ELRA/RMP Update 2009

Environmental Liabilities Risk Assessment 2009

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1. INTRODUCTION

1.1. Background

Wyeth Nutritionals Ireland (WNI) was granted an IPPC licence, Register No. P0395-02, by the Environmental Protection Agency on 24th January 2004. This licence was amended on the 26th June 2006 by the amendment document titled 678 S82 (11) and was amended again in July 2007 to account for fuel provisions in the CHP plant. The details of both amendments must be read in conjunction with the licence. The IPPC licence covers:

"*manufacture of Dairy products where the processing capacity exceeds 50 million gallons of milk equivalent per year"*

"the burning of any fuel in a boiler or furnace with a nominal heat output exceeding 50MW"

The Wyeth site is located in Askeaton, Co. Limerick. The Wyeth facility is an integrated manufacturing facility which produces a comprehensive range of Infant Nutritional products, in both canned powder form and Liquid Ready-to-Feed (RTF) form in glass bottles and Tetra-Paks. Can manufacture also takes place on the site.

Condition 15.2 of the operating IPPC licence requires the licensee to arrange for the preparation of an Environmental Liabilities Risk Assessment (ELRA) covering the Wyeth Nutritionals Ireland (WNI) Askeaton site. The ELRA must address liabilities arising from past and present activities and must be completed by an independent and appropriately qualified consultant. Furthermore, the financial provision for the completed ELRA must be reviewed annually and agreed with the EPA.

URS, as an independent and appropriately qualified consultant, was appointed to complete an ELRA. URS completed the original ELRA (date of report 19th August 2005). The second revision in 2007, in addition to updating the ELRA to account for any changes in risk, also accounted for the requirements of the most Recent EPA Guidance Document entitled "*Guidance on Environmental Liability Risk Assessment, Residuals Management Plans and Financial Provision 2006*" (hereafter referred to as the EPA ELRA Guidance Document). The ELRA was again updated in 2008 to account for any changes in risk in the previous year.

This is the fourth revision of the ELRA and will account for any changes in risk since the 2008 ELRA update.

1.2. Environmental Liability Risk Assessments

Any industrial site has the potential to generate environmental liabilities, i.e. damage to the environment which must be remedied, such remediation associated with a quantifiable financial cost.

Environmental liabilities may arise from *anticipated* or *foreseeable* events, i.e. known and quantifiable releases to the environment which arise due to the day-to-day operation of the facility. Examples of such potential liabilities include the long-term management and aftercare of a tailings pond at a mining or minerals refining site or on-site land filling of waste materials. For a site subject to IPPC Licensing, regular emissions to air, water and land have been the subject of detailed quantification and consequence analysis, i.e. assessment of the impact of emissions, during the licence application process. The resulting IPPC licence either establishes emission limits and other conditions at a level which prevents the arising of new liabilities or may require bonding or other secure funding mechanism to cover the expected liability. The latter case applies usually to, for example, on-site land filling activities.

Environmental liabilities may also arise from unanticipated or unforeseen events. Such events may be loosely classified under the following headings:

- events which are *sudden* and which are identifiable as an incident or series of related incidents which give rise to an environmental liability concurrent with the incident or shortly thereafter;
- events which develop gradually or go unnoticed for a long period of time which *gradually* give rise to an environmental liability.

Examples of the former would include explosion/fire or accidental release of chemicals from a storage tank to a watercourse.

An example of the latter would be leaks in underground storage tanks or transfer lines, which would result in the gradual build-up of soil and/or groundwater contamination.

An Environmental Liability Risk Assessment (ELRA) considers the risk of unplanned events occurring during the operation of a facility that could result in unknown liabilities materialising. Based on an initial risk categorisation of the activity into Low, Medium or High risk (refer to Section 3), different approaches are recommended according to the risk category. Simple approaches are proposed for low risk facilities to more detailed site-specific approaches involving detailed environmental liability risk assessment for higher risk facilities.

1.3. Structure of the ELRA

The ELRA report is structured as follows:

Section 2 provides an overview of Wyeth Nutritional Ireland including details of existing process carried out on-site and the buildings and structures present on the site at the time this report was prepared.

Section 3 describes the initial screening and operational risk assessment carried out for the Wyeth facility.

Section 4 provides an overview of the historical environmental liabilities associated with the facility.

Section 5 described the site specific risk assessment which was carried out for the facility. It includes section on Risk Identification, Occurrence Likelihood, Severity Assessment, Risk Evaluation and Prevention/Mitigation

Section 6 describes the financial provisions in place and recommended to deal with any unknown liabilities

Section 7 is the assessment conclusion.

1.4. Independent and Appropriately Qualified Consultants

Condition 15.2.1 requires that the ELRA be carried out by independent and appropriately qualified consultants.

URS is a world-wide environmental consultancy, offering a full range of environmental services. We have been operating in Ireland since 1995, employing a multi-disciplinary staff of highly qualified engineers and scientists. We have completed numerous environmental assessment projects, including environmental due diligence, soil and groundwater investigation and remediation, waste management, IPPC support, EMS support, legal support, and hazard ranking. URS has completed several projects for Wyeth Nutritionals Ireland at their Askeaton site, including Phase I and Phase II assessments, IPPCL compliance audits, hydrogeological investigations, Air Dispersion Modelling and Closure Restoration and Aftercare Management Plans. We are currently monitoring groundwater at the site on a biannual basis to fulfil IPPC licence requirements.

2. OVERVIEW OF WYETH

2.1. The Company

Wyeth Nutritionals Ireland (WNI) is part of the Wyeth Corporation. Wyeth Corporation is a multi-national organisation with global revenue in 2008 of US$22.8 billion and employing 52,000 people worldwide. The company operates a strict environmental policy.

The corporation's financial strength, coupled with their commitment to maintaining their environmental policy indicates that there is both the will and the financial depth to cope with any environmental liabilities that may arise through the operation of the Askeaton site in a responsible manner.

2.2. Site Description and History

Wyeth Nutritionals Ireland (WNI) was established in Askeaton Co. Limerick in 1973 and developed from a green field site status. Over time, the site expanded to the North and now includes a portion of a farm originally adjacent to the north border of the site. The site is adjacent to the main Limerick-Foynes road near Askeaton town. The site is situated in farmland and is bordered on its eastern perimeter by the River Deel, a tributary of the river Shannon.

There are no other notable industrial activities in the immediate surrounds of the Wyeth plant.

The WNI facility is an integrated manufacturing facility which produces and distributes a range of infant nutritional products. The use of hazardous materials on site is limited. Products are manufactured by compounding, sterilisation and homogenisation of liquid and powder milked based raw materials. Products have dedicated process lines. The products are packaged on site and dispatched to customers from the site. Approximately 45% of product is exported to the U.K.

There are approximately 550 permanent personnel employed at the Askeaton site. The facility operates continuously, seven days a week/ twenty-four hours/day.

The production part of the site comprises of 11.5 acres of the total 36 acre site area. The main areas of the production operation are summarised as follows:

RTF-Wet Process	Materials Handling
RTF-Krones Filling Room	Can Manufacturing Plant
RTF-LAN/Barriquand Room	Powder Plant Wet
RTF-Tetra-Pak Filing Line	Canning Lines 2,3,4,5,6
RTF-Packing Line/Warehouse	Pouch Filling Line
Batch Make-up and Dispensing	Tote Bin Filling
Fat Blending	Stickpack Filling Line

Process 1,2,2 X , 3	Utilities Operations
Evaporation/Drying	Laboratory Operations
Dry Blending Plant	Air Abatement Systems
Tote Bin C.I.P Station	CHP Plant
Water Treatment Plant	

The manufacturing operation is supported by a range of Administration, Utilities and Laboratory services on site as well as a new product and process development department.

The CHP plant was commissioned in October 2004 with start up completed during the 1st quarter 2005.

WNI reported that the Askeaton operation is not a Seveso II (Major Accidents Directive) facility.

3. SCREENING AND OPERATIONAL RISK ASSESSMENT

3.1. General

As a starting point in the process, a straightforward risk assessment decision matrix can be used to classify sites according to Low, Medium and High risk and thereby select the specific ELRA and Financial Provision (FP) requirements that will be needed. The risk assessment decision matrix outlined in the EPA's ELRA Guidance Document 2005 was used.

The risk assigned to the facility depends on the complexity of operations at the site, the environmental sensitivity of the receiving environment and the pollution record (compliance history) of the facility.

- **Complexity** – the extent and magnitude of potential hazards present due to the operation of the facility (e.g. a function of the nature of the activity, the volumes of hazardous materials stored on site etc.). A Complexity Band (G1 least complex to G5 most complex) for each class of activity has been assigned and included in a Look-Up Table (Appendix A to the ELRA Guidance Document 2005).
- **Environmental Sensitivity** – the sensitivity of the receiving environment in the vicinity of the facility, with more sensitive locations given a higher score (e.g. the presence of aquifers below the site, groundwater vulnerability, the proximity to surface water bodies and their status, the proximity to sensitive human receptors, etc). The Environmental Sensitivity is calculated on a site-specific basis using a sub-matrix (Table 3.2).
- **Pollution Record** – the compliance history of the facility and whether soil and/or groundwater contamination is present below the site.

Each aspect is multiplied to give the **Total Score** for the facility, and this can be used to place the facility into an appropriate Risk Category as follows:

- Low Risk = Score < 5
- Medium Risk = Score 5 - 9
- High Risk = Score = > 9.

Once this has been completed, the licensee proceeds through the relevant steps of ELRA and Financial Provision (FP) that are considered appropriate for the Risk Category.

3.2. Complexity

The Complexity Band is used to determine the value used in the Operational Risk Assessments as follows:

G1 = 1, G2 = 2, G3 = 3, G4 = 4 and G5 = 5

The relevant complexity band for Wyeth according to the EPA's ELRA Guidance Document 2005 is G3 both relating to the combustion facilities on site >50 Megawatts (but less than 300 Megawatts) and due to the manufacture of dairy products where the processing capacity exceeds 50 million gallons of milk equivalent per year.

Thus, a complexity score of '3' is assigned to WNI.

3.3. Environmental Sensitivity

A sub-matrix for environmental sensitivity for the WNI site is presented in Table 3.2 and is based on an assessment of the site sensitivity presented in Appendix A. The sub-matrix considers 6 key potential environmental receptors and assigns individual scores that are added together to arrive at a total environmental attribute score. The total environmental attribute score is used to look up the environmental sensitivity classification in Table 3.1 below. The environmental sensitivity classification is used in the operational risk assessment to calculate the total score.

The key receptors include:

- Human Beings
- Groundwater
- Surface Water
- Air Quality
- Protected Ecological Sites
- Sensitive Agricultural Receptors

Table 3.1 Environmental Sensitivity Classification

Total Environmental Attribute Score	Environmental Sensitivity Classification
Low <7	1
Moderate 7-12	2
High >12	3

Table 3.2 - Environmental Sensitivity Sub-Matrix

Environmental Attribute	Environmental Attribute Score
Human Occupation	
<50m	**5**
50m-250m	3
250m–1,000m	1
>1km	0
Groundwater Protection	
Regionally Important Aquifer	**2**
Locally Important Aquifer	1
Poor Aquifer	0
Vulnerability Rating – Extreme	**3**
Vulnerability Rating – High	2
Vulnerability Rating - Moderate	1
Vulnerability Rating - Low	0
Sensitivity of Receiving Water	
Class A	3
Class B	2
Class C	**1**
Class D	0
Designated Coastal & Estuarine Waters	2
Potentially Eutrophic Coastal & Estuarine Waters	1
Air Quality & Topography	
Complex Terrain	2
Intermediate Terrain	1
Simple Terrain	**0**
Protected Ecological Sites	
Within or directly bordering protected site	2
<1km to protected site	**1**
>1km to protected site	0
Sensitive Agricultural Receptors	
<50m from site boundary	**2**
50m-150m from site boundary	1
>150m from site boundary	0

Note 1 – The environmental attribute, which is relevant to the WNI facility is underlined – the reasoning for the selections are explained in Appendix A Site Characterisation.

Scores in Table 3.2 appropriate for WNI are underlined in bold font typeface. Based on the above Environmental Sensitivity Sub-Matrix, the total environmental attribute score for Wyeth is 14 which indicates that that the Environmental sensitivity Classification (referring to Table 3.1) for the site and surrounds is 'High' with an assigned score of '3'.

3.4. Pollution Record

The pollution record score is derived from the compliance record of the facility and whether significant ground contamination is present below the facility.

For newly licensed facilities and those operating without non-compliance of emission limits, then these are classified as **Compliant/New Facility** and have a score of 1.

Licensed facilities with minor non-compliances (< 5 non-compliances in 12 month period) are classified as being **Minor Non-Compliant** and have a score of 2. Facilities with minor soil and groundwater contamination (i.e. those with concentrations above background but not posing risk to the environment) are also considered in the class.

Licensed facilities with major non-compliance history (≥ 5 non-compliances in 12 month period) and/or those with significant soil and groundwater contamination (i.e. requiring remediation and/or long-term monitoring requirements) are classified as **Major Non-Compliant/Significant Ground Contamination** and have a score of 3.

As part of the preparation of the ELRA, documentation relating to IPPC licence compliance, in particular monitoring reports to the EPA were reviewed for 2003, 2004, 2005, 2006 and 2007. This documentation review demonstrated a high compliance level with IPPC licence specified emission limit values. In 2007 there were zero exceedances of emission limit values with respect to boiler emissions or emissions to water. Wastes arising at Wyeth Nutritionals Ireland, comprising largely non-hazardous wastes, are characteristic of a food processing operation.

Another aspect of IPPC licence compliance relates to environmental complaints. Wyeth Nutritionals Ireland have had noise and dust complaints. In 2007, there was one odour complaint and one noise complaint. Complaints are reported to the EPA monthly (except in certain emergency or serious circumstances) and submitted as part of the Annual Environmental Report.

A leak from an underground effluent pipeline in January 2006 resulted in minor contamination of the sub-surface soil and groundwater on the site. However, this impact was temporary and by April 2006 parameter concentrations had returned to normal, indicating the absence of sewage contamination. On the 20 September 2006, a leak from an overground effluent pipeline resulted in the release of process effluent. Some minor contamination was identified in the wells closest to the release.

In 2008 two incidents occurred:

1. On 23rd/24th of January 2008 wastewater ELV for total nitrogen was significantly exceeded due to the spillage of a large quantity of nitric acid from the production process to the wastewater treatment plant. This resulted from an overfill event.

2. On 15th May 2008 there was a spill from an underground drainage pipe that entered the local river. The spill was due to a pumping and alarm failure in a transfer sump

that caused the effluent to backup the pipe network and overflowed at a manhole below ground level.

The detection of major ion and microbial concentrations in groundwater from wells 101, 202 and 203 during 2007 is thought to be a result of influent water flow from the river to the groundwater (See Section 4.3).

Considering the above, a Pollution Record score of '3' is assigned to WNI.

3.5. Risk Category

The proceeding subsections of this section has determined the:

Complexity Score (G4) = 3

Environmental Sensitivity Score = 3

Pollution Record Score = 3

The product of these scores is used to calculate a total score, which is then used to assign the site specific risk category (Table 3.3). The product of the above scores is 27, which according to Table 3.3 below indicates that Risk Category 3 is applicable to the PIP Site.

Table 3.3 – Risk Category

Risk Category	Total Score
Category 1	<5
Category 2	5-23
Category 3	>23

The Wyeth site is classified in Risk Category 3 which infers the overall risk of the facility is high. The guidance provided in the EPA RMP Guidance Document 2006 for such facilities was used when carrying out the remainder of this assessment.

4. HISTORIC ENVIRONMENTAL LIABILITIES

4.1. Releases to Air

There is no evidence to suggest that any historical release to air, either sudden/accidental or gradual arising from the site has resulted in the development of any off-site environmental liability.

With regard to sudden and unexpected incidents, there is no history of:

- major fires or explosions;
- run-away reactions resulting in significant discharge to atmosphere;
- significant accidental releases of hazardous gases.

Regular emissions, via licensed sources, at the site have been subject of a comprehensive monitoring programme, the results of which are forwarded to the EPA on a regular basis.

Any off-site impact of emissions to air which have been noted have been transient in nature, i.e. occasional short-term noise episodes and a once-off dust complaint.

Vegetation on and near the site is in good condition with no evidence of blight or damage due to either atmospheric quality or deposition.

Any required changes or modifications to the understanding of emissions monitoring or interpretation of reporting requirements are agreed with the EPA. Additional reporting requirements, e.g., through regular EPA site inspections, are dealt with promptly by WNI.

4.2. Releases to Surface Water

The River Deel is the receptor for licensed treated wastewater emissions from the facility.

There is no evidence to suggest that releases from the site to the River Deel have had any significant impact or resulted in an environmental liability.

There have been some recorded accidental releases of untreated effluent to the River Deel. An incident occurred in April 2004, when discoloration was noted in the River Deel. An initial investigation by Wyeth Nutritional Ireland revealed that there was a defect in part of the effluent drainage system and this had caused an overflow to ground near the oil and fat skimming pit, which contained effluent. On the 20 September 2006, a leak from an over ground effluent pipeline resulted in the release of process effluent. The release effluent entered fissured rock beneath the gravel surface, with some of the effluent migrating directly to the bank of the River Deel and some of it entering the groundwater in the rock.

With regard to these incidents full survey's and remedial work was completed. There is currently no evidence to suggest that the release from the site to the River Deel has resulted in a medium to long-term environmental liability.

As the products handled at Wyeth Nutritional are readily biodegradable, no significant, long term contamination or deterioration in water quality is predicted.

There is a comprehensive database of monitoring data on the quality of treated effluent. Difficulties had been encountered with regard to exceedance of certain licensed parameters, however none of these events may be considered to be significant in terms of the quality of the receiving waters. More importantly, WNI has spent considerable time and money in improving the operation of the wastewater treatment plant, especially in 2005. This includes the installation and operation of a pilot plant operated under a number of various operating parameters. This work was carried out on request of the Agency. This has resulted in a significant decrease in the number of exceedences of emission limit values relating to the emissions to the River Deel from the wastewater treatment plant. Only two such exceedance occurred since 2005, one in 2006 and another in 2008.

New instrumentation for the on-line measurement of Ammonia, Turbidity and COD prior to discharge was installed in 2006. The ammonia and turbidity analysers became operational in 2007. The COD analyser is not currently being utilised owing to operational problems with it.

4.3. Releases to Ground/ Groundwater

There is no reported history of landfilling or burial of waste material on any part of the site.

Table 4.1 contains a summary of the more historical aspects of releases to ground and groundwater on the site. The incidents summarised in Table 4.1 have been detailed in previous versions of the ELRA.

Table 4.1: Historical incidents leading to soil and groundwater pollution on the site

Date	Incident & Effects	Current Status
2001	Temporary storage of fructose resulting in elevated sugar sourced COD in certain groundwater wells.	Sugar contamination largely flushed from limestone aquifer and significantly reduced well COD concentrations
2001	Defective process drain resulting in slightly elevated pH and COD in groundwater well BH202.	Process drain repaired. Contamination levels reduced.
2004	Effluent overflow from the production areas. Groundwater in the area of well 202 was impacted, with an elevated COD.	COD had declined to below detection limits within several days.

Date	Incident & Effects	Current Status
2006	In January defective underground process effluent pipeline resulted in the release of process effluent and domestic sewage derived from the RTF process building, resulting in increased major ion concentrations and electrical conductivity in well 202. In September, a leak from an over-ground effluent pipeline resulted in the release of process effluent, resulting in the elevated major ion concentrations, COD and presence of coliforms in wells 101, 202 and 203.	Continuous groundwater monitoring confirmed that impact on groundwater quality was temporary.

Site management confirmed that all wastes generated on-site since the commencement of site operations have been either recycled, disposed of to local authority landfill, by a licensed composting facility, or disposed via specialist hazardous waste management contractors (exported for recycling or incineration). There is no evidence to suggest that any waste generated at the site has resulted in any off-site liabilities.

In April 2007 major ion results were within their normal concentration ranges with the exception of chloride in well 202. BOD concentrations were also within their normal ranges when compared with previous monitoring rounds, however the sample for well 203 returned significantly elevated results for faecal and total coliforms. This high result suggests impact from sewer effluent in the vicinity of well 203, which may be related to the leak in September 2006. Wyeth have confirmed that there have been no leaks in the sewer system since that time.

Wells 202 and 203 were re-sampled in July 2007. Surface water from the River Deel was also sampled in July as a result of an EPA recommendation. The concentration of chloride in well 202 has declined compared to that recorded in April 2007. Concentrations of chloride in well 202 have fluctuated over time and may reflect differing brackish conditions in the adjacent River Deel during different stages of the tidal cycle. Similarly, the presence of coliforms in groundwater from wells adjacent to the River Deel may reflect influent water flow from the river into groundwater as coliform counts in the river are significantly higher than in the adjacent wells.

Major ion and microbial concentrations in groundwater from wells 101 and 202 were again elevated in October 2007 and December 2007, which is likely to be a result of influent water flow from the river to the groundwater.

Following the detection of faecal and total coliforms in groundwater from well 203 in April and July 2007 the EPA requested that all groundwater monitoring wells on site be sampled for faecal and total coliforms on a quarterly basis. The EPA also requested that

water from the River Deel (upstream and down stream off the site) and discharge effluent from Wyeth's wastewater treatment plant be sampled during quarterly monitoring rounds.

A decrease in major ion concentrations and microbial concentrations was recorded in continuously throughout 2008, with exception of total and faecal coliforms results in groundwater from BH202 being recorded at their highest concentrations in February 2008 since monitoring for bacteriological parameters began in July 2007.

There appears to be negative impact on the groundwater quality adjacent to the River Deel in terms of COD and bacteriological quality, thought to be due to the Limerick County Council sewage discharge to the River Deel from their sewage treatment facility within the Wyeth site. This influence on groundwater quality is illustrated by the elevated faecal coliform result for groundwater from well BH202, adjacent to the outfall from the Limerick County Council sewage facility.

The incidents in 2006 resulted in a detailed test programme and risk assessment of underground pipelines where there is a pumped flow involved. Remedial works are well underway, with remaining works due to be completed during 2009. Also there are new secondary bunds around four mixed process tanks. There is now a bund solely designated to the storage of waste solvent drums.

All incidents reported above have involved one-off incidents with short-lived impacts on groundwater. As the products handled at Wyeth are highly biodegradable (milk powder and sugars) no significant, long-term contamination of the soil or underlying bedrock aquifer are predicted.

Localised hydrocarbon contamination around fuel storage facilities is possible but has not been evident in groundwater sampling to date.

The current management strategy for groundwater is based on quarterly monitoring to confirm the absence of contaminants in groundwater concentrations. Assuming that the decrease of contaminants continues, the total cost of this management strategy is estimated to lie in the region of €13,000 per annum over the next year. These costs are not significant in terms of total site financial turn-over.

5. HIGH RISK FACILITY – SITE SPECIFIC ELRA

5.1. General

For High Risk facilities such as WNI, a detailed site specific ELRA should be conducted. The objectives of the proposed ELRA are:

- To identify and quantify environmental liabilities at the facility focusing on: unplanned, but possible and plausible events occurring during the operational phase.
- To calculate the value of financial provisions required to cover unknown liabilities.

- To identify suitable financial instruments to cover each of the financial provisions; and
- To provide a mechanism to encourage continuous environmental improvement through the management of potential environmental risks.

The proposed methodology is based on that provided in the EPA ELRA Guidance Document 2006. This detailed assessment includes a Risk Management Programme for the mitigation and management of any environmental liabilities identified at WNI. This programme is not required for the calculation or implementation of a financial provision at a facility. However, such a programme would encourage continuous environmental improvement and the reduction of environmental liabilities.

The ELRA covers environmental risks leading to a potential or anticipated liability. Environmental risks will be deemed to cover all risks to: surface water, groundwater, atmosphere, land and human health.

5.2. Methodology - Risk Identification, Likelihood and Consequence

The following steps were undertaken as part of the site specific ELRA;

- Risk Identification
- Risk Classification (includes an Occurrence Assessment and a Severity Assessment)
- Risk Evaluation
- Risk Prevention/Mitigation

5.2.1. Risk Identification

Risks were identified on the site through a combination of:

1. What-if analysis - A suggested method of carrying out this process is to initially identify all the 'processes' on site, list the hazards associated with each process, identify potential causes of failure of the processes and analyse the effect impacts on the environment.
2. Site Visit – A one day site visit of the facility was carried out to examine all process areas, storage areas and associated utilities present at the WNI Site.

Table 5.1: Example Hazard Identification Table

Risk ID	Potential Hazard	Environmental Effect
1	Describe scenario for occurrence of potential liability e.g. spill of acid from acid storage tank.	Describe consequence of proposed scenario e.g. spill of acids goes to the River Deel.

5.2.2. Risk Classification - Occurrence Analysis

Having identified the potential risk, the likelihood of its occurrence needs to be assessed. An analysis of historical data and existing environmental controls was the method used for estimating likelihood of identified potential risks occurring at WNI.

Table 5.2 provides the means to quantify the likelihood of occurrence.

Table 5.2: Risk Classification Table - Occurrence

Rating/ Score	*Category*	*Description*	*Likelihood of Occurrence (%)*
1	Very Low	Very low chance of hazard occurring in 30 yr period	0-5
2	Low	Low chance of hazard occurring in 30 yr period	5-10
3	Medium	Medium chance of hazard occurring in 30 yr period	10-20
4	High	High chance of hazard occurring in 30 yr period	20-50
5	Very High	Very high chance of hazard occurring in 30 yr period	>50

5.2.3. Risk Classification - Severity Assessment

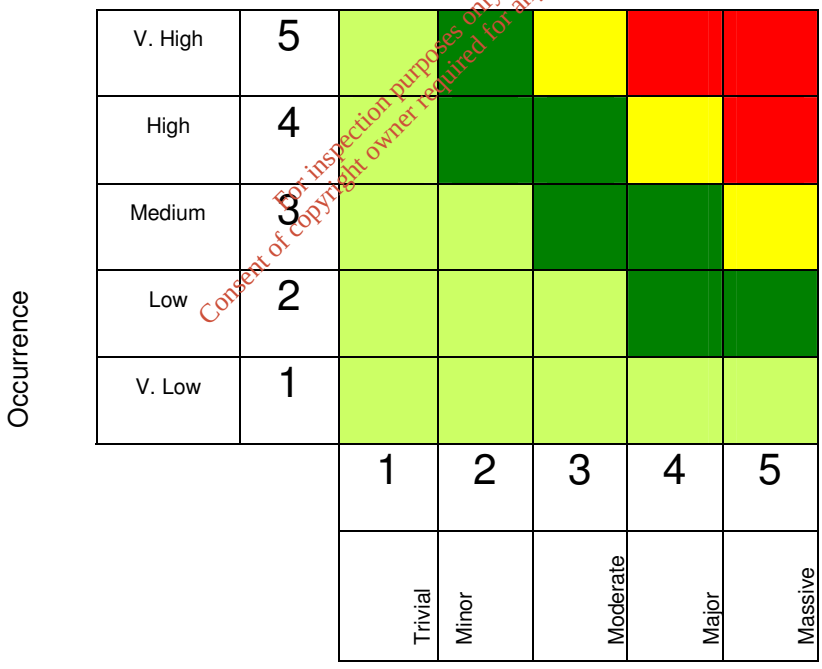
Once the environmental impact had been identified one of the following consequences is assigned.

Table 5.3: Risk Classification Table - Severity Criteria

Rating/ Score	*Category*	*Description*	*Cost of Remediation (€)*
1	Trivial	No damage or negligible change to the environment	<1,000
2	Minor	Minor impact/localised or nuisance	1,000-10,000
3	Moderate	Moderate damage to the environment	10,000-100,000
4	Major	Severe damage to the environment	100,000,000-500,000
5	Massive	Massive damage to a large area, irreversible in medium term	>500,000

5.2.4. Risk Evaluation

Having identified the hazard and decided on its likelihood and severity the significance of the risk is assigned. A risk score is determined by multiplying the occurrence score by the severity score. The risk scores can be tabulated in a risk matrix.



Where:

- **Red** – These are considered to be high-level risks requiring priority attention. These risks have the potential to be catastrophic and as such should be addressed quickly.

- **Amber / Yellow** – These are medium-level risks requiring action, but are not as critical as a red coded risk.
- **Green (light and dark green**) – These are lowest-level risks and indicate a need for continuing awareness and monitoring on a regular basis. Whilst they are currently low or minor risks, some have the potential to increase to medium or even high-level risks and must therefore be regularly monitored and if cost effective mitigation can be carried out to reduce the risk even further this should be pursued.

For all risks ('high', 'medium' or 'low') an insurance policy or other financial instrument must be put in place to cover any liabilities.

With regard to 'medium' and 'high' risks the licensee must detail in the ELRA how these risks will be made 'acceptable'.

With regard to liabilities that are not covered by insurance, or other financial instrument, the licensee must indicate how these liabilities will be underwritten in the future.

5.2.5. Risk Prevention/Mitigation

Mitigation measures are assigned to each risk and each Risk Score is revised using post-mitigation severity and occurrence rankings. The risks are then re-ranked and tabulated in the risk matrix to illustrate the overall degree of risk reduction resulting from the risk mitigation measures. Where appropriate, the mitigation measures are accepted for implementation. A Risk Management Programme is then prepared which allocates a Risk owner for the ongoing management of risks and the implementation of risk mitigation measures. Timeframes are also allocated for the implementation of each risk mitigation measure.

5.3. Identification of Risks at WNI

Through a combination of site visits and utilising information supplied by WNI URS identified all of the key 'processes' (key relating to environmental risk) on site, listed the hazards associated with each process and identified any potential causes of failure of the processes. If any effect to the environment could be perceived from the failure the effect was analysed and so the potential failure became a Risk. A Risk Register was developed which contained all the Risks identified on site. Table 7.4 illustrates the Risk Register.

Table 5.4: - WNI Risk Register

Risk ID	Potential Failure Mode
1	Wastewater treatment plant overflow
2	Wastewater treatment plant overloading and so failure of biological treatment
3	Release of petroleum oil product to ground or surface water
4	Accidental spillage of hazardous chemicals in yard areas during transport to and from local storage (e.g., chlorine based disinfectants, detergents, thinners, coating laquor)
5	Accidental spillage of drummed solvents and laquor in the waste storage compound
6	Accidental release of food oils from ISO tanker parking areas
7	Failure of underground pipelines or sumps
8	Failure of over ground secondary containment
9	Overfilling of process storage tanks
10	Misclassification of waste that can enter the food chain
11	Loss of containment of contaminated firewater
12	Contamination of by-product sold as animal feed
13	Site Closure
14	Blocking of dryer cyclone
15	Generation of odours

These risks were assessed against the risk classification tables (RCTs) as provided in Table 5.2 and 5.3. The risk classification table was designed to reflect the critical levels of risk appropriate to the WNI site. Ratings, taken from a risk classification table, were applied to the severity and chance of occurrence of each risk. Table 5.5 below illustrates the assessment carried out for each risk in terms of its severity and likelihood of occurrence.

Table 5.5 – Risk Assessment

Risk ID	Process	Potential Hazard	Environmental Effect	Occurrence Rating	Basis of Occurrence	Severity Rating	Basis of Severity
1	Operation of Wastewater Treatment Plant	Wastewater treatment plant overflow	Pollution of River Deel and potential impact on groundwater	1	No previous incidents in 33 years of WNI operation. Adequate space volumetric capacity is maintained in the Balance Tank and the SBR's.	3	Due to proximity to tidal zone and non-hazardous nature of effluent, short/medium term effect but large quantity of wastewater.
2	Operation of Wastewater Treatment Plant	Wastewater treatment plant overloading and so failure of biological treatment	Release of partially treated wastewater to the River Deel and threat of pollution	2	One IPPCL ELV breach in 2008. New better management of process tanks. Procedures and training implemented.	3	Effluent would be partially treated
3	Storage of marked gas oil and HFO	Release of petroleum oil product to ground or surface water	Pollution of soil and groundwater	2	No history of oil pollution of soil or groundwater on the site. However, that is not to say there is no contamination. Further, URS experience is that some contamination can be common in older facilities. Bunded area that has been integrity testing.	2	Vulnerable aquifer but oil products not very mobile and contamination would probably be localised.

Table 5.5 – Risk Assessment

Risk ID	Process	Potential Hazard	Environmental Effect	Occurrence Rating	Basis of Occurrence	Severity Rating	Basis of Severity
					Interceptor on site.		
4	Transport of chemicals to and from local storage	Accidental spillage of hazardous chemicals in yard areas during (e.g., chlorine based disinfectants, detergents, thinners, coating laquor)	Pollution of River Deel through migration of pollutants through the surface water drainage system	1	No previous incidents in 33 years of WNI operation	4	Amounts released probably small due to storage in small drums. However, chlorine product largest risk with large adverse impact on salmonid population in the river possible, even in small quantities.
5	Current storage arrangements	Accidental spillage of drummed solvents and laquor in the waste storage compound. Protective drain blocked with silt.	Potential pollution of soil and groundwater immediate to storage areas	1	No previous incidents in 33 years of WNI operation. Waste storage compound upgrade complete.	3	Solvent containing materials, including toluene, with vulnerable and regionally important aquifer beneath the site. Maximum possible amount of spillage is 1000 Litres.
6	Parking of ISO tankers	Accidental release of food oils from ISO tanker parking areas	Potential pollution of soil and groundwater immediate to storage areas	1	No previous incidents in 33 years of WNI operation	3	Large quantity of product loss possible. However, non-hazardous material.

Table 5.5 – Risk Assessment

Risk ID	Process	Potential Hazard	Environmental Effect	Occurrence Rating	Basis of Occurrence	Severity Rating	Basis of Severity
7	Process effluent and domestic effluent drainage	Failure of underground and overground pipelines or sumps	Potential pollution of soil and groundwater and possibly River Deel (depending on nature of failure)	5	Four recorded incidents between 2004 and 2008. However, on-going testing and repair programme implemented. An underground pipe report was completed involving hydrostatic inspections and CCTV. Recommendations from the underground survey is 40-50% completed and is expected to be 100% completed by January 2010. Improvements included replacement of some pipes and manholes and some pipes were brought above ground.	3	Costs to date relating to remediation of environment from known spills.
8	Storage of potentially polluting	Failure of over ground secondary containment or	Potential pollution of soil and groundwater and possibly River	2	No previous incidents in 33 years of WNI operation but known	4	Releases likely to be observed early. However, with high BOD

Table 5.5 – Risk Assessment

Risk ID	Process	Potential Hazard	Environmental Effect	Occurrence Rating	Basis of Occurrence	Severity Rating	Basis of Severity
	materials	lack of secondary containment	Deel (depending on nature of failure)		secondary containments shortfalls. However, there are new secondary bunds around two of the four mixed process tanks with bunding of the remaining two tanks currently underway.		dairy based material storage, sudden and large releases of such material could have a high impact.
9	Bulk storage of liquid raw materials	Overfilling of process storage tanks	Release of potentially polluting substances to River Deel and/or soil	3	Prior to 2008, no incidents in 33 years of WNI operation. Overfilling incident in 2008, leading to dumping of a large quantity of nitric acid from the production process, wastewater ELVs exceeded.	2	Large release directly to ground & groundwater or surface water possible however, good management of the process tanks and secondary containment and improved instrumentation.
10	Waste Management	Misclassification of waste that can enter the food chain	Health effects on animals or humans	1	No previous incidents in 33 years of WNI operation	4	By-products in question not contaminated with substances that can significantly adversely effect animal or human

Table 5.5 – Risk Assessment

Risk ID	Process	Potential Hazard	Environmental Effect	Occurrence Rating	Basis of Occurrence	Severity Rating	Basis of Severity
							health. However, given recent lawsuits with another Wyeth facility,the financial exposure from any contamination event, regardless of risk, could be significant.
11	All processes	Loss of containment of contaminated firewater	Potential pollution or River Deel and/or groundwater	1	No previous incidents in 33 years of WNI operation	4	Assumes large fire and so generation of large volumes of firewater
12	All processes	Contamination of by-product sold as animal feed	Health effects on animals or humans	1	No recorded incidents	4	By-products in question not contaminated with substances that can significantly adversely effect animal or human health. However, given recent lawsuits with another Wyeth facility , the financial exposure from any contamination event, regardless of risk, could be significant.

Table 5.5 – Risk Assessment

Risk ID	Process	Potential Hazard	Environmental Effect	Occurrence Rating	Basis of Occurrence	Severity Rating	Basis of Severity
13	Site Closure	Residual environmental pollution. Accidental release of potentially polluting substances. Mis-management of waste.	Various	1	Proposed/Expected lifetime of production building, etc.	5	Costs associated with Site closure – See RMP
14	Air emissions from dryers	Blocking of cyclones resulting in dust deposition	Nuisance	2	Only one dust complaint received in recent years. Wyeth are currently considering continuous monitoring of the dryers.	2	Localised impact
15	Various	Odorous Fugitive Emissions	Odour Nuisance	2	Only one odour complaint received in recent years.	2	Localised impact

5.4. Assessment of Risks at WNI

5.4.1. Risk Register

The risk register below ranks the risks in order to prioritise mitigation and management measures.

Table 5.6 Risk Register ranked by Risk Score

Risk ID	Description	Occurrence	Severity	Overall
7	Failure of underground pipelines or sumps	5	3	15
8	Failure of over ground secondary containment	2	4	8
9	Overfilling of process storage tanks	3	2	6
2	Wastewater treatment plant overloading and so failure of biological treatment	2	3	6
13	Site Closure (refer to Table 5.5 for risk descriptions).	1	5	5
10	Misclassification of waste that can enter the food chain	1	4	4
12	Contamination of by-product sold as animal feed	1	4	4
3	Release of petroleum oil product to ground or surface water	2	2	4
1	Wastewater treatment plant overflow	1	3	3
4	Accidental spillage of hazardous chemicals in yard areas during transport to and from local storage	1	4	4

Table 5.6 Risk Register ranked by Risk Score

Risk ID	Description	Occurrence	Severity	Overall
	(e.g., chlorine based disinfectants, detergents, thinners, coating laquor)			
11	Loss of containment of contaminated firewater	1	4	4
14	Dust emissions from dryers	2	2	4
15	Generation of odour's	2	2	4
5	Accidental spillage of drummed solvents and laquor in the waste storage compound	1	3	3
6	Accidental release of food oils from ISO tanker parking areas	1	3	3

5.4.2. Risk Matrix

The risk matrix below, specific to WNI, pictorially indicates the critical nature of each risk. (Risk ID's from the Risk Register have been used to complete this matrix.)

Table 5.7 – Risk Matrix (specific to WNI)

Occurrence						
V. High	5			7		
High	4					
Medium	3		9			
Low	2		3,14,15	2	8	
V. Low	1			1,5,6	4,10,11 12	13
		1	2	3	4	5
		Trivial	Minor	Moderate	Major	Massive

Severity

Where:
Red is a high level risk.
Yellow is a medium level risk.
Green (light and dark) is a low level risk.

Table 5.7 above indicates that there are no high level or medium level risks that require immediate action. All 14 risks identified are located in the green zone (light and dark) indicating a need for continuing awareness and monitoring on a regular basis.

Further assessment of all zone risks indicates that many of these risks can be reduced through the implementation of mitigation measures. These measures are outlined in the following section of this report.

5.5. Risk Prevention, Mitigation and Management

The risk assessment and categorisation phase identified one risk in the yellow amber zone which requires mitigation and management action. Mitigation and management actions identified and implemented for this risk should be a matter of priority, whilst all other risks (green zone) require monitoring on a regular basis.

However, the green zone risks may have the potential to increase to yellow or red zone risks, and where additional risk management measures are available to manage them at their current levels or reduce them further, these should be implemented if considered cost-effective.

Table 5.8 illustrates the recommended risk mitigation measures identified during the this assessment. Such measures are currently well in place at WNI or have been planned as part of the company's Environmental Management Programme. This table provides the risks in descending order of risk score with the proposed mitigation measure. The current controls are also provided.

Table 5.8 Risk Mitigation Form

Risk ID	Process	Potential Hazard	Risk Score before Mitigation	Possible Mitigation measures	Time to Complete	Revised Risk Score
7	Process effluent and domestic effluent drainage	Failure of underground pipelines or sumps	15	Ongoing risk assessment and action plan to remediate system. (Repairs not completed)	1 year	15
8	Storage of potentially polluting materials	Failure of over ground secondary containment or inadequate secondary containment	8	Risk assessment of current arrangements underway and programme to address shortfalls in place. Additional secondary containment being provided, especially for process tanks.	ongoing	5
9	Bulk storage of liquid raw materials	Overfilling of process storage tanks	6	Fitting process storage tanks with high level alarms and automatic fill shut off.	Complete	2
13	Site Closure	Various	5	Preparation of Residuals Management Plan (RMP) and appropriate financial provision which would be updated on an annual basis	Initial draft to complete in 2005 with an annual updates completed thereafter.	5
2	Operation of Wastewater Treatment Plant	Wastewater treatment plant overloading and so failure of biological treatment	6	Improvement programme for control of emissions to water not implemented in 2008-9 due to high costs.		6

Table 5.8 Risk Mitigation Form

Risk ID	Process	Potential Hazard	Risk Score before Mitigation	Possible Mitigation measures	Time to Complete	Revised Risk Score
3	Storage of marked gas oil and HFO	Release of petroleum oil product to ground or surface water	4	Existing Controls are adequate. Remediating the bund for the tank	Ongoing	3
10	Waste Management	Misclassification of waste that can enter the food chain	4	Existing controls deemed adequate.	Ongoing	4
12	All processes	Contamination of by-product sold as animal feed	4	Existing Controls are adequate.	Ongoing	4
1	Operation of Wastewater Treatment Plant	Wastewater treatment plant overflow	3	Existing Controls are adequate. However, WNI continues to improve the design and performance of the plant and implementing the experiences gained from operating the pilot plant.	Ongoing	3
4	Transport of chemicals to and from local storage	Accidental spillage of hazardous chemicals in yard areas during transport)	4	Provision of specially designed mobile bund units and adequate securing of drums to unit	Ongoing	2

Table 5.8 Risk Mitigation Form

Risk ID	Process	Potential Hazard	Risk Score before Mitigation	Possible Mitigation measures	Time to Complete	Revised Risk Score
5	Current storage arrangements	Accidental spillage of drummed solvents and laquor in the waste storage compound	3	Upgrade to the waste storage compound complete. Existing Controls are adequate following completion of detailed risk assessment in 2007.	Ongoing	2
6	Parking of ISO tankers	Accidental release of food oils from ISO tanker parking areas	3	Existing Controls are adequate following completion of detailed risk assessment in 2007.	Ongoing	2
12	All processes	Loss of containment of contaminated firewater	4	Existing Controls are adequate. However, WNI continues to improve the design and performance of the plant	Ongoing	2
14	Air emissions from dryers	Blocking of cyclones resulting in dust deposition	4	Existing controls are adequate. Continuous monitoring of cyclones is currently being considered.	Ongoing	2
15	Various	Generation of odour's on site	4	Existing Controls are adequate.	Ongoing	2

The revised risk matrix below indicates the critical nature of each risk when considered with the mitigation measures described in table 5.8 above.

Table 5.9: - Revised Risk Matrix for WNI

Occurrence						
V. High	5			7		
High	4					
Medium	3					
Low	2			2		
V. Low	1		4,5,6,9, 11,14,15	1, 3		8, 10, 12, 13
		1	2	3	4	5
		Trivial	Minor	Moderate		Massive

Severity

Where

- Red is a high level risk
- Yellow is a medium level risk
- Green (light and dark) is a low level risk

Table 5.9 above indicates that, based on current mitigation programmes and risk assessments, most of the identified risks can be confined to very low risk ratings.

Risk ID No. 7 is assigned medium level risk due to the remaining portion of underground drainage scheduled for repair and given the sump failure incident in May 2008. The testing & repair programme should be completed by mid 2009.

Once existing programmes of improvement and monitoring are maintained, then such risks should remain at the revised levels. However, any significant deterioration in control programmes can elevate individual risks to higher levels in the future.

5.5.1. Quantification of Unknown Environmental Liabilities

The costs associated with the known environmental liabilities (e.g. closure and aftercare costs and on-site contamination) for the WNI facility were calculated through the preparation and costing of the RMP (refer to Site Specific RMP prepared for WNI).

For the unknown liabilities identified in this report a financial model is necessary to estimate the environmental liability associated with these risks.

Each Risk has two characteristics that are derived from the Risk Classification Tables (See tables 5.2, 5.3 and as applied in Table 5.5) that are used in the financial models and as revised through consideration of risk mitigation measures (refer to Table 5.8):

• The range in probability (X-Y%) of the risk occurring

• The range in cost implications (€A-B) if the risk occurs

The requirements of the financial model must first be defined in terms of worst, most likely or best case scenarios. If the model is for the worst case scenario, then the higher end of each range is used in the calculations, if the model is for the most likely case then the median of each range is used and similarly if the best case scenario is required then the lower end of each range is used resulting in the lowest cost.

The simplest form of financial model can be based on simply multiplying the minimum, median or maximum value of each range for each Risk (depending on the scenario considered) and totaling the values for each Risk in the Register.

For the WNI facility the worst case scenario was calculated. Table 5.10 illustrates how the financial output for the worst case scenario is calculated.

From this, financial instruments for unknown liabilities can be selected as outlined in Section 6 of this report.

Table 5.10 – Worst Case Scenario Financial Model

Risk ID	Potential Hazard	Revised Occurrence Rating	Likelihood of Occurrence Range (%)	Revised Severity Rating	Cost Range (€)	Worst Case Probability (%) A	Worst Case Severity (€) B	Most Likely Cost (€) = A x B
7	Failure of underground pipelines or sumps	4	20 to 50	3	10,000 to 100,000	50	100,000	50,000
13	Various issues due to Site Closure	1	0 to 5	5	500,000 to 1,500,000	5	1,500,000	1.5 million (*)
8	Failure of over ground secondary containment	1	0 to 5	3	10,000 to 100,000	5	100,000	5,000
2	Wastewater treatment plant overloading and so failure of biological treatment	2	5 to 10	3	10,000 to 100,000	10	100,000	10,000
3	Release of petroleum oil product to ground or surface water	1	0 to 5	3	10,000 to 100,000	5	100,000	5,000
10	Misclassification of waste that can enter the food chain	1	0 to 5	4	500,000 to 1,500,000	5	1,500,000	75,000
12	Contamination of by-product sold as animal feed	1	0 to 5	4	500,000 to 1,500,000	5	1,500,000	75,000

Risk ID	Potential Hazard	Revised Occurrence Rating	Likelihood of Occurrence Range (%)	Revised Severity Rating	Cost Range (€)	Worst Case Probability (%) A	Worst Case Severity (€) B	Most Likely Cost (€) = A x B
1	Wastewater treatment plant overflow	1	0 to 5	3	10,000 to 100,000	5	100,000	5,000
4	Accidental spillage of hazardous chemicals in yard areas during transport)	1	0 to 5	2	1,000 to 10,000	5	10,000	500
5	Accidental spillage of drummed solvents and laquor in the waste storage compound	1	0 to 5	2	1,000 to 10,000	5	10,000	500
6	Accidental release of food oils from ISO tanker parking areas	1	0 to 5	2	1,000 to 10,000	5	10,000	500
9	Overfilling of process storage tanks	1	0 to 5	2	1,000 to 10,000	5	10,000	500
11	Loss of containment of contaminated firewater	1	0 to 5	2	1,000 to 10,000	5	10,000	500
14	Dust depositions from dryers	1	0 to 5	2	1,000 to 10,000	5	10,000	500
15	Generation of Odour's	1	0 to 5	2	1,000 to 10,000	5	10,000	500

Note 1: The costs associated with a closure of the facility or with remediation of contaminated soils and groundwater are dealt with in the Residual management Plan along with details of the financial provisions in place to deal with this.

(*) This figure is used instead of the calculation procedure described in Section 5.5.1 since the revised Residuals Management Plan, dealing with site closure, has separately provided a cost estimate (shown in this table).

6. FINANCIAL PROVISION

6.1. Current Financial Provisions

There are two financial provisions that are relevant to this study that are in currently in place at WNI:

1. Wyeth is 'self-insured', i.e., any costs will be covered by trading revenue, against all liabilities;

2. WNI has provided the EPA with a letter of financial guarantee relating to meeting the requirements of a Residuals Management Plan. The RMP includes for residual soil and groundwater contamination that may be present at cessation since the RMP must be updated annually. This letter is provided as Appendix B;

6.2. Assessment of WNI Financial Provision

The environmental liabilities identified and assessed in this report (refer to Section 5) are unforeseen or unanticipated events that could occur suddenly but with only short to medium term impact likely. The exceptions to this are:

1. Risk ID 7: Underground pipeline or sump failure. The hazard event can either be unforeseen and sudden (e.g., the January 2006 incident described in Section 4), or gradual. However, if the hazard event is gradual, the current risk assessment and testing programme should limit the timeframe over which the event occurs, i.e, a leak, thus limiting the resulting impact;

2. Risk ID 3: Release of petroleum product release to ground. Again, there are two ways of looking at this risk. The associated hazard event can be an unforeseen or sudden, e.g., if there is a sudden tank failure and/or bund failure. There could also be a gradual hazard event associated with oil storage through historical oil storage over time that may be present but not identified. However, current groundwater monitoring data for groundwater beneath the site does not suggest any significant oil product contamination;

3. Risk ID 13: Site Closure. This risk is a well defined event and has been described and costed in the revised Residuals Management Plan for the WNI site.

Having consideration for the 'most likely' costs calculated in Table 5.10, and the above discussion on the types of risk involved, a comparison of existing financial provisions presented in Section 6.1 above may be made with the suggested financial provisions contained in the tables provided in Section 5 of the EPA Guidance Document. Extracts from Table 5.3 of the EPA Guidance Document is compared with existing Financial Provisions (FP) at WNI in Table 6.1.

Table 6.1 – Assessment of WNI Financial Provision

Table 5.3 of EPA Guidance – Recommended & Appropriate FP	**Existing WNI Financial Provision**	**Comment**
Short-Medium Term Unknown Liabilities: - Insurance	Self-insured, i.e, cover expenditure with available cash flow	Wyeth worldwide has revenue and profit at the billions level.
Short term unknown liabilities, subsidiary operations of large reputable parent organisation: - Parent Company Guarantee	WNI Guarantee Letter (Appendix B).	This letter was written to include underwriting the RMP. Note that this letter must get parent company approval before issue.
Known Closure Restoration and Aftercare Liabilities: - Cash Deposits	WNI Guarantee Letter (Appendix B).	This letter was written to include underwriting the RMP. Note that this letter must get parent company approval before issue.

Therefore, it is unlikely that WNI requires any additional financial provisions beyond those detailed in Section 6.1.

7. CONCLUSIONS

The Wyeth Nutritional Ireland site at Askeaton is well defined in terms of historic and current environmental impacts. The site has been subject to Phase I and II due diligence audits, and is subject to an on-going monitoring programme for releases to air and water as well as surveillance of groundwater.

The overall site sensitivity to environmental liabilities is moderate to low. This has been concluded based on a detailed assessment provided in Section 5.

There was no significant historic environmental liability identified at the site.

The current environmental management programme on the site has reduced the risk of the development of new significant environmental liabilities to a low level.

No scenarios have been identified which could result in environmental liabilities that would threaten the financial solvency of Wyeth Nutritionals Ireland.

The Wyeth parent company guarantee has confirmed corporate commitment to underwrite any required environmentally related remedial works resulting from the activities of Wyeth Nutritionals Ireland.

Appendix A - Site Sensitivity Assessment

SITE CHARACTERISATION

Site Sensitivity

The site is adjacent to the main Limerick-Foynes road near Askeaton town. The surrounding land use is predominantly agricultural, consisting mainly of pasture land. The site is bordered on its eastern perimeter by the River Deel, a tributary of the river Shannon.

Site Geology

Soil and groundwater investigation work has been completed on behalf of Wyeth by URS Dames & Moore in January 2001 (Report 15282-143 dated 19 April 2001) The drilling investigation indicated that subsoils on site comprise of glacial till deposits with an increasing sand content moving west to east towards the Deel estuary. The depth to bedrock is approximately 3m.

Bedrock beneath the site has been mapped as Waulsortian limestone by the Geological Survey of Ireland (GSI). This limestone comprises fresh, massive, blue grey, fine to coarsely crystalline, occasionally cherty, unaltered, fossiliferous limestone. According to the Geological Survey of Ireland Online Maps, the bedrock aquifer in this region is classified as a Regionally important aquifer – Karsified, conduit (Rkc). This suggests the limestone is highly fractured and highly permeability. Local knowledge of the groundwater by site personnel supports this data.

Site Hydrogeology

The main mass of bedrock is largely impermeable, with groundwater movement only occurring within fractures in the bedrock. There is evidence for the karstification of this limestone in the Askeaton area, and local wells are subject to large variation in yields. This indicates that groundwater flow in karstified fracture zones will depend on whether or not wells intersect the fractures. The GSI (Geological Survey of Ireland) have classified the aquifer beneath the site as a regionally important karst aquifer, but with the development potential limited by concentrations of flow.

There are 4 wells reported on the GSI database within an approximate 2km radius of the site; 3 of the wells are recorded as having unknown yields and the fourth has a poor yield (<44m^3 / day). It should be noted that the well records in Ireland are not complete –wells used for domestic purposes are often not declared by the owners. Therefore there may be additional wells located within a 2km radius of the site.

The GSI have classified the aquifer beneath the site as being extremely vulnerable to contamination. The classification is based on the low soil thickness in the area as well as the karstified nature of the aquifer.

Groundwater flows from west to east across the site toward the Deel estuary, following the local topography.

Hydraulic connection between the aquifer and Deel estuary is thought to be limited due to the massive nature of the limestone and the lack of tidal response in the wells.

Surface Water

The Wyeth site is located on a gently sloping estuarine site, which slopes down to the east to the estuary of the River Deel. There is a sharp drop on the eastern side of the site to the Deel estuary, which is bordered by steep slopes and rock outcrops on both sides, just to the east of the site. The land also slopes down gently from the site to the north towards the Shannon estuary and to the south towards the town of Askeaton. The River Deel is classified by the EPA River Quality Report 2005 (http://www.epa.ie/rivermap) as moderately polluted (Q3/Class C) at the nearest measurement point, Kilcool Bridge, approx 7.0km South and upstream of the site.

Limerick County Council indicate that the public water supply in the Askeaton area is abstracted from the River Deel close to the bridge in Askeaton village and upstream of the site.

The River Deel is fished although not on any large scale. However the inner Shannon South shore is a designated proposed Natural Heritage Area and a local boat repair facility is situated approximately 150m down river from the site. As these sensitive areas are near the site and hydraulically down gradient, it is a potential vulnerable receptor for any potential contamination from the site.

The River Deel is assumed to be the discharge point for site groundwater (see above) and is the discharge point for site surface water and effluent outfall

Treated Effluent from the site is discharged to a sewer owned and operated by Wyeth Nutritionals Ireland. The effluent comprises trade effluent, sewage effluent and contaminated waste water domestic and trade effluent. The effluent is treated in the onsite waste water treatment plant prior to discharge to the River Deel. Stormwater is discharged from the site in a separate stormwater pipeline system. There are also 8 separate surface water discharges from the site.

In 2001 Wyeth Nutritionals Ireland commissioned a Dye study at the effluent outfall to determine the adequacy of the outfall to ensure that the location and the mixing zone is compatible with protection of the receiving water. The study concluded that under 2001 emission rates the receiving waters are capable of diffusing the effluent with no significant impact to the surrounding environment.

Sensitive Receptors

The overall site sensitivity with regard to the development of significant environmental liabilities is considered to be moderate to high for the following reasons:

The surrounding land use is predominantly agricultural, consisting mainly of pasture land.

The site is situated approximately 1 km from Askeaton town and a number of residential dwellings are also located in the immediate vicinity of the site and are considered potentially sensitive receptors.

The nearest surface water bodies and hence potential receptors for accidental releases from the site include the River Deel and Shannon Estuary. Neither body of water is particularly sensitive given their tidal/saline nature and the very large dilution volumes available. Neither supports large-scale fisheries. However the inner Shannon South shore is a candidate Special Area of Conservation and the River Deel is utilised by the local boat repair facility. As this sensitive area is near the site and hydraulically down gradient, it is a potential vulnerable receptor for any potential contamination from the site.

The public water supply in the Askeaton area is abstracted from the River Deel close to the bridge in Askeaton village and upstream of the site.

The aquifer beneath the site has been classed by the GSI as being extremely vulnerable to contamination.

Animal Health Issues

The Askeaton area was subject to a number of animal health issues during the early 1990s. It is noted that Wyeth Nutritionals Ireland was never implicated or involved at any stage.

During subsequent investigations (1995-1998) managed by the Irish Environmental Protection Agency (published 2001) the Askeaton area, including lands close to the Wyeth Nutritionals Ireland were the subject of an extensive program, which included the assessment of a number of environmental factors such as air, soil and ground and surface water quality. Soils within 1 km (to the east and west) of the site were tested for a range of nutrients, heavy metals, pesticides, hydrocarbons, dioxins and PAHS. All analytes tested were below the respective guidelines values (mostly Dutch C Limits) and were within the typical background ranges for Irish agricultural soils.

Appendix B - Parent Company Guarantee

Wyeth Nutritionals Ireland
Askeaton, Co. Limerick
Ireland
061 392168 tel
061 392440 fax

Wyeth

Ms Regina Campbell.
Office of Environmental Enforcement,
Environmental Protection Agency,
Regional Inspectorate,
Inniscarra,
Co. Cork.
August 22, 2005

Dear Ms. Campbell,

In compliance with condition 14.2 of our Integrated Pollution Control Licence ref. 678, WNI are required to prepare and submit to the Agency for agreement a fully detailed and costed Residual's Management Plan for the decommissioning or closure of the site or part thereof.

The plan for WNI was submitted to the Agency on 19th August, 2005. As regards our commitment to comply with Section 4 of the Plan, the Company [licensee] undertakes to activate, execute and fund its cost, in the very unlikely event of site closure at Askeaton. The Company shall obtain all relevant permissions prescribed by Local and/or National Authorities and shall comply with all requirements of such permissions and with all Building regulations and statutory requirements (if any) required for the undertaking at Askeaton. The Company shall materially comply with all applicable statutory requirements and the Integrated Pollution Control License issued by the Environmental Protection Agency in relation to environmental controls and the prevention of pollution in connection with the undertaking at Askeaton.

Trusting this is to the satisfaction of the Agency. Should you have any queries please do not hesitate in contacting me.

Yours sincerely,