



Environmental Risk Assessment

Oswestry STOR Facility

FOR: ARL 020 LTD

PROJECT NUMBER: ECCS 129 002

PREPARED BY: EC CONSULTANCY SERVICES LTD

Environmental Risk Assessment

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Environmental Risk Assessment – ECCS 129 002 R 002 A

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1 INTRODUCTION

1.1 OVERVIEW

This Environmental Risk Assessment has been prepared on behalf of ARL 020 Ltd (hereby referred to as the 'Operator') in support of an Environmental Permit application for a proposed new STOR Facility to be located on land east of the A5, near Oswestry in Shropshire.

The Operator is applying for a bespoke Installation Environmental Permit comprising a Section 1.1(A)(1)(a) schedule 1 listed activity and Directly Associated Activities (DAA), under the Environmental Permitting (England and Wales) Regulations 2016 ('EPR').

The Facility will comprise Twelve (No.12) 2.5 MWe natural gas fired reciprocating engines with an aggregated thermal input of 70.98MWth operating for less than 2,500 hours per engine per year. Given that the aggregation of engines is >50MWth, the proposed Facility is captured under Chapter II of the Industrial Emissions Directive (2010/75/EU) (IED).

1.2 SCOPE AND OBJECTIVES OF THE ASSESSMENT

This Environmental Risk Assessment (ERA) has been prepared specifically in answer to Question 6 and 6b within Part B2 and Question 2, 3b and 3c of Part B3 of the Environment Agency's Application Forms.

The objectives of this ERA are to:

- Identify potential sources of risk and hazards that the activity may present to the environment;
- Identify nearby sensitive receptors;
- Screen out those that are insignificant and don't require detailed assessment;
- Where appropriate identify potentially significant risks and undertake detailed assessment;
- Where appropriate choose the right control measures; and
- Report the findings of the assessment.

This report contains justification for all risk assessments completed and those screened out from requiring further consideration and provides an overall assessment of the acceptability of the proposed STOR Facility.

1.3 SITE LOCATION AND ENVIRONMENTAL SETTING

The proposed STOR Facility is to be situated on land to the east of the A5 within the administrative boundary of Shropshire Council. The proposed site occupies 0.5 hectares of land and is currently an undeveloped green field site with no allocated postcode (nearest postcode is SY11 2YU). The grid reference for the site is SJ 30828 30275.

Agricultural fields and farmland surround the site to the north, east and southern boundaries, with the A5 running parallel and 70 West of the western boundary of the proposed site. The proposed site was previously used for the grazing of cattle and consists of improved grassland with localised patches vegetation, a species-poor defunct hedge, and an existing access track with a wooden fence and dense scrub running parallel to the A5 west of the proposed site. A small watercourse (Common Brook) is situated just beyond the proposed sites south-eastern boundary and flows into a network of water features to the south-east.

The proposed site is situated in close proximity to existing infrastructure including pylons, overhead electrical lines and underground gas and water pipes. These existing utility features have restricted the choice of site location, thus the propose site boundary is considered the most suitable in order to circumvent existing infrastructure. The proposed site boundary has been chosen to A sewage treatment works is situated approximately 400m to the north-east of the proposed site. Access to the site will be off the southern bound carriageway of the A5, via the existing access point to the field, entering the site via the south-western corner. The proposed sites location is illustrated in orange within in Figure 1.3.1 below.

The full site address is:

Oswestry STOR Facility
ARL 020 Ltd
Land East of A5
Oswestry
Ball
Shropshire
SY11 2YU
Site Grid Reference: **SJ 30828 30275**

Figure 1.3.1 Site Location

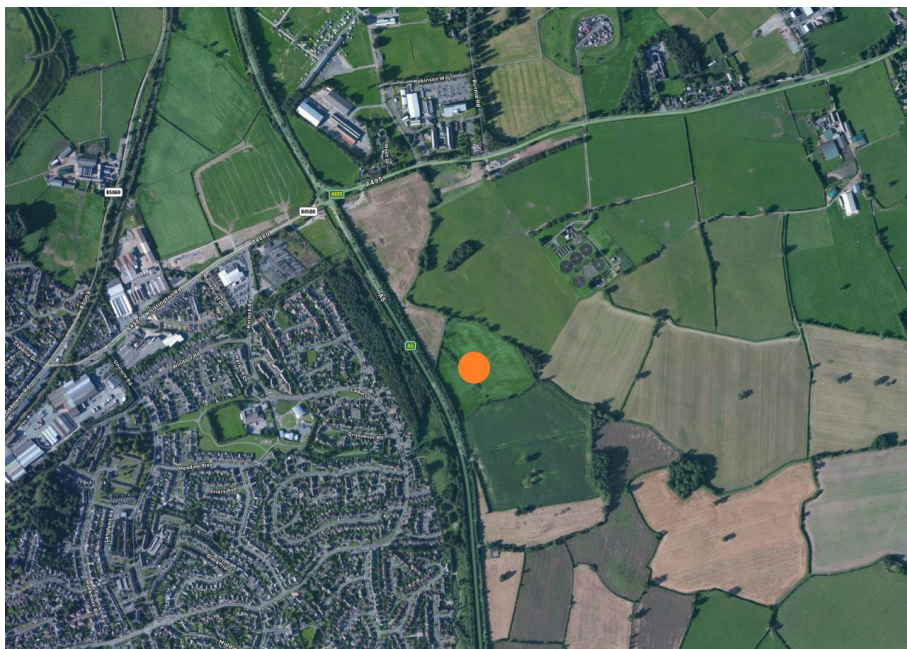


Image sourced from GridReferenceFinder.com ©2020

1.4 RELEVANT LEGISLATION AND GUIDANCE

Guidance for undertaking an Environmental Risk Assessment for an Installation was published on 1 February 2016 and is available via the following link: [Environment Agency Risk Assessment Guidance](#).

1.5 PROPOSED ACTIVITIES

The Operator is applying for a Part A Installation Environmental Permit consisting of a single Schedule 1 listed activity, as detailed within Table 1.5.1 below.

Table 1.5.1 Proposed Activities

Proposed Activities	
Description of Activities	Limits of Activities
Section 1.1 A(1)(a) Burning any fuel in an appliance with a rated thermal input of 50 megawatts or more	Operation of Twelve (No.12) 2.5 MWe natural gas fired reciprocating engines with an aggregated thermal input of 70.98MWth operating for less than 2,500 hours per engine per year
DAA	Storage of raw materials
DAA	Site surface water drainage system

The Oswestry STOR Facility is intended to operate within the Capacity Market, Balancing Market and as an Energy Trading Generation Plant on the Energy Market.

The engines will operate using the principle of lean burn combustion using twelve (No.12) MTU 20V4000GS generating units. The units are to be housed in individual containers in two rows within a secure compound, along with transformers, electrical switchgear and other associated infrastructure.

All equipment and associated infrastructure to be installed at the Oswestry STOR Facility will be contained within a secure compound area (5286m²sized footprint), and will include:

- No.12 x MTU 20V4000GS 2 gas utilisation engines measuring with No.12 6.5m high individual stacks discharging to atmosphere (2.5MWe each);
- 1 x Switchgear Cabin;
- 1 x Customer Control / Welfare Cabin;
- Earthing Resistors;
- Customer Transformer;
- Gas Governor;
- CCTV System;
- 4m high Lighting Columns;
- DNO Substation; and
- Gated compound with 2.4m high palisade fencing.

The system will consist of the following termination points:

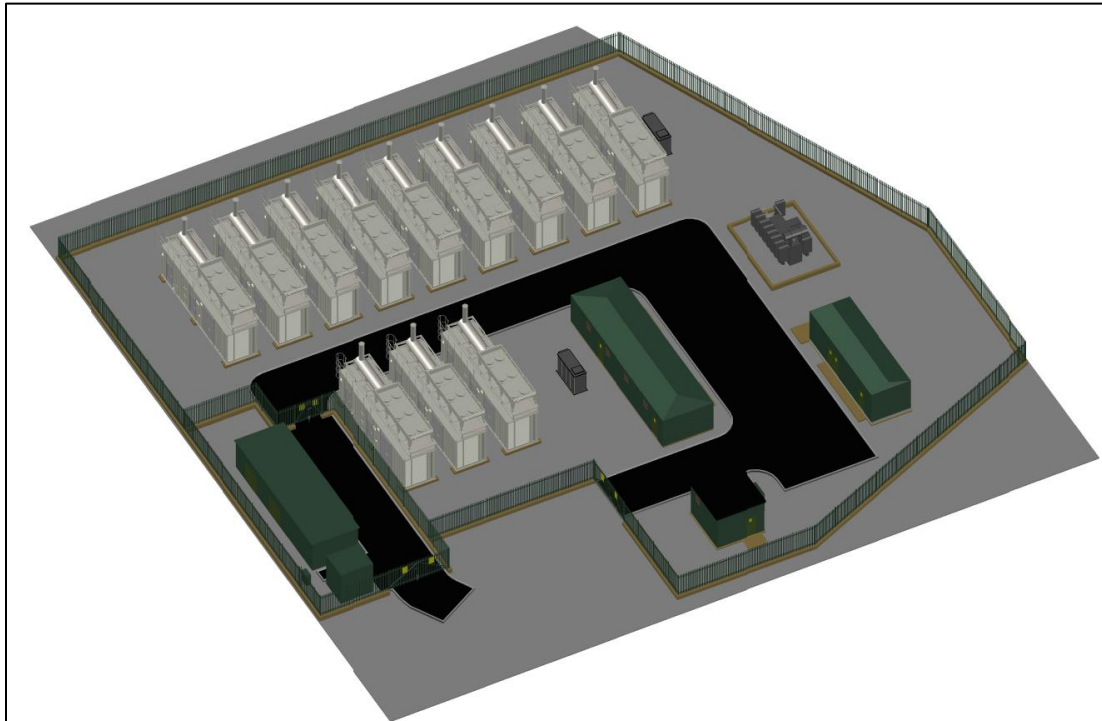
- Natural Gas connection onto the site;

- DNO 66kV switchyard and power transformer (outdoor compound);
- DNO 11kV Backup supply to the local network.

Cable runs and gas pipes linking the proposed compound to the point of connections on the national gas/electricity grid will all be located underground.

The proposed STOR Facility will sit within a small footprint of land (0.5 hectares). The layout is illustrated within Figure 1.5.2 below.

Figure 1.5.2 Isometric Image of Proposed STOR Facility



Source: Smith Brothers Contracting Ltd © 2020

1.6 ASSOCIATED HAZARDS AND RISKS

This report follows the Environment Agency’s Guidance and begins by identifying potential hazards and risks to the environment from the proposed activity. Hazards and risks to be considered within this assessment are presented within Table 1.6.1 below.

Table 1.6.1 Identified Hazards

Proposed Oswestry STOR Facility		
No.	Hazard / Risk	Details
1.	Amenity Impacts	Potential Dust, Litter, Mud, Pest/Vermin from normal operations and during routine maintenance
2.	Noise	Potential noise sources include MTU engines; exhaust silencer, air cooler radiator, auxiliary transformer and DNO transformer
3.	Odour	Potential odour sources include fuel source (natural gas), exhaust emissions, chemical store

4.	Point Source Emissions to Air	Potential harmful emissions from exhaust stack from combustion process
5.	Climate Change	As the site will operate for more than 5 years, the potential impact of climate change must be considered
6.	Surface Water Run-off	Potential uncontrolled releases to the environment from the Gen-set engines, chemicals stored on site or potentially contaminated run-off
7.	Wastes Generated on Site	Under normal operations predicted wastes will include waste oil from the MTU engines; oily rags & cloths from maintenance works; and empty chemical drums
8.	Abnormal Operations or Accidents	Potential hazards include fire, vandalism/arson, gas explosion, plant or equipment failure, major / minor spillages due to loss of containment, gas leak, power outage, adverse weather conditions
9.	Global Warming Potential	Direct and indirect emissions produced by the energy the proposed activity will consume

1.7 SENSITIVE RECEPTORS

Nearby human sensitive receptors are illustrated within the satellite image in Figure 1.7.1a below. Properties identified in orange are the closest human sensitive receptors to the proposed STOR Facility, which is identified in green.

Figure 1.7.1a Location of Human Sensitive Receptors



Image sourced from GridReferenceFinder.com ©2020

Table 1.7.1b below provides further details of all nearest human sensitive receptors considered within this risk assessment.

Table 1.7.1b Sensitive Human Receptors

Receptor	Type	Distance (m)	Direction From Site Boundary
Cabin Lane	Residential	160	West
Henley Drive	Residential	160	West
Sewage Treatment Works	Industrial / Commercial	400	North-East
Artillery Business Park	Industrial / Commercial	490	North
Artillery Business Park	Industrial / Commercial	500	North North-West

A search was carried out using the government website 'www.magic.gov.uk' as well as a nature and heritage conservation screen assessment obtained from the Environment Agency. The results of which are summarised within Table 1.7.1c below. The location of each designated site is shown on plans provided within Appendix E.

Table 1.7.1c Statutory Designated Sites

Distance	Direction	Name	Details	Designation(s)
1 km	WSW	Shelf Bank	Acid grassland, woodland and scrub. The site is of Local value	Local Nature Reserve (LNR)
1.2 km	NW	Old Oswestry Hillfort	Selected for its 400 species of flora and fauna Old Oswestry is protected as both a heritage and wildlife site	Local Wildlife Site (LWS)
2.8 km	NE	Fernhill Pastures	Pastures consists of a series of traditionally managed fen-meadows situated on gently sloping ground alongside the River Perry in north west Shropshire. Fernhill Pastures is of special interest as the largest remaining example of these types of habitats which are now scarce in Shropshire. The site is of national value	Site of Special Scientific Interest (SSSI)
4.8 km	SSE	Montgomery Canal, Aston Locks - Keeper's Bridge	A disused length of canal which is among the best localities for aquatic plants in Shropshire. The site is also of importance in demonstrating aspects of the succession from open water to reed swamp and fen. The site is of national value	Site of Special Scientific Interest (SSSI)
7.1 km	N	River Dee and Bala Lake	Annex I habitats that are a primary reason for selection of this site. Annex II species that are a primary reason for selection of this site. The site is of international value	Special Areas of Conservation (cSAC or SAC)
10.5 km	E	Midland Meres & Mosses Phase 1	Geographically discrete series of lowland open water and peatland sites in the north-west Midlands of England. Ramsar criterion1 and Ramsar criterion2 The site is of international value	Ramsar

12.8 km	E	Midland Meres & Mosses Phase 2	Geographically discrete series of lowland open water and peatland sites in the north-west Midlands of England. Ramsar criterion1 and Ramsar criterion2 The site is of international value	Ramsar
13.1 km	E	Midland Mosses	Annex I habitats that are a primary reason for selection of this site. The site is of international value	Special Areas of Conservation (cSAC or SAC)

1.8 POINT SOURCE EMISSIONS

Table 1.8.1 below provides details of all proposed point source emissions to atmosphere from the Oswestry STOR Facility. There will be a total of twelve (No.12) single flue stacks, all discharging to atmosphere via 6.5m high stacks.

Table 1.8.1 Point Source Emissions to Atmosphere

Emission Point Reference and Location	Source of Emission	Stack Height (m)	Emissions
A1 - 330788, 330261	Single engine exhaust stack	6.5	Oxides of nitrogen (NO and NO ₂ expressed as NO ₂) Carbon monoxide (CO) and Sulphur Dioxide (SO ₂)
A2 - 330792, 330263	Single engine exhaust stack	6.5	
A3 - 330796, 330266	Single engine exhaust stack	6.5	
A4 - 330772, 330270	Single engine exhaust stack	6.5	
A5 - 330776, 330273	Single engine exhaust stack	6.5	
A6 - 330781, 330275	Single engine exhaust stack	6.5	
A7 - 330785, 330277	Single engine exhaust stack	6.5	
A8 - 330790, 330279	Single engine exhaust stack	6.5	
A9 - 330794, 330282	Single engine exhaust stack	6.5	
A10 - 330798, 330284	Single engine exhaust stack	6.5	
A11 - 330803, 330286	Single engine exhaust stack	6.5	
A12 - 330807, 330288	Single engine exhaust stack	6.5	

There will be no other point source emissions from the proposed STOR Facility.

Foul water and sewage from on-site welfare cabins will be serviced with an underground cesspit, which will be routinely emptied via vacuum tanker and removed off site to a suitable facility for onwards treatment.

There will be no point source emissions to surface waters from the site. Details of the proposed site surface water drainage system is provided within Section 2.7 below.

2 ENVIRONMENTAL RISK ASSESSMENTS

2.1 SCOPE OF ASSESSMENTS COMPLETED

A number of assessments have been considered to determine the environmental risks posed by the STOR Facility and to identify whether the level of risk is considered acceptable with appropriate mitigation or if further measures are required.

During pre-application discussions held with the Environment Agency, it was established early on in the project conception phase, that the following bespoke quantitative modelling assessments would be required:

- **Noise.** A Noise Impact Assessment (NIA) would be required to identify maximum noise ratings; to establish the potential impact of the proposed STOR Facility on nearby residential receptors; and provide suitable mitigation; and
- **Air Quality.** An Air Quality (AQ) Assessment would be required to establish if emissions to atmosphere from the proposed Facility risk exceedances of either human-health or ecological-health related air quality standards (AQs).

All other hazards identified within Table 1.6.1 above have been considered and either assessed qualitatively or screened out as requiring no further assessment.

Techniques to minimise the environmental impacts associated with the STOR Facility are outlined within the Operational Techniques and Monitoring Plan and in the Risk Assessment and Management Control Table presented within Appendix A to this report.

2.2 AMENITY IMPACTS

The potential for the STOR Facility to cause amenity impacts, such as dust, litter, debris, pests or vermin are considered to be extremely low.

The site will not be manned full time. As a result, there will be no perishable foods or other consumables stored on site routinely, that may attract pests or vermin. The plant control room and welfare port-a-cabins will be locked at all times when not in use, further preventing the risk of litter.

The only potential source of dust to be generated on site is from vehicle movements during periods of dry weather. During inclement weather there would be a risk of mud. The proposed access track to the site, along with the site footprint itself, will be formed of a permeable granular material, a minimum of 300mm thick. Surface water run-off will therefore be reduced to a minimum as the permeable material will allow infiltration of rainwater into the natural underlying soil below. The use of such granular material across the site and along the access roads will reduce the risk of dust from vehicle movements across the surface.

In consideration of the above, the potential for the proposed activities to generate dust, litter or mud or attract vermin during normal operations or during routine maintenance is considered to be negligible.

2.3 NOISE

A Noise Impact Assessment (NIA) was completed by Inaccoustic in September 2019 in support of the planning application to vary the original consent. A copy of the Noise Impact Assessment is provided within Appendix B.

The noise assessment has concluded that noise from the proposed Oswestry STOR Facility would have a low noise impact in accordance with BS4142:2014+A1:2019, and that based on the conclusions of the assessment, noise from the proposed Oswestry STOR Facility is not predicted to have an unacceptable impact or cause pollution to nearby residential receptors providing the cumulative rating sound level from all mechanical plant items does not exceed the stated noise criteria.

2.4 ODOUR

Under normal operations, there will be very minimal potential sources of odour from the proposed STOR Facility. Potential odour sources identified within Table 1.6.1 above include natural gas, exhaust emissions, or potential odours from any chemicals stored on site.

Natural gas will arrive on site via underground pipework and there will be no requirement for additional storage on site. All above ground pipework infrastructure will consist of stainless steel and will undergo pressure testing during dry commissioning to ensure they are fit for purpose. The Plant Operations Manager will undertake routine maintenance checks to ensure the plant is operating within normal parameters and to visually inspect for any damage or leaks within the pipework.

Odours from exhaust gases are considered insignificant as the combustion process will destroy 99% of any potentially odorous components within the natural gas fuel.

A small volume of chemicals is required to be stored on site. Chemicals will be stored within a dedicated COSHH cabinet serviced with integral secondary containment providing 110% of the volume of drum or 25% of the total volume (whichever is the greatest). Staff will follow COSHH risk assessments & wear appropriate PPE when handling substances during transfer and replacement of old drums with new. Containers will be regularly inspected to ensure they remain fit for purpose and containment remains intact with no potential for odour release. Full details of all raw materials to be stored at the site are detailed within the Operational Techniques and Monitoring Plan (*ECCS 129 002 R 004 A*).

Based on the above proposed control measures and the output of the risk assessment in Appendix A of this report, the potential risk to the environment from odours is considered to be negligible

2.5 POINT SOURCE EMISSIONS TO ATMOSPHERE

A quantitative Air Quality Assessment (AQA) was undertaken in December 2019 to identify predicted emissions from the proposed STOR Facility and their potential impact on nearby sensitive receptors (including ecological receptors). The objective was to establish if the predicted impacts would be significant from both a human health and ecological perspective. A copy of the full assessment is provided within Appendix D.

The proposed fuel (natural gas) is characterised by low emissions of Sulphur dioxide (SO₂) and particulate matter, thus these parameters were screened out early on as not significant. Emissions of carbon monoxide are also considered to be small compared to the environmental standards and not warranting further assessment. CO₂ generation is minimised by controlling combustion conditions, whilst the engine provides complete destruction to an efficiency of >99% of any VOCs within the gas, thus these parameters were also screened out as not requiring any further assessment.

The assessment therefore considered the principle emissions to atmosphere from the proposed STOR Facility, which are the generation of nitrogen dioxide (NO₂). This is considered to have the potential to affect human health. Emissions of NO₂ also has the potential to affect nearby habitat sites in the form of airborne concentrations of NO₂, acidification and nutrient nitrogen deposition.

Predicted Concentrations within the modelling represented an extreme conservative and worst-case approach, as the modelling assumed the STOR Facility would operate continuously, at the maximum load and results are presented for the worst-case meteorological year.

The assessment considered the maximum Process Contribution (PC) to annual means concentrations and concluded that as a maximum (at any off-site sensitive human receptor location), the predicted contribution of the proposed Oswestry STOR Facility to annual mean concentrations would be 2.63 µg m³ and is 6.6% of the Air Quality Standards (AQS) of 40 µg m³. As this is greater than 1% of the AQS, further modelling was carried out. However, the Predicted Environmental Concentration (PEC) is less than 70% of the AQS and the assessment has thus concluded the impact of the STOR facility on annual mean NO₂ can be deemed as 'not significant'.

Similarly, the predicted short-term impact was assessed as 'potentially significant' and not screened out as the PC exceeded the 10% screening threshold. Further modelling was undertaken. The proposed STOR Facility is highly unlikely to operate for the extended periods modelled, and the predicted concentrations are thus representative of the extreme worst-case conditions. Combined with the background concentration, the predicted environmental concentration (PEC) was assessed as being well below the AQS of 200 µg m³ at all sensitive human receptor locations and locations of relevant exposure. The AQA concluded that the impact of the STOR Facility would be 'not significant' with respect to short-term concentrations of NO₂.

The AQA also considered the impact of the STOR Facility on sensitive habitat sites and in particular, the Midland Meres and Mosses Phase 2 RAMSAR, River Dee and Bala Lake SAC and Shelf Bank LNR designated sites. The assessment considered airborne concentrations of NO_x, acidification and nutrient nitrogen deposition.

For NO_x, predicted annual mean and 24-hour mean concentrations at Midland Meres and Mosses Phase 2 RAMSAR and River Dee and Bala Lake SAC were less than 1% of the long-term critical level and less than 10% of the short-term critical level, respectively. For NO_x, predicted annual mean and 24-hour mean concentrations at Shelf Bank LNR were less than 100% of the long-term and the short-term critical levels. Therefore, the impact of airborne NO_x concentrations has also been screened out as 'not significant'.

The assessment has concluded that the overall air quality impact of the proposed Oswestry STOR Facility on human health and sensitive habitat sites will be not significant.

2.6 CLIMATE CHANGE RISK ASSESSMENT

As of 3 October 2019, the Environment Agency introduced a new requirement for applicants applying for a bespoke waste or installation permit. If the Facility is expected to operate for more than 5 years, the applicant must complete the climate change risk screening tool, even if the Facility is not expected to be operational after 2050. The Environment Agency’s guidance ‘Adapting to climate change: risk assessment for your environmental permit’ has thus been followed.

The Oswestry STOR Facility has been designed to achieve a minimum 20 to 25-year operating life. It is highly probably however that the plant will continue to operate beyond 2025. As such, a conservative approach has been applied and a minimum of 40 years operational life has been assumed for the purpose of this exercise. The results of the Risk Screening tool are presented within Table 2.6.1 below.

Table 2.6.1 Climate Change Risk Screening

Category	Screening Question	Score	Oswestry STOR Facility Score
1. TIMESCALES	How long will a permit be required for this site / activity?		
	5 years or less of operation	0	
	Less than 20 years of operation	1	
	Until between 2040 and 2060 (between 20 and 40 years from now)	3	
	Until 2060 or beyond (more than 40 years from now)	5	5
2. FLOODING	What is your site’s risk of flooding from rivers or the sea?		
	Not in a flood-risk zone	0	0
	Very low or Low	1	
	Medium	2	
	High	5	
3. WATER USE	If you use water for your site operations or fire prevention, what is the source of your water?		
	Water not required	0	0
	Mains Water	1	
	Surface water or groundwater abstraction	5	
TOTAL SCREENING SCORE			5

For proposed Facilities with a total screening score of 5 or more, applicants must also complete the relevant climate change risk assessment. As the proposed Oswestry STOR Facility is situated within Perry Roden and Tern North Shropshire Catchment Area, the CCRA worksheet for Severn Catchment has been completed. A copy of the complete worksheet is provided within Appendix C to this report. The overall risk from climate change to this proposed Facility is considered to be very low as the site is not at risk of flooding from either rising sea levels or localised flooding. Control measures have been proposed to mitigate for potential risks associated with a rise in average summer temperatures.

2.7 SURFACE WATER RUN-OFF

The proposed surface water drainage system for the STOR Facility has been designed in accordance with Sustainable Urban Drainage Systems (SUDS). Site foundations will be formed on permeable material

through which the base will bear onto the underlying soil. This will allow clean surface water to be stored in the top layer of granular material and then infiltrate into the underlying soil. There will be some impermeable areas across the site (bases of the engine units).

All hazardous substances including transformer oil and lubrication oil used for the engines will be serviced with dedicated bunds that will be designed to C736 standards. Any rainwater captured within the transformer bund will be drained manually after inspection into a shallow catch-pit type soakaway within the permeable gravel. Used lubrication oil for the engines will be stored within double skinned waste oil tanks stored within the containerised units, prior to being collected and removed off site to a suitable facility for onwards recovery.

Given the proposed design, it is considered unlikely that there will be any direct run-off from the site. The proposed surface water management system has been designed to control 1 in 100-year rainfall events, with climate change allowance for the lifetime of the development. The design will ensure the effective drainage of the site using sustainable drainage principles, will safeguard the development and will not increase flood risk elsewhere.

2.8 FUGITIVE EMISSIONS

Fugitive emissions can be from either intentional (i.e. vented) or unintentional (i.e. leaked) sources. Whilst extremely unlikely, the nature of any fugitive emissions to air would comprise either of natural gas in the event of a leak; VOCs released following loss of containment and a spillage on site or uncontrolled emissions from damaged or loosened pipework.

The design of the proposed STOR Facility has considered the need for emergency vents or pressure relief valves to be built into the system as part of the integral safety procedures for equipment on site. There pressure vents build into the design, in order to release steam in the event of overpressure. The entire site will be assessed under Hazardous Area classification (ATEX - DSEAR), with any hazardous areas defined as DSEAR zoning clearly labelled on site. Emergency vents will be located at height and away from potential access from Operational Staff or pedestrian access ways.

There is potential for other unintentional, uncontrolled fugitive releases to the environment from the STOR Facility. These may arise from the MTU engines or any chemicals stored on site. The likelihood of these types of fugitive release is considered to be very low, and any emissions would be localised to the site.

The assessment in Appendix A concludes that these potential hazards from fugitive emissions to air is considered to be low following implementation of appropriate control measures.

The primary potential hazards identified would be under abnormal operations, from oils or chemicals due to accidental release from spillages during transferring of substances to and from site. Spillages could also occur from overfilling of vessels.

All chemicals and oils to be stored on site will be provided with secondary containment and will be located on sealed hardstanding. Spill kits will be available with materials suitable for absorbing and containing

minor spills and maintenance staff will be trained in their use and in the spill clean-up procedures. Hazards from potential Accidents are considered in more detail within Section 2.10 below.

Based on the above proposed control measures and the output of the risk assessment in Appendix A of this report, the potential risk to the environment from fugitive emissions to sewer is considered to be low.

2.9 WASTES GENERATED ON SITE

There will be very minimal volumes of waste produced on site. Wastes which are produced will primarily consist of waste oil from the MTU engines, Transformer oils and other maintenance fluids / oily rags or residual chemical containers.

All Hazardous wastes will be removed from site by an appropriately permitted waste contractor and will be recovered at a permitted facility. As a waste producer, the Operator will receive consignee returns every quarter from their consignee dealing with their hazardous wastes.

Records of all wastes removed from site will be recorded, held securely, and made available for inspection by the Environment Agency upon request. Should any new waste streams be generated during either normal or abnormal operations, the Operator will apply the principles of the Waste Hierarchy prior to removal off site.

The site will not be manned full time. As a result, there will very little waste generated from the welfare cabins. Sewage and foul water produced from on-site welfare facilities will discharge into an underground cesspit, which will be maintained and emptied regularly.

2.10 ABNORMAL OPERATIONS OR ACCIDENTS

There is potential for hazards and exposure from abnormal, emergency scenarios or accidents on site to anyone living or working close to the proposed STOR Facility. The key sensitive receptors include the local human population and adjacent businesses. An assessment of each hazard identified has been evaluated and the potential risk and prevention measures described within the Risk Assessment and Management Control table provided within Appendix A to this report.

The Operator has prepared a series of Emergency Protocols / Accident Plans (copies provided within Appendix F of the Operational Technique & Monitoring Plan Report *ECCS 129 002 R 004 A*) which detail procedures and actions to be taken to minimise the potential causes of accidents, and the consequences in the event of an incident occurring. The Emergency Protocols which will form part of the EMS have been developed to put measures in place to prevent and manage accidents, incidents and non-conformances and include the following key emergency or abnormal scenarios:

- Lines of Reporting;
- Incident Reporting;
- Critical Alarms;
- Gas Leak;
- Power Outage;
- Fire and Emergency (Normal Ops);
- Fire and Emergency (Out of Hours);
- Minor and Major Spillage.

In consideration of the output of the risk assessment in Appendix A, the potential risks from abnormal scenarios or accidents is considered low following the implementation of appropriate control measures.

2.11 GLOBAL WARMING POTENTIAL

The global warming potential (GWP) of the proposed STOR Facility has been calculated in accordance with the [Environment Agency's GWP Guidance](#).

The calculations and GWP scores for the proposed STOR Facility are provided within Tables 2.11.1a and 2.11.1b below. These have been derived from carbon dioxide emissions from the direct combustion of natural gas and indirect production of electricity. This is based on worst case scenarios with the proposed Facility operating continuously throughout the year.

Table 1.11.1a Energy Consumption

Number	Energy Source	Emissions Type	Delivered MWh/yr	Conversion Factor	Primary MWh/yr	CO ₂ Factor	CO ₂ Tonnes/yr
1	Electricity from public supply	Indirect	30.42	2.40	73.0	0.166	12.12
2	Natural Gas	Direct	42.924	1.00	42.924	0.19	8.15

Table 1.11.1b Global Warming Potential Impacts

Emissions Type	Source	Annual Rate MWh/yr	GWP Value per Tonne	Annual GWP
CO ₂ Energy	Direct Emissions	30.42	1.00	30.42
CO ₂ Energy	Indirect Emissions	42.924	1.00	42.924

3 CONCLUSIONS

3.1 CONCLUSIONS OF RISK ASSESSMENT

This Environmental Risk Assessment has been prepared on behalf of ARL 020 Ltd in support of an Environmental Permit application for the proposed new Oswestry STOR Facility. The Oswestry STOR Facility is intended to operate within the Capacity Market, Balancing Market and as an Energy Trading Generation Plant on the Energy Market.

The Operator is applying for a bespoke Installation Environmental Permit to carry out a single regulated activity (Section 1.1 A(1)(a) listed activity - Burning any fuel in an appliance with a rated thermal input of 50 megawatts or more).

This Environmental Risk Assessment has followed the Environment Agency's guidance and best practice on '*Risk Assessments for your Environmental Permit*'.

A number of environmental risk assessments have been carried out to determine whether the proposed STOR Facility can be operated without causing pollution to the environment. Bespoke quantitative modelling assessments were undertaken for both noise and air quality:

- **Noise.** A Noise Impact Assessment (NIA) was undertaken to identify maximum noise ratings; establish the potential impact of the proposed STOR Facility on nearby residential receptors; and provide suitable mitigation; and
- **Air Quality.** An Air Quality (AQ) Assessment was undertaken to establish if emissions from the proposed stacks risk exceedances of either human-health or ecological-health related Air Quality Standards (AQSs).

Taking into consideration all potential emissions as well as the intended design and operational management and mitigation practices to be implemented, all assessments have considered the possible impacts on nearby sensitive receptors and have concluded that potential impacts from the proposed STOR Facility will not be significant.

As presented within the report, the Operator will implement appropriate control measures and management systems to ensure that the proposed STOR Facility does not have any significant impacts or represent an unacceptable risk to the local environment.

APPENDICES

APPENDIX A – RISK ASSESSMENT & MANAGEMENT CONTROLS

Table A: Risk Assessment and Risk Management Techniques

Hazard	Receptor	Pathway	Risk Management Techniques	Probability of Exposure	Consequence	Overall Risk
Amenity Impacts						
Dust, litter or Debris	Nearby Human Residential Receptors	Transportation through the air or tracked via vehicle wheels leaving site	<p>There will be minimal vehicle movements to and from site as fuel (natural gas) will be delivered to site via pipework. Only small volumes of chemicals and maintenance crew will arrive via vehicle.</p> <p>The small compound will be serviced with 300mm permeable granular material through which the bases bear onto the underlying soil. This granular material will minimise any risk of dust, mud or debris being generated from the site compound and site access road.</p> <p>The site will not be manned full time, however any litter waste generated by staff / maintenance crew will be stored in secure bins within the welfare cabins and regularly removed off site</p>	Low	Low	Low
Pest/Vermin		Travel across land or air	<p>The site will not be manned full time, however any litter waste generated by staff / maintenance crew will be stored in secure bins within the welfare cabins and regularly removed off site</p> <p>There will be no putrescible / degradable wastes stored on site that may attract pests/vermin.</p>	Low	Low	Low
Noise						
Loss of Noise Attenuation on MTU Engine	Nearby Human Residential Receptors	Noise through the air	<p>Each MTU engine to be housed within purpose built acoustic enclosure; the enclosure inlet & outlet cooling ventilation and will be fitted with acoustic attenuators + acoustic louvres and horizontally mounted as low as possible. The exhaust silencers will also be mounted as low as possible.</p> <p>The Operator will implement an effective planned preventative maintenance regime to ensure equipment and above-mentioned attenuation measures remain fit for purpose and equipment operates within optimum conditions and minimises generation of noise and/or vibration.</p> <p>Operational procedures will be in place to investigate and respond to any complaints about noise. Records will be maintained on site.</p>	Moderate	Moderate	Low
Loss of Noise Attenuation on Exhaust Silencer & Exhaust Stacks			Moderate	Moderate	low	
Odour						
Gas Leak			Underground gas pipework will be constructed of plastic. All over ground pipework associated with the plant will be constructed of	Low	Low	Low

Hazard	Receptor	Pathway	Risk Management Techniques	Probability of Exposure	Consequence	Overall Risk
			<p>stainless steel and will undergo CQA integrity tests prior to the site being commissioned.</p> <p>The Site Technician will undertake routine checks across to site to identify any gas leaks.</p> <p>In the event a leak is detected the Operators Emergency Protocols will be followed.</p>			
Abnormal exhaust gases	Nearby Human Residential Receptors	Transportation through the air	<p>The Operator will implement a Planned Preventative Maintenance programme that will include regular checks on the Gen-set compound area to ensure it is operating within optimum conditions.</p> <p>SCADA system will continuously monitor the plants performance. In the event any abnormal conditions are detected, or critical alarms raised, the Site Technician will be alerted via text message / phone call.</p> <p>The Site Technician will have remote access to the plant out-of-hours</p>	Low	Low	Low
Loss of containment of stored chemicals			All hazardous substances including transformer oil and lubrication oil used for the engines will be serviced with dedicated secondary containment that is designed to meet C736 standards where appropriate.	Low	Low	Low
Accidents						
Fugitive emissions of natural gas due to gas leak	Nearby Human Residential Receptors	Transportation through the air	<p>There is potential for unintentional, uncontrolled fugitive releases of natural gas to the environment from the STOR Facility.</p> <p>These may arise from the MTU engines. All over ground pipework associated with the plant will be constructed of stainless steel and will undergo CQA integrity tests prior to the site being commissioned.</p> <p>The Site Technician will undertake routine checks across to site to identify any gas leaks.</p> <p>In the event a leak is detected the Operators Emergency Protocols will be followed.</p>	Low	Low	Low
Accidental release of potential polluting substances due to mechanical failure	Nearby Human Residential Receptors; Nearby natural habitats	Transportation through the air; Percolation through soils, direct run-off from site across the ground and entering	The design of the proposed STOR Facility has considered the need for emergency vents or pressure relief valves to be built into the system as part of the integral safety procedures for equipment on site. Emergency vents will be located at height and away from potential access from Maintenance Staff or pedestrian access ways. An ATEX and DSEAR assessment will determine appropriate zoning, with all relevant zones on site clearly labelled.	Moderate	Moderate	low

Hazard	Receptor	Pathway	Risk Management Techniques	Probability of Exposure	Consequence	Overall Risk
		existing combined drainage system.				
Abnormal release of gases from exhaust stacks	Nearby Human Residential Receptors	Transportation through the air	<p>The Operator will implement a Planned Preventative Maintenance programme that will include regular checks on the Gen-set units to ensure it is operating within optimum conditions. SCADA system will continuously monitor the plants performance. In the event any abnormal conditions are detected, or critical alarms raised, the Site Technician will be alerted via text message / phone call.</p> <p>Emissions from the stack will undergo periodic monitoring, as detailed within the Operational Techniques & Monitoring Plan Document (ECCS 129 002 R 004 A).</p>	Moderate	Moderate	low
Contaminated effluent discharged off site	Nearby natural habitats; Ground and Groundwater	Transportation across land and into drainage channels	<p>Under normal operations there is very low probability of any contaminated effluent discharging off site.</p> <p>There will be no point source discharges to surface waters as the site drainage system has been designed in accordance with SUDS. Chemicals will be serviced with appropriate secondary containment.</p> <p>Spill kits will be available on site and staff will receive internal training on their use. Any spill kit equipment used will be replenished as soon as practically possible.</p>	Low	Low	Low
Loss of containment of wastes stored on site	Nearby Human Residential Receptors; Nearby natural habitats; Ground and Groundwater	Transportation across land, percolation through soils	<p>All wastes will be stored in suitable containers will hazardous wastes serviced with appropriate secondary containment</p> <p>Only small volumes of wastes will be stored at any one time and will be removed from site for onwards disposal at regular intervals.</p>	Low	Low	Low
Accidental release of potential polluting substances due to vehicle collision	Nearby natural habitats; Ground and Groundwater	Percolation through soils, direct run-off from site across the ground	<p>There will be minimal vehicle movements to and from site as fuel (natural gas) will be delivered to site via pipework. Only small volumes of chemicals and maintenance crew will arrive via vehicle.</p> <p>Due to the small size of the proposed compound, vehicles will likely park outside the walled boundary in the yard area.</p>	Low	Low	Low
Accidental release of potential polluting substances through flooding	Nearby natural habitats; Ground and Groundwater	Percolation through soils, direct run-off from site across the ground	<p>The Site is designated as a Flood Zone 1 with low probability of flooding. Any potentially polluting substances will be stored off the ground within stored containers, thus reducing the risk of release in the event of a localised flood event. The proposed surface water management system has been designed to control 1</p>	Low	Low	Low

Hazard	Receptor	Pathway	Risk Management Techniques	Probability of Exposure	Consequence	Overall Risk
			in 100-year rainfall events, with climate change allowance for the lifetime of the development.			
Accidental release of potential polluting substances due to adverse weather conditions	Nearby natural habitats; Ground and Groundwater	Percolation through soils, direct run-off from site across the ground and entering existing combined drainage system.	Weather conditions will be monitored, and appropriate action taken. Access to the compound will be prohibited during storm events, and the decision on whether to close the site will be at the discretion of senior management, this includes turning the generators off remotely if required. Primary consideration will be given to staff safety and environmental considerations of the operatives & running the site. The plant can be monitored and controlled remotely if adverse weather prevents staff attending site.	Low	Low	Low
Arson and / or vandalism and / or theft causing the release of polluting materials to air (smoke or fumes), water or land.	Nearby natural habitats; Ground and Groundwater	Transportation through the air; Percolation through soils, direct run-off from site across the ground and entering existing combined drainage system.	The compound area is to be located in a remote rural location away from densely populated areas. The compound will be serviced with secure palisade fencing around the perimeter of the site, with security access gates remaining locked when the site is unoccupied. CCTV cameras will also be in operation.	Moderate	Moderate	low
Accidental fire/explosion causing the release of polluting materials to air (smoke or fumes), water or land from on-site machinery	Nearby natural habitats; Nearby Human Residential Receptors; Ground and Groundwater	Transportation through the air; Percolation through soils, direct run-off from site across the ground and entering existing combined drainage system.	<p>The Operator will follow strict security measures to prevent unauthorised access. These will include fencing of the site, security gates and CCTV cameras.</p> <p>The site has a No Smoking Policy which is to be strictly enforced by Site Rules and by signage around site. This will be incorporated into the Environmental Management System.</p> <p>All plant and equipment and electrical installations will be kept maintained and in good working condition and subject to routine inspection and maintenance.</p> <p>Good housekeeping measures will be in place including the cleaning of small leaks of oils or other flammable liquids immediately.</p> <p>Emergency Protocols have been compiled to manage foreseeable risks from the proposed STOR Facility.</p> <p>The Operators Environmental Management System will also include procedures and actions required in the event of fire or spillage to control and minimise their spread.</p> <p>Localised firefighting equipment (fire extinguishers) will be maintained in accordance with fire regulations.</p>	Moderate	Moderate	low

Hazard	Receptor	Pathway	Risk Management Techniques	Probability of Exposure	Consequence	Overall Risk
Accidental release of potential polluting substances due to power outage	Nearby natural habitats; Nearby Human Residential Receptors	Transportation through the air; Percolation through soils, direct run-off from site across the ground and entering existing combined drainage system.	<p>SCADA system will continuously monitor the plants performance. In the event a power outage is detected a critical alarm will be raised and the Site Technician alerted via text message / phone call.</p> <p>The plant shall automatically undertake a controlled shut-down mitigating against the event and risk of any potentially polluting substances being released.</p> <p>The plant will be fitted with emergency 'E. Stop's on each individual engine as well as a master E Stop and slam-shut valve able to shut the entire site down in event of an emergency. These E. Stops can be activated either on site or remotely.</p>	Moderate	Moderate	low

APPENDIX B – NOISE IMPACT ASSESSMENT

APPENDIX C – CLIMATE CHANGE RISK ASSESSMENT

APPENDIX D – AIR QUALITY ASSESSMENT

APPENDIX E – NATURE & HERITAGE SCREENING REPORT
