ENVIRONMENTAL LIABILITIES RISK ASSESSMENT (ELRA) FOR NENAGH WASTE TRANSFER STATION, SPRINGFORT CROSS, NENAGH, CO. TIPPERARY

W0240-01

OCTOBER 2016

AES Bord na Móna ~with nature

FEHILY TIMONEY & COMPANY

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Abstract: This report presents an environmental liability risk assessment (ELRA) for the Nenagh waste transfer station (W0240-01), Solsborough, Springfort Cross, Nenagh, Co. Tipperary.

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1 INTRODUCTION

Advanced Environmental Solutions (Ireland) Ltd. (AES) retained Fehily Timoney & Company (FTC) to complete an environmental liabilities risk assessment (ELRA) for the Nenagh waste transfer station (WTS) (W0240-01). As an independent environmental consultancy, FTC is experienced in the preparation of ELRAs. FTC has prepared and submitted a number of ELRAs to the Agency in the past on behalf of various clients.

Condition 12.2.2 of waste licence W0240-01 requires that AES Ltd. must "*arrange for the completion, by an independent and appropriately qualified consultant, of a comprehensive and fully costed Environmental Liabilities Risk Assessment (ELRA) which addresses the liabilities from past and present activities*."

The Nenagh WTS ELRA has been prepared in accordance with the most recent (April 2014) EPA Guidance document entitled "*Guidance on assessing and costing environmental liabilities*[1]*"* hereafter referred to as the "Guidance".

AES Ireland Ltd. operates an EPA licensed (W0240-01) waste transfer facility at Solsborough, Springfort Cross, Nenagh, Co. Tipperary. The site is located on the Kilcolman Road, directly off the R445 Limerick Road at the Springfort Cross junction, approximately 250 metres west of the Springfort Retail Park and 1 km from the town centre.

A retail premises (Comerfords Garage) is located directly south of the facility entrance while there are 2 no. residences directly south west of the facility (less than 50 m) and 1 no. residence approximately 100m to the west. There are 8 no. further residences located less than 150m from the south east of the facility, while there is an office block within the Springfort Retail Park, located directly north east of the facility boundary.

The facility accepts 24,750 tonnes per annum of non-hazardous municipal wastes of household and commercial origin, as well as construction and demolition (C&D) wastes collected by AES. The majority of material accepted at the facility is bulked up and transported off site, for further processing. 'Bulking up' refers to the process of accepting smaller volumes of waste from refuse collection vehicles (RCV's), skips etc. and transferring this material to larger volume trailers for more efficient and economic transportation of the waste material. A very small portion of the waste accepted is processed in order to recover recyclable elements. Processed wastes are primarily C&D wastes and bulky waste from skips. Processing comprises removal by grab machine to recover larger recyclable materials (wood, metals, cardboard, plastics) and any other non-conforming waste material that may have entered the site inadvertently in a skip (e.g. white goods, WEEE, paint pots, waste oil drums etc.).

1.1 European Communities (Environmental Liability) Regulations 2008

The Environmental Liability Directive[2] (2004/35/EC) was transposed into Irish law through the European Communities (Environmental Liability) Regulations (S.I. 547 of 2008[3]). The Directive identifies activities for which 'strict liabilities' apply, for which waste management operations are identified.

The Regulations place a number of responsibilities on operators i.e. the entity that controls an activity, namely:

- prevention of environmental damage including taking measures to prevent (environmental) damage occurring when there is an imminent threat of damage,
- informing the EPA of the imminent threat of environmental damage where the preventative measures have not been successful in dispelling the threat,
- informing the EPA when environmental damage has occurred,
- complying with the EPA's direction in relation to imminent threat of damage, and
- where damage has occurred, the operators shall take steps to control, contain, remove or manage the contaminants.

[1] as well as its accompanying document "Guidance on assessing and costing environmental liabilities – Unit cost rates for verification"
[2] Available online at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2004:143:0056:0075:en:PDF [accessed 09/05/2016]
[3] Available online at http://www.irishstatutebook.ie/pdf/2008/en.si.2008.0547.pdf [accessed 09/05/2016]

Section 4.1 of the document '*Environmental Liabilities Regulations – Guidance Document*[4]*, EPA 2011'* identifies proactive risk management as a core principle under which the EPA will implement these Regulations. Section 4.3 of the document identifies Environmental Liability Risk Assessment (ELRA) as being a good example of a methodology for environmental risk management. Therefore, the preparation of an ELRA is considered as an acceptable way of implementing these Regulations.

[4] Available online at http://www.epa.ie/pubs/advice/general/Liability_Regulations%20Final%20August%202011.pdf [accessed 09/05/2016]

2 FACILITY DESCRIPTION AND OPERATION

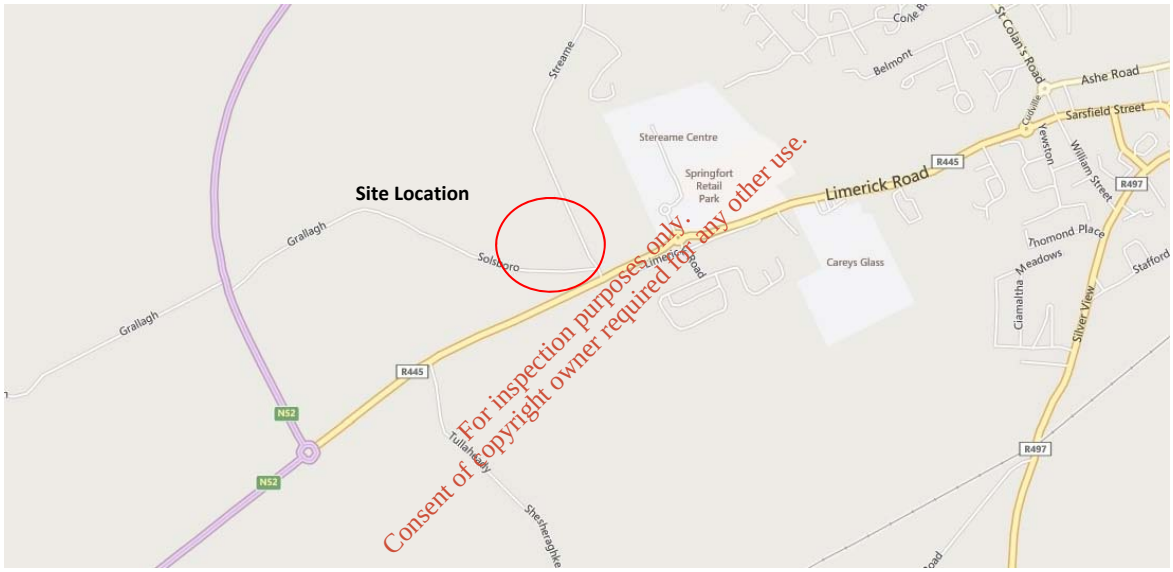
This section provides an overview of the site development, historic use, licensing history, nature of activity and operator performance.

This section broadly follows Table 3.1 of the Guidance through identifying the relevant information to inform the risk identification process undertaken in Section 3.3.1 following.

2.1 Site Operation

2.1.1 Site Development and History

The Nenagh WTS is located at Solsborough, Springfort Cross, Nenagh, Co. Tipperary, just off the R445 Limerick Road at the Springfort Cross junction, approximately 250 metres west of the Springfort Retail Park and 1 km from the town centre.



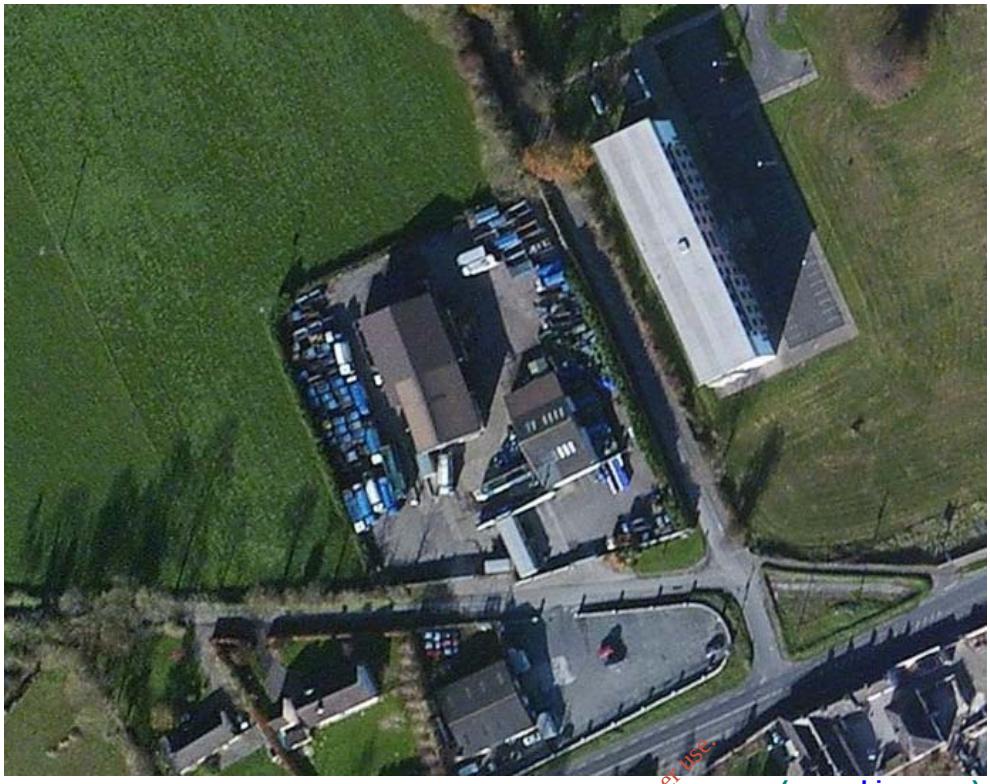
(www.bing.com)

Figure 2-1: Site Location Map

The site was originally developed by O'Brien Waste, which was purchased by AES Ireland Ltd. in 2004. A number of planning permission relates to the site:

- In February 1995, permission was granted for a refuse compactor, sorting bay and signage (Planning Ref: 5116713)
- In April; 1995, permission was granted for a waste sorting building (Planning Ref: 5117323)
- Permission was granted for the retention of existing sorting/compactor building and septic tank in July 1999 (Planning Ref: 5120932)
- In April 2000, permission was granted for the extension to site boundary for the provision of hardstanding for transport vehicles, installation of hoval pyrolytic heat exchanger and erection of canopy to workshop and recycling area (Planning Ref: 5121876)
- Permission was granted to extend the existing waste sorting and compacting building to provide bring to recovery transfer centre, to install weighbridge with portacabin, pay station, alterations to workshop, new offices and road signs in November 2011 (Planning Ref: 5124144)

The above permissions were granted to O'Brien Waste while a further application in August 2006, by AES, to modify the existing site boundary, was refused.



(www.bing.com)

Figure 2-2: Site Layout (centre of image)

2.2 Size and Nature of the Activity

The licensed activities as set out in the EPA waste licence W0240-01 and as updated based on the European Communities (Waste Directive) Regulations 2011, are as follows:

Activity	As per Licence W0194-02	Activity	As per European Communities (Waste Directive) Regulations 2011
Waste Disposal Activities	**Class 11** - Blending or mixture prior to submission to any activity referred to in a preceding paragraph of this Schedule.	Waste Disposal Activities	**Class D13** - Blending or mixing prior to submission to any of the operations numbered D1 to D 12
	Class 12 - Repackaging prior to submission to any activity referred to in a preceding paragraph of this Schedule.		**Class D14** - Repackaging prior to submission to any of the operations numbered D1 to D13
	Class 13 - Storage prior to submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where the waste concerned is produced.		**Class 13** – Storage pending any of the operations numbered D1 to D14

Activity	As per Licence W0194-02	Activity	As per European Communities (Waste Directive) Regulations 2011
Waste Recovery Activities	**Class 2** - Recycling or reclamation of organic substances which are not used as solvents (including composting and other biological processes).	Waste Recovery Activities	**Class R3** - Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes), which includes gasification and pyrolisis using the components as chemicals
	Class 3 - Recycling or reclamation of metals and metal compounds.		**Class R4 -** Recycling/reclamation of metals and metal compounds.
	Class 4 - Recycling or reclamation of other inorganic materials.		**Class R5 -** Recycling or reclamation of other inorganic materials.
	Class 13 - Storage of waste intended for submission to any activity referred to in a preceding paragraph of this Schedule, other than temporary storage, pending collection, on the premises where such waste is produced.		**Class R12 –** Exchanges of waste for submission to any other operations numbered R1 to R11
			Class R13 – Storage of waste pending any of the operations numbered R1 to R12

2.3 Nature and Volumes of Waste

Waste received at the facility consists of non-hazardous municipal wastes of household and commercial origin, as well as construction and demolition (C&D) wastes at a rate of up to 24,750 tonnes per annum.

Table 2-1 shows the annual quantity of waste material received at the facility between 2011 and 2015.

Table 2-1 Waste Intake (Tonnes)

Year	Waste Materials (tonnes)
2015	24,594
2014	25,357
2013	23,666
2012	25,681
2011	23,951

2.4 Details of Waste Licence

In November 2007, AES applied to the EPA for a waste licence to operate a waste transfer facility at the Nenagh site. A waste licence (Register No. 240-01) was granted in July 2009. The facility was licenced to accept 24,750 tonnes per year of non-hazardous household, commercial, industrial and construction and demolition waste.

2.5 Site Operations

Waste vehicles access the facility through a c. 8 m gated entrance. Access is off the local Kilcolman Road junction on the R445 road. After entering through the access gate, vehicles travel directly onto a weighbridge for weighing at the portacabin offices, prior to travelling along the western flank and northern side of the processing building to access the processing building on the eastern flank. A second entrance, located on the southern boundary of the site, facilitates visitors and customers arriving the facility.

Carparking is provided to the southwest of the site adjacent to portacabin offices. Truck parking is facilitated east of the waste vehicle entrance

A bunded diesel tank is located along the northern side of the processing building to facilitate vehicle refuelling.

There are two access points to the processing building on the eastern flank; one that allows for the filling of high sided trailers at a lower level and one that allows for the emptying of loads within the main body of the building.

No processing, other than recovery of larger items like pallets, metals etc., occurs onsite. Materials, primarily dry recyclables, mixed residual municipal waste and C&D waste is received and bulked at the facility, prior to transportation offsite to other processing facilities.

A ramp on the external eastern flank of the building allows for the loading of skips and hooklifts for glass, timber etc.

A vehicle maintenance shed is located to the south east of the processing building where vehicle upkeep is undertaken.

A washing area directly south of the processing building is used for the washing of bins, containers and vehicles.

Surface waters generated on hardstanding areas and building roofs are collected via gullies before passing through a silt trap and oil interceptor prior to discharge to a drainage ditch located at the north-eastern boundary of the site. This drainage ditch connects to a storm water collection network via a culvert at the northern end of the Dark Road c. 600m north of the site. This storm water network ultimately connects with the Nenagh River some 4 km to the north east.

Effluent generated within the processing building as well as from the washing area and from the office accommodation flows to a foul effluent pumping station in the centre of the site and is then pumped via a rising main to a sewer connection point located at the visitor site entrance.

2.5.1 Site Infrastructure

The infrastructure on site includes:

- 1 no. weighbridge
- Administration building & welfare facilities
- Maintenance shed
- 1. no grab excavator
- 1 no. skidsteer
- 1 No. Road sweeper
- Bin Wash area
- Foul and stormwater drainage system including interceptors
- Site fencing and gates

Diesel oil is the primary form of energy used on site, to fuel vehicles. Electricity also powers office support systems. The power and diesel oil usage at the facility in 2015 were:

- electricity - approximately 29.97 MWh per annum
- diesel oil - approximately 316,359 litres

2.5.2 Tank, Pipeline and Bund Testing

The drainage system was upgraded in February 2010 and a CQA for these specified engineering works was provided to the Agency in August 2010. Routine inspections of tank, pipeline and bund inspections are carried out every three years, as per Condition 6.9 of the licence.

The last recorded inspection was completed in November 2012 and the diesel storage bund onsite was found to be compliant. Report ref: ECS4377 was provided to the Agency regarding same.

2.5.3 Environmental Emissions

Environmental monitoring at the facility is carried out in accordance with Condition 6 and Schedule C of the waste licence.

The environmental media monitored and the frequencies of monitoring at the facility are as follows:

- Noise - annually
- Dust Deposition - quarterly
- Emissions to sewer – monthly & quarterly
- Stormwater emissions – weekly, monthly and quarterly

Details in relation to environmental emissions in 2015 (the most recent full year of operations) are included in the 2015 AER, included in Appendix 1 to this document.

2.5.4 Nuisances Controls

The Facility Manager/Compliance Officer undertake daily site inspections, which highlight any nuisances on site such as litter, pests, noise, birds, flies, odour or dust, in adherence with AES Standard Operational Procedures (SOPs) for environmental control. When nuisances are highlighted, they are recorded and corrective actions undertaken.

No dedicated abatement equipment is installed at the Nenagh facility as its necessity has not been required

2.6 Operator Performance

2.6.1 Environmental Management Systems

AES Ireland Ltd. operates to and is certified under the ISO 14001:2004 Environmental Management System standard. The EMS encompasses the company as a whole and also each individual waste facility. The EMS sets out general environmental policy and environmental procedures that are applicable across the company. In addition, in order to satisfy the conditions of W0104-03, and to achieve the objectives and targets set out in the Nenagh Annual Environmental Management Programme, a range of site specific procedures and work instructions have been developed.

The Nenagh EMS describes the Operations Procedures in place to maintain licence compliance during normal operations at the facility and have been developed for all normal operations required to run the facility.

SOPs are informed by the environmental aspects register. Once hazards are identified and environmental impacts evaluated, the recommended control measures are developed and implemented to prevent or reduce the impact on the receiving environment. These control measures are incorporated in to the environmental and operational procedures and work instructions. Consequently, operations are guided by approved quality controlled operational procedures and staff are trained in all relevant work instructions

Table 2-2: List of applicable EMS Procedures

Document	Subject
EP 1.0	Identification and Evaluation of Environmental Aspects
EP 2.0	Maintenance and Control of Register of Environmental Legislation
EP 3.0	Determining and Reviewing Environmental Objectives and Targets and Programmes
EP 4.0	Annual Environmental Review
EP 5.0	Emergency Preparedness and Response
EP 6.0	Environmental Incident Investigation and Reporting
EPF 6.1	Incident Investigation Report Form
EPF 6.2	Incident Notification Report Form
EP 7.0	Environmental Non-Conformance
EP 8.0	Environmental Corrective and Preventive Action
EPF 8.1	Environmental Corrective and Preventive Action Form
EP 9.0	Environmental Complaints
EPF 9.1	Environmental Complaints Form
EPF 9.2	Environmental Complaint/Incidents/Corrective Actions Log
EP 10.0	Environmental Monitoring
EP 11.0	Control of Contractors & Visitors
EPF 11.1	Site Visitor Rules
EPF 11.2	Contractors Induction Form
EPF 11.3	Visitor, Contractor, HGV/LGV & Employee Induction Booklet
EP 12.0	Environmental Auditing
EPF 12.1	Internal Audit Schedule
EPF 12.2	Internal Audit Form
EP 13.0	Environmental Document Control
EPF 13.1	Amendment List
EP 14.0	Communication
EPF 14.1	Information Request Form
EP 15.0	Reporting
EP 16.0	Programme for Public Information
EP 17.0	Training
EPF 17.1	Environmental Training Record
EPF 17.2	Environmental Training Matrix
EPF 17.3	Environmental Induction Training Sheet
EP 18.0	Surface Water Management

Table 2-3 lists the waste licence non-compliances and incidents that have occurred at the Nenagh WTS since 2011. The EPA was notified of each non-compliance.

Table 2-3: Non-Compliances / Incidents since 2011

Year	Description
2011	Eight non-compliances recorded during an EPA site visit: • Install appropriate infrastructure for the isolation of the underground sump & provide details to the Agency. Include the three chamber underground sump in the weekly inspection schedule. • Ensure the fire escape door on the northeast corner of the waste transfer building is kept closed at all times. • Provide details of the appropriate disposal of cosmetics waste. • Amend the daily inspection records sheet to ensure the person carrying out the daily site inspections signs the sheet. • Devise an SOP for the regular cleaning of the oil filters in the on-site oil-interceptor. Records of the maintenance of the oil interceptor should be kept onsite. • Review the location of dust monitoring D3 and consider a monitoring location that will more accurately represent dust emissions from the site. • Submit a specified engineering works proposal for the installation of the concrete kerbing. • Revise the energy efficiency audit report. All the above non-compliances were addressed, with corrective action outlined, in correspondence from AES on 20th April 2011. Four non-compliances were recorded during Quarter 4 report 2011: • Exceedance of the emission limits value (ELV) at emissions to sewer (SE-1) for ammonia at 83 mg/l N versus ELV of 50 mg/l. • Exceedance of the emission limits value (ELV) at SE1 for Biochemical oxygen demand at 3,824 mg/l O2 versus ELV of 1000 mg/l O2. • Exceedance of the emission limits value (ELV) at SE-1 for Chemical oxygen demand at 6470 mg/l O2 versus ELV of 50 mg/l O2. • Exceedance of the emission limits value (ELV) for pH at 5.8 versus ELV range of 6 to 10. • The Agency also noted that the COD value and the Suspended solids at the SW-1 storm water discharge point were elevated which the Agency considered to be environmentally significant All the above non-compliances were addressed, with corrective actions outlined, in correspondence from AES on 11th April 2012.
2012	One Observation and one non-compliance were found during a site visit on the 31/05/12: • The inspectors notice that the water that was used to clean out the wheelie bins was running off into two drains which are surface water discharge drains. The inspectors state that the quality of the discharge was not acceptable due the runoff from the bin washing. • During the inspection it was noted that the piping used to take the grab sample for the emission to sewer sample was not positioned correctly for a representative sample to be taken from this location, the pipe was moved and is now considered to be capable of taking a representative sample. All the above non-compliances were addressed, with corrective action outlined, in correspondence from AES on 8th June 2012. Furthermore, an SEW was prepared in 2012 to modify and extend the footprint of the bin wash area which lead to significant improvements in the water quality at storm water discharge point SW1. • Dust levels at D2 location was above the ELV 599 mg/m^2/day ELV limit 350mg/m^2/day. Monitoring dates were 16/08/12 to 17/09/12.

Year	Description
	The above incident was addressed with an incident form and corrective action by AES on 4th October 2012. • Strong pungent odour detected after skip was emptied turned out to have contained a quantity of concentrated garlic extract. The above incident was addressed with an incident form and corrective action by AES on 30th October 2012.
2013	• 3 no. breaches of ELVs to SE-1 discharge in 2013 on 3 different dates • 1 no. exceedance of dust deposition ELV at D2
2014	• 1 no. breach of ELVs to SE1 in 2014 • Breach of ELVs at 1 no. dust monitoring locations (D1) during one monitoring event
2015	• 2 no. breaches of ELVs to SE1 in 2015 on 2 different dates • Breach of ELVs at 2 no. dust monitoring locations (D1 & D3) during one monitoring event

No complaints have been received at the site in 2011, 2012, 2013, 2014 & 2015 and the EPA has taken no enforcement actions in relation to the non-compliances or incidents identified.

2.7 Environmental Sensitivity

The environmental sensitivities at the facility are presented under the following respective headings:

2.7.1 Geology/Hydrogeology

Geology / Soils

In terms of quaternary geology, as per the GSI 1:100,000 scale bedrock geology map (Sheet 18, Tipperary) '"*Bedrock Geological Map of the Carboniferous of Central Ireland*" (Geological Survey of Ireland, 1992), the geology maps show that Lower Carboniferous (Upper Dinantian) rock underlies the site.

The General Soil Map of Ireland, 1:575,000 scale shows that the soils in the area of the site are covered by gleys, which are poorly drained mineral soils with poor physical properties.

Hydrogeology

As per GSI Groundwater Data Viewer, the site area is underlain by a “Locally Important Aquifer (Lm)” which is “generally moderately productive”. The closest groundwater well is located c. 1 km from the site.

Monitoring for groundwater is not required under licence W0240-01.

2.7.2 Hydrology

Stormwater generated onsite passes through an oil interceptor and discharges to a drainage ditch running in a roughly north south direction from the northeastern corner of the site boundary.

The facility is located in the Shannon International River Basin District (SIRBD). The facility site is located within the Lough Derg Water Management Unit (WMU). The Lough Derg Water Management Unit Action Plan outlines the status, pressures, action programme, objectives and future developments for the WMU.

The closest identified waterbody is the Ardgregane Stream, to which the drainage ditch adjacent to the facility runs. The overall status of the Ardgregane Stream is “moderate” with an objective to “Restore by 2015”. The waterbody is identified as being “At risk” due to diffuse pressures, channelization and morphology.

One previous flooding event has been recorded in the vicinity of Springfort Cross.

2.7.3 Human Receptors

A retail premises (Comerfords Garage) is located directly south of the facility entrance while there are two no. residences directly southwest of the facility (less than 50 m) and one no. residence approximately 100m to the west. There are 8 no. further residences located less than 150m from the southeast of the facility, while there is an office block within the Springfort Retail Park, located directly northeast of the facility boundary.

2.7.4 Natural Habitats

5 designated sites are located within 10 km of the proposed development. There are two Special Areas of Conservation (SACs) and three Natural Heritage Area (NHAs) as follows:

- Lough Ourna pNHA
- Willsborough Esker pNHA
- Silvermines Mountains West SAC
- Lough Derg pNHA
- Lough Derg (Shannon) SAC

Given the distance of these sites from the area of the Nenagh facility and lack of direct linkages, it is highly unlikely that any designated sites are negatively impacted by the operation carried out at the facility.

3 APPROACH TO ENVIRONMENTAL LIABILITIES

3.1 Environmental Liability Risk Assessment

ELRA assesses the risk of incidents that could result in a liability to the operator of a licenced facility. As per the Guidance, incidents are considered as "*a change of circumstances from the norm with actual or potential negative consequences*".

The approach for assessing and costing environmental liabilities is illustrated in Figure 3-1.

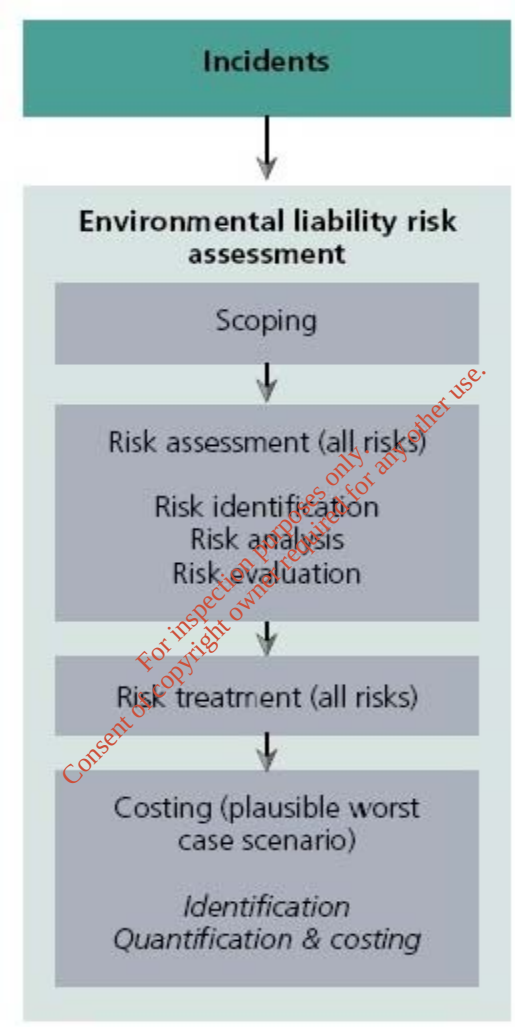


Figure 3-1: Assessing and costing environmental liabilities

In accordance with the recommendations of the Guidance, FTC, as an appropriately qualified consultant has been retained to prepare this ELRA. In addition, and as also recommended in the Guidance, FTC liaised with AES own staff to ascertain site specific information and knowledge in relation to the operations of the Nenagh facility through the holding of an informal, risk identification workshop in December 2014.

The purpose of the environmental liability risk assessment (ELRA) is to:

- identify and quantify environmental liabilities focusing on unplanned, but possible and plausible events occurring during the operational phase;
- provide a mechanism to encourage continuous environmental improvement through the management of potential environmental risks;
- cost the worst-case scenario for the purposes of informing the level of financial provision.

The ELRA procedure is set out in Figure 3-2.

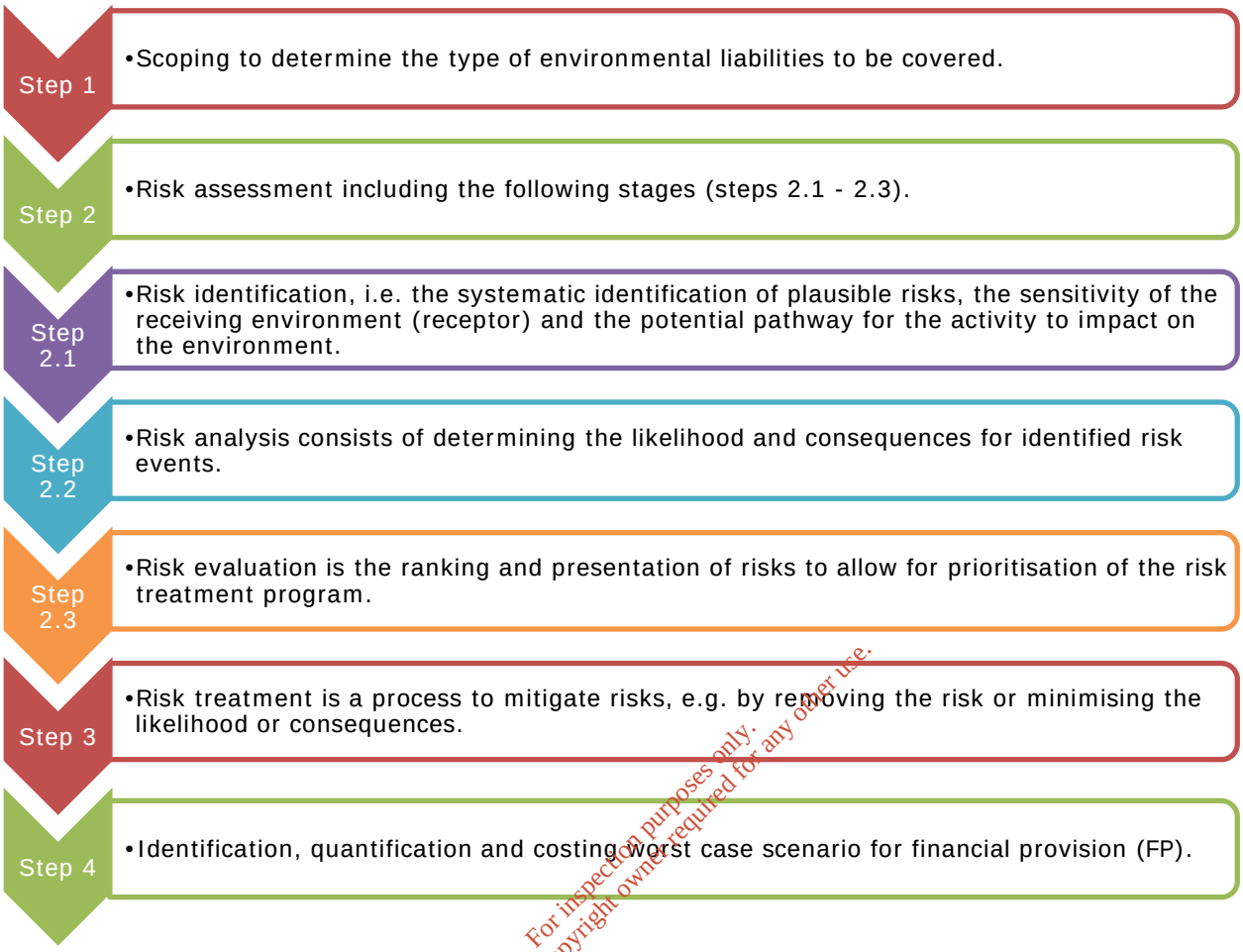


Figure 3-2: Environmental Liability Risk Assessment Process

3.2 Step 1 - Scoping

The Guidance states that the purpose of an ELRA is to identify and cost risks to the environment (surface water, groundwater, atmosphere, land, flora, fauna and human health). It should not include health and safety type risks, e.g. direct injury or death resulting from vehicular collisions. In addition, the analysis and costing should cover the environmental aspects of an event i.e. stopping it, preventing further contamination; clean-up of emissions/pollution caused. It should not include other associated costs that are non-environmental.

Condition 12.2.2 of the waste licence W0240-01 states that:

> *"The licensee shall arrange for the completion, by an independent and appropriately qualified consultant, of a comprehensive and fully costed Environmental Liabilities Risk Assessment (ELRA) which addresses the liabilities from past and present activities. The assessment shall include those liabilities and costs identified in Condition 10 for execution of the DMP. A report on this assessment shall be submitted to the Agency for agreement within twelve months of the date of grant of this licence. The ELRA shall be reviewed as necessary to reflect any significant change on site, and in any case, every three years following initial agreement. Review results are to be notified as part of the AER."*

This condition requires the consideration of "past and present" activities, so to this end, any plausible risks resulting from past activities and current activities have been considered in the formulation of this ELRA.

Condition 12.2.2 also requires the consideration of the liabilities and costs associated with Decommissioning Management Plan (DMP). To this end, a separate document titled “Decommissioning Management Plan” has previously been submitted to the EPA by AES.

3.3 Step 2 – Risk Assessment

The assessment of risk comprises three sub-stages:

- Risk identification
- Risk analysis
- Risk evaluation

3.3.1 Step 2.1 - Risk Identification

The Guidance document identifies that risk identification must focus on plausible incidents and, in doing, so must take account of the controls and mitigating measures in place but with regard to the capacity of the controls to contain incidents and the potential for failure of these controls.

Table 3.1 of the Guidance presents the key information required for the risk identification process and this data has been summarised in Section 2 of this document, and as identified, a risk identification workshop was held with AES personnel to assist the risk identification process.

Based on this process, Table 3-1 presents a list of plausible risks applicable to the Nenagh facility.

Table 3-1: Plausible Risks Identified for Activities at the Nenagh WTS

Risk ID	Process	Potential Risks
1	Drainage Network	Exceedance of suspended solids limit values
2		Exceedance of ammonia limit values
3		Failure of hydrocarbon interceptor
4	Waste Processing activities	Elevated dust generation and escape to atmosphere
5		Fire due to ignition source in incoming waste or generated within processing building
6		Excessive odour generation from putrescible material
7	Traffic	Fuel loss to environment due to collision or other incident with site traffic and incoming trucks
8		Leachate loss from leaks from trailers containing putrescibles
9	Fuel Storage	Fuel loss due to rupture of fuel tank; bund failure; leak during filling
10	General Operations	Excessive Noise generation due to site activities
11		Dust generation due to traffic and external yard operations
12		Litter generation from externally stored waste
13	Weather	Flooding resulting from blockages to onsite gullys/pipework and excessive rainfall

Risk ID	Process	Potential Risks
14	Decommissioning	Site Investigations identify contaminated ground, requiring remediation

3.3.2 Step 2.2 - Risk Analysis

The plausible risks identified in Section 3.3.1 are assessed against the likelihood and consequence as per Tables 3-2 and Table 3-3, as per the Guidance. These tables are used to calculate (using the formula **Likelihood x Consequence = Risk Score**) a risk score for each risk identified and the results of the analysis are presented in Table 3-4, overleaf.

Table 3-2: Risk Classification Table – Likelihood

Rating	Likelihood	
	Category	Description
1	Very Low	Very low chance of hazard occurring
2	Low	Low chance of hazard occurring
3	Medium	Medium chance of hazard occurring
4	High	High chance of hazard occurring
5	Very High	Very high chance of hazard occurring

Table 3-3: Risk Classification Table –Consequence

Rating	Consequence	
	Category	Description
1	Trivial	No damage or negligible change to the environment
2	Minor	Minor impact/localised or nuisance
3	Moderate	Moderate damage to environment
4	Major	Severe damage to local environment
5	Massive	Massive damage to a large area, irreversible in medium term

Table 3-4: Risk Analysis

Risk ID	Process	Potential Risks	Environmental Effect	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score (Consequence x Likelihood)
1	Drainage Network	Exceedance of suspended solids trigger values	Contamination of surfacewater	2	Non-hazardous and not persistent with very limited potential to impact on water quality objectives	1	Interceptor in place at emission point but has occurred in the past	2
2		Exceedance of ammonia limit values	Contamination of surfacewater	2	Non-hazardous and not persistent but potential to impact on water quality objectives	3	Interceptor in place at emission point but has occurred in the past	6
3		Failure of hydrocarbon interceptor	Contamination of surfacewater	2	Non-hazardous and not persistent but potential to impact on water quality objectives	2	Interceptor in place at emission point	4
4	Waste Processing activities	Elevated dust generation and escape to atmosphere	Uncontrolled emissions to Air	1	Localised and non-persistent	3	Dust exceedances observed in the past	3
5		Fire due to ignition source in incoming waste or generated within processing building	Uncontrolled emissions to air, firewater discharge to surfacewater and groundwater	4	Potential for large volume loss of mixed pollutants, surfacewater and groundwater contamination	3	Combustible waste storage internally; good fire protection measures & emergency response procedures in place. No firewater retention capacity in place but approval of relevant SEW received from Agency. Full hardstanding in place across the entire site.	12
6		Excessive odour generation from putrescible material	Odour emission to atmosphere	2	Localised and non-persistent but of a nuisance nature	2	Putrescibles stored internally in processing building in a containerised system	4
7	Traffic	Fuel loss to environment due to collision or other incident with site traffic and incoming trucks	Emission to surface and/or groundwaters	3	Fuel tanker may have large volumes; potential impact on water quality objectives, soil and groundwater contamination	2	Heavily trafficked site; good traffic control measures in place	6
8		Leachate loss from leaks from trailers containing putrescibles	Contamination of storm water	2	Low volume, non-hazardous and not persistent but potential to impact on water quality objectives	2	Implementation of vehicle maintenance schedule; putrescibles stored internally in processing building in a containerised system and do not touch building floor	4
9	Fuel Storage	Fuel loss due to rupture of fuel tank; bund failure; leak during filling	Emission to surface and/or groundwaters	3	Persistent and hazardous pollutant, but tank volumes limited	2	Tanks and bunds inspected in keeping with requirements of W0240-01	6
10	General Operations	Excessive Noise generation due to site activities	Nuisance generation to local receptors	2	Nuisance generation for local receptors	1	No noise exceedances observed at NSLs in the past 4 years	2
11		Dust generation due to traffic and external yard operations	Uncontrolled emissions to Air	2	Localised and non-persistent but of a nuisance nature	2	Dust exceedance observed in the past	4

Risk ID	Process	Potential Risks	Environmental Effect	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score (Consequence x Likelihood)
12		Litter generation from externally stored waste	Nuisance generation and littering of surrounding areas	2	Localised and non-persistent but of a nuisance nature	1	Daily inspection procedures in place	2
13	Weather	Flooding resulting from blockages to onsite gullys/pipework and excessive rainfall	Contamination of surfacewaters	2	Not persistent and non-hazardous with limited potential to impact on water quality objectives	1	Weekly inspection of drainage system as per Condition 6.10 of W0240-01	2
14	Decommissioning	Site Investigations identify contaminated ground, requiring remediation	Contamination of surface and/or groundwaters	3	Potential to identify soil contamination impacting on ground and surfacewater quality and requiring remediation	1	While a brownfield site originally, no existing evidence of previous or current contamination	3

3.3.3 Step 2.3 - Risk Evaluation

The risks calculated in Table 3-4 are prioritised and ranked from highest to lowest in Table 3-5. This method is an important tool for establishing the mitigating factors required in the risk treatment process.

Table 3-5: Risk Evaluation

Risk ID	Process	Potential Risks	Risk Score (Consequence x Likelihood)
5	Waste Processing activities	Fire due to ignition source in incoming waste or generated within processing building	12
2	Drainage Network	Exceedance of ammonia limit values	6
7	Traffic	Fuel loss to environment due to collision or other incident with site traffic and incoming trucks	6
9	Fuel Storage	Fuel loss due to rupture of fuel tank; bund failure; leak during filling	6
3	Drainage Network	Failure of hydrocarbon interceptor	4
6	Waste Processing activities	Excessive odour generation from putrescible material	4
8	Traffic	Leachate loss from leaks from trailers containing putrescibles	4
11	General Operations	Dust generation due to traffic and external yard operations	4
4	Waste Processing activities	Elevated dust generation and escape to atmosphere	3
14	Decommissioning	Site Investigations identify contaminated ground, requiring remediation	3
12	General Operations	Litter generation from externally stored waste	2
1	Drainage Network	Exceedance of suspended solids trigger values	2
10	General Operations	Excessive Noise generation due to site activities	2
13	Weather	Flooding resulting from blockages to onsite gullys/pipework and excessive rainfall	2

The risk matrix (Table 3-6) is colour coded in order to provide an indication of the critical nature of each risk and to facilitate prioritisation of risks for treatment/mitigation.

The location of the individual risks (ID 1 to 4) within the risk matrix (Table 3-6) is determined based on the "likelihood" and "consequences" of the risk occurring, as per Table 3-4. For example, the location of risk ID No. 4 is based on its consequence value of 1 and a likelihood value of 3.

The risk matrix in Table 3-6 presented below indicates that there is no risk in the red zone requiring priority treatment. There are four risks in the amber zone requiring mitigation or management action.

All other risks are located in the green zone indicating the need for continuing awareness, and the need for mitigation measures.

Table 3-6: Risk Matrix

Likelihood							
	V. High	5					
	High	4					
	Medium	3	4, 14	2		5	
	Low	2	10,13	3, 6, 8, 11,	7, 9		
	V. Low	1	1	12			
			Trivial	Minor	Moderate	Major	Massive
			1	2	3	4	5

Consequence

3.4 Step 3 – Risk Treatment

Risk treatment is the process to mitigate risks, e.g. by removing the risk or minimising the likelihood or consequences.

The output from this process is the preparation of a Statement of Measures to be taken in relation to the prevention of impact on the environment, which is presented in Table 3-7.

Responsibility for the carrying out of such measures is assigned in Table 3-7 to the relevant person within AES. A cornerstone of risk management at the facility is the onsite presences of experienced staff with a detailed knowledge and understanding of site operations. This Statement of Measures will be updated on an annual basis to include new risks or remove existing risks, based on the status of at the facility.

Table 3-7: Statement of Measures

Risk ID	Process	Potential Risks	Risk Score (Consequence x Likelihood)	Mitigation Measures to be taken	Outcome	Action	Completion Date	Relevant Individual
5	Waste Processing activities	Fire due to ignition source in incoming waste or generated within processing building	12	• Minimise quantity of waste stored within waste processing building. • Continued adherence to incoming waste inspection procedures • No smoking policy • Emergency response procedures in place • Fire detection system to be regularly maintained and tested. • Shut off valve on interceptor	Reduced potential for internal fire hazards.	• Facility Manager strictly enforces existing procedures & policies • Fire detection system to be regularly tested	Ongoing with 6 monthly-detailed review.	Facility Manager
2	Drainage Network	Exceedance of ammonia limit values	6	• Ongoing monitoring in compliance with licence requirements • Regular maintenance of interceptor unit • Regular cleaning of yard area in keeping with existing procedures	Reduced potential for storm water contamination	• Ongoing maintenance and monitoring	As per monitoring requirements and site cleaning schedule	AES Environmental Manager
7	Traffic	Fuel loss to environment due to collision or other incident with site traffic and incoming trucks	6	• Maintaining of site speed limits • Maintaining adequate site signage	Improved awareness and reduced potential for traffic incidents	• Review existing site signage and update where necessary	Within 3 months	Facility Manager
9	Fuel Storage	Fuel loss due to rupture of fuel tank; bund failure; leak during filling	6	• Continued tank, pipeline and bund integrity testing in adherence with facility waste licence	Continued assessment of tanks, pipelines and bunds integrity and protection against losses	• Tank, pipeline and bund integrity testing in accordance with waste licence condition	As per licence requirements	AES Environmental Manager
3	Drainage Network	Failure of hydrocarbon interceptor	4	• Continue frequent hydrocarbon interceptor maintenance	Continued protection against losses	• Undertake interceptor maintenance as per schedule • Amend procedures to reflect revised emergency procedures in event of fire	As per maintenance schedule	AES Environmental Manager
6	Waste Processing activities	Excessive odour generation from putrescible material	4	• Putrescibles stored internally in processing building in a containerised system • Enclosed delivery vehicles • Movement offsite within a 24-hour period	Reduced potential for odour generation	• Continued implementation of waste acceptance procedures	Ongoing	Facility Manager
8	Traffic	Leachate loss from leaks from trailers containing putrescibles	4	• Implementation of vehicle maintenance schedule • Putrescibles stored internally in processing building in a containerised system and do not touch building floor	Reduced potential for leachate generation	• Continued implementation of waste acceptance procedures & vehicle maintenance schedules	Ongoing	Facility Manager
11	General Operations	Dust generation due to traffic and external yard operations	4	• Regular cleaning of yard area in keeping with existing procedures • Daily inspection procedures • Dust monitoring in adherence with licence requirements	Reduced potential for dust generation	• Ongoing maintenance and monitoring	Ongoing	AES Environmental Manager

Risk ID	Process	Potential Risks	Risk Score (Consequence x Likelihood)	Mitigation Measures to be taken	Outcome	Action	Completion Date	Relevant Individual
4	Waste Processing activities	Elevated dust generation and escape to atmosphere	3	• Regular cleaning of yard area in keeping with existing procedures • Daily inspection procedures • Dust monitoring in adherence with licence requirements • Waste inspection procedures to identify excessively 'dusty' material	Reduced potential for dust generation	• Ongoing maintenance, monitoring & implementation of procedures	Ongoing	Facility Manager & AES Environmental Manager
14	Decommissioning	Site Investigations identify contaminated ground, requiring remediation	3	• Site investigation works to be carried out under proper & competent supervision • Findings and further actions to be assessed and developed by specialist consultant, if required	Reduced potential from pollution that might derive from any identified issues	• As per Closure Plan, SI to be carried out upon decommissioning of the facility	Upon facility decommissioning	AES Environmental Manager
12	General Operations	Litter generation from externally stored waste	2	• Regular cleaning of yard area in keeping with existing procedures • Daily inspection procedures	Reduced potential for litter generation	• Ongoing implementation of cleaning & inspection procedures	Ongoing	Facility Manager
1	Drainage Network	Exceedance of suspended solids trigger values	2	• Ongoing monitoring in compliance with licence requirements • Regular maintenance of interceptor unit • Regular cleaning of yard area in keeping with existing procedures	Reduced potential for storm water contamination	• Ongoing maintenance and monitoring	As per monitoring requirements and site cleaning schedule	AES Environmental Manager
10	General Operations	Excessive noise generation due to site activities	2	• Drivers awareness of impacts of vehicle movements • Noise monitoring in adherence with licence requirements	Reduced noise generation	• Noise awareness during drivers site induction • Continued noise monitoring	Ongoing	AES Environmental Manager
13	Weather	Flooding resulting from blockages to onsite gullys/pipework and excessive rainfall	2	• Regular cleaning of yard area in keeping with existing procedures • Daily/weekly inspection procedures in accordance with condition of W0240-01	Reduced potential for flooding	• Ongoing implementation of cleaning & inspection procedures	Ongoing	Facility Manager

3.5 Step 4 – Identification, Quantification & Costing of Worst-case Scenario

3.5.1 Risk Identification

The Guidance requires that the costing of the required ELRA financial provision be based on the "*worst case scenario*" and that the worst case scenario refers to the event that "*poses the maximum environmental liability*." In this context, the worst case can be represented by the risk with the highest **consequence** rating, with the likelihood not being taken into account in the analysis.

The plausible risk identified with the highest consequence is:

- Risk ID 5 – Waste Processing: Fire due to ignition source in incoming waste or generated within processing building

In addition to the above, it has also been identified that the following risk needs to be taken into account for quantification and costing of the worst case scenario.

- Risk ID 9 – Fuel Storage: Fuel loss due to rupture of fuel tank; bund failure; leak during filling

It is plausible that Risk ID 5 could cause the rupture of the fuel tanks on site, resulting in fuel loss. To this end, the above two risks are considered together as **one risk**, representing **fire resulting in fuel loss**.

3.5.2 Risk Quantification

As per the Guidance, a detailed description of the plausible risk is required to inform the costing process. The plausible worst case scenario in terms of expected losses to the environment is presented below. This does not describe works associated with clean up at the site, waste material removal offsite, demolition, etc. but rather then possible environmental impact of resultant emissions to the environment associated with the worst case scenario.

This description details the types and quantities of material that may be lost (sources), the potential passages that this material may take towards nearby environmental media (pathways), and the nature and extent of the potential impact on nearby environmental media (receptors).

The necessary remediation measures required in the event of the worst case scenario occurring are outlined following this.

Sources

The occurrence of a fire across the whole site and the associated loss of fuel will likely result in a risk of the following materials being lost to nearby environmental media:

- Firewater
- Fuel – diesel oil

Soiled waste generated post firefighting will remain on site and is unlikely to be lost to nearby environmental media. It is anticipated that 100 tonnes of soiled waste will be generated post firefighting. This waste is not considered in terms of expected losses to nearby environmental media. However, the clean-up and management of this waste on site is included in the costing of the worst case scenario.

The quantities of both firewater and fuel that are likely to be lost to nearby environmental media from the occurrence of the worst case scenario are detailed below.

Firewater

In order to determine the amount of firewater that could be generated during a fire fighting event, this is quantified with reference to the duration of the firefighting event and the volume of extinguishing water required.

In order to accurately determine this, reference is made to the paper *Fire water retention - latest guidance for appropriate design* [5], which refers to guidance from the Province of Hessen that, based on information from German professional fire brigade managers working group, suggests an extinguishing rate of 3 l/min/m^2 for a fire area up to 2,400 m^2.

The entire building footprint at Nenagh is c. 900 m^2. A fire area of **900 m^2** is therefore assumed within the facility during a fire event.

In terms of fire-fighting duration, the same document states that, in relation to facilities without sprinkler systems "*For fires with surface areas greater than 600 m^2, the extinguishing phase lasted with 65% of cases for longer than 90 minutes, therefore an extinguishing time of a minimum of two hours must be applied and correlates with the time frame for which the extinguishing water must be safely provided*".

However, this is identified as being as a uniform approach and consideration is required to be given to material that are particularly combustible, which DMR materials can be considered. A doubling of extinguishing water is suggested.

Therefore, in order to take a conservative approach, a fire area of **900 m^2** is proposed to be managed with **6 l/min/m^2** for a duration of **6 hours**. Note that this 6 hours does not relate the duration of time a fire tender will spend on site, which is likely to be much greater than this, but rather the duration and application of extinguishing water to a fire.

The above guidance also states that for fires associated with particularly combustible materials "*half the applied water is associated with heat transfer and evaporation, the other half remains as contaminated fire water and must as a consequence be retained*".

Therefore, the quantity of firewater that would potentially require management is 972,000 litres **(972 m^3)**.

Fuel

Fuel – 0.5 cu. m of road diesel to adjacent drainage ditch

The quantity of fuel loss has been estimated based on the assumption that the road diesel fuel storage tank[6] located on site will be at full capacity when ruptured. It is also based on the assumption that 50% of each of the tank's contents could be lost to the environment. This assumption is in keeping with guidance[7] for standard bunded tank as the tank is bunded and contained.

Pathways

Part of the firewater and fuel generated from the occurrence of a fire will be retained within the stormwater network on site. Firewater will not be discharged until such time as firefighting begins – to this end, a member of staff will be onsite in any instance of fire occurring and facility emergency procedures require the immediate closing of the shut off value of the interceptor (discharge point to drainage ditch).

However, in a worst case scenario it has to be assumed that firewater does make its way to the drainage ditch located at the north eastern boundary of the site. In order to quantify this amount, it is assumed that a quantity of firewater is retained onsite through the use of temporary firewater containment which centres on utilising capacity within the existing drainage network (drainage pipes and interceptor) as well as falls over the gradient of the overall site. With an overall site area of c. 6,300 m^2 and assuming the retention of an equivalent of 25 mm of firewater across the site (averaged over falls), this suggests a potential to retain 157 m^3 of firewater within this system. A further 25 m^3 retention capacity[8] with the drainage network is assumed, totalling 182 m^3 retention capacity potential.

[5] http://www.pmgroup-global.com/pmgroup/media/News-Attachments/Fire-Water-Retention-Hazards-24.pdf
[6] Storage capacity assumed to be 1,000 litres
[7] Thyer et al. (2002) Bund overtopping – the consequence of catastrophic tank failure. Journal of Loss Prevention in the Process Industries, 15: 357-363.
[8] Pipework network comprises 130 m of 200 mm drainage pipe & a 12.5 m^3 full retention interceptor (Klargester NSFA 125 or similar), providing 1.25 m^3 of oil retention capacity also

However, with 972 m^3 of firewater potentially generated, up to 790 m^3 has the potential to make its way to the drainage ditch adjacent to the facility, through uncontained flow.

Of potentially 0.5 m^3 of fuel loss to the environment, it is assumed half of this could potentially be discharged through uncontained flow to the drainage ditch.

As a hardstanding area covers the entirety of the site, the likelihood of firewater and fuel percolating vertically downwards into the substrata and underlying aquifer prior to discharge to this drainage ditch is considered low.

Receptors

The drainage ditch located at the north eastern boundary of the site is considered to be the primary nearby environmental medium that would be affected by the loss of firewater and fuel from the site. It is anticipated that the worst case scenario event would result in increased levels of pollution in this drainage ditch. The drainage ditch discharges to the Ardgregane Stream and ultimately the Nenagh River.

The extent of the impact on the aquifer underling the site would be minimal. As noted above, it is considered unlikely that the firewater and fuel would reach the underling aquifer. The underling aquifer is also not considered to be of regional importance, indicating that any potential pollutants would have limited impacts. Despite the low risk of firewater and fuel reaching the underlying aquifer, remediation measures for groundwater should be considered for this worst case scenario. These measures are outlined as part of the remedial action plan, identified below.

The distance that the nearest protected sites are located from the facility and lack of direct linkages to these sites indicate that it is highly unlikely that they would be adversely impacted from the occurrence of the worst case scenario.

Remediation

While the exact nature of potential surface water contamination from the occurrence of the worst case scenario is difficult to define at this stage, the likely remediation measures that will need to be put in place will be as follows.

Step 1 – Implementation of Emergency Response Measures

In response to this ELRA, and as indicated in the Statement of Measures previously presented, the facility emergency response procedures will be augmented to identify actions to be implemented in the event of a fire onsite in order to minimise impact of uncontrolled firewater discharge to the local drainage network.

This will include:

- Measures to ensure closure of shut off values in event of fire
- Measures to block off drainage ditch at identified locations in a fire emergency event through importation of fill material and application within ditches

Step 2 – Confirmation of Extent of Impacts

Upon implementation of emergency measures, investigations will take place to determine the nature of the remediation measures required. These investigations will, if deemed necessary, include the following:

- Collection and analysis of soil samples
- Collection and analysis of surface water samples from drainage ditch
- Collection and analysis of groundwater samples from groundwater wells

Step 3 – Remedial Action Plan (RAP)

So as to ensure that remediation measures effectively mitigate the environmental risk posed by the contamination, the RAP will include the following:

- Pumping of retained firewater from drainage ditch
- In situ treatment of residual soil contamination, if present
- Removal of floating oil/fuel on top of water in drainage ditch, if present
- Compensatory fish restocking in Ardgregane Stream, if required
- Reinstatement of drainage ditch
- Installation of groundwater wells on site
- Pumping of contaminated groundwater from groundwater wells and disposal of same
- Post remediation monitoring to confirm effectiveness of the RAP – monitoring will be carried out for 4 quarters

The exact nature of potential surface water contamination from the occurrence of the worst case scenario is difficult to define at this stage, potential costs associated with carrying out the above remediation tasks are outlined in Table 3-8, insofar as possible.

3.5.3 Risk Costing

The costs provided below are identified from a number of sources, including FTC's own professional judgement. The costs are indicative, insofar as can be identified at this juncture, for the activities involved in the control and remediation of a fire and fuel loss. To provide a cost estimate for Risk ID 5 & 9 which are considered as one risk, a number of assumptions are made. These include assumptions relating to the potential extent of damage to buildings, the duration of firefighting and the need to transport waste off site. No consideration is given to health and safety (except that associated with clean-up) or to other non-environmental costs.

Table 3-8: Quantification and Costing of Risk ID 5 & 9 (considered as one risk)

Task	Activity Description	Quantity	Unit	Rate (€)	Cost (€)	Source of Unit Rates
Response to Risk ID 5 & 9	**Firefighting & associated costs**					
	Firefighting – 4 no. tenders for 36 hours each	144	hour	750	108,000	*Note 1*
	Firefighting water supply	972	m^3	1.16	1,127	*Note 2*
	Testing and classification of firewater	10	samples	50	500	*Note 3*
	Transportation of retained firewater on site	182	m^3	6	1,092	*Note 4*
	Disposal fee for firewater @ WWTP	182	m^3	20	3,640	*Note 5*
	Demolition Works					
	Structural Assessment	3	days	750	2,250	*Note 6*
	Civil Engineering Contractor & labour	15	days	700	10,500	*Note 7*
	Electrical disconnection of plant	40	hr	35	1,400	*Note 8*
	Removal of burned out plant and equipment	1	event	5,000	5,000	*Note 9*
	Crane Hire (incl. Driver)	5	days	800	4,000	*Note 10*
	Consultancy support	5	days	750	3,750	*Note 11*

Task	Activity Description	Quantity	Unit	Rate (€)	Cost (€)	Source of Unit Rates
	Transportation of fire damaged construction materials (non haz)	200	tonne	10	2,000	*Note 12*
	Disposal of fire damaged construction materials (non haz)	200	tonne	115	23,000	*Note 13*
	Building demolition and removal from site	1	event	45,000	45,000	*Note 14*
	Soiled Waste management & associated costs					
	Site clean-up - Labour: 5 men x 8hr days x 10 working days	400	hour	20	8,000	*Note 15*
	Hire of Loading shovel & driver	2	weekly rate	500	1,000	*Note 16*
	Transportation of soiled waste	100	tonnes	10	1,000	*Note 17*
	Disposal cost of soiled waste	100	tonnes	115	11,500	*Note 18*
	Remediation					
	Implementation of Emergency Response Measures	1	event	6,000	6,000	*Note 19*
	Confirmation of Extent of Impacts	1	event	5,000	5,000	*Note 20*
	Remediation Action Plan					
	Pumping & Transportation of retained firewater	790	m^3	20	15,800	*Note 21*
	Disposal of retained firewater	790	m^3	20	15,800	*Note 22*
	Floating oil/Fuel removal & resultant material disposal	50	tonne	688	33,400	*Note 23*
	Fish restocking – allowance	1,000	fish	2.5	2,500	*Note 24*
	Reinstatement of drainage ditch	1	event	5,000	5,000	*Note 25*
	Installation of GW wells	1	event	5,000	5,000	*Note 26*
	Pumping and disposal of contaminated GW from GW wells	1	event	25,000	25,000	*Note 27*
	Monitoring	1	event	5,000	5,000	*Note 28*
	Consultancy & Operational support					
	Consultancy Support	80	hours	80	6,400	*Note 29*
	Own staff oversight	1	per event	10,000	10,000	*Note 30*
	Security Costs	1	month	10,000	10,000	*Note 31*
	Subtotal				377,659	
	Plus, contingency @ 10 %				37,766	
	Total				**415,425**	

Note 1 - Assume 4 no. tenders for 36 hours, no tender rates provided by Tipperary Co. Co. but have taken neighbouring Clare Co. Co. rates, as per http://www.clarecoco.ie/emergency-services/fees/fire-charges/

36 hours' duration assumed – this allows for increased number of tenders for a shorter duration or a lower number of tenders for a longer duration

Task	Activity Description	Quantity	Unit	Rate (€)	Cost (€)	Source of Unit Rates
Note 2 – Firefighting water requirements at Tipperary County Council – typical commercial water rate						
Note 3 – Allowance for testing and classification of firewater						
Note 4 – Revised rate for transportation to Wastewater Treatment Plant – contractor rate						
Note 5 - Rate for treatment at Wastewater Treatment Plant – contractor rate						
Note 6 – Structural assessment – typical consultant rate						
Note 7 – Civil day rate – assume 3 men – consultant experience						
Note 10 – Crane hire rate – consultant experience						
Note 11 – Consultancy support – typical consultant rate						
Note 12– Transportation rate – contractor rate, assumed quantity – not possible to quantify at this juncture						
Note 13 - Disposal of rubble, steel etc. – assumed quantity – not possible to quantify at this juncture. Assume disposal to landfill as worst case – landfill rate of €115/tonne						
Note 14 - A steel credit will apply but a demolition contract cost is presented based on consultant knowledge of similar event, pro rata; extent of building damage cannot be quantified at this juncture						
Note 15 - Labour hire rate – consultant experience						
Note 16 – Loading shovel hire rate – consultant experience						
Note 17 – Transportation of soiled waste – contractor rate; 100 tonnes representing an assumed 3 days of waste acceptance at the facility						
Note 18 – Disposal of soiled waste – landfill rate						
Note 19 – Allowance for works agreed with identified contractor in event of fire						
Note 20 – Allowance for required testing – cannot quantify sampling requirements at this juncture						
Note 21 – Pumping and transportation rate – quantity as per previous analysis						
Note 22 – WWTP rate – quantity as per previous analysis						
Note 23 – Allowance for haz disposal of 50 tonnes of hydrocarbon contaminated soils						
Note 24 –Allowance in the event of fish restocking requirement in Ardgregane Stream						
Note 25 – Allowance for contractor works associated with unblocking of drainage ditch and re-instatement of same						
Note 26 – Allowance for the installation of 2 no. groundwater wells on site						
Note 27 – Allowance for the pumping and disposal of contaminated groundwater from groundwater wells – based on FT experience for mobilising contractors for similar work						
Note 28 – Ongoing SW and GW monitoring – allowance						
Note 29 – General consultancy support allowance						
Note 30 – Allowance for AES staff oversight – overtime etc.						
Note 31 – Assumed security requirement during demolition phase						

3.6 Summary & Next Steps

The financial provision to cover the environmental liability at the Nenagh Waste Transfer Station is based on a plausible worst-case scenario. This is the maximum liability that may be incurred and is calculated at **€415,425**.

In adherence with Condition 12.2, AES will update the Statement of Measures and financial provision identified as necessary and as previously outlined, as part of the preparation of the facility Annual Environmental Report.

4 FINANCIAL PROVISION

Financial provision ensures that an available source of funding is maintained for:

- known environmental liabilities that will arise at the time of facility closure
- known environmental liabilities that are associated with the aftercare and maintenance of the facility until such a time as the facility is considered to no longer pose a risk to the environment
- unknown environmental liabilities that may occur during the operating life of the facility

The EPA prepared draft guidance on the matter of financial provision in 2014, entitled "*Draft Guidance on Financial Provision*". The steps in the agreement of the financial provision assessment process are shown in Figure 4-1.

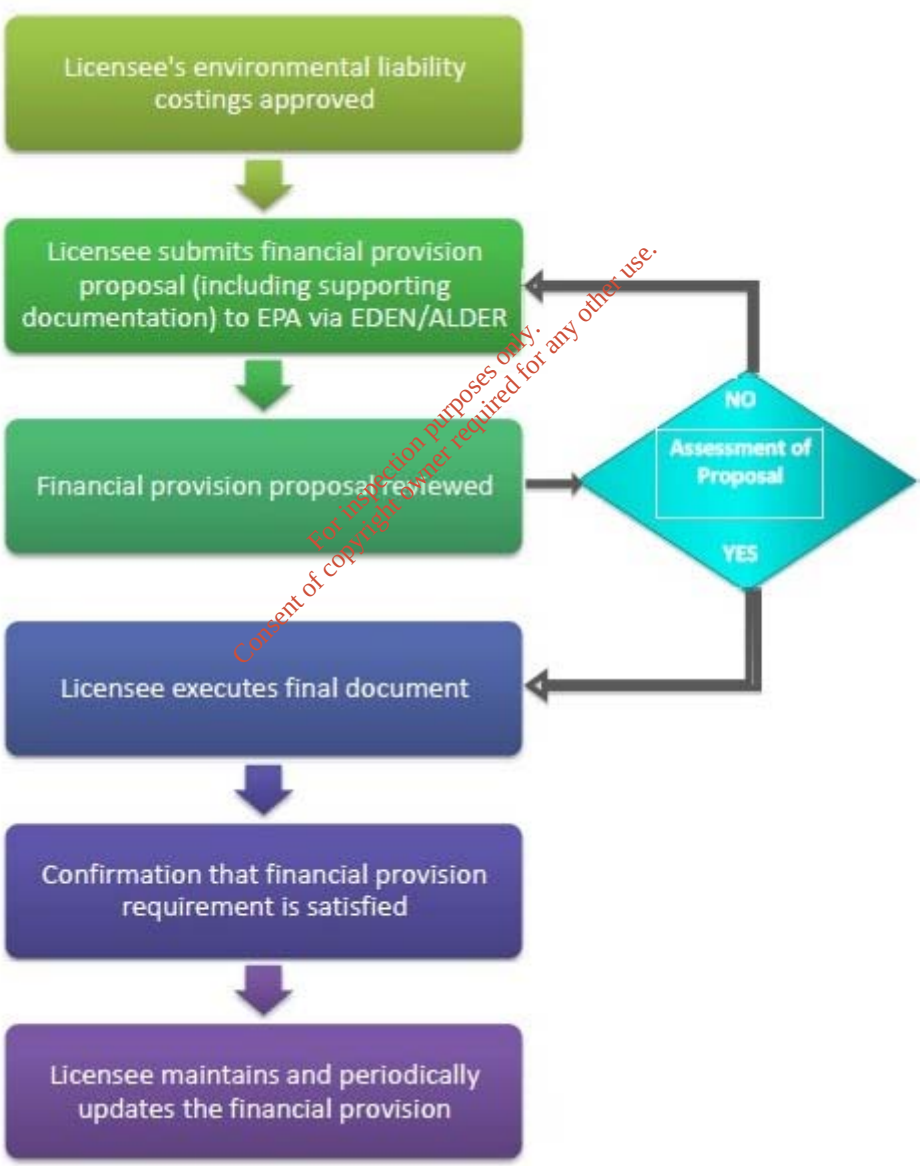


Figure 4-1: Steps in Financial Provision assessment process

Section 4 of the draft Guidance suggests the following appropriate measures as appropriate financial provision instruments:

- Secured fund
- On-demand performance bond
- Parent Company guarantee
- Insurance
- Charge on Property

This document presents the likely costs to be associated with the environmental liabilities of the worst case risk events to be associated with site operations. As per the first step shown in Figure 4-1, agreement of the environmental liability costings with the EPA is required prior to identification of the appropriate financial provision instrument.

To this end, this ELRA document is submitted for agreement to facilitate the further stages in the financial provision assessment process.