ENVIRONMENTAL RISK ASSESSMENT

RE-EPRA-WNA-ERA-007

Revision 0

July 2024

WNA Permit Variation

DOCUMENT TITLE	DOCUMENT REFERENCE
KEY APPLICATION DOCUMENTS	
Environmental Risk Assessment	RE-EPRA-WNA-ERA-007

1. Abbreviations and Definitions

Definitions for the Environemntal Risk Assessment	
ID:	Identification number the hazard has been given to allow for easy referencing.
Activity / Event	The specific operating 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.
Source	A source of pollutants from the activity taking place such as flaring. (Source can also be referred to as 'hazard').
Pathway	The pathway the pollutant is taking such as air or unsaturated zones.
Receptor	Although the likelihood of pollution is low it may have an adverse effect on surrounding residents, wildlife and habitats; these are known as the pollutants receptors.
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 post mitigation measures i.e. not significant, low, medium, high very high etc.
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 i.e. not significant, low, medium, high very high etc.
Not Significant	The severity of risk together with the likelihood of the risk is not expected to cause harm to the environment.
Low	The severity of risk together with the likelihood of the risk is not expected to cause harm to the environment.
Medium	The severity of risk together with the likelihood of the risk has a moderate potential for causing harm to the environment.
High	The severity of risk together with the likelihood of the risk has a high potential for causing harm to the environment.
Other Definitions	
AQIA	Air Quality Impact Assessment
MCPSG	Medium Combustion Plant - Specified Generator
SMR	Steam-Methane Reformation

Table 1.1: Definitions

2. Methodology

The structure of the Environmental Risk Assessment follows the Environment Agency guidance using a source pathway receptor model and includes:

- Identifying the risk from the site;
- Assessing risks and checking they are acceptable;
- Justifying appropriate measures to control the risk (if needed); and
- Presenting the risk assessment.

The Environmental Risk Assessment has included the following items, which have been reviewed for applicability within the proposed operations.

- Accidents and Incidents;
- Air Emissions;
- Dust;
- Fugitive Emissions;
- Global Warming Potential;
- Light;
- Noise;
- Odour;
- Releases to Water;
- Waste.

2.1 Scoring Criteria

In order to establish a risk rating for each Source-Pathway-Receptor (S-P-R) linkage both the Likelihood (Probability of Exposure) and Consequence have been issued a score. The score is used in conjunction with Table 4.3 to provide an overall risk rating of the activity. All scores and risk ratings are provided on the basis that the mitigation measure are in place.

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 2.1: Scoring System Likelihood

Consequence	Descriptor
Very Low	Slight environmental effect that does not exceed a regulatory standard.
Low	Minor environmental effect which may breach a regulatory standard but is localised to the point of release with no significant impact on the environment or human health.
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 2.2: Scoring System Consequence

The risk matrix presented in Table 4.3 below derives 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 2.3: 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 4.4 below.

Consequence	Acceptable	Descriptor
Not Significant	Acceptable	Near-certain that an incident will not occur. If it did occur the consequences would not be significant.
Low	Acceptable	Unlikely an incident will occur or give rise to anything more than a minor consequence on the immediate area.
Medium	Tolerable	The activity can only take place provided that any impacts remain localised and risk remediation is readily available.
High	Unacceptable	The risk must be further reduced before the activity can commence.

Table 2.4 Risk Rating Definition

3. Scope

This Environmental Risk Assessment is applicable the WNA development and considers all of the currently permitted and future activities. Although the residual risk for each of the currently permitted activies is unlikely to have increased, it is necessary to revise the previous assessment to consider whether the proposed activities will present any significant changes to the residual risk.

Receptors	Search Radius	Name	Distance from Site	Direction from Site	Grid Reference	Area (Ha)
RAMSAR	**10 Km**	No receptors found				
Special Areas of Conservation (SAC)	**10 Km**	No receptors found				
Special Protection Areas (SPA)	**10 Km**	Hornsea Mere	6.93 Km	North	TA 17983 46008	232.25
Special Protection Areas (Marine)	**10 Km**	Greater Wash	5.24 Km	Northeast	TA 23650 42421	353,577.85
Marine Conservation Zones	**10 Km**	Holderness Inshore	5.84 Km	Northeast	TA 24212 41663	30,886.85
Special Areas of Conservation (Marine)	**10 Km**	No receptors found				
World Heritage Sites	**10 Km**	No receptors found				
Areas of Outstanding Natural Beauty (AONB)	**10 Km**	No receptors found				
Sites of Special Scientific Interest (SSSI)	**2 Km**	Lambwath Meadows	0.79 Km	Northeast	TA 20100 39699	29.59
Scheduled Monuments	**2 Km**	Burton Constable medieval settlement and field system, north of Burton Constable Hall	1.92 Km	South	TA 18852 37191	7.96
Registered Parks and Gardens	**2 Km**	Burton Constable	0.81 Km	Southwest	TA 18882 28260	397.54
Wood Pastures and Parkland BAP Priority Habitat	**2 Km**	Parkland in 1995: Late 18th C	1.62 Km	South	TA 19006 37474	N/A
		Parkland in 1995: Late 18th C	1.70 Km	South	TA 19375 37381	N/A
		Parkland in 1995: Late 18th C	1.76 Km	South	TA 19094 37317	N/A
Local Wildlife Sites (LWS)	**2 Km**	The Moors, Burton Constable	0.84 Km	South	TA 18876 38359	N/A
		Wycliffe, North Plantation	0.92 Km	South	TA 18676 38389	N/A
		Mill Avenue, Burton Constable	1.27 Km	South	TA 19442 37093	N/A
		Sallymere Plantation	1.70 Km	Southwest	TA 17778 38222	N/A
		Burton Constable Parkland	1.77 Km	South	TA 19098 37311	N/A
National Nature Reserves	**2 Km**	No receptors found				
National Forest	**2 Km**	No receptors found				
RSPB Reserves	**2 Km**	No receptors found				
National Parks	**2 Km**	No receptors found				
Registered Battlefields	**2 Km**	No receptors found				
Local Nature Reserves	**2 Km**	No receptors found				
Sensitive Receptors: Households / Businesses	**2 Km**	Black Bush Farm	0.40 Km	East	TA 19892 39301	N/A
		Caley Cottage	0.46 Km	East	TA 19947 39168	N/A
		High Fosham Cottage	0.52 Km	East	TA 19991 39142	N/A
		Church House	0.53 Km	Southwest	TA 18916 38673	N/A
		Old School House	0.58 Km	Southwest	TA 18948 38593	N/A
		Wood End Farm	0.63 Km	West	TA 18625 38977	N/A
		Marton Farm	0.78 Km	West	TA 18481 39216	N/A
		White House Farm	0.84 Km	Southwest	TA 18618 38534	N/A
		Straits Farm (Withernwick)	0.92 Km	North	TA 19571 40124	N/A
		Manor House	0.92 Km	Northeast	TA 19804 40071	N/A
		Piper Garth	1.05 Km	West	TA 18214 39235	N/A
		West Newton Village	1.11 Km	South	TA 19544 37955	N/A
		Wood House	1.15 Km	South	TA 19077 37949	N/A
		Heywood Farm	1.16 Km	West	TA 18095 39261	N/A
		Treasure Cottage	1.30 Km	West	TA 17952 39248	N/A
		Model Farm	1.32 Km	Southeast	TA 19912 37803	N/A
		Mount Pleasant	1.39 Km	Southeast	TA 20163 37846	N/A
		Homer House	1.42 Km	Northeast	TA 20285 40378	N/A
		Farm at Low Fosham	1.43 Km	East	TA 20878 38786	N/A
		Old Farm Cottage	1.49 Km	Southeast	TA 20352 37829	N/A
		Hill Farm	1.52 Km	West	TA 17710 39289	N/A
		Withernwick Hall	1.81 Km	North	TA 19635 41070	N/A
		Longdykes Farm	1.91 Km	Northwest	TA 18325 40764	N/A
		Northfield Cottage	1.99 Km	North	TA 19463 41185	N/A

Receptors	Search Radius	Name	Distance from Site	Direction from Site	Grid Reference	Area (Ha)
Surface Water Features (Closest to Boundary in All Directions)	**2 km**	Field Drain	0.01 km	West	TA 19231 39097	N/A
		Field Drain	0.06 km	North	TA 19235 39265	N/A
		Pond at Black Bush Cottage	0.34 km	East	TA 19815 39298	N/A
		Field Drain	0.53 km	South	TA 19372 38533	N/A
		Field Drain	0.90 km	East	TA 20381 39178	N/A
Aquifers (Bedrock)	**2 km**	Principal	Site located within designation			N/A
Aquifers (Superficial Drift)	**2 km**	Secondary (Undifferentiated)	Site located within designation			N/A
		Secondary A	0.25 km	Northwest	TF 19087 39418	N/A
Source Protection Zones	**2 km**	No receptors found				
Drinking Water Protected Areas (Surface Water)	**2 km**	No receptors found				
Drinking Water Safeguard Zones (Groundwater)	**2 km**	No receptors found				
Drinking Water Safeguard Zones (Surface Water)	**2 km**	No receptors found				
Bathing Waters	**2 km**	No receptors found				

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
ASSESSMENT OF ODOUR EMISSIONS - MAJOR										
01	Combustion of Natural Gas	Combustion Unit Stack	Gas and Particulate Matter Emissions	Carried on Prevailing Winds	See Receptor Table	Medium	Medium	Medium	Combustion Unit shall be subject to approval by the Environment Agency and shall be the subject of a Best Available Technique Assessment. Combustion Unit shall be subject to approval by the Environment Agency and subject of a Best Available Technique Assessment. Equipment installed, serviced and maintained by competent and qualified contractors. All working personnel to receive full site induction covering odour management. An established flare monitoring operating procedure shall be implemented. Records shall be kept of complaints and subsequent mitigation. Dedicated Odour Management Plan for the site shall be established and implemented.	Not Significant
02	Combustion of Natural Gas	Specified Generator Exhaust	Gas and Particulate Matter Emissions	Carried on Prevailing Winds	See Receptor Table	Low	Medium	Medium	Specified Generators shall be permitted by the Environment Agency and approved for use. Equipment installed, serviced and maintained by competent and qualified contractors. Specified Generators shall be assessed for compliance with Emission Limit Values as dictated by legislation and the environmental permit. All working personnel to receive full site induction covering odour management. Records shall be kept of complaints and subsequent mitigation. Dedicated Odour Management Plan for the site shall be established.	Low
03	Well Clean Up / Cold Venting	Combustion Unit Stack	Wellbore Gas	Carried on Prevailing Winds	See Receptor Table	Low	High	Medium	Hydrogen Sulphide is not anticipated based on previous gas analysis, though potential for small volumes upon completion of acidisation. Well clean up anticipated to last no longer than 45 minutes per occurrence. Propane shall be used to increase the calorific value of the gas whilst heavy with nitrogen / carbon dioxide. All working personnel to receive full site induction covering odour management. Records shall be kept of complaints and subsequent mitigation. Dedicated Odour Management Plan for the site shall be established.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
ASSESSMENT OF ODOUR EMISSIONS - MINOR										
04	Storage of Crude Oil	Dedicated Vent Line(s)	Crude Oil Vapour	Carried on Prevailing Winds	See Receptor Table	Very Low	Low	Not Significant	Vent lines shall be the subject of a drum filter vessel used to remove VOC's. Breather line shall be elevated to aid in the dispersion of residual vapours. Equipment installed, serviced and maintained by competent and qualified contractors. All working personnel to receive full site induction covering odour management. Records shall be kept of complaints and subsequent mitigation. Dedicated Odour Management Plan for the site shall be established.	Very Low
05	Breaking of Containment	• Storage Tanks. • Pipework. • Wellhead. • Separator. • Any Other Equipment.	• Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids. • Natural Gas.	Carried on prevailing winds	See Receptor Table	Low	Low	Low	Plant and pipework shall be installed by competent and qualified contractors and shall be suitable for its intended use. Plant and pipework shall be tested for leaks prior to first use. Breaking containment of tanks and pipework systems shall minimised. Equipment shall be cleaned / purged where possible prior to breaking containment. All working personnel to receive full site induction covering odour management. Records shall be kept of complaints and subsequent mitigation. Dedicated Odour Management Plan for the site shall be established.	Not Significant
06	Storage of Low Volume Odorous Products	Damaged / Unsealed Storage Containers	• Hydraulic Oil. • Diesel. • Lubricating Oil. • Proppant Carrier Fluid and constituents.	Carried on prevailing winds	See Receptor Table	Very Low	Low	Not Significant	Odourless products shall be used ahead of those which give rise to odour where reasonably practicable. Quantities of odorous products to be kept to a minimum. Damaged / leaking containers shall be segregated and used as a priority where possible. Chemicals shall be segregated and stored correctly and sealed when not in use. Containers shall be checked on delivery, pre-use and periodically for signs of damage/leaks. All working personnel to receive full site induction covering odour management. Dedicated Odour Management Plan for the site shall be established. Dedicated Emergency Response Plan for the site established and tested routinely.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
07	Produced fluids on the surface of wellbore equipment	• Drilling Rig. • Drill Pipe. • Wellhead. • Any Other Equipment.	• Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids.	Carried on prevailing winds	See Receptor Table	Low	Low	Low	Cleaning and purging where possible prior to pulling out of hole. Records shall be kept of complaints and subsequent mitigation. All working personnel to receive full site induction covering odour management. Volume expected to be minimal. Dedicated Odour Management Plan for the site shall be established.	Not Significant
08	Use / Decanting of Low Volume Odorous Products	Containment Unit / Canister	• Hydraulic Oil. • Diesel. • Lubricating Oil. • Proppant Carrier Fluid and constituents.	Carried on prevailing winds	See Receptor Table	Very Low	Low	Not Significant	Odourless products shall be used ahead of those which give rise to odour where reasonably practicable. Quantities of odorous products to be kept to a minimum. Products shall be kept within their dedicated storage area when not in use. Drip trays shall be utilised for the transfer / decanting of fuels or small volume liquids such as engine oil etc. All working personnel to receive full site induction covering odour management. Dedicated Odour Management Plan for the site shall be established. Dedicated Emergency Response Plan for the site established and tested routinely.	Not Significant
09	Storage of Sewage	Sewage Tanks	Sewage	Carried on prevailing winds	See Receptor Table	Very Low	Low	Not Significant	Tanks shall be self-contained / enclosed to prevent emissions. Tanks and pipework shall be inspected prior to use to ensure complete integrity. Tanks shall be monitored daily and emptied as required. Breaking containment of tanks and pipework systems shall minimised. Tanks shall be cleaned / purged where possible prior to breaking containment. Plug / cap tanks, pipes, hoses etc. after breaking containment. All working personnel to receive full site induction covering odour management. Dedicated Odour Management Plan for the site shall be established.	Not Significant
10	Storage of General Waste	Waste Skips	General Waste	Carried on prevailing winds	See Receptor Table	Very Low	Low	Not Significant	Skips shall be self-contained / enclosed to prevent emissions. Skips shall be clearly marked to ensure that waste is kept segregated and cross contamination does not occur. Skips shall be monitored daily and emptied as required. All working personnel to receive full site induction covering odour management. Dedicated Odour Management Plan for the site shall be established.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
11	Storage of Odorous Waste Products	Waste Receptacles including: • Waste Containers. • Waste Storage Tanks. • Waste Skips.	• Hydraulic Oil. • Diesel. • Lubricating Oil. • Proppant Carrier Fluid. • Proppant Sand.	Carried on Prevailing Winds	See Receptor Table	Very Low	Low	Not Significant	Waste Receptacles shall be self-contained / enclosed to prevent odorous emissions. Waste Receptacles shall be clearly marked to ensure that waste is kept segregated and cross contamination does not occur. Skips shall be monitored daily and emptied as required. All working personnel to receive full site induction covering odour management. Dedicated Odour Management Plan for the site shall be established.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
ASSESSMENT OF EMISSIONS TO AIR - MAJOR										
01	Combustion of Natural Gas	Combustion Unit Stack	Gas and Particulate Matter Emissions	Carried on Prevailing Winds	See Receptor Table	Low	Medium	Medium	An Air Quality Impact Assessment shall be undertaken to demonstrate the worst case impact for the proposed development. Combustion Unit shall be subject to approval by the Environment Agency and subject of a Best Available Technique Assessment. Equipment installed, serviced and maintained by competent and qualified contractors. Combustion unit temperature and support fuel shall be monitored, where applicable, to ensure combustion efficiency (>98%). An established flare monitoring operating procedure shall be implemented. Regular maintenance and inspections conducted as directed by written procedures.	Not Significant
02	Combustion of Natural Gas	Specified Generator Exhaust	Gas and Particulate Matter Emissions	Carried on Prevailing Winds	See Receptor Table	Low	Medium	Medium	Specified Generators shall comply with the Emission Limit Values. An Air Quality Impact Assessment shall be undertaken to demonstrate the worst case impact for the proposed development. Equipment installed, serviced and maintained by competent and qualified contractors. Specified Generators assessed for compliance with Emission Limit Values as dictated by legislation and environmental permit.	Not Significant
03	Well Clean Up / Cold Venting	Combustion Unit Stack	Wellbore Gas	Carried on Prevailing Winds	See Receptor Table	Low	High	Medium	Based on previous gas analysis, Hydrogen Sulphide (H_2S) is not anticipated. Potential for small volumes of gas upon completion of acidisation. Well clean up anticipated to last no longer than 45 minutes per occurrence. Propane shall be used to increase the calorific value of the gas whilst heavy with Nitrogen(N_2) / Carbon Dioxide (CO_2) to encourage combustion. Records kept of complaints and subsequent mitigation imposed if necessary.	Not Significant
ASSESSMENT OF EMISSIONS TO AIR - MINOR										
04	Storage of Crude Oil	Dedicated Vent Line(s)	Crude Oil Vapour	Carried on Prevailing Winds	See Receptor Table	Very Low	Low	Not Significant	Vent lines shall be the subject of a drum filter vessel used to remove VOC's. Breather line shall be elevated to aid in the dispersion of residual vapours. An Air Quality Impact Assessment shall be undertaken to demonstrate the worst case impact for the proposed development. Records kept of complaints and subsequent mitigation imposed if necessary. Equipment installed, serviced and maintained by competent and qualified contractors.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
05	All Phases of Development: • Drilling. • Well Testing. • Well Treatments. • Workovers. • Production. • Abandonment.	• Vehicles. • Stationary Plant.	Exhaust Emissions	Carried on Prevailing Winds	See Receptor Table	Very Low	Low	Not Significant	Vehicles and plant shall be serviced, maintained and kept in good working order. Trained persons to operate vehicles and site plant. Vehicles and plant shall be switched off when not in use. An Air Quality Impact Assessment shall be undertaken to demonstrate the worst case impact for the proposed development.	Not Significant
06	Breaking of Containment	• Storage Tanks. • Pipework. • Wellhead. • Separator. • Any Other Equipment.	Entrained Vapours from: • Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids.	Carried on Prevailing Winds	See Receptor Table	Very Low	Low	Not Significant	Plant and pipework shall be installed by competent and qualified contractors and shall be suitable for its intended use. Plant and pipework shall be tested for leaks prior to first use. Breaking containment of tanks and pipework systems shall minimised. Equipment shall be cleaned / purged where possible prior to breaking containment.	Not Significant
07	Produced fluids on the surface of wellbore equipment	• Drilling Rig. • Drill Pipe. • Wellhead. • Any Other Equipment.	Entrained Vapours from: • Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids.	Carried on Prevailing Winds	See Receptor Table	Very Low	Low	Not Significant	Cleaning and purging of wellbore equipment undertaken where possible prior to pulling out of hole. Records shall be kept of complaints and subsequent mitigation. Volume of produced fluids on wellbore equipment is expected to be minimal.	Not Significant
08	Storage of Sewage	Sewage Tanks	Sewage	Carried on Prevailing Winds	See Receptor Table	Very Low	Low	Not Significant	Tanks shall be self-contained / enclosed to prevent emissions. Tanks and pipework shall be inspected prior to use to ensure complete integrity. Tanks shall be monitored daily and emptied as required. Breaking containment of tanks and pipework systems shall minimised. Tanks shall be cleaned / purged where possible prior to breaking containment. Plug / cap tanks, pipes, hoses etc. after breaking containment.	Not Significant
09	Storage of General Waste	Skips	General Waste	Carried on Prevailing Winds	See Receptor Table	Very Low	Low	Not Significant	Skips shall be self-contained / enclosed to prevent emissions. Skips shall be clearly marked to ensure that waste is kept segregated and cross contamination does not occur. Skips shall be monitored daily and emptied as required.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
ASSESSMENT OF NOISE AND VIBRATION EMISSIONS - MAJOR										
01	Combustion of Natural Gas	Combustion Unit Stack		Atmosphere and Ground Vibrations	See Receptor Table	Medium	Medium	Medium	Noise limits set by the planning authority shall be complied with. Transport restrictions and hours of operation set by the planning authority shall not be breached. Plant shall be serviced, maintained and kept in good working order. Periodic noise monitoring will take place during the development. Plant shall be switched off when not in use. Records of noise complaints and additional mitigation measures shall be kept.	Not Significant
02	Fixed Plant Operation, Generators etc.	Running Site Plant including: • Generators. • Lighting Towers. • Drilling Rig. • Well Test Equipment.		Atmosphere and Ground Vibrations	See Receptor Table	Low	Medium	Medium	Noise limits set by the planning authority shall be complied with. Transport restrictions and hours of operation set by the planning authority shall not be breached. Plant shall be serviced, maintained and kept in good working order. Acoustic barrier shall be installed where required. Periodic noise monitoring will take place during the development. Plant shall be switched off when not in use. Records of noise complaints and additional mitigation measures shall be kept.	Not Significant
ASSESSMENT OF NOISE AND VIBRATION EMISSIONS - MINOR										
03	Vehicle Movements, Loading / Unloading Operations	Vehicles including: • Engines. • Reversing Alarms. • Unloading / Loading of plant and equipment.		Atmosphere and Ground Vibrations	See Receptor Table	Low	Low	Low	Noise limits set by the planning authority shall be complied with. Transport restrictions and hours of operation set by the planning authority shall not be breached. Vehicles shall be serviced, maintained and kept in good working order. Collections and deliveries shall be planned to reduce quantity of movements. White noise reversing alarms shall be fitted to site vehicles if required. Loading/unloading operations shall be planned for day light hours where possible. Trained operators to load / unload vehicles using MHE plant equipment. Vehicles shall be switched off when not in use. Records of noise complaints and additional mitigation measures shall be kept.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
ASSESSMENT OF DISCHARGES - GROUNDWATER										
01	Drilling Activities	Exploratory / Production Borehole	Drilling Fluids	Percolation through formation to groundwater bodies through losses	Groundwater bearing formations	Low	Medium	Medium	Borehole(s) are/will be constructed to industry standards and reviewed by an Independent Well Examiner and approved for use by the Environment Agency under Section 199 of the Water Resources Act 1991. Wells drilled using a number of cased section to isolate aquifers from one another. Cementation best practice to be utilised. Loss Circulation Material available to include within drilling fluid. Water based drilling fluid used whilst drilling through near surface (<400m) aquifers. Groundwater monitoring regime implemented. Competent Site Supervisor shall be appointed who holds the necessary qualifications and experience.	Not Significant
02	Well Treatments	Exploratory / Production Borehole	Acid Treatments	Percolation through well perforations and formation to groundwater bodies	Groundwater bearing formations	Low	Low	Low	Borehole(s) are/will be constructed to industry standards and reviewed by an Independent Well Examiner and approved for use by the Environment Agency under Section 199 of the Water Resources Act 1991. Acid becomes spent (non-hazardous) upon reacting with the formation. Wellbore treatment fluids entering the formation are 'tight' and once used (spent) shall return to the well and to surface. Area within formation unlikely to contain groundwater or is considered by the Operator as permanently unsuitable due to its depth and properties. Competent Site Supervisor shall be appointed who holds the necessary qualifications and experience.	Not Significant
03	Well Treatments	Exploratory / Production Borehole	• Hot Oiling / Washing. • Solvents.	Percolation through well perforations and formation to groundwater bodies	Groundwater bearing formations	Low	Low	Low	Borehole(s) are/will be constructed to industry standards and reviewed by an Independent Well Examiner and approved for use by the Environment Agency under Section 199 of the Water Resources Act 1991. Oil & Solvents to return to surface with produced oil. Wellbore treatment fluids entering the formation are 'tight' once used. Competent Site Supervisor shall be appointed who holds the necessary qualifications and experience.	Not Significant
04	Well Treatments	Exploratory / Production Borehole	Carrier Fluids and Proppant used for Reservoir Stimulation	Percolation through well perforations and formation to groundwater bodies	Groundwater bearing formations	Low	Low	Low	Borehole(s) are/will be constructed to industry standards and reviewed by an Independent Well Examiner and approved for use by the Environment Agency under Section 199 of the Water Resources Act 1991. 30 - 50% of Carrier Fluids and Proppant to return to surface. Competent Site Supervisor shall be appointed who holds the necessary qualifications and experience.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
ASSESSMENT OF DISCHARGES - SURFACE WATER										
05	Discharge of Surface Water	Outlet 1	• Rain Water	Percolation through well and formation to groundwater bodies	Groundwater and Surface Water	Very Low	Medium	Low	Class 1 Interceptor installed on the site to remove finer traces of oil. Surface water monitoring regime implemented with results of monitoring being submitted to the Environment Agency. Greenfield run-off rate complied with by using an orifice plate or similar. Competent persons shall be appointed to open, close and manage the interceptor. Routine visual check on the containment ditch by operatives.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
ASSESSMENT OF FUGITIVE EMISSIONS TO AIR										
01	Potential for Sour Gas	Exploration and Production Equipment. • Storage Tanks. • Pipework. • Wellhead. • Separator. • Any Other Equipment.	Hydrogen Sulphide (H_2S)	Carried on Prevailing Winds	See Receptor Table	Low	Medium	Medium	Based on previous gas analysis, Hydrogen Sulphide (H_2S) is not anticipated. Potential for small volumes of gas upon completion of acidisation. If present, it is likely to be of a short duration during well clean up. Area and personal gas detectors shall be deployed with an alarm trigger of 5ppm / 7mg.m^3 (EH40 WELs). Dedicated scrubbers shall be in place to remove H_2S from natural gas before onward incineration within a combustion unit/engine. Filter drums shall be in place to remove H_2S from storage tank breather lines. Records shall be kept of complaints and subsequent mitigation. Dedicated Leak Detection and Repair Plan for the site shall be established. Dedicated Emergency Response Plan for the site established and tested routinely.	Not Significant
02	Containment Failure	Exploration and Production Equipment. • Storage Tanks. • Pipework. • Wellhead. • Separator. • Any Other Equipment.	Natural Gas. Entrained Vapours From: • Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids.	Carried on Prevailing Winds	See Receptor Table	Low	High	Medium	Based on previous gas analysis, Hydrogen Sulphide (H_2S) is not anticipated. Potential for small volumes of gas upon completion of acidisation. If present, it is likely to be of a short duration during well clean up. Area and personal gas detectors shall be deployed with an alarm trigger of 5ppm / 7mg.m^3 (EH40 WELs). Dedicated scrubbers shall be in place to remove H_2S from natural gas before onward incineration within a combustion unit/engine. Filter drums shall be in place to remove H_2S from storage tank breather lines. Records shall be kept of complaints and subsequent mitigation. Dedicated Leak Detection and Repair Plan for the site shall be established. Dedicated Emergency Response Plan for the site established and tested routinely.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
03	All Phases of Development: • Drilling. • Well Testing. • Well Treatments. • Workovers. • Production. • Abandonment.	Dust and Mud Generated by Vehicles	Dust Particles	Carried on Prevailing Winds	See Receptor Table	Medium	Medium	Medium	Operations shall be planned / designed to minimise transport and handling operations. Vehicles shall drive on approved roads and follow site traffic management system. Roads to / from the site are monitored for mud deposits. A road sweeping contractor will be arranged for road cleaning if required. Avoid certain activities that may present dust if high winds occur. High winds are defined as a strong breeze >25mph. (http://www.rmets.org/resource/beaufort-scale). Activities include the dispensing of powders and 'where feasible' excessive driving'. Records will kept of complaints and action taken to resolve complaints if required.	Not Significant
04	All Phases of Development: • Drilling. • Well Testing. • Well Treatments. • Workovers. • Production. • Abandonment.	Fume Emissions from Unexpected Chemical Reactions / Runaway Reactions	Fumes Resulting from Chemical Reaction	Carried on Prevailing Winds	See Receptor Table	Low	Medium	Medium	Chemicals shall be stored correctly on site and containers sealed / closed when not in use. Competent personnel only to store / use chemicals. Adequate and suitable spillage kits shall be available on site / transport vehicles. Training on environmental awareness and emergency procedures for site personnel. Regular maintenance and inspections shall be conducted as directed by written procedures. Records will be kept of complaints and action taken to resolve complaints if required.	Not Significant
ASSESSMENT OF FUGITIVE ODOUR EMISSIONS										
05	Containment Failure	Exploration and Production Equipment. • Storage Tanks. • Pipework. • Wellhead. • Separator. • Any Other Equipment.	Natural Gas Entrained Vapours From: • Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids.	Carried on Prevailing Winds	See Receptor Table	Very Low	Medium	Low	Based on previous gas analysis, Hydrogen Sulphide (H_2S) is not anticipated. Potential for small volumes of gas upon completion of acidisation. If present, it is likely to be of a short duration during well clean up. Area and personal gas detectors shall be deployed with an alarm trigger of 5ppm / 7mg.m^3 (EH40 WELs). Dedicated scrubbers shall be in place to remove H2S from natural gas before onward incineration within a combustion unit/engine. Filter drums shall be in place to remove H2S from storage tank breather lines. Records shall be kept of complaints and subsequent mitigation. Dedicated Leak Detection and Repair Plan for the site shall be established. Dedicated Emergency Response Plan for the site established and tested routinely.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
06	Potential for Sour Gas	Exploration and Production Equipment. • Storage Tanks. • Pipeworks. • Wellhead. • Separator. • Any Other Equipment.	Hydrogen Sulphide (H_2S)	Carried on prevailing winds	See Receptor Table	Very Low	Medium	Low	Based on previous gas analysis, Hydrogen Sulphide (H_2S) is not anticipated. Potential for small volumes of gas upon completion of acidisation. If present, it is likely to be of a short duration during well clean up. Area and personal gas detectors shall be deployed with an alarm trigger of 5ppm / 7mg.m^3 (EH40 WELs). Dedicated scrubbers shall be in place to remove H_2S from natural gas before onward incineration within a combustion unit/engine. Filter drums shall be in place to remove H_2S from storage tank breather lines. Records shall be kept of complaints and subsequent mitigation. All working personnel to receive full site induction covering odour management. Dedicated Odour Management Plan for the site shall be established. Dedicated Leak Detection and Repair Plan for the site shall be established. Dedicated Emergency Response Plan for the site established and tested routinely.	Not Significant
ASSESSMENT OF FUGITIVE DISCHARGES TO SURFACE WATER & GROUNDWATER										
07	Surface Water Containment (Contaminated)	Overfill of Site Containment Ditch	• Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids. • Rain Water. • Ancillary Products.	Percolation through near surface and deeper formation to groundwater bodies	Groundwater and Surface Water	Low	High	Medium	Dedicated secondary containment measures for oil / produced fluid to prevent spill into tertiary containment system (HDPE). Drip trays shall be utilised for the transfer / decanting of fuels or small volume liquids such as engine oil etc. All surface plant, equipment and vehicles shall be maintained and serviced in accordance with manufacturers recommendations to prevent leaks. Ditch levels to be monitored at all times to ensure overfill does not occur. Surface rainfall shall be discharged through a Class-1 Interceptor managed in accordance with EA approved work procedures. Site designed to flood in the first instance before over spilling. Groundwater and surface water monitoring regime implemented. Dedicated Spillage Response Procedure for the site established. Competent Site Supervisor shall be appointed who holds the necessary qualifications and experience.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
08	Discharge of Surface Water (Contaminated)	Outlet 1	• Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids. • Rain Water. • Ancillary Products.	Percolation through near surface and deeper formation to groundwater bodies	Groundwater and Surface Water	Low	High	Medium	Dedicated secondary containment measures for oil / produced fluid to prevent spill into tertiary containment system (HDPE). Drip trays shall be utilised for the transfer / decanting of fuels or small volume liquids such as engine oil etc. All surface plant, equipment and vehicles shall be maintained and serviced in accordance with manufacturers recommendations to prevent leaks. Ditch levels to be monitored at all times to ensure overfill does not occur. Surface rainfall shall be discharged through a Class-1 Interceptor managed in accordance with EA approved work procedures. Site designed to flood in the first instance before over spilling. Groundwater and surface water monitoring regime implemented. Dedicated Spillage Response Procedure for the site established. Competent Site Supervisor shall be appointed who holds the necessary qualifications and experience.	Not Significant
09	Spillages onto the Site Surface	Site Surface	• Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids. • Ancillary Products.	Percolation through near surface and deeper formation to groundwater bodies	Groundwater and Surface Water	Low	Medium	Medium	Site shall be constructed with at least 1mm HDPE impermeable membrane, to capture any surface spills. HDPE membrane shall be the subject of visual inspection where possible. Groundwater monitoring regime implemented. Where containment failure is presumed, non-intrusive testing shall be undertaken on the HDPE membrane. All surface plant, equipment and vehicles shall be maintained and serviced in accordance with manufacturers recommendations. Drip trays shall be utilised for the transfer / decanting of fuels or small volume liquids such as engine oil etc. Dedicated secondary containment measures for oil / produced fluid to prevent spill into tertiary containment system (HDPE). Dedicated Spillage Response Procedure for the site established.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
10	Leaks associated with the construction of the well(s)	Compromised Steel Casing or Pathways within Cemented Annulus	• Oil. • Formation Water. • Drilling Fluids. • Suspension Brines. • Well Treatment Fluids.	Percolation through well and formation to groundwater bodies through losses	Groundwater bearing formations	Very Low	High	Low	Borehole(s) are/will be constructed to industry standards and reviewed by an independent well examiner and approved for use by the Environment Agency under Section 199 of the Water Resources Act 1991. Wells drilled using a number of cased section to isolate aquifers from one another. Cementation best practice to be utilised. Well subject to pressure / leak off tests. Groundwater monitoring regime implemented. Competent Site Supervisor shall be appointed who holds the necessary qualifications and experience.	Not Significant
11	Leaks associated with the construction of the well(s)	Compromised Steel Casing or Pathways within Cemented Annulus	• Oil. • Formation Water. • Drilling Fluids. • Suspension Brines. • Well Treatment Fluids.	Percolation through well and formation to groundwater bodies through losses	Groundwater bearing formations	Very Low	Medium	Low	Borehole(s) are/will be constructed to industry standards and reviewed by an independent well examiner and approved for use by the Environment Agency under Section 199 of the Water Resources Act 1991. Wells drilled using a number of cased section to isolate aquifers from one another. Cementation best practice to be utilised. Well subject to pressure / leak off tests. Groundwater monitoring regime implemented. Competent Site Supervisor shall be appointed who holds the necessary qualifications and experience.	Not Significant
ASSESSMENT OF OTHER FUGITIVE RELEASES										
12	All Phases of Development: • Drilling. • Well Testing. • Well Treatments. • Workovers. • Production. • Abandonment.	Site Surface	Litter from Site Surface	Carried on prevailing winds	See Receptor Table	Very Low	Medium	Low	Provision of adequate refuse receptacles for both inside and outside working areas. Training on environmental awareness and site waste management. Site shall be kept clear of litter. Skips shall be monitored and emptied when required by authorised contractor. Site inspection process.	Not Significant
13	All Phases of Development: • Drilling. • Well Testing. • Well Treatments. • Workovers. • Production. • Abandonment.	Site Surface	Pests Attracted to the Site: • Flies. • Rats / Mice. • Wasps.	Carried on prevailing winds	See Receptor Table	Very Low	Medium	Low	Provision of adequate refuse receptacles for both inside and outside working areas. Training on environmental awareness and site waste management. Litter shall be cleared at end of each day / shift. Skips shall be monitored and emptied when required by authorised contractor. Site inspection process.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
ASSESSMENT OF POSSIBLE SOURCES OF ACCIDENTS										
01	All Phases of Development: • Drilling. • Well Testing. • Well Treatments. • Workovers. • Production. • Abandonment.	Transferring Substances: • Spillages. • Overfilling. • Poor Connections.	• Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids. • Rain Water. • Ancillary Products.	Flow by gravity. Carried on Prevailing Winds	See Receptor Table	Low	Medium	Medium	Site shall be constructed with at least 1mm HDPE impermeable membrane, to capture any surface spills. HDPE membrane shall be the subject of visual inspection where possible. Groundwater monitoring regime implemented. Where containment failure is presumed, non-intrusive testing shall be undertaken on the HDPE membrane. All surface plant, equipment and vehicles shall be maintained and serviced in accordance with manufacturers recommendations. Drip trays shall be utilised for the transfer / decanting of fuels or small volume liquids such as engine oil etc. Dedicated secondary containment measures for oil / produced fluid to prevent spill into tertiary containment system (HDPE). Dedicated Spillage Response Procedure for the site established.	Not Significant
02	Containment Failure	Exploration and Production Equipment. • Storage Tanks. • Pipeworks. • Wellhead. • Separator. • Any Other Equipment.	Natural Gas. Entrained Vapours From: • Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids.	Carried on Prevailing Winds	See Receptor Table	Medium	High	High	Hydrogen Sulphide is not anticipated based on previous gas analysis, though potential for small volumes upon completion of acidisation. If present, it is likely to be of a short duration during well clean up. Area and personal gas detectors shall be deployed with an alarm trigger of 5ppm / 7mg.m^3 (EH40 WELs). Dedicated scrubbers shall be in place to remove H2S from natural gas before onward incineration within a combustion unit/engine. Filter drums shall be in place to remove H2S from storage tank breather lines. Records shall be kept of complaints and subsequent mitigation. Dedicated Leak Detection and Repair Plan for the site shall be established. Dedicated Emergency Response Plan for the site established and tested routinely.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
03	Surface Water Containment (Contaminated)	Overfill of Site Containment Ditch	• Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids. • Rain Water. • Ancillary Products.	Percolation through near surface and deeper formation to groundwater bodies	Groundwater and Surface Water	Low	Medium	Medium	Dedicated secondary containment measures for oil / produced fluid to prevent spill into tertiary containment system (HDPE). Drip trays shall be utilised for the transfer / decanting of fuels or small volume liquids such as engine oil etc. All surface plant, equipment and vehicles shall be maintained and serviced in accordance with manufacturers recommendations to prevent leaks. Ditch levels to be monitored at all times to ensure overfill does not occur. Surface rainfall shall be be discharged through a Class-1 Interceptor manged in accordance with EA approved work procedures. Site designed to flood in the first instance before overspilling. Groundwater and surface water monitoring regime implemented. Dedicated Spillage Response Procedure for the site established. Competent Site Supervisor shall be appointed who holds the necessary qualifications and experience.	Not Significant
04	Discharge of Surface Water (Contaminated)	Outlet 1	• Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids. • Rain Water. • Ancillary Products.	Percolation through near surface and deeper formation to groundwater bodies	Groundwater and Surface Water	Low	Medium	Medium	Dedicated secondary containment measures for oil / produced fluid to prevent spill into tertiary containment system (HDPE). Drip trays shall be utilised for the transfer / decanting of fuels or small volume liquids such as engine oil etc. All surface plant, equipment and vehicles shall be maintained and serviced in accordance with manufacturers recommendations to prevent leaks. Ditch levels to be monitored at all times to ensure overfill does not occur. Surface rainfall shall be be discharged through a Class-1 Interceptor manged in accordance with EA approved work procedures. Site designed to flood in the first instance before overspilling. Groundwater and surface water monitoring regime implemented. Dedicated Spillage Response Procedure for the site established. Competent Site Supervisor shall be appointed who holds the necessary qualifications and experience.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
05	Spillages onto the Site Surface	Site Surface	• Oil. • Formation Water. • Drilling Fluids. • Well Treatment Fluids. • Ancillary Products.	Percolation through near surface and deeper formation to groundwater bodies	Groundwater and Surface Water	Low	Medium	Medium	Site shall be constructed with at least 1mm HDPE impermeable membrane, to capture any surface spills. HDPE membrane shall be the subject of visual inspection where possible. Groundwater monitoring regime implemented. Where containment failure is presumed, non-intrusive testing shall be undertaken on the HDPE membrane. All surface plant, equipment and vehicles shall be maintained and serviced in accordance with manufacturers recommendations. Drip trays shall be utilised for the transfer / decanting of fuels or small volume liquids such as engine oil etc. Dedicated secondary containment measures for oil / produced fluid to prevent spill into tertiary containment system (HDPE). Dedicated Spillage Response Procedure for the site established.	Not Significant
06	Poor storage arrangements of hazardous substances	Site Surface	Hazardous Substances	Percolation through near surface and deeper formation to groundwater bodies	Groundwater and Surface Water	Low	Medium	Medium	Site shall be constructed with at least 1mm HDPE impermeable membrane, to capture any surface spills. HDPE membrane shall be the subject of visual inspection where possible. Groundwater monitoring regime implemented. Where containment failure is presumed, non-intrusive testing shall be undertaken on the HDPE membrane. All surface plant, equipment and vehicles shall be maintained and serviced in accordance with manufacturers recommendations. Drip trays shall be utilised for the transfer / decanting of fuels or small volume liquids such as engine oil etc. Site based fire risk assessment shall be in place. Fire awareness training / site induction for personnel. Local Fire & Rescue Service shall be notified of operations with a review of the emergency response and a site visit possibly being undertaken. COSHH Assessments and SDS sheets in place for hazardous items with a list and location of hazardous substances made available to the Fire & Rescue Service and copy held on site as part of Emergency Response Plan. Dedicated secondary containment measures for oil / produced fluid to prevent spill into tertiary containment system (HDPE). Dedicated Spillage Response Procedure for the site established.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
07	Impact from Fire Water • In use. • Failed Containment.	Fire Water Tank / Hose	Fire Water	Percolation through near surface and deeper formation to groundwater bodies	Groundwater and Surface Water	Low	Medium	Medium	Site shall be constructed with at least 1mm HDPE impermeable membrane, to capture any surface spills. HDPE membrane shall be the subject of visual inspection where possible. Groundwater monitoring regime implemented. Where containment failure is presumed, non-intrusive testing shall be undertaken on the HDPE membrane. Fire awareness training / site induction for personnel. Local Fire & Rescue Service shall be notified of operations with a review of the emergency response and a site visit possibly being undertaken. Dedicated secondary containment measures for oil / produced fluid to prevent spill into tertiary containment system (HDPE). Dedicated Spillage Response Procedure for the site established.	Not Significant
08	Fire Breakout	Exploration and Production Equipment. • Storage Tanks. • Pipeworks. • Wellhead. • Separator. • Any Other Equipment.	Fire and Associated Fumes	Carried on Prevailing Winds	See Receptor Table	Low	Medium	Medium	A Permit to Work System shall be in place to authorise the use of any potential ignition source within the site boundary and active area. Site based fire risk assessment shall be in place and will outline the control measure and procedures used to reduce the likelihood of a fire igniting. COSHH Assessments and SDS sheets in place for hazardous items with a list and location of hazardous substances made available to the Fire & Rescue Service and copy held on site as part of Emergency Response Plan which shall be implemented and tested. COSHH Items shall be stored appropriately in accordance with the Manufacturers / Suppliers Safety Data Sheets and current regulations. The Local Fire & Rescue Service shall be notified of operations with a review of the emergency response plan and a site visit possibly being undertaken. Fire points, extinguishers and a fire water tank located around the site.	Not Significant
09	All Phases of Development: • Drilling. • Well Testing. • Well Treatments. • Workovers. • Production. • Abandonment.	Fume Emissions from Unexpected Chemical Reactions / Runaway Reactions	Fumes Resulting from Chemical Reaction	Carried on Prevailing Winds	See Receptor Table	Low	Medium	Medium	Chemicals shall be stored correctly on site and containers sealed / closed when not in use. Competent personnel only to store / use chemicals. Adequate and suitable spillage kits shall be available on site / transport vehicles. Training on environmental awareness and emergency procedures for personnel. Regular maintenance and inspections shall be conducted as directed by written procedures. Records will be kept of complaints and action taken to resolve complaints if required.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
10	Vandalism	Exploration and Production Equipment: • Storage Tanks. • Pipeworks. • Wellhead. • Separator. • Any Other Equipment.	Various – acts of vandalism may cause fires, loss of containment from containers, damage to site equipment, etc.	Percolation through near surface and deeper formation to groundwater bodies Carried on Prevailing Winds	See Receptor Table	Very Low	Medium	Low	Site shall be constructed with at least 1mm HDPE impermeable membrane, to capture any surface spills. HDPE membrane shall be the subject of visual inspection where possible. Groundwater monitoring regime implemented. Where containment failure is presumed, non-intrusive testing shall be undertaken on the HDPE membrane. All surface plant, equipment and vehicles shall be maintained and serviced in accordance with manufacturers recommendations. Drip trays shall be utilised for the transfer / decanting of fuels or small volume liquids such as engine oil etc. Site based fire risk assessment shall be in place. Fire awareness training / site induction for personnel. Local Fire & Rescue Service shall be notified of operations with a review of the emergency response and a site visit possibly being undertaken. COSHH Assessments and SDS sheets in place for hazardous items with a list and location of hazardous substances made available to the Fire & Rescue Service and copy held on site as part of Emergency Response Plan. Dedicated secondary containment measures for oil / produced fluid to prevent spill into tertiary containment system (HDPE). Security measures implemented at site. Dedicated Spillage Response Procedure for the site established.	Not Significant
11	Flooding	Overfill of Site Containment Ditch	Heavy Rainfall	Flow by Gravity	Groundwater and Surface Water	Very Low	Medium	Low	The proposed wellsite is in an area designated as Flood Zone 1 and is described as: Land having a less than 1 in 1,000 annual probability of river or sea flooding.	Not Significant
12	Vehicle Related Accidents	Vehicle, Fuel and Hydraulic Systems	Systems spillages and Leaks as a Result from Vehicle Related Accidents	Percolation through near surface and deeper formation to groundwater bodies	See Receptor Table	Low	Medium	Medium	Site shall be constructed with at least 1mm HDPE impermeable membrane, to capture any surface spills. HDPE membrane shall be the subject of visual inspection where possible. Groundwater monitoring regime implemented. Where containment failure is presumed, non-intrusive testing shall be undertaken on the HDPE membrane. Drip trays shall be utilised for the transfer / decanting of fuels or small volume liquids such as engine oil etc. Dedicated secondary containment measures for oil / produced fluid to prevent spill into tertiary containment system (HDPE). Dedicated Spillage Response Procedure for the site established.	Not Significant

ID	Activity / Event Leading to Emission	Potential Release Point	S-P-R Linkage			Exposure Probability	Impact Severity	Risk Magnitude	Risk Management	Residual Risk
			Source	Pathway	Receptor					
ASSESSMENT OF VISIBLE PLUMES										
01	Combustion of Natural Gas	Combustion Unit Stack	Gas and Particulate Matter Emissions	Carried on Prevailing Winds	See Receptor Table	Low	Low	Low	Incinerator units designed and constructed to industry standards / best available techniques. Incinerator units shall be of a shrouded and enclosed nature ensuring efficient combustion. Good phase separation upstream of incinerator to remove and prevent liquid carryover. Procedures established and communicated to operational personnel should the flow rate of gas exceed or fall below the incinerators flow range. Combustion equipment shall be agreed by Environment Agency. Monitoring of combustion temperature shall be undertaken during periods of incineration. Equipment shall be inspected for leaks prior to delivery / use as required by manufacturer / written procedures. An Air Quality Impact Assessment has been undertaken prior to commencement of flaring operations. Records will be kept of complaints and action taken to resolve complaints if required.	Not Significant
02	Combustion of Natural Gas	Specified Generator Exhaust	Gas and Particulate Matter Emissions	Carried on Prevailing Winds	See Receptor Table	Low	Low	Low	Specified Generators shall comply with the Emission Limit Values. An Air Quality Impact Assessment shall be undertaken to demonstrate the worst case impact for the propposed development. Equipment installed, serviced and maintained by competent and qualified contractors. Specified Generators shall be assessed for compliance with Emission Limit Values as dictated by legislation and the environmental permit.	Not Significant

GLOBAL WARMING POTENTIAL								
Year	Activity	Substance	Formula	Atmospheric Lifetime (Years)	Global Warming Potential (GWP)	Direct / Indirect Releases	Released Mass (Tonnes)	Global Warming Potential of Emissions (Released Mass x GWP)
001	WNA-1 and WNA-2 Appraisal Drilling, Workover, Testing Operations Site Construction Operations WNA-1 and WNA-2 Production	Carbon Dioxide	CO2	Variable	1	Direct	26892	26892
		Methane	CH4	12.3	28		68.5	1918
		Nitrious Oxide	N2O	120	265		0.46	121.9
002	WNA-3 Drilling, Clean Up, Well Testing WNA-4 and WNA-5 Drilling, Clean Up WNA-1 and WNA-2 in Production	Carbon Dioxide	CO2	Variable	1	Direct	40102	40102
		Methane	CH4	12.3	28		177	4956
		Nitrious Oxide	N2O	120	265		0.55	145.75
003	WNA-4 and WNA-5 Well Testing WNA-6, WNA-7 and WNA-8 Drilling WNA-1 to WNA-5 in Production	Carbon Dioxide	CO2	Variable	1	Direct	62848	62848
		Methane	CH4	12.3	28		487.9	13661.2
		Nitrious Oxide	N2O	120	265		0.6	159
004	WNA-6, WNA-7 and WNA-8 Clean Up, Well Testing WNA-8 Drilling Cont. WNA-1 to WNA-8 in Production	Carbon Dioxide	CO2	Variable	1	Direct	71153	71153
		Methane	CH4	12.3	28		497.6	13932.8
		Nitrious Oxide	N2O	120	265		0.67	177.55
005	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	70411	70411
		Methane	CH4	12.3	28		637.4	17847.2
		Nitrious Oxide	N2O	120	265		0.68	180.2
006	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	70411	70411
		Methane	CH4	12.3	28		637.4	17847.2
		Nitrious Oxide	N2O	120	265		0.68	180.2
007	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	70411	70411
		Methane	CH4	12.3	28		637.4	17847.2
		Nitrious Oxide	N2O	120	265		0.68	180.2
008	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	70411	70411
		Methane	CH4	12.3	28		637.4	17847.2
		Nitrious Oxide	N2O	120	265		0.68	180.2
009	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	70411	70411
		Methane	CH4	12.3	28		637.4	17847.2
		Nitrious Oxide	N2O	120	265		0.68	180.2
010	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	70411	70411
		Methane	CH4	12.3	28		637.4	17847.2
		Nitrious Oxide	N2O	120	265		0.68	180.2
011	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	70411	70411
		Methane	CH4	12.3	28		637.4	17847.2
		Nitrious Oxide	N2O	120	265		0.68	180.2
012	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	70411	70411
		Methane	CH4	12.3	28		637.4	17847.2
		Nitrious Oxide	N2O	120	265		0.68	180.2
013	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	70411	70411
		Methane	CH4	12.3	28		637.4	17847.2
		Nitrious Oxide	N2O	120	265		0.68	180.2
014	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	70411	70411
		Methane	CH4	12.3	28		637.4	17847.2
		Nitrious Oxide	N2O	120	265		0.68	180.2
015	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	70411	70411
		Methane	CH4	12.3	28		637.4	17847.2
		Nitrious Oxide	N2O	120	265		0.68	180.2
016	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	70411	70411
		Methane	CH4	12.3	28		637.4	17847.2
		Nitrious Oxide	N2O	120	265		0.68	180.2
017	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	52905	52905
		Methane	CH4	12.3	28		478.1	13386.8
		Nitrious Oxide	N2O	120	265		0.51	135.15
018	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	52905	52905
		Methane	CH4	12.3	28		478.1	13386.8
		Nitrious Oxide	N2O	120	265		0.51	135.15
019	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	17929	17929
		Methane	CH4	12.3	28		161.7	4527.6
		Nitrious Oxide	N2O	120	265		0.18	47.7
020	WNA-1 to WNA-8 in Production Intermittent Workovers	Carbon Dioxide	CO2	Variable	1	Direct	17929	17929
		Methane	CH4	12.3	28		161.7	4527.6
		Nitrious Oxide	N2O	120	265		0.18	47.7
021	WNA-1 to WNA-8 Decomissioning	Carbon Dioxide	CO2	Variable	1	Direct	4430	4430
		Methane	CH4	12.3	28		2.7	75.6
		Nitrious Oxide	N2O	120	265		0.12	31.8

022	Site Restoration	Carbon Dioxide	CO2	Variable	1	Direct	1078	1078
		Methane	CH4	12.3	28		0.5	14
		Nitrious Oxide	N2O	120	265		0.03	7.95
							Total GWP of Emissions	1480827.85

ENERGY SOURCES, CONVERSION EFFICIENCY AND EMISSIONS FACTORS

ID	Energy Source	Location of Emission	Delivered to Primary Conversion Factor	CO2 Factor (t/mwh, Primary)
001	Electricity	Indirect	2.4	0.166
002	Gas Oil	Direct	1	0.25
003	Natural Gas	Direct	1	0.19

ENERGY EMISSIONS FACTORS

ID	Energy Source	MWh	Delivered to Primary Conversion Factor	CO2 Factor (t/mwh, Primary)	CO2 Emissions (Tonnes)
001	Gas Oil	246,934.75	1	0.25	61,733.69
002	Natural Gas	2,863,132.80	1	0.19	543,995.23
003	Electricity	0	2.4	0.166	0.00
				Total CO2 Emissions (Tonnes)	605,728.92