

# ***Rathlin Energy***

Waste Management  
Plan

Environmental Permit  
Variation

West Newton A  
Wellsite

East Riding of Yorkshire

PEDL 183

December 2018

Revision 3



**APPROVAL LIST**

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## 1. INTRODUCTION

Rathlin Energy (UK) Limited (Rathlin) is a private company with its head office in Beverley, East Riding of Yorkshire. Rathlin is a petroleum exploration, development and production company with operations in the United Kingdom. Rathlin is the operator of PEDL183.

The purpose of the waste management plan is to present and outline the waste management arrangements for the West Newton A wellsite. For clarity, the West Newton A wellsite was previously referred to as the West Newton Wellsite.

The Waste Management Plan has been the subject of a number of permit applications and continues to be updated throughout the lifetime of the West Newton A wellsite. A Revision Record of the Waste Management Plan has been provided within Table 1.1 below, together with a description for each Revision.

Issue No.	Date	Description
R0	-	Draft in preparation for an environmental permit application.
R1	16/01/2014	Original Copy as part of an environmental permit application.
R2	17/04/2014	Revised to include amended appendices.
R3	14/12/2018	Revised as Part of an Application to Vary the Existing Permit. Changes briefly comprises of: <ul style="list-style-type: none"> <li>• West Newton wellsite is now referred to as West Newton A wellsite</li> <li>• Removal of specified activities: <ul style="list-style-type: none"> <li>• Mini Fall-Off Test within Upper Visean/Lower Namurian;</li> <li>• Pressure Monitoring and flow test in the Lower Namurian sandstone formation.</li> </ul> </li> <li>• Addition of specified activities: <ul style="list-style-type: none"> <li>• Undertake multiple Well Clean Up operations;</li> <li>• Undertake multiple Extended Well Test operations;</li> </ul> </li> <li>• Removal of Appendices which are now stored as separate documents.</li> </ul>

**Table 1.1: Waste Management Plan Revision Record**

## **2. SCOPE**

The Waste Management Plan is applicable to the West Newton A wellsite in accordance with environmental permits and planning consent.

It is applicable to Rathlin, its contractors and subcontractors and can be used in support of applications to the Environment Agency under the Environmental Permitting (England and Wales) Regulations 2016 (EPR2016), where there is a requirement to provide a Waste Management Plan.

Environmental Permits, which are subject to the Mining Waste Directive, cover the management of extracted waste and not the extraction process. This Waste Management Plan has been drafted such that it aligns with the management of extracted waste and not the extraction process.

Following the approval of this Waste Management Plan by the Environment Agency and, following the completion of the proposed WNA-2 drilling operations, this Waste Management Plan will supersede all others previous.

### 3. DEFINITIONS

API:	American Petroleum Institute
BAT:	Best Available Technique
BS:	British Standard
CO <sub>2</sub> :	Carbon Dioxide
EPR2016:	Environmental Permitting (England and Wales) Regulations
EWT:	Extended Well Test
HCl:	Hydrochloric Acid
HDPE:	High Density Polyethylene
m:	Metre
m <sup>3</sup> :	Metres Cubed
mm:	Millimetre
NORM:	Naturally Occurring Radioactive Material
PEDL:	Petroleum Exploration and Development Licence
RP:	Recommended Practices
UK:	United Kingdom
WNA-1:	West Newton A 1 Well
WNA-2:	West Newton A 2 Well

## 4. ENVIRONMENTAL LEGISLATION AND APPLICABILITY

The West Newton A wellsite is the subject of a number of activities which, under current environmental legislation, require an environmental permit. The Environment Agency regulate all permitted activities under the Environmental Permitting (England and Wales) Regulations 2016 (EPR2016). Under EPR2016, Operators are required to submit environmental permit applications to the Environment Agency to seek approval to undertake such activities.

The West Newton A wellsite has been the subject of the environmental permitting regulations since 1<sup>st</sup> October 2013, and as such a number of environmental permits have already been obtained. This Waste Management Plan aims to update the Environment Agency on the proposed activities to be conducted at the West Newton A wellsite.

### 4.1 Environmental Permitting (England and Wales) Regulations 2016

A number of activities likely to be undertaken during the West Newton A operations are deemed by Rathlin as requiring permits under EPR2016.

#### 4.1.1 Industrial Emissions Activity

The Industrial Emissions Directive 2010/75/EU lays down rules on integrated prevention of pollution arising from industrial activities, whilst also laying down rules designed to prevent or, where that is not practicable, to reduce emissions into the air, water and land and to prevent the generation of waste, in order to achieve a high level of protection of the environment taken as a whole.

Schedule 1, Part 2 of EPR2016 details a number of activities that are classified as an Industrial Emissions Activity including Energy Activities (Chapter 1) and Waste Management (Chapter 5). Energy Activities include the storage of crude oil, whilst Waste Management includes the incineration of waste, a description of each has been provided below.

##### 4.1.1.1 Oil Storage

Schedule 1, Part 2, of EPR2016 transposes the requirements of the Industrial Emissions Directive, which requires an environmental permit to authorise an installation for gasification, liquefaction and refining activities, as detailed within Section 1.2, Part A(1) including the loading, unloading, handling or storage of, or the physical, chemical or thermal treatment of crude oil.

*Part A(1)*

*(e) The loading, unloading, handling or storage of, or the physical, chemical or thermal treatment of—*

*(i) crude oil;*

The West Newton A operations will involve the handling and storage and unloading of crude oil or condensate and therefore under EPR2016 an Oil Storage permit will be applied for. Due to the permitted site boundary being located within 50m of a water course a SR2015 No2 permit cannot be applied for. Therefore, a variation to the existing environmental permit is being sought to include a bespoke oil storage activity.

##### 4.1.1.2 Incineration of Natural Gas

Schedule 1, Part 2 of the EPR2016 transposes the requirements of the Industrial Emissions Directive, which requires an environmental permit to authorise an installation operation for Incineration and co-incineration of waste, as detailed within Section 5.1, Part A(1) which includes the incineration of hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 10 tonnes per day.

*Part A(1)*

- (a) *The incineration of hazardous waste in a waste incineration plant or waste co-incineration plant with a capacity exceeding 10 tonnes per day;*

The West Newton A operations will involve the incineration of natural gas exceeding 10 tonnes per day and therefore under EPR2016 a permit is required. Rathlin are currently in possession of an environmental permit (EPR/BB3001FT) which allows for the incineration of natural gas above 10 tonnes per day. Rathlin is seeking to vary this activity to reflect the proposed changes to the WNA-2 well testing programme.

**4.1.2 Mining Waste Activity**

The Mining Waste Directive 2006/21/EC requires that extractive wastes are managed in such a way that it minimises harm to human health and the impact on the environment. It applies to the management of waste resulting from the prospecting, extracting, treatment and storage of mineral resources and working quarries, which the Mining Waste Directive refers to as extractive waste. The waste can take the form of a solid, liquid or gas.

Schedule 20 of EPR2016 defines a mining waste operation as being the management of extractive waste, whether or not it involves a waste facility. Under EPR2016, an environmental permit is required to authorise a mining waste operation.

The West Newton A operations involve the management of non-hazardous extractive waste, not including a waste facility. Environmental Permit EPR/BB3001FT has been issued by the environment agency which covers the mining waste activities being undertaken at the West Newton A wellsite.

**4.1.3 Water Discharge Activity**

Schedule 21 of EPR2016 relates to water discharge activities, including the discharge or entry to inland freshwaters, coastal waters or relevant territorial waters of any trade effluent. Clean surface run-off water at the wellsite will be collected within containment ditches for subsequent removal via road tanker during operations or where the site is non-operational, discharged to surface water.

Environmental Permit EPR/BB3001FT enables Rathlin to undertake a water discharge activity at the West Newton A wellsite following a variation in 2015. This activity is being retained by Rathlin.

**4.1.4 Groundwater Activity**

Under Schedule 22 of EPR2016, an activity that could involve the discharge of pollutants into groundwater must be notified to the Environment Agency, together with the nature of these pollutants. The Environment Agency will then determine whether the groundwater activity needs to be permitted.

The West Newton A operations will not involve a groundwater activity. As such, a permit under schedule 22 of EPR2016 will not be applied for.

**4.1.5 Radioactive Substances Activity**

Schedule 23 of EPR2016 provides for the control of Naturally Occurring Radioactive Material (NORM). Schedule 23 defines the production of oil and gas as a NORM industrial activity and therefore any accumulation of radioactive waste, which exceeds concentration threshold set out in Table 1 of Schedule 23, and its subsequent disposal, requires an environmental permit to authorise a radioactive substances activity.

The West Newton A operations may involve the production of formation water which may or may not contain NORM at levels exceeding those set out in Table 1 of Schedule 23, therefore, until such time as the concentration of NORM can be established a Radioactive Substances Activity Permit is required. A SR2014 No4 Permit (EPR/PB3030DJ) is currently in place.

## 5. CRITERIA FOR DETERMINING THE CLASSIFICATION OF WASTE FACILITIES

In addition to the management of extractive waste, wellsites may require environmental permits that also cover the deposit or accumulation of extractive waste in a waste facility. The definition of a waste facility is based on the wellsite having a designated area for the accumulation or deposit of waste subject to certain timescales, depending on the nature and source of the waste.

Article 3 (15) of the Mining Waste Directive defines a waste facility as *any area designated for the accumulation or deposit of extractive waste whether in a solid or liquid state or in solution or suspension, for the following time periods:*

- *No time-period for Category A waste facilities and waste characterised as hazardous in the waste management plan;*
- *A period of more than six months for facilities for hazardous waste generated unexpectedly;*
- *A period of more than one year for facilities for non-hazardous non-inert waste; and*
- *A period of more than three years for facilities for unpolluted soil, non-hazardous prospecting waste, waste, resulting from extraction, treatment and storage of peat and inert waste.*

The West Newton A wellsite will not involve the accumulation or deposit of extractive waste exceeding the timescales specified above. All extractive wastes stored at the wellsite will:

- a) Be limited to non-hazardous substances; and
- b) Be of a short duration, significantly less than 1 year.

A full list of extractive waste streams has been provided within Section 7 of this Waste Management Plan.

### 5.1 Criteria for Determining a Category A Waste Facility

Where the proposed activities include a waste facility, the Operator is required to include an assessment as to whether the proposed facility will be classified as Category A or not.

Where a mining waste facility is to be considered, a review of the mining waste facility against criteria specified within Annex III of the Mining Waste Directive must be undertaken to determine whether or not the mining waste facility should be classified as a Category A Mining Waste Facility. The criteria for determining a Category A Mining Waste Facility is as follows:

- a) *A failure or incorrect operation e.g. the collapse of a heap or the busting of a dam, could give rise to a major accident, on the basis of a risk assessment taking into account factors such as the present or future size, the location and the environmental impact of the water facility;*
- b) *It contains waste classified as hazardous under Directive 91/689/EEC above a certain threshold: or*
- c) *It contains substances or preparations classified as dangerous under Directives 67/548/EEC or 1999/45/EC above a certain threshold.*

Section 5 above provides justification detailing why the West Newton A well testing operations are not considered a waste facility. The criteria for determining a Category A Waste Facility does not apply to this Waste Management Plan.

## 6. WASTE GENERATING ACTIVITIES

A waste is defined in Article 3(1) of the Mining Waste Directive by reference to Article 3(1) of the Waste Framework Directive 2008/98/EC. The definition is; 'waste' shall mean any substance or object in the categories set out in Annex I which the holder discards or intends or is required to discard. The wastes are defined in Article 3 of the Directive as inert, non-hazardous or hazardous and are as follows:

**Hazardous Waste:** The Waste Framework Directive (2008/98/EC) (WFD) sets out what waste is and how it should be managed. The WFD defines some wastes to be hazardous waste. A hazardous waste is defined as a waste that has one or more of the fifteen specified hazardous properties listed in Annex III to the WFD. The application of this is determined by the List of Wastes Decision (2000/532/EC).

**Non-hazardous Waste:** A waste which is neither classed as inert or hazardous.

**Inert Waste:** Inert Waste is waste which does not undergo any significant physical, chemical or biological transformations. Inert waste will not dissolve burn or otherwise physically or chemically react, biodegrade or adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm human health. The total leachability and pollutant content of the waste and the ecotoxicity of the leachate must be insignificant and in particular not endanger the quality of surface water and/or groundwater.

A summary of the waste generating activities associated with operations at the West Newton A wellsite is outlined below, with a more detailed description of each activity provided within each subsection.

- Well Maintenance (Currently Permitted);
- Drilling of a Second Borehole (WNA-2) (Currently Permitted);
- Well Testing of Second Permitted Well; and
- Well Suspension and Abandonment (Currently Permitted)

This Waste Management Plan sets out the classification of waste streams associated with the West Newton A wellsite and associated site activities. Waste management arrangements for each waste stream are detailed within Section 7.3 of this Waste Management Plan.

Extractive waste streams associated with the drilling of the WNA-1 and WNA-2 boreholes were the subject of the previously approved Waste Management Plan, Revision 2.

Following the approval of this Waste Management Plan by the Environment Agency and, following the completion of the proposed WNA-2 drilling operations, this Waste Management Plan will supersede all others previous.

### 6.1 Well Maintenance (Currently Permitted)

Following drilling operations, during the maintenance cycle of an exploration well, the potential to generate waste is limited.

Well Maintenance is currently permitted under the existing environmental permit and will remain a permitted activity.

### 6.2 Drilling of a Second Permitted Borehole (Currently Permitted)

Rathlin intend to drill an appraisal well (WNA-2) from the West Newton A wellsite. WNA-2 will investigate the extent of the petroleum reservoir encountered during the drilling of the first well (WNA-1).

The drilling of the WNA-2 well is currently permitted under the existing environmental permit and will remain a permitted activity. The same waste streams will be produced as stated within Waste Management Plan Revision 2, however the volume of waste generated will be considerably less due to the well being drilled to circa 2,000m TVD KB, 1,000m less than the currently permitted activity. This Waste Management Plan will form part of an application to vary the existing permit, whilst concurrently the drilling operations for WNA-2 well will be undertaken. Discussions with the Environment Agency have indicated that this approach is satisfactory. Only once this Waste Management Plan has been approved by the Environment Agency and the drilling of the WNA-2 well has been completed will this Waste Management Plan Revision 3, supersede Revision 2.

### **6.3 Well Testing of WNA-2**

Geological logging is undertaken during well construction to determine whether formations encountered during drilling contain petroleum. The borehole logs assist Rathlin in determining specific zones, which justify subsequent testing.

Well testing may involve various different processes, all of which are intended to obtain a greater understanding of the formation properties and ultimately determine whether the formations are capable of producing commercial quantities of petroleum. Well testing processes vary, depending on the formation being tested.

Well testing will commence with the mobilisation of a work over rig and the well testing spread to the West Newton A wellsite. The well testing spread is expected to consist of a choke manifold, surface safety valves, 3 phase separator, fluid storage tanks and a flare unit(s).

Rathlin have identified a number of zones of interest within the Permian which may warrant clean up and testing. A decision will be made during the drilling of WNA-2 as to which zones of interest will be tested. An Air Quality Impact Assessment has been undertaken to assess the impact of the emissions from the flaring activity.

#### **6.3.1 Perforation of the Casing and Reservoir Formation**

In order to establish communication between the formation(s) being tested and the wellbore the casing must be perforated.

The perforating operation, in particular the use of explosive charges, is regulated by the Police Authority and the Health and Safety Executive. Perforating may be undertaken a number of times as deemed necessary by Rathlin.

The anticipated extractive waste streams for the perforation of the casing string include:

- Circulation Fluid / Suspension Brine; and
- Metal Debris.

#### **6.3.2 Well Clean Up**

Rathlin may undertake a number of well clean up activities. Well clean up may include one or more well treatment activities, described below within the Section 6.3.4 of this Waste Management Plan.

Following the perforation of the casing and following any well treatments that may be undertaken the formation will be evaluated by means of flow testing. The purpose of an initial flow test or well clean up is to prepare the well for an Extended Well Test (EWT).

Natural gas is flowed to surface (ordinarily unaided), together with any produced fluids (oil, condensate and/or formation water). Once at surface, natural gas and produced fluids will be diverted by temporary pipework to a three phase separator, which will separate out oil/condensate, formation water and natural gas.

Oil and condensate, which for clarity is not a waste, will be stored onsite for subsequent offsite removal by a licenced haulier to a permitted refinery for sale. Formation water, which is considered a waste, will be stored onsite for subsequent offsite removal by a licenced haulier to an Environment Agency permitted water treatment facility where it is processed, treated and discharged in accordance with the permitted controls of the water treatment facility.

Natural gas separated during the three phase separation will be diverted to a shrouded flare located onsite for incineration. At the point of incineration, the natural gas is considered a waste.

Rathlin have prepared a Gas Management Plan (RE-EPRA-WNA-GMP-010) providing a BAT justification for use of a shrouded flare and enclosed flare during the well testing operations. The cumulative incineration of natural gas during this phase is anticipated to be 20mmscf.

The anticipated extractive waste streams for the well clean-up includes:

- Natural Gas;
- Formation Water; and
- Carbon Dioxide;
- Nitrogen; and
- Spent Acid.

### **6.3.3 Extended Well Test**

Once each well clean up operation is completed the WNA-2 well will be shut in whilst the shrouded flare is substituted for an enclosed flare, with the exception of an EWT for Cadeby oil where the shrouded flare will continue to be used. For clarity, following the completion of an EWT the flares may again be substituted to allow for further well clean up operations within the formation.

A number of EWTs may be undertaken as part of the well testing activities following on from the well clean up phase.

Similarly, as with the clean up phase, natural gas will be flowed to surface together with any produced fluids (oil/condensate and formation water). The natural gas and produced fluids will be separated by the three phase separator where natural gas will be incinerated and considered a waste, with oil/condensate and formation water being separated and stored in separate storage tanks for subsequent offsite removal. Any formation water produced shall be considered a waste while oil and condensate are classified as commercial products.

Rathlin have prepared a Gas Management Plan (RE-EPRA-WNA-GMP-010) providing a BAT justification for use of an enclosed flare during the EWT except in the case of an EWT for Cadeby oil. The cumulative incineration of natural gas during this phase is anticipated to be circa 180mmscf.

The anticipated extractive waste streams for the Extended Well Test include:

- Formation Water; and
- Natural Gas.

### **6.3.4 Well and Reservoir Treatments**

Well treatments may be undertaken following the drilling of the WNA-2 well. This may include acidisation, as described in Section 6.3.4.1 following perforation, or the use of Carbon Dioxide and/or Nitrogen. The same section may be the subject of repeated well treatments in the event the first treatment is only partially successful in cleaning the near wellbore formation.

#### **6.3.4.1 Acid Wash and Squeeze (Currently Permitted)**

Rathlin currently hold the necessary environmental permits to undertake an acid wash and squeeze at the West Newton A wellsite. Following the drilling of the WNA-2 well and when necessary during the lifetime of the well an acid wash and squeeze may be undertaken for the purpose of cleaning the well and the near wellbore.

For clarity, Rathlin will undertake Acid Wash and Acid Squeeze operations in line with the Environment Agency's definition as provided within the *'Use of acid at oil and gas exploration and production sites, January 2018'* publication.

Whilst the injection of hydrochloric acid within deep saline water bearing formations is a 'groundwater activity', the activity is considered de minimis and can be excluded under Schedule 22 3 (3) of EPR2016. The acid wash/squeeze does therefore not require a groundwater permit.

It is anticipated that the acid wash and squeeze process may be undertaken a number of times depending on the discrete zones perforated. Each acid squeeze would involve the application of up to 15m<sup>3</sup> of 15% acid solution.

#### **6.3.4.2 Liquid CO<sub>2</sub> Treatment**

The purpose of Carbon Dioxide (CO<sub>2</sub>) treatment is to assist in the removal of all wellbore fluids and near wellbore debris sustained during the drilling operation.

Each CO<sub>2</sub> injection treatment requires between 2m<sup>3</sup> and 5m<sup>3</sup> litres of liquid CO<sub>2</sub> per 10m interval being treated, which is pumped in liquid state from surface through the wellbore and into the formation.

All liquid CO<sub>2</sub> introduced to the formation will return to surface in a gaseous state and will be passed through the three phase separator.

Whilst the application of liquid CO<sub>2</sub> within deep saline water bearing formations is a 'groundwater activity', the CO<sub>2</sub> will return to surface in a gaseous state. No CO<sub>2</sub> will remain in the formation and therefore the application of liquid CO<sub>2</sub> is considered de minimis and can be excluded under Schedule 22 3 (3) of EPR2016 from requiring a groundwater activity permit.

#### **6.3.4.3 Nitrogen Treatment (Currently Permitted)**

To aid the initial flow of petroleum, nitrogen may be introduced into the wellbore to displace wellbore fluids, reducing its hydrostatic weight. Nitrogen is classified as an inert waste and venting of such considered a closed loop system, insofar as nitrogen is extracted from the atmosphere and is vented back atmosphere. No nitrogen would remain in the wellbore.

## 7. MANAGEMENT OF EXTRACTIVE WASTE

The following sections describe the various extractive wastes arising from the West Newton A well testing operations, including their classification and anticipated quantities. This section also describes the objectives of Rathlin insofar as appropriately managing wastes and how these objectives are achieved through waste minimisation, methods of treatment and disposal.

### 7.1 Operator Waste Objective

Rathlin's policy on waste duty of care, waste segregation, waste handling and waste transfer are set out within the management system documentation.

The Site Waste Manager for the West Newton A wellsite will:

- Promote awareness of the Waste Management Plan;
- Monitor and report on waste generation;
- Monitor and enforce on waste segregation;
- Monitor the effectiveness of the Waste Management Plan;
- Form a good working relationship with the waste management contractor; and
- Encourage suggestions for better waste management onsite.

#### 7.1.1 Article 5(2) of the 2006/21/EC Mining Waste Directive

Article 5(2) of the 2006/21/EC Mining Waste Directive sets out the objectives of the Waste Management Plan:

*(a) to prevent or reduce waste production and its harmfulness, in particular by considering:*

- (i) waste management in the design phase and in the choice of the method used for mineral extraction and treatment;*

In accordance with Article 5(2)(a)(i) of the Mining Waste Directive, the management of waste was identified during the design phase of the West Newton A well testing operations.

The choice of method proposed for formation water management will involve the offsite treatment and/or disposal at an Environment Agency permitted waste treatment facility.

- (ii) the changes that the extractive waste may undergo in relation to an increase in surface area and exposure to conditions above ground;*

With reference to Article 5(2)(a)(ii) of the Mining Waste Directive, extractive waste generated during the exploratory operations does not undergo any changes in relation to surface area or exposure to conditions above ground. It is the intention that all extractive waste generated during operations will be temporarily stored onsite for subsequent offsite treatment and/or disposal at an Environment Agency permitted waste treatment facility, including reinjection facilities independent from Rathlin's operations and wellsite and this permit application.

- (iii) placing extractive waste back into the excavation void after extraction of the mineral, as far as is technically and economically feasible and environmentally sound in accordance with existing environmental standards at Community level and with the requirements of this Directive where relevant;*

Hydrocarbon exploratory operations will not generate extraction voids. Article 5(2)(a)(iii) of the Mining Waste Directive is, therefore, not applicable to the West Newton A wellsite.

- (iv) putting topsoil back in place after the closure of the waste facility or, if this is not practically feasible, reusing topsoil elsewhere;*

The wellsite is subject to a closure plan upon cessation of exploratory operations. The closure plan will set out the details for wellsite restoration, including the replacement of topsoil currently stored onsite. The reuse of topsoil after closure accords with Article 5(2)(a)(iv) of the Mining Waste Directive.

*(v) using less dangerous substances for the treatment of mineral resources;*

The treatment of mineral resources shall be limited to those described within the environmental permit application.

*(b) to encourage the recovery of extractive waste by means of recycling, reusing or reclaiming such waste, where this is environmentally sound in accordance with existing environmental standards at Community level and with the requirements of this Directive where relevant;*

Where reasonably practicable the recovery of extractive waste by means of recycling, reusing or reclaiming will be considered. However, with the exception of suspension brines this is extremely limited.

*(c) to ensure short and long-term safe disposal of the extractive waste, in particular by considering, during the design phase, management during the operation and after-closure of a waste facility and by choosing a design which:*

- (i) requires minimal and, if possible, ultimately no monitoring, control and management of the closed waste facility;*
- (ii) prevents or at least minimises any long-term negative effects, for example attributable to migration of airborne or aquatic pollutants from the waste facility; and*
- (iii) ensures the long-term geotechnical stability of any dams or heaps rising above the pre-existing ground surface.*

The West Newton A wellsite is anticipated to be permitted as a site for the management of non-inert, non-hazardous extractive waste that does not include a waste facility. Following the abandonment and subsequent restoration of the wellsite no waste, extractive or other shall remain.

## 7.2 Waste Prevention and Minimisation

Article 4 of the Waste Framework Directive provides a Waste Hierarchy and is described below in order of priority for waste prevention.



Figure 7.1 Hierarchy of Waste Management

### 7.2.1 Waste Prevention

Every effort will be made to eliminate the waste produced at source. Control measures will include:

- Calculating quantities of required products;
- Avoiding packaged material where practicable;
- Ordering correct quantities;

- Avoiding damage by handling and storing correctly; and
- Using fewer materials in designs and manufacturing.

### **7.2.2 Preparing for Re-Use**

Only dispose of waste which cannot economically or practically be re-used or recycled. Checking, cleaning, repairing and refurbishing of items and spare parts for subsequent re-use.

### **7.2.3 Recycle**

Waste is to be segregated onsite to allow for recycling offsite. Additionally, materials that are recycled shall be procured for use onsite where practicable and where specification permits. Turning wastes into a substance or product including composting subject to quality protocols.

### **7.2.4 Other Recovery**

Other recovery includes anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy (fuels, heat and power) and materials from waste.

### **7.2.5 Disposal**

Waste that cannot be reused or recycled practicably shall be disposed of responsibly and in compliance with Rathlin's duty of care obligations. All waste shall be removed from site by a licenced waste carrier to a licenced waste facility.

## **7.3 Waste Description and Management Arrangements**

An assessment of the potential waste arising during the West Newton A well testing operation has been undertaken. The potential waste, together with its classification anticipated quantities, prevention, minimisation, treatment and disposal is provided in this section.

### 7.3.1 Extractive Waste

Well Suspension Brine / Circulation Fluid		
<b>Waste Classification, Quantity and Storage</b>	<b>Classification</b>	Non Hazardous
	<b>EWC Code</b>	01 05 08
	<b>Estimated Quantity</b>	150m <sup>3</sup>
	<b>Onsite Storage</b>	Storage Tanks
	<b>Odour Potential</b>	No Odour Anticipated
<b>Operation / Activity</b>	The well will be subject to a period of suspension using suspension brine and mechanical plugs. Following suspension any further operations will require the suspension brine to be circulated out of the well to an onsite storage tank via temporary surface pipework.	
<b>Waste Prevention and Minimisation</b>	The suspension brine will be stored onsite for subsequent reuse as a suspension brine for the well at a later date when the well will need to be suspended again.	
<b>Waste Treatment and Disposal</b>	Once the suspension fluid has fully served its purpose at the wellsite, the suspension brine will be removed from site via a licenced haulier to an Environment Agency permitted waste water treatment works facility where it is processed, treated and discharged in accordance with the permitted controls of the water treatment facility.	
<b>Waste Remaining in Formation</b>	None. Suspension brine is circulated out prior to well intervention and/or flow testing.	
<b>Monitoring</b>	An inspection of the fluid tanks that contain the suspension fluid shall be carried out prior to being used and will be subject to visual weekly inspections and annual thickness checks.	

**Table 7.1: Well Suspension Brine / Circulation Fluid**

Metal Debris		
<b>Waste Classification, Quantity and Storage</b>	<b>Classification</b>	Non Hazardous
	<b>EWC Code</b>	20 01 40
	<b>Estimated Quantity</b>	De-minimis <10kg
	<b>Onsite Storage</b>	Enclosed Skip
	<b>Odour Potential</b>	No Odour Anticipated
<b>Operation / Activity</b>	Fluid will be circulated in the wellbore during the wellbore cleaning operation and will circulate out the debris.	
<b>Waste Prevention and Minimisation</b>	Debris minimisation is provided by minimising the sections of casing to be cleaned, thus reducing the amount of debris circulate to surface.	
<b>Waste Treatment and Disposal</b>	The debris, consisting of small steel scrapings, will be separated from the fluid at surface and diverted to an enclosed cuttings skip for subsequent removal from site for offsite recycling and/or waste disposal at an Environment Agency permitted waste treatment facility where it may be recycled as metal. The criteria for determining whether waste will be recycled or disposed of will be determined by the receiving waste treatment facility upon receipt of waste. The waste will be tested by the waste treatment facility, the results of which will determine the treatment and or disposal method to be used. Such treatment and /or disposal method will be in accordance with the waste treatment facilities environmental permits.	
<b>Waste Remaining in Formation</b>	None	
<b>Monitoring</b>	An inspection of the skips that contain the metal debris shall be carried out prior to being used and will be subject to regular visual inspections and annual thickness checks.	

Table 7.2: Metal Debris

<b>Spent Hydrochloric Acid (Calcium Chloride)</b>		
<b>Waste Classification, Quantity and Storage</b>	<b>Classification</b>	Non Hazardous
	<b>EWC Code</b>	01 05 08
	<b>Estimated Quantity</b>	15m <sup>3</sup> per Acid Wash and Squeeze
	<b>Onsite Storage</b>	Cylindrical Tanks
	<b>Odour Potential</b>	No Odour Anticipated
<b>Operation / Activity</b>	<p>The purpose of an acid wash is to clean the well after drilling and results in improved permeability. The fine particles and drilling muds may block, or blind, the natural pore spaces in the rock. An acid wash is used to clean the well out following drilling in order to return the natural porosity and permeability of the damaged formation. The proposed dilution of hydrochloric acid (HCl) is 15%.</p> <p>An “acid squeeze” is an oil industry term that is generally used when the intention is for the acid to remain local to the well in to the geological formation. It is most frequently used when the permeability of the geological formation is very low. An acid squeeze results in the acid being squeezed in to the rock formation and dissolving the rock.</p> <p>The chemical reaction between the calcium carbonate formation and acid can be represented by the following formula:</p> $\text{CaCO}_3 + 2\text{HCl} > \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$ <p>Once the HCl acid has reacted with the formation it will form a waste stream known as ‘spent acid’ which, following the completion of the acid squeeze, will be recovered (circulated) back to surface.</p>	
<b>Waste Prevention and Minimisation</b>	<p>The hydrochloric acid will be used in stages to ensure its use is minimised. The reaction of the hydrochloric acid with the calcite produces calcium chloride. This reaction, and in turn the waste generated, is unavoidable.</p> <p>Careful planning will be taken prior to any acid wash or squeeze being undertaken to ensure Rathlin minimises the amount of acid used, which in turn reduces the amount of waste generated by the operation.</p>	
<b>Waste Treatment and Disposal</b>	<p>The calcium chloride will be circulated out of the wellbore into a storage tank and stored onsite for subsequent removal via a licenced haulier to an Environment Agency permitted waste water treatment works facility where it is processed, treated and discharged in accordance with the permitted controls of the water treatment facility.</p>	
<b>Waste Remaining in Formation</b>	<p>None. All spent acid is expected to return to surface.</p>	
<b>Monitoring</b>	<p>An inspection of the fluid tanks that contain the spent acid shall be carried out prior to being used and will be subject to visual inspections and annual thickness checks.</p>	

Table 7.3: Spent Hydrochloric Acid (Calcium Chloride)

Carbon Dioxide		
<b>Waste Classification, Quantity and Storage</b>	<b>Classification</b>	Inert
	<b>EWC Code</b>	Not Applicable
	<b>Estimated Quantity</b>	Not Known at this Time
	<b>Onsite Storage</b>	None – Comingled with the Natural Gas
	<b>Odour Potential</b>	No Odour Anticipated
<b>Operation / Activity</b>	Liquid Carbon Dioxide is injected into the well to assist in the removal of all wellbore fluids and near wellbore debris sustained during the drilling operations.	
<b>Waste Prevention and Minimisation</b>	The use of liquid Carbon Dioxide can be classified as a closed loop system due to the carbon dioxide having been first taken from the atmosphere during its manufacture process where it is cooled to a liquid state before being injected into the well. The temperature of the formation changes the state of the Carbon Dioxide from a liquid to a gas, which is then returned to surface and vented back into the atmosphere.	
<b>Waste Treatment and Disposal</b>	Carbon Dioxide that has been extracted from the atmosphere will be vented back into the atmosphere via the ground flare without any treatment being necessary.	
<b>Waste Remaining in Formation</b>	None. Liquid Carbon Dioxide injected into the well will flow to surface in a gaseous state.	
<b>Monitoring</b>	The volume of Carbon Dioxide pumped into the wellbore will be monitored. Carbon Dioxide returning as gas to surface is non-flammable.	

Table 7.4: Carbon Dioxide

Nitrogen		
<b>Waste Classification, Quantity and Storage</b>	<b>Classification</b>	Inert
	<b>EWC Code</b>	Not Applicable
	<b>Estimated Quantity</b>	Not Known at this Time
	<b>Onsite Storage</b>	None – Comingled with the Natural Gas
	<b>Odour Potential</b>	No Odour Anticipated
<b>Operation / Activity</b>	Nitrogen is injected into the wellbore to aid the initial lifting of wellbore fluids.	
<b>Waste Prevention and Minimisation</b>	The use of nitrogen can be classified as a closed loop system, having first been extracted from the atmosphere during its manufacturing process and subsequently released to atmosphere.	
<b>Waste Treatment and Disposal</b>	Nitrogen will be released to atmosphere during the natural gas combustion process.	
<b>Waste Remaining in Formation</b>	None. Nitrogen injected into the wellbore to aid the initial lifting of wellbore fluids will flow to surface.	
<b>Monitoring</b>	<p>The volume of nitrogen pumped into the wellbore to displace (pushing) the fluids in the wellbore will be monitored.</p> <p>Nitrogen returning to surface is non-flammable</p>	

Table 7.5: Nitrogen

Natural Gas		
<b>Waste Classification, Quantity and Storage</b>	<b>Classification</b>	Hazardous
	<b>EWC Code</b>	16 05 04*
	<b>Estimated Quantity</b>	115mmscf cumulative (per 1 clean up and 1 EWT)
	<b>Onsite Storage</b>	None – Incineration by Flare Unit
	<b>Odour Potential</b>	No Odour Anticipated
<b>Operation / Activity</b>	During operations there is a likelihood of natural gas being produced from the formation and flowed at different rates to determine the characteristics of the formation, allowing Rathlin to determine whether or not the reservoir is capable of producing commercial quantities of natural gas.	
<b>Waste Prevention and Minimisation</b>	<p>The ability to prevent or minimise natural gas is extremely limited during this operation as it is required to enable Rathlin to determine the condition and volume of the reservoir. Given that the operation is exploratory, no consideration has been given at this stage to capture the gas for sale and transportation for reuse as a fuel or other means of generating energy.</p> <p>Due to the unknown composition, quantity and pressure of any natural gas encountered during the operations, the generation of electricity by means of a gas powered generator and connection to the national grid is not feasible.</p> <p>The infrastructure required to suitably store natural gas onsite in a liquid state for subsequent offsite transfer to a liquid natural gas receiving facility is not feasible for such a temporary operation. Only at the point of incineration is the natural gas considered a waste.</p>	
<b>Waste Treatment and Disposal</b>	Natural gas is separated from produced fluids at surface and diverted to a flare located onsite for incineration.	
<b>Waste Remaining in Formation</b>	None. Natural gas naturally occurs within certain hydrocarbon bearing formations and is only considered as a waste at the point of incineration.	
<b>Monitoring</b>	Flaring operations will be managed through onsite supervision and safety and performance systems to ensure its effectiveness and efficiency.	

Table 7.6: Natural Gas

Formation Water		
<b>Waste Classification, Quantity and Storage</b>	<b>Classification</b>	Non-Hazardous
	<b>EWC Code</b>	01 01 02
	<b>Estimated Quantity</b>	Unknown
	<b>Onsite Storage</b>	Cylindrical Tanks
	<b>Odour Potential</b>	No Odour Anticipated
<b>Operation / Activity</b>	<p>During flow testing operations there is a possibility of formation water being produced together with hydrocarbons. Formation water is separated from the hydrocarbons at surface using fluid separation equipment and transferred via temporary pipework to cylindrical storage tanks.</p> <p>The formation water has the potential to contain low levels of Naturally Occurring Radioactive Material (NORM). Samples of formation water will be sent to a laboratory holding the appropriate accreditations for radionuclide analysis by gamma spectrum. Formation Water is not an expected waste stream but has been included as a precautionary approach.</p>	
<b>Waste Prevention and Minimisation</b>	<p>The ability to prevent or minimise recovery of formation water is extremely limited. Given that the operation is exploratory, no consideration has been given at this stage for reinjection of produced formation water. Formation water cannot be reused onsite due to unknown components within the formation water and high salinity. Therefore, formation water is considered a waste.</p>	
<b>Waste Treatment and Disposal</b>	<p>Formation water will be transported via a licenced haulier to either an Environment Agency permitted waste water treatment facility where it is processed, treated and discharged in accordance with the permitted controls of the water treatment facility, or to a bespoke RSR permitted waste treatment facility for treatment and disposal in accordance with the Best Available Technique (BAT).</p>	
<b>Waste Remaining in Formation</b>	<p>None. Formation water naturally occurs within certain hydrocarbon bearing formations and is only considered as a waste when produced from the wellbore.</p>	
<b>Monitoring</b>	<p>A Radioactive Waste Advisor will be appointed for the well testing operations in accordance with the general management arrangements as detailed within SR2014 No 4 Permit.</p> <p>A contamination monitoring programme will be devised and will include the wellhead, temporary separation equipment and storage tanks. Consignment of formation water will be screened externally for contamination prior to leaving site.</p> <p>An inspection of the fluid tanks that contain the formation water shall be carried out prior to being used and will be subject to visual inspections and annual thickness checks.</p>	

Table 7.7: Formation Water

### 7.3.2 Non-Extractive Waste

During the West Newton A well testing operations there will be non-extractive wastes generated onsite, including:

- Surface run-off water;
- Foul water and sewage;
- Waste engine, gear and lubricating oils;
- Waste hydraulic oils;
- Oil rags and absorbents;
- Waste oil filters;
- Paper and cardboard;
- Canteen waste;
- Cement;
- Wood;
- Mixed Municipal Waste; and
- Metal.

### 7.3.3 Non-Extractive Waste

Storage of non-extractive waste will be limited to temporary storage, pending collection. No temporary storage of non-extractive waste will exceed 3 months.

### 7.3.4 Waste Supervision and Carriers

Rathlin is ultimately accountable for waste management at the site. During operations, the management of waste generated at the wellsite will be delegated to the Site Waste Manager, appointed by Rathlin to exercise overall control of the wellsite operations, in accordance with the Borehole Sites and Operations Regulations 1995 and the Waste (England and Wales) Regulations 2011.

The management of waste onsite will include:

- Management of waste in accordance with the waste hierarchy, as set out in the Waste (England and Wales) Regulations 2011;
- Monitoring of all waste storage units such as skips and storage tanks;
- Liaison with third party waste advisors with respect to sampling and analysis of waste;
- Compiling all waste transfer notes; and
- Managing the collection and offsite disposal of all waste streams.

Rathlin will appoint competent waste dealers or brokers and carriers, responsible for the transportation of all waste streams to the relevant Environment Agency permitted waste treatment facility. Waste dealers or brokers and carriers will hold relevant certificates issued by the Environment Agency, which shall be inspected prior to being appointed.

### 7.3.5 Wellsite Supervisor

During the operations at the West Newton A wellsite, management of the wellsite will be delegated to the Wellsite Supervisor, appointed by Rathlin to exercise overall control of the wellsite operations, in accordance with the Borehole Sites and Operations Regulations 1995 and the Waste (England and Wales) Regulations 2011.

The Wellsite Supervisor will be responsible for the Health and Safety of personnel, contractors and the public and the implementation of any identified environmental requirements to ensure that operations do not have an adverse impact on the environment during the exploratory operations, including waste management.

All Wellsite Supervisors will hold the relevant certificates and will be sufficiently experienced in accordance with the Rathlin Environmental Management System. The appointed Wellsite Supervisor will have:

- Minimum 5+ years' experience in wellsite supervision and in oil and gas drilling and production technologies;
- Current IWCF Level 4 certification;

- Experience of well engineering, operation standards and applicable industry best practices;
- Experience in emergency response procedures; and
- Understanding and application of applicable legislation, including but not limited to, the Offshore Installation and Wells (Design and Construction etc.) Regulations 1996, Borehole Sites and Operations Regulation 1995 and be aligned with any revisions therewith.

## 8. ENVIRONMENTAL AND HUMAN IMPACT

The West Newton A wellsite has been designed and constructed with consideration for both environmental and human impacts. All permitted activities will take place within the contained area of the wellsite.

The wellsite has been constructed to provide complete containment of any spillages in the unlikely event they occur onsite. An enclosed perimeter containment ditch has been excavated and installed around the perimeter of the wellsite, with the exception of the car parking area. Following the excavation of the perimeter containment ditch, the wellsite was overlaid with an impermeable membrane to provide wellsite integrity and ensure that any surface run off liquids, either rain water or spillages, flow to the perimeter containment ditch.

Details of the construction and installation of the impermeable membrane are detailed within the West Newton A Site Condition Report (RE-EPRA-WNA-SCR-006) provided in support of the environmental permit application to vary the existing permit.

During the well testing operations, all hazardous substances will be stored within the wellsite, ensuring that in the unlikely event of a spillage, hazardous substances will be contained within the wellsite, preventing the migration or percolation of hazardous substances offsite. No hazardous substances shall be stored outside of the active area of the wellsite.

A site plan detailing the location of the perimeter containment ditch providing containment of the wellsite has been included within the Site Plans (RE-EPRA-WNA-SP-004) provided in support of the environmental permit application to vary the existing permit.

The Environmental Risk Assessment (RE-EPRA-WNA-ERA-007) has been undertaken in accordance with Environment Agency [guidance](#).

This qualitative risk assessment has considered odour, noise, fugitive emissions, dust, air emissions, releases to water environment, waste, global warming potential, and potential for accidents and incidents as these relate directly to the activities. The Environmental Risk Assessment has also identified the potential hazards associated with the extractive wastes, including the risk they pose and the control measures that Rathlin will adopt in order to mitigate all risks identified.

The assessment concluded that with the implementation of appropriate risk management measures, potential hazards from the activities are likely to be insignificant due to the control measures proposed by Rathlin. Any environment or human impact is expected to be negligible.

Measures to minimise the environmental and human impact of the exploratory operations have been incorporated as part of the initial site selection process, site design and construction. The measures to mitigate long term environmental impact are:

- Site located suitable distance from residential properties;
- Site design to include impermeable membrane and containment ditches;
- Wellbore lifecycle designed to protect groundwater;
- Hierarchy of waste management;
- Operating procedures and inductions;
- Waste handling, storage and disposal regime;
- Continuous training and development;
- Environmental monitoring; and
- Restoration and aftercare.

## **9. CONTROL AND MONITORING OF WASTE AND EMISSIONS**

A brief description of the waste controls and monitoring processes is provided below.

### **9.1 Releases to Groundwater**

The potential for a release to groundwater exists both at surface and within the subsurface and have been assessed and included within the Environmental Risk Assessment (RE-EPRA-WNA-ERA-007), provided in support of the environmental permit application to vary the existing permit.

#### **9.1.1 Surface Release**

Incorporated into the design of the wellsite is an impermeable membrane which will be constructed using a HDPE impermeable liner. The impermeable membrane prevents surface fluids (mainly rainwater) from penetrating the underlying subsoils. Surface fluids migrate along the surface of the impermeable membrane to a perimeter ditch, where it is contained pending collection via a licenced haulier to an Environment Agency approved waste water treatment facility. During periods of non-operation, the surface water will be tested and discharged in accordance with the existing environmental permit.

#### **9.1.2 Subsurface Release**

Subsurface releases are mitigated by adopting the best practice approach to wellsite construction and wellbore construction. Dilute (15%) Hydrochloric Acid will be introduced to the formation at levels considered de-minimis and will not constitute a ground water activity. All fluids introduced to the formation(s) by Rathlin shall be recovered and will not remain within the formation (subsurface).

### **9.2 Release to Air**

An Air Quality Impact Assessment has been undertaken as part of the application to vary the existing permit. A baseline on background air quality has been provided within the assessment using data obtained from Defra.

The Air Quality Impact Assessment has assessed that the impact and concluded that pollutant releases from the proposed natural gas flaring are unlikely to pose any substantial risk to, or have any significant influence on, the attainment of environmental standards in the vicinity of the West Newton A well site.

The Air Quality Impact Assessment is included within the Gas Management Plan, provided in support of the environmental permit application.

### **9.3 Odour**

Extractive wastes generated are not ordinarily malodorous, nor are any of the associated processes that will be performed. However previous operations have been the subject of odour complaints and as such an Odour Management Plan is place. Measures will be taken to minimise all fugitive emissions which may cause odours.

The potential of odour releases has been assessed and included within the West Newton A Odour Management Plan (RE-EPRA-WNA-OMP-009) provided in support of the environmental permit application to vary the existing permit.

### **9.4 Waste Management**

The quantity of each waste will be recorded as it is removed from site. All records of waste movements (extractive and non-extractive wastes) will be retained by the operator and made available for inspection by the Environment Agency on request.

## **9.5 Natural Gas or Oil**

In the event of any unexpected release of natural gas or oil releases, the Environment Agency will be notified in accordance with the environmental permit requirements. Details of the quantities of unexpected releases will be recorded by the operator along with the measures taken to manage them and made available to the Environment Agency on request.

## **9.6 Contractor Performance**

Rathlin is ultimately responsible for any waste generated onsite during the exploratory operations. Rathlin will not delegate its responsibilities or accountabilities as Operator to a contractor.

Contractors, who are involved in the generating of waste and subsequent reuse, recycle or disposal will first have been selected in accordance with the Rathlin Environmental Management System.

## **9.7 Security**

Security of the wellsite is provided in the form of a security fence and lockable access gates. The positioning of, both permanent and temporary equipment, including the groundwater quality monitoring boreholes, will be within the confines of the security fence.

During operations it may be necessary to have manned security. Manned security will control access and egress to the wellsite and will play a key role in the control of personnel in the event of an emergency situation, in accordance with the Site Safety Document, a requirement of the Borehole Sites and Operations Regulations 1995.

## **9.8 Complaints**

In the event that a complaint is received from stakeholders, including neighbours, the complaint shall be recorded and investigated in accordance with Rathlin Management systems.

Complaints relating to the environment will be reported to the Environment Agency. In some cases, permit conditions will require notification the Environment Agency within 24 hours or without delay for a potentially polluting incident.

Following notification, measures to prevent reoccurrence will be agreed with the Environment Agency, together with a programme for implementation. Implementation of the actions will be monitored and the Environment Agency informed.

## **10. ENVIRONMENTAL INCIDENT MANAGEMENT**

The potential for an environmental incident to occur during exploratory operations is minimal. The source of such incident is contained within the wellbore and contained within the wellsite.

### **10.1 Containment Within the Wellbore**

During short duration wellbore operations, wellbore control equipment and/or pressure control equipment will be deployed on the wellbore in accordance with the relevant American Petroleum Institute (API) Recommended Practices (RP) and/or applicable British Standard (BS). Wellbore control equipment and/or pressure control equipment is subject to a schedule of certification and testing, together with a requirement for those operating wellbore control equipment to be certified competent.

### **10.2 Wellsite Containment**

Incorporated into the design of the wellsite is a HDPE impermeable membrane. The impermeable membrane prevents surface fluids (mainly rainwater) from penetrating the underlying subsoils. Surface fluids migrate along the surface of the impermeable membrane to a perimeter ditch, where it is contained.

In addition, general spill containment and clean up equipment is provided onsite. In the very unlikely event of an environmental incident occurring beyond the capabilities of the equipment or personnel onsite then a specialist contractor, for example Veolia Environmental Services, will be called to assist Rathlin in dealing with the incident.

### **10.3 Fire Response**

Whilst a fire is associated more so with the health and safety of the personnel onsite, a fire does have the potential to lead to an environmental incident. It is imperative, therefore, that any potential for a fire and subsequent emergency response is identified and included in the operational planning. The Site Safety Document, which is a requirement under Regulation 7 of the Boreholes Sites and Operations Regulations 1995, specifies the arrangements for identification and mitigation in the event of a fire, including consultation with the local Fire & Rescue Service.

Containment of any firefighting fluid is provided by the impermeable membrane incorporated in to the design of the wellsite. In the event that such requirements were to be necessary, continued monitoring of the containment ditch shall be implemented to ensure it does not exceed its containment capacity.

### **10.4 Incident Reporting and Investigation**

All incidents, no matter how minor, are reported in accordance with Rathlin's management systems. The procedures therein provide for the investigation of all incidents to ensure lessons are captured and actions implemented to avoid reoccurrence.

In addition, the procedure provides for the notification to the relevant Regulatory Authority in the event of an incident which extends beyond the containment of the wellsite.

Environmental incidents will be reported to the Environment Agency within the required timescales, as determined by the severity and environmental impact of the incident and/or permit conditions. In some cases, permit conditions will require notification to the Environment Agency within 24 hours or without delay for a potentially polluting incident.

Following notification, measures to prevent reoccurrence will be agreed with the Environment Agency, together with a programme for implementation. Implementation of the actions will be monitored and the Environment Agency informed.

## **11. ALTERATIONS TO THE PLAN**

Any required changes or deviations from this waste management plan are to be referred to the Rathlin management team or, during operations, to the West Newton A Wellsite Supervisor in the first instance. No changes to or deviations from this waste management plan are to be implemented until the required changes or deviations have been reviewed and approved by Rathlin and the relevant approvals obtained in writing from the Environment Agency for any changes to the plans and operating techniques approved under the environmental permits to be issued.

Within the environmental permits there will be a requirement for the operator, Rathlin, to review the waste management plan every five (5) years and amend where necessary. The review date shall take place five (5) years from the date of permit issue. Reviews and amendments will also be required in the event of a substantial change(s) to the operations taking place onsite.

In some cases, changes to operations will require the environmental permit to be varied in order to accommodate such changes. In this instance an application will be made to the Environment Agency to vary the existing permit or apply for a new permit.

## **12. PROPOSED PLAN FOR CLOSURE**

Following the cessation of exploratory operations and / or a period of suspension a decision may be made to close the site resulting in subsequent wellbore abandonment and wellsite restoration.

### **12.1 Well Abandonment**

If a decision is made to restore the wellsite, the boreholes will be abandoned in accordance with Oil & Gas UK Guidelines for the abandonment of wells, which requires all distinct permeable zones penetrated by the wellbore to be isolated from each other and from surface by a minimum of one permanent barrier. If any permeable zone penetrated by the wellbore is hydrocarbon-bearing or over-pressured and water-bearing then the requirement is for two permanent barriers from surface, the second barrier being a back-up to the first.

In addition to the Oil & Gas UK Guidelines for the abandonment of wells, the borehole abandonment(s) will be undertaken in accordance with the following regulations:

- The Borehole Sites and Operations Regulations 1995; and
- Offshore Installations and Wells (Design & Construction, etc.) Regulations 1996.

Prior to any abandonment a full wellbore abandonment programme will be submitted to the HSE and the Rathlin Independent Well Examiner for review and examination. The wellbore abandonment programme does not form part of the Well Testing programme.

### **12.2 Wellsite Restoration**

The purpose of the site restoration is to ensure that the wellsite is returned to its former use, in a condition that is as close as reasonably practically possible to its original condition, prior to wellsite construction. The restoration will typically involve the following activities as detailed within each subsection below.

The West Newton A wellsite will be restored following the abandonment of the boreholes. Full details of the proposed wellsite restoration will be included within the Site Condition Report, which will be submitted as part of an application to surrender the environmental permit.

No extractive wastes will be produced during the wellsite restoration phase.

#### **12.2.1 Pre-Restoration Site Clearance**

All surface equipment will be purged clean and dismantled for offsite reuse. The wellsite containment systems and associated management of surface water will continue to be implemented until all equipment has been removed from the site and the wellbore has been decommissioned.

A wellbore that has been designed, independently examined and reviewed by the HSE to ensure integrity, which in turn is constructed and subsequently decommissioned in accordance with applicable regulation, guidance and industry best practice, represents no risk of contamination.

The boundary fencing will be dismantled and removed prior to site restoration works. Temporary Heras fencing, if necessary, will be used to maintain security of the site once the boundary fencing has been removed. On completion of the site restoration works, all boundary fencing and temporary Heras fencing will be removed.

#### **12.2.2 Surface Water Containment System**

All surface water containment systems will be emptied using vacuum tankers for subsequent offsite treatment and/or disposal at an Environment Agency permitted waste water treatment works.

Once the containment systems are empty of surface water, surface aggregate will be carefully removed exposing the impermeable membrane. The impermeable membrane will then be removed

and the geotextile and subsoil below the impermeable membrane carefully inspected for signs of contamination. In the unlikely event that localised contamination is identified, the contaminated area will be excavated for subsequent offsite treatment and/or disposal at an Environment Agency permitted waste facility.

The impermeable membrane will be removed for subsequent offsite recycling and/or disposal at an Environment Agency permitted waste facility.

The drilling cellar will be dismantled and the concrete removed from site for subsequent offsite recycling and/or disposal at an Environment Agency permitted waste facility.

The open voids as a result of removal of the surface water containment system and drilling cellar, will be infilled with sub-soil stored on the site during site construction.

### **12.2.3 Timing**

Landscape proposals shall be implemented during the first planting season following the cessation of operations at the West Newton A wellsite.

### **12.2.4 Soil Management**

The cultivation of sub-soil and the replacement/cultivation of top-soil is weather dependent. Timescales are estimated assuming both the sub-soil and top-soil are in a suitably dry non-plastic state such that damage to its structure shall be avoided.

The subsoil and topsoil should be in a non-compacted state, such that the growth of roots is unimpeded and drainage water can percolate down through the profile relatively freely to the naturally permeable strata.

The topsoil mound will be redistributed over the previously surfaced area of the site to a minimum depth of 300mm and reseeded using a grassland mix.