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ELRA/RMP Update 2009
Closure, restoration and
aftercare management plan

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EXECUTIVE SUMMARY

Wyeth Nutritionals Ireland is an integrated manufacturing facility which produces a comprehensive range of Infant Nutritional product located in Askeaton, Co. Limerick. The site is licensed by the Environmental Protection Agency, under IPPC licence Register No. P0395-02 (and associated Technical Amendments A 7 B, June 2006 and April 2008 respectively). This residual management plan is prepared in the event of site closure or partial site closure of this facility.

The basis of the requirement for the preparation of a Closure, Restoration, Aftercare Management Plan (CRAMP) stems from the IPPC Directive (96/61/EC), which places a specific obligation on the regulator of an IPPC licensed site, to ensure that site closure is addressed as stated in Article 3:

“the necessary measures are taken upon definitive cessation of activities to avoid any pollution risk and to return the site of the operation to a satisfactory state”

This requirement is directly translated into Condition 14 of the operating IPPC licence (Register No. P0395-02). Note that the term CRAMP now replaces the term Residuals Management Plan (or RMP).

It has been estimated that, in the very unlikely event of site closure involving complete cessation of all production activities at the Wyeth Nutritionals facility at Askeaton, an allowance of approximately € 1.5 million would be required to bring the site to an environmentally safe condition. It should be noted that a percentage of this cost relates to potential soil and groundwater corrective action.

The second revision of the original RMP (dated August 19th, 2005) in 2007, in addition to updating the CRAMP to account for any changes in costs to the RMP, 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”. The CRAMP was again in 2008 to account for any changes on the site since the 2007 CRAMP update.

This is the fourth revision of the RMP and will account for any changes to the physical infrastructure on the site and costs to underwrite the CRAMP since the 2008 CRAMP update.

1.0 INTRODUCTION

1.1. Introduction to the Facility

Wyeth Nutritionals Ireland was granted a revised IPPC licence, Register No. P0395-02, by the Environmental Protection Agency for the

“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 ”

on 24th January, 2004. This licence was amended on the 26th June 2006 by the amendment document titled 678 S82(11) and again in April 2008 to account for changes in fuel burning in the combined heat & power plant (CHP). The details of the amendments must be read in conjunction with the licence. This IPPC licence supersedes previous IPPC Licence Register No. P0395-01 for the site.

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 (RFT) form in glass bottles and Tetra-Paks. Can manufacture also takes place on the site.

1.2. Requirement for a Closure, Restoration, Aftercare Management Plan (CRAMP)

In accordance with Condition 14 of the operating IPPC licence, Wyeth Nutritionals Ireland (WNI) is required to prepare a Residuals Management Plan (RMP, now replaced by CRAMP) comprising a fully detailed and costed plan for the decommissioning or closure of the site or part thereof. Condition 14 also required this plan be submitted to the EPA for approval. The IPPC licence states, as follows:

Condition 14.1

“Following termination, or planned cessation for a period greater than six months, of use or involvement of all or part of the site in the licensed activity, the licensee shall, to the satisfaction of the Agency, decommission, render safe or remove for disposal/recovery, any soil, subsoils, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.”

Condition 14.2

“Residuals Management Plan:

The licensee shall prepare, to the satisfaction of the Agency, a fully detailed and costed plan for the decommissioning or closure of the site or part thereof. This plan shall be submitted to the Agency for agreement within six months of the date of grant of this licence.

The plan shall be reviewed annually and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the written agreement of the Agency.”

Condition 14.3

“The Residuals Management Plan shall include as a minimum, the following:

A scope statement for the plan.

The criteria which define the successful decommissioning of the activity or part thereof, which ensures minimum impact to the environment.

14.3.3 A programme to achieve the stated criteria.

Where relevant, a test programme to demonstrate the successful implementation of the decommissioning plan

Details of costings for the plan and a statement as to how these costs will be underwritten

The original Residuals Management Plan (RMP) for the site was completed and submitted to the Environmental Protection Agency (EPA) in August 2005.

Since completion of the 2005 RMP report, there have been little or no changes to operations on the site. The first update of the RMP was carried out in 2006 and reflected the most recent EPA Guidance Document entitled “*Guidance Documents and Assessment Tools on Environmental Liabilities Risk Assessment and Residuals Management Plans incorporating Financial Provision Assessment (EPA Contract OEE-04-03) – Draft for Consultation, May 2005*” (hereafter referred to as the EPA Guidance Document 2005). This guidance was finalised and issued in 2006. The CRAMP was again updated in 2007 and 2008 to account for any changes at the site.

This update has been prepared for the site to consider any site changes and impacts (if any) on the 2008 CRAMP update and associated costs submitted in the 2008 CRAMP update in response to condition 14.2 above.

1.3. Site Closedown Scenario: Comments & Assumptions

To develop a fully detailed and costed CRAMP, it is necessary to present a number of assumptions regarding the mode and management of a hypothetical site shut down.

Site closure or partial closure is considered to include:

- Cessation of the IPPC licensed activity under Article 90 of EPA Act, 1992 amended by the POE (Protection of the Environment) Act 2003.
- Voluntary or involuntary liquidation of the company or organisation holding the IPPC licence which results in cessation of the activity

- Transfer of ownership under Article 91 of the EPA Act, 1992 amended by the POE (Protection of the Environment) Act 2003
- Site closure as a result of corporate rationalisation or relocation
- Partial closure
- Mothballing

Wyeth Nutritionals Ireland (WNI) is part of the Wyeth Corporation. Wyeth Corporation is a multi-national organisation with global revenue for 2008 of US\$22.8 billion and employing 52,000 people worldwide. The company operates under strict environmental policies and procedures. Therefore, it is assumed that any shutdown of the site will be a well-planned and well-resourced event. This implies that the shutdown date will be known well in advance and that both production schedules and raw materials purchasing will be planned with the shutdown already factored in. It also implies that Wyeth Nutritionals Ireland will have the resources in terms of both financial inputs and manpower to implement the CRAMP through completion – with no requirement for external financing or manpower other than for expert advice.

A general assumption is that the site cannot be sold as a going concern to a third party and that completion of the plan will result in a decommissioned and decontaminated site with no restrictions placed on future land use. In reality, this assumption lacks credibility, as the Wyeth Nutritionals Ireland site is an extremely valuable asset with a current replacement value for the plant and equipment in excess of €800m. The assumption is made purely for the purposes of developing “worst-case” costs for site closure and decontamination.

The third general assumption is that all parts of the site are closed as part of one comprehensive CRAMP. No direct reference to partial closure is made in the CRAMP. Under a closure scenario involving a single plant or element of the site, the facility would still operate under its IPPC licence. The CRAMP and associated costs have been developed for a number of discrete programme stages arranged in a logical sequence to facilitate complete site closure. The actual steps to be carried out and their associated costs for any partial shut downs may be derived from the CRAMP by simply reviewing that part of the CRAMP which covers that specific activity or land-parcel.

It is a requirement of the IPPC licence that the CRAMP be reviewed and up-dated as necessary, on an annual basis as part of the Annual Environmental Report (AER). As part of this CRAMP preparation, site activities including planned activities for 2008 were reviewed.

1.4. Structure of the CRAMP

The CRAMP is divided into sections addressing the various issues on decommissioning and residuals management. The overall structure is as follows:

- Section 2.0** Site Assessment
- Section 3.0** Criteria for Successful Decommissioning

Section 4.0	Management of the CRAMP
Section 5.0	Programme to Achieve Stated Criteria
Section 6.0	Test Programme Implementation
Section 7.0	Summary of Costs Associated with the Implementation of the CRAMP
Section 8.0	Underwriting of the CRAMP
Section 9.0	Review of the CRAMP

Section 2.0 provides an overview of the scope of the CRAMP in terms of the buildings, activities and issues, which are covered in this plan.

Section 3.0 describes the proposed criteria to be used to demonstrate successful decommissioning and decontamination.

Section 4.0 outlines the responsibilities for management of the CRAMP.

Section 5.0 describes the CRAMP in a project management style with definite stages and associated tasks. The CRAMP is considered in two main programmes, namely:

- **Short Term Programme (STP):** Decontamination of all above and below ground structures – including management of residues arising.
- **Long Term Programme (LTP):** Management of long term residual soil and groundwater contamination.

Section 6.0 describes the requirement (if any) for the preparation and implementation of a test programme for the CRAMP.

Section 7.0 provides a summary of the costs associated with implementation of the CRAMP.

Section 8.0 outlines the company's assurance to finance the implementation of the CRAMP to completion.

Section 9.0 outlines the requirement and importance of reviewing the CRAMP.

2. SITE ASSESSMENT

2.1. Wyeth Nutritionals Ireland Site Description and History

Wyeth Nutritionals Ireland (WNI) was established in Askeaton Co. Limerick in 1973. The entire site comprises approximately 14.5 hectares. 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.

The Wyeth Nutritionals Ireland facility is an integrated manufacturing facility which produces and distributes a range of infant nutritional products. Products are manufactured by compounding and homogenisation of liquid and powder milk 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. A site layout plan is provided in the Appendix A. The main features of the production operation are summarised as follows:

- RFT-Wet Process
- RFT-Krones Filling Room
- RFT-LAN/Barriquand Room
- RFT-Tetra-Pak Filling Line
- RFT-Packing Line/Warehouse
- Materials Handling
- Can Manufacturing Plant
- Batch Make-up and Dispensing
- Fat Blending
- Powder Plant Wet Process
1,2,2X , 3
- Evaporation/Drying
- Dry Blending Plant
- Canning Lines 2,3,4,5,6
- Pouch Filling Line
- Tote Bin Filling
- Tote Bin C.I.P Station
- Stickpack Filling Line
- Water Treatment Plant
- Wastewater Treatment Plant
- Utilities Operations
- Laboratory Operations
- Air Abatement Systems
- CHP 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.

2.2. Site Evaluation & Issue Identification

It is considered that the Wyeth Nutritionals Ireland facility and associated activities in Askeaton are well characterised at this stage and all potential residues arising in the event of site shutdown, including hazardous wastes and non hazardous wastes have been identified and discussed in terms of management and costing in this CRAMP. Any other potential residues arising in the future can be incorporated into the annual review of the CRAMP.

With regard to programmes for production decontamination, it is considered that many such programmes are currently in place due to the strict cleaning regimes and regulatory and legislative requirements in force. These programmes can be utilised or adapted for use as part of CRAMP implementation.

Furthermore, site utilities (namely adequate water supply, nitrogen system etc.) required for decontamination and decommissioning procedures are considered to be readily available on-site for utilisation during implementation of the CRAMP.

With regard to the identification of issues, there is a minor soil and groundwater contamination issue associated with the site. The contamination of groundwater at the site has been due to once off incidents with short term impacts at the site which are detailed in section 5.2 of this report.

2.3. IPPC Licence Compliance

Wyeth Nutritionals Ireland was granted a revised IPPC licence Reg. No. P0395-02 by the EPA on 24th January, 2004, for

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

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

This IPPC licence supersedes previous IPPC licence Register No. P0395-01 for the site.

A review of environmental control documentation demonstrated a high compliance level with IPPC licence specified emission limit values. Wyeth Nutritionals Ireland are committed to a WWTP improvement programme with the aim to achieve 100% compliance with IPPC license limits. Wastes arising at Wyeth Nutritionals Ireland, comprising both hazardous and non-hazardous wastes, are characteristic of a food processing operation.

Major non-compliances and incidents during 2008 were:

- On 23rd/24th of January 2008, the composite sample for the waste water emissions to the local river exceeded the emission limit value (ELV) (42 mg/l versus an ELV of 15 mg/l). This was due to the overfilling and dumping of a large quantity of nitric acid from the production process.

- 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.
- On 25th November 2008 at one of the emission points for a Dryer an exceedance of the ELV for particulates (60.8 mg/Nm³ versus and ELV of 50 mg/Nm³) was detected during routine monitoring.

Complaints are reported to the EPA monthly (except in certain emergency or serious circumstances) and submitted as part of the Annual Environmental Report.

It is our understanding that the Wyeth Nutritionals Ireland facility is operated in compliance with the IPPC licence and should the site be subject to closure/partial closure, Wyeth Nutritionals Ireland will apply the same level of dedication to implementation of the CRAMP as shown to IPPC licence compliance.

2.4. Assessment of Potential Risks

An initial screening and operational risk assessment was carried out on the site. The EPA's RMP Guidance Document 2005 provides a straightforward risk assessment decision matrix which can be used to classify sites according to Low, Medium and High Risk and thereby help in the preparation of an appropriate Residuals Management Plan and Financial Provision Requirements suitable for the site. Industries classified as high risk usually require both a Closure Plan and some form of Restoration and Aftercare Management Plan. Low Risk industries usually only require a Closure Plan.

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. Based on the guidance given in the EPA's Guidance Document 2005, the Wyeth Nutritionals Ireland site is classified in a 'High Risk Category' and will therefore require some degree of Restoration and Aftercare Management Plan. Such a requirement is addressed in this CRAMP.

The full operational risk assessment carried out for the site is detailed section 3 of the Environmental Liabilities Risk Assessment Report (ELRA).

This CRAMP designed for site closure incorporating decontaminating and decommissioning procedures will contain a hazardous element. However, as the site is dealing with processes, materials and wastes on a regular basis, it is anticipated that the facility and personnel involved in decommissioning will be capable of dealing with any hazardous element of the CRAMP, in terms of decommissioning and waste management.

The implementation of the CRAMP at Wyeth Nutritionals Ireland may in itself create environmental risks. Therefore it is recommended prior to decontamination and decommissioning operations that an environmental risk assessment is carried out on-site. This assessment will identify potential risks associated with implementation of the CRAMP, which may include but is not limited to the following:

- Inadequate bulk storage of wastes prior to off-site disposal;
- Inadequate bunding of liquid wastes prior to collection by waste contractors;
- Structural hazards (e.g. overhead/underground services)
- Health and safety hazards

It is recommended that a site safety plan be developed prior to the commencement of the decontamination and decommissioning process at Wyeth Nutritionals Ireland. Any other aspects of implementation of the CRAMP, which may involve specific health and safety issues, should be accompanied by a dedicated health and safety plan for that particular activity.

2.5. Scope of the CRAMP

Taking into consideration the site description, as previously detailed in Section 2.1, the scope of the CRAMP is proposed in two programmes:

The Short Term Programme (STP) will focus on the decontamination and decommissioning of most of the site activities related directly to production and the disposal of the residuals arising thereof.

This will involve decommissioning of:

- all production buildings;
- all ancillary/utility areas;
- all storage areas;

The STP will also involve the disposal of all residuals arising as a direct result of decommissioning. Here, the term 'residuals' is used to describe any materials that should not be left on the site following process decommissioning. Therefore this includes raw materials, wastes, finished product, intermediate product, tankage, etc.

In the case of Wyeth Nutritionals Ireland, it is proposed that a Long Term Programme (LTP) will be also required. This programme will focus on post decommissioning soil, groundwater assessment and treatment as appropriate.

2.6. Exclusions from the CRAMP

Completion of the CRAMP will occur when all potential sources of environmental harm have been either removed from the site or rendered harmless (assuming contained industrial use of the land). The costs of removing above and below ground structures – effectively returning the site to “green field” status have not been included.

3. CRITERIA FOR SUCCESSFUL DECOMMISSIONING

It is essential to define criteria for successful decommissioning to ensure appropriate management of the residuals and minimum impact to the environment. The criteria considered relevant to the Wyeth Nutritionals Ireland facility should include the following:

- Confirmed removal of all hazardous substances
- Agreement from the EPA on the Long Term Programme (LTP)
- Decontamination of soil/groundwater (as necessary).

The above criteria can be achieved as follows:

1. Decontamination Procedures, including the following:

- Procedures to ensure appropriate decontamination of all process equipment according to site developed instructions and standards;
- Procedures to ensure appropriate decontamination of all pipelines, ancillary works and utility systems according to manufacturer recommendations
- Specification of such decontamination/cleaning materials required in the procedures

2. Materials and Waste Management/Disposal Operations, to include the following

- Documented and fully costed reports to ensure that all raw materials and finished product have been dispatched from the site that are not considered waste and so have a monetary value;
- Documented and fully costed reports on the disposal of hazardous waste including full certification required under appropriate legislation;
- Documented and fully costed reports on the disposal of non hazardous wastes including all certification required under the Waste Management Act and operating IPPC licence;
- Clearance and final disposal documentation for any asbestos found on the site;

3. Remediation Programmes, as appropriate, should include the following to ensure successful decommissioning:
 - If contamination is found to be present, remediation of site soil and groundwater to pre-determined, risk based, remedial goals, agreed with the Agency and verified by a programme of groundwater monitoring post corrective action.
4. EPA Compliance:
 - Continued compliance with the operating IPPC licence during decommissioning operations.
 - Completion on any requirements raised in an EPA Closure Audit in the event of cessation of activities.
5. Documentation Management is an important criterion in successful decommissioning for validation and verification of all decommissioning and residuals management operations.

Note that, with respect to the above criteria, the costs and time to complete decommissioning should not exceed that estimated in the most up-to-date revision of the Closure, Restoration, Aftercare Management Plan in place at the time of decommissioning.

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4. MANAGEMENT OF THE CRAMP

The overall responsibility and management of the CRAMP will be undertaken by designated members of site management lead by the Environmental Manager. The personnel selected to form CRAMP including financial management, environmental management etc. All decontamination procedures, decommissioning operations and residuals management, as required under this CRAMP will be authorised by the group members. In addition, a person will be nominated to conduct all necessary communications with relevant authorities and ensure the appropriate information transfer.

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5. PROGRAMMES TO ACHIEVE STATED CRITERIA

5.1. Short Term Programme

5.1.1. Introduction

The short term programme (STP) encompasses the decommissioning and decontamination operations associated with all above and below ground structures, and subsequent management of all residues arising as a result of such activities, in the short and medium term.

The structure of the STP of the CRAMP is based on a logical sequence of events (project milestones) that would occur in the event of a shutdown, similar in logic to an annual maintenance shutdown. However, STP completion involves the removal of all wastes and materials from the site that could pose a residual threat to the environment. All remaining structures/buildings would be in a steady-state and safe condition.

The STP would involve below ground structures, primarily in-ground sumps, bunds, and drains, only in terms of decontamination of internal surface areas i.e. emptying and flush/rinse etc. Issues associated with removal of such structures, disposal of resulting residuals and assessment of soil/groundwater contamination are dealt with in the Long Term Programme (LTP).

The STP is constructed in a Project Management style format with a number of Stages, each with a set of specific tasks that involve the management of residual waste. The individual stages are in a logical sequence, however, some overlap in terms of timeframes is expected. Each stage includes the following elements:

- Tasks to complete the stage
- Cost
- Time to complete
- Plant status at completion of stage.

STAGE NO	STAGE
1	Production decommissioning, including transfer of residuals to on-site storage
2	Removal of excess residuals from Stage 1 (including raw materials, wastes and final product) from site
3	Treatment of bulk liquid wastes in WWTP
4	Removal of production related hazardous and non-hazardous waste

STAGE NO	STAGE
5	Contract cleaning of bulk storage
6	Decommissioning of site utilities, administration buildings and WWTP
7	Removal of residual hazardous materials
8	Documentation and certification of decommissioning and decontamination

The individual stages proposed are set out as follows. A timetable is included in Appendix C.

5.1.2. Stage 1: Production Decommissioning, Including Transfer of Residuals to On- Site Storage

Preface to Production Decommissioning

This stage will involve decommissioning of the Powder Plant (including the Can Manufacturing Plant) and the Ready to Feed Plant. As each of the production operations are staffed with separate production teams, it is possible, in a complete shutdown situation to decommission the production plants in parallel.

Task 1: Transfer of raw material and products to appropriate site storage.

At this stage it is assumed that all blending and sterilisation steps are finished. Therefore, to fully complete the production run, allow for packing of product into bottles and cans, sterility testing and release by quality control department.

Residuals management will involve the following:

- Labelling product and transfer to packing line/warehouse for palletising
- Isolation and purging of conveyors and transfer lines
- Remove drums of laqor and thinners to the drum storage area
- Transfer of raw material drums to the warehouse
- Transfer of product samples and documentation to a designated off-site storage area where they can be stored for a minimum of 7 years.

The estimated quantities of residues generated at this point are contained in Table 5.1.5.1 and 5.1.5.2.

Task 2: Transfer of production liquid wastes.

Production liquid waste (which will be categorised as a strong effluent) will be transferred at a controlled rate to the WWTP for treatment. Laquers and thinners will be transferred to the flammable materials storage area.

Table 5.1.5.1 summarises the residuals expected to arise. Transfer lines from production/bulk storage will be isolated and purged to transfer pipe volumes of production liquid waste back to bulk storage.

Task 3: Transfer all production solid wastes to storage.

This task will include the specific transfer of hazardous and non-hazardous solid waste to appropriate storage on-site, as follows:

- Transfer of all properly labelled drums of hazardous and non-hazardous waste – includes drums of packaging material, pallets, plastic, plastic scoops, ink glue to the warehouse.
- Transfer of hazardous empty drums, lined bins, etc. to the waste storage compound;
- Removal of the carbon bed, cation and anion multimedia beds from the de-ionising plant to appropriate drums and transfer to the waste storage compound;
- Removal of all HVAC HEPA filters from approximately 100-200 units and transfer to warehouse.
- Removal of non-hazardous general skip waste (e.g., packaging not product contaminated) to dedicated general waste receptacles.

The remaining residuals are summarised in Table 5.1.5.1 (Hazardous) and Table 5.1.5.2 (Non-hazardous).

Task 4: Decontamination

All liquid streams produced here are classified as “strong effluent” and “weak effluent”. Strong effluent is generated from the washings of interior of vessels. Strong effluent is composed of Nitrogen, Phosphoric blend, organic material from vessel internals and hydrogen peroxide. These are discharged to IBC’s and stored in the designated waste storage area. They can be released in a controlled manner to the WWTP where they will be treated.

Weak effluent will include of floor washings. Floor washings are comprised of caustic based detergent at 0.2% solution, and ‘oxonia’ active. Weak effluent can be pumped directly to the WWTP. It is estimated that it will take approximately 1 week to clean each production area as the process is decommissioned.

This task specifically includes:

- Execution of Clean in Place (CIPs) for all equipment associated with each of the production steps including rinse checking. This process will involve the use of acid, caustic, condensate, deionised water and steam.
- Nitric acid and sodium hydroxide utilised for CIP in plant 1 and 2. They are recovered and reused in plant 2 until their strength drops below a set point. They are then discharged to drain.
- Oil and fat blending tanks are steam cleaned.
- Cleaning of production building materials in contact with any product or raw material.
- Purging and cleaning of transfer and conveying lines .

Task 5: Isolate from steam, compressed air & other utilities available.

There are no specific residuals associated with this stage.

Task 6: Isolate from HVAC, nitrogen plant, refrigeration plant, CHP plant and air abatement.

This stage will include isolation from heating, ventilation and air condition (HVAC) system, nitrogen plant, refrigeration plant, deionised water plant, air abatement systems and CHP plant. This stage will also specifically include the following:

Task 7: Shutdown Air abatement units.

The cyclone and bag house abatement units attached to the dryers can now be shutdown. Residues arising from the air abatement units are detailed in the next task (Task 8).

Task 8: Transfer resulting wastes to drum storage (where required), bottle storage or to bulk tanks.

This task will include the specific transfer of resulting hazardous and non-hazardous waste to appropriate storage on-site, as follows:

- Drain oil and fat residues from transfer lines, drum and transfer to drum storage area;
- Remove residual powder from the cyclones by vacuum;
- Removal of filter bags from bag house dryers and storage;
- Removal of product and intermediate samples and obsolete chemicals from laboratories and production areas to drum storage area.

Plant Status at Completion of Stage 1

Following successful completion of Stage 1 (Tasks 1 – 8), the plant status is as follows:

- All site production equipment decontaminated and in a “safe to work” (and environmentally secure) state.
- All production related residuals transferred to bulk storage or warehouse.
- All auxiliary systems decommissioned and working mediums –oils, fats, vitamins, minerals, laquers etc, removed from production buildings to storage.

Time to Complete

It is estimated that Stage 1 would take approximately 2-3 weeks to complete utilising the full compliment of production and maintenance staff at Wyeth Nutritionals Ireland. Where necessary, external contractors will assist in the decommissioning and decontamination operations.

Budget Cost Estimate

As described in Section 1.2 it is assumed that the shutdown is a well-planned and resourced event and all costs in terms of manpower will be allocated to normal plant running costs for the period in question. However, it is anticipated that technical personnel, incorporating 50 personnel for three weeks will be required for specific aspects of decommissioning. This results in a cost of €240,000. Additionally, plant and equipment hire will be required for various decommissioning procedures, at an estimated cost of €100,000.

5.1.3. Stage 2: Removal of Excess Residuals from Stage 1 (including Raw Materials, Wastes & Final Product) from Site

Task 1: Dispatch of finished product from final production

The Wyeth site is an integrated manufacturing facility which produces Infant Nutritional Products in their final dosage. The site produces approximately 39 million kg of infant formula per annum. Once product leaves the site it is ready to be placed directly on the open market. It is therefore assumed that there will be no finished product remaining once production ceases. Intermediates can be shipped to other sites for final processing, formulation and packaging. Based on inventory data supplied to the Agency for the IPPC licence review of 2003, approximate maximum quantities to be dispatched during site decommissioning are summarised in Table 5.1.3.1.

Table 5.1.3.1 Inventory of Intermediate Materials

Material	Storage Tanks
Process 1 Intermediate liquid	6 x 10,000l
	2 x 30,000l
	1 x 40,000l

Material	Storage Tanks
Process 2, 2X Intermediate liquid	4 x 12,000l
	6 x 45,000l
	1 x 65,000
Process 3 Intermediate liquid	3 x 23,000l
	4 x 65,000l

Task 2: Shipping of excess raw material and solvents off-site.

The following table approximates the raw materials on-site at any one time, which will require shipment off-site.

Table 5.1.3.2 Inventory of Raw Materials

Material	Quantity	Storage
Solid Reagents (dry powders)	375 tonnes	25 kg bags 1000 kg bulk bags
Liquid Reagent	446 tonnes	Bulk storage
Laquer and Thinners	8.2 tonnes	25l Metal drums
Acid/base	141 tonnes	Bulk Storage 1000l IBCs

Raw material purchase is planned on a schedule directly related to the planned production schedule. As the date for plant shutdown will be known in advance, it is assumed that stocks of raw materials will be reduced accordingly. However for the purposes of the CRAMP, it is assumed that the planned reduction in stocks reduces the inventory by 80% at shut down and that the remainder is shipped from site as a hazardous waste. Treating the material as a hazardous waste is a “worst case” scenario. In reality there will be alternative routes for this material including:

- Return of raw material to suppliers;
- Transfer of materials to other Wyeth Nutritionals Ireland sites;
- Use of some acids and bases in the wastewater treatment plant;
- Transfer of materials for reuse as animal feed.

All of the above routes would result in considerable costs savings when compared to the “hazardous waste” route. Based on an 80% reduction in inventory prior to shutdown, Table 5.1.3.3 summarises the raw materials, which will still be on-site and require off-site disposal.

Table 5.1.3.3 Residual Materials Remaining

Material	Quantity	Storage
Solid Reagents (dry powders)	75 tonnes	25 kg bags 1000 kg bulk bags
Liquid Reagents	89 tonnes	Bulk storage
Laquer and Thinners	1.6 tonnes	25l Metal drums
Acid/base	28 tonnes	Bulk Storage 1000l IBCs

Assuming the transfer of all intermediate/proprietary materials to other Wyeth Nutritionals Ireland sites, Table 5.1.3.3 above provides summary details of the residuals expected from Stage 2.

Costs (both unit and total estimates) are provided in Table 5.1.5.1.

Plant Status at Completion of Stage 2

The warehouse, bulk storage and drum storage areas will be clear of raw materials.

Time to Complete

The residuals set out in Table 5.1.3.3 should all be removed over an 8 - 10 week period, allowing for documentation (including inventory lists) and arranging shipment.

Budget Cost Estimate

The costs associated with Task 1 are not considered as it is assumed that shipping costs will be absorbed as part of the net value of the intermediates and products.

The estimated costs, both unit costs and total estimates, for the disposal of the residuals from Task 2 are presented in Table 5.1.5.1.

5.1.4. Stage 3: Treatment of Bulk Liquid Wastes in the WWTP.

The production related bulk liquid wastes generated from decommissioning and decontamination operations during Stage 1 will be treated in the WWTP.

As previously described in Stage 1, all “weak effluent streams” generated during the shut down will be treated in the on-site WWTP. Strong effluent streams, which are readily biodegradable, will be treated at a controlled rate in the WWTP.

It is estimated that site shutdown will generate approximately 10,000 m³ of wastewater. This quantity is based on production data reviewed for the purposes of the CRAMP study.

Plant Status at Completion of Stage 3

All bulk liquid wastes treated in WWTP.

Time to Complete

The time to complete will be determined by the WWTP throughput. It is estimated that on-site treatment of bulk liquid wastes in the WWTP will require 3 - 5 weeks . This is based on the assumption that it takes 10 days for process waste to pass through the WWTP. It is also assumed that treatment will start one week following the commencement of the shut down period.

Budget Cost Estimate

It is assumed that the WWTP operation is included with normal production related costs and therefore there is no net residual cost for this stage.

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5.1.5. Stage 4: Removal of Production-related Hazardous & Non-hazardous Wastes.

Task 1: Create inventory of all waste to be disposed with correct classification (e.g., hazardous, non-hazardous).

At this stage, all hazardous and non-hazardous waste arising from production related decommissioning is confined to dedicated site storage and is quantified.

The gross inventory of hazardous waste anticipated to be disposed is detailed in Table 5.1.5.1. It is assumed that all hazardous wastes will be incinerated. A footnote to Table 5.1.5.1 explains the basis behind the figures presented.

The gross inventory of anticipated non-hazardous wastes arising for disposal is detailed in Table 5.1.5.2. It is assumed that all non-hazardous wastes will be recycled, composted or landfilled.

Table 5.1.5.1 Anticipated Hazardous Waste Inventory

ITEM	DESCRIPTION	Tonnes	Cost/tonne (€)	Total cost (€)
1	Solid Raw Materials	75	1,200	90,000
2	Liquid Raw Material	89	1,200	106,800
3	Acids/bases	28	1,200	33,600
4	Waste solvent for incineration (†)	2.4#	600	1,440
5	Laboratory smalls (GOD vials)	0.38	1,200	456
6	Contaminated Drums (oil, solvent)	60	1,200	72,000
7	Waste Material for Recovery	10*	1,200	12,000
8	Other Waste Material for Incineration	5**	600	3,000
	TOTAL (approximate)***			319,296

laquer drum washings
 *Includes batteries and an estimate of and any other small waste stream arisings
 ** Includes aerosols, medical waste, and any other small waste stream arising
 *** Average cost of hazardous waste disposal in 2007 was approximately €1,600 per tonne
 † - Thinners, lacquers, waste solvent from laboratory

Note: The basis for tonnage of items 5 to 8 in Table 5.1.5.1 and for all items in Table 5.1.5.2 is a typical inventory quantity obtained from available records.

Table 5.1.5.2 Non-Hazardous Waste Disposal Cost Estimate

ITEM	DESCRIPTION	Tonnes*	Cost/tonne (€)	Total cost (€)
1	General Site Refuse	350	100	35,000
2	Product tailings	140	100	14,000
3	Sweepings	120	100	12,000
4	Tin plate sheeting	209 [#]	30	6,270
5	Pallets	400	50	20,000
6	Glass	10	224	2,240
7	Paper/cardboard/plastic	259	150	38,850
8	Metal	250 [#]	30	7,500
	TOTAL (approximate) ***			135,860

* Amounts based on levels of waste for half a year, (RMP is expected to take 6 months to implement) figures estimated from recent year AER's.

*** Average cost of hazardous waste disposal in 2007 was approximately €1,600 per tonne

#Transport cost only

Task 2: Contact disposal companies.

Following compilation of the hazardous and non-hazardous inventories, the administrative function of contacting disposal companies will be undertaken to arrange waste disposal operations. Although existing arrangements may be in place, Wyeth will ensure waste companies are licensed and will comply with all relevant waste management legislation.

Task 3: Remove waste from site.

Licensed waste disposal contractors will remove the specified waste from the site in accordance with the conditions of the operating IPPC licence and all relevant legislative requirements.

Plant Status at Completion of Stage 4

All wastes in dedicated storage removed off-site by licensed waste contractors.

Time to Complete

This stage will be carried out, following a lag time of approximately 2 weeks, in parallel to the decommissioning stages. Wastes arising on-site will be transferred for appropriate storage in the drum store and warehousing areas. This waste will then be quickly removed by licensed waste management contractors for incineration or landfill, to ensure waste storage areas have sufficient storage space. It is expected that this stage will take 6 weeks.

Budget Cost Estimate

Tables 5.1.5.1 and 5.1.5.2 summarise the anticipated costs associated with removal and disposal of wastes.

5.1.6. Stage 5: Contract Cleaning of Bulk Tanks, Sumps and Bunds.

This stage is started when bulk storage vessels or tanks begin to be emptied and with all virgin and waste contents removed for return or disposal. At the site, there are approximately 35 above ground, external bulk storage tanks. These tanks are associated with production (Nitric tank, vegetable oils and fats) and the associated utilities (e.g. hydrochloric and caustic storage tanks). In addition there are approximately 15 bunds, nine small sumps and one very large sump. A specialist company will be contracted to provide a comprehensive cleaning service for all tanks and pipelines including the collection of any residual sludge. Residual material will be drummed and disposed of off site by specialist waste contractors. Amounts generated have been included in table 5.1.3.3

Plant Status at Completion of Stage 5

All bulk storage, bunds and sumps on-site decontaminated and residual materials collected by specialist cleaning contractors.

Time to Complete

It will take approximately 12 weeks to complete this stage, assuming that one tank per day, 3 bunds per day and 5 sumps per day can be cleaned. This stage can start after two weeks into Stage 3 – Treatment of bulk liquid wastes.

Budget Cost Estimate

The pricing provided by a cleaning contractor in Dublin at the time of writing this report is €1,500 a day for tank cleaning and €1,000 for sump cleaning. In the worst case scenario, it would take a day to clean a 200m³ tank, and approximately 3 – 5 sumps or bunds could be cleaned in a day. Therefore, in this report a flat rate price of €1,500 per tank and €350 per sump or a bund is used.

- Tanks €1,500 x 35 = **€52,500**
- Sumps € 350 x 9 + € 2,000 x 1 = € 5,150
- Bunds € 350 x 15 = € 5,250
- **Total € 62,900**

5.1.7. Stage 6: Decommission of Site Utilities, Administration Buildings and WWTP.

This stage of decommissioning will apply to the following site utilities and contractor compounds, plus site administration buildings and the site wastewater treatment plant (WWTP):

1. Nitrogen plant
2. Deionised Water plant
3. CHP
4. Boiler house (duty & standby boilers)
5. Refrigeration plant
6. Compressed air plant
7. Maintenance
8. Laboratories
9. Contractor compounds
10. Administration buildings
11. Water treatment plant
12. Wastewater Treatment Plant (WWTP)
13. Fire Suppression System
14. Firewater Utilities
15. LPG Plant

(1) CHP, Boiler house, deionised water plant, refrigeration plant and Nitrogen Plant

With regard to the decommissioning of CHP, boiler house, Deionised Water plant, refrigeration plant, Compressed air plant and the nitrogen plant, the following tasks will apply:

- Task 1:** Decommissioning of the nitrogen plant system and purge with air.
- Task 2:** Transfer of waste oils and machining waste from the maintenance building to the drum storage area.
- Task 3:** Cleaning of Deionised Water system and removal of resins to hazardous waste storage.
- Task 4:** Cleaning of refrigeration system.

- Task 5:** Remove and transfer of ammonia from the compressors
- Task 6:** Isolation and shut down of compressed air plant
- Task 7:** Remove oil from the compressors, and desiccant from the dryers
- Task 8:** Isolation and shutdown stand-by boiler and associated utilities (demineralisation plant).
- Task 9:** Isolation of gas, steam and electricity supply followed by shutdown of the CHP plant
- Task 10:** Return waste oils to licensed waste contractor for recovery.

The following points should be taken into consideration for this stage of decommissioning:

1. The pressure swing adsorption unit for nitrogen production can be decommissioned when the final canning of product has taken place.
2. It is assumed that the Deionised Water plant, refrigeration plant, nitrogen plant system and boilers have a capital value and thus no residuals management is considered.
3. An electrical contractor may be required to decommission some of the electrical equipment. This is subject to discussion between the owners of the CHP plant and Wyeth.

Refrigeration

There is a chilled water plant. There are 6 compressors, associated with the chilled water plant, which contain ammonia. The compressors contain an estimated quantity of 1.6 tonnes of ammonia. The ammonia from the closed loop refrigeration system will be removed by a specialist contractor.

Cryogenics

The Liquid Nitrogen Plant can store 19 tonnes of Liquid nitrogen. It is anticipated that a specialised company will be contracted for decommissioning.

Laboratories

It is assumed that laboratory instruments can be sold on as assets, with decommissioning costs associated primarily with expired chemicals and laboratory waste disposal.

Contractor Compounds

Wyeth Nutritionals Ireland will be responsible for ensuring the decommissioning of the contractor compounds on-site. Additional contractors will be required for the decommissioning process. It is anticipated that there will be no residuals associated with this operation.

Administration Buildings

At this stage, it is assumed that only partial administration facilities will be required for the remaining site decommissioning operations and the successful completion of the RMP. The only anticipated residuals associated with decommissioning of the administration buildings include waste electrical and electronic equipment (WEEE). Present figures indicate approximately 300 PCs and 100 printers at the facility, which would require disposal. Removal and disposal of fluorescent tubing is considered in Stage 7.

Water Treatment Plant

There is on-site storage for 757m³ of treated water, once the plant requirement is reduced below this level decommissioning of the water treatment plant can begin.

The primary tasks in decommissioning the Water Treatment Plant would involve the following:

- Task 1:** Flush the feed lines and isolate.
- Task 2:** Treat remaining raw water through treatment stages.
- Task 3:** With submersible pumps or equivalent, pump the sludge in the clarifier to the effluent treatment plant,
- Task 4:** Remove the sand from the filters and resin bed from the softener
- Task 5:** Remove the any remaining sodium hypochlorite
- Task 6:** Power clean the system and discharge effluent to the sewer.
- Task 7:** Disposal of residual treatment chemicals (alum, polyelectrolyte, sodium hypochlorite, salt, sand and resin.

Wastewater Treatment Plant (WWTP)

Production and subsequent decommissioning will generate the majority of the effluent to be treated in the on-site WWTP. Therefore, the WWTP may be reduced in loading rate to an acceptable minimum to allow functioning over the remaining decommissioning phase. It is anticipated that equipment, vessel, pipeline and tank washing generated effluent over the remaining commissioning period will allow the functioning of the WWTP throughout. Therefore, in effect, the WWTP will be the last process to undergo decommissioning.

It is assumed that the final effluent will be monitored throughout the decommissioning period for compliance with the operating IPPC licence as normal.

The primary tasks in decommissioning the WWTP would involve the following:

- Task 1:** Flush WWTP feed lines and isolate.
- Task 2:** Treat remaining raw effluent through treatment stages.

- Task 3:** With submersible pumps or equivalent, pump Balance tank and SBR contents to the sludge dewatering plant, and drain supernatant to tankers for off-site treatment in an activated sludge wastewater treatment plant.
- Task 4:** Power clean SBR and repeat Task 3.
- Task 5:** Decommission de-watering facilities.
- Task 6:** Disposal of de-watered sludge.

Fire Suppression System

The fire suppression system at Wyeth Nutritionals Ireland contains 20,000l of FM200 Agent. Halon gas was substituted with FM200. While FM200 has not been categorised as an ozone depleting substance it does have global warming potential. The system is maintained by a specialist contractors. The gas can be recovered from the system prior to it's decommissioning and reused by the contractors. This system will be one of the last to be decommissioned and can only be removed when all potential fire sources have been eliminated from the site.

Budget Cost Estimates

The costs for the servicing of the system will cover the cost of the gas removal.

Fire Water Utilities

There are two firewater tanks on the site. In addition there is a water storage tank associated with the water treatment plant and a water tank which contains the water supply for the sprinkler system. The water contained in the storage tank associated with the water treatment plant will be used during the final processing. The remaining water can be discharged to the River Deel provided that it is uncontaminated, as a worst case it can be discharged to the WWTP.

LPG Plant

LPG tanks can be isolated and removed by Calor gas. Calor will reimburse Wyeths for the value of the gas remaining. Calor also lease the tanks to Wyeths and will remove the tanks at no additional cost.

Plant Status at the Completion of Stage 6

All site utilities, with the exception of limited electrical supply, effectively decommissioned.

Time to Complete

Utility decommissioning should not start until cleaning (Stage 5) has been completed. The WWTP would be the final facility to be decommissioned. An overall estimate of the time to decommission all utilities is 6 weeks.

Budget Cost Estimates

It is estimated the cost to hire an electrical contractor to decommission some of the electrical equipment and to have the decommissioning work certified by the ESB will cost approximately €26,300. Remaining residual management and disposal costs are detailed in the following sections:

Refrigerants

Following decommissioning, the disposal of gas will be coordinated by approved waste management contractors. This is a worst case scenario. The disposal cost of €16 per kg is only charged if, when a sample of the gas is analysed, the gas is not fit for recovery. In the case when the gas can be recovered, there is no charge. Table 5.1.6.1 provides a cost estimate based on €16 per kg.

Table 5.1.6.1 Cost Estimates for Ammonia Gas Removal and Recovery

Compound	kg	Disposal Cost (€)
Ammonia	1,600	25,600
Total Cost (approximate)		25,600

Laboratory Waste

It is anticipated following decommissioning of site laboratories that there will be expired chemicals and general laboratory waste requiring disposal. A PC sum of **€33,760** is provided for waste removal and subsequent disposal.

Waste Electrical & Electronic Equipment

Even though it is assumed that most waste electrical and electronic equipment can be returned to the manufacturers, a worst case scenario would involve disposal of all PCs and printers at the Wyeth Nutritionals Ireland facility. There are approximately 300 PC's and 100 printers, with present disposal costs at €80 per PC and €14 per printer, giving a total cost of **€25,400** for adequate disposal.

Waste oils

It is anticipated from site records that there would be approximately 400 tonnes of Marked Gas Oil in storage at the end of decommissioning. In addition there will be an estimated 5 tonnes of motor oil for disposal, based on 2007 waste figures.

In 2007, 7 tonnes of organic vegetable and fat oil residues from the canteen was recycled.

Removal of this waste oil, cleaning of tanks and subsequent recovery or disposal will cost less than **€7,900**.

Water treatment plant

The principal elements and costs in decommissioning of the Water Treatment Plant are as follows:

1. The Clarifier, Sand filters Softener, Chlorination and Storage tank: allow €10,000 per tank, 6 tanks. Therefore estimate: €60,000
2. The total sand filter tank volume is approximately 9 m³ and total softener volume is 10m³. It is assumed for the purposes of the RMP that the sand and resin are non-hazardous and so will be diverted to landfill at an approximate cost of €150 per tonne, with an overall costs estimated at €1,200.

This gives a total budget cost estimate for the Water Treatment Plant is **€61,200**.

WWTP

The principal elements and costs in decommissioning of the WWTP are as follows:

1. Effluent Collection sump, Balance tank, 2x 1 Sequencing Batch Reactors, buffer tank, picket fence sludge thickener, sludge dewatering plant: allow €10,000 per tank, 6 tanks. Therefore estimate: **€60,000**
2. Dewatered sludge composting: Total balance tank volume is approximately 1,800 m³ and total SBR volume is 5,000m³. Based 2007 waste data, Wyeth disposes of approximately 3000 tonnes of sludge on an annual basis from the WWTP by composting, at €100 per tonne, with an overall costs estimated at **€300,000**.

This gives a total budget cost estimate for the WWTP of **€360,000**.

5.1.8. Stage 7: Removal of Residual Hazardous Materials

This stage applies to the situation where there may be specific residuals associated with the building structure and plant equipment that may not be removed during an annual maintenance shutdown. This includes PCBs, radioactive wastes and fluorescent tubes but does not include for actual concrete that may be contaminated.

Task 1: Remove identified hazardous materials (asbestos etc).

Asbestos cement sheeting has been removed in the past by a licensed waste contractor. It is foreseen that there may be small quantities of asbestos associated with gaskets and seals remaining.

It is reported that there are 2 large and 6 small transformers, which are oil filled. The oil is classified as hazardous waste.

Without knowledge of the type of asbestos, its risk factor and quantity, an estimate of €20,100 is given for disposal of transformer oil and Asbestos.

There are no PCB sources on the Wyeth Nutritionals Ireland site.

Task 2: Remove and dispose of radioactive material and fluorescent tubing.

It is difficult to estimate the number of fluorescent tubes that exist on the site, 5000 is an approximate figure. There are also UV lamps, used in the sterilisation processes on site which may be classed as hazardous and therefore a budget of €13,300 is allowed for lamp disposal.

There are no radioactive sources on the Wyeth Nutritionals Ireland site.

Plant Status at Completion of Stage 7

All hazardous residual materials removed off-site.

Budget Cost Estimate

The overall cost estimate to removal asbestos material, transformer oil and fluorescent tubing from the site is €33,400.

Time to Complete

An overall estimate of the time required to decommission and remove all residual hazardous materials off-site is 6 weeks.

5.1.9. Stage 8: Documentation and Certification of Decommissioning and Decontamination

Throughout implementation of the CRAMP, documentation will be generated to track progress. All residues removed from site will be recorded and final clearance certificates will be prepared as required under the terms of the IPPC licence and as required under relevant waste management regulations. Environmental documentation must be retained by the company for a period of 7 years, financial and health and safety data must be retained for much longer. Arrangements for secure storage must be made as one of the final tasks of the decommissioning process.

A full report on the outcome of the CRAMP will be prepared and submitted to the EPA.

5.2. Long Term Programme

5.2.1. Introduction

Wyeth Nutritionals Ireland is located in Askeaton, County Limerick, and was established in 1974. The plant manufactures and distributes infant nutritional products, principally infant milk powder formula.

The Wyeth site is located on a gently sloping coastal 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 surrounding land use is predominantly agricultural, consisting mainly of pasture land.

Soil and groundwater investigation work has been completed on behalf of Wyeth by URS 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.

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.

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.

Table 5.1 contains a summary of the more historical aspects of releases to ground and groundwater on the site. The incidents summarised in Table 5.1 have been detailed in previous versions of the CRAMP.

Table 5.1: 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

Date	Incident & Effects	Current Status
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.
2006	<p>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.</p> <p>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.</p>	Continuous groundwater monitoring confirmed that impact on groundwater quality was temporary.

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 resampled in July '07. 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 as stated previously 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, 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.

Wyeth Nutritionals run a continuous programme of pipeline testing and repairs.

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

5.2.2. Characterisation of Potential Source areas of Chemical Release

Following site closure, so as to avoid interference with the decommissioning and plant decontamination phase, investigations of potential source areas of chemical release would be carried out by undertaking an intrusive investigation close to areas of potential concern. Undertaking a post site closure investigation also guarantees that data is collected at a point in time that marks the end of chemical use/transfer/storage on-site. The intrusive investigation would focus primarily on the subsoils (<5 m thick).

The existing groundwater database from the existing site bedrock wells is comprehensive. Therefore only a relatively limited groundwater investigation will be needed from these.

The budget required to complete a comprehensive investigation of potential source areas, including soil drilling, laboratory analysis, drains survey, risk assessment and risk communication is estimated to be of the order of €11,000.

5.2.3. Design/Implementation source area soil remediation programme (as appropriate)

If the post-closure investigation encounters significant shallow soil contamination, it could continue to leach to groundwater (acting as an ongoing source of groundwater contamination) or have implications with respect to the potential future use of the site. Therefore the results of the post-closure investigation study will be used to establish whether specific corrective action will be required. This is considered unlikely to be required based on currently available data. Risk based decision making will be used to

quantitatively evaluate the appropriate levels of residual contamination that can be left in place.

Since there is no evidence to date that would suggest that there is a significant mass of residual soil contamination beneath the site, for the purposes of this RMP it has been assumed that no significant, long-term residual contamination beneath the Wyeth site exists and no groundwater interception and treatment will be required.

Annual modifications to the Residuals Management Plan may alter this assumption if, in the meantime, further investigations of potential soil contamination are completed.

5.2.4. Management of corrective action programme with post remediation monitoring

Following site closure a period of groundwater monitoring will be required.

In a site closure and decommissioning situation, the scope of the groundwater monitoring programme would be a variation on the current monitoring programme underway at Wyeth and would be based on the most up-to-date data available on the quality of groundwater at that time.

Assuming a total of two years monitoring until final closure and surrender of the IPPC licence, groundwater monitoring and data assessment/reporting costs for the existing five wells at Wyeth Askeaton are predicted to be of the order of €13,000 per year, totalling €26,000 over 2 years.

In the event that the EPA require further characterisation of groundwater based on the findings of the soils investigation a further four bedrock wells have been assumed to be required. This would be completed at a cost of approximately €5,500 per well, with additional monitoring costs of €1000 per well per year, for an additional cost of €30,000 over 2 years.

6. TEST PROGRAMME

It is assumed following completion of all decontamination and decommissioning operations on-site, subsequent compilation of all documentation (as previously detailed in Section 3.0) and submission to the EPA and relevant authorities, that this will be satisfactory to demonstrate successful implementation of the decommissioning plan. Furthermore, in relation to the successful implementation of the LTP, it is also assumed that any ongoing soil/groundwater remediation and/or monitoring programmes will be accompanied by associated monitoring data. This monitoring data, which will demonstrate any contaminant levels and/or ongoing performance of treatment systems, will be submitted to the EPA and relevant authorities and will demonstrate the completion of the programme. A certificate of completion will be issued on completion of the CRAMP.

It is therefore assumed that this documentation and communications with the EPA and relevant authorities will be sufficient to demonstrate successful decommissioning of the CRAMP and a test programme will not be required. Following decommissioning of the plant, there is an anticipated 2 years remaining as part of the groundwater management programme for groundwater containment and monitoring purposes only.

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7. SUMMARY OF COSTS ASSOCIATED WITH THE CRAMP

This section briefly summarises the costs presented in Sections 5.1 and 5.2 of this report. The summary is presented in Table 7.1 and includes all costs identified during the analysis of the Short Term and Long Term Programmes.

Table 7.1 Summary of CRAMP Costs

ITEM	DESCRIPTION	COST (€)
STP.1	Production decommissioning	340,000
STP.4	Production related hazardous waste disposal	319,296
	Production related non-hazardous waste disposal	135,860
STP.5	Cleaning of bulk storage	62,900
STP.6	Decommission site utilities, including:-	
	Decommission & certification of electrical work	26,300
	Disposal of laboratory waste	33,760
	Disposal of ammonia gas	25,600
	WEEE disposal costs	25,400
	Disposal of waste oils	7,900
	Decommissioning of water treatment plant	61,200
	Decommissioning of WWTP	360,000
STP.7	Disposal of residual hazardous materials	33,400
	SUB TOTAL STP (approximate)	1,431,616
LTP	Investigation for potential contamination sources	11,000
	Management of groundwater corrective action	56,000
	SUB TOTAL LTP (approximate)	66,000
	CRAMP TOTAL (approximate)	1,497,616

In conclusion it has been estimated that, in the event of site closure involving complete cessation of all production activities by Wyeth Nutritionals at Askeaton, an allowance of approximately € 1.5 M would be required to confirm the site to an environmentally safe (inert) condition.

8. UNDERWRITING THE RMP – FINANCIAL INSTRUMENT

It is imperative to demonstrate the successful underwriting of the CRAMP. Appendix B contains a copy of a correspondence from Wyeth confirming liabilities associated with decommissioning will be underwritten, in the form of a parent company guarantee.

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9. REVIEW OF THE CRAMP

The summary of costs associated with the CRAMP, as presented in Section 7.0 of this report, are estimates only and are based on the information and data available at the time of compilation of the report. It is anticipated that these costs will vary as time progresses and will depend on factors, including the following:

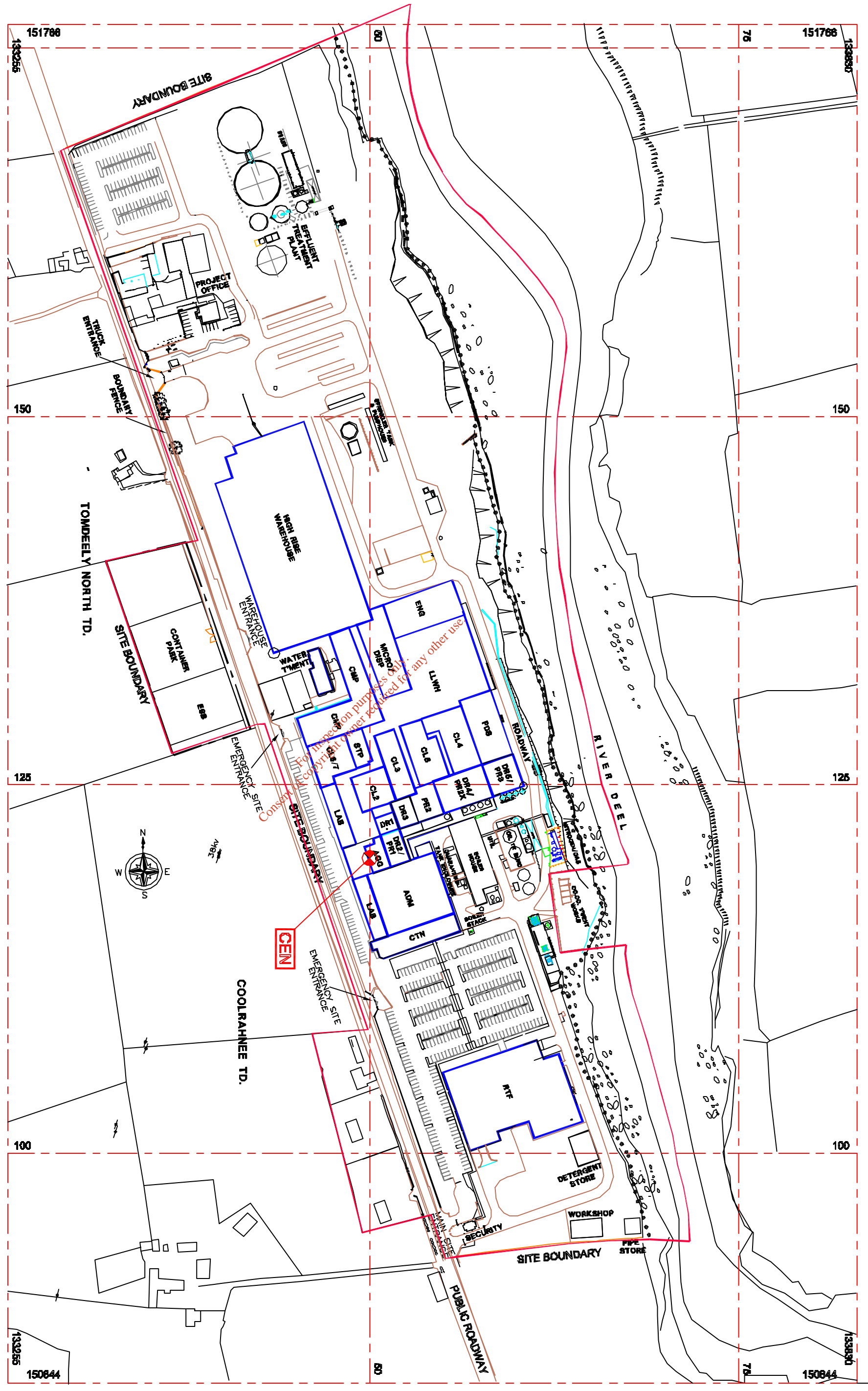
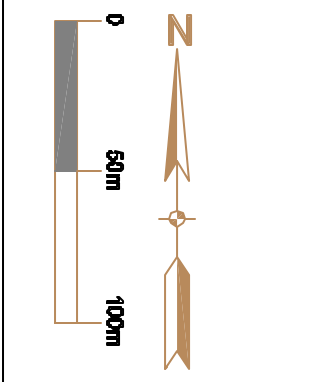
- Site conditions;
- Legislative developments;
- Advances in remediation technology;
- Inflation.

Taking this into consideration therefore, it is important that the CRAMP report and associated costs are reviewed and updated to reflect the current site situation. In addition, IPPC licence requirements specify the CRAMP report must be reviewed on an annual basis as part of the Annual Environmental Report.

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Appendix A - Site plan



REV	ISSUE / DESCRIPTION	DATE
A	INITIAL ISSUE	07-07-08

Wyeth
AMERSON
CO. LINCOLN

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EPA DIGITAL SITE PLAN
NATIONAL GRID REFERENCES

DEPARTMENT: 2005-EPH-0001
PROJECT: A
SCALE: 1:500 @ A3
DRAWN BY: A

Appendix B - Parent Company Guarantee

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Wyeth Nutritionals Ireland

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

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,

Wyeth Nutritionals Ireland is a business
name of AHP Manufacturing bv, a company
incorporated (Reg. No. 80067) with limited
liability in The Netherlands
Registered in Ireland – No. E3277

Managing Directors: William J. Noonan
Ploos van Amstel (Dutch)
Paul J. Jones (U.S.A.)
Eileen M. Lach (U.S.A.)
Jack M. O'Connor (U.S.A.)

Appendix C - Gantt Chart

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Figure: Timetable for Decommissioning Process

ID	Stage	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	Production Decommissioning	█	█	█																							
2	Removal of Excess Materials			█	█	█	█	█	█	█	█	█															
3	Treatment of Bulk Liquid Wastes		█	█	█	█																					
4	Removal of Production Wastes			█	█	█	█	█																			
5	Cleaning				█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█				
6	Decommissioning WWTP & Utilities.																				█	█	█	█	█	█	
7	Removal of Residual Hazardous																					█	█	█	█	█	█
8	Documentation	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█

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Where W = week