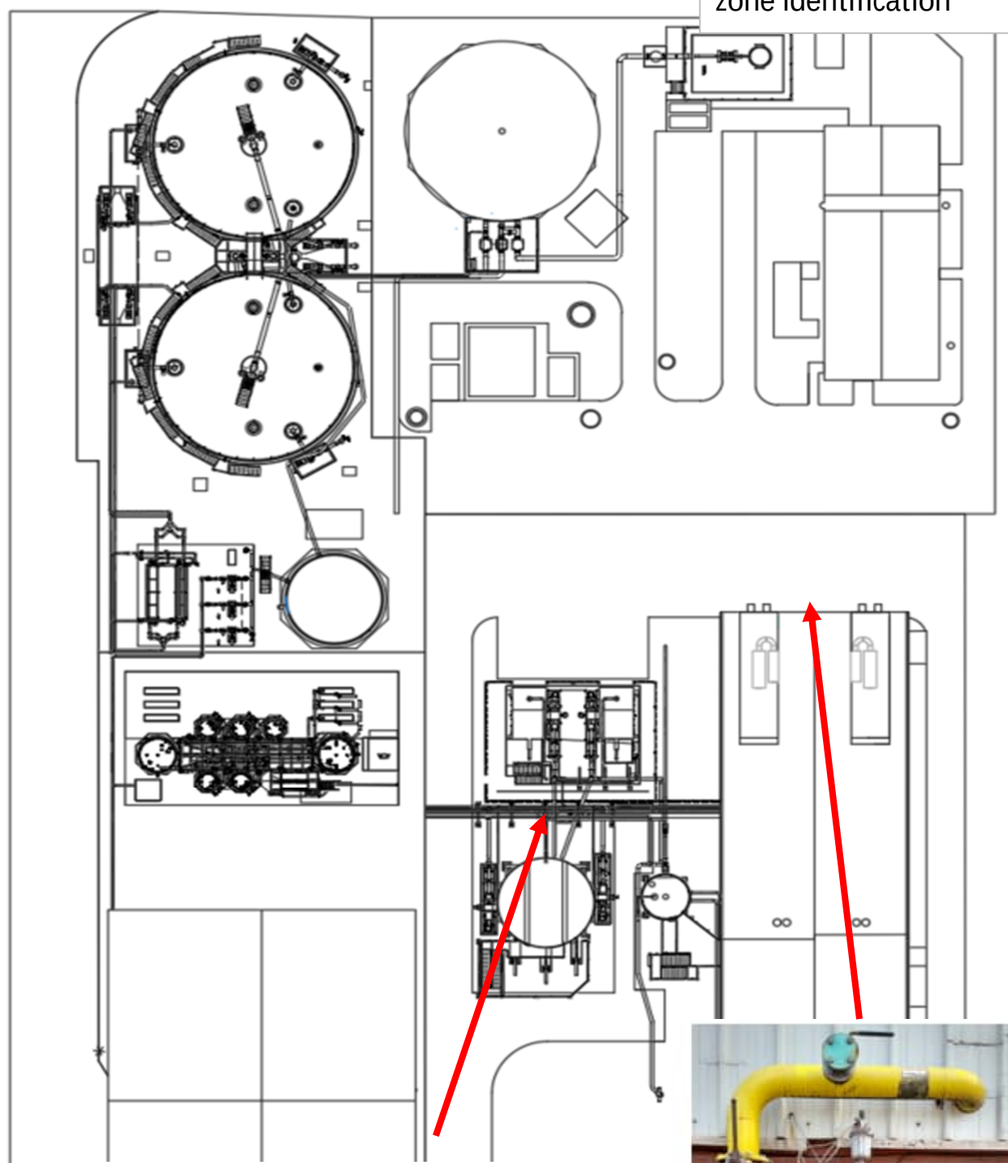


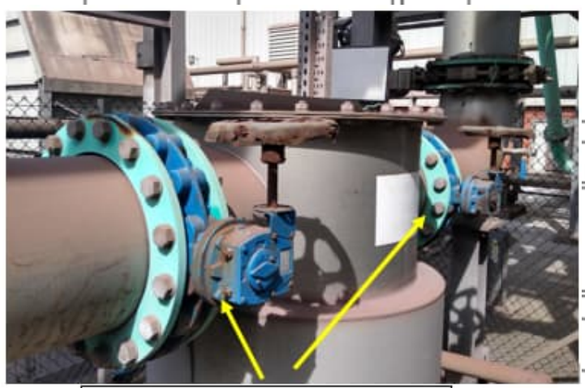


Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR	GAS LEAKS FROM PIPES AND EQUIPMENT	ISSUE: DATE:

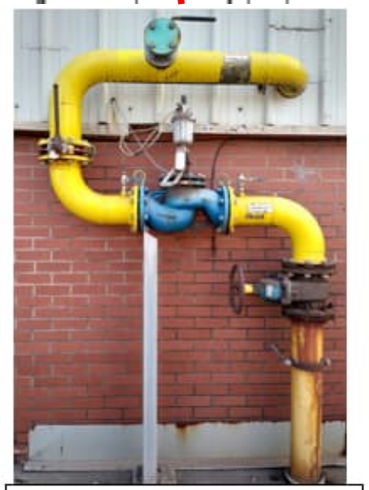
	CLASSIFY THE EMERGENCY		
	SLIGHT	MODERATE	SEVERE
MEASURE:	Personal Gas Alarm sounds at 100mm, bubbles visible when surface wetted.	Personal Gas Alarm sounds at 0.5 m	Personal Gas Alarm sounds at 1.0 m or greater
	PREPARE		
EVACUATE:	Area around leak. Bigger exclusion area for bigger leak.		
ASSESS THE RISK:	Consider H2S, asphyxiation and explosion/fire risk. Ensure sources of ignition are controlled.		
COMMUNICATE:	Alert site manager.		
GATHER EQUIPMENT:	Personal Gas Monitor, Leak Detection Fluid (LDF), adjustable spanners,		
	CONTAIN	CONTAIN	CONTAIN
ACTIONS	Turn off associated equipment & close isolation valves	Turn off nearby and associated equipment at control panel & close isolation valves.	Turn off nearby and associated equipment at control panel & close isolation valves. If the leak is identified inside the boiler house, evacuate immediately and close the biogas and natural gas isolation valves. Ventilate thoroughly before entry.
	CONTROL	CONTROL	CONTROL
ACTIONS ADVICE	Investigate the leak using LDF, and fix with hand tools if possible. If the leak is due to equipment damage, arrange for replacement parts to be supplied.	Set up exclusion area around leaking equipment. Investigate the leak using LDF, and fix with hand tools if possible. If the leak is due to equipment damage, arrange for replacement parts to be supplied.	Set up large exclusion area. With a colleague nearby, investigate the leak, and fix with hand tools if possible. If the leak is due to equipment damage, arrange for replacement parts to be supplied.
	CONSOLIDATE	CONSOLIDATE	CONSOLIDATE
ACTIONS	If the leak is fixed, return site to normal operation. If the leak cannot be fixed, alert site manager. Consider downstream systems- if the leak is on the gas system, stop feeding until it can be repaired.	If the leak is fixed, return site to normal operation. If the leak cannot be fixed, alert site manager. Consider downstream systems- if the leak is on the gas system, stop feeding until it can be repaired.	If the leak is fixed, return site to normal operation. If the leak cannot be fixed, alert site manager. Consider downstream systems- if the leak is on the gas system, stop feeding until it can be repaired.

Site layout drawing to assist with action planning and exclusion zone identification





Biogas Manual Safety Shut Off Valves



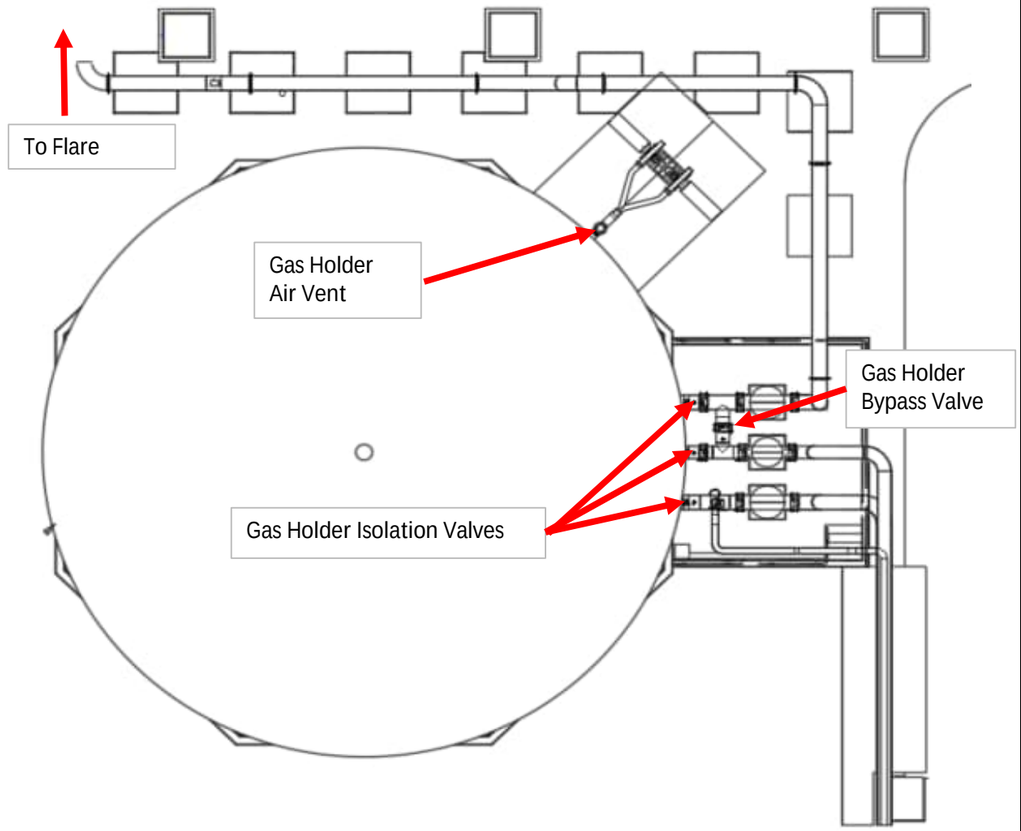
Natural Gas
Manual Safety Shut Off Valve

Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW		marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR	GAS LEAK FROM GAS HOLDER INNER MEMBRANE		ISSUE: DATE:

	CLASSIFY THE EMERGENCY		
	SLIGHT	MODERATE	SEVERE
MEASURE:	Methane detected in Gas holder air space: less than 2%	Methane detected in Gas holder air space: More than 2%	Methane detected in Gas holder air space: More than 5%

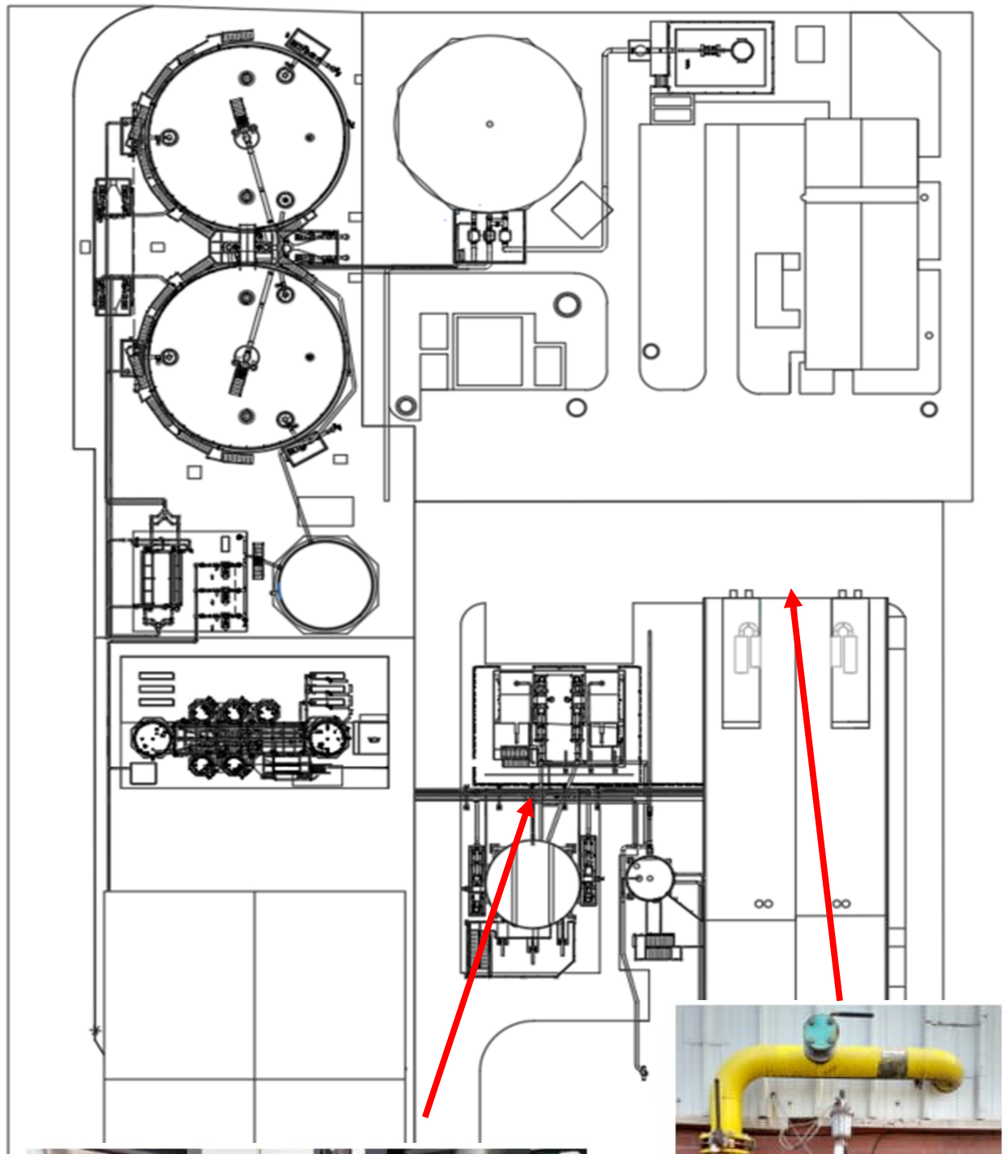
	PREPARE
EVACUATE:	Gas holder area and digester rooves
ASSESS THE RISK:	How severe is the leak? (5% methane is Lower Flammability Limit in air)
COMMUNICATE:	Inform site supervisor
GATHER EQUIPMENT:	PPE & gas monitor, Gas analyser & fittings, cones & barrier tape

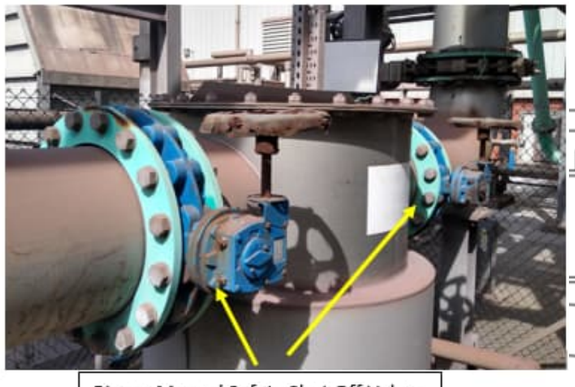
	CONTAIN	CONTAIN	CONTAIN
ACTIONS	Turn off all biogas consumers Allow Gas Holder to fully inflate. Run all biogas consumers until shutoff on low level DO NOT ALLOW SHUTOFF ON LOW PRESSURE Allow Gas Holder to reinflate and normal operation to resume	Adjust SCADA setpoints so that the Biogas Holder automatically fills and empties fully over time. This will draw in and then expel fresh air, allowing a "breathing" purge effect. Faster empty/fill cycle = more effective purging.	Turn off CHPs, Boilers & Digester feeding Isolate gas holder from digesters, CHPs and boilers. Using Gas Holder Isolation Valves
	CONTROL	CONTROL	CONTROL
ACTIONS	Monitor methane in the air space of the Gas Holder. If the above actions removed the methane detection, monitor and alert statutory maintenance. If event repeats, treat as Moderate	Set up exclusion area around Gas Holder Air Vent to protect staff from purge gases.	Turn on the Flare in Hand at local panel. Run flares until low pressure prevents operation, then close isolation valve. Set up exclusion area around gas holder. Authorised access only.
	CONSOLIDATE	CONSOLIDATE	CONSOLIDATE
ACTIONS	Arrange Gas holder inspection with statutory maintenance team. If methane persists or repeats, treat as Moderate	Arrange for gas holder repair by specialists ASAP. Notify site supervisor of leak extent and duration. Note, CHPs and Boilers are not designed for stop/start operation. Remedial measures must be carried out as soon as possible.	Arrange for gas holder repair by specialists ASAP. Stop digester feeding Alert Logistics: Cancel sludge deliveries If site resources permit, consider opening biogas holder bypass valve and flaring digesters directly. Notify site supervisor of leak extent and duration.



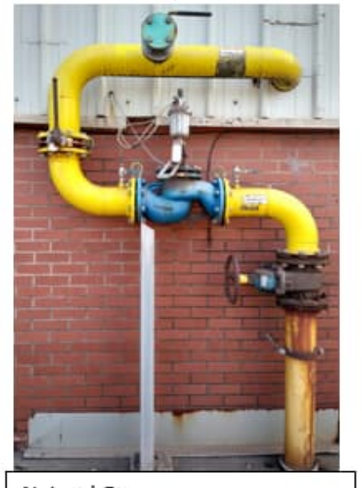
Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR	GAS LEAK IN BOILER HOUSE	ISSUE: DATE:

CLASSIFY THE EMERGENCY	
MEASURE:	Methane alarm activates in Boiler House.
PREPARE	
EVACUATE:	Boiler room & building immediately
ASSESS THE RISK:	
COMMUNICATE:	
GATHER EQUIPMENT:	PPE & gas monitor, Cones and barrier tape
CONTAIN	
ACTIONS	Isolate Gas Consumer valve at gas holder. Ensure Flare is in "remote" at local panel to allow automatic control.
ADVICE	
CONTROL	
ACTIONS	Establish an exclusion area around boiler house, authorised access only. Allow gas within the boiler house to dissipate If possible, improve ventilation by opening doors etc. DO NOT use motorised doors.
ADVICE	
CONSOLIDATE	
ACTIONS	Monitor gas alarm. Be prepared to call fire brigade should the alarm persist or fire break out.
ADVICE	





Biogas Manual Safety Shut Off Valves



Natural Gas
Manual Safety Shut Off Valve

DIGESTER SAFETY INSTRUCTION
Afan WWTW

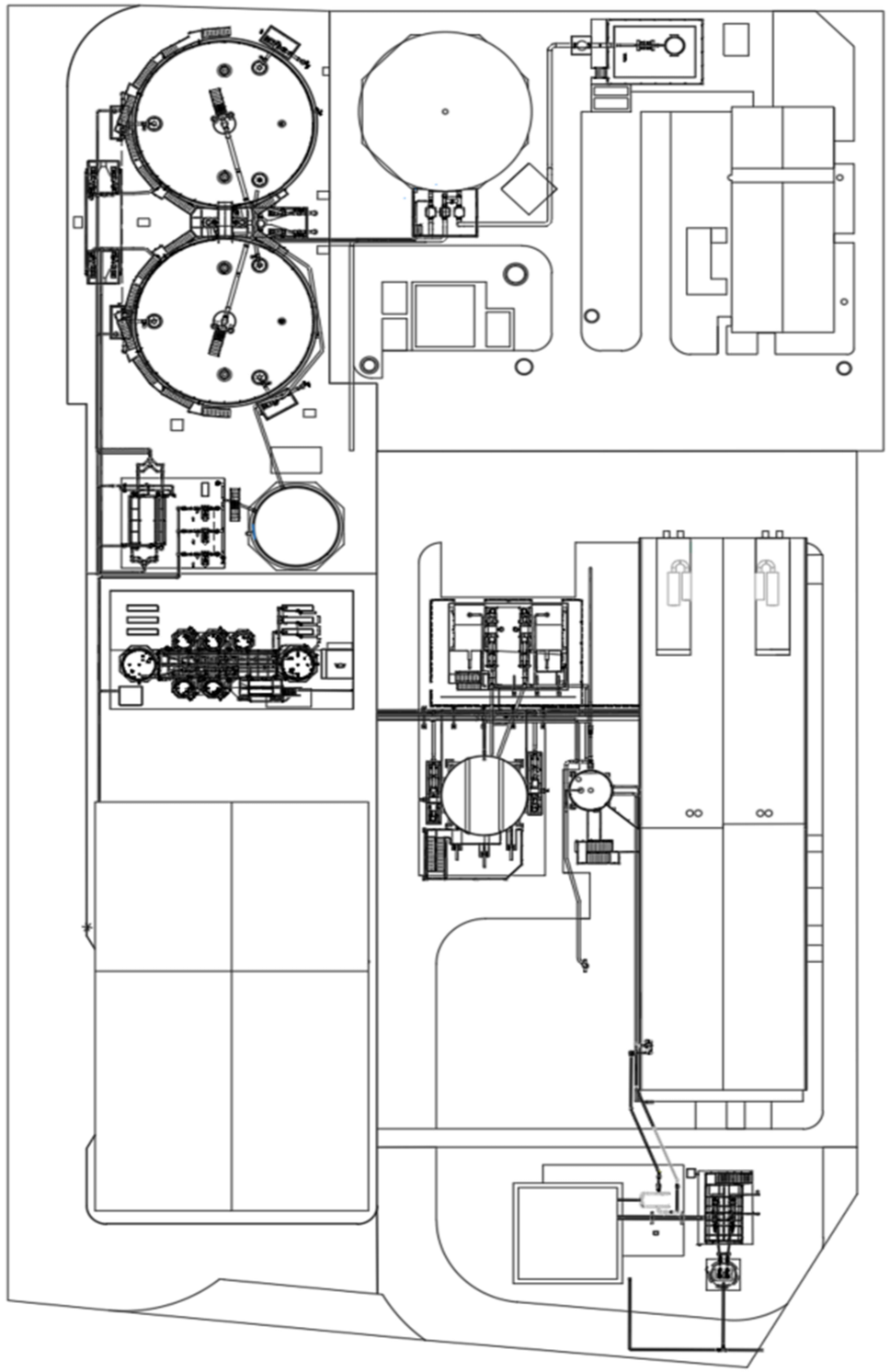
EMERGENCY INSTRUCTIONS FOR

FEED PIPEWORK LEAKS

ISSUE:
DATE:

	CLASSIFY THE EMERGENCY		
	SLIGHT	MODERATE	SEVERE
MEASURE:	Leak at flange or equipment	Pipe/equipment rupture	Severe/long duration damage
	PREPARE		
EVACUATE:	Vicinity of leak	Vicinity of leak	
ASSESS THE RISK:	Refer to the DCWW digester safety procedures		
COMMUNICATE:	Inform Site Supervisor		
GATHER EQUIPMENT:	PPE & gas monitor, Adjustable spanners, cones & barrier tape, spill kits & hoses		
	CONTAIN	CONTAIN	CONTAIN
ACTIONS	Turn off feed & recirc pumps. Isolate electrically and mechanically Close valves at digesters. Isolate.	Turn off feed & recirc pumps. Isolate electrically and mechanically Close valves at digesters. Isolate.	Turn off feed & recirc pumps. Isolate electrically and mechanically If safe, close valves at digester or otherwise isolate as far as is safe. Consider using valves at Flow Transmitter
	CONTROL	CONTROL	CONTROL
ACTIONS	Repair the leak using tools, equipment and methods which you are trained in the use of. If the repair is beyond what you can achieve, call for assistance.	Establish extent of sludge spillage and drainage routes. If possible, use spill kits/sandbags to prevent spill spreading. Use portable pumps and additional water to direct flow to site drainage.	Check level and pressure on both digesters. Low level alarms could indicate draw-down through damage. Check gas holder level and pressure. Consider isolating systems depending on situation.
ADVICE	Logistics: Cancel sludge deliveries	Logistics: Cancel sludge deliveries	
	CONSOLIDATE	CONSOLIDATE	CONSOLIDATE
ACTIONS	Resume site normal operation- bring isolated systems back online. Call site manager to let them know site has returned to normal.	Call specialists for assistance with making repairs to damaged equipment. Clean up spill. Call site manager to discuss situation.	Call specialists for assistance with making repairs to damaged equipment. Clean up spill. Call site manager to discuss situation.
ADVICE	Try and establish the cause of the leak, and check if there have been any secondary effects of the leak-damaged panels etc.		

Site layout drawing to assist with action planning and exclusion zone identification



Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR	**DIGESTER VESSEL LEAKS**	ISSUE: DATE:

CLASSIFY THE EMERGENCY	
MEASURE:	Any new leak permeating through the digester or around a fitting. Any severe/major escape of sludge from the digesters, tanks or pipework

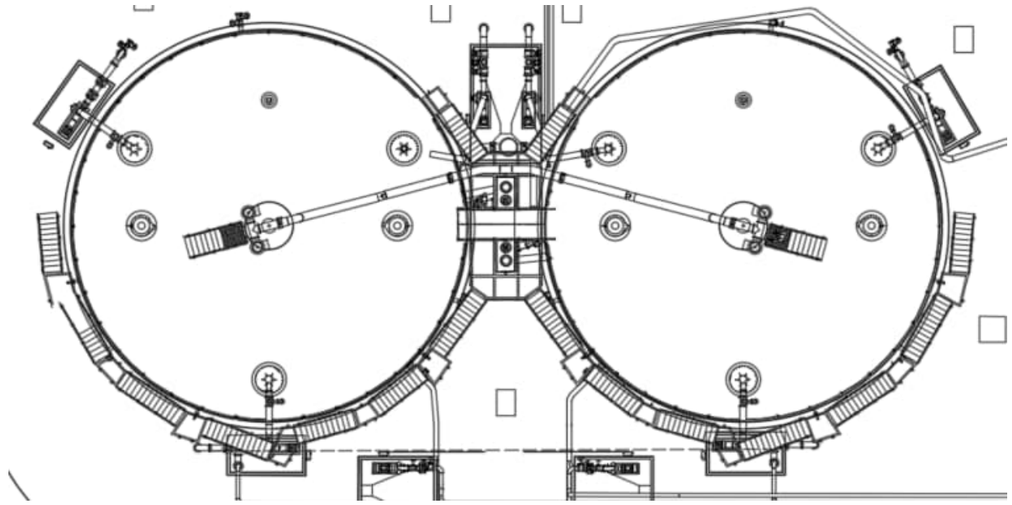
PREPARE	
EVACUATE:	Digester area including the roof Area. Suspend all deliveries to and from site An exclusion zone should be established to protect staff and contractors
ASSESS THE RISK:	Where is the leak? How big is it? Is the leak a dribble or a flow? If there has been an earth tremor, vehicle strike or similar, check both digesters thoroughly.
COMMUNICATE:	Inform Supervisor, digester controller and Silver manager Inform NRW by WOTPOL
GATHER EQUIPMENT:	PPE & gas monitor, cones & barrier tape, spill kits, portable pumps, tankers & hoses

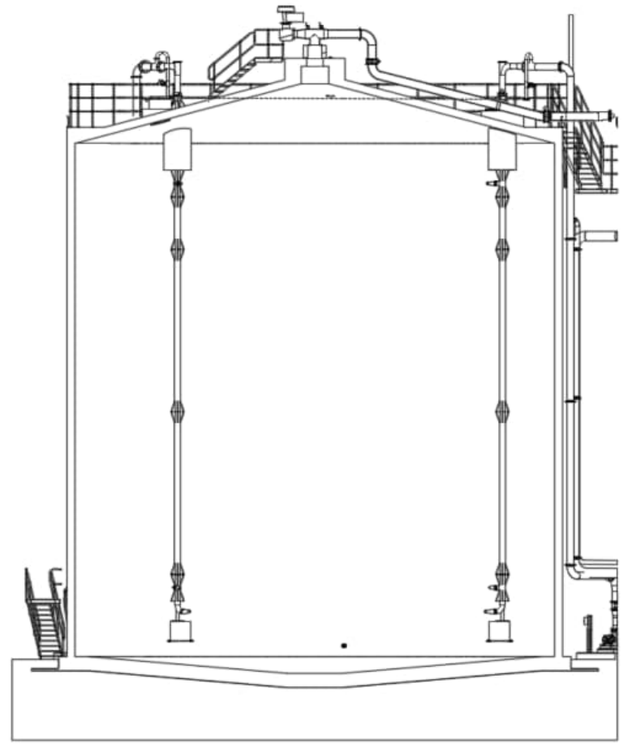
CONTAIN	
ACTIONS	Stop feeding affected digester/digesters Ensure flood gates are closed. Can the impacted area be isolated by valving? Set up an exclusion area around and beneath the leak location. If the escape is severe, isolate liquor return pumping station and suplus activated sludge pumps Consider establishing containment measures such as tankers, booms or earth bunds
ADVICE	The Silver manager will decide if a Silver or Gold incident should be declared in line with DCWW emergency planning guidance Inform NRW via WATPOL

CONTROL	
ACTIONS	If safe and practicable, mark leak extents and monitor for expansion If leak cannot be reached or approached, take photographs from a safe location. If the escape can be managed with tankers, the logistics manager should be informed to arrange tankering Can the escape be managed with tankers booms or earth bunds Refer to the DCWW digester safety procedures If the escape is severe arrange tankers to manage the return liquor well levels
ADVICE	Inform Silver manager of developments on site

CONSOLIDATE	
ACTIONS	Any liquid sludge which cannot be re treated through the remaining digestion process must be tankered from site to a suitable facility. Mobile centrifuge equipment may be engaged to treat any large spill volumes Site manager to arrange for specialists to survey the digester for structural integrity.
ADVICE	The Silver incident manager will coordinate the response via the silver incident room

Use the drawings below to show the leak location

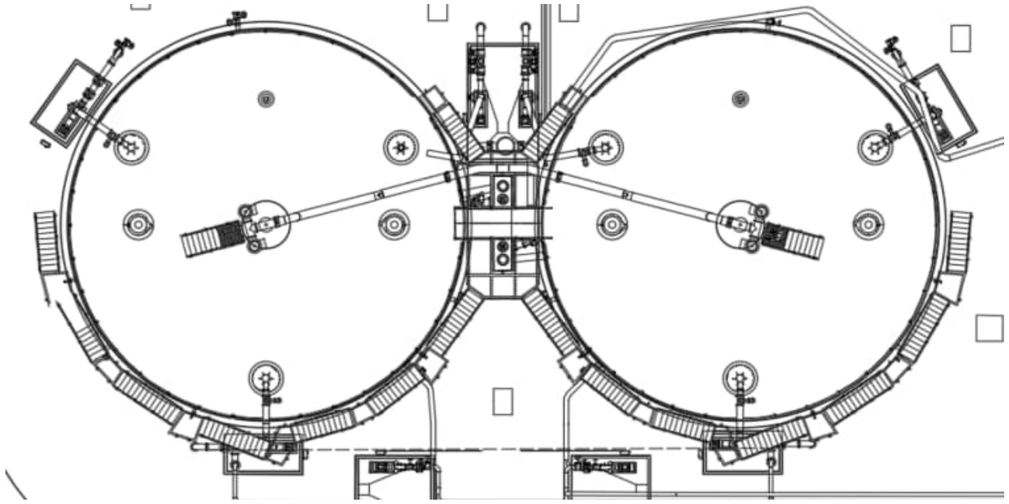


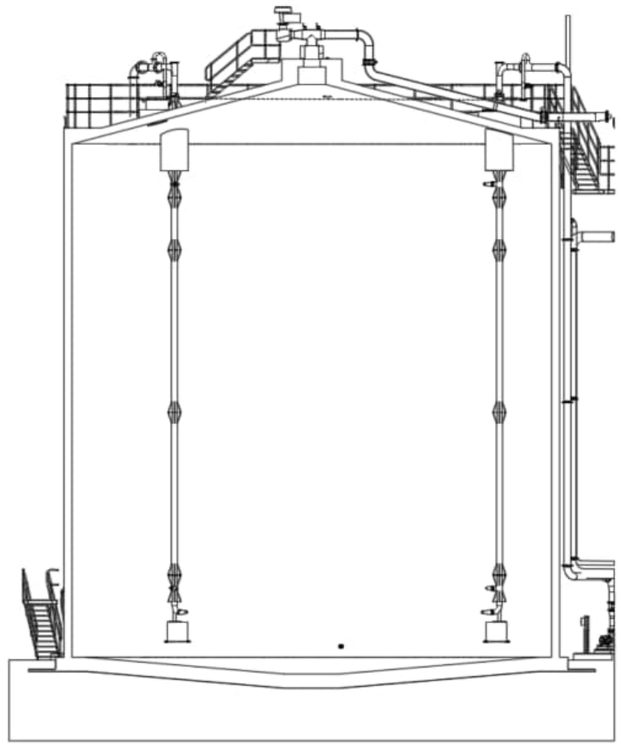


Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS FOR	DIGESTER VESSELS & TANKS	ISSUE: DATE:

	CLASSIFY THE EMERGENCY
MEASURE:	Daily visual inspections by staff The digesters are continually monitored at site SCADA level through active measures for liquid level, biogas pressure, VPRV proximity switches, liquid temperature, feed flow, biogas flow, foam level all of which have associated levels
	of alarms that require operator intervention.
	Daily dashboard data is examined to determine pressure, health and feed rates
	PREPARE
STATUTORY:	The statutory maintenance team undertake periodic statutory maintenance inspections of all critical safety equipment Thermal imaging inspections by drone are undertaken every two years to assess the condition of vessels Grit levels are assessed by thermal imaging which will determine future de-grit requirements Flood gates and associated trigger devices are tested every six months Manufacturers recommended maintenance requirements are held within the SAP maintenance system During the de-grit operation an internal inspection is undertaken by an independent contractor
	CONTAIN
ACTIONS	Ensure that all leaks or defects are reported to the site supervisor Ensure that the dashboards are completed in full each day Ensure that all staff are trained in the emergency procedures Ensure that regular testing of the flood gate operation is undertaken and recorded in SAP
ADVICE	The Silver manager will decide if a silver or Gold incident should be declared in line with DCWW emergency planning guidance
	CONTROL
ACTIONS	If safe and practicable, mark leak extents and monitor for expansion If leak cannot be reached or approached, take photographs from a safe location. If the escape can be managed with tankers, the logistics manager should be informed to arrange tankering Can the escape be managed with tankers booms or earth bunds Refer to the DCWW digester safety procedures
ADVICE	Inform Silver manager of developments on site
	CONSOLIDATE
ACTIONS	Periodic testing of all emergency measures and recorded in SAP Daily dashboard monitoring
ADVICE	Seek advice from the statutory maintenance team

Use the drawings below to show the leak location





DIGESTER SAFETY INSTRUCTION
Afan WWTW

INCIDENT REPORT SHEET

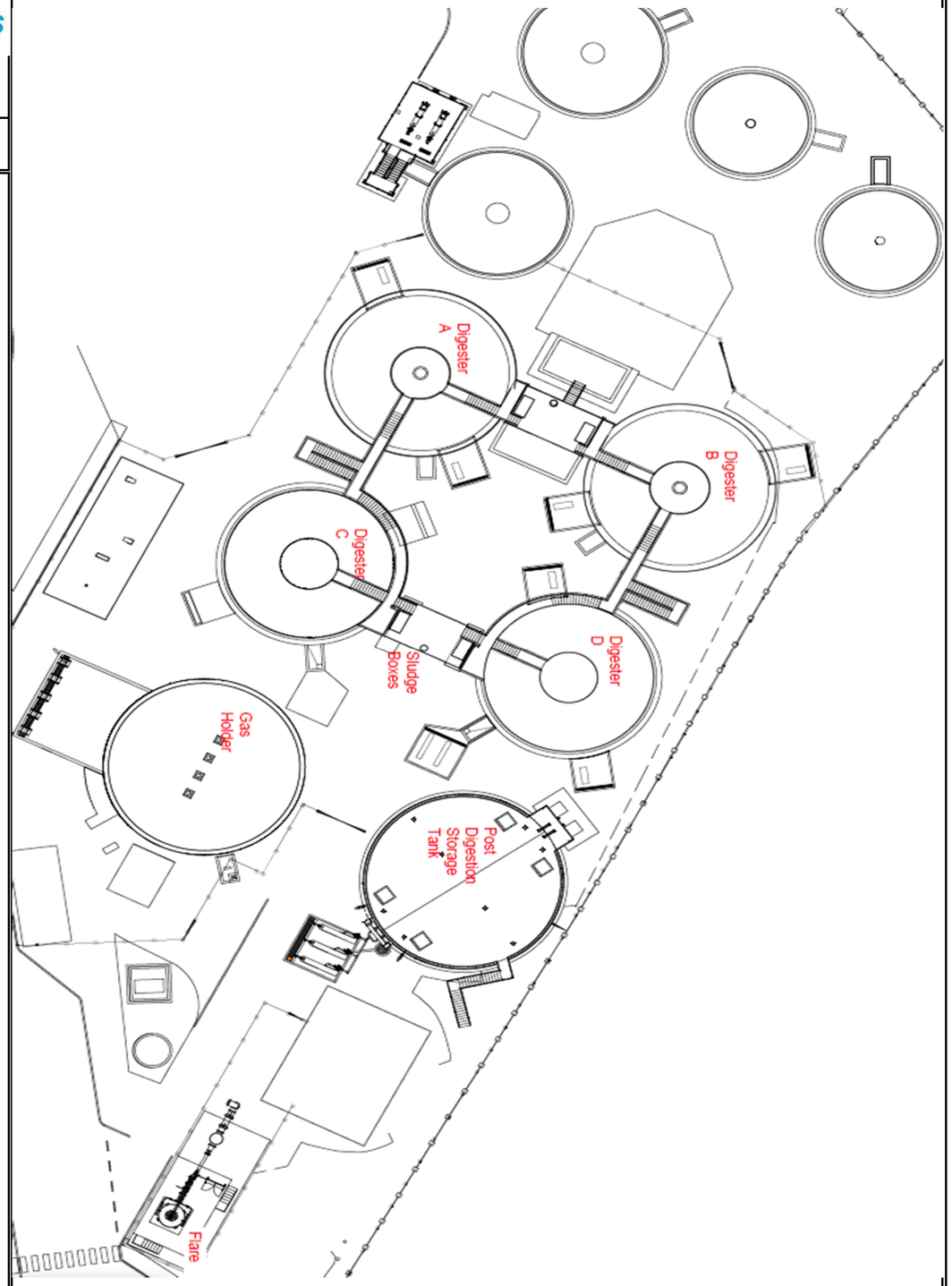
ISSUE:
DATE:

This sheet is to be used post-incident as a tool to handover site to a new shift.
Use the diagram opposite to show incident location, effects and other useful information

What happened?

What actions have been taken as a result?

What is the status of the site now?



DIGESTER SAFETY INSTRUCTIONS
Afan WWTW

EMERGENCY ACTIONS PRACTICE REGISTER

ISSUE:
DATE:

It is recommended that emergency actions are practiced so that equipment operability can be relied upon, and that staff are made familiar with required actions. An annual practice cycle is recommended, or effected systems practiced whenever a change is made to the process. The below register is not exhaustive, as some emergencies have no significant intervention actions associated with them.

Action Practiced:	Date:	Situation simulated:	Issues identified:	Issue resolution	Target completion date	Completed?
Emergency - Mechanical Damage						
Emergency - Foaming						
Emergency - Fire						
Foam/Condensate Pot blowout						
Biogas Leak - Pipes & equipment						
Biogas Leak- Gas Holder						
Sludge Leak - Feed System						
Sludge Leak - Heating System						
Other:						

Dŵr Cymru Welsh Water	DIGESTER SAFETY INSTRUCTION Afan WWTW	marches biogas anaerobic digestion engineering
EMERGENCY INSTRUCTIONS TO		ISSUE: DATE:

CLASSIFY THE EMERGENCY			
MEASURE:	SLIGHT	MODERATE	SEVERE

PREPARE	
EVACUATE:	(tanker deliveries? Line manager? Emergency services?)
ASSESS THE RISK:	
COMMUNICATE:	
GATHER EQUIPMENT:	(PPE & gas monitor, special kit from the store (list))

CONTAIN			
ACTIONS			
ADVICE			

CONTROL			
ACTIONS			
ADVICE			

CONSOLIDATE			
ACTIONS			
ADVICE			

B. PEXA (DSEAR) Drawing

Document Cover Sheet

Back to home page GO

The lefthand pane of this window contains *bookmarks* which list the contents of each section and subsection of the manual.

Click on the + signs to open the contents lists; or click on the - signs to close the contents lists.

Click on the *bookmarks* to go directly to the indicated content

P&ID REF

Plant Tag No.

Description

EXPLOSION PROTECTION DOCUMENT

Manufacturer/Author

IMTECH

Imtech Process Ltd
The Willowford
Treforest Ind. Estate
Pontypridd
CF37 5UR
Tel: 01443 848600
Fax: 01443 848641

Document Cover Sheet

Project Title	Afan Advanced Digestion
Project Number	P1759
Client	DWR CYMRU/WELSH WATER
Document Reference Number	P1759/6/12/0001

Advanced Digestion.

EXPLOSION PROTECTION DOCUMENT

Rev.	Date	Description/Purpose	Prepared	Document Verification[1]		Site Verification[2]
				Checker	Approver	
R00	22.10.2009	Level 2 (Area 1)	SF	MF	TS	
R01	03.11.2009	Level 2 (All Area's)	SF	MF	TS	
C00	03.11.2009	Update of PEXA drawings	SF	MF	TS	
C01	26.10.2010	Internal Review	SF	DV		
X00	01.03.2011	As Built	SF	MF		
X01	06.04.2011	Temperature Class Change	SF	MF		

Notes

1. Lead Design Engineer / Senior Engineer
2. Commissioning Manager

CONTENTS:

1. INTRODUCTION

1.1 PURPOSE OF DOCUMENT

The purpose of this document is to ensure that the design of the Works takes account of any risk of fire, explosion or similar energetic event arising from dangerous substances used or present in the workplace. The risk assessment to be undertaken considers the possibility of igniting the dangerous substances that could be present.

This document has been produced in conjunction with the DCWW DSEAR PROCESS GUIDELINE – DESIGNERS (DJBT 1.3a Rev 1).

This Explosion Protection Document is classed as a "live" document which can be referred to at any time and be amended in the future. Once completed it needs to be incorporated into the project Health & Safety file.

Any of the following will necessitate a review:

- New dangerous / hazardous substance
- New process to be used
- New equipment to be installed
- New work operation to be undertaken.

1.2 PROCESS DESCRIPTION

Refer to process specification detailed below,

T:\TRF\ImtechProcess\Contracts\P1759 Afan Advanced Digestion\06 Design\6.2 Process Design

Process Description Afan.doc.

1.3 SCOPE OF WORKS

SUMMARY OF CIVIL WORK

Refer to process specification detailed below,

T:\TRF\ImtechProcess\Contracts\P1759 Afan Advanced Digestion\06 Design

Arups Design Statement.pdf

MECHANICAL ELECTRICAL & ICA SCOPE OF WORK

Refer to the outline design doc detailed below,

T:\TRF\ImtechProcess\Contracts\P1759 Afan Advanced Digestion\06 Design\1.4 Outline Design Report

P1759-1 4-001-Outline Design Document RevB.docx

2.0 SUMMARY OF DANGEROUS / HAZARDOUS SUBSTANCES

All dangerous / hazardous substances that could result in a fire, explosion or similar energetic event are listed here.

Potentially dangerous / hazardous substances can be those that are:

- Brought into the workplace and handled, stored and used for processing.
- Produced or given off (e.g. as fumes, vapours, dusts etc…) by a process or activity, or as a result of an incident or accident.
- Used for, or arise from maintenance, cleaning, and repair work.
- Produced as a by product of any work or process (e.g. waste, residues, scrap materials etc…).
- Naturally occurring in the workplace (e.g. methane may be present in tunnelling and mining operations).

2.1 TABLE OF DANGEROUS / HAZARDOUS SUBSTANCES

Potentially Dangerous / Hazardous Substances	**Where does the substance emanate from?**	**Comments** **(Refer to NOTE (1) for points to be considered and commented on if relevant).**
Bio Gas	Process – biogas pipelines & vessels (including digesters, drains / condensate traps)	Released from PRV's/vents
Hydrogen Sulphide	Process – sludge storage & processing	Released from silos when opened for filling & sludge cake handling.
Hydrogen Sulphide	Extraction of odorous air	Extracted from the sludge processing plant & storage.
Methane	Process	Lighter than air, may travel in cable ducts.
Ammonia	Cake storage	Present in post digested sludge from processing plant & cake storage
Carbon Monoxide	Combustion of Biogas & Natural Gas	Present around flue stack of boilers & CHP units.

When listing these substances the following should be determined:

- Whether the substance or process / preparation has been classified under the Chemicals (Hazard Information and Package for Supply) Regulations (CHIP) as explosive, oxidising, extremely flammable, highly flammable or flammable.
- Location / area (including how stored).
- Any synergetic effects (i.e. reactions with other chemicals).
- Quantities of the substance.
- The containment system and controls provided to prevent liquids, gases, vapours or dusts escaping into the general atmosphere of the workplace.
- Any explosive atmosphere formed within an enclosed plant or storage vessel.

- Any measures provided to ensure that any explosive atmosphere does not persist for an extended time (e.g. ventilation).
- Frequency of presence.
- The temperature and pressure at which the dangerous substances will be handled.
- Physical and chemical properties (including whether a gas, vapour, mist, combustible dust exists or is generated).
- Does the process (or preparation) or any cleaning, repair or maintenance activity create an environment from which a fire, explosion or similar energetic event may occur.
- Consider any potential secondary effects of a fire, explosion or other energetic event (e.g. thermal, pressure and oxygen depletion).

3.0 PRELIMINARY REVIEW OF HAZARDOUS AREA CLASSIFICATION AND ZONING

3.1 ACTIONS TAKEN TO ELIMINATE OR REDUCE THE DANGEROUS / HAZARDOUS SUBSTANCES

1) Odour Control is employed for Area 2, 8 & 9. This has been designed to provide 10 air changes / hour.
2) Methane & Hydrogen Sulphide gas alarms have been added to Area 6 with early warning lamps & annunciators.
3) Methane gas alarms have been added to Area 8 with early warning lamps & annunciators.

3.2 PEXA TABLE

The PEXA Table is included in Appendix (1).

3.3 PEXA SITE PLAN

The PEXA Site Plan is included in Appendix (2).

4.0 DCWW DSEAR GROUP

4.1 SUMMARY OF DEALINGS WITH DCWW DSEAR GROUP

The minutes of the DSEAR group which sat on the 16/09/09 stated;

1) Post Digestion Tank to be labeled as Area 04 on layout 500501.
2) Hatching on drawing's to be consistent.
3) Sectional view of Gas Holder to be shown.
4) Tables to be consistent with drawings in terms of zone and zone extent.
5) CHP drawings to be compiled.

5.0 DETAILED RISK ASSESSMENT

5.1 DETAILED RISK ASSESSMENT TABLE

The Detailed Risk Assessment Table is included in Appendix (3).

6.0 UPDATE HAZARDOUS AREA CLASSIFICATION AND ZONING

6.1 PEXA TABLE

The PEXA Table is included in Appendix (1).

6.2 PEXA SITE PLAN

The PEXA Site Plan is included in Appendix (2).

7.0 PEXA DRAWINGS

7.1 SUMMARY OF PEXA DRAWINGS

Drawing No.	Title	Rev
SWK-53154-SLT-PEX-00001	Area 00 PEXA Classification Diagram - Area Layout For AD Scheme	CO1
SWK-53154-SLT-PEX-02001	Area 2 & 6 PEXA Classification Diagram – Water Traps, Gas Pipelines & Vents. Extent of hazardous areas.	CO1
SWK-53154-SLT-PEX-04001	Area 4 PEXA Classification Diagram - Digestion Tanks & Gas Pipes. Extent of hazardous areas.	CO2
SWK-53154-SLT-PEX-05001	Area 5 PEXA Classification Diagram - Waste Gas Burner, Gas Pipelines, Gas Holder & Water Traps	CO0

These drawings are included in Appendix (4).

7.2 SUMMARY OF DEALINGS WITH DCWW DSEAR GROUP (RE-SUBMISSION)

All points listed in 4.1 were dealt with.

8.0 CONCLUSION & VERIFICATION

8.1 SUMMARY OF "PROPOSED" EQUIPMENT ORDERED

The following is a summary of the "proposed" equipment ordered:

No.	Item of Electrical & ICA Equipment	Certificate / Declaration Required?	Instrument Tag No		
	Area 4				
1	Digester No.1 Gas Flow Meter	Yes	FIT	-04	1507
2	Digester No.1 Gas Pressure 1	Yes	PIT	-04	1508
3	Digester No.1 Level (Digester Feed Pump Loop)	Yes	LIT	-04	1509
4	Digester No.1 Bellmouth High Level	Yes	LSH	-04	1512
5	Digester No.2 Gas Flow Meter	Yes	FIT	-04	1521
6	Digester No.2 Gas Pressure 1	Yes	PIT	-04	1522
7	Digester No.2 Level (Digester Feed Pump Loop)	Yes	LIT	-04	1523
8	Digester No.2 Bellmouth High Level	Yes	LSH	-04	1526
9	Digester No.1 Recirculation Sludge Flowmeter	Yes	FIT	-04	1506
10	Digester No.2 Recirculation Sludge Flowmeter	Yes	FIT	-04	1520
11	Sludge Cooler No.1 Outlet Flowmeter No.1	Yes	FIT	-04	1536
12	Sludge Cooler No.1 Outlet Flowmeter No.2	Yes	FIT	-04	1537
13	Sludge Cooler No.2 Outlet Flowmeter No.1	Yes	FIT	-04	1538
14	Sludge Cooler No.2 Outlet Flowmeter No.2	Yes	FIT	-04	1539
15	Pepperl & Fuchs Fieldbus Barrier (4 Way Profibus IS)	Yes	AFD	-04	0066
	Area 5				
16	Gas Holder - Incoming Bio Gas Drainage Trap Low Level	Yes	LSL	-05	2007
17	Gas Holder No.1 - Waste Gas Burner Drainage Trap Low Level	Yes	LSL	-05	2008
18	Waste Gas Burner Condensate Trap Low Level	Yes	LSL	-05	2009
19	Gas Holder - Boiler/CHP Biogas Drainage Trap Low Level	Yes	LSL	-05	2014
20	Waste Gas Burner Bio Gas Flow Meter	Yes	FIT	-05	2010
21	Boiler/CHP Biogas Condensate Trap Low Level	Yes	LSL	-05	2015
22	Boiler/CHP Biogas Slam Shut Actuator	Yes	V	-05	0149
23	Low Level Waste Gas Burner Package	Yes	X	-05	05
	Area 8				
24	Belt Press No.1 Flowmeter	Yes	FIT	-08	3524
25	Belt Press No.2 Flowmeter	Yes	FIT	-08	3535
26	Belt Press No.3 Flowmeter	Yes	FIT	-08	3546
	Area 4				
27	Digester No.1 Roof Floodlight	Yes	n/a		
28	Digester No.1 Roof Floodlight Junction Box	Yes	n/a		
29	Digester No.2 Roof Floodlight	Yes	n/a		
30	Digester No.2 Roof Floodlight Junction Box	Yes	n/a		
31	Digester Common Sludge Box Floodlight	Yes	n/a		
32	Digester Common Sludge Box Floodlight Junction Box	Yes	n/a		

No.	Item of Mechanical Equipment	Certificate / Declaration Required?	Instrument Tag No		
	Area 4				
1	Digester No.1 Whessoe Valve	Yes	V	-04	0221/2
2	Digester No.2 Whessoe Valve	Yes	V	-04	0267/8

8.2 SUMMARY OF THE WORK UNDERTAKEN ON THE EXISTING EQUIPMENT

- None

8.3 SUMMARY OF LOW RISK WORK

- None

NOTE – In these instances Operations will take responsibility for replacing these items of equipment and will carry the "risk" until this work is complete.

8.4 SUMMARY OF CERTIFICATES AND DECLARATIONS

The certificates and declarations required (as outlined in Sections 8.1 and 8.2) are included in Appendix (5).

Type Of Equipment	***Zone where equipment Installed.***	***Requirement***
Electrical	0, 1. 20, 21	Certificate
Non – Electrical	0, 20	Certificate
Electrical	2, 22	Declaration
Non – Electrical	1, 2, 21, 22	Declaration

8.5 SUMMARY OF PEXA WARNING SIGNS INSTALLED

The following is a summary of the warning signs installed as per Appendix 2 of DCWW PEXA Handbook:

No.	**Sign Type (i.e. A to F)**	**Location**
1	A	Site Gates, MCC Room
2	D	Local to hazard
3	Appendix 3	Inside MCC Room

8.6 VERIFICATION

There are two parts to the verification process ~

1. Document Verification

This Explosion Protection Document has been checked and approved. This is confirmed on the front cover sheet.

2. Site Verification

Once the installation work was completed, final site verification was undertaken to ensure that equipment and installations are safe and correct. This is confirmed on the front cover sheet

9.0 APPENDICIES

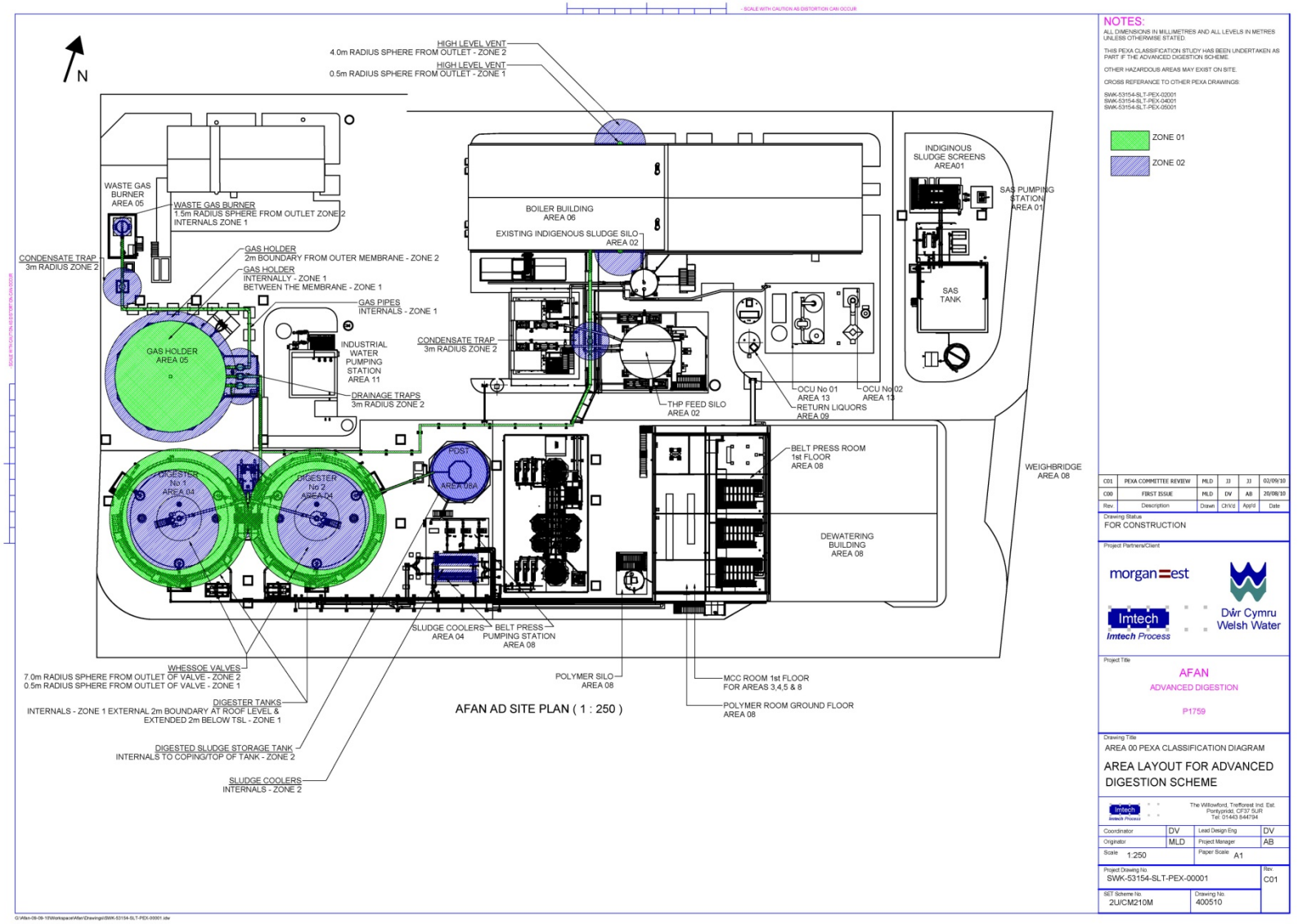
9.1 APPENDIX (1) ~ PEXA TABLE

POTENTIALLY EXPLOSIVE ATMOSPHERE TABLE – AREA CLASSIFICATION								
Project No. ~ P1759		**Project Title ~ Afan Advanced Digestion**						**Date ~ 03/11/09**
Plant / Process Equipment Area 1	**Tag No**	**Process Temp & Pressure**	**Ventilation**	**Area Classification**				**Remarks**
				Zone 0	**Zone 1**	**Zone 2**	**None**	
Area 4								
Digester No.1 Gas Flow meter	FIT-04-1507	Flow	Natural		✔			Within 2m of Zone 1 boundary at the roof of the digester tank
Digester No.1 Gas Pressure 1	PIT-04-1508	Pressure	Natural		✔			Within 2m of Zone 1 boundary at the roof of the digester tank
Digester No.1 Level (Digester Feed Pump Loop)	LIT-04-1509	Level	Natural		✔			Within 2m of Zone 1 boundary at the roof of the digester tank
Digester No.1 Bell mouth High Level	LSH-04-1512	Level Switch	Natural			✔		Within 7m of Zone 2 high level vent
Digester No.2 Gas Flow meter	FIT-04-1521	Flow	Natural		✔			Within 2m of Zone 1 boundary at the roof of the digester tank
Digester No.2 Gas Pressure 1	PIT-04-1522	Pressure	Natural		✔			Within 2m of Zone 1 boundary at the roof of the digester tank
Digester No.2 Level (Digester Feed Pump Loop)	LIT-04-1523	Level	Natural		✔			Within 2m of Zone 1 boundary at the roof of the digester tank
Digester No.2 Bellmouth High Level	LSH-04-1526	Level Switch	Natural			✔		Within 7m of Zone 2 high level vent
Digester No.1 Recirculation Sludge Flowmeter	FIT-04-1506	Flow	Closed pipe			✔		Internal pipe Zone 2
Digester No.2 Recirculation Sludge Flowmeter	FIT-04-1520	Flow	Closed pipe			✔		Internal pipe Zone 2
Sludge Cooler No.1 Outlet Flowmeter No.1	FIT-04-1536	Flow	Closed pipe			✔		Internal pipe Zone 2
Sludge Cooler No.1 Outlet Flowmeter No.2	FIT-04-1537	Flow	Closed pipe			✔		Internal pipe Zone 2
Sludge Cooler No.2 Outlet Flowmeter No.1	FIT-04-1538	Flow	Closed pipe			✔		Internal pipe Zone 2

Sludge Cooler No.2 Outlet Flowmeter No.2	FIT-04-1539	Flow	Closed pipe			✔		Internal pipe Zone 2
Pepperl & Fuchs Fieldbus Barrier (4 Way Profibus IS)	AFD-04-0066	AFD	Natural			✔		Within 7m of Zone 2 high level vent
Area 5								
Gas Holder - Incoming Bio Gas Drainage Trap Low Level	LSL-05-2007	Level Switch	Natural			✔		Within 3m radius of trap
Gas Holder No.1 - Waste Gas Burner Drainage Trap Low Level	LSL-05-2008	Level Switch	Natural			✔		Within 3m radius of trap
Waste Gas Burner Condensate Trap Low Level	LSL-05-2009	Level Switch	Natural			✔		Within 3m radius of trap
Gas Holder - Boiler/CHP Biogas Drainage Trap Low Level	LSL-05-2014	Level Switch	Natural			✔		Within 3m radius of trap
Waste Gas Burner Bio Gas Flow Meter	LSL-05-2010	Flow	Natural			✔		Within 3m radius of trap
Boiler/CHP Biogas Condensate Trap Low Level	LSL-05-2015	Level Switch	Natural			✔		Within 3m radius of trap
Boiler/CHP Biogas Slam Shut Actuator	V050149	Automated Valve	Natural			✔		Within 3m radius of trap
Low Level Waste Gas Burner Package	X0505	Flare Stack	Natural / Closed Pipe		✔			Internal pipe Zone 1
Area 8								
Belt Press No.1 Flowmeter	FIT-08-3524	Flow	Closed pipe			✔		Internal pipe Zone 2
Belt Press No.2 Flowmeter	FIT-08-3524	Flow	Closed pipe			✔		Internal pipe Zone 2
Belt Press No.3 Flowmeter	FIT-08-3524	Flow	Closed pipe			✔		Internal pipe Zone 2
Area 4								
Digester No.1 Roof Floodlight	N/A	Light	Natural			✔		Within 7m of Zone 2 high level vent
Digester No.1 Roof Floodlight Junction Box	N/A	Junction Box	Natural			✔		Within 7m of Zone 2 high level vent
Digester No.2 Roof Floodlight	N/A	Light	Natural			✔		Within 7m of Zone 2 high level vent
Digester No.2 Roof Floodlight Junction Box	N/A	Junction Box	Natural			✔		Within 7m of Zone 2 high level vent
Digester Common Sludge Box Floodlight	N/A	Light	Natural			✔		Within 7m of Zone 2 high level vent
Digester Common Sludge Box Floodlight Junction Box	N/A	Junction Box	Natural			✔		Within 7m of Zone 2 high level vent

Mechanical Equipment								
Digester No.1 Whessoe Valve	V040221 / 2	Mechanical Valve	Natural		✔			Centre of the 0.5metre zone
Digester No.2 Whessoe Valve	V040267 / 8	Mechanical Valve	Natural		✔			Centre of the 0.5metre zone

9.2 APPENDIX (2) ~ PEXA SITE PLAN



9.3 APPENDIX (3) ~ DETAILED RISK ASSESSMENT TABLE

Existing Equipment & Installation							Proposed Equipment to be Installed							
Equipment / Installation	Specification	ATEX 100a Compliant (Y / N)	ATEX 100a Non –compliant		ACTION	Reason for Action / Comments	Item	Potential Ignition Sources	Certificate / Declaration Required	Hazardous Area	Flammable / Explosive Atmosphere OR Dangerous Hazardous Substance Present	Gas Group	Zone	T-Class
			Potential Ignition Source	Condition										
							Digester No.1 Gas Flow Meter	Sparks / Heat	Atex II2G/D Exdia IIC-T4	Gas Pipelines, High Level Vent & Whessoe Valves	Hydrogen Sulphide Methane Bio Gas	IIB IIA IIA	1	T4 T1 T1
							Digester No.1 Gas Pressure 1	Sparks / Heat	EExd IIC–T4	Gas Pipelines, High Level Vent & Whessoe Valves				

							Digester No.1 Level (Digester Feed Pump Loop)	Sparks / Heat	EExd IIC–T4	Gas Pipelines, High Level Vent & Whessoe Valves				
							Digester No.1 Bellmouth High Level	Sparks / Heat	EExia II C – T4	Gas Pipelines, High Level Vent & Whessoe Valves				
							Digester No.2 Gas Flow Meter	Sparks / Heat	Atex II2G/D Exdia IIC-T4	Gas Pipelines & Whessoe Valves				
							Digester No.2 Gas Pressure 1	Sparks / Heat	EExd IIC–T4	Gas Pipelines & Whessoe Valves				
							Digester No.2 Level (Digester Feed Pump Loop)	Sparks / Heat	EExd IIC–T4	Gas Pipelines & Whessoe Valves				
							Digester No.2 Bellmouth High Level	Sparks / Heat	EExia II C – T4	Gas Pipelines & Whessoe Valves				

							Digester No.1 Recirculation Sludge Flowmeter	Sparks / Heat	Atex II3G/D-T6	Sludge Pipeline				
							Digester No.2 Recirculation Sludge Flowmeter	Sparks / Heat	Atex II3G/D-T6	Sludge Pipeline				
							Sludge Cooler No.1 Outlet Flowmeter No.1	Sparks / Heat	Atex II3G/D-T6	Sludge Pipeline				
							Sludge Cooler No.1 Outlet Flowmeter No.2	Sparks / Heat	Atex II3G/D-T6	Sludge Pipeline				
							Sludge Cooler No.2 Outlet Flowmeter No.1	Sparks / Heat	Atex II3G/D-T6	Sludge Pipeline				
							Sludge Cooler No.2 Outlet Flowmeter No.2	Sparks / Heat	Atex II3G/D-T6	Sludge Pipeline				
							Pepperl & Fuchs Fieldbus Barrier (4 Way Profibus IS)	Sparks / Heat	EEx me [ia] IIC T4	High Level Vent				

Existing Equipment & Installation							Proposed Equipment to be Installed							
Equipment / Installation	Specification	ATEX 100a Compliant (Y / N)	ATEX 100a Non –compliant		ACTION	Reason for Action / Comments	Item	Potential Ignition Sources	Certificate / Declaration Required	Hazardous Area	Flammable / Explosive Atmosphere OR Dangerous Hazardous Substance Present	Gas Group	Zone	T-Class
			Potential Ignition Source	Condition										
							Gas Holder - Incoming Bio Gas Drainage Trap Low Level	Sparks / Heat	EExia II C-T4	Gas Pipelines & loss of water	Hydrogen Sulphide Methane Bio Gas	IIB IIA IIA	1	T3 T1 T1
							Gas Holder No.1 - Waste Gas Burner Drainage Trap Low Level	Sparks / Heat	EExia II C-T4	Gas Pipelines & loss of water				
							Waste Gas Burner Condensate Trap Low Level	Sparks / Heat	EExia II C-T4	Gas Pipelines & loss of water				

							Gas Holder - Boiler/CHP Biogas Drainage Trap Low Level	Sparks / Heat	EExia II C-T4	Gas Pipelines & loss of water				
							Waste Gas Burner Bio Gas Flow Meter	Sparks / Heat	Atex II2GD Exdia IIC-T4	Gas Pipelines & loss of water				
							Boiler/CHP Biogas Condensate Trap Low Level	Sparks / Heat	Atex II2GD Exdia IIC-T4	Gas Pipelines & loss of water				
							Boiler/CHP Biogas Slam Shut Actuator	Sparks / Heat	Atex (1323X) Ex II 2G	Gas Pipelines & loss of water				
							Low Level Waste Gas Burner Package	Sparks / Heat	Declaration of conformity Cert 102297	Gas Pipelines				

Existing Equipment & Installation							Proposed Equipment to be Installed							
Equipment / Installation	Specification	ATEX 100a Compliant (Y / N)	ATEX 100a Non –compliant		ACTION	Reason for Action / Comments	Item	Potential Ignition Sources	Certificate / Declaration Required	Hazardous Area	Flammable / Explosive Atmosphere OR Dangerous Hazardous Substance Present	Gas Group	Zone	T-Class
			Potential Ignition Source	Condition										
							Belt Press No.1 Flowmeter	Sparks / Heat	Sparks / Heat	Atex II3G/D-T6	Hydrogen Sulphide Methane	IIB IIA	1	T4 T1
							Belt Press No.2 Flowmeter	Sparks / Heat	Sparks / Heat	Atex II3G/D-T6				
							Belt Press No.3 Flowmeter	Sparks / Heat	Sparks / Heat	Atex II3G/D-T6				

Existing Equipment & Installation							Proposed Equipment to be Installed							
Equipment / Installation	Specification	ATEX 100a Compliant (Y / N)	ATEX 100a Non –compliant		ACTION	Reason for Action / Comments	Item	Potential Ignition Sources	Certificate / Declaration Required	Hazardous Area	Flammable / Explosive Atmosphere OR Dangerous Hazardous Substance Present	Gas Group	Zone	T-Class
			Potential Ignition Source	Condition										
							Digester No.1 Roof Floodlight	Sparks / Heat	Ex II 3G	Gas Pipelines & loss of water	Hydrogen Sulphide Methane Bio Gas	IIB IIA IIA	1	T4 T1 T1
							Digester No.1 Roof Floodlight Junction Box	Sparks / Heat	Ex II 2GD	Gas Pipelines & loss of water				
							Digester No.2 Roof Floodlight	Sparks / Heat	Ex II 3G	Gas Pipelines & loss of water				
							Digester No.2 Roof Floodlight Junction Box	Sparks / Heat	Ex II 2GD	Gas Pipelines & loss of water				

							Digester Common Sludge Box Floodlight	Sparks / Heat	Ex II 3G	Gas Pipelines & loss of water				
							Digester Common Sludge Box Floodlight Junction Box	Sparks / Heat	Ex II 2GD	Gas Pipelines & loss of water				

NOTES –

1. **A Detailed Risk Assessment Table shall be produced for each hazardous area / zone.**
2. **Certification (or Declaration) required for all proposed new equipment.**
3. **If Declaration for non-Electrical Equipment in Group 2 Category 2 area, Declaration to state to which notified body technical documentation has been submitted.**
4. **Status of existing equipment and installation to be discussed with the Operators; also any resulting "actions" will need to be discussed. Status to include condition and standard / specification to which it was manufactured or installed.**

9.4 APPENDIX (4) ~ PEXA DRAWINGS

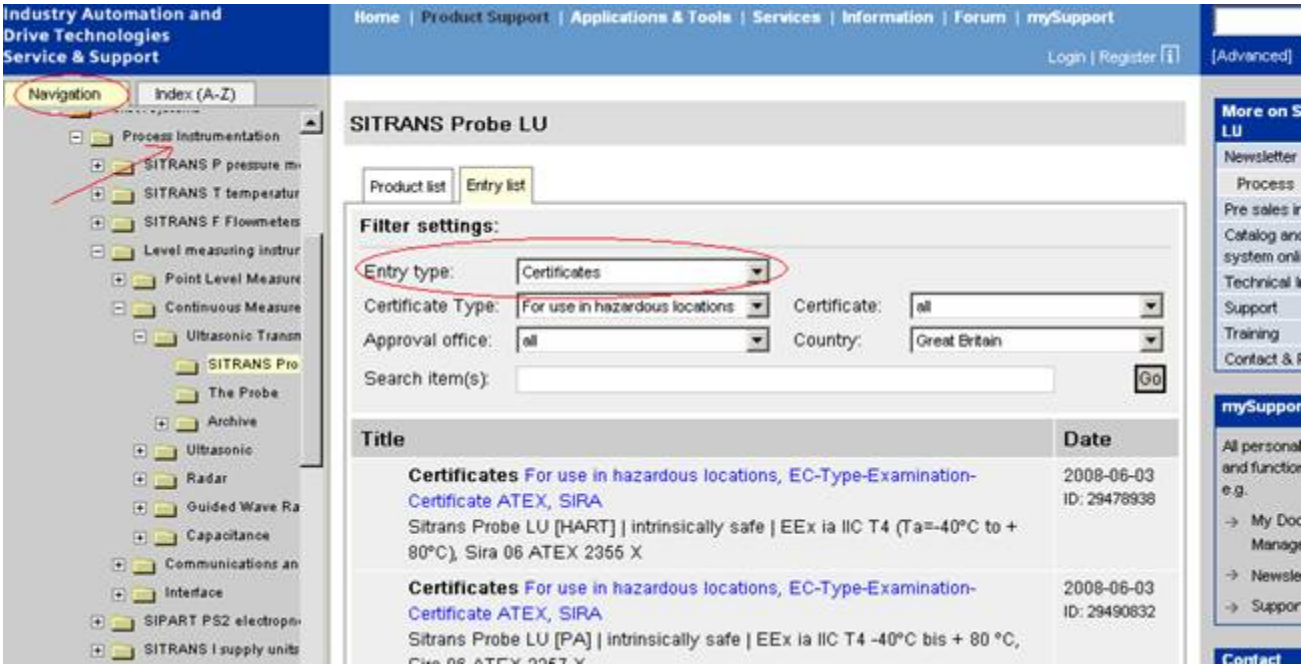
See drawings listed on server in 7.1

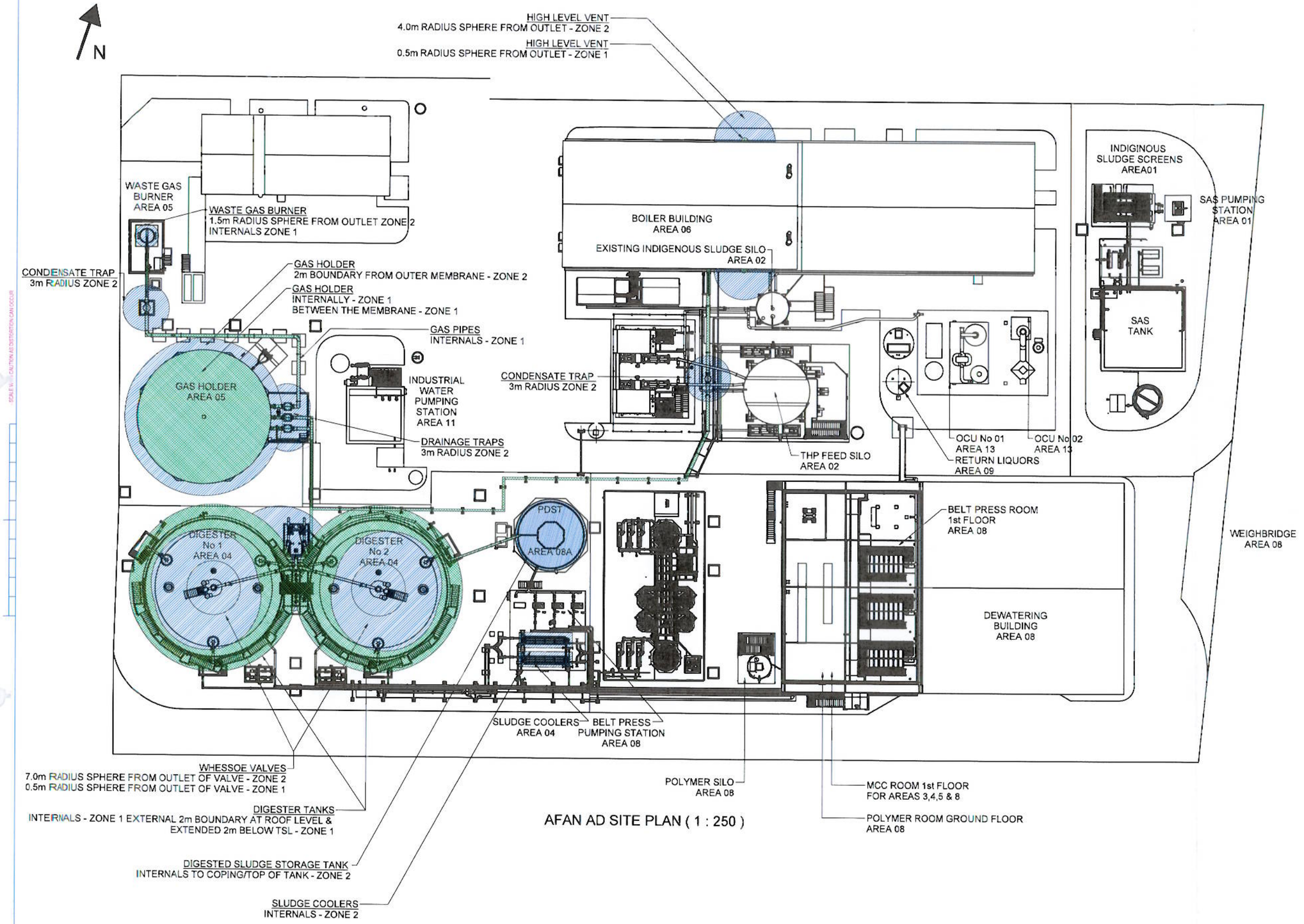
9.5 APPENDIX (5) ~ CERTIFICATES AND DECLARATIONS

To be completed in level 3 study.

Link to all Siemens equipment documentation manuals, data sheets, certificates approvals downloads etc all can be found here

http://support.automation.siemens.com/WW/llisapi.dll?func=cslib.csinfo&lang=en&objid=19100600&subtype=134400&subtype=134400&caller=view





AFAN AD SITE PLAN (1 : 250)

NOTES:

ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS IN METRES UNLESS OTHERWISE STATED.

THIS PEXA CLASSIFICATION STUDY HAS BEEN UNDERTAKEN AS PART IF THE ADVANCED DIGESTION SCHEME.

OTHER HAZARDOUS AREAS MAY EXIST ON SITE.

CROSS REFERANCE TO OTHER PEXA DRAWINGS:

SWK-53154-SLT-PEX-02001
SWK-53154-SLT-PEX-04001
SWK-53154-SLT-PEX-05001

ZONE 01

ZONE 02

Rev.	Description	Drawn	Ch'k'd	App'd	Date
C01	PEXA COMMITTEE REVIEW	MLD	JJ	JJ	02/09/10
C00	FIRST ISSUE	MLD	DV	AB	20/08/10

Drawing Status
FOR CONSTRUCTION

Project Partners/Client

morganest
Imtech Process
Dŵr Cymru Welsh Water

Project Title
AFAN
ADVANCED DIGESTION
P1759

Drawing Title
AREA 00 PEXA CLASSIFICATION DIAGRAM
AREA LAYOUT FOR ADVANCED DIGESTION SCHEME

Imtech Process
The Willowford, Trefforest Ind. Est.
Pontypridd, CF37 5UR
Tel: 01443 844794

Coordinator	DV	Lead Design Eng	DV
Originator	MLD	Project Manager	AB
Scale 1:250		Paper Scale A1	

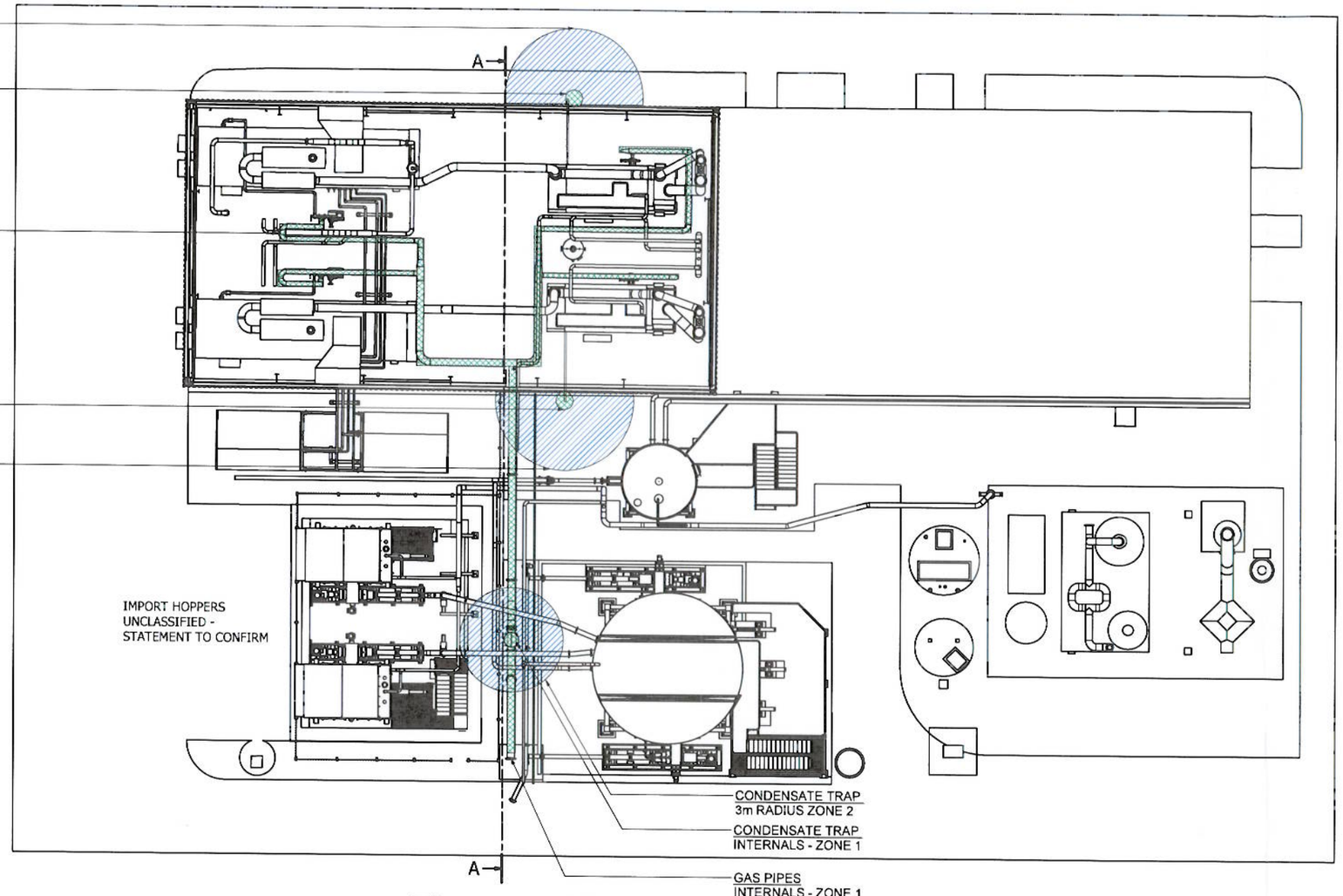
Project Drawing No.: SWK-53154-SLT-PEX-00001 — Rev.: C01

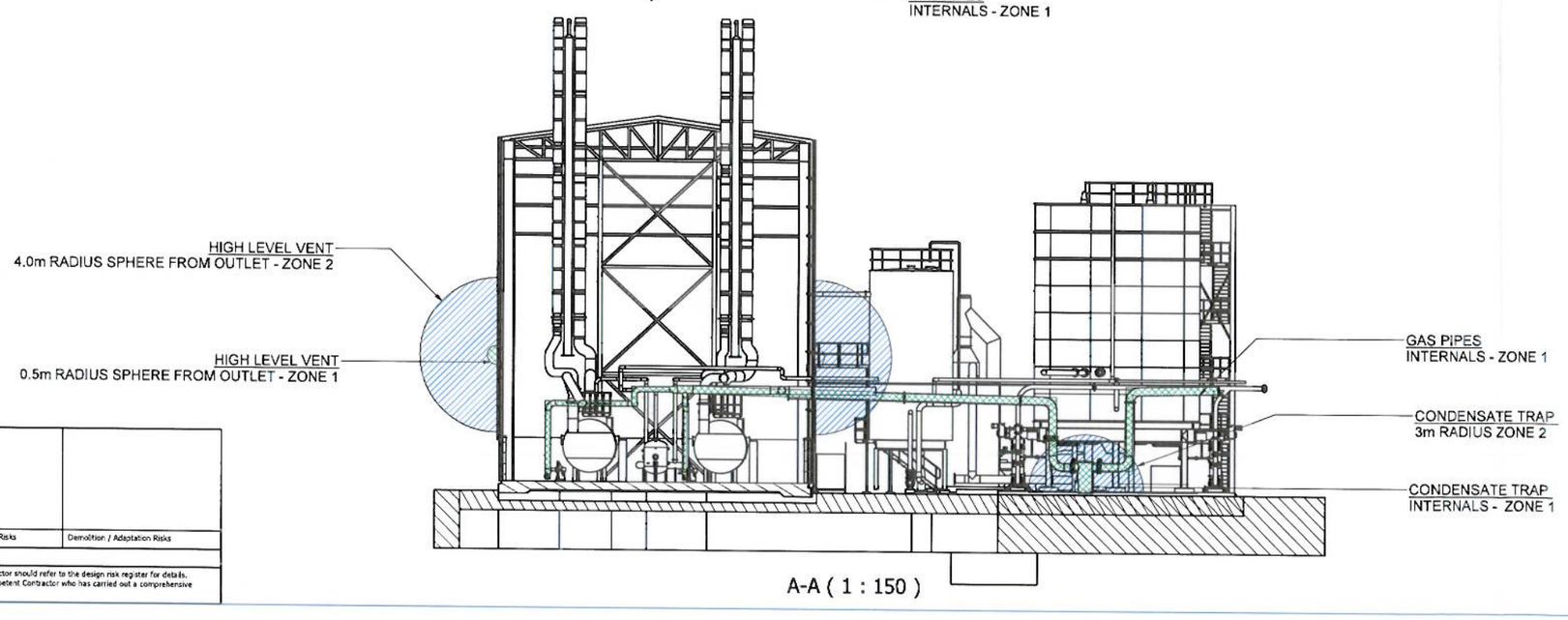
SET Scheme No.: 2U/CM210M — Drawing No.: 400510

G:\Afan-09-09-TIDWorkspace\Afan\Drawings\SWK-53154-SLT-PEX-00001.idw

ALL DIMENSIONS IN MILLIMETRES. ALL LEVELS IN METRES UNLESS OTHERWISE STATED.

- SCALE WITH CAUTION AS DISTORTION CAN OCCUR





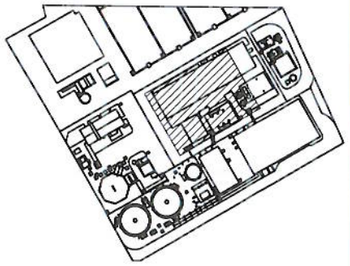
A-A (1 : 150)

Rev	Construction Risks	Maintenance / Operating Risks	Demolition / Adaptation Risks
Health & Safety Information Box			

1. The headings for the risks identified are given in the above table; the contractor should refer to the design risk register for details.
2. It is assumed that all the works on this drawing will be carried out by a competent Contractor who has carried out a comprehensive risk assessment.

G:\Afan-09-09-10\Workspace\Afan\Drawings\SWK-53154-SLT-PEX-02001.idw

NOTES:



ZONE 1
AREA WHERE AN EXPLOSIVE GAS ATMOSPHERE IS LIKELY TO OCCUR IN NORMAL OPERATION.

ZONE 2
AREA WHERE AN EXPLOSIVE GAS ATMOSPHERE IS NOT LIKELY TO OCCUR IN NORMAL OPERATION, AND IF IT DOES OCCUR, IS LIKELY TO DO SO ONLY INFREQUENTLY AND WILL EXIST FOR A SHORT PERIOD ONLY.

NATURAL GAS PIPES ARE NOT CLASSIFIED AS A ZONED AREA

Rev.	Description	Drawn	Ch'kd	App'd	Date
C01	PEXA COMMITTEE REVIEW	MLD	JJ	JJ	01/09/10
C00	FIST ISSUE CONSTRUCTION	MLD	DV	DV	11/08/10

Drawing Status
CONSTRUCTION

Project Partners/Client
MORGAN SINDALL
Imtech Process
Dŵr Cymru Welsh Water

Project Title
AFAN
ADAVNCED DIGESTION
P1759

Drawing Title
AREA 02 & 06 PEXA CLASSIFICATION DIAGRAM
WATER TRAPS, GAS PIPLINES & VENTS
EXTENT OF HAZARDOUS AREAS

Imtech Process
The Willowford, Trefforest Ind. Est.
Pontypridd, CF37 5UR
Tel: 01443 844794

Coordinator	DV	Lead Design Eng	DV
Originator	MLD	Project Manager	AB
Scale AS SHOWN		Paper Scale A1	

Project Drawing No. SWK-53154-SLT-PEX-02001
Rev. C01

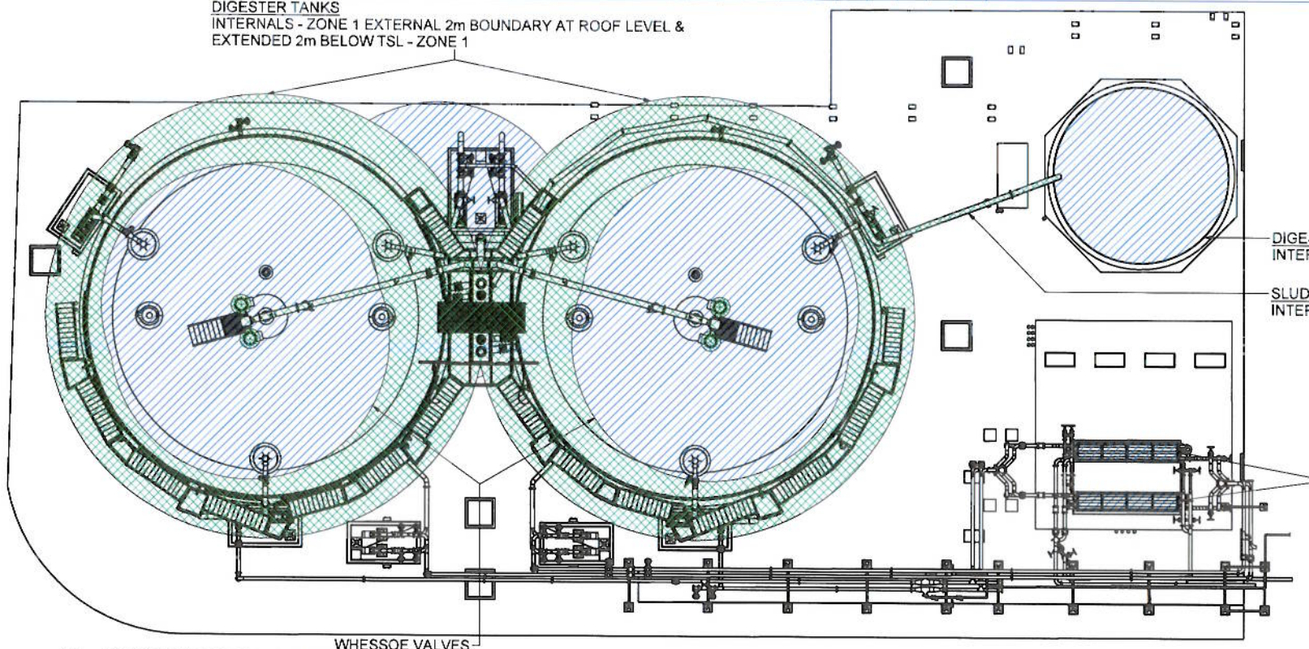
SET Scheme No. 2U/CM210M
Drawing No. 505201

ALL DIMENSIONS IN MILLIMETRES. ALL LEVELS IN METRES UNLESS OTHERWISE STATED.

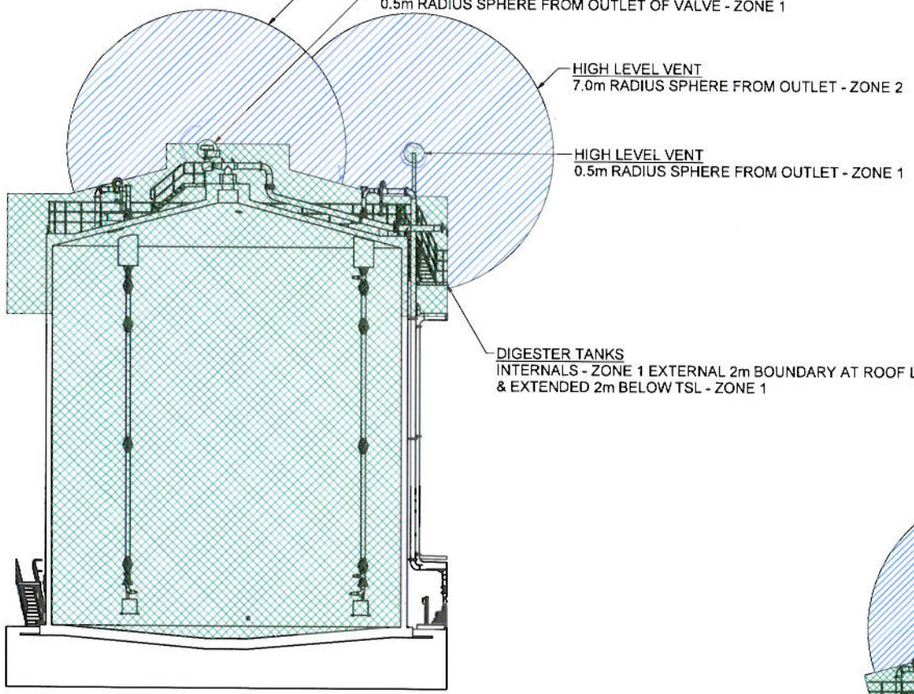
- SCALE WITH CAUTION AS DISTORTION CAN OCCUR

SCALE WITH CAUTION AS DISTORTION CAN OCCUR

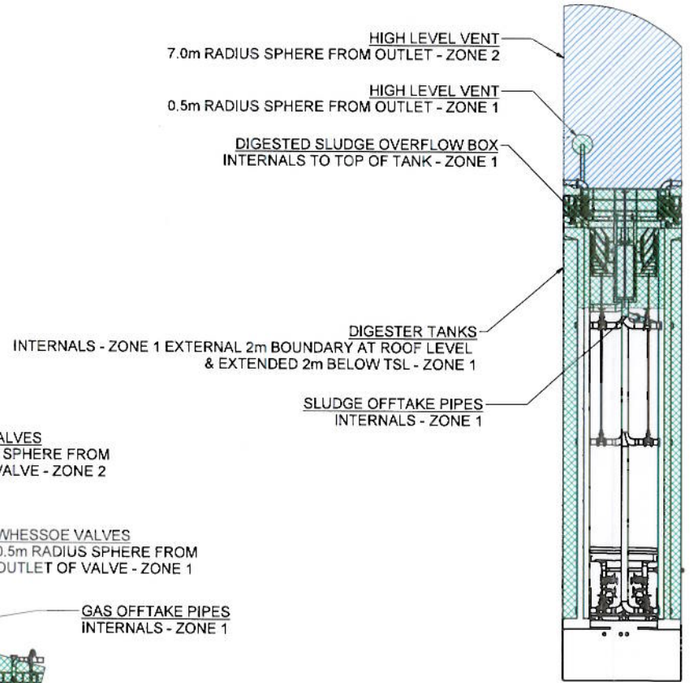
DIGESTER TANKS
INTERNALS - ZONE 1 EXTERNAL 2m BOUNDARY AT ROOF LEVEL &
EXTENDED 2m BELOW TSL - ZONE 1



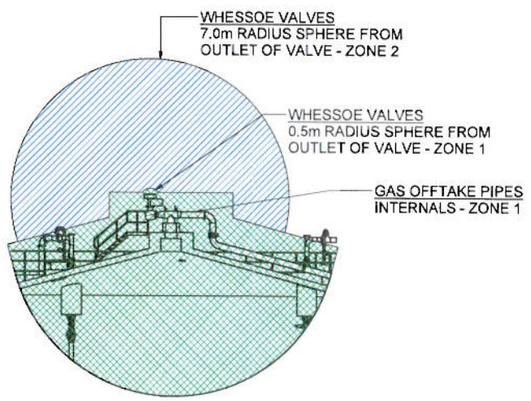
PLAN
SCALE (1 : 150)



ELEVATION
SCALE (1 : 150)



SECTION C-C
SCALE (1 : 150)



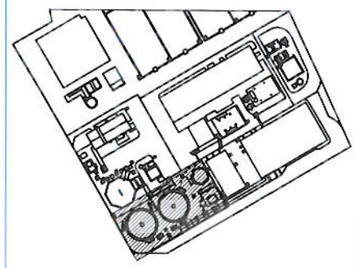
WHESSOE VALVE DETAIL
SCALE (1 : 150)

Rev	Construction Risks	Maintenance / Operating Risks	Demolition / Adaptation Risks
Health & Saftey Information Box			

1. The headings for the risks identified are given in the above table; the contractor should refer to the design risk register for details.
2. It is assumed that all the works on this drawing will be carried out by a competent Contractor who has carried out a comprehensive risk assessment.

G:\Afan-09-09-10\Workspace\Afan\Drawings\SWK-53154-SLT-PEX-04001.dw

NOTES:



ZONE 1
AREA WHERE AN EXPLOSIVE GAS ATMOSPHERE IS LIKELY TO OCCUR IN NORMAL OPERATION.

ZONE 2
AREA WHERE AN EXPLOSIVE GAS ATMOSPHERE IS NOT LIKELY TO OCCUR IN NORMAL OPERATION, AND IF IT DOES OCCUR, IS LIKELY TO DO SO ONLY INFREQUENTLY AND WILL EXIST FOR A SHORT PERIOD ONLY.

Rev.	Description	Drawn	Ch'k'd	App'd	Date
C02	PEXA COMMITTEE REVIEW	MLD	JJ	JJ	01/09/10
C01	3D UPDATE CONSTRUCTION	MLD	DV	DV	23/08/10
C00	CONSTRUCTION	PW	MR	DV	08/03/10
R00	PRE CONSTRUCTION	PS	MR	DV	15/09/09
T00	FIRST ISSUE	PS	MR	DV	01/06/09

Drawing Status
CONSTRUCTION

Project Partners/Client
MORGAN SINDALL
Imtech Process
Dŵr Cymru Welsh Water

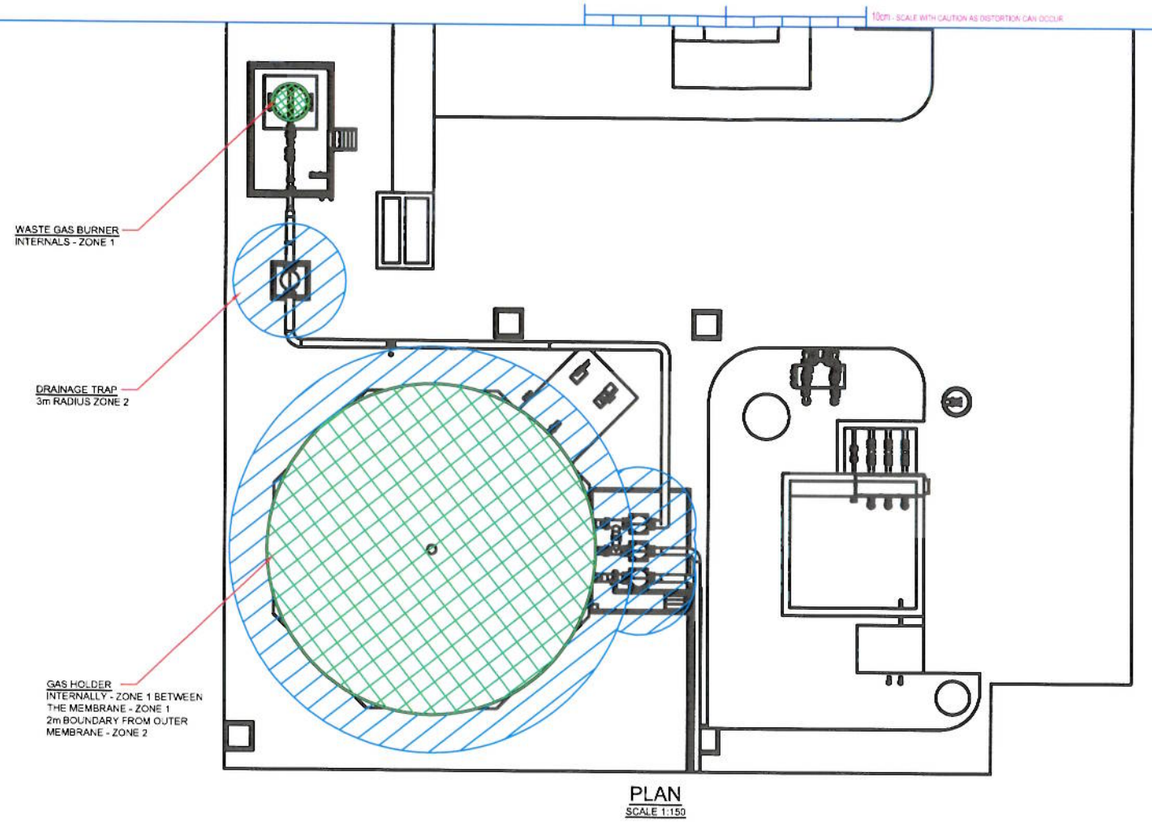
Project Title
AFAN
ADAVNCED DIGESTION
P1759

Drawing Title
AREA 04 PEXA CLASSIFICATION DIAGRAM
DIGESTION TANKS & GAS PIPES
EXTENT OF HAZARDOUS AREAS

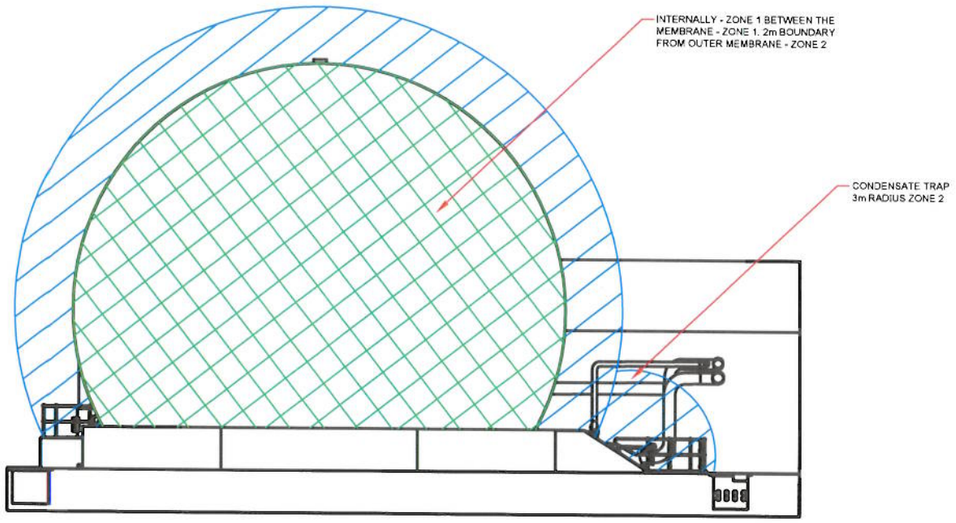
Imtech Process
The Willowford, Trefforest Ind. Est.
Pontypridd. CF37 5UR
Tel: 01443 844794

Coordinator	DV	Lead Design Eng	DV
Originator	MLD	Project Manager	AB
Scale AS SHOWN		Paper Scale A1	

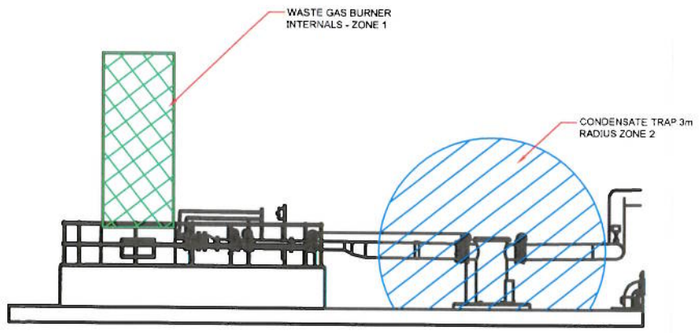
Project Drawing No.	Rev.
SWK-53154-SLT-PEX-04001	C02
SET Scheme No. 2U/CM210M	Drawing No. 504501



PLAN
SCALE 1:150



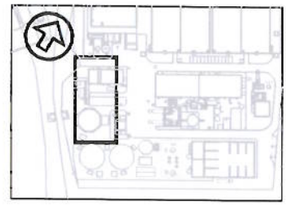
GAS HOLDER ELEVATION
SCALE 1:100



WASTE GAS BURNER ELEVTION
SCALE 1:75

NOTES:

ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS IN METRES UNLESS OTHERWISE STATED.



ZONE 1
AREA WHERE AN EXPLOSIVE GAS ATMOSPHERE IS LIKELY TO OCCUR IN NORMAL OPERATION.

ZONE 2
AREA WHERE AN EXPLOSIVE GAS ATMOSPHERE IS NOT LIKELY TO OCCUR IN NORMAL OPERATION, AND IF IT DOES OCCUR, IS LIKELY TO DO SO ONLY INFREQUENTLY AND WILL EXIST FOR A SHORT PERIOD ONLY.

Rev.	Description	Drawn	Ch'k'd	App'd	Date
C00	FOR CONSTRUCTION	PW			08/03/10
R00	FIRST ISSUE	PS	MR	DV	15/09/09
T00	FIRST ISSUE	PS	MR	DV	01/06/09

Drawing Status: CONSTRUCTION

Project Partners/Client: morgan est; Dŵr Cymru Welsh Water; ImtechProcess

Project Title:
AFAN
ADVANCED DIGESTION
-
P1759

Drawing Title:
AREA 05: GAS HOLDER
GAS HOLDER & WATER TRAP
PLANS

ImtechProcess
The Willowford, Treforest Ind. Est.
Pontypridd, CF37 5UR
Tel: 01443 844784

Coordinator	MR	Lead Design Eng	DV
Originator	PW	Project Manager	AB
Scale: AS SHOWN		Paper Scale: A1	

Project Drawing No.: SWK-53154-SLT-PEX-05001 Rev.: C00

SET Scheme No.: 2U/CM210M Drawing No.: 505501

(1) # EC-TYPE EXAMINATION CERTIFICATE

(2) **Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC**

(3) EC-Type Examination Certificate Number: **KEMA 03ATEX1008 X** Issue Number: **4**

(4) Equipment: **Capacitive Level Switch Pointek CLS 200, Model 7ML550.-.....-...1-z**

(5) Manufacturer: **Siemens Milltronics Process Instruments Inc.**

(6) Address: **1954 Technology Drive, Peterborough, Ontario, Canada K9J 6X7**

(7) This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) KEMA Quality B.V., notified body number 0344 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.

The examination and test results are recorded in confidential test report number 211215800/6.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014 : 1997 + A1, A2	**EN 50020 : 2002**	**EN 50284 : 1999**	**EN 60079-27 : 2006**
EN 50281-1-1 : 1998 + A1	**EN 61241-0 : 2006**	**EN 61241-11 : 2006**	

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 1 G **EEx ia IIC T6 ... T4** and
II 1/2 D **IP6X T100 °C** or
II 2 D **IP6X T100 °C** or
II 1 G D **EEx ia IIC T6 ... T4 IP6X T100 °C**

This certificate is issued on July 22, 2008 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

KEMA Quality B.V.

T. Pijpker
Certification Manager

PRODUCTS RvA C 001

KEMA Quality B.V. Utrechtseweg 310, 6812 AR Arnhem P.O. Box 5185, 6802 ED Arnhem The Netherlands
T +31 26 3 56 20 00 F +31 26 3 52 58 00 customer@kema.com www.kema.com Registered Arnhem 09085396

(13) # SCHEDULE

(14) **to EC-Type Examination Certificate KEMA 03ATEX1008 X** Issue No. **4**

(15) **Description**

The Capacitive Level Switch Pointek CLS 200 Model 7ML550.-.....-...1-z is used for the detection of the level limit of fluids or solids. The Level Switch is intended to be connected to a Profibus PA fieldbus. A separate solid state output is available for use as an alarm switch or as a level limit switch. Optionally the Level Switch is provided with an indicator.

The Level Switch is available with an integral level probe, or with a remotely mounted level probe.

The electronics enclosure of the Level Switch and the enclosure of the level probe ensure a degree of protection of at least IP65 and IP68 in accordance with EN 60529.

Ambient temperature range: -40 °C to +40 °C for temperature class T6,
-40 °C to +85 °C for temperature class T4.

Process temperature range -40 °C to +125 °C.

The maximum surface temperature of the enclosure T100 °C is based on a maximum ambient temperature of 85 °C.

Marking

Depending on the version, the equipment marking includes the following:

Integral version:	II 1 G II 1/2 D	EEx ia IIC T6 ... T4 IP6X T100 °C	
Remote version, level switch:	II 1 G II 2 D	EEx ia IIC T6 ... T4 IP6X T100 °C	
Remote version, level probe:	II 1 G D	EEx ia IIC T6 ... T4	IP6X T100 °C

Electrical data

Supply and signal circuit Profibus PA (terminals PA+ and PA-):
in type of protection intrinsic safety EEx ia IIC, only for connection to a certified intrinsically safe fieldbus in accordance with the FISCO Model according to EN 60079-27, with following maximum values:
U_i = 24 V; I_i = 380 mA; P_i = 5,32 W; C_i = 5 nF; L_i = 10 µH.

Switch output circuit (terminals 4 and 5):
in type of protection intrinsic safety EEx ia IIC or EEx ia IIB, only for connection to a certified intrinsically safe circuit, with following maximum values:
U_i = 30 V; I_i = 110 mA (group IIC) or 200 mA (group IIB); P_i = 825 mW (group IIC) or 1500 mW (group IIB); C_i = 0 nF; L_i = 0 µH.

Probe circuit:
in type of protection intrinsic safety EEx ia IIC, only for connection to the integral probe or to a remotely mounted probe. Maximum cable length 333 m.

The Solid state output switch is infallibly galvanically isolated from the signal and supply circuit to a maximum voltage of 30 V.

(13) # SCHEDULE

(14) **to EC-Type Examination Certificate KEMA 03ATEX1008 X** Issue No. **4**

Installation instructions

When the Level Switch is used in explosive atmospheres caused by air/dust mixtures, requiring the use of apparatus of equipment category 2 D, cable entry devices shall be used that provide a degree of protection of at least IP6X, that are suitable for the application and are correctly installed.

Routine tests

Transformer T1 shall be subjected to a routine test in accordance with EN 50020, clause 10.6, applying a test voltage of at least 500 Vac during 1 minute between the primary and secondary windings, without breakdown.

(16) **Test Report**

KEMA No. 211215800/6.

(17) **Special conditions for safe use**

When an insulated probe is used in a potentially explosive atmosphere caused by gas, damp or a non-conducting liquid, requiring equipment of group IIC, or when it is used in a potentially explosive atmosphere caused by air/dust mixtures, precautions must be taken to avoid ignition due to hazardous electrostatic charges.

Because the enclosure of the Level Switch and optionally the process connection is made of aluminium alloy, when used in a potentially explosive atmosphere requiring apparatus of equipment category 1 G, the transmitter must be installed so, that even in the event of rare incidents, an ignition source due to impact or friction between the enclosure and iron/steel is excluded.

The intrinsically safe supply and signal circuit (Profibus PA) must be connected separately from the switch output circuit, in order to prevent current and/or voltage addition.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at (9).

(19) **Test documentation**

As listed in Test Report No. 211215800/6.

KEMA

(1) # EC-TYPE EXAMINATION CERTIFICATE

(2) **Equipment and protective systems intended for use in potentially explosive atmospheres - Directive 94/9/EC**

(3) EC-Type Examination Certificate Number: **KEMA 00ATEX2039 X** Issue Number: **3**

(4) Equipment: **Capacitance Level Switch Type Pointek CLS200**

(5) Manufacturer: **Siemens Milltronics Process Instruments Inc.**

(6) Address: **1954 Technology Drive, Peterborough, Ontario, Canada K9J 6X7**

(7) This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) KEMA Quality B.V., notified body number 0344 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.

The examination and test results are recorded in confidential test report number 2112160-1.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014 : 1997 + A1, A2 **EN 50018 : 1994 + prA1 ... prA3** **EN 50020 : 1994**
EN 50281-1-1 : 1998 + A1 **EN 50284 : 1999**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 1/2 G	**EEx d[ia] IIC T6...T4** or
II 2(1) G	**EEx d[ia] IIC T6** or
II 1 G	**EEx ia IIC T6...T4** or
II 1/2 D	**T 100 °C**

This certificate is issued on July 4, 2008 and, as far as applicable, shall be revised before the date of cessation of presumption of conformity of (one of) the standards mentioned above as communicated in the Official Journal of the European Union.

KEMA Quality B.V.

P.T. van Nijen
Certification Manager

PRODUCTS RvAC 001

KEMA Quality B.V. Utrechtseweg 310, 6812 AR Arnhem P.O. Box 5185, 6802 ED Arnhem The Netherlands
T +31 26 3 56 20 00 F +31 26 3 52 58 00 customer@kema.com www.kema.com Registered Arnhem 09085396

(13) # SCHEDULE

(14) **to EC-Type Examination Certificate KEMA 00ATEX2039 X Issue No. 3**

(15) **Description**

The Capacitance Level Switch Type Pointek CLS200 detects the level of a process medium. The Capacitance Level Switch Type Pointek CLS200 can be provided with either an integral probe or a remote probe. The remote level probe enclosure is connected to the electronics enclosure by means of a cable.
The level switch can be provided with a Profibus PA signal amplifier, reed switch and display unit.

For use in potentially explosive atmospheres of flammable gases, fluids or vapours:

Ambient and process temperature range for category II 1 G: -20 °C to +60 °C.

Ambient and process temperature range for category II 2 G:

The relation between temperature class, ambient temperature range and maximum process medium temperature is shown in the following table:

Temperature class	Ambient temperature range	Max. process medium temperature
T6	-40 °C to +70 °C	80 °C
T5	-40 °C to +85 °C	95 °C
T4	-40 °C to +85 °C	125 °C

For use in the presence of combustible dust:

The maximum surface temperature T 100 °C is based on a maximum ambient temperature of 85 °C.

Marking

The different executions are marked as follows:

Integral	**II 1/2 G**	**EEx d[ia] IIC T6...T4**	
Remote	**II 2(1) G**	**EEx d[ia] IIC T6**	electronics enclosure
	II 1 G	**EEx ia IIC T6...T4**	level probe enclosure
Integral/Remote	**II 1/2 D**	**T 100 °C**	

Electrical data

Power supply:	12 - 250 V, 0 - 400 Hz, max. 2 VA
Profibus models:	12 - 30 V, max. 2 VA
Output:	Profibus PA
	Solid state max. 30 Vdc, 82 mA

For the remote version: The length of the connecting cable between the electronics enclosure and the level probe enclosure is max. 333 m.

(13) # SCHEDULE

(14) **to EC-Type Examination Certificate KEMA 00ATEX2039 X Issue No. 3**

Installation instructions

For temperatures above 70 °C, suitable heat resistant cables and cable glands shall be used.

For use in potentially explosive atmospheres of flammable gases, fluids or vapours:
The cable entry devices and the closing elements of unused apertures shall be of a certified flameproof type, suitable for the conditions of use and correctly installed.

For use in the presence of combustible dust:
The cable entry devices and the closing elements of unused apertures shall be of a certified flameproof type, suitable for the conditions of use and correctly installed. The minimum ingress protection requirement of IP6X according to EN 60529 must be satisfied.

Routine tests

Each welded glass bushing must be submitted to the routine test according to Clause 16.1 of EN 50018 at a static pressure of 17,3 bar.

(16) **Test Report**

KEMA No. 2112160-1.

(17) **Special conditions for safe use**

The insulated probe shall be installed in such a way, that ignition due to hazardous electrostatic charges cannot occur.

(18) **Essential Health and Safety Requirements**

Assured by compliance with the standards listed at (9).

(19) **Test documentation**

As listed in Test Report No. 2112160-1.

SIEMENS

EC Declaration of Conformity
EG-Konformitätserklärung

No. A5E00783865 - 04

Manufacturer: *Hersteller:*	Siemens Milltronics Process Instruments Inc. Division I IA SC
Address: *Anschrift:*	1954 Technology Drive, P.O. Box 4225; Peterborough, Ontario; K9J 7B1, Canada
Product description: *Produktbezeichnung*	POINTEK CLS200 – Standard 7ML56ab-xxxxx-xcx0 ab= 30, 31, 32, 33, 34 c = A, B, C, D, E

The product described above in the form as delivered is in conformity with the provisions of the following European Directives:
Das bezeichnete Produkt stimmt in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinien überein:

2004/108/EC EMC	Directive of the European Parliament and of the Council on the approximation of the laws of the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC. *Richtlinie des Europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit und zur Aufhebung der Richtlinie 89/336/EWG.*
2006/95/EC LVD	*Directive of the European Parliament and of the Council on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.* *Richtlinie des Europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen.*
94/9/EC ATEX	*Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres.* *Richtlinie des Europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen.*

Annex A is integral part of this declaration.
Anhang A ist integraler Bestandteil dieser Erklärung.
This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.
Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie nach §443 BGB.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

Siemens Milltronics Process Instruments Inc.

1954 Technology Drive, P.O. Box 4225
Peterborough, Ontario
K9J 7B1 / Canada

Tel.: (705) 745-2431
Fax: (705) 741-0466
www.siemens.com/processautomation

Peterborough, 2010.01.25
Siemens Milltronics Process Instruments Inc.

Steven Woodward

V.P. Technology

Name, function
Name, Funktion

Steven Woodward

signature
Unterschrift

JAN 2 5 2010

Alan Browne

Senior Director, Operations

Name, function
Name, Funktion

Alan J. Browne

signature
Unterschrift

JAN 2 6 2010

Annex A is integral part of this declaration.
Anhang A ist integraler Bestandteil dieser Erklärung.
This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.
Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie nach §443 BGB.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

Siemens Milltronics Process Instruments Inc.

1954 Technology Drive, P.O. Box 4225
Peterborough, Ontario
K9J 7B1 / Canada

Tel.: (705) 745-2431
Fax: (705) 741-0466
www.siemens.com/processautomation

SIEMENS

Anhang EG-Konformitätserklärung
EC Declaration of Conformity

No. A5E00783865 - 04

Product description: POINTEK CLS200 – Standard
Produktbezeichnung 7ML56ab-xxxxx-xcx0
ab= 30, 31, 32, 33, 34 c = A, B, C, D, E

Conformity to the Directives indicated on page 1 is assured through the application of the following standards (depending on versions):
Die Konformität mit den auf Blatt 1 angeführten Richtlinien wird nachgewiesen durch die Einhaltung folgender Normen (variantenabhängig):

Directive *Richtlinie*	Standard / Reference number *Norm / Referenznummer*	Edition *Ausgabedatum*	ab =	c =
2004/108/EC	EN 61326-1 *	2006	all	all
2006/95/EC	EN 61010-1	2001	all	all
94/9/EC	EN 50014 + A1 + A2 Note 1	1997	all	C, D, E
	EN 50018 + prA1 ... prA3 Note 1	1994	all	D, E
	EN 50020 Note 1	1994	all	D, E
	EN 50284 Note 1	1999	all	D, E
	EN 50281-1-1 + A1 Note 1	1998	all	C, D, E
Note 1: The requirements of these standards have been checked against BS EN 60079-0: 2006, BS EN 60079-1: 2007, BS EN 60079-11: 2007, BS EN 60079-26: 2007, BS EN 61241-0: 2006 and BS EN 61241-1: 2004, and there were no differences affecting the latest technical knowledge for the product identified on this declaration.				

* all environments included

Certificates
Zertifikate

Certificates *Zertifikate*	ab =	c =		
KEMA 00ATEX2039X	all	C, D, E		

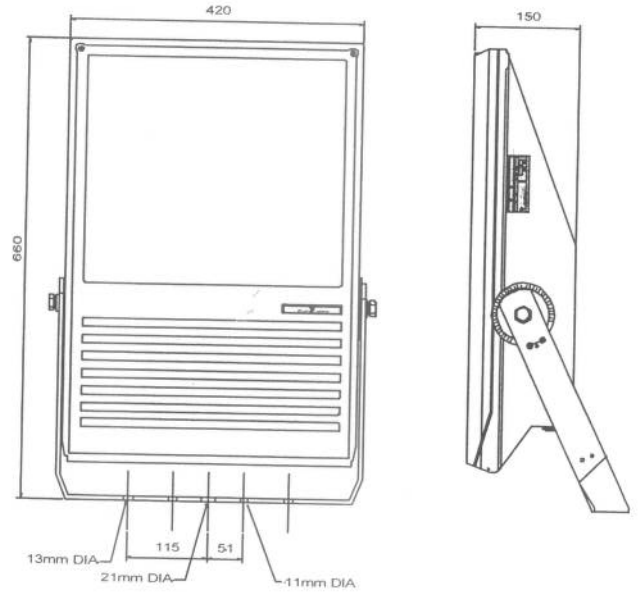
Inspection / Surveillance:
Kontrolle / Überwachung:

Directive *Richtlinie*		Notified Body Product Quality Assurance *Benannte Stelle Qualitätssicherung Produktion*		No.:
94/9/EC	ATEX	SIRA Certification Services	Rake Lane, Eccleston Chester, CH4 9JN, England	0518

Maxinex Floodlight

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

Important : Please read these instructions carefully before installing or maintaining this equipment. Good electrical practices should be followed at all times and this data should be used as a guide only.



Type of Protection	Ex nR (non-sparking) (restricted breathing)
Protection Standard	EN 50021
Area of Application	Zone 2 areas to BS EN 60079-10 and installation to BS EN 60079-14
ATEX Equipment Classification	Group II Category 3 G
Equipment Coding	Ⓔx II 3 G Ex nR II T2/T3/T4 (Refer to Table 0 for Tamb)
Certificate	Type Examination EECS BAS97ATEX4368
Ingress Protection	IP66 and IP67 to BS EN 60529

Declaration of compliance with standards

CE

The CE marking of this product applies to "The Electrical Equipment (Safety) Regulations 1994", "The Electromagnetic Compatibility Regulations 1992", the "Waste Electrical and Electronic Equipment Regulations 2006" and the "Equipment and Protective Systems intended for use in Explosive Atmospheres Regulations 1996". [This legislation is the equivalent in UK law of EC directives 73/23EEC, 89/336/EEC and 2002/96/EC respectively].
The Equipment is declared to meet the provisions of the ATEX directive (94/9/EC) by reason of the EC Type Examination and compliance with the Essential Health and Safety Requirements.
I MacLeod Technical Manager

1.0 Introduction - Maxinex Floodlight

The type of protection is Ex nR using a restricted breathing enclosure. It is available with wide (mottled) or narrow (specular) reflectors.

Note : *Lamp ranges, maximum ambient and surface temperature ratings are as outlined in TABLE 1.*

2.0 Application

The luminaire is designed to be safe in normal operation.
The luminaire should not be used in conditions where there are environmental, vibration or shock conditions above the normal for fixed installations.
The gaskets should not be exposed to hydrocarbons in liquid or high concentration vapour states.
The body material is made from marine grade aluminium, copper free (*BS1490 LM6).*
The luminaire is suitable for applications where Category 3 apparatus is used. The application is for ignitable gas atmospheres. The type examination does not address suitability for dusts or portable applications

Table 1 Lamp Ranges, Maximum Ambient and Temperature Ratings

Wattage	Lamp	Ambient Temp °C	T Rating	Cable Rating °C	Cable Rise °C
150W	SON/T, MBI/T	55	T4	75	20
250W	SON/T, MBI/T	55	T3	85	30
400W	SON/T	45	T3	85	40
400W	MBI/T	30	T3	75	40
400W	SON/T	50	210(T2)	90	40
400W	MBI/T	50	220(T2)	90	40
400W	SON/T*	55	220(T2)	95	40
400W	MBI/T*	55	230(T2)	95	40

Note : *400W, 55°C versions are not fitted with PFC capacitors.*

Table 2 Starting and Running Currents

Lamp	Lamp A	Start A	Run A	PFC µF	Circuit Power (W)
150W HPS	1.8	1.2	0.75	15	168
250W HPS	3.0	2.35	1.3	20	286
400W HPS	4.5	4.0	2.2	30	440
150W MBI	1.8	1.2	0.75	15	170
250W MBI	3.0	2.65	1.35	30	282

Chalmit lighting

IOM - Maxinex Floodlight

not be treated as commercial waste. The unit is mainly made from incombustible materials. The control gear contains plastic, resin and electronic components. All electrical components may give off noxious fumes if incinerated.

6.1 Lamps

Incandescent lamps and discharge lamps in modest quantities are not "special waste". The outer envelope should be broken in a container to avoid possible injury from fragmentation. This applies to the UK, there may be other regulations on disposal operating in other countries.

Important : *Do not incinerate lamps.*

To comply with the Waste Electrical and Electronic Equipment directive 2002/96/EC the apparatus cannot be classified as commercial waste and as such must be disposed of or recycled in such a manner as to reduce the environmental impact.

Chalmit Lighting is a leading supplier of Hazardous Area and Marine Lighting products

Chalmit Lighting
PO Box 5575
Glasgow
G52 9AP
Scotland

Telephone : +44 (0) 141 882 5555
Fax : +44 (0) 141 883 3704
Email : info@chalmit.com
Web : www.chalmit.com

Registered Office :
Mitre House,
160 Aldersgate Street,
London,
EC1A 4DD

Registered No: 669157

For technical support, please contact:
techsupport@chalmit.com

CE

BSI REGISTERED UKAS QUALITY MANAGEMENT 003

HUBBELL®

ingress points eliminated by re-gasketting.

3 Check the cable gland for tightness and nip up if necessary.

4 Check the tightness of the cover screws and nip up if necessary.

5 Clean the lampglass.

6 When relamping, check that the cover gasket has not softened or become excessively deformed If in doubt, replace (*See Section 4.0*).

3.9 Electrical Fault Finding and Replacement

The supply must be isolated before opening the luminaire. In most instances, the faults are simple, namely loose or broken connections, unserviceable lamps or open circuit control gear. Control gear will not normally go open circuit unless it has first over-heated; the signs of this are obvious, being severe discoloration of the paint on the gear and cracks in any exposed insulation. Similarly, a bad contact at the lamp cap will usually result in discoloration as a sign of overheating. Any fault finding must be done by a competent electrician and, if carried out with the luminaire in place, under a permit to work. With HPS and MBI, the ignitor can become faulty. If the lamp is fitted, the choke has continuity and the connections are good and correct, they should produce an "attempt to start" effect in the lamp and a buzzing sound from the ignitor. It will be unusual to have no other parts available to perform a substitution fault finding routine and this is the normal procedure. Before re-assembling, all connections should be checked and any damaged cable replaced. The ignition connection to the lampholder is sleeved with H.T. sleeving and this must be kept in place.

3.9.1 Thermal Protector

Thermal protectors are included. If the lamp goes on and off over a timescale of several minutes, this could be the thermal protector operating. The causes are defective lamps/diode effects, gross over voltage or the choke beginning to fail and this should be investigated directly (*See Section 3.4.*).

4.0 Overhaul

The unit is largely made of materials which are very corrosion resistant. This allows the unit to be completely stripped, cleaned, then re-built with new electrical parts as required. The internal wiring is 1.0mm² flexible, silicone rubber insulated. An H.T. sleeve is fitted to the ignitor cable. All the spares required are available. Please state the model number, lamp and reflector details. The seal at the cover is between the glass and the frame. The glass is retained in the cover frame by silicone R.T.V. adhesive. If the cover gasket has deteriorated by softening or permanent set, a new cover gasket should be fitted, which can be obtained from Chalmit. To fit this, care is needed, the old gasket should be removed and remaining adhesive scraped off with a chisel type blade. The gasket is fixed in place and joined with silicone R.T.V. to the body. The cover is tightened down and the assembly should be tested for air tightness prior to installation.

5.0 Fuse Ratings

The fuse ratings for HID lamp circuits need to take account of three components of circuit current. Current inrush to PFC capacitors which can be up to 25 x the rated capacitor current and last 1-2 millisecs; lamp starting current including steady capacitor current which together may decline from up to 200% of normal at 10 seconds after switch-on to normal after 4 minutes; rectification effects caused by asymmetrical cathode heating for a few seconds after starting, this effect is random and very variable. With the availability of MCB's with a wide range of characteristics, the individual engineer can make a better judgement of what is required. Use MCB's suitable for inrush currents to reduce ratings. The inrush current can be calculated where circuit conditions are known. The nominal capacitor current will probably be the determining factor, 0.076A per µF at 240V, 50Hz (adjust for other supply volts by multiplication, x 6/5 for 60Hz). For HBC fuses use 1.5 x normal capacitor current. All calculations must satisfy wiring regulations.

6.0 Disposal of Material

The unit is mostly made from incombustible materials. The capacitor is of the dry film type and does not contain PCB's. The control gear contains plastic parts and polyester resin. The ignitor contains electronic components and synthetic resins. All electrical components and the body parts may give off noxious fumes if incinerated. Take care to render these fumes harmless or avoid inhalation. Any local regulations concerning disposal must be complied with. Any disposal must satisfy the requirements of the WEEE directive [2002/96/EC] and therefore must

Chalmit lighting

IOM - Maxinex Floodlight

400W MBI	4.2	4.4	2.2	40	440

Table 3 Lamp, Starting and Running Currents (120V, 50Hz)

Lamp	Lamp A	Start A	Running A	PFC µF	Circuit Power
150W	1.8	2.4	1.5	20	170
250W	3.0	5.3	2.7	30	290
400W	4.6	8.0	4.4	40	450

Table 4 Fuse Ratings

Lamp Wattage	Number of Lamps					
	1	2	3	4	5	6
150W	4A	6A	10A	10A	16A	16A
250W	10A	16A	16A	20A	20A	20A
400W	16A	20A	20A	25A	25A	32A

Table 5 Weights and Windages

Type	Weight	Windage
MAXINEX 400	17.0kg	0.25m²
MAXINEX 250	15.5kg	0.25m²
MAXINEX 150	14.5kg	0.25m²

Power factor = 0.85

EMC EN 55015

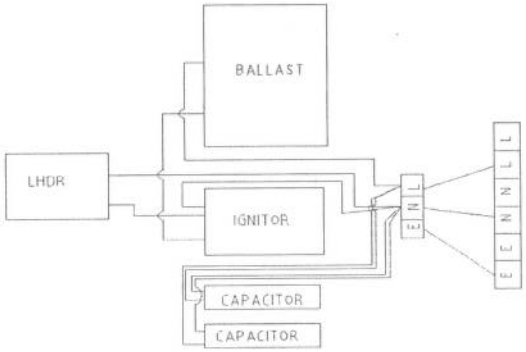
Terminals 6mm² as standard, through wiring and looping has current limit of 16A.

Tamb Storage -40°C to +80°C

Storage Luminaires should be stored in cool dry conditions preventing ingress of moisture and condensation

Lamps Lamps with an E27 or E40 cap in accordance with EN 60238

Fuse and MCB ratings Refer to tables 2, 3 & 4 for starting and running currents and fuse ratings. Also refer to section 5 for information regarding inrush current.



TYPICAL WIRING ARRANGEMENT
FOR HPS & MBI LAMPS

3.0 Installation and Safety

3.1 General

There are no health hazards associated with this product whilst in normal use. However, care should be exercised during the following operations.

Installation should be carried out in accordance with BS EN60079-14 or the local hazardous area code of practice, whichever is appropriate.

The luminaires are Class 1 and should be effectively earthed.

Certification details on the rating plate must be verified against the application requirements before installation. The information in this leaflet is correct at the time of publication. The company reserves the right to make specification changes as required.

3.2 Tools

A cross head screwdriver blade to open the cover.

19mm A/F spanner, 3mm and 5mm flat blade screwdriver.

Pliers, knife, wire strippers/cutters.

3.3 Electrical Supplies

The supply voltage and frequency should be specified when ordering a maximum voltage variation of +6%/-6% on the nominal is expected. (The safety limit for T rating is +10%).

Luminaires should not be operated continuously at more than +6%/-10% of the rated supply voltage of the control gear or tapping. The user must determine the ***actual*** underlying site supply and purchase or adjust accordingly. In some cases, the luminaires have multi-tapped control gear which can be set to a range of 50 and 60Hz voltages. The tappings are shown on the control gear and the limits are shown on the rating plate. If the equipment is located in high or low voltage sections of the system, an appropriate voltage tap should be selected to obtain the best lamp performance, but care must be taken to log or mark the equipment so that the tapping is re-set if the equipment is relocated. If in doubt, tappings should be set on the high side.

If an autotransformer is fitted, the output voltage should be checked and, where appropriate, the tappings should be adjusted to suit the actual circuit voltage. 10V Max. drop is desirable for HPS and required for MBI. All circuits use S.I.P. (superimposed pulse) ignitors. This means that there are only two connections to the choke, so tap selection is obvious.

Where supply conditions include significant harmonics, the PFC can be omitted.

Where shore or construction site supplies are used, which are different to the service location supplies, tappings should be re-set. If not, advice on the effect of these temporary supplies should be sought from the Technical Department.

3.4 Lamps

The discharge lamps used are of a standardised type. There is no preference between make or colour. All have E40 caps. The Maxinex uses tubular HPS and MBI lamps. Care must be taken to fit the correct new and replacement lamp in order to preserve the certification conditions and obtain the designed photometric performance. The lamp type is shown on the rating plate.

Chalmit lighting

IOM - Maxinex Floodlight

Lamps should be replaced shortly after they do not light.

One indication of the end of life for HPS lamps is 'cycling', where the lamp goes out then re-ignites after a minute or so interval. If discharge luminaires are burned continuously, they should be switched off occasionally to allow old lamps to fail to re-ignite, rather than possibly become diodes with detrimental effects to control gear. The above information is current at the time of preparation. The development of lamps and control gear is ongoing and detailed advice on lamp performance can be obtained from the lamp supplier or from Chalmit.

Important : *HPS and MBI circuits should not be energised without a lamp fitted. HPS and MBI lamps with internal ignitors must not be used.*

3.5 Mounting

Luminaires should be installed where access for maintenance is practical and in accordance with any lighting design information provided for the installation. This will usually consist of aiming points and aiming angles. The foot mounting or rear mounting arrangements should be secured with lock washers or self-locking nuts and bolts. The luminaire should be mounted with the lamp axis horizontal.

3.5.1 Weights and Windages

Weights and Windages for the various types are outlined in Table 5.

3.6 Cabling and Cable Glands

3.6.1 Cables

The cable entry temperatures are given as the rise over the maximum rated ambient. This allows the user to adjust the cable specification for the actual site maximum temperature. The terminals are suitable for standard conductor section up to 6mm² max. All models are suitable for looping. Standard 300/500V cable is suitable. The cable makeup must be suitable to ensure the obtaining of a restricted breathing enclosure when the cable gland assembly is fitted.

It is strongly advisable to use a high quality and well filled cable with direct entry into restricted breathing luminaires.

3.6.2 Cable Glands

Cable glands and sealing plugs when installed must maintain the restricted breathing enclosure. Entries suitable for M20 cable glands are standard.

To maintain the restricted breathing properties of the enclosure a suitable cable gland such as a **Hawke 501/453/RAC** type should be installed or a cable gland satisfying the following requirements:

- The cable gland must satisfy the requirements for en 60079-0 and must maintain an ingress rating of at least IP65.
- The certified cable gland is to be a compression type gland where the cable sheath is evenly compressed when tightened or an Ex d stuffing type or a punched seal type.
- To enable a reliable seal at the cable entry face a neoprene or silicone rubber washer and a stainless steel washer are provided for each entry and must be fitted.

3.7 Cabling and Fitting Lamps

Access for cabling and fitting lamps is by removing the front cover. The cover is released by undoing the two screws using a screwdriver. Reselect the voltage tappings if necessary. Install the conductors in the appropriate terminals. Take care not to cut back the insulation excessively, 1 mm bare conductor outside the terminal is a maximum. Any unused terminal should be fully tightened. When the cabling is complete, make a final tightness and connection check. Lamps must be of the correct type and firmly screwed into place. The cover is replaced and the screws tightened down.

3.8 Inspection and Maintenance

Visual inspection should be carried out at a minimum of 12 monthly intervals and more frequently if conditions are severe. The time between lamp changes could be very infrequent and this is too long a period without inspection.

3.8.1 Routine Examination

The equipment must be de-energised before opening. Individual organisations will have their own procedures. What follows are guidelines based on *BS EN 60079-17* and on our experience :

1. Ensure the lamp is lit when energised and that the lampglass is not damaged.
2. When de-energised and left to cool, there should be no significant sign of internal moisture. If there are signs of water ingress, the luminaire should be opened up, dried out, and any likely

TYPE EXAMINATION CERTIFICATE

Equipment intended for use in Potentially Explosive Atmospheres

3 Type Examination Certificate Number : **BAS97ATEX4368**

4 Equipment: **MAXINEX FLOODLIGHT LUMINAIRE**

5 Manufacturer: **SIMPLEX CHALMIT LIGHTING**

6 Address: **388 Hillington Road, Glasgow, Scotland, G52 4BL**

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 The Electrical Equipment Certification Service certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment of Category 3 intended for use in potentially explosive atmospheres given in Annex II to European Union Directive 94/9/EC of 23 March 1994.

The examination and test results are recorded in confidential Report N°

97(C)0858/2 dated 24 February 1998

9 Compliance with the Essential Health and Safety Requirements has been assessed by reference to:

prEN 50 021: 1996

except in respect of those requirements listed at item 18 of the Schedule.

10 If the sign "**X**" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment, and not to specific items of equipment subsequently manufactured.

12 The marking of the equipment shall include the following:-

II 3 G Ex nR II T (see item 15 in Schedule)

This certificate may only be reproduced in its entirety and without any change, schedule included.

File No: EECS 0068/03/030

This certificate is granted subject to the general conditions of the Electrical Equipment Certification Service. It does not necessarily indicate that the apparatus may be used in particular industries or circumstances.

I M CLEARE
DIRECTOR
24 February 1998

HSE Health & Safety Executive

Electrical Equipment Certification Service
Health and Safety Executive
Harpur Hill, Buxton, Derbyshire. SK17 9JN. United Kingdom
Tel: 01298 28000 Fax: 01298 28244

13 **Schedule**

14 **TYPE EXAMINATION CERTIFICATE N° BAS97ATEX4368**

15 **Description of Equipment**

The Maxinex Floodlight Luminaire is designed for fitting 150W, 250W or 400W SON/T or MBI/T lamps at supply voltages of 200 to 254V, 50 or 60 Hz.

Enclosure

The enclosure comprises a die cast aluminium lid and body with a toughened glass lens fitted to the lid assembly. Internally the enclosure contains bracket mounted control gear, a reflector and a bracket mounted lampholder.

The body is pierced with one or two entry holes for cable glands which may be up to M25. A flat plate with threaded holes may be provided to increase the wall thickness at this point. The gland is sealed with a neoprene sealing washer and plain washer supplied with the luminaire.

The supply conductors are terminated on a Type MK6 component certified terminal strip BASEEFA No. Ex 813095U coded EEx e II, incorporating pressure plates under screw pressure. Alternatively a Hylec terminal block, part No. PA76FV, may be used. If required conductors up to 6 mm^2 may be looped in to a Weidmuller MK6/6 way supply terminal block with cross connection combs fitted to link terminals.

The luminaire enclosure is classified as restricted breathing and has a degree of protection IP66 and IP67.

Control gear

The ballast, which includes thermal protectors, is manufactured by Transtar, Parry or Tridonic and is rated at 200 to 254V, 50 Hz and 210 to 254V, 60 Hz which is achieved by single or multi tappings. The ballasts have a T_w 140°C and Δt 55°C for 400 W lamps, or Δt 75°C for 250W and 150W lamps.

The ignitor is the Parry PXA 000 (all lamps), or PXA400 (150W or 250W lamps) detailed in BASEEFA Certification Report 96(C)1064. The Tridonic ZRM6ESB ignitor, Component Approval Ex 94Y4538U coded Ex N II may be fitted to 150W or 250W lamps.

Capacitors which are marked Tc 90°C and which comply with EN 61048 and EN 61049 may be fitted. Capacitors for a 40°C maximum ambient temperature may have a marked Tc 85°C.

The capacitors and ballast may be omitted from the luminaire and located in a remote control gear box. The gear box may contain any ballast suitable for lamps in accordance with the lamp manufacturer's specification, provided that all ballasts comply with IEC 922 and IEC 923 or BS EN 60922: 1991 and BS EN 60923: 1991 and have third party assessment.

13 **Schedule**

14 **TYPE EXAMINATION CERTIFICATE N° BAS97ATEX4368**

Marking

Luminaire configuration	Temperature class	Referred ambient temperature
400W SON/T	T3	-40°C to +45°C
400W SON/T	210 (T2)	-40°C to +50°C
400W SON/T*	210 (T2)	-40°C to +55°C
400W MBI/T	T3	-40°C to +30°C
400W MBI/T	220 (T2)	-40°C to +50°C
400W MBI/T*	230 (T2)	-40°C to +55°C
250W SON/T	T3	-40°C to +55°C
250W MBI/T	T3	-40°C to +55°C
150W SON/T	T4	-40°C to +55°C
150W MBI/T	T4	-40°C to +55°C

* Without power factor correction (PFC) capacitor.

The following cable glands may be fitted to the enclosure:

HAWKE CABLE GLANDS		CMP PRODUCTS		BICC COMPONENTS	
Type	**Certificate No**	**Type**	**Certificate No**	**Type**	**Certificate No**
311	Ex 813162U	A2F	Ex 94C1293U	A2F	Ex 87B3022U
321		E1FX		E1W	Ex 87B3431U
352	Ex 813163U	E2FW		E1X	Ex 87B3430U
353		E1FW		RTL	Ex 87B3429U
353T	Ex 813164U	A4e	Ex 87B3413U		
354	Ex 813162U				
VBL321	Ex 813165U				
VBL352					
VBL353					
VBL354					

13 # Schedule

14 **TYPE EXAMINATION CERTIFICATE N° BAS97ATEX4368**

16 **Report Nos.**

97(C)0858/1

17 **Special Conditions For Safe Use**

None

18 **Essential Health and Safety Requirements**

Essential Health & Safety Requirements not covered by Standards listed at (9)		
Clause	**Subject**	**Compliance**
1.0.2	Analysis of possible operating faults and misuse	4.1.0.2
1.0.5	Marking	4.1.0.5
1.0.6	Instructions	4.1.0.6
1.1.1	Materials not to trigger off explosions	4.1.1.1
1.1.2	Constructional materials not to degrade and reduce protection	4.1.1.2
1.2.2	Components for incorporation and replacement	4.1.2.2
1.2.5	Additional means of protection	4.1.2.5
1.2.7	Protection against other hazards	4.1.2.7
1.3.3	Hazards arising from stray electric and leakage currents	4.1.3.3
1.4.1	Safe function in changing external conditions	4.1.4.1
1.4.2	Withstanding attack by stresses or aggressive substances	4.1.4.2
1.6.4	Hazards arising from connections	4.1.6.4

19 **DRAWINGS**

Number	Sheet	Issue	Date	Description
D1729	1	0	25.11.97	General arrangement
D1729	2	0	25.11.97	Detail views
A6568	-	0	8.12.97	Cable gland details

1 # SUPPLEMENTARY TYPE EXAMINATION CERTIFICATE

2 **Equipment Intended for use in Potentially Explosive Atmospheres**
Directive 94/9/EC

3 Supplementary Type Examination Certificate Number: **BAS97ATEX4368/1**

4 Equipment: **MAXINEX FLOODLIGHT LUMINAIRE**

5 Manufacturer: **CHALMIT LIGHTING LIMITED**

6 Address: **388 Hillington Road, Glasgow, Scotland, G52 4BL**

7 This supplementary certificate extends Type Examination Certificate No. BAS97ATEX4368 to apply to equipment designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

This Supplementary Certificate shall be held with the original Certificate.

File No: EECS 0068/03/030

This certificate is granted subject to the general conditions of the Electrical Equipment Certification Service. It does not necessarily indicate that the apparatus may be used in particular industries or circumstances.

I M CLEARE
DIRECTOR
4 November 1998

HSE
Health & Safety Executive

Electrical Equipment Certification Service
Health and Safety Executive
Harpur Hill, Buxton, Derbyshire. SK17 9JN. United Kingdom
Tel: 01298 28000 Fax: 01298 28244

Schedule

SUPPLEMENTARY TYPE EXAMINATION CERTIFICATE N° BAS97ATEX4368/1

Description of the Variation to the Equipment

VARIATION ONE

To permit an alternative E40 lampholder and marking plate modifications.

Report Nos.

Not applicable.

Special Conditions For Safe Use

Not applicable.

Essential Health and Safety Requirements

See original certificate.

DRAWINGS

Number	Sheet	Issue	Date	Description
D1729	1	1	11/8/98	General arrangement
D1729	2		25/11/97	Detail views

1 # SUPPLEMENTARY EC-TYPE EXAMINATION CERTIFICATE

2 **Equipment or Protective System Intended for use in Potentially explosive atmospheres Directive 94/9/EC**

3 Supplementary EC-Type Examination Certificate Number: **BAS97ATEX4368/2**

4 Equipment or Protective System: **MAXINEX FLOODLIGHT LUMINAIRE**

5 Manufacturer: **CHALMIT LIGHTING LTD**

6 Address: **388 Hillington Road, Glasgow, G52 4BL**

7 This supplementary certificate extends EC-Type Examination Certificate No. BAS97ATEX4368 to apply to equipment or protective systems designed and constructed in accordance with the specification set out in the Schedule of the said Certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

This Supplementary Certificate shall be held with the original Certificate.

This certificate may only be reproduced in its entirety and without any change, schedule included.

File No: EECS 0068/03/030

This certificate is granted subject to the general conditions of the Electrical Equipment Certification Service. It does not necessarily indicate that the apparatus may be used in particular industries or circumstances.

I M CLEARE
DIRECTOR
21 September 1999

HSE
Health & Safety Executive

Electrical Equipment Certification Service
Health and Safety Executive
Harpur Hill, Buxton, Derbyshire. SK17 9JN. United Kingdom
Tel: 01298 28000 Fax: 01298 28244

13 **Schedule**

14 **EC-TYPE EXAMINATION CERTIFICATE N° BAS97ATEX4368/2**

Description of the Variation to the Equipment or Protective System

VARIATION TWO

The luminaires may be operated in an ambient temperature of -45°C when used with the capacitors and ignitors in the schedule drawing below.

Report No.

None

SPECIAL CONDITIONS FOR SAFE USE

None

Essential Health and Safety Requirements

See original certificate.

DRAWINGS

Number	Sheet	Issue	Date	Description
D1729	1	2	29.6.99	General arrangement
D1729	2	2	29.6.99	Details

1 # SUPPLEMENTARY TYPE EXAMINATION CERTIFICATE

2 **Equipment Intended for use in Potentially Explosive Atmospheres**
Directive 94/9/EC

3	Supplementary Type Examination Certificate Number :	**BAS97ATEX4368/3**
4	Equipment:	**MAXINEX FLOODLIGHT LUMINAIRE**
5	Manufacturer :	**CHALMIT LIGHTING LTD**
6	Address :	**388 Hillington Road, Glasgow, G52 4BL**

7 This supplementary certificate extends Type Examination Certificate No. BAS97ATEX4368 to apply to equipment designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

This Supplementary Certificate shall be held with the original Certificate

The Electrical Equipment Certification Service, Notified Body Number 0600, retains responsibility for its original documentation. Baseefa (2001) Ltd. is responsible only for the additional work relating to this supplementary certificate and any other supplementary certificate that it has issued.

Baseefa (2001) Ltd. Customer Reference No. 0068

Project File No. 02/0148

R S SINCLAIR
DIRECTOR
On behalf of
Baseefa (2001) Ltd.

Baseefa (2001) Ltd.
Health and Safety Laboratory Site, Harpur Hill,
Buxton, Derbyshire SK17 9JN
Telephone +44 (0) 1298 28255 Fax +44 (0) 1298 28216
e-mail info@baseefa2001.biz web site www.baseefa2001.biz
Registered in England No. 4305578 at 13 Dovedale Crescent, Buxton, Derbyshire, SK17 9BJ

Schedule

Description of the variation to the Equipment

Variation 3.1

To allow the Maxinex Floodlight Luminaire to be used in dust environments. The apparatus can be classified as Category 3D or Category 3GD and include the marking:

⟨Ex⟩ II3D T (see schedule) T_{amb} (see schedule)

The following models are included for use in zone 22 dust:

							Without PFC fitted	
Lamp Type	Designation	Power (W)	Max. amb. (°C)	Max. surface temp. (°C)	Max. amb. (°C)	Max. surface temp. (°C)	Max. amb. (°C)	Max. surface temp. (°C)
HPS	SON/T	400	45	200	50	205	55	210
Metal Halide	MBI/T		30			215		220
HPS	SON/T	250	55	180				
Metal Halide	MBI/T							
HPS	SON/T	150	55	130				
Metal Halide	MBI/T							

Report No.

02(C)0148 dated 12 November 2002

Special Conditions for Safe Use

None

Essential Health and Safety Requirements

See original certificate

Drawings and Documents

Number	Issue	Date	Description
D2113	0	21/6/02	Dust general arrangement

1 # SUPPLEMENTARY TYPE EXAMINATION CERTIFICATE

2 **Equipment Intended for use in Potentially Explosive Atmospheres**
Directive 94/9/EC

3	Supplementary Type Examination Certificate Number:	**BAS97ATEX4368/4**
4	Equipment:	**Maxinex Floodlight Luminaire**
5	Manufacturer:	**Chalmit Lighting Limited**
6	Address:	**388 Hillington Road, Glasgow, G52 4BL**

7 This supplementary certificate extends Type Examination Certificate No. **BAS97ATEX4368** to apply to equipment designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to.

This supplementary certificate shall be held with the original certificate.

The original certificate was issued by The Electrical Equipment Certification Service, which retains responsibility for its original documentation. Baseefa (2001) Ltd. is responsible only for the additional work relating to this supplementary certificate and any other supplementary certificate it has issued.

Baseefa Customer Reference No.**0068**

Project File No. **04/0268**

This certificate is granted subject to the general terms and conditions of Baseefa (2001) Ltd. It does not necessarily indicate that the equipment may be used in particular industries or circumstances.

R S SINCLAIR
DIRECTOR
On behalf of
Baseefa (2001) Ltd.

Baseefa
Rockhead Business Park, Staden Lane,
Buxton, Derbyshire SK17 9RZ
Telephone +44 (0) 1298 766600 Fax +44 (0) 1298 766601
e-mail info@baseefa.com web site www.baseefa.com
Baseefa is a trading name of Baseefa (2001) Ltd
Registered in England No. 4305578 at the above address

13 # Schedule

14 ## Certificate Number BAS97ATEX4368/4

15 **Description of the variation to the Equipment**

Variation 4.1

To add references of individual items to certificate BAS98ATEX3379U.

16 **Report Number**

None

17 **Special Conditions for Safe Use**

None

18 **Essential Health and Safety Requirements**

Compliance with the Essential Health and Safety Requirements is not affected by this variation.

19 **Drawings and Documents**

Number	Issue	Date	Description
D1729 Sheets 1&2	04	27.01.05	General Arrangement – Maxinex Floodlight

FLAMEPROOF ELECTRICAL ENCLOSURES LTD
Tat Bank Road, Oldbury, West Midlands B69 4NP
Tel: 0121 541 1315 Fax: 0121 552 0592
E-mail: sales@feel-online.co.uk Website: www.feel-online.co.uk

ISO 9001 : 2000 sira UKAS QUALITY MANAGEMENT
Certificate No. 930015

SIRA 0518

CE

RANGE 9000 Ex e
Terminal Enclosure
Installation Instructions

SIRA06ATEX3185

II 2 G D

1. This enclosure is ATEX certified and carries the label marking depicted below depending on the T rating and ambient temperature range selected.

The wattage figure "_____W" may or may not be included on the certification label depending on the method used to determine the terminal rating.

This enclosure has been designed as an electrical enclosure suitable for installation within an explosive atmosphere as described in BS EN 60079 – 0

Installation must be in accordance with BS EN 60079 and current wiring regulations of the Country where the enclosure will be installed.

2. Installation

The enclosure must be fixed into position using the external fixing lugs provided for this purpose. Under no circumstances must the enclosure be supported by way of any cable entry device.
The gasket is retained within the enclosure cover and must be secured between the body and the cover.
It is important that the cover is securely fitted to the body of the enclosure. All cover fixing screws must be tightened down to 3.5Nm

3. Cable entry devices

These must be selected in accordance with the marking on the certification label on the cover of the enclosure.

The enclosure may be supplied with the following approved entries if they were requested at the time of order:

STOPPING PLUGS		
TYPE	DESCRIPTION	CERTIFICATE
PD-U	II 2 DG EEx de IIC Dome head with "O" ring seal	Sira 00ATEX1094
PD-E-4	II 2 DG EEx e II Dome head with "O" ring seal	Sira 00ATEX3091
REDUCERS & ADAPTORS		
TYPE	DESCRIPTION	CERTIFICATE
AD-U and RD-U	II 2 DG EEx de IIC (Metric Female)	Sira 00ATEX1094
	II 2 DG EEx de IIC (Non-Metric Female)	Sira 99ATEX1115U
AD-E-4 and RD-E-4	II 2 DG EEx e II (Metric Female)	Sira 00ATEX3091
	II 2 DG EEx e II (Non-Metric Female)	Sira 99ATEX3116U
BREATHER DRAIN		
DP-E	II 2 DG EEx e II (All materials)	Sira 99ATEX3050U

If installing any of the above entries on site they must be covered by the certificates referred to above or be IECEx approved.

4. Terminals

The enclosure may be fitted with a combination of terminals as indicated in the tables below:

FIXED TERMINAL RATINGS FOR –40 °C to +50 °C @ T6			CONDUCTOR CAPACITY MM²		MAXIMUM RATINGS		TERMINAL RESISTANCE mΩ @ 20 °C
TYPE	CERTIFICATION	QTY	MIN	MAX	VOLTS	AMPS	
BK3 to BK6	SIRA 01ATEX3247U or IECEx SIR 05.0035U	1	0.5	4.0	275	21	0.35
MK6/3 to MK6/6	SIRA 01ATEX3249U or IECEx SIR 05.0037U	1	0.5	6.0	418	18	0.12
SAK 2.5	KEMA 97ATEX1798U VARIATION 6	10	0.5	2.5	550	15	0.35
SAK 4	KEMA 97ATEX1798U VARIATION 6	8	0.5	4.0	550	15	0.30
SAK 6N	KEMA 97ATEX1798U VARIATION 6	6	0.5	6.0	550	18	0.20
SAK 10	KEMA 97ATEX1798U VARIATION 6	4	1.5	10.0	550	37	0.04
WDU 2.5	KEMA 98ATEX1683U or IECEx ULD 05.0008U	8	0.5	2.5	726	15	0.20
The terminals below may only be used under the Power Dissipation method							
WDU 4	KEMA 98ATEX1683U or IECEx ULD 05.0008U	8	0.5	4.0	690	28	0.14
WDU 6	KEMA 98ATEX1683U or IECEx ULD 05.0008U	6	0.5	6.0	550	36	0.09
RK 2.5 Ex	Nemko 06ATEX1136U	10	0.5	2.5	690	26	0.18
RK2.5-4 Ex	Nemko 06ATEX1136U	8	0.5	4.0	690	34	0.15
RK6-10 Ex	Nemko 06ATEX1136U	4	0.5	10.0	690	61	0.09
SAKK4 (Ni)	SIRA 03ATEX3425U or IECEx SIR 05.0032U	8	0.5	4.0	275	28	0.71
SAKK10 (Ni)	SIRA 03ATEX3425U or IECEx SIR 05.0032U	4	0.5	10.0	275	50	0.29
EK 2.5N	KEMA 97ATEX1798U	**	0.5	2.5	EARTH TERMINAL		
EK 4	KEMA 97ATEX1798U	**	0.5	4.0	EARTH TERMINAL		
EK10	KEMA 97ATEX1798U	**	1.5	10.0	EARTH TERMINAL		
WPE 2.5	KEMA 98ATEX1683U or IECEx ULD 05.0008U	**	0.5	2.5	EARTH TERMINAL		
WPE 4	KEMA 98ATEX1683U or IECEx ULD 05.0008U	**	0.5	4.0	EARTH TERMINAL		
WPE 6	KEMA 98ATEX1683U or IECEx ULD 05.0008U	**	0.5	6.0	EARTH TERMINAL		
SL 2.5	Nemko 06ATEX1136U	**	0.5	2.5	EARTH TERMINAL		
SL 4	Nemko 06ATEX1136U	**	0.5	4.0	EARTH TERMINAL		
SL 10	Nemko 06ATEX1136U	**	1.5	10.0	EARTH TERMINAL		

THIS ENCLOSURE IS ALSO CERTIFIED: T6 (-40 °C to +40 °C) @ 7.2Watts
T5 (-40 °C to +50 °C) @ 7.2 Watts
T5 (-40 °C to +55 °C) @ 7.2 Watts
T3 (-40 °C to +130 °C) @ 7.2Watts

** EARTH TERMINALS MAY BE USED IN LIEU OF POWER TERMINALS.

For T6 rating (+40°C) terminals that have a minimum operating temperature of at least 80°C are used.
For T5 rating (+50°C and +55°C) terminals that have a minimum operating temperature of at least 100°C are used.
For T3 rating (+130°C) terminals are ceramic.

The maximum ratings for other ambient / wattage characteristics can be determined by using the following formulas.

The formula for determining the maximum current that can be applied to the enclosure is: - $I = \text{Square root } W/N\ (Rt + Rc)$

Where I = Allowable current through the cable connections.
W = Enclosure power dissipation figure.
N = Number of terminals.
Rt = Terminal resistance.
Rc = Resistance of one conductor.

The formula to use where several different circuit loads are required to determine the suitability of the enclosure is: - $W = I^2 \times N\ (Rt + Rc)$

CONDUCTOR CHARACTERISTICS		
SIZE (mm^2)	mΩ @ 20°C	LENGTH (MTR)
0.5	4.24	0.118
1.0	2.13	0.118
1.5	1.42	0.118
2.5	0.87	0.118
4.0	0.54	0.118
6.0	0.36	0.118
10.0	0.21	0.118

In order to maintain the certification relevant to the terminal component certificates, please be aware of the following requirements when wiring the terminations:

i). The end terminal must be covered with the associated end plate (Type AP) and the terminal assembly should be clamped at both ends using the appropriate end bracket (Type EWK and WEW for Weidmuller or Type ES for Conta-Clip). If the end of the terminal row is fitted with an earth terminal (Type EK and WPE for Weidmuller or Type SL for Conta-Clip) the end bracket is not required.

ii). Where smaller conductor sizes are used a crimped lug or ferrule with a minimum size (see table above) shall be fitted.

iii). Except where shown in a certificate as being internal wiring of apparatus, not more than one single or multiple strand conductor shall be connected into either side of any terminal, unless multiple conductors have been joined in a suitable manner, e.g. two conductors into a single insulated crimped bootlace ferrule.

iv). Conductors connected to the terminals shall be insulated for the appropriate voltage and this insulation shall extend to within 1mm of the metal of the terminal throat.

5. <u>"T" Ratings</u>

As the enclosure may be approved for installation in various ambient temperatures, the marking on the label on the cover **must** comply with the ambient temperature into which the enclosure is being installed.

The terminals fitted in this enclosure conform to the following requirements:

Temperature Class of Junction Box	Requirement
T6	The terminals have an insulation limiting temperature of 80°C minimum.
T5	The terminals have an insulation limiting temperature of 100°C minimum
T3	The terminals fitted are Ceramic.

6. <u>Conductor Installation.</u>

All conductors must be fully tightened down within the terminals. Conductor tightening screws may be below the surface of the terminal, it is important that the correct sized screwdriver is used. An oversized screwdriver will break the insulation around the terminal.
A routine electric strength test of the wired terminals must be conducted in accordance with IEC 60079 – 7: 2003 clause 6.1

7. Earthing
When the enclosure is fitted with an earth continuity plate and/or Internal/External earth stud, a suitable ring type terminal lug must be used to secure the earth conductor.

8. Maintenance
Periodic inspection of this enclosure is necessary; refer to EN 60079-17 Clause 4.3 for guidance.

Particular attention should be paid to tightening of terminal screws,
'O' ring, cover fixing screws and earth assemblies, if any are lost or require replacement, contact FEEL for the appropriate part. Failure to use approved replacement parts will very likely invalidate certification.

9. Surrounding Area Conditions
The junction box has been manufactured from glass-reinforced polyester plastic and is fitted with stainless steel cover fixing screws, neoprene or silicone 'O' ring and brass earth screws. The performance of these materials should be considered with respect to contact with aggressive substances with which the enclosure may come into contact.

The enclosure is intended for use under normal industrial conditions and must not be installed in an area where extreme vibration may occur.

10. Ingress Protection
The enclosure has been tested to IP66 and with the cover fully tightened down and the use of suitable cable entry devices will maintain this protection under normal working conditions.

11. Conditions for safe use
The enclosure is fitted with a Static Warning label adjacent to the hinge:
" WARNING – POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE INSTRUCTIONS"

Employees who work in Zoned Areas should be provided with clothing, especially footwear, which minimizes the risk of an electrostatic discharge igniting the explosive atmosphere.

1. Enclosure should only be cleaned using a damp cloth.
2. Be aware of the danger of propagating brush discharge.

Brush discharges occur between a conductor and a charged insulating surface.
Charge cannot migrate through the insulator and a multiplicity of very small spark channels eminate from the insulating surface. Closer to the conductor they join into a single channel so the overall appearance is like a brush - hence the name.
The energy of this type of discharge has under experiment indicated that the maximum energy from a brush discharge can easily ignite many flammable vapors.

12. Misuse
This enclosure must be used as an electrical enclosure only. It is not intended for any other function.
A copy of the enclosure product certificate is available on request.

13. Tools
Allen Key, 4mm across flats for cover fixing screws.
Spanner, 10mm across flats for Internal/External earth

14. **CAUTION**
The installation of this product must be carried out by suitably trained and qualified personnel only.

Terminal ratings given on the terminal table are based on the maximum size conductor for the terminal. If smaller conductors are to be used it will be necessary to refer to the specific terminal certification document for guidance.

Flameproof Electrical Enclosures Ltd., will not accept any responsibility for any damage, injury or any form of loss due to products not being installed or used in strict accordance with these instructions. If in doubt, please contact us.

FLAMEPROOF ELECTRICAL ENCLOSURES LTD
Tat Bank Road, Oldbury, West Midlands B69 4NP
Telephone: 0121 541 1315 Fax: 0121 552 0592 E-mail: sales@feel.uk.net Website: www.feel.uk.net

ISO 9001 : 2000 Registered Company
sira Certification Service
UKAS QUALITY MANAGEMENT
011

Certificate No. 930015

RANGE 9000

EXPLOSION PROTECTED / WEATHERPROOF / JUNCTION BOX

Sira certified under directive 94/9/EC (ATEX) for Group II, Category 2, G and D. The enclosure has been certified to give a large measure of flexibility based on Power Dissipation and is suitable for Zone 1, 2 (Gases) Zone 21 and 22 (Dusts).
Product complies with standards EN 50014, EN 50019 and EN 50281-1-1

CERTIFICATE NUMBER: Sira 02ATEX3111

PROTECTION CONCEPT:
EEx e II T6 T85°C
EEx e II T5 T100°C
EEx e II T3 T150°C

AMBIENT TEMPERATURE:
-40°C to +50°C (T6)
-40°C to +55°C (T5)
-40°C to +130°C (T3)

POWER DISSIPATION LIMIT: 7.2W

INGRESS PROTECTION: IP66

MATERIALS STANDARD: Glass Reinforced Polyester, Fire Retardant.

SPECIAL: Forton PPS for 130°C ambient, when fitted with ceramic terminals.

COVER SCREWS: Stainless Steel captive - the enclosure has a uniquely designed hinged cover which allows the unit to remain 'as one' at the time of installation.

EARTHING FACILITIES: Supplied as an optional extra: 1. Earth continuity Plate. 2. internal / External Earth Stud.

FINISH STANDARD: Matt Black.

WEIGHT: 0.6Kg (approx)

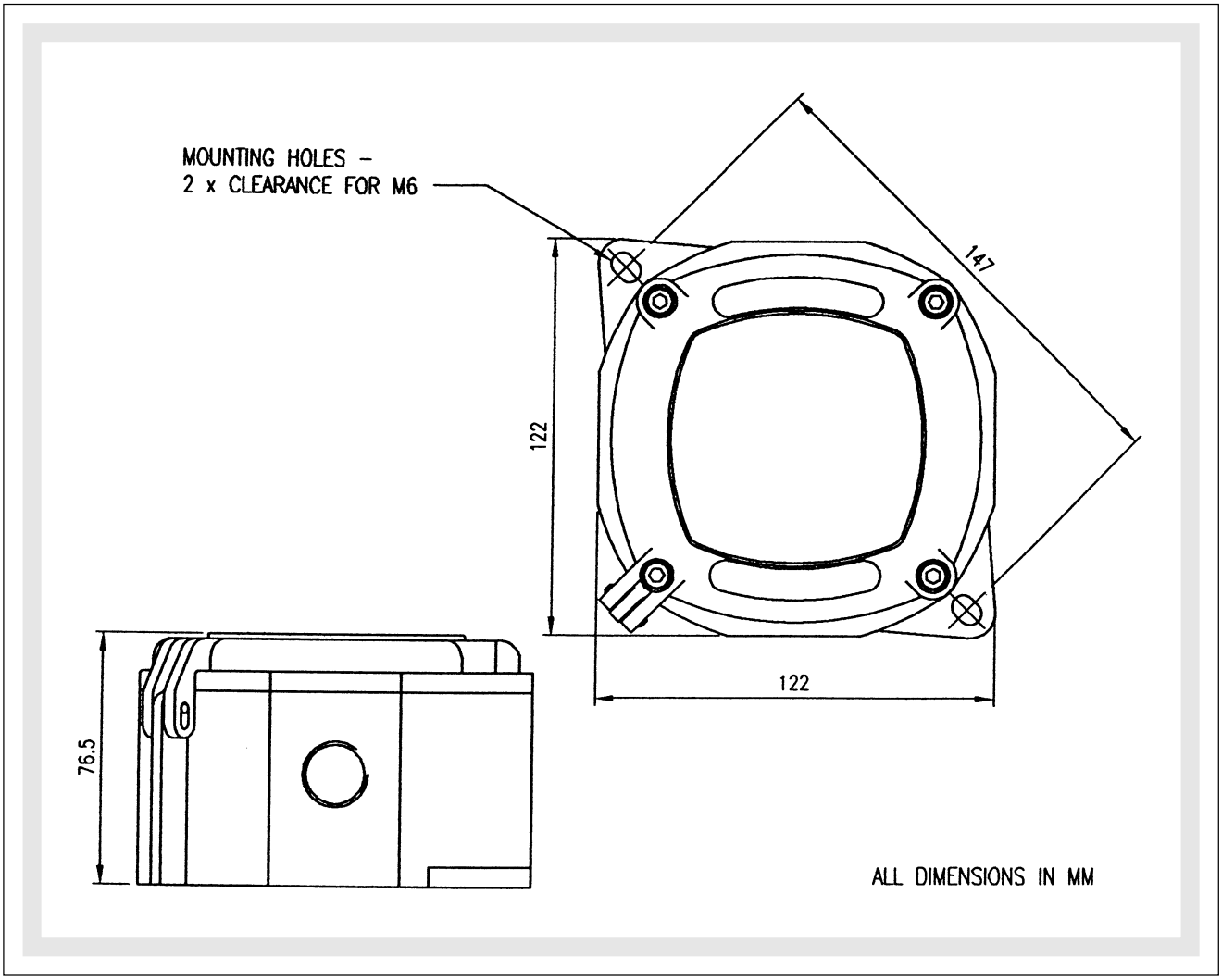
CABLE ENTRIES: Standard entries are 20mm and 25mm ISO metric. 1.5mm pitch. Alternative entries are available upon request. NPT $^{1}/_{2}$" and $^{3}/_{4}$". Pg 11, 13.5, 16 and 21. BS conduit $^{3}/_{4}$" and 1".
or plan clearance holes.

	Entry Position		20mm	25mm
1 Way	West		9001	9051
2 Way	West and East		9002	9052
3 Way	West, East and South		9003	9053
4 Way	West, East, South and North		9004	9054
Angle	West and South		9005	9055

TERMINAL BLOCKS: Various terminal blocks may be fitted to the enclosure the table opposite is a guide to ratings that can be obtained using various terminal combinations.
The table assumes that each terminal is carrying the same level of current for further information please call FEEL technical personnel.

Terminal Form	Maximum No of Ways	Conductor Size (mm^2)	Load per Terminal (T6)	Load per Terminal (T5)	Load per Terminal (T3)	Terminal Voltage
Block	6	4.0	28.0	28.0	N/A	275
Block	6	6.0	26.0	26.0	N/A	420
Rail mounted	10	2.5	21.0	21.0	N/A	550
Rail mounted	8	4.0	28.0	28.0	N/A	550
Rail mounted	6	6.0	36.0	36.0	N/A	550
Rail mounted	4	10.0	50.0	50.0	N/A	550
Rail mounted (ceramic)	7	4.0	N/A	N/A	21.0	275
Rail mounted (ceramic)	4	10.0	N/A	N/A	37.0	275

IMPORTANT In order to comply with certification requirements it is necessary to supply each enclosure fitted with a terminal block. Please detail your exact requirements. If terminal blocks are not defined each enclosure will be fitted with a 4-way block suitable for 4.0mm^2 conductors @ 28 Amps. Entry to enclosure must be by way of approved cable glands and unused entries must be fitted with approved plugs.



INSTALLATION INSTRUCTIONS: The installer must ensure that the enclosure chosen is suitable for the field of application. Which means that the marking on the certification label must correspond to the classification given to the Ex area.
Also that the temperature class of the enclosure meets the respective requirements.
For further information refer to the Installation Instruction sheet provided with the enclosures.

THE RIGHT CHOICE FOR QUALITY AND SERVICE

1 EC TYPE-EXAMINATION CERTIFICATE

2 Equipment intended for use in Potentially Explosive Atmospheres Directive 94/9/EC

3 Certificate Number: Sira 06ATEX3185

4 Equipment: Range 9000 Junction Boxes

5 Applicant: Flameproof Electrical Enclosures Limited

6 Address: 1-1A St Martins Industrial Estate
Tat Bank Road
Oldbury
Warley
West Midlands B69 4NP
UK

7 This equipment and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 Sira Certification Service, notified body number 0518 in accordance with Article 9 of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number R51A15124E.

9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the schedule to this certificate, has been assured by compliance with the following documents:

EN 60079-0:2004
EN 60079-7:2003
IEC 61241-0:2004
EN 61241-1:2004

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC type-examination certificate relates only to the design and construction of the specified equipment. If applicable, further requirements of this Directive apply to the manufacture and supply of this equipment.

12 The marking of the equipment shall include the following:

II 2 G D
Ex e II T6 (Ta = -40°C to +40°C) or
Ex e II T6 (Ta = -40°C to +50°C) or
Ex e II T5 (Ta = -40°C to +50°C) or
Ex e II T5 (Ta = -40°C to +55°C) or
Ex e II T3 (Ta = -40°C to +130°C)
Ex tD A21 IP 66 T85°C or T100°C or T150°C as appropriate

Project Number 51A15124
Date 10 January 2007
C. Index 04

C Ellaby
Certification Officer

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 06ATEX3185

13 **DESCRIPTION OF EQUIPMENT**

The Range 9000 Junction Boxes comprises a glass reinforced polyester enclosure with a hinged lid secured by four socket head screws. They may be fitted with an M6 internal/external earth assembly that is manufactured from brass. An internal earth continuity plate is also an option. The manufacturer has specified the type and quantity of terminals (refer to drawing 9000/123). When a tested combination of terminals is supplied, the arrangements, maximum voltage and maximum current, are shown on an internal label and the following codes are applicable:

Ex e II T6 (Ta = -40°C to +50°C)	T85°C

Alternatively, the terminals may be in any combination subject to the manufacturer calculating the maximum dissipated power in accordance with EN 60079-7:2003 and the conditions of certification associated with the terminals. A maximum dissipated power rating of 7.2 W is assigned for this purpose. When using the power dissipation method to select terminals the following certification codes are appropriate:

Ex e II T6 (Ta = -40°C to +40°C)	T85°C
Ex e II T5 (Ta = -40°C to +50°C)	T100°C
Ex e II T5 (Ta = -40°C to +55°C)	T100°C
Ex e II T3 (Ta = -40°C to +130°C)	T150°C

14 **DESCRIPTIVE DOCUMENTS**

14.1

Drawing	Sheet	Rev.	Date	Description
9000/120	1 of 1	A	Sep 06	Range 9000 Ex e Junction Box
9000/121	1 of 1	A	Sep 06	Range 9000 Ex e Junction Box with External Earthing Stud
9000/123	1 of 1	C	08 Sept 06	Range 9000 Enclosure Terminal Combinations
9000/03	1 of 1	A	Feb94	Earth Continuity Plate for the Range 9000 Junction Box
9000/13	1 of 1	A	Mar 97	Range 9000 Earth Stud
9000/15	1 of 1	A	Mar 97	Range 9000 Terminal Mounting Plate
9000/07	1 of 1	B	14 Apr 94	Terminal Platform Style 2
9000/08	1 of 1	A	18 Apr 94	Insulated Cross Connecting Comb
9000/26	1 of 1	0	22 Mar 00	EEx e JB9000 Junction Box with Alternative Fixing Method
9000/122	1 of 1	A	Sep 06	Certification Labels
9000/124	1 of 1	A	Sep 06	Trade Agent Label

14.2 Report number R51A15124E

15 **SPECIAL CONDITIONS FOR SAFE USE** (denoted by X after the certificate number)

None

16 **ESSENTIAL HEALTH AND SAFETY REQUIREMENTS OF ANNEX II** (EHSRs)

The relevant EHSRs that are not addressed by the standards listed in this certificate have been identified and individually assessed in report number R51A15124E.

Date 10 January 2007

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

SCHEDULE

EC TYPE-EXAMINATION CERTIFICATE

Sira 06ATEX3185

17 CONDITIONS OF CERTIFICATION

17.1 The use of this certificate is subject to the Regulations Applicable to Holders of Sira Certificates.

17.2 Holders of EC type-examination certificates are required to comply with the production control requirements defined in Article 8 of directive 94/9/EC.

17.3 The following routine test applies to enclosures supplied by Flameproof Electrical Enclosures Ltd that have been wired at the manufacturer's premises:

An electrical strength test of 2 x rated voltage +1000 V, rms (minimum 1500 V) shall be applied between live parts and earth for at least 60 s and no more 63 s as required by clause 6.1 of EN 60079-7: 2003. Alternatively the test voltage shall be 1.2 x this maximum value and the duration shall be 100 ms in accordance with 7.1 of EN 60079-7: 2003.

17.4 The products covered by this report incorporate previously certified devices, it is therefore the responsibility of the manufacturer to continually monitor the status of the certification associated with these devices, and the manufacturer shall inform Sira of any modifications of the devices that may impinge upon the explosion safety design of the products.

17.5 The terminals fitted into the Range 9000 Junction Boxes shall conform to the following requirements:

Temperature Class/T Dust	Requirement
T6/T85°C	The terminals shall have an insulation limiting temperature of 100°C minimum
T5/T100°C	The terminals shall have an insulation limiting temperature of 120°C minimum
T3/T150°C	The terminals shall be ceramic

17.6 All terminals fitted shall be installed in accordance with their certificate conditions and the relevant codes of practice/wiring regulations.

17.7 When using the maximum dissipated power method, the power of a particular junction box shall be calculated in accordance with EN 60079-7: 2003 Annex E, E2 and this shall not exceed the maximum dissipated power rating of the enclosure, 7.2 W.

Date 10 January 2007

Sira Certification Service
Rake Lane, Eccleston, Chester, CH4 9JN, England

Tel: +44 (0) 1244 670900
Fax: +44 (0) 1244 681330
Email: info@siracertification.com
Web: www.siracertification.com

EC-TYPE EXAMINATION CERTIFICATE

(1)

(2) Equipment or protective system intended for use in potentially explosive atmospheres - Directive 94/9/EC

(3) EC-Type Examination Certificate Number: **KEMA 02ATEX2042**

(4) Equipment or protective system: **Flowmeter Series FlexMasster ST98 and ST98L**

(5) Manufacturer: **Fluid Components International**

(6) Address: **1755 La Costa Meadows Drive, San Marcos, CA 92069, USA**

(7) This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) KEMA Quality B.V., notified body number 0344 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the directive.

The examination and test results are recorded in confidential report no. 2017783.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014 : 1997 **EN 50018 : 2000**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment or protective system according to the Directive 94/9/EC. Further requirements of the directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

(12) The marking of the equipment or protective system shall include the following:

II 2 G **EEx d IIC T6...T5** (Electronics housing)
EEx d IIC T4...T2 (Sensing element)

Arnhem, 13 September 2002
KEMA Quality B.V.

L.M.J. Vries
Certification Manager

KEMA Quality B.V.
Utrechtseweg 310, 6812 AR Arnhem, The Netherlands
P.O. Box 5185, 6802 ED Arnhem, The Netherlands
Telephone +31 26 3 56 20 00, Telefax +31 26 3 52 58 00

ACCREDITED BY THE DUTCH COUNCIL FOR ACCREDITATION

(13) # SCHEDULE

(14) ## to EC-Type Examination Certificate KEMA 02ATEX2042

(15) **Description**

Flowmeter Series FlexMasster ST98 and ST98L is a range of thermal mass flowmeters for gas applications, consisting of a sensing element and associated integrally or remote mounted transmitter in type of explosion protection flameproof enclosure "d".

The relation between the ambient temperature, process temperature and the temperature class is as follows::

- Electronics housing: T6 for an ambient temperature range of -40 °C ... +40 °C,
  T5 for an ambient temperature range of -40 °C ... +60 °C
- Sensing element: T4 for a process temperature range of -40 °C ... + 40 °C,
  T2 for a process temperature range of -40 °C ... +177 °C.

Electrical data

Power supply: 100-240 Vac, 50-60 Hz, or 22-30 Vdc, 7 W
Output signals: 4 ... 20 mA, max. 16,5 Vdc and 1-5, 0-5 or 0-10 Vdc

Installation instructions

The cable and conduit entry devices and blanking elements shall be of a certified flameproof type EEx d, suitable for the conditions of use and correctly installed. With the use of conduit entries a sealing device shall be provided immedialtely on the entrance of the enclosure.

Routine tests

- The electronics housing need not be subjected to a routine pressure test according to EN 50018, clause 16.
- Each epoxy-filled sensing element shall be subjected to a routine pressure test according to EN 50018, clause 16, using a minimum test pressure of 13 bar during 1 minute.
- Each non-filled sensing element shall be subjected to a routine pressure test according to EN 50018, clause 16, using a minimum test pressure of 64 bar during 1 minute.

(16) **Report**

KEMA No. 2017783.

(17) **Special conditions for safe use**

None.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at (9).

(19) **Test documentation**

1. Certificate of Conformity DEMKO 97D.122443 U
   LCIE 88.B6099 X

		dated
2. Drawing No.	017799, rev. B (4 sheets)	13.03.2001
	017700, rev. B	04.10.1999
	017328-05	-
	017981, rev. F (4 sheets)	04.06.2001

AMENDMENT 1

to EC-Type Examination Certificate KEMA 02ATEX2042

Manufacturer: **Fluid Components International**

Address: **1755 La Costa Meadows Drive, San Marcos, CA 92069, USA**

Description

In the future, the sensing element of the Flowmeter Series Flexmasster ST98 and ST98L may also be used at a process temperature in the range of -40 °C ... +450 °C with a related temperature class of T1.

All other data remain unchanged.

Test documentation

	dated
Example product marking	08.06.2004

Arnhem, 3 September 2004
KEMA Quality B.V.

C.G. van Es
Certification Manager

[2075182]

KEMA

AMENDMENT 2

to EC-Type Examination Certificate KEMA 02ATEX2042

Manufacturer: **Fluid Components International**

Address: **1755 La Costa Meadows Drive, San Marcos, CA 92069, USA**

Description

In the future, the Flowmeter Series Flexmasster ST98 and ST98L may also be used in an explosive atmosphere caused by the presence of combustible dust.

Compliance with the Essential Health and Safety Requirements has additionally been assured by compliance with EN 50281-1-1 : 1998 with A1 : 2002.

The marking of the Flowmeter Series Flexmasster shall include the following code:

II 2 GD T.. °C IP6X
EEx d IIC T..

The relation between the temperature class, maximum surface temperature, ambient temperature and the process temperature is as follows:

- Electronics housing: T6 / T 85 °C for an ambient temperature range of -40 °C … +40 °C,
  T5 / T 100 °C for an ambient temperature range of -40 °C … +60 °C
- Sensing element: T4 / T 135 °C for a process temperature range of -40 °C … + 40 °C,
  T2 / T 300 °C for a process temperature range of -40 °C … +177 °C.
  T1 / T 450 °C for a process temperature range of -40 °C … +450 °C.

The specified maximum surface temperature T.. °C for applications in explosive atmospheres caused by air/dust mixtures is based upon a maximum ambient/process temperature as mentioned above.
The enclosure of the apparatus provides a degree of ingress protection IP6X according to EN 60529.

All other data remain unchanged.

Test documentation

1. EC-Type Examination Certificate DEMKO 02ATEX 0205350 U

   dated

2. Drawing No. 017328, rev. F — 27.10.2004

Arnhem, 26 September 2005
KEMA Quality B.V.

T. Pijpker
Certification Manager

[20850121]

WRAS

Water Regulations Advisory Scheme®

This certifies that

SIEMENS AG

has had the undermentioned product examined, tested and found, when correctly installed, to comply with the requirements of the United Kingdom Water Supply (Water Fittings) Regulations/Scottish Water Byelaws.

SITRANS P DS3 TYPE 7MF4 & SITRANS P 300 TYPE 7MF8 PRESSURE TRANSMITTERS

Reference should be made to the accompanying acceptance letter for installation requirements

The product so mentioned will be listed in the Water Fittings and Materials Directory for a period until:

13 JUNE 2012

0706036

Certificate No.

Chairman, Test and Assessment Group *Secretary*

WRAS APPROVED PRODUCT

January 2006

WRAS

Water Regulations Advisory Scheme®

This certifies that

SIEMENS AG

has had the undermentioned product examined, tested and found, when correctly installed, to comply with the requirements of the United Kingdom Water Supply (Water Fittings) Regulations/Scottish Water Byelaws.

SITRANS P DS3 TYPE 7MF4 & SITRANS P 300 TYPE 7MF8 PRESSURE TRANSMITTERS

Reference should be made to the accompanying acceptance letter for installation requirements

The product so mentioned will be listed in the Water Fittings and Materials Directory for a period until:

13 JUNE 2012

0706036

Certificate No.

Chairman, Test and Assessment Group *Secretary*

WRAS APPROVED PRODUCT

January 2006

SIEMENS

Siemens Flow Instruments A/S

DK-6430 Nordborg
Denmark
CVR nr.: 27319149

Telephone: +45 7488 5252
Fax: +45 7488 5250

E-mail: flow@siemens.com
Homepage: www.siemens.com/flow

Date: 02-11-2004

Letter of compliance

The purpose of this letter is to certify that the Siemens Flow Instruments electromagnetic flow meter type

SITRANS FM MAGFLO MAG 6000 Industry,
SITRANS FM MAGFLO MAG 5000/6000 IP67 and 19" IP65 variants
With Sensors
MAG 5100, MAG 3100 and MAG 1100

meet the requirements as defined by

CE Directive 94/9/EC (ATEX Directive) EN50021 and EN50281-1 for electrical installations in Group II Category 3, G/D T6 (Zone 2 and Zone 22)
Temperature class T6 for ambient temperatures according to manual

and
the requirements as defined by UL 1604 for electrical equipment for use in Class I and Class II Division 2.

The MAGFLO electromagnetic flow meter does not during normal service produce arcs, sparks or ignition-capable hot surfaces.

However the above mentioned applies only under the condition that all terminals are connecting to the manual specification.

Sincerely,

Ove Kirk Andersen
Quality and Support Manager

FLARE PRODUCTS LIMITED

UNIT 14,BROADMEAD BUSINESS PARK
BROADMEAD ROAD STEWARTBY
BEDFORD MK43 9NX
ENGLAND
Telephone: [01234] 767755 Fax: 768624

Registered in England No. 1607975

The Supply of Machinery (Safety) Regulations	
E.C. DECLARATION OF CONFORMITY	CERT NO. 102297

CUSTOMER: IMTECH PROCESS LTD. (AFAN Ww.T.W.)	
DESCRIPTION OF ITEMS: E.T.C. GROUND FLARE .	SERIAL NO: 102297
	MACHINERY REF: E.T.C.

LIST OF NATIONAL & INTERNATIONAL STANDARDS WORKED TO & DIRECTIVES COMPLIED TO

94/9/EC(ATEX 100a)	EEC DEFLAGRATION PROTECTIVE SYSTEMS
90/396	EEC GAS DIRECTIVE
73/23	EEC LOW VOLTAGE DIRECTIVE
98/37/EC	EEC MACHINERY DIRECTIVE

NAME & ADDRESS OF SUPPLIER	NAME & ADDRESS OF MANUFACTURE (If different from supplier)
FLARE PRODUCTS LTD UNIT 14, BROADMEAD BUSINESS PARK BROADMEAD ROAD, STEWARTBY BEDFORD MK43 9NX ENGLAND	———

IN ACCORDANCE WITH THE REGULATIONS WITHIN THE MACHINERY DIRECTIVE, THEN IF DIFFERENT FROM THE SUPPLIER, THE NAME(S) & ADDRESS (ES) OF:

FILEHOLDER:	DESIGNER:
———	———
IMPORTER:	RESPONSIBLE PERSON:
———	———
C-E MARKING	CE/ 102297

WE THE UNDERSIGNED DECLARE THAT THE AFOREMENTIONED EQUIPMENT SUPPLIED AGAINST YOUR PROJECT NO. P1579 CONFORM WITH THE ESSENTIAL HEALTH & SAFETY REQUIREMENTS OF ATEX DIRECTIVE 94/9/EC AND THE CE MARKING AS STATED ABOVE HAS BEEN ATTACHED.
FURTHERMORE EQUIPMENT INSTALLED WITHIN THE USERS DESIGNATED ZONE 1 AREA COMPLIES UNDER THE DIRECTIVE AND IS INDEPENDANTLY CERTIFIED FOR USE WITHIN A ZONE 1 AREA .

ALSO THAT A TECHNICAL FILE AS DESCRIBED ON THE MACHINERY DIRECTIVE REGULATION IS HELD BY THE COMPANY AND WILL REMAIN AVAILABLE FOR AT LEAST 10 YEARS AFTER COMPLETION OF THIS ITEM.

SIGNED..... POSITION..TECHNICAL DIRECTOR.....

NAME: (PRINT)..MR STUART SIMPSON.....

ON BEHALF OF: FLARE PRODUCTS LIMITED (COMPANY)

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) # EG-Baumusterprüfbescheinigung

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 94/9/EG**

(3) EG-Baumusterprüfbescheinigungsnummer

PTB 02 ATEX 2086

(4) Gerät: Feldbus Barriere Typ **D0-FB-EX*.****

(5) Hersteller: Pepperl + Fuchs GmbH

(6) Anschrift: Königsberger Allee 87, 68307 Mannheim, Deutschland

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Physikalisch-Technische Bundesanstalt bescheinigt als benannte Stelle Nr. 0102 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht PTB Ex 02-21400 festgelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

EN 50014:1997 + A1 + A2 EN 50020:1994 EN 50019:2000 EN 50028:1987

(10) Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Bau des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes.

(12) Die Kennzeichnung des Gerätes muß die folgenden Angaben enthalten:

II 2 (1) G EEx me [ia] IIC T4

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 9. August 2002

(13) # Anlage

(14) ## EG-Baumusterprüfbescheinigung PTB 02 ATEX 2086

(15) Beschreibung des Gerätes

Die Feldbus Barriere Typ **D0-FB-EX*.**** dient zur Versorgung eigensicherer Feldgeräte sowie der bidirektionalen Übertragung von Feldbussignalen. Die bis zu 4 eigensicheren Ausgänge entsprechen dem FISCO-Modell und können sowohl mit Feldgeräten des Profibus PA sowie der Fieldbus Foundation beschaltet werden.

Der zulässige Umgebungstemperaturbereich beträgt -40 °C bis 70 °C.

Elektrische Daten

Versorgung ..... (Klemmen 3, 8 (+) und 4, 7 (-))	in Zündschutzart Erhöhte Sicherheit EEx e 16...32 V DC, ca. 4,2 W Sicherheitstechnische Maximalspannung U_m = 253 V AC
Schirmanschluss ..... (Klemmen 5s und 6s)	nur zum Anschluss der Kabelschirme
Kurzschlussbrücke..... (Klemme 1b und 2b)	mit der Kurzschlussbrücke ist der Schirmanschluss (Klemme 5s und 6s direkt mit dem PA verbunden. Ohne die Kurzschlussbrücke ist der Schirmanschluss (Klemme 5s und 6s) über eine Kapazität von ≤ 5,7nF mit dem PA verbunden.
Klemme PA	nur zum Anschluss des Potentialausgleichsleiters
Ausgangsstromkreise ..... (Klemmen 10 (+), 11 (-) bzw. 13 (+), 14 (-) bzw. 16 (+), 17 (-) bzw. 19 (+), 20 (-))	in Zündschutzart Eigensicherheit EEx ia IIC/IIB Höchstwerte je Stromkreis: U_o = 15,75 V I_o = 247,7 mA P_o = 975 mW R = 63,6 Ω C_i ≈ 0 L_i ≈ 0 Ausgangskennlinie linear

zum Anschluss an Feldbus-Systeme nach dem FISCO-Modell mit folgenden Eigenschaften:
Die an den Ausgangsstromkreis (Feldbus) angeschlossenen Geräte müssen alle als passive Stromsenke wirken (nichteinspeisend). Die wirksame innere Induktivität und Kapazität jedes Gerätes muss folgende Grenzen einhalten:

$L_i \leq 10\,\mu H$
$C_i \leq 5$ nF.

oder

zum Anschluss an Feldbus-Systeme nach dem Entity-Modell (Fieldbus Foundation) mit folgenden Eigenschaften:
Die an den Ausgangsstromkreis (Feldbus) angeschlossenen Geräte müssen alle als passive Stromsenke wirken (nichteinspeisend).
Es dürfen maximal 6 Geräte der Typen 111 und 112 der Fieldbus Foundation-Specification angeschlossen werden. Die wirksame innere Induktivität und Kapazität jedes Gerätes muss folgende Grenzen einhalten:

$L_i \leq 20\,\mu H$
$C_i \leq 5$ nF.

oder

zum gemischten Anschluss von maximal 6 Feldgeräten pro Ausgang. Es können Feldgeräte, welche dem FISCO-Modell oder welche dem Typ 111 bzw. Typ 112 der Fieldbus Foundation-Specification entsprechen, mit folgenden Eigenschaften angeschlossen werden:
Die an den Ausgangsstromkreis (Feldbus) angeschlossenen Feldgeräte müssen alle als passive Stromsenke wirken (nichteinspeisend). Die wirksame innere Induktivität und Kapazität jedes Gerätes muss folgende Grenzen einhalten:

$L_i \leq 20\,\mu H$
$C_i \leq 5$ nF.

Die verwendete Leitung für den Feldbus muss hinsichtlich ihrer Leitungsbeläge innerhalb der folgenden Bereiche liegen:

R' = 15...150 Ohm/km (Schleifenwiderstand)
L' = 0,4...1 mH/km
C' = 80...200 nF/km (incl. eines ggf. vorhandenen Schirmes),
$C' = C'_{Ader/Ader} + 0{,}5 * C'_{Ader/Schirm}$
(bei potentialfreiem Feldgerätestromkreis),

bzw.
$C' = C'_{Ader/Ader} + C'_{Ader/Schirm}$
(wenn der Schirm mit einem Pol der Feldbus Barriere verbunden ist).

Am Ende der Leitung ist ein Abschlusswiderstand, bestehend aus einer Kapazität bis 2,2 µF (incl. Toleranz) in Reihe mit einem Widerstand von 90...100 Ohm, zulässig.
Hierfür ist in der Regel eine separate Prüfbescheinigung erforderlich. Anstelle des externen Abschlusswiderstandes kann der interne Abschlusswiderstand alternativ (Schalter S1) eingesetzt werden.

Bei Einhaltung der genannten Bedingungen ist die maximale Leitungslänge bis zu 1000 m sicherheitstechnisch nicht begrenzt. Die maximale Leitungslänge pro Spur beträgt 30 m.

Schirmanschluss ..... (Klemmen 12s,15s, 18s, 21s)	nur zum Anschluss der Kabelschirme intern über eine Kapazität von ≤ 12 nF pro Anschluss mit dem Potentialausgleich verbunden

Die eigensicheren Ausgänge sind von der Versorgung bis zu einem Scheitelwert der Nennspannung von 375 V sicher galvanisch getrennt, sie sind jedoch untereinander galvanisch miteinander verbunden.

(16) Prüfbericht PTB Ex 02-21400

(17) Besondere Bedingungen

keine

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

durch Normen abgedeckt

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 9. August 2002

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) # EC-TYPE-EXAMINATION CERTIFICATE

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 02 ATEX 2086

(4) Equipment: Field bus barrier, type **D0-FB-EX*.****

(5) Manufacturer: Pepperl + Fuchs GmbH

(6) Address: 68307 Mannheim, Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 02-21400.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997 + A1 + A2 **EN 50020:1994** **EN 50019:2000** **EN 50028:1987**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 2 (1) G EEx me [ia] IIC T4

Zertifizierungsstelle Explosionsschutz
By order:

Braunschweig, August 9, 2002

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT 24

(13) # SCHEDULE

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 02 ATEX 2086

(15) Description of equipment

The field bus barrier, type **D0-FB-EX*.**** is used for the supply of intrinsically safe field equipment as well as for the bidirectional transmission of field bus signals. Up to four intrinsically safe outputs comply with the FISCO-model and may be interconnected to field equipment of both, the Profibus PA and the Foundation Fieldbus.

The permissible range of the ambient temperature is -40 °C up to +70 °C.

Electrical data

Supply ..... (terminals 3, 8 (+) and 4, 7 (-))	type of protection Increased Safety EEx e 16...32 V DC, approx. 4.2 W Maximum voltage U_m = 253VAC
Shield connection ..... (terminals 5s and 6s)	for connection to cable shields only
Short-circuiting link ..... (terminals 1b and 2b)	with the short-circuiting link the shield terminal (terminals 5s and 6s) is directly connected to the PA-conductor. Without short-circuiting link the shield terminal (terminals 5s and 6s) is connected to the PA-conductor through a capacitance of ≤ 5.7 nF.
PA- terminal.....	only for connection to the equipotential bonding conductor
Output circuits..... (terminals 10 (+), 11 (-) or 13 (+), 14 (-) or 16 (+), 17 (-) or 19 (+), 20 (-))	type of protection Intrinsic Safety EEx ia IIC/IIB Maximum values per circuit: U_o = 15.75 V I_o = 247.7 mA P_o = 975 mW R = 63.6 Ω C_i ≈ 0 L_i ≈ 0 linear characteristic

for connection to field bus systems in accordance with the FISCO-model with the following characteristics:
Each apparatus connected to the output circuit (field bus) has to operate as passive current sink (non-feeding). The effective internal inductance and capacitance of each apparatus shall keep the following limits:

$L_i \leq 10\,\mu H$
$C_i \leq 5\ nF.$

or

for connection to field bus systems in accordance with the Entity-model (Foundation Fieldbus) with the following characteristics:
Each apparatus connected to the output circuit (field bus) has to operate as passive current sink (non-feeding).
Up to a maximum of 6 apparatus of type 111 and 112 of Foundation Fieldbus specification may be connected.
The effective internal inductance and capacitance of each apparatus shall keep the following limits:

$L_i \leq 20\,\mu H$
$C_i \leq 5\ nF.$

or

for combined connection up to a maximum of 6 field apparatus per output.
Field apparatus, which correspond to the FISCO-model or which correspond to type 111 or 112 of the Foundation Fieldbus specification, may be connected with the following characteristics:
Each apparatus connected to the output circuit (field bus) has to operate as passive current sink (non-feeding).
The effective internal inductance and capacitance of each apparatus shall keep the following limits:

$L_i \leq 20\,\mu H$
$C_i \leq 5\ nF.$

The line used for the field bus has to keep the following ranges concerning the reactances per unit length.

R' = 15...150 Ohm/km (loop resistance)
L' = 0.4...1 mH/km
C' = 80...200 nF/km (incl. a possibly existing shield),
$C' = C'_{lead/lead} + 0{,}5 * C'_{lead/shield}$
(with floating field apparatus circuit),

resp.
$C' = C'_{lead/lead} + C'_{lead/shield}$
(if the shield is connected to one pole of the field bus barrier).

A terminator consisting of a capacitance up to 2.2 µF (incl. tolerance) and a resistance of 90 ... 100 Ω connected in series is permissible at the end of the line.
This requires a separate certificate as a rule. Instead of the external terminator the internal terminator (switch S1) may be used alternatively.

If the above conditions are met the maximum line length up to 1000 m is not limited with respect to safety technology.
The maximum line length per track is 30 m.

Shield connection ..... (terminals 12s,15s, 18s, 21s)	for connection to cable shields only internally connected to the equipotential bonding conductor through a capacitance of ≤ 12 nF per terminal

The intrinsically safe outputs are safely electrically isolated from the supply up to a peak value of the nominal voltage of 375 V, they are, however, interconnected with each other.

(16) Test report PTB Ex 02-21400

(17) Special conditions for safe use

none

(18) Essential health and safety requirements

met by standards

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, August 9, 2002

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. E R G Ä N Z U N G

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 02 ATEX 2086

Gerät: Feldbus Barriere Typ **D0-FB-EX*.****

Kennzeichnung: **II 2 (1) G EEx me [ia] IIC T4**

Hersteller: Pepperl + Fuchs GmbH

Anschrift: Königsberger Allee 87, 68307 Mannheim, Deutschland

Beschreibung der Ergänzungen und Änderungen

Die Feldbus Barriere Typ **D0-FB-EX*.**** wurde überarbeitet. Zukünftig darf die Feldbus Barriere Typ **D0-FB-EX*.**** wie in den Prüfungsunterlagen zum Prüfbericht PTB Ex 03-23091 beschrieben, gefertigt und betrieben werden.

Die Änderungen betreffen den inneren Aufbau, die Kennzeichnung sowie die "Elektrischen Daten". Alle anderen Angaben gelten unverändert.

Die Kennzeichnung lautet zukünftig wie folgt:

II 2 (1G/D) G EEx me [ia] IIC T4

Elektrische Daten

Versorgung	in Zündschutzart Erhöhte Sicherheit EEx e
(Klemmen 3, 8 (+)	16...32 V DC, ca. 4,2 W
und 4, 7 (-))	Sicherheitstechnische Maximalspannung U_m = 253VAC
Schirmanschluss.....	nur zum Anschluss der Kabelschirme
(Klemmen 5s und 6s)	

Kurzschlussbrücke..... (Klemme 1b und 2b)	mit der Kurzschlussbrücke ist der Schirmanschluss (Klemme 5s und 6s direkt mit dem PA verbunden. Ohne die Kurzschlussbrücke ist der Schirmanschluss (Klemme 5s und 6s) über eine Kapazität von ≤ 5,7nF mit dem PA verbunden.
Klemme PA.....	nur zum Anschluss des Potentialausgleichsleiters
Ausgangsstromkreise ..... (Klemmen 10 (+), 11 (-) bzw. 13 (+), 14 (-) bzw. 16 (+), 17 (-) bzw. 19 (+), 20 (-))	**Zur Verwendung in Feldbussystemen nach FISCO** in Zündschutzart Eigensicherheit EEx ia IIC/IIB Höchstwerte je Stromkreis: U_o = 15,75 V; I_o = 247,7 mA; P_o = 975 mW; R = 63,6 Ω; C_i ≈ 5 nF; L_i ≈ 0 Ausgangskennlinie linear

zum Anschluss an Feldbus-Systeme nach dem FISCO-Modell mit folgenden Eigenschaften:
Die an den Ausgangsstromkreis (Feldbus) angeschlossenen Geräte müssen alle als passive Stromsenke wirken (nichteinspeisend). Die wirksame innere Induktivität und Kapazität jedes Gerätes muss folgende Grenzen einhalten:

$L_i \leq 10\,\mu H$
$C_i \leq 5\ nF$

oder

zum Anschluss an Feldbus-Systeme nach dem FF-Modell (Fieldbus Foundation) mit folgenden Eigenschaften:
Die an den Ausgangsstromkreis (Feldbus) angeschlossenen Geräte müssen alle als passive Stromsenke wirken (nichteinspeisend).
Es dürfen maximal 6 Geräte der Typen 111 und 112 sowie der Typen 511 und 512 der Foundation Fieldbus-Specification pro Ausgang angeschlossen werden. Die wirksame innere Induktivität und Kapazität jedes Gerätes muss folgende Grenzen einhalten:

$L_i \leq 20\,\mu H$
$C_i \leq 5\ nF$

oder

zum gemischten Anschluss von maximal 6 Feldgeräten pro Ausgang. Es können Feldgeräte welche dem Typ 111 bzw. Typ 112 sowie den Typen 511 bzw. 512 der Fieldbus- Foundation Specification oder dem FISCO-Modell entsprechen mit folgenden Eigenschaften angeschlossen werden:
Die an den Ausgangsstromkreis (Feldbus) angeschlossenen Feldgeräte müssen alle als passive Stromsenke wirken (nichteinspeisend). Die wirksame innere Induktivität und Kapazität jedes Gerätes muss folgende Grenzen einhalten:

$L_i \leq 20\,\mu H$
$C_i \leq 5\ nF$

Die verwendete Leitung für den Feldbus muss hinsichtlich ihrer Leitungsbeläge innerhalb der folgenden Bereiche liegen:

R' = 15...150 Ohm/km (Schleifenwiderstand)
L' = 0,4...1 mH/km
C' = 45...200 nF/km (incl. eines ggf. vorhandenen Schirmes)
$C' = C'_{Ader/Ader} + 0{,}5 * C'_{Ader/Schirm}$
(bei potentialfreiem Feldgerätestromkreis)

bzw.
$C' = C'_{Ader/Ader} + C'_{Ader/Schirm}$
(wenn der Schirm mit einem Pol der Feldbus Barriere verbunden ist).

Am Ende der Leitung ist ein Abschlusswiderstand, bestehend aus einer Kapazität bis 2,2 µF (incl. Toleranz) in Reihe mit einem Widerstand von 90...100 Ohm, zulässig.
Hierfür ist in der Regel eine separate Prüfbescheinigung erforderlich. Anstelle des externen Abschlusswiderstandes kann der interne Abschlusswiderstand alternativ (Schalter S1) eingesetzt werden.

Bei Einhaltung der genannten Bedingungen ist die maximale Leitungslänge bis zu 1000 m (Hauptleitung plus Summe aller Stichleitungen) sicherheitstechnisch nicht begrenzt.
Die maximale Leitungslänge pro Stichleitung beträgt 60 m.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 02 ATEX 2086

Ausgangsstromkreise ..... **Zur Verwendung in Systemen entsprechend Entity-Modell**
(Klemmen in Zündschutzart Eigensicherheit EEx ia IIC/IIB
10 (+), 11 (-) bzw.
13 (+), 14 (-) bzw.
16 (+), 17 (-) bzw.
19 (+), 20 (-))

Höchstwerte je Stromkreis:

U_o = 15,75 V
I_o = 247,7 mA
P_o = 975 mW
R = 63,6 Ω
C_i ≈ 5 nF
L_i ≈ 0

Ausgangskennlinie linear

EEx ia	IIC	IIB
höchstzulässige äußere Induktivität L_o	0,5 mH	2 mH
höchstzulässige äußere Kapazität C_o	355 nF	1495 nF

Bei der höchstzulässigen äußeren Kapazität ist die innere Kapazität C_i bereits berücksichtigt.

Schirmanschluss..... nur zum Anschluss der Kabelschirme
(Klemmen 12s,15s, intern über eine Kapazität von ≤ 10nF ± 20 % pro Anschluss mit
18s, 21s) dem Potentialausgleich verbunden

Die eigensicheren Ausgänge sind von der Versorgung bis zu einem Scheitelwert der Nennspannung von 375 V sicher galvanisch getrennt, sie sind jedoch untereinander galvanisch miteinander verbunden.

Prüfbericht: PTB Ex 03-23091

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Braunschweig, 10. Dezember 2003

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. S U P P L E M E N T

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 02 ATEX 2086

(Translation)

Equipment: Field bus barrier, type **D0-FB-EX*.****

Marking:  **II 2 (1) G EEx me [ia] IIC T4**

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87, 68307 Mannheim, Germany

Description of supplements and modifications

The field bus barrier, type **D0-FB-EX*.**** has been revised. In future the field bus barrier, type **D0-FB-EX*.**** may be manufactured and operated in accordance with the test documents listed in the test report PTB Ex 03-23091.

The modifications concern the internal construction, the marking as well as the „Electrical data".
All other specifications remain without changes.

The marking will be in future:

 **II 2 (1G/D) G EEx me [ia] IIC T4**

Electrical data

Supply ..... (terminals 3, 8 (+) and 4, 7 (-))	type of protection Increased Safety EEx e 16...32 V DC, approx. 4.2 W Maximum voltage U_m = 253 VAC
Shield connection ..... (terminals 5s and 6s)	for connection to cable shields only

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 02 ATEX 2086

Short-circuiting link ..... (terminals 1b and 2b)	with the short-circuiting link the shield terminal (terminals 5s and 6s) is directly connected to the PA-conductor. Without short-circuiting link the shield terminal (terminals 5s and 6s) is connected to the PA-conductor through a capacitance of ≤ 5.7 nF.
PA- terminal.....	for connection to the equipotential bonding conductor only

For use with field bus systems according to the FISCO-model

Output circuits..... (terminals 10 (+), 11 (-) or 13 (+), 14 (-) or 16 (+), 17 (-) or 19 (+), 20 (-))

type of protection Intrinsic Safety EEx ia IIC/IIB
Maximum values per circuit:

U_o	=	15.75	V
I_o	=	247.7	mA
P_o	=	975	mW
R	=	63.6	Ω
C_i	≈	5	nF
L_i	≈	0	

linear output characteristic

for connection to field bus systems in accordance with the FISCO-model with the following characteristics:
Each apparatus connected to the output circuit (field bus) has to operate as passive current sink (non-feeding). The effective internal inductance and capacitance of each apparatus shall keep the following limits:

$L_i \leq 10\,\mu H$
$C_i \leq 5\ nF$

or

for connection to field bus systems in accordance with the FF-model (Foundation Fieldbus) with the following characteristics:
Each apparatus connected to the output circuit (field bus) has to operate as passive current sink (non-feeding).

Up to a maximum of 6 apparatus of types 111 and 112 as well as types 511 and 512 of Foundation Fieldbus specification may be connected.
The effective internal inductance and capacitance of each apparatus shall keep the following limits:

$L_i \leq 20\,\mu H$
$C_i \leq 5\ nF$

or

for combined connection up to a maximum of 6 field apparatus per output.
Field apparatus, which correspond to types 111 or 112 as well as types 511 and 512 of the Foundation Fieldbus specification or of the FISCO-model, may be connected with the following characteristics:
Each apparatus connected to the output circuit (field bus) has to operate as passive current sink (non-feeding).

The effective internal inductance and capacitance of each apparatus shall keep the following limits:

$L_i \leq 20\,\mu H$
$C_i \leq 5\ nF$

The line used for the field bus has to keep the following ranges as regards the reactances per unit length.

R' = 15...150 Ohm/km (loop resistance)
L' = 0.4...1 mH/km
C' = 45...200 nF/km (incl. a possibly existing shield)
$C' = C'_{lead/lead} + 0{,}5 * C'_{lead/shield}$
(with floating field apparatus circuit)

resp.

$C' = C'_{lead/lead} + C'_{lead/shield}$
(if the shield is connected to one pole of the field bus barrier).

A terminator consisting of a capacitance up to 2.2 µF (incl. tolerance) and a resistance of 90 ... 100 Ω connected in series is permissible at the end of the line.
This requires a separate certificate as a rule. Instead of the external terminator, the internal terminator (switch S1) may be used alternatively.

If the above conditions are met, the maximum line length up to 1000 m is not limited with respect to safety technology.
The maximum line length per spur is 60 m.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 02 ATEX 2086

..... **For use with systems according to the entity-model**

Output circuits..... type of protection Intrinsic Safety EEx ia IIC/IIB
(terminals Maximum values per circuit:

10 (+), 11 (-) or
13 (+), 14 (-) or
16 (+), 17 (-) or
19 (+), 20 (-))

U_o = 15.75 V
I_o = 247.7 mA
P_o = 975 mW
R = 63.6 Ω
C_i ≈ 5 nF
L_i ≈ 0

linear output characteristic

EEx ia	IIC	IIB
max. permissible external inductance L_o	0.5 mH	2 mH
max. permissible external capacitance C_o	355 nF	1495 nF

The values of the max. permissible external capacitance include the internal capacitance C_i which has already been considered.

Shield connection ..... for connection to cable shields only
(terminals 12s,15s, internally connected to the equipotential bonding conductor
18s, 21s) through a capacitance of ≤ 10 nF ± 20% per terminal

The intrinsically safe outputs are safely electrically isolated from the supply up to a peak value of the nominal voltage of 375 V, they are, however, interconnected with each other.

Test report: PTB Ex 03-23091

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, December 10, 2003

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. E R G Ä N Z U N G

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 02 ATEX 2086

Gerät: Feldbus Barriere Typ **D0-FB-EX*.****

Kennzeichnung: Ⓔx **II 2 (1G/D) G EEx me [ia] IIC T4**

Hersteller: Pepperl + Fuchs GmbH

Anschrift: 68307 Mannheim, Deutschland
Königsberger Allee 87

Beschreibung der Ergänzungen und Änderungen

Die Feldbus Barriere Typ **D0-FB-EX*.**** wurde überarbeitet. Zukünftig darf die Feldbus Barriere Typ **D0-FB-EX*.**** wie in den Prüfungsunterlagen zum Prüfbericht PTB Ex 04-23535 beschrieben gefertigt und betrieben werden.

Die Änderungen betreffen den inneren Aufbau sowie den zulässigen Umgebungstemperaturbereich. Alle anderen Angaben gelten unverändert.

Der zulässige Umgebungstemperaturbereich beträgt -50 °C bis + 70 °C.

Prüfbericht: PTB Ex 04-23535

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, 13. April 2004

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 02 ATEX 2086

(Translation)

Equipment: Field bus barrier, type **D0-FB-EX*.****

Marking: ⟨Ex⟩ **II 2 (1G/D) G EEx me [ia] IIC T4**

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87, 68307 Mannheim, Germany

Description of supplements and modifications

The field bus barrier, type **D0-FB-EX*.**** has been revised. In future the field bus barrier, type **D0-FB-EX*.**** may be manufactured and operated in accordance with the test documents listed in the test report PTB Ex 04-23535 .

The modifications concern the internal construction as well as the permissible range of the ambient temperature.
All other specifications remain without changes.

The permissible range of the ambient temperature is -50 °C up to +70 °C.

Test report: PTB Ex 04-23535

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

Braunschweig, April 13, 2004

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

3. E R G Ä N Z U N G

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 02 ATEX 2086

Gerät: Feldbus Barriere Typ **D0-FB-EX*.****

Kennzeichnung: ⟨Ex⟩ **II 2 (1G/D) G EEx me [ia] IIC T4**

Hersteller: Pepperl + Fuchs GmbH

Anschrift: Königsberger Allee 87, 68307 Mannheim, Deutschland

Beschreibung der Ergänzungen und Änderungen

Die Feldbus Barriere Typ **D0-FB-EX*.**** wurde überarbeitet. Zukünftig darf die Feldbus Barriere Typ **D0-FB-EX*.**** wie in den Prüfungsunterlagen zum Prüfbericht PTB Ex 05-25079 beschrieben gefertigt und betrieben werden.

Die Änderungen betreffen den inneren Aufbau.
Die „Elektrischen Daten" sowie alle anderen Angaben gelten unverändert.

Prüfbericht: PTB Ex 05-25079

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, 25. Mai 2005

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

3. S U P P L E M E N T

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 02 ATEX 2086

(Translation)

Equipment: Field bus barrier, type **D0-FB-EX*.****

Marking: ⟨Ex⟩ **II 2 (1G/D) G EEx me [ia] IIC T4**

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87, 68307 Mannheim, Germany

Description of supplements and modifications

The field bus barrier, type **D0-FB-EX*.**** has been revised. In the future the field bus barrier, type **D0-FB-EX*.**** may be manufactured and operated in accordance with the test documents listed in the test report PTB Ex 05-25079 .

The modifications concern the internal structure.
The "Electrical data as well as all other specifications apply without changes.

Test report: PTB Ex 05-25079

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, May 25, 2005

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

4. ERGÄNZUNG

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 02 ATEX 2086

Gerät: Feldbus Barriere Typ **D0-FB-EX*.****

Kennzeichnung: ⟨Ex⟩ **II 2 (1G/D) G EEx me [ia] IIC T4**

Hersteller: Pepperl + Fuchs GmbH

Anschrift: 68307 Mannheim, Deutschland, Königsberger Allee 87

Beschreibung der Ergänzungen und Änderungen

Die Feldbus Barriere Typ **D0-FB-EX*.**** wurde überarbeitet. Zukünftig darf die Feldbus Barriere Typ **D0-FB-EX*.**** wie in den Prüfungsunterlagen zum Prüfbericht PTB Ex 07-27290 beschrieben gefertigt werden.

Die Änderungen betreffen den inneren Aufbau.
Die „Elektrischen Daten" sowie alle anderen Angaben gelten unverändert.

Angewandte Normen

EN 50014:1997 + A1 + A2 **EN 50020:1994** **EN 50019:2000** **EN 50028:1987**

Prüfbericht: PTB Ex 07-27290

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, 7. Dezember 2007

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • 38116 Braunschweig, Deutschland

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

4. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 02 ATEX 2086

(Translation)

Equipment: Fieldbus barrier, type **D0-FB-EX*.****

Marking: ⟨Ex⟩ **II 2 (1G/D) G EEx me [ia] IIC T4**

Manufacturer: Pepperl + Fuchs GmbH

Address: Königsberger Allee 87, 68307 Mannheim, Germany

Description of supplements and modifications

The fieldbus barrier, type **D0-FB-EX*.**** has been revised. In the future the fieldbus barrier, type **D0-FB-EX*.**** may be manufactured in accordance with the test documents listed in the test report PTB Ex 07-27290 .

The modifications concern the internal structure.
The "Electrical data" as well as all other specifications apply without changes.

Applied standards

EN 50014:1997 + A1 + A2 **EN 50020:1994** **EN 50019:2000** **EN 50028:1987**

Test report: PTB Ex 07-27290

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, December 7, 2007

Sheet 1/1

94116, 94130, 94110, 94126

Intertek ETL SEMKO

1. EC-TYPE EXAMINATION CERTIFICATE

2. **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres Directive 94/9/EC**

3. EC-Type Examination Certificate Number: **ITS04ATEX12484**

4. Equipment or Protective System: **A Weight Loaded Low Pressure Conservation Vent Type 94020**

5. Manufacturer: **Shand & Jurs/GPE Controls**

6. Address: **5911 Butterfield Road, Hillside, Illinois, 60162. USA**

7. This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8. Intertek Testing and Certification Limited, notified body number 0359 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

   The examination and test results are recorded in confidential Report Number: Intertek Report Ref 04014160C dated November 2004

9. Compliance with the Essential Health and Safety Requirements has been assured by compliance with: EN 13463-1: 2001 except in respect of those requirements referred to at item 18 of the Schedule.

10. If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

11. This EC Type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12. The marking of the equipment or protective system shall include the following:-

    Ex II 1 G, T (see Schedule), Tamb (see Schedule)

C Davey
Deputy Certification Manager
5 November 2004

Intertek Testing & Certification Limited
Intertek House, Cleeve Road, Leatherhead, Surrey, KT22 7SB
Tel: + 44 (0)1372 370900 Fax: +44 (0)1372 370977
http://www.uk.intertek-etlsemko.com
Registered No 3272281 Registered Office: 25 Savile Row London W1X 1AA

Intertek ETL SEMKO

13. Schedule

14. EC-TYPE EXAMINATION CERTIFICATE NUMBER ITS04ATEX12484

15. DESCRIPTION OF EQUIPMENT OR PROTECTIVE SYSTEM

A Weight Loaded Low Pressure Conservation Vent Type 94020 (pressure /vacuum vent) comprising a cast metal body incorporating guided pressure and vacuum pallets which are sealed using a Teflon film seal. The pressure vent may be direct to atmosphere (open type) or provided with an outlet flange to allow the vented product to be piped away (closed vent).

The pressure and vacuum settings are made by adjusting the weights added to the pallets.

The enclosure may be constructed from aluminium alloy, cast iron, ductile iron, cast steel or 316 stainless steel and the pallet seat may be constructed from aluminium alloy or 316 stainless steel.

Sizes 2", 3", 4", 6", 8", 10" and 12" are available.

The housing is attached to the top of a tank or pipe by a flange or thread.

The Temperature Class will be dependent on the temperature at the point of installation with a maximum temperature of 80°C. The lower ambient will be dependent on the seal fitted and can be down to –184°C. The upper ambient will be 80°C. Alternative seal material will allow process temperatures up to 260°C.

16. REPORT NUMBER

Intertek Report Ref 04014160C dated November 2004

17. SPECIAL CONDITIONS FOR SAFE USE

None

18. ESSENTIAL HEALTH AND SAFETY REQUIREMENTS (ESHR'S)

The relevant EHSR's that have not been addressed by the standards listed in this certificate have been identified and assessed in Intertek Report Ref 04014160C dated November 2004.

Intertek Testing & Certification Limited
Intertek House, Cleeve Road, Leatherhead, Surrey, KT22 7SB
Tel: + 44 (0)1372 370900 Fax: +44 (0)1372 370977
http://www.uk.intertek-etlsemko.com
Registered No 3272281 Registered Office: 25 Savile Row London W1X 1AA

SIEMENS

EC Declaration of Conformity
EG-Konformitätserklärung

No. A5E00409496-03

Manufacturer: *Hersteller:*	Siemens Milltronics Process Instruments, Inc.
Address: *Anschrift:*	1954 Technology Drive, Peterborough Ontario, Canada K9J 7B1
Product description: *Produktbezeichnung*	RADAR Level Measurement / RADAR Füllstandmessung SITRANS LR200 Flanged Adapter/Horn Antenna 7ML5425-abcde-xxfg a = 0,1,2 bc = AA,BA,CA,DA,EA,AC,BC,CC,DC,EC d = 0,1 e = 0,1,2 f = A,E,G,H g = 0,1

The product described above in the form as delivered is in conformity with the provisions of the following European Directives:
Das bezeichnete Produkt stimmt in der von uns in Verkehr gebrachten Ausführung mit den Vorschriften folgender Europäischer Richtlinien überein:

2004/108/EC EMC	Directive of the European Parliament and of the Council of 15 December 2004 on the approximation of the laws the Member States relating to electromagnetic compatibility and repealing Directive 89/336/EEC *Richtlinie des Europäischen Parlaments und des Rates vom 15. Dezember 2004 zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über die elektromagnetische Verträglichkeit und zur Aufhebung der Richtlinie 89/336/EWG*
2006/95/EC LVD	Directive of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits *Richtlinie des Europäischen Parlaments und des Rates vom 12. Dezember 2006 zur Angleichung der Rechtsvorschriften der Mitgliedstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen*
99/5/EC R&TTE	*Directive of the European Parliament and of the Council on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity* Richtlinie des Europäischen Parlaments und des Rates über Funkanlagen und Telekommunikationsendeinrichtungen und die gegenseitige Anerkennung ihrer Konformität
94/9/EC ATEX	Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres *Richtlinie des Europäischen Parlaments und des Rates zur Angleichung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen*

Annex A is integral part of this declaration.
Anhang A ist integraler Bestandteil dieser Erklärung.
This declaration certifies the conformity to the specified directives but does not imply warranty for properties. The safety documentation accompanying the product shall be considered in detail.
Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Beschaffenheits- oder Haltbarkeitsgarantie nach § 443 BGB. Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.

SIEMENS

EG-Konformitätserklärung
EC Declaration of Conformity

No. A5E00409496-03

97/23/EC	Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning pressure equipment
PED	*Richtlinie des Europäischen Parlaments und des Rates über Druckgeräte*

Peterborough, 13.07.2008
Siemens Milltronics Process Instruments, Inc.

Steven Woodward
V.P. of Technology
Name, function
Name, Funktion

Steven Woodward
signatur
Unterschrift

JUL 1 3 2009

Alan Browne
Senior Director, Operations
Name, function
Name, Funktion

Alan J. Browne
JUL 1 3 2009
signatur
Unterschrift

Anhang A ist integraler Bestandteil dieser Erklärung
Annex A is integral part of this declaration Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Zusicherung von Eigenschaften.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.

SIEMENS

Anhang EG-Konformitätserklärung
EC Declaration of Conformity

No. A5E00409496-03

Product description: RADAR Level Measurement / RADAR Füllstandmessung
Produktbezeichnung SITRANS LR200 Flanged Adapter/Horn Antenna
7ML5425-abcde-xxfg a = 0,1,2 bc = AA,BA,CA,DA,EA,AC,BC,CC,DC,EC
d = 0,1 e = 0,1,2 f = A,E,G,H g = 0,1

Conformity to the Directives indicated on page 1 is assured through the application of the following standards (depending on versions):
Die Konformität mit den auf Blatt 1 angeführten Richtlinien wird nachgewiesen durch die Einhaltung folgender Normen (variantenabhängig):

Direktive *Richtlinie*	Standard / Reference number *Norm / Referenznummer*	Edition *Ausgabedatum*	a =	bc =	d =	e =	f =	g =
2004/108/EC	EN 61326-1 all environments included	2006	0, 1, 2	all	0, 1	0,1,2	A,E,G,H	0, 1
	EN 61326-2-5	2006	0, 1, 2	all	1	0,1,2	A,E,G,H	0, 1
	EN 55011 + A1 + A2	2002	0, 1, 2	all	0, 1	0,1,2	A,E,G,H	0, 1
2006/95/EC	EN 61010-1	2001	0, 1, 2	all	0, 1	0,1,2	A,E,G,H	0, 1
99/5/EC	EN 300 440-1 V1.3.1	(2001-09)	0, 1, 2	all	0, 1	0,1,2	A,E,G,H	0, 1
	EN 300 440-2 V1.1.1	(2001-09)	0, 1, 2	all	0, 1	0,1,2	A,E,G,H	0, 1
94/9/EC	EN 50014 +A1 + A2 Note 1	1997	0, 1, 2	all	0, 1	0,1,2	E	0, 1
	EN 50020 Note 1	2002	0, 1, 2	all	0, 1	0,1,2	E	0, 1
	EN 50284 Note 1	1999	0, 1, 2	all	0, 1	0,1,2	E	0, 1
	EN 60079-0	2006	0, 1, 2	all	0	0,1,2	G, H	0, 1
	EN 60079-1	2007	0, 1, 2	all	0	0,1,2	G, H	0, 1
	EN 60079-11	2007	0, 1, 2	all	0	0,1,2	G, H	0, 1
	EN 60079-18	2004	0, 1, 2	all	0	0,1,2	G, H	0, 1
	EN 60079-26	2007	0, 1, 2	all	0	0,1,2	G, H	0, 1
97/23/EC	ASME B&PVC, Sect. VIII, Div.1	1998+99add.	0	BA,CA,DA,EA, BC,CC,DC,EC	0, 1	0, 2	A,E,G,H	0
Note 1: The requirements of these standards have been checked against BS EN 60079-0: 2006, BS EN 60079-11: 2007 and BS EN 60079-26: 2007, and there were no differences affecting the latest technical knowledge for the product identified on this declaration.								

Certificates
Zertifikate:

Certificate *Zertifikat*	d =	f =		
Sira 06ATEX2378X, Sira 06ATEX2356X	0,1	E		
Sira 05ATEX1001X	0	G, H		

Inspection / Surveillance:
Kontrolle/Überwachung:

Directive *Richtlinie*		Notified Body Product Quality Assurance *Benannte Stelle Qualitätssicherung Produktion*		No.:
94/9/EC	ATEX	SIRA Certification Services	Rake Lane, Eccleston Chester, CH4 9JN, England	0518

Anhang A ist integraler Bestandteil dieser Erklärung
Annex A is integral part of this declaration Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Zusicherung von Eigenschaften.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.

SIEMENS

Anhang EG-Konformitätserklärung
EC Declaration of Conformity

No. A5E00409496-03

97/23/EC	PED	TÜV RNA - TÜV Anlagentechnik GmbH	Am Grauen Stein D-51101 Cologne, Germany	0035

Anhang A ist integraler Bestandteil dieser Erklärung
Annex A is integral part of this declaration Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, ist jedoch keine Zusicherung von Eigenschaften.
Die Sicherheitshinweise der mitgelieferten Produktdokumentation sind zu beachten.
This declaration certifies the conformity to the specified directives but contains no assurance of properties. The safety documentation accompanying the product shall be considered in detail.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) # EG-Baumusterprüfbescheinigung

(2) Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen - **Richtlinie 94/9/EG**

(3) EG-Baumusterprüfbescheinigungsnummer

PTB 05 ATEX 2048

(4) Gerät: Messumformer
SITRANS P300 - HART, Typ 7MF 8 ** 3 - *****-* B ** - Z bzw.
SITRANS P300 - PROFIBUS PA, Typ 7MF 8 ** 4 - *****-* B ** - Z

(5) Hersteller: Siemens AG

(6) Anschrift: Östliche Rheinbrückenstraße 50, 76187 Karlsruhe, Deutschland

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage und den darin aufgeführten Unterlagen zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Physikalisch-Technische Bundesanstalt bescheinigt als benannte Stelle Nr. 0102 nach Artikel 9 der Richtlinie des Rates der Europäischen Gemeinschaften vom 23. März 1994 (94/9/EG) die Erfüllung der grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie.

Die Ergebnisse der Prüfung sind in dem vertraulichen Prüfbericht PTB Ex 05-25163 festgehalten.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

EN 50014:1997 + A1 + A2 **EN 50020:2002** **EN 50284:1999**

(10) Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird auf besondere Bedingungen für die sichere Anwendung des Gerätes in der Anlage zu dieser Bescheinigung hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf Konzeption und Prüfung des festgelegten Gerätes gemäß Richtlinie 94/9/EG. Weitere Anforderungen dieser Richtlinie gelten für die Herstellung und das Inverkehrbringen dieses Gerätes. Diese Anforderungen werden nicht durch diese Bescheinigung abgedeckt.

(12) Die Kennzeichnung des Gerätes muß die folgenden Angaben enthalten:

II 1/2 G EEx ia IIC/IIB T4/T5/T6 bzw. II 1/2 G EEx ib IIC/IIB T4/T5/T6

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Gerlach
Oberregierungsrat

Braunschweig, 30. September 2005

(13) # Anlage

(14) ## EG-Baumusterprüfbescheinigung PTB 05 ATEX 2048

(15) Beschreibung des Gerätes

Der Messumformer SITRANS P300 - HART, Typ 7MF 8 ** 3 - *****-* B ** - Z bzw. SITRANS P300 - PROFIBUS PA, Typ 7MF 8 ** 4 - *****-* B ** - Z dient zur Druckmessung aggressiver, nicht aggressiver und gefährlicher Gase, Dämpfe und Flüssigkeiten. Durch entsprechende Paramatrierung kann das Gerät auch zur Messung von Füllstand, Volumen oder Masse eingesetzt werden. Das Ausgangssignal ist ein eingeprägter Gleichstrom von 4 ... 20 mA bzw. ein PROFIBUS-PA-Signal, welche dem Eingangsdruck linear proportional sind.

Kategorie-1/2-Betriebsmittel

Das Elektronikgehäuse wird in explosionsgefährdeten Bereichen errichtet, die ein Betriebsmittel der Kategorie 2 erfordern. Die Prozessanschlusselemente werden in die Trennwand errichtet, die die Bereiche voneinander trennt, in denen Betriebsmittel der Kategorie 2 oder 1 erforderlich sind.

Die Abhängigkeit der Temperaturklasse von der höchstzulässigen Temperatur des Mediums und der höchstzulässigen Umgebungstemperatur an der Elektronik ist der folgenden Tabelle zu entnehmen:

Temperaturklasse	Temperatur des Mediums	Umgebungstemperatur an der Elektronik
T4	-20 ... +60 °C	-40 ... +85 °C
T5		-40 ... +70 °C
T6		-40 ... +60 °C

Der Prozessdruck der Medien muss bei Anwendungen, die Kategorie-1-Betriebsmittel erfordern, zwischen 0,8 bar ...1,1 bar liegen. Die Einsatzbedingungen für den Betrieb ohne explosionsfähige Gemische sind den Herstellerangaben zu entnehmen.

Kategorie-2-Betriebsmittel

Die Messumformer werden in explosionsgefährdeten Bereichen, die ein Betriebsmittel der Kategorie 2 erfordern, errichtet.

Die höchstzulässige Umgebungstemperatur in Abhängigkeit von der Temperaturklasse ist der folgenden Tabelle zu entnehmen:

Temperaturklasse	Umgebungstemperatur
T4	-40 ... +85 °C
T5	-40 ... +70 °C
T6	-40 ... +60 °C

Die zulässigen Betriebstemperaturen und Drücke für den Betrieb sind den Herstellerangaben zu entnehmen.

Elektrische Daten

Messumformer SITRANS P300 - HART, Typ 7MF 8 ** 3 - ***-* B ** - Z**

Hilfsenergie-/Ausgangssignalstromkreis (Anschluss +,-)

in Zündschutzart Eigensicherheit EEx ia IIC/IIB
bzw: EEx ib IIC/IIB
nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis

Höchstwerte:
U_i = 30 V
I_i = 100 mA
P_i = 750 mW
R_i = 300 Ω

L_i = 0,4 mH
C_i = 6 nF

Kontrollanzeigerstromkreis (Anschluss: Steckkontakte Flachstecker)

in Zündschutzart Eigensicherheit EEx ia IIC/IIB
bzw: EEx ib IIC/IIB
nur zum Anschluss an erdfreie Anzeiger oder Prüfgeräte ohne eigene Stromversorgung (Batterie, Netz) und ohne Fremdstromkreise

oder

zum Anschluss von Prüfgeräten, die für den explosionsgefährdeten Bereich zugelassen sind. Höchstwerte der Zusammenschaltung von Kontrollanzeigestromkreis und Prüfgerät:

Höchstwerte:
U_i = 30 V
I_i = 100 mA
P_i = 750 mW

	IIC	IIB
L_o	0,5 mH	1 mH
C_o	3 nF	50 nF

Messzellenstromkreis

geräteintern in Zündschutzart Eigensicherheit, keine Schnittstelle nach außen

Messumformer SITRANS P300 - PROFIBUS PA, Typ 7MF 8 ** 4 - ***-* B ** - Z**

Hilfsenergie-/Ausgangs-signalstromkreis (Anschluss: +, -)

in Zündschutzart Eigensicherheit EEx ia IIC/IIB
bzw. EEx ib IIC/IIB
nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis (z.B. FISCO-Speisegerät) mit den Höchstwerten entsprechend folgender Tabelle:

	FISCO-Speisegerät ia / ib für Gruppe IIB / IIC	lineare Barriere ia / ib für Gruppe IIB / IIC
U_o	17,5 V	24 V
I_o	380 mA	250 mA
P_o	5,32 W	1,2 W

L_i = 7 µH
C_i = 1,1 nF

Messzellenstromkreis

geräteintern in Zündschutzart Eigensicherheit, keine Schnittstelle nach außen

(16) Prüfbericht PTB Ex 05-25163

(17) Besondere Bedingungen

keine

Hinweise für Herstellung und Betrieb

Wird der Messumformer an einem eigensicheren Speisegerät der Zündschutzart „EEx ib" und gleichzeitig als Kategorie-1/2-Betriebsmittel betrieben, hängt der Explosionsschutz zusätzlich von der Dichtheit der Trennmembran ab.
Für diesen Anwendungsfall ist der Messumformer in die regelmäßige Druckprüfung der Anlage mit einzubeziehen und darf nur für solche brennbaren Gase und Flüssigkeiten verwendet werden, gegen die die Trennmembran hinreichend chemisch und gegen Korrosion beständig ist.

(18) Grundlegende Sicherheits- und Gesundheitsanforderungen

erfüllt durch Übereinstimmung mit den vorgenannten Normen

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Gerlach
Oberregierungsrat

Braunschweig, 30. September 2005

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. E R G Ä N Z U N G

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 05 ATEX 2048

Gerät: Messumformer
SITRANS P300 - HART, Typ 7MF 8 ** 3 - *****-* B ** - Z bzw.
SITRANS P300 - PROFIBUS PA, Typ 7MF 8 ** 4 - *****-* B ** - Z

Kennzeichnung: **II 1/2 G EEx ia IIC/IIB T4/T5/T6 bzw.**
II 1/2 G EEx ib IIC/IIB T4/T5/T6

Hersteller: Siemens AG

Anschrift: Östliche Rheinbrückenstraße 50, 76187 Karlsruhe, Deutschland

Beschreibung der Ergänzungen und Änderungen

Die Messumformer der Serie SITRANS P300, Typenreihe 7MF 8***-*****-****-Z dürfen künftig auch nach den im Prüfbericht aufgeführten Prüfungsunterlagen gefertigt und betrieben werden. Die Änderungen umfassen die Einführung der neuen Gerätevariante SITRANS P300 - FF - Bus, Typ 7MF 8 ** 5 - ***** - **** - Z, technische Änderungen ohne Einfluss auf den Explosionsschutz, die Erweiterung des Einsatzbereiches für Bereiche der Kategorie 3 und durch brennbaren Staub gefährdete Bereiche und demzufolge eine Erweiterung der Kennzeichnung sowie Änderungen am Gehäusedeckel und des Sichtfensters. Im Zuge dieser Änderungen erfolgt ferner eine Anpassung an den derzeit aktuellen Normenstand.

Die niedrigste zulässige Umgebungstemperatur beträgt künftig:

-40 °C für Ausführungen mit Sichtfenster aus Kunststoff

-20 °C für Ausführungen mit Sichtfenster aus Mineralglas

Die elektrischen Daten und alle weiteren Angaben der EG-Baumusterprüfbescheinigung sowie die „Hinweise für Herstellung und Betrieb" gelten unverändert.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 05 ATEX 2048

In Abhängigkeit von den möglichen Gerätevarianten lautet die Kennzeichnung künftig:

Ex	II 1/2 G Ex ia IIC/IIB T4/T5/T6	bzw.
Ex	II 1/2 G Ex ib IIC/IIB T4/T5/T6	bzw.
Ex	II 2/3 G Ex ic IIC/IIB T4/T5/T6	bzw.
Ex	II 2/3 G Ex nL IIC/IIB T4/T5/T6	bzw.
Ex	II 2/3 G Ex nA II T4/T5/T6	bzw.
Ex	II 1 D Ex iaD 20 T120 °C	bzw.
Ex	II 2 D Ex ibD 21 T120 °C	bzw.
Ex	II 3 D Ex ibD 22 T120 °C	

Angewandte Normen

EN 60079-0:2006	**EN 60079-11:2007**	**EN 60079-26:2004**
EN 60079-15:2005	**EN 61241-0:2006**	**EN 61241-11:2006**

Prüfbericht: PTB Ex 08-26212

Zertifizierungsstelle Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, 21. April 2008

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. E R G Ä N Z U N G

gemäß Richtlinie 94/9/EG Anhang III Ziffer 6

zur EG-Baumusterprüfbescheinigung PTB 05 ATEX 2048

Gerät: Messumformer
SITRANS P300 - HART, Typ 7MF 8 ** 3 - *****-* B ** - Z bzw.
SITRANS P300 - PROFIBUS PA, Typ 7MF 8 ** 4 - *****-* B ** - Z bzw:
SITRANS P300 - FF - Bus, Typ 7MF 8 ** 5 - ***** - **** - Z

Kennzeichnung: ⟨Ex⟩

II 1/2 G	Ex ia IIC/IIB T4/T5/T6	bzw.
II 1/2 G	Ex ib IIC/IIB T4/T5/T6	bzw.
II 2/3 G	Ex ic IIC/IIB T4/T5/T6	bzw.
II 2/3 G	Ex nL IIC/IIB T4/T5/T6	bzw.
II 2/3 G	Ex nA II T4/T5/T6	bzw.
II 1 D	Ex iaD 20 T120 °C	bzw.
II 2 D	Ex ibD 21 T120 °C	bzw.
II 3 D	Ex ibD 22 T120 °C	

Hersteller:	Siemens AG Industry Sector Industry Automation Division	vormals	Siemens Aktiengesellschaft
Anschrift:	76181 Karlsruhe, Deutschland	vormals	Östliche Rheinbrückenstraße 50, 76187 Karlsruhe, Deutschland

Beschreibung der Ergänzungen und Änderungen

Die Messumformer der Serie SITRANS P300, Typenreihe 7MF 8***-*****-****-Z dürfen künftig auch nach den im Prüfbericht aufgeführten Prüfungsunterlagen gefertigt und betrieben werden. Die Änderungen betreffen die elektronische Schaltung und einige Zeichnungskorrekturen sowie den Namen und die Anschrift des Herstellers wie oben angegeben.

Die elektrischen Daten werden hier nocheinmal vollständig aufgeführt, da sich durch die Anpassung an den aktuellen Normenstand (1. Ergänzung) auch die Kennzeichnung der dort aufgeführten eigensicheren Stromkreise geändert hat. Hiervon betroffen sind auch die „Hinweise für Herstellung und Betrieb".

ZSEx10101d.dot

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 05 ATEX 2048

Elektrische Daten

Messumformer SITRANS P300 - HART, Typ 7MF 8 ** 3 - ***-* B ** - Z**

Hilfsenergie-/Ausgangs-signalstromkreis (Anschluss +,-)

in Zündschutzart Eigensicherheit Ex ia IIC/IIB
bzw: Ex ib IIC/IIB
nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis

Höchstwerte:

U_i = 30 V
I_i = 100 mA
P_i = 750 mW
R_i = 300 Ω

L_i = 0,4 mH
C_i = 6 nF

Kontrollanzeigerstromkreis (Anschluss: Steckkontakte Flachstecker)

in Zündschutzart Eigensicherheit Ex ia IIC/IIB
bzw: Ex ib IIC/IIB
nur zum Anschluss an erdfreie Anzeiger oder Prüfgeräte ohne eigene Stromversorgung (Batterie, Netz) und ohne Fremdstromkreise

oder

zum Anschluss von Prüfgeräten, die für den explosionsgefährdeten Bereich zugelassen sind. Höchstwerte der Zusammenschaltung von Kontrollanzeigestromkreis und Prüfgerät:

Höchstwerte:

U_i = 30 V
I_i = 100 mA
P_i = 750 mW

	IIC	IIB
L_o	0,5 mH	1 mH
C_o	3 nF	50 nF

Messzellenstromkreis

geräteintern in Zündschutzart Eigensicherheit, keine Schnittstelle nach außen

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 05 ATEX 2048

Messumformer SITRANS P300 - PROFIBUS PA, Typ 7MF 8 ** 4 - ***-* B ** - Z**
Messumformer SITRANS P300 - FF - Bus, Typ 7MF 8 ** 5 - *** - **** - Z**

Hilfsenergie-/Ausgangs-signalstromkreis (Anschluss: +, -)

in Zündschutzart Eigensicherheit Ex ia IIC/IIB
bzw. Ex ib IIC/IIB
nur zum Anschluss an einen bescheinigten eigensicheren Stromkreis (z.B. FISCO-Speisegerät) mit den Höchstwerten entsprechend folgender Tabelle:

	FISCO-Speisegerät ia / ib für Gruppe IIB / IIC	**lineare Barriere ia / ib für Gruppe IIB / IIC**
U_o	17,5 V	24 V
I_o	380 mA	250 mA
P_o	5,32 W	1,2 W

L_i = 7 µH
C_i = 1,1 nF

Messzellenstromkreis

geräteintern in Zündschutzart Eigensicherheit, keine Schnittstelle nach außen

Hinweise für Herstellung und Betrieb

Wird der Messumformer an einem eigensicheren Speisegerät der Zündschutzart „Ex ib" und gleichzeitig als Kategorie-1/2-Betriebsmittel betrieben, hängt der Explosionsschutz zusätzlich von der Dichtheit der Trennmembran ab.
Für diesen Anwendungsfall ist der Messumformer in die regelmäßige Druckprüfung der Anlage mit einzubeziehen und darf nur für solche brennbaren Gase und Flüssigkeiten verwendet werden, gegen die die Trennmembran hinreichend chemisch und gegen Korrosion beständig ist.

Alle weiteren Angaben der EG-Baumusterprüfbescheinigung, sowie der 1. Ergänzung gelten unverändert auch für diese 2. Ergänzung.

Angewandte Normen

EN 60079-0:2006	**EN 60079-11:2007**	**EN 60079-15:2005**	**EN 60079-26:2007**
EN 60079-27:2008	**EN 61241-0:2006**	**EN 61241-11:2006**	

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. Ergänzung zur EG-Baumusterprüfbescheinigung PTB 05 ATEX 2048

Bewertungs- und Prüfbericht: PTB Ex 10-29261

Zertifizierungssektor Explosionsschutz
Im Auftrag

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, 27. Januar 2010

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • 38116 Braunschweig • DEUTSCHLAND

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

(1) # EC-TYPE-EXAMINATION CERTIFICATE

(Translation)

(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - **Directive 94/9/EC**

(3) EC-type-examination Certificate Number:

PTB 05 ATEX 2048

(4) Equipment: Measuring transducers
SITRANS P300-HART, type 7MF 8 ** 3 - *****-* B ** - Z and
SITRANS P300-PROFIBUS PA, type 7MF 8 ** 4 -*****-* B ** - Z

(5) Manufacturer: Siemens AG

(6) Address: Östliche Rheinbrückenstraße 50, 76187 Karlsruhe, Germany

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential report PTB Ex 05-25163 .

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50014:1997 + A1 + A2 **EN 50020:2002** **EN 50284:1999**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC-type-examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment shall include the following:

II 1/2 G EEx ia IIC/IIB T4/T5/T6 or II 1/2 G EEx ib IIC/IIB 4/T5/T6

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Gerlach
Oberregierungsrat

Braunschweig, September 30, 2005

(13) # SCHEDULE

(14) ## EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2048

(15) Description of equipment

Measuring transducers SITRANS P300-HART, type 7MF 8 ** 3 - *****-* B ** - Z and SITRANS P300-PROFIBUS PA, type 7MF 8 ** 4 -*****-* B ** - Z are used for the measurement of corrosive, non-corrosive and hazardous gases, vapours and liquids. Respective parameterisation makes it possible to use the equipment also for the measurement of level, volume or mass. The output signal is a load-independent direct current of 4 ... 20 mA or a PROFIBUS-PA-signal which are linearly proportional to the input pressure.

Category-1/2-equipment

The housing for the electronics is installed in hazardous areas which require equipment of category 2. The process connection elements are mounted into the partition which separates areas from each other, where equipment of category 2 or 1 is required.

For assignment of the temperature class to the maximum medium temperature and the maximum ambient temperature at the electronics, reference is made to the following table:

temperature class	medium temperature	ambient temperature at the electronics
T4	-20 ... +60 °C	-40 ... +85 °C
T5		-40 ... +70 °C
T6		-40 ... +60 °C

For applications which require category-1-equipment, the process pressure of the media shall range from 0.8 bar to 1.1 bar.

The operating conditions for operation without explosive mixtures shall be taken from the manufacturer's instructions.

Category-2-equipment

The measuring transducers are installed in hazardous areas which require equipment of category 2.

For assignment of the maximum ambient temperature to the temperature class reference is made to the following table:

temperature class	ambient temperature
T4	-40 ... +85 °C
T5	-40 ... +70 °C
T6	-40 ... +60 °C

The permissible operating temperatures and pressures for the operation shall be taken from the manufacturer's instructions.

Electrical data

Measuring transducer SITRANS P300 - HART, type 7MF 8 ** 3 - ***-* B ** - Z**

Auxiliary power / output signal circuit (terminals +,-)

type of protection Intrinsic Safety EEx ia IIC/IIB
or: EEx ib IIC/IIB
Only for connection to a certified intrinsically safe circuit.

Maximum values:
U_i = 30 V
I_i = 100 mA
P_i = 750 mW
R_i = 300 Ω

L_i = 0.4 mH
C_i = 6 nF

Pilot indicator circuit (terminal: flat plug connector)

type of protection Intrinsic Safety EEx ia IIC/IIB
or: EEx ib IIC/IIB
Only for connection to floating indicators or test instruments without internal power supply (battery, mains) and without external circuits.

or

for connection to test instruments certified for the hazardous area.
Maximum values for the interconnection of pilot indicator circuit and test instrument:

Maximum values:
U_i = 30 V
I_i = 100 mA
P_i = 750 mW

	IIC	IIB
L_o	0.5 mH	1 mH
C_o	3 nF	50 nF

Measuring cell circuit

internal, type of protection Intrinsic Safety, no external interface

Measuring transducer SITRANS P300 - PROFIBUS PA, type 7MF 8 ** 4 - ***-* B ** - Z**

Auxiliary power / output signal circuit (terminals: +, -)

type of protection Intrinsic Safety EEx ia IIC/IIB
bzw. EEx ib IIC/IIB
only for connection to a certified intrinsically safe circuit (e.g. FISCO-supply unit) with the maximum values corresponding to the following table:

	FISCO-supply unit ia / ib for group IIB / IIC	linear barrier ia / ib for group IIB / IIC
U_o	17.5 V	24 V
I_o	380 mA	250 mA
P_o	5.32 W	1.2 W

L_i = 7 µH
C_i = 1.1 nF

Measuring cell circuit

internal, type of protection Intrinsic Safety, no external interface

(16) Test report PTB Ex 05-25163

(17) Special conditions for safe use

none

Notes for manufacture and operation

When the measuring transducer is supplied from an intrinsically safe supply unit of type of protection "EEx ib" and when it is simultaneously operated as category-1/2-equipment, explosion protection additionally depends on the pressure-tightness of the diaphragm.

For this type of application the measuring transducer shall be included in the recurring pressure test of the system and it shall be used only for such flammable gases and liquids, for which the diapragm is sufficiently resistent to chemical influences and corrosion.

(18) Essential health and safety requirements

met by compliance with the standards mentioned above

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Gerlach
Oberregierungsrat

Braunschweig, September 30, 2005

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2048

(Translation)

Equipment: Measuring transducers
SITRANS P300 - HART, type 7MF 8 ** 3 - *****-* B ** - Z and
SITRANS P300 - PROFIBUS PA, type 7MF 8 ** 4 - *****-* B ** - Z

Marking: ⟨Ex⟩ **II 1/2 G EEx ia IIC/IIB T4/T5/T6 or**
⟨Ex⟩ **II 1/2 G EEx ib IIC/IIB T4/T5/T6**

Manufacturer: Siemens AG

Address: Östliche Rheinbrückenstraße 50, 76187 Karlsruhe, Germany

Description of supplements and modifications

In the future the measuring transducers of series SITRANS P300, type series 7MF 8***-*****-****-Z may also be manufactured and operated according to the test documents listed in the test report. The modifications comprise the introduction of the new variant SITRANS P300 - FF - Bus, Typ 7MF 8 ** 5 - ***** - **** - Z, technical modifications without an effect on explosion protection, the extension of the field of application for areas of category 3 and hazardous areas due to combustible dust and therefore an extension of the marking as well as modifications of the housing cover and the inspection window. In the course of these modifications the applied standards are adapted to the currently latest state.

In the future the permissible lowest ambient temperature will be:

-40 °C for variants designed with an inspection window made of plastics

-20 °C for variants designed with an inspection window made of mineral glas.

The electrical data and all further specifications of the EC-type examination certificate as well as the "Notes for manufacture and operation" apply without changes.

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2048

Depending on the possible variant types the equipment will be marked in future as follows:

⟨Ex⟩ II 1/2 G	Ex ia IIC/IIB T4/T5/T6	or
⟨Ex⟩ II 1/2 G	Ex ib IIC/IIB T4/T5/T6	or
⟨Ex⟩ II 2/3 G	Ex ic IIC/IIB T4/T5/T6	or
⟨Ex⟩ II 2/3 G	Ex nL IIC/IIB T4/T5/T6	or
⟨Ex⟩ II 2/3 G	Ex nA II T4/T5/T6	or
⟨Ex⟩ II 1 D	Ex iaD 20 T120 °C	or
⟨Ex⟩ II 2 D	Ex ibD 21 T120 °C	or
⟨Ex⟩ II 3 D	Ex ibD 22 T120 °C	

Applied standards

EN 60079-0:2006	**EN 60079-11:2007**	**EN 60079-26:2004**
EN 60079-15:2005	**EN 61241-0:2006**	**EN 61241-11:2006**

Test report: PTB Ex 08-26212

Zertifizierungsstelle Explosionsschutz
By order:

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

Braunschweig, April 21, 2008

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. S U P P L E M E N T

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2048

(Translation)

Equipment: Measuring transducers
SITRANS P300 - HART, Typ 7MF 8 ** 3 - *****-* B ** - Z or
SITRANS P300 - PROFIBUS PA, Typ 7MF 8 ** 4 - *****-* B ** - Z or
SITRANS P300 - FF - Bus, Typ 7MF 8 ** 5 - ***** - **** - Z

Marking: ⟨Ex⟩

II 1/2 G	Ex ia IIC/IIB T4/T5/T6	or
II 1/2 G	Ex ib IIC/IIB T4/T5/T6	or
II 2/3 G	Ex ic IIC/IIB T4/T5/T6	or
II 2/3 G	Ex nL IIC/IIB T4/T5/T6	or
II 2/3 G	Ex nA II T4/T5/T6	or
II 1 D	Ex iaD 20 T120 °C	or
II 2 D	Ex ibD 21 T120 °C	or
II 3 D	Ex ibD 22 T120 °C	

Manufacturer: Siemens AG
Industry Sector
Industry Automation Division
formerly Siemens Aktiengesellschaft

Address: 76181 Karlsruhe, Germany
formerly Östliche Rheinbrückenstraße 50, 76187 Karlsruhe, Germany

Description of supplements and modifications

In the future the measuring transducers of series SITRANS P300, type series 7MF 8***-*****-****-Z may also be manufactured and operated according to the test documents listed in the test report. The modifications concern the electronic circuitry and some corrections of label drawings as well as the name and the address of the manufacturer as given above.

The electrical data are listed here once again completely since, due to the adaption to the current state of the standards (1. Supplement), also the marking of the intrinsically safe circuits has changed. This applies also to the "Notes for manufacture and operation".

ZSEx10101e.dot

2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2048

Electrical data

Measuring transducer SITRANS P300 - HART, type 7MF 8 ** 3 - ***-* B ** - Z**

Auxiliary power / output signal circuit (terminals +,-)

type of protection Intrinsic Safety Ex ia IIC/IIB
or: Ex ib IIC/IIB
Only for connection to a certified intrinsically safe circuit.

Maximum values:

U_i	=	30	V
I_i	=	100	mA
P_i	=	750	mW
R_i	=	300	Ω
L_i	=	0.4	mH
C_i	=	6	nF

Pilot indicator circuit (terminal: flat plug connector)

type of protection Intrinsic Safety Ex ia IIC/IIB
or Ex ib IIC/IIB
Only for connection to floating indicators or test instruments without internal power supply (battery, mains) and without external circuits.

or

for connection to test instruments certified for the hazardous area.
Maximum values for the interconnection of pilot indicator circuit and test instrument:

Maximum values:

U_i	=	30	V
I_i	=	100	mA
P_i	=	750	mW

	IIC	IIB
L_o	0.5 mH	1 mH
C_o	3 nF	50 nF

Measuring cell circuit

internal, type of protection Intrinsic Safety, no external interface

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2048

Measuring transducer **SITRANS P300 - PROFIBUS PA, type 7MF 8 ** 4 - *****-* B ** - Z**
Measuring transducer **SITRANS P300 - FF - Bus, Typ 7MF 8 ** 5 - ***** - **** - Z**

Auxiliary power / output signal circuit (terminals: +, -)

type of protection Intrinsic Safety Ex ia IIC/IIB
or Ex ib IIC/IIB
only for connection to a certified intrinsically safe circuit (e.g. FISCO-supply unit) with the maximum values corresponding to the following table:

	FISCO-supply unit ia / ib for group IIB / IIC	**linear barrier ia / ib for group IIB / IIC**
U_o	17.5 V	24 V
I_o	380 mA	250 mA
P_o	5.32 W	1.2 W

L_i = 7 µH
C_i = 1.1 nF

Measuring cell circuit

internal, type of protection Intrinsic Safety, no external interface

Notes for manufacture and operation

When the measuring transducer is supplied from an intrinsically safe supply unit of type of protection "Ex ib" and when it is simultaneously operated as category-1/2-equipment, explosion protection additionally depends on the pressure-tightness of the diaphragm.

For this type of application the measuring transducer shall be included in the recurring pressure test of the system and it shall be used only for such flammable gases and liquids, for which the diaphragm is sufficiently resistent to chemical influences and corrosion.

All further specifications of the EC-type examination certificate as well as the 1st supplement apply without changes also to this 2nd supplement.

Applied standards

EN 60079-0:2006 **EN 60079-11:2007** **EN 60079-15:2005** **EN 60079-26:2007**
EN 60079-27:2008 **EN 61241-0:2006** **EN 61241-11:2006**

Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

2. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 05 ATEX 2048

Assessment and test report: PTB Ex 10-29261

Zertifizierungssektor Explosionsschutz
By order:

Braunschweig, January 27, 2010

Dr.-Ing. U. Johannsmeyer
Direktor und Professor

C. COSHH Data Sheets

COSHH Activity Assessment Report

Substance			
Product Name	Low/Ultra Low Sulphur Diesel	**CAS Number(s)**	Complex mixture of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons, predominantly in the C9 to C25 range. 68334-30-5
Trade Name / Synonym(s)	Diesel (ULSD/Gasoil/GO)	**COSHH INDEX Ref No.**	089
WEL	Fuels, diesel LTEL 100mg/m3 Kerosine (petroleum), hydrodesulphurised LTEL 200mg/m3 Cumene LTEL 25ppm 125mg/m3 STEL 50ppm 250mg/m3	**Chemical Identity**	Fuels, diesel Kerosine (petroleum), hydrodesulphurised
Recommended Use And Restrictions On Use	Fuel for diesel engines		

Record Details			
Reference	089 Afan AAD	**Assessor Name**	Faye Ward
Org Unit	DC -> 1. COSHH Generic RA -> DCWW -> Operations -> Waste Water Services -> Bio-Resources -> AAD Facilities -> Afan AAD	**Job Title**	COSHH Assessor
Location	Afan AAD	**Assessment Date**	15/01/2021
Authorised By	Trystan Lewis-Wiliams	**Date Authorised**	23/05/2018
Description	Low/Ultra Low Sulphur Diesel		

Hazards

Classification Type	Classification	Category	Hazard Label	Signal Word	Hazard Statement
Physical	Flammable Liquids	Category 3		Warning	H226: Flammable liquid and vapour
Health	Skin Corrosion/Irritation	Category 2		Warning	H315: Causes skin irritation

COSHH Activity Assessment Report

Health	Acute Toxicity: Inhalation	Category 4		Warning	H332: Harmful if inhaled
Health	Carcinogenicity	Category 2		Warning	H351: Suspected of causing cancer
Health	Specific Target Organ Toxicity (Repeated Exposure)	Category 2		Warning	H373: May cause damage to organs through prolonged or repeated exposure
Environmental	Aquatic Toxicity (Chronic)	Category 2			H411: Toxic to aquatic life with long lasting effects
Tasks					

COSHH Activity Assessment Report

Activity Type & Activity Description	Persons At Risk & How Is Person At Risk	Control Measures	Potential Risk Factor	Additional Control Measures	Residual Risk Factor
Use Fuelling vehicles	Colleagues Contact, inhalation	PPE as below NB safety glasses will be used when there is a potential for splashes Ensure good ventilation. Keep away from sources of ignition. Earth bond when transferring from one container to another.	12 - High Risk	Secured in its own bunded area	2 - Low Risk

Quantity	10,000 gallons
Frequency Of Use	As and when required
Duration Of Use	minimal time to refuel as and when required
Environment	Enclosed Space
Route Of Entry	Contact
State	Liquid
Approved For Use Within Area?	Yes

Eye protection must be worn

Safety glasses

Hand protection must be worn

Disposable nitrile gloves

First Aid		Seek Immediate Attention
Inhalation	Remove to fresh air. If rapid recovery does not occur, take patient to nearest medical facility for additional treatment.	No
Skin Contact	Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.	No
Eye Contact	Remove contact lenses. Wash with copious amounts of water for several minutes. If irritation persists, seek medical assistance.	No
Ingestion	If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing. Give nothing by mouth	Yes
Injection		No
Storage		
Storage Measures	Store in a cool, dry and well-ventilated place. Keep protected from direct sunlight and temperatures over 50oC. Maximum size of plastic can is 5 litres.	

COSHH Activity Assessment Report

Emergency Measures	
Loss of containment measures	Absorb into dry earth or sand. Transfer to a closable, labelled salvage container for disposal. Do not flush away traces using water, use detergent to complete cleaning.

Fire Fighting	
Fire Fighting Measures	Foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.
Unsuitable Fire Fighting Measures	Do not use direct water jets on the burning product as they could cause a steam explosion and spread of the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Transport

Transport Hazard Class(es)	Transport Special Precautions
Class No 3 UN No 1202	If volume transported 1000 litres or less - Limited Scope, if above Full Scope. Please refer to HSP701 Carriage of Dangerous Goods Procedure for further information.

Conclusion			
Conclusion	Residual risk level Low		
Have you considered using an alternative substance?	Yes		
Reasoning			
Overall Potential Risk Level	12	**Overall Residual Risk Level**	2

COSHH Activity Assessment Report

Substance			
Product Name	Flopam FO 4440	**CAS Number(s)**	Mixture - see SDS
Trade Name / Synonym(s)	Flopam FO 4440	**COSHH INDEX Ref No.**	1571
WEL	N/A	**Chemical Identity**	N/A
Recommended Use And Restrictions On Use	Coagulation of digested sludge		

Record Details			
Reference	1571 Afan AAD	**Assessor Name**	Jessica Deane
Org Unit	DC -> 1. COSHH Generic RA -> DCWW -> Operations -> Waste Water Services -> Bio-Resources -> AAD Facilities -> Afan AAD	**Job Title**	Lead COSHH Assessor
Location	Afan AAD	**Assessment Date**	15/06/2022
Authorised By		**Date Authorised**	
Description	Flopam FO 4440		

Hazards

Classification Type	Classification	Category	Hazard Label	Signal Word	Hazard Statement
Not Classified	Not Classified	Not Classified			

Tasks

COSHH Activity Assessment Report

Activity Type & Activity Description	Persons At Risk & How Is Person At Risk	Control Measures	Potential Risk Factor	Additional Control Measures	Residual Risk Factor
Use Coagulation of digested sludge	Site colleagues Contact	PPE as below. Avoid contact with skin and eyes. Avoid dust formation. Can render wet surfaces extremely slippery. Ensure adequate ventilation.	4 - Low Risk	Ensure dehumidifier is operational to prevent clumping of product	2 - Low Risk

Quantity	As required
Frequency Of Use	As required
Duration Of Use	As required
Environment	Enclosed Space
Route Of Entry	Contact
State	Dust
Approved For Use Within Area?	Yes

Eye protection must be worn

Safety glasses

Hand protection must be worn

Disposable nitrile gloves

First Aid		Seek Immediate Attention
Inhalation	Move to fresh air. Get medical attention if symptoms occur.	No
Skin Contact	Wash off with soap and plenty of water. Get medical attention if irritation develops and persists.	No
Eye Contact	Rinse immediately with plenty of water, also under eyelids. Get medical attention.	Yes
Ingestion	Rinse mouth,. If conscious give the victim plenty of water to drink. Induce vomiting but only if victim is fully conscious.	No
Injection		No
Storage		
Storage Measures	Keep in a dry place away from oxidising substances.	
Emergency Measures		
Loss of containment measures	Do not flush with water. Clean up promptly by sweeping or vacuum.	
Fire Fighting		
Fire Fighting Measures	Water. Water spray. Foam. Carbon Dioxide. Dry powder.	
Unsuitable Fire Fighting Measures	N/A	

COSHH Activity Assessment Report

Transport		
	Transport Hazard Class(es)	**Transport Special Precautions**
	N/A	N/A

Conclusion			
Conclusion	2		
Have you considered using an alternative substance?	Yes		
Reasoning			
Overall Potential Risk Level	4	**Overall Residual Risk Level**	2

COSHH Activity Assessment Report

Substance			
Product Name	Flopam FO 4240 SEP, FO 4650 SSH, FO 4650 VHM & FO 4490	**CAS Number(s)**	Sulphamidic acid 226-218-8
Trade Name / Synonym(s)	Flopam FO 4240 SEP, FO 4650 SSH, FO 4650 VHM & FO 4490	**COSHH INDEX Ref No.**	424
WEL	N/A	**Chemical Identity**	N/A
Recommended Use And Restrictions On Use	Water treatment		

Record Details			
Reference	424 Afan	**Assessor Name**	Faye Ward
Org Unit	DC -> 1. COSHH Generic RA -> DCWW -> Operations -> Waste Water Services -> Bio-Resources -> AAD Facilities -> Afan AAD	**Job Title**	Lead COSHH Assessor
Location	Afan AAD	**Assessment Date**	25/02/2021
Authorised By		**Date Authorised**	
Description	Flopam FO 4240 SEP, FO 4650 SSH, FO 4650 VHM & FO 4490		

Hazards

Classification Type	Classification	Category	Hazard Label	Signal Word	Hazard Statement
Not Classified	Not Classified	Not Classified			Aqueous solutions or powders that become wet render surfaces extremely slippery

Tasks

COSHH Activity Assessment Report

Activity Type & Activity Description	Persons At Risk & How Is Person At Risk	Control Measures	Potential Risk Factor	Additional Control Measures	Residual Risk Factor
Use Water treatment	Site colleagues Aqueous solutions or powders that become wet render surfaces extremely slippery	PPE as below. Avoid contact with skin and eyes. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.	4 - Low Risk	Disposal by a registered waste carrier	1 - Low Risk

Quantity	IBC held for use
Frequency Of Use	Automatic batch process
Duration Of Use	As and when required
Environment	Enclosed Space
Route Of Entry	Contact
State	Dust
Approved For Use Within Area?	Yes

Eye protection must be worn

Safety glasses

Hand protection must be worn

Disposable nitrile gloves

First Aid		Seek Immediate Attention
Inhalation	Move to fresh air. Get medical attention if symptoms occur.	No
Skin Contact	Wash off with soap and plenty of water. Get medical attention if irritation develops and persists.	No
Eye Contact	Rinse immediately with plenty of water. Get medical attention if irritation develops and persists.	No
Ingestion	Rinse mouth. If conscious, give the victim plenty of water to drink. Induce vomiting, but only if victim if fully conscious.	No
Injection		No
Storage		
Storage Measures	Keep in a dry place. Incompatible with oxifizing agents.	
Emergency Measures		
Loss of containment measures	Small spills - do not flush with water. Clean up promptly by sweeping or vacuum. Large spills - sweep up and shovel into suitable containers for disposal.	
Fire Fighting		

COSHH Activity Assessment Report

Fire Fighting Measures	Ues media appropriate for the surrounding fire.		
Unsuitable Fire Fighting Measures			
Transport			
	Transport Hazard Class(es)	**Transport Special Precautions**	
Conclusion			
Conclusion	Residual risk level low		
Have you considered using an alternative substance?	Yes		
Reasoning			
Overall Potential Risk Level	4	**Overall Residual Risk Level**	1

COSHH Activity Assessment Report

Substance			
Product Name	Petronas Lubricating Oil	**CAS Number(s)**	112-90-3 (Z)-octadec-9-enylamine n-phenyl-1-naphtylamine CAS:90-30-2 CAS:68955-53-3 CAS:112-90-3 (Z)-N-methyl-N-(1-oxo-9-octadecenyl)glycine CAS:110-25-8
Trade Name / Synonym(s)	Petronas gear MEP 220 Petronas gear MEP320 Petronas gear NT 220 Petronas gear SYN PAG 220 Petronas gear SYN PAO 320 Petronas GEARSYNT 320 Petronas Hydraulic 100	**COSHH INDEX Ref No.**	1233
WEL	oil mists - TLV/TWA (8 h) : 5 mg/m3 - TLV/STEL: 10 mg/m3	**Chemical Identity**	PETRONAS oils
Recommended Use And Restrictions On Use	Lubricant oil		

Record Details			
Reference	1233 Afan AAD	**Assessor Name**	Faye Ward
Org Unit	DC -> 1. COSHH Generic RA -> DCWW -> Operations -> Waste Water Services -> Bio-Resources -> AAD Facilities -> Afan AAD	**Job Title**	Lead COSHH Assessor
Location	Afan AAD	**Assessment Date**	12/02/2021
Authorised By		**Date Authorised**	

COSHH Activity Assessment Report

Description	PETRONAS LUBRICATING OIL Petronas gear MEP 220 Petronas gear MEP320 Petronas gear NT 220 Petronas gear SYN PAG 220 Petronas gear SYN PAO 320 Petronas GEARSYNT 320 Petronas Hydraulic 100

Hazards

Classification Type	Classification	Category	Hazard Label	Signal Word	Hazard Statement
Health	Serious Eye Damage/Eye Irritation	Category 2B		Warning	H320: Causes eye irritation
Environmental	Aquatic Toxicity (Chronic)	Category 3			H412: Harmful to aquatic life with long lasting effects

Tasks

COSHH Activity Assessment Report

Activity Type & Activity Description	Persons At Risk & How Is Person At Risk	Control Measures	Potential Risk Factor	Additional Control Measures	Residual Risk Factor
Use Lubricant oil is used as part of ongoing PPM	site colleagues Contact with eyes and skin	PPE as below	6 - Medium Risk	Stored in a separate location - fully bunded area. Disposal is by a certified waste disposal compay	1 - Low Risk

Quantity	Stock supply of each type
Frequency Of Use	As part of PPM
Duration Of Use	As part of PPM
Environment	Workshop
Route Of Entry	Contact
State	Liquid
Approved For Use Within Area?	Yes

Eye protection must be worn

Safety goggles

Hand protection must be worn

Disposable nitrile gloves

First Aid		Seek Immediate Attention
Inhalation	Expose affected person to fresh air and obtain medical attention if necessary.	No
Skin Contact	Remove contaminated clothes and shoes and rinse thoroughly with plenty of water and soap.	No
Eye Contact	Rinse thoroughly with plenty of water for at least 10 minutes keeping eyelids open. Remove contact lenses if this can be done easily. Obtain medical attention in case of development and persistence of pain and redness. In case of contact with hot product, rinse thoroughly with plenty of water to dissipate heat. Obtain immediate medical attention to assess eye conditions and the correct treatment to be practiced	No
Ingestion	Do not induce vomiting to avoid aspiration into the respiratory tracts. Wash out thoroughly the mouth with water. Obtain immediate medical attention	No
Injection		No

Storage	
Storage Measures	Store under cover in the original container securely closed away from heat and sources of ignition. Do not store in the open air. Assure a correct ventilation of premises and the control of possible leak. Keep out of flame or spark and avoid the accumulation of electrostatic charges. Keep out of reach of children and away from food and drink.

Emergency Measures

COSHH Activity Assessment Report

Loss of containment measures	Avoid flame and/or spark near leak and produced waste. Do not smoke. In case of large spills dike, absorb and shovel up into suitable containers for disposal. Contain small spills with absorbent material. Put dirty material in suitable container. Dispose of dirty material in accordance with local or national regulations.
Fire Fighting	
Fire Fighting Measures	This product has no special fire risk. In case of fire use foam, carbon dioxide, dry chemical powder and water mist
Unsuitable Fire Fighting Measures	EXTINGUISHING MEDIA WHICH MUST NOT BE USED FOR SAFETY REASONS: None in particular.
Transport	

	Transport Hazard Class(es)	**Transport Special Precautions**
		refer to carriage of dangerous goods procedure

Conclusion			
Conclusion	Residual risk level Low		
Have you considered using an alternative substance?	Yes		
Reasoning			
Overall Potential Risk Level	6	**Overall Residual Risk Level**	1

COSHH Activity Assessment Report

Substance			
Product Name	Petronas oils: Gearsynt 220; Gearsynt 460; Hydraulic HFDU 68	**CAS Number(s)**	Mixture - see SDS
Trade Name / Synonym(s)	Petronas oils: Gearsynt 220; Gearsynt 460; Hydraulic HFDU 68; Hydraulic Syn Bio 32; Hydraulic Syn Bio 46; Syntium 3000 5W40; and White Oil P22	**COSHH INDEX Ref No.**	1276
WEL	N/A	**Chemical Identity**	N/A
Recommended Use And Restrictions On Use	Lubrication		

Record Details			
Reference	1276 - Afan AAD	**Assessor Name**	Faye Ward
Org Unit	DC -> 1. COSHH Generic RA -> DCWW -> Operations -> Waste Water Services -> Bio-Resources -> AAD Facilities -> Afan AAD	**Job Title**	Lead COSHH Assessor
Location	Afan AAD	**Assessment Date**	12/02/2021
Authorised By		**Date Authorised**	
Description	Petronas oils: Gearsynt 220; Gearsynt 460; Hydraulic HFDU 68; Hydraulic Syn Bio 32; Hydraulic Syn Bio 46; Syntium 3000 5W40; and White Oil P22		

Hazards

Classification Type	Classification	Category	Hazard Label	Signal Word	Hazard Statement
Not Classified	Not Classified	Not Classified			

Tasks

COSHH Activity Assessment Report

Activity Type & Activity Description	Persons At Risk & How Is Person At Risk	Control Measures	Potential Risk Factor	Additional Control Measures	Residual Risk Factor
Use Lubrication	Site colleagues Contact	PPE as below. NB goggles and visor required. Avoid ingestion. Avoid frequent and prolonged skin contact and contact with eyes. Provide adequate ventilation to avoid mist or aerosol. Don't smoke or use spare flames; avoid contact with spark or other sources of ignition. Don't work near open container to avoid high concentration of vapours. Don't eat or drink during use.	4 - Low Risk	Kept in its own secure bunded area. Only used by trained Craft personnel. Disposed of by a registered waste carrier.	2 - Low Risk

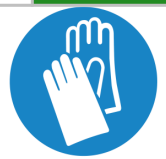
Quantity	1 Tub
Frequency Of Use	As part of PPM or as and when required
Duration Of Use	minimal
Environment	Enclosed Space
Route Of Entry	Contact
State	Liquid
Approved For Use Within Area?	Yes

Eye protection must be worn

Safety goggles

Face shields must be worn

Face shield



Hand protection must be worn

Disposable nitrile gloves

First Aid		Seek Immediate Attention
Inhalation	Expose affected person to fresh air and obtain medical attention if necessary.	No
Skin Contact	Remove contaminated clothes and shoes and rinse thoroughly with plenty of water and soap.	No
Eye Contact	Rinse thoroughly with plenty of water for at least 10 minutes keeping eyelids open. Remove contact lenses if this can be done easily. Obtain medical attention in case of development and persistence of pain and redness. In case of contact with hot product, rinse thoroughly with plenty of water to dissipate heat. Obtain immediate medical attention to assess eye conditions and the correct treatment to be practiced.	Yes
Ingestion	Do not induce vomiting to avoid aspiration into the respiratory tracts. Wash out thoroughly the mouth with water. Obtain immediate medical attention.	No
Injection		No

Storage	
Storage Measures	Store under cover in the original container securely closed away from heat and sources of ignition. Do not store in the open air. Assure a correct ventilation of premises and the control of possible leak. Keep out of flame or spark and avoid the accumulation of electrostatic charges.

COSHH Activity Assessment Report

Emergency Measures	
Loss of containment measures	Avoid flame and/or spark near leak and produced waste. Do not smoke. In case of large spills dike, absorb and shovel up into suitable containers for disposal. Contain small spills with absorbent material. Put dirty material in suitable container. Dispose of dirty material in accordance with local or national regulations.
Fire Fighting	
Fire Fighting Measures	This product has no special fire risk. In case of fire use foam, carbon dioxide, dry chemical powder and water mist. Cool down with water the containers don't get involved in fire to avoid their possible explosion.
Unsuitable Fire Fighting Measures	Avoid high pressure water jet. Use water jet only to cool down surfaces exposed to fire.

Transport		
	Transport Hazard Class(es)	**Transport Special Precautions**
	N/A	N/A

Conclusion			
Conclusion	Residual risk level low		
Have you considered using an alternative substance?	Yes		
Reasoning			
Overall Potential Risk Level	4	**Overall Residual Risk Level**	2

COSHH Activity Assessment Report

Substance			
Product Name	Sodium Chloride – Rocksalt, Salt Tablets, granular & low bro	**CAS Number(s)**	N/A
Trade Name / Synonym(s)	Sodium Chloride – Rocksalt, Salt Tablets, granular & low bromide	**COSHH INDEX Ref No.**	064
WEL	N/A	**Chemical Identity**	N/A
Recommended Use And Restrictions On Use	Industrial and as laboratory reagent Boiler additive		

Record Details			
Reference	064 Afan AAD	**Assessor Name**	Faye Ward
Org Unit	DC -> 1. COSHH Generic RA -> DCWW -> Operations -> Waste Water Services -> Bio-Resources -> AAD Facilities -> Afan AAD	**Job Title**	Lead COSHH Assessor
Location	Afan AAD	**Assessment Date**	17/05/2021
Authorised By		**Date Authorised**	
Description	Sodium Chloride – Rocksalt, Salt Tablets, granular & low bromide		

Hazards

Classification Type	Classification	Category	Hazard Label	Signal Word	Hazard Statement
Not Classified	Not Classified	Not Classified			

Tasks

COSHH Activity Assessment Report

Activity Type & Activity Description	Persons At Risk & How Is Person At Risk	Control Measures	Potential Risk Factor	Additional Control Measures	Residual Risk Factor
Use Industrial and as laboratory reagent	Site collegues Contact or inhalation	PPE as below. Avoid spilling. Avoid contact with skin and eyes. Provide adequate ventilation. Avoid handling which leads to dust formation.	4 - Low Risk	Held in a controlled area	2 - Low Risk

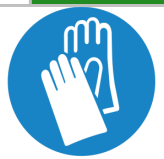
Quantity	10 x 25kg bags
Frequency Of Use	when required
Duration Of Use	as required
Environment	Open Environment
Route Of Entry	Contact
State	Dust
Approved For Use Within Area?	Yes

An Apron Must Be Worn

Laboratory Coat

Eye protection must be worn

Safety goggles



Hand protection must be worn

Disposable nitrile gloves

First Aid		Seek Immediate Attention
Inhalation	Move to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately if symptoms occur.	No
Skin Contact	Wash off with warm water and soap. If symptoms occur, obtain medical attention.	No
Eye Contact	Rinse immediately with plenty of water, also under eyelids, for at least 15 minutes. Obtain medical attention.	Yes
Ingestion	Do not induce vomiting. Obtain medical attention.	Yes
Injection		No

Storage	
Storage Measures	Keep containers tightly closed in a cool, dry and well-ventilated place.

Emergency Measures	
Loss of containment measures	Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

Fire Fighting	
Fire Fighting Measures	The product is not flammable. Use fire-extinguishing media suitable for the surrounding fire.

Unsuitable Fire Fighting Measures	N/A		
Transport			
	Transport Hazard Class(es)	**Transport Special Precautions**	
Conclusion			
Conclusion	Residual risk level Low		
Have you considered using an alternative substance?	Yes		
Reasoning			
Overall Potential Risk Level	4	**Overall Residual Risk Level**	2

COSHH Activity Assessment Report

Substance			
Product Name	Caustic Soda 2 - 50%	**CAS Number(s)**	1310-73-2
Trade Name / Synonym(s)	Sodium Hydroxide solution	**COSHH INDEX Ref No.**	021-16
WEL	Short Term Exposure Limit (STEL): 2 mg/m3	**Chemical Identity**	Sodium Hydroxide solution in water
Recommended Use And Restrictions On Use	pH Adjustment		

Record Details			
Reference	021 Afan AAD	**Assessor Name**	Faye Ward
Org Unit	DC -> 1. COSHH Generic RA -> DCWW -> Operations -> Waste Water Services -> Bio-Resources -> AAD Facilities -> Afan AAD	**Job Title**	Lead COSHH Assessor
Location	Afan AAD Facility	**Assessment Date**	19/02/2021
Authorised By	Henryk J. Freyer	**Date Authorised**	27/04/2017
Description	Caustic Soda		

Hazards

Classification Type	Classification	Category	Hazard Label	Signal Word	Hazard Statement
Health	Skin Corrosion/Irritation	Category 1A		Danger	H314: Causes severe skin burns and eye damage
Physical	Corrosive To Metals	Category 1		Warning	H290: May be corrosive to metals

Tasks

COSHH Activity Assessment Report

Activity Type & Activity Description	Persons At Risk & How Is Person At Risk	Control Measures	Potential Risk Factor	Additional Control Measures	Residual Risk Factor
Use Water treatment	Site colleagues Skin and eye contact	Keep container tightly closed. In normal use this is within a contained system. Where there is potential of exposure use PPE below. Provide sufficient air exchange and/or exhaust in work rooms. Avoid formation of aerosol. In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit. Avoid contact with the skin and the eyes. Avoid inhalation of vapour or mist. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.	12 - High Risk		6 - Medium Risk

Quantity	1000l
Frequency Of Use	Continuously
Duration Of Use	Continuously
Environment	Enclosed Space
Route Of Entry	Contact
State	Liquid
Approved For Use Within Area?	Yes

Eye protection must be worn

Safety goggles

Hand protection must be worn

Gauntlet - PVC

Overall/Body Covering must be worn

Chemical Suit Chemmaster Hooded

Protective footwear must be worn

Safety Wellington

First Aid		Seek Immediate Attention
Inhalation	Remove casualty to fresh air and keep at rest. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.	No
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.	Yes
Eye Contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible	Yes
Ingestion	Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician immediately. Rinse mouth with water. Give small amounts of water to drink.	Yes
Injection	Nor likely route of exposure	No

COSHH Activity Assessment Report

Storage	
Storage Measures	Keep in an area equipped with alkali resistant flooring. Store in original container. Suitable materials for containers: Stainless steel; carbon steel Materials to avoid; Acids, Aluminium; Zinc; Tin;

Emergency Measures	
Loss of containment measures	Danger of slipping if spilled. Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders). Keep in suitable, closed containers for disposal. Bund large quantities for disposal. All waste liquid, absorbed product and empty containers to be disposed of as Hazardous Waste by a licensed contractor

Fire Fighting	
Fire Fighting Measures	The product itself does not burn. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Reacts exothermic with water, Gives off hydrogen by reaction with base metals (zinc, aluminium). Risk of explosion In the event of fire, wear self-contained breathing apparatus. Wear appropriate body protection (full protective suit) Collect contaminated fire extinguishing water separately. This must not be discharged into drains. .
Unsuitable Fire Fighting Measures	High volume water jet

Transport

Transport Hazard Class(es)	Transport Special Precautions
UN No. 1824 Class 8 ADR Proper Name: SODIUM HYDROXIDE SOLUTION	Refer to Carriage of Dangerous Goods procedure

Conclusion			
Conclusion			
Have you considered using an alternative substance?	Yes		
Reasoning			
Overall Potential Risk Level	12	**Overall Residual Risk Level**	6

COSHH Activity Assessment Report

Substance			
Product Name	Easi-Treat D3F	**CAS Number(s)**	Mixture - see SDS
Trade Name / Synonym(s)	Easi-Treat D3F	**COSHH INDEX Ref No.**	1572
WEL	SODIUM HYDROXIDE STEL 2mg/m3	**Chemical Identity**	SODIUM HYDROXIDE
Recommended Use And Restrictions On Use	Boiler Water Treatment		

Record Details			
Reference	1572 Afan AAD	**Assessor Name**	Jessica Deane
Org Unit	DC -> 1. COSHH Generic RA -> DCWW -> Operations -> Waste Water Services -> Bio-Resources -> AAD Facilities -> Afan AAD	**Job Title**	Lead COSHH Assessor
Location	Afan AAD	**Assessment Date**	15/06/2022
Authorised By		**Date Authorised**	
Description	Easi-Treat D3F		

Hazards

Classification Type	Classification	Category	Hazard Label	Signal Word	Hazard Statement
Health	Skin Corrosion/Irritation	Category 2		Warning	H315: Causes skin irritation
Health	Serious Eye Damage/Eye Irritation	Category 2A		Warning	H319: Causes serious eye irritation

Tasks

COSHH Activity Assessment Report

Activity Type & Activity Description	Persons At Risk & How Is Person At Risk	Control Measures	Potential Risk Factor	Additional Control Measures	Residual Risk Factor
Use Boiler water treatment	Site colleagues Contact	PPE as below. Ensure eye bath is to hand.	6 - Medium Risk		4 - Low Risk

Quantity	As required
Frequency Of Use	As required
Duration Of Use	As required
Environment	Enclosed Space
Route Of Entry	Contact
State	Liquid
Approved For Use Within Area?	Yes

Eye protection must be worn

Safety glasses

Hand protection must be worn

Disposable nitrile gloves

First Aid		Seek Immediate Attention
Inhalation	Consult a doctor.	No
Skin Contact	Wash immediately with plenty of soap and water.	No
Eye Contact	Bathe the eye with running water for 15 minutes.	No
Ingestion	Wash out mouth with water.	No
Injection		No

Storage	
Storage Measures	Store in a cool, well ventilated area. Keep container tightly closed.

Emergency Measures	
Loss of containment measures	Absorb into dry earth or sand. Transfer to a closable, labelled salvage container for disposal by an appropriate method.

Fire Fighting	
Fire Fighting Measures	Suitable extinguishing media for the surrounding fire should be used. Use water spray to cool containers.

Unsuitable Fire Fighting Measures	N/A		
Transport			
	Transport Hazard Class(es)	**Transport Special Precautions**	
	N/A	N/A	
Conclusion			
Conclusion	Residual Risk Rating 4		
Have you considered using an alternative substance?	Yes		
Reasoning			
Overall Potential Risk Level	6	**Overall Residual Risk Level**	4