

1. Abbreviations and Definitions

Definitions for the Surface Water Discharge Risk Assessment	
ID:	Identification number the hazard has been given to allow for easy referencing.
Activity / Event	The specific operation being undertaken relating to the proposed hazard and risk.
Activity / Event	The specific operation being undertaken relating to the proposed hazard and risk.
Potential Release Point	The point at which the pollutant / emission leaves its dedicated infrastructure and enters the environment.
Hazard	The hazards category i.e. type of emission.
Source	The pollutants from the activity taking place such as flaring.
Pathway	The pathway the pollutant is taking such as air or unsaturated zones.
Receptor	Those who it may have an adverse effect on i.e. surrounding residents, wildlife and habitats, designated sites.
Exposure Probability	The chance of the hazard occurring without taking into account mitigation measures.
Impact Severity	The impact of the hazard should it occur without taking into account mitigation measures.
Risk Magnitude	A hazard that has been assessed and has been given a risk rating level pre-mitigation measures.
Risk Management	Mitigation measures that will be put in place to control the risks so far as reasonably practicable.
Residual Risk	A hazard that has been assessed and has been given a risk rating level post mitigation measures.
Not Significant	The severity, together with the likelihood of the risk is not expected to cause any harm to the environment.
Low	The severity, together with the likelihood of the risk has low potential to cause harm to the environment.
Medium	The severity, together with the likelihood of the risk has moderate potential to cause harm to the environment.
High	The severity, together with the likelihood of the risk has a high potential to cause harm to the environment.

Table 1: Definitions

2. Methodology

The structure of the Surface Water Discharge Risk Assessment follows the Environment Agency guidance and uses a model known as the 'Source-Pathway-Receptor' model.

- Identifying the surface water discharge risk from the site;
- Assessing risks and checking they are acceptable;
- Justifying appropriate measures to control the risk (if needed); and
- Present the findings of the risk assessment.

3. Scoring Criteria

In order to establish a risk rating for each Source-Pathway-Receptor (S-P-R) linkage both the Likelihood (Exposure Probability) and Consequence (Impact Severity) have been issued with a score using Table 2 and Table 3 respectively. The score is used in conjunction with Table 4 to provide an overall risk rating of the activity. All scores and risk ratings are provided on the basis that the mitigation measure are not in place.

The Residual Risk uses the same scoring system but does consider the proposed mitigation measures.

Likelihood	Descriptor
Very Low	Rarely encountered, never reported or highly unlikely.
Low	Infrequent occurrences.
Medium	Can be expected to occur several times per year.
High	Repeated Occurrences.

Table 2: Scoring System Likelihood

Consequence	Descriptor
Very Low	Slight environmental effect that does not exceed a regulatory standard.
Low	Minor environmental effect, may breach a regulatory standard, localised to the point of release with no significant impact.
Medium	Moderate, localised effect on people and the environment in the vicinity of the incident.
High	A major environmental incident resulting in significant damage to the environment and harm to human health.

Table 3: Scoring System Consequence

The risk matrix presented in Table 4 provides a risk rating for each S-P-R linkage identified within this Environmental Risk Assessment.

Risk Rating		Consequence			
		Very Low	Low	Medium	High
Likelihood	Very Low	Not Significant	Not Significant	Low	Low
	Low	Not Significant	Low	Medium	Medium
	Medium	Low	Medium	Medium	High
	High	Low	Medium	High	High

Table 4: Risk Matrix

Environmental risks are assigned a Not Significant, Low, Medium or High risk rating and coded using a colour coded system. A description of each risk rating is presented in Table 5 below.

Consequence	Acceptable	Descriptor
Not Significant	Acceptable	Near-certain that an incident will not occur, or the consequences would not be significant.
Low	Acceptable	Unlikely an incident will occur, or the consequences would be minor confined to the immediate area.
Medium	Tolerable	Activity can only take place provided that impacts are localised and risk remediation is readily available.
High	Unacceptable	The risk must be further reduced before the activity can commence.

Table 5: Risk Rating Definition

Weaverthorpe Wellsite
Surface Water Discharge Risk Assessment

Source ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Probability of Exposure	Consequence	Magnitude of Risk	Risk Management	Residual Risk	Responsible Person for Monitoring Release Point
			Source	Pathway	Receptor						
ASSESSMENT OF SURFACE WATER DISCHARGE - PHASE 4a SITE SUSPENSION											
01	Ancillaries - Generators - Lighting Towers - Small Fuel Store - Welfare	Equipment Failure	- Hydraulic Oil. - Diesel. - Lubricating Oil. - Drilling Fluids / Chemical Products and constituents. - Well Treatment Fluids. - Crude Oil. - Formation Water.	Discharge of Surface Run-off Water (Rainwater) collected from the 'Active Area' site foot print. Soakaway.	See Receptor Table	Very Low	Medium	Low	Class 1 Separator (Interceptor) installed to remove any trace of oils prior to discharge. Competent operators employed / contracted. Dedicated Emergency Response Plan Established. Dedicated Leak Detection and Repair Plan Established Dedicated Surface Water Management Plan Established Personnel inducted / trained on emergency response procedures. Personnel to shut interceptor if pollution event occurs. Plant and equipment installed, maintained and operated as directed by manufacturer. Scheme of monitoring being undertaken. Small fuel stores if present are the subject of secondary containment.	Negligible	Wellsite Supervisor
02	Ancillaries - Generators - Lighting Towers - Small Fuel Store - Welfare	- Planned Breaking of Containment - Planned Maintenance Operations	- Hydraulic Oil. - Diesel. - Lubricating Oil. - Drilling Fluids / Chemical Products and constituents. - Well Treatment Fluids. - Crude Oil. - Formation Water.	Discharge of Surface Run-off Water (Rainwater) collected from the 'Active Area' site foot print. Soakaway.	See Receptor Table	Very Low	Medium	Low	Breaking of containment to be kept to a minimum on an as needs basis. Class 1 Separator (Interceptor) installed to remove any trace of oils prior to discharge. Competent operators employed / contracted. Dedicated Emergency Response Plan Established. Dedicated Surface Water Management Plan Established Drip trays utilised. Maintenance / Service operations conducted by competent personnel Personnel inducted / trained on emergency response procedures. Personnel to shut interceptor if pollution event occurs. Plant and equipment installed, maintained and operated as directed by manufacturer. Scheme of monitoring being undertaken.	Negligible	Wellsite Supervisor
03	Ancillaries - Generators - Lighting Towers - Small Fuel Store - Welfare	- Handling and Transfer of Fuels for Power Generation - Overfilling of Fuel Tanks	Diesel.	Discharge of Surface Run-off Water (Rainwater) collected from the 'Active Area' site foot print. Soakaway.	See Receptor Table	Low	Medium	Medium	Class 1 Separator (Interceptor) installed to remove any trace of oils prior to discharge. Competent operators employed / contracted. Dedicated Emergency Response Plan Established. Dedicated Surface Water Management Plan Established Drip trays utilised. Personnel inducted / trained on emergency response procedures. Personnel to shut interceptor if pollution event occurs. Plant and equipment installed, maintained and operated as directed by manufacturer. Scheme of monitoring being undertaken. Small fuel stores if present are the subject of secondary containment.	Negligible	Wellsite Supervisor
04	Well Equipment Wellhead	Equipment Failure	- Oil - Formation Water - Suspension Brine	Discharge of Surface Run-off Water (Rainwater) collected from the 'Active Area' site foot print. Soakaway.	See Receptor Table	Very Low	Medium	Low	Class 1 Separator (Interceptor) installed to remove any trace of oils prior to discharge. Dedicated Emergency Response Plan Established. Dedicated Leak Detection and Repair Plan Established Dedicated Surface Water Management Plan Established Personnel inducted / trained on emergency response procedures. Personnel to shut interceptor if pollution event occurs. Plant and equipment installed, maintained and operated as directed by manufacturer. Scheme of monitoring being undertaken. Suspension column in the well. Wellhead installed and maintained as directed by industry standards. Wellhead placed within a cellar, capturing initial pollution.	Negligible	Wellsite Supervisor
05	Well Equipment Wellhead	- Planned Breaking of Containment - Planned Maintenance Operations	- Oil - Formation Water - Suspension Brine	Discharge of Surface Run-off Water (Rainwater) collected from the 'Active Area' site foot print. Soakaway.	See Receptor Table	Very Low	High	Medium	Breaking of containment to be kept to a minimum on an as needs basis. Class 1 Separator (Interceptor) installed to remove any trace of oils prior to discharge. Competent operators employed / contracted. Dedicated Emergency Response Plan Established. Dedicated Surface Water Management Plan Established Drip trays utilised. Maintenance / Service operations conducted by competent personnel Personnel inducted / trained on emergency response procedures. Personnel to shut interceptor if pollution event occurs. Plant and equipment installed, maintained and operated as directed by manufacturer. Scheme of monitoring being undertaken. Suspension column in the well. Wellhead installed and maintained as directed by industry standards. Wellhead placed within a cellar, capturing initial pollution.	Negligible	Wellsite Supervisor

Air and Odour

- 1 • Air Quality Impact Assessment concludes no significant impact.
- 2 • Avoid direct sunlight on open tanks.
- 3 • Breaking containment of tanks and pipework systems shall be minimised.
- 4 • Breather line elevated to promote better dispersion of the entrained oil vapours.
- 5 • Chemicals segregated, stored correctly and sealed when not in use.
- 6 • Cleaning and purging where possible prior to pulling out of hole.
- 7 • Cold venting of gas is not considered BAT and is therefore not anticipated to be undertaken.
- 8 • Combustion temperature managed to ensure efficient (>98%) combustion efficiency.
- 9 • Combustion unit subject to approval by the EA.
- 10 • Competent flare operators.
- 11 • Competent operators.
- 12 • Competent personnel only to store / use chemicals.
- 13 • Containers are to be sealed immediately after use.
- 14 • Containers checked on delivery, pre-use and periodically for signs of damage/leaks.
- 15 • Control acidity/alkalinity to make more soluble in water and therefore reduce likelihood of evaporation.
- 16 • Decanting/transfer of chemicals to be conducted inside buildings where possible.
- 17 • Dedicated scrubbers in place to remove VOCs / H2S from natural gas, if necessary.
- 18 • Drilling mud provides over balanced weight to prevent gas to surface.
- 19 • Drip trays used for the transfer or decanting of fuel/small volume liquids such as engine oil.
- 20 • Employ odour masking if necessary.
- 21 • Ensure connections to well head are correctly fitted and pressure tested.
- 22 • Ensure connections to well head fitted correctly.
- 23 • Ensure correct connections.
- 24 • Equipment cleaned / purged where possible prior to breaking containment.
- 25 • Equipment installed, serviced and maintained by competent and qualified contractors.
- 26 • Equipment to be serviced/maintained prior to mobilisation.
- 27 • Equipment to be serviced/maintained.
- 28 • Flare monitoring (to be) in place with results reported in accordance with EA permit.
- 29 • Flare pilot light on prior to delivery of wellbore fluids.
- 30 • Generators assessed for compliance with Emission Limit Values.
- 31 • H2S is not anticipated at a level above 5.7 mg/Nm³.
- 32 • H2S Monitoring in Place.
- 33 • Identification of short term or long term odour sources.
- 34 • Increase humidity to reduce evaporation.
- 35 • Inspection of storage and work areas for signs of spillages.
- 36 • Inspection of storage areas for signs of degradation/damage to containers/leaks.
- 37 • Installation and leak testing of flare equipment prior to commission.
- 38 • Minimise flow through vents.
- 39 • Minimise quantity of materials held onsite to prevent potential reactions.
- 40 • Monitor levels to prevent spillage.
- 41 • Monitor waste levels to prevent overflowing/spillage.
- 42 • Notification to emergency services of commencement of operations on mobilisation.
- 43 • Odour Management Plan implemented for the site.
- 44 • Odourless products used ahead of those which give rise to odour where practicable.
- 45 • Personnel inducted on waste procedures.
- 46 • Personnel inducted/trained on emergency response procedures.
- 47 • Pipes used within the transfer to be capped after use.
- 48 • Plan for breaking containment operations at cessation of operations.
- 49 • Plant, tanks and pipework cleaned / purged where possible prior to breaking containment.
- 50 • Plant, tanks and pipework tested for leaks following installation to confirm integrity.
- 51 • Plant, tanks and pipework tested for leaks prior to first use to confirm integrity.
- 52 • Plug/Top tanks, pipes, hoses etc. after breaking containment.
- 53 • Pressure test equipment prior to use.
- 54 • Products kept within their dedicated storage area when not in use.
- 55 • Propane shall be used to increase the calorific value of the gas whilst heavy with nitrogen / carbon dioxide.
- 56 • Purge equipment prior to breaking containment.
- 57 • Quantities of odorous products to be kept to a minimum.
- 58 • Records kept of complaints and subsequent mitigation imposed if necessary.
- 59 • Reduce air flow over surface of fluids.
- 60 • Reduce surface areas of fluids to minimise evaporation rate.
- 61 • Regular inspection of connections and pipes for failure or leaks.
- 62 • Regular inspection of equipment, pressure containment, packing, fluid containment etc.
- 63 • Regular inspection of storage areas/containers for damage/leaks.
- 64 • Regular inspection of wellhead connections and pipes for failure or leaks.
- 65 • Regular maintenance and inspections conducted as directed by written procedures.
- 66 • Remove odorous fluids where possible offsite for odour treatment prior to disposal - Maintain well control capabilities.
- 67 • Remove odorous fluids where possible offsite for odour treatment prior to disposal.
- 68 • Safety flare installed to incinerate unexpected / blowdown gas.
- 69 • Segregation of materials.
- 70 • Segregation of waste.
- 71 • Sensitive Receptors in excess of 500 metres away from the development.
- 72 • Site skips to provide protection.
- 73 • Skips clearly marked to ensure waste segregation and avoid cross contamination.
- 74 • Skips monitored daily and emptied as required.
- 75 • Skips self-contained / enclosed to prevent emissions.
- 76 • Spillages to be remediated as soon as reasonably practicable.
- 77 • Storage containers identified as damaged/leaking used as priority or quarantined for offsite disposal.
- 78 • Tanks and associated pipework protected.
- 79 • Tanks monitored and emptied as required.
- 80 • Tanks sealed after transfer.
- 81 • Tanks self-contained / enclosed where necessary to limit emissions to air.
- 82 • Trained persons to operate vehicles and site plant.
- 83 • Use enclosed tanks where possible.
- 84 • Use of alternative non-odorous chemicals where possible.
- 85 • Use of recognised standard oil field flare.
- 86 • Use of vacuums to remediate spillages.
- 87 • Used spillage equipment to be segregated and contained to prevent odour prior to offsite disposal.
- 88 • Vapour recovery system installed and in use.
- 89 • Vehicles and plant serviced and maintained in line with manufacturer requirements.
- 90 • Vehicles and plant switched off when not in use.
- 91 • Vent lines subject to installation of a drum filter to remove VOCs / H2S where necessary.
- 92 • Water bath heater pilot light on prior to delivery of wellbore fluids.
- 93 • Well control procedures established and tested.
- 94 • Working personnel subject to a site induction covering odour management.

Surface Water Discharge

Automatic ESD Devices installed on production equipment in the event of High Pressure / Low Pressure, preventing / limiting wellbore fluid spillages.

Breaking of containment to be kept to a minimum on an as needs basis.

Class 1 Separator (Interceptor) installed to remove any trace of oils prior to discharge.

Competent operation employed / contracted.

Containment System locked off from interceptor to prevent discharge during high risk operations.

Containment water unsuitable for discharge shall be tankered offsite.

Dedicated Emergency Response Plan Established.

Dedicated Leak Detection and Repair Plan Established.

Dedicated Surface Water Management Plan Established.

Discharge through Interceptor should results indicate water is suitable for discharge.

Drip trays utilised.

Established and Tested Well Control Procedures.

Maintenance / Service operations conducted by competent personnel.

Personnel inducted / trained on emergency response procedures.

Personnel lock off containment area from interceptor to prevent discharge if pollution event occurs.

Personnel to shut Interceptor if pollution event occurs.

Plant and equipment installed, maintained and operated as directed by manufacturer.

Scheme of monitoring being undertaken.

Site Manned 24/7 during operations.

Site remotely monitored via CCTV system when unmanned.

Small fuel stores if present are the subject of secondary containment.

Storage tanks shall be placed within CEM 735 compliant containment bunds.

Suspension column in the well.

Wellhead encased within cellar and caged enclosure for security.

Wellhead installed and maintained as directed by industry standards.

Wellhead placed within a cellar, capturing initial pollution.

Negligible	Carbon Dioxide	Direct	Electricity
Not Applicable	Methane	Indirect	Gas Oil
Very Low	Nitrous Oxide		Natural Gas
Low			
Medium			
High			