Accidents and Their Consequences Risk Assessment

1.0 Introduction

1.1 A risk assessment has been undertaken to determine if any accident or emergency situations at the facility may have an effect on any receptors located within close proximity of the facility boundary.

1.2 **Table 1** includes a list of the receptors that have been identified through a desktop assessment of the locality.

1.3 Risks have been considered during the operational phase of the Residual Waste 'Dirty' Materials Recycling Facility (RWMRF) and 'Clean' Materials Recycling Facility (MRF).

1.4 The accident management plan will be regularly reviewed and updated if deemed necessary. Incidents and near misses will be recorded and investigated, with remedial and preventative measures being undertaken in accordance with the Accident Management Plan and Site Management Plan.

Table 1 – Identified potential receptors within 500m of the facility.

Receptor	Approximate distance from the facility	Direction from the facility
Residential Property *"Ty Hen"* (unoccupied)	260m	NW
Fuel Station	300m	N
Residential property (Awelfan)	330m	NW
Small tributary of the Afon-y-Bantwen	280m	SE
Residential Property "*Llety-Dau-Filwr*"	290m	SE
Residential Properties "Bronhafod", "Falcondale" and "Avalon"	305m	E
Coedgain Farm	420m	N
Unnamed Ponds	450m	N
Unnamed tributary of the Nant y Pibwr	465m	NW/N

2.0 Methodology

2.1 The scoring methodology employed in the Natural Resources Wales Guidance is used as a framework for assessing the risk from various accident scenarios identified. The scoring system attributes a nominal score to the likelihood and consequence of an identified scenario, and then uses a matrix to identify whether the risk is acceptable. The scoring system is outlined below:

Likelihood categories

Category	Description	Score
Extremely unlikely	Incident occurs less than once in a million years	1
Very unlikely	Incident occurs between once per million and once every 10,000 years	2
Unlikely	Incident occurs between once per 10,000 years and once every 100 years	3
Somewhat unlikely	Incident occurs between once per hundred years and once every 10 years	4
Fairly probable	Incident occurs between once per 10 years and once per year	5
Probable	Incident occurs at least once per year	6

Consequence categories

Category	Description	Score
Minor	• nuisance on site only (no off-site effects) • no outside complaint	1
Noticeable	• noticeable nuisance off-site e.g. discernible odours • minor breach of Permitted emission limits, but no environmental harm • one or two complaints from the public	2
Significant	• severe and sustained nuisance, e.g. strong offensive odours or noise disturbance • major breach of Permitted emissions limits with possibility of prosecution • numerous public complaints	3
Severe	• hospital treatment required • public warning and off-site emergency plan invoked • hazardous substance releases into water course with ½ mile effect	4
Major	• evacuation of local populace • temporary disabling and hospitalisation • serious toxic effect on beneficial or protected species	5

	• widespread but not persistent damage to land • significant fish kill over 5 mile range	
Catastrophic	• major airborne release with serious offsite effects • site shutdown • serious contamination of groundwater or watercourse with extensive loss of aquatic life	6

Risk assessment matrix

Likelihood	Consequence					
	Minor	Noticeable	Significant	Severe	Major	Catastrophic
Extremely unlikely	1	2	3	4	5	6
Very unlikely	2	4	6	8	10	12
Unlikely	3	6	9	12	15	18
Somewhat unlikely	4	8	12	16	20	24
Fairly probable	5	10	15	20	25	30
Probable	6	12	18	24	32	36

Risk scores

Magnitude of risk	Score
Acceptable	6 or less
Acceptable if reduced as much as reasonably practical	8 to 12
Unacceptable	15 or more

2.2 The identification of the hazards and the risk assessment process is documented in Table 2.

Table 2 – Accidents and Emergencies Risk Assessment Matrix

Hazard	Pathway	Receptor	Likelihood	Score	Consequence	Score	Overall score	Acceptability of risk	Justification for acceptability (description of risk management measures)
Spillage during delivery or dispatch of waste materials.	Run-off, absorption to ground and airborne.	Land, site personnel, site visitors and local population.	Probable	6	Minor	1	6	Acceptable.	1. Procedures for leaks and spillages are described in the site's Management Plan. 2. All waste treatment operations will be conducted on impermeable concrete surfaces where required, with surface falls directed in a manner that provides containment as necessary. 3. All treatment operations and the majority of storage (with the exception of "specified waste" and baled recylcate stored under the S2 Exemption/Permit) will be undertaken inside enclosed buildings. Transfer between the 'Clean' MRF and RWMRF will be via enclosed conveyor. 4. Foul Drainage from the RWMRF buildings will be directed towards a sealed sump which is removed by tanker to a treatment works as necessary. There is no formal drainage system within the Clean MRF, however non-hazardous liquids will be directed to a low point and removed via the use of absorbent materials. 5. All external manoeuvring area surface waters will be drained via oil interceptors. 6. Vehicles for dispatch will not be overfilled and will be supervised during loading. 7. All vehicles hauling waste will be sheeted or enclosed.

Hazard	Pathway	Receptor	Likelihood	Score	Consequence	Score	Overall score	Acceptability of risk	Justification for acceptability (description of risk management measures)
Spillage of raw materials during delivery/ refuelling of plant/ equipment.	Run-off, absorption to ground and site drains.	Land, groundwater, water abstractions and surface water.	Probable	6	Minor	1	**6**	Acceptable.	1. All operational fuels and waste liquid tanks will be self-bunded and/or surrounded by bunds to a minimum of 110% of the tank's capacity. 2. All bund side walls and bases will be impermeable. 3. All operations, where appropriate, will be conducted on impermeable surfaces with falls providing appropriate containment as necessary. 4. Absorbent spill kits will be available for use should any spillage occur. 5. Tank levels will be checked prior to a delivery/ordering dispatch to ensure sufficient capacity is available. 6. Staff will undertake daily monitoring for evidence of spillages/leaks.

Hazard	Pathway	Receptor	Likelihood	Score	Consequence	Score	Overall score	Acceptability of risk	Justification for acceptability (description of risk management measures)
Damage to containment facilities for stored raw materials.	Run-off, absorption to ground and site drains.	Land, groundwater, water abstractions and surface water.	Fairly probable	5	Minor	1	**5**	Acceptable.	1. All operational fuel tanks will be double skinned or surrounded by bunds to a minimum of 110% of the tank's capacity. 2. The effective capacities of all bunds will be maintained. 3. All operations will be conducted on impermeable surfaces with dedicated sealed drainage with isolation of discharge possible. 4. Bunds, tanks and drainage systems will be inspected at least weekly. 5. Any repairs will be affected as soon as possible. Mitigation measures will be undertaken immediately if there is a possibility of pollution.

Hazard	Pathway	Receptor	Likelihood	Score	Consequence	Score	Overall score	Acceptability of risk	Justification for acceptability (description of risk management measures)
Damage to containment facilities for stored waste pending treatment.	Run-off, absorption to ground and site drains, airborne.	Land, groundwater, water abstractions and surface water,	Fairly probable	5	Minor	1	**5**	Acceptable.	1. All operations, where appropriate, will be conducted on impermeable surfaces with falls providing appropriate containment as necessary. 2. All wastes with the potential for leaching will be stored upon concrete hardstanding and inside an enclosed building. 3. Storage areas will be checked regularly to ensure required capacity is available and that they remain impermeable and are fit for purpose. 4. Any repairs will be affected as soon as possible. Mitigation measures will be undertaken immediately if there is a possibility of pollution. 5. Good housekeeping will be promoted in order to keep waste confined to storage areas.

Hazard	Pathway	Receptor	Likelihood	Score	Consequence	Score	Overall score	Acceptability of risk	Justification for acceptability (description of risk management measures)
Major fire or explosion.	Airborne	Site personnel, site visitors, local population, residential properties within 500m of site and air quality.	Unlikely	3	Severe	4	12	Acceptable if reduced as much as reasonably practicable.	1. Procedures will be incorporated into accident management plan. 2. No fires are permitted on site. 3. Smoking is prohibited at the site. 4. Only permitted wastes will be accepted at the site. 5. Checks will be carried out on electrical equipment to ensure that any faults are identified and repaired. 6. Firefighting equipment will be available and maintained, and site operators will be trained in their correct use. 7. A Fire Prevention and Mitigation Plan is included in **Appendix 10** which takes into account activities at both the RWMRF and 'Clean' MRF.
Failure to contain firewater.	Run-off, absorption to ground and site drains.	Land, groundwater, water abstractions and surface water.	Unlikely	3	Significant	3	9	Acceptable if reduced as much as reasonably practicable.	1. Drainage on site is isolated from the surrounding environment via an impermeable hardstanding and sealed drainage system internal to the building. This will enable the containment of any potentially contaminated firewater arising's. 2. Firewater falls on impermeable surfaces with gradient providing appropriate containment as necessary. 3. All surface waters will be drained via oil interceptors 4. A Fire Prevention and Mitigation Plan is included in Appendix 10 which takes into account activities at both the RWMRF and 'Clean' MRF.

Hazard	Pathway	Receptor	Likelihood	Score	Consequence	Score	Overall score	Acceptability of risk	Justification for acceptability (description of risk management measures)
Flooding.	Saturation of ground, rising groundwater levels and via site drainage.	Land (agricultural and residential), surface waters, drainage systems.	Unlikely	3	Significant	3	9	Acceptable if reduced as much as reasonably practicable.	1. The site lies outside the floodplain and outside any recognised flood zones. There is a less than 0.1% (1 in 1000) chance of flooding occurring each year. 2. Drainage systems will be checked daily to ensure they are working correctly and free from blockages. 3. Any blockages found will be removed as soon as possible.

Hazard	Pathway	Receptor	Likelihood	Score	Consequence	Score	Overall score	Acceptability of risk	Justification for acceptability (description of risk management measures)
Loss of power.	Airborne.	Local population (residents), land, surface and groundwater.	Fairly probable	5	Minor	1	**5**	Acceptable.	1. For periods where loss of power to the treatment equipment is experienced, operations will either be suspended or backup generators utilised. 2. No mains water is utilised in the treatment process so operations will remain unaffected by a cut in supply. 3. If power/water is lost for a sufficiently long period of time where it has the potential to affect ancillary functions (e.g. weighbridge, mess facilities, dust suppression) alternative means of power generation/water supply will be sought.
Vandalism/ breach in security.	Over land.	Site personnel, site visitors and plant and equipment.	Somewhat unlikely.	4	Noticeable.	2	**8**	Acceptable if reduced as much as reasonably practicable.	1. Facility has combination of steel palisade gates, fencing and in places landscaped hedgerows. The MRF buildings are kept secure when not in use. 2. Security fencing and gates are inspected daily by operations staff. Maintenance and repair will be carried out as necessary. 3. The MRF's have 24 hour lighting. 4. All visitors to the site must report to the site office to sign in.

Hazard	Pathway	Receptor	Likelihood	Score	Consequence	Score	Overall score	Acceptability of risk	Justification for acceptability (description of risk management measures)
Operator error.	Airborne and over land.	Local and distant human population, land, surface and groundwater environment.	Fairly probable.	5	Minor.	1	**5**	Acceptable.	1. Technically competent people will oversee the management of activities of the site, in accordance with the fit and proper person assessment. 2. Training (including refresher training) will be given to all site staff on the Environmental Permit, health and safety and incident response.
Cross-connected drains.	Drainage systems.	Surface water, groundwater and water abstractions.	Fairly probable.	5	Minor.	1	**5**	Acceptable.	1. Suitably qualified engineers will ensure that all drains are checked and upgrades installed to the approved designs. 2. All foul water generated on impermeable surfacing on site operational waste storage and treatment areas will be directed towards a sealed sump. There is no discharge to offsite receiving environments. All external manoeuvring area surface waters will be drained via oil interceptors to existing surface water outlets.

Hazard	Pathway	Receptor	Likelihood	Score	Consequence	Score	Overall score	Acceptability of risk	Justification for acceptability (description of risk management measures)
Emissions from plant or equipment due to abnormal conditions.	Airborne and over land.	Local human population, (working and residential) within 500m of site, land, surface and groundwater environment.	Somewhat unlikely	4	Noticeable	2	8	Acceptable if reduced as much as reasonably practicable.	1. All machinery used on site will be operated and maintained in accordance with manufacturers' recommendations; 2. Alarms and interlocks will be used on major items of plant and equipment to monitor performance. 3. Strict operating guidelines will ensure adherence with start-up and shut down procedures. 4. All equipment is underlain with an impermeable surface and sealed drainage where internal to the MRF buildings. All external manoeuvring area surface drainage is directed towards an oil interceptor. 5. All machinery will be subject to regular checks and maintenance.

Hazard	Pathway	Receptor	Likelihood	Score	Consequence	Score	Overall score	Acceptability of risk	Justification for acceptability (description of risk management measures)
Inadequate waste acceptance procedures.	Transported by vehicle.	Site operatives and site visitors.	Somewhat unlikely	4	Significant	3	12	Acceptable if minimised as much as reasonably practicable.	1. Where possible, incoming waste will be visually checked at the gate (weighbridge) to confirm the waste type. 2. Accompanying paperwork will be scrutinised to ensure the details are correct and all fields are completed. 3. All waste loads will be visually inspected during deposit in the waste reception areas. 4. Any non-conforming wastes will be segregated as soon as possible.

3.0 Conclusions

3.1 All risks have been categorised as either 'acceptable' or 'acceptable if reduced as much as reasonably practicable'. Of the hazards categorised as 'acceptable is reduced as much as reasonably practicable' there are a significant number of mitigation measures available that effectively nullify the hazard.