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ENVIRONMENTAL RISK ASSESSMENT

Didcot North Data Centre Campus

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ENVIRONMENTAL RISK ASSESSMENT
V2
R1
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Quality Management

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1 INTRODUCTION

1.1.1 This Environmental Risk Assessment has been carried out in support of an application for an environmental permit. It includes an assessment of the risk to the environment and human health from an emergency back-up generation installation with associated fuel storage. Fuel for the generators will either be diesel or Hydrotreated Vegetable Oil (HVO).

1.1.2 The Environment Agency's Risk Assessments for your environmental permit[1] covers a range of environmental risks. Those aspects relevant to the operation of the proposed installation are covered within the following sections.

1.1.3 The assessment of 'Amenity and Accidents' risks is presented in the risk assessment tables in section 2.

1.1.4 This document provides the relevant risk assessments covering the above aspects.

[1] Environment Agency, Risk assessments for your environmental permit, https://www.gov.uk/guidance/risk-assessments-for-your-environmental-permit

2 SITE DETAILS

2.1.1 The site is located at part of the former Didcot A Power Station in Didcot, Oxfordshire. The approximate post code is OX11 7BF. The site is centred at National Grid Reference SU 51443 91794.

2.1.2 The site covers approximately 23 hectares of former Didcot A Power Station which was used for coal storage and cooling towers. The power station itself has been demolished, and the site has been flattened and remediated prior to ready for development. The eastern area of the site boundary is currently occupied by unused grassland.

2.1.3 The wider site is bounded by the A4130 to the east and Purchas Road at the southern site boundary and crossing north to south through the site.

2.1.4 The nearest residential receptor, Hill Farm is located 600 m north-east of the site. An industrial park is located 50 m to the east and 50 m south of the site.

2.1.5 The closest sensitive ecological receptor to the site is an Ancient Woodland located circa 1.2km northeast from the site. Culham Brake Site of Special Scientific Interest (SSSI) is located approximately 4.5 km north of the site. The Little Wittenham Special Area of Conservation (SAC) and (SSSI) is located approximately 5.5 km to the north-east of the site and Cothill Fen SAC is located approximately 10 km northwest of the site.

2.1.6 The nearest surface water feature is an unnamed stream located on the eastern and western boundaries of the site. Moor Ditch is located 900 m to the east of the Site.

3 AMENITY AND ACCIDENTS

3.1.1 This section provides an assessment of risks to environmental amenity and from accidents that could arise from operation of the installation. The assessment has been completed in accordance with the EA's Risk Assessments for your environmental permit.

3.1.2 The scope of the assessment has covered the following aspects:

- Odour;
- Noise and vibration;
- Fugitive emissions;
- Visible emissions; and
- Accidents.

3.1.3 For each of the above, the approach to the assessment has followed the following six stage process:

- Identify and consider risks for the site, and the sources of the risks;
- Identify the receptors at risk;
- Identify the possible pathways from the sources of the risks to the receptors;
- Assess risks relevant to the activity;
- Choose appropriate further measures to control these risks (if required); and
- Submit the assessment of overall risk.

3.1.4 Results of the assessment are provided in the following tables:

- Table 2-2 Assessment of odour risks
- Table 2-3 Assessment of noise and vibration risks
- Table 2-4 Assessment of fugitive emission risks
- Table 2-5 Visible emissions
- Table 2-6 Accidents risk assessment and management plan

3.1.5 The risk assessment methodology has used a scoring mechanism whereby scores are assigned to:

- The probability of exposure; and
- The consequence of the hazard to the environment or human health.

3.1.6 The risk assessment has been completed by scoring the hazard areas outlined above using a risk matrix as shown in Table 2-1 below:

Table 3-1: Risk Matrix

Consequence	Probability of Exposure			
	High	Medium	Low	Very Low
High	High	Medium	Low	Low
Medium	Medium	Medium	Low	Very Low
Low	Low	Low	Low	Very low
Very Low	Low	Very Low	Very Low	Very Low

3.1.7 In completing the assessment, the proposed prevention and control measures are assumed to be in place. Where relevant, details of these measures are identified within the assessment.

Table 3-2 Odour risk assessment and management plan

Hazard What has the potential to cause harm?	**Receptor** What is at risk? What do I wish to protect?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will you take to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**What is the overall risk?** What is the risk that still remains? The balance of probability and consequence.
Odour emissions from operation of the installation	Local residents (nearest residential receptor is approximately 600 m to the north-east of the site). Industrial park workers located 50 m east and south of the site.	Air	The fuel tanks will be vented but odour emissions are not expected to be significant. The belly tanks will be vented and will be within the generator containers. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Very Low	Very Low	Very Low

Table 3-3 Noise and vibration risk assessment and management plan

Hazard What has the potential to cause harm?	**Receptor** What is at risk? What do I wish to protect?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will you take to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**What is the overall risk?** What is the risk that still remains? The balance of probability and consequence.
Noise from vehicle movements onsite	Local residents (nearest residential receptor is approximately 600 m to the north-east of the site) Industrial park workers located 50 m east and south of the site.	Air	Under normal operation the generators will be operated only for testing and therefore deliveries of fuel will be less frequent. In the event of emergency operation fuel from the existing inventory will be used initially. More frequent deliveries may be required once the initial inventory is consumed but the duration of this would be short and the likelihood of operation in this mode is very low. Personnel responsible for the generator installation will be part of the staffing of the wider data storage installation site therefore there will be no additional staff vehicle movements over and above those employed within the wider data centre. Additional vehicle movements will be associated with planned maintenance and deliveries which will take place during normal working hours. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Very Low	Very Low	Very Low
Noise from operation of the installation, including generators, air-intake, CCCW system etc.	Local residents (nearest residential receptor is approximately 600 m to the north-east of the site) Industrial park workers located 50 m east and south of the site.	Air	The installation is designed to provide emergency back-up electricity generation in the event of failure of the grid connection. The permit will allow generators to operate as emergency back-up for up to 500 hours per annum, but in reality, it is likely to be significantly less than this and limited to testing for less than 50 hours per generator per annum. Generators and associated plant will be enclosed within individual containers which reduces acoustic emissions. Noise from the generators has been mitigated and reduced to a minimum by locating generators in high performing acoustic enclosures with attenuated inlets and exhausts, following best practice for this type of equipment. In the event of a complaint, the operator will follow the complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary. A rigorous maintenance schedule is implemented, where regular inspections will prevent increase in noise levels over time. There are not predicted to be any adverse effects during testing of the generators, which will be the typical use case for these systems. A Noise Impact Assessment is included as Appendix F of the supporting information document.	Very Low	Medium	Very Low – due to the very low probability of the requirement for emergency back-up use.
Vibration from the installation.	Local residents (nearest residential receptor is approximately 600 m to the north-east of the site) Industrial park workers located 50 m east and south of the site.	Air	Significant vibration effects are not anticipated for the installation. The generators will be fixed on concrete pads within containers. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Very Low.	Low	Very Low

Table 3-4 Fugitive emissions risk assessment and management plan

Hazard What has the potential to cause harm?	**Receptor** What is at risk? What do I wish to protect?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will you take to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**What is the overall risk?** What is the risk that still remains? The balance of probability and consequence.
To Air						
Dust	Local residents (nearest residential receptor is approximately 600 m to the north-east of the site). Industrial park workers located 50 m east and south of the site. Ancient Woodland located circa 1.2km from the site. The Little Wittenham Special Area of Conservation (SAC) (SSSI) 5.5 km northwest. Culham Brake SSSI is located 4.5 km north of the site.	Air	There are no significant dust-generating activities or dusty materials used or stored within the installation. In the event of a complaint, the operator will follow a complaints procedure to record the complaint and take appropriate action or provide further monitoring as necessary.	Very Low - significant dust generation is not anticipated for operation of the installation.	Very low	Very Low
Fumes (VOCs) from delivery and storage diesel or HVOon site.	Local residents (nearest residential receptor is approximately 600 m to the north-east of the site). Industrial park workers located 50 m east and south of the site. Ancient Woodland located circa 1.2km from the site. The Little Wittenham Special Area of Conservation (SAC) (SSSI) 5.5 km northwest. Culham Brake SSSI is located 4.5 km north of the site.	Air	The fuel tanks will be fitted with vents however these will only allow minimal potential for fumes to escape. No other oils will only be stored on site. Lubricating oil is present within the generators but this will be within a closed loop system with no emissions.	Very Low	Low	Very Low
To Water						
Leakage of diesel or HVO from delivery, storage or pipework	Site drainage system, Stream located on the eastern and western boundaries of the site. Moor Ditch 900 m to the east of the Site	Surface water drainage systems	All deliveries of fuel will be overseen by suitably qualified personnel. All connections will take place with drip trays to capture any potential leaks or spillages and appropriate spill kits will be available. Deliveries will take place from tankers in a contained fuel unloading area to the main top up tanks. Deliveries will only be made to the main top up tank associated with each compound. Connections between the top up tank and the individual fuel tanks for each engine will have drip trays to capture any leaks or spillages and appropriate spill kits will be available in each compound. Top up of tanks will be automated and as such any spillage is unlikely and connections will be fixed. All tanks will be fitted with leak detection and high-level alarms to avoid overfilling. In the unlikely event that any leakage or spill should occur this would be contained by the bund or generator container (depending where this occurred). It would then be dealt with by use of the available spill kits and the Spill Response Plan will be followed. The generator belly tanks are housed within containers and would be unable to reach the surface water drainage system. The main top up tanks are within bunds which will be subject to routine inspection. All tanks will be compliant with the Oil Storage Regulations and CIRIA requirements. All bunds and surfacing will be subject to regular inspections and maintenance throughout the life of the installation. The bunds containing the main top up tanks will be checked for rainwater accumulation daily and emptied where necessary. Any surface water run-off from the facility (roofs, roads, hard standing, etc.) water will discharge into the surface water drainage system serving the generator compounds and the wider data centre site before release into the attenuation basins and ultimately Moor Ditch. Small spillages of fuel would be managed via the interceptor. However, should a significant failure of the unloading station tanks and simultaneously the associated	Very Low	Medium	Very Low

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
			bunding or a complete loss of a fuel delivery vehicle then the penstock valves would be closed and any oil not contained within the interceptor would be held within the drainage system.			
To Land						
Spillage of oil to land	Land	Direct contact	The main top up tanks are within bunds which will be subject to routine inspection. All tanks will be compliant with the Oil Storage Regulations and CIRIA requirements. An appropriate spill kit will be provided to clean up any spills during deliveries, and the spill response On delivery, only personnel trained in spillage procedures will be permitted to carry out deliveries of fuel to the site. The generators (including the fuel tanks) will be located within individual containers on concrete hardstanding and therefore the opportunity for direct contact to land is minimal. Routine inspections of the bunds and compound surface will be carried out in order to ensure it remains in good working order throughout the lifetime of the installation.	Very Low	Medium	Very Low
Litter						
Litter from solid waste storage and removal from site	Local residents (nearest residential receptor is approximately 600 m to the north-east of the site). Industrial park workers located 50 m east and south of the site.	Local residents (nearest residential receptor is approximately 600 m to the south east of the site)	Minimal solid waste generation is anticipated on site. In general staff will only be required on site during testing and routine inspections. All staff will be trained in waste management procedures by their supervisors. All wastes produced during maintenance tasks will be immediately removed by vendors (specialist contractors) from the installation following completion of the relevant maintenance task.	Very Low - significant waste on site is not anticipated	Very Low	Very Low
Pests						
Flies, and other pests or vermin	Local residents (nearest residential receptor is approximately 600 m to the south-east of the site). Industrial park workers located 50 m east and south of the site.	Local residents (nearest residential receptor is approximately 600 m to the south-east of the site)	Not relevant to the operation.	Very Low	Very Low	Very Low

Table 3-5 Visible emissions

Hazard What has the potential to cause harm?	Receptor What is at risk? What do I wish to protect?	Pathway How can the hazard get to the receptor?	Risk management What measures will you take to reduce the risk? If it occurs – who is responsible for what?	Probability of exposure How likely is this contact?	Consequence What is the harm that can be caused?	What is the overall risk? What is the risk that still remains? The balance of probability and consequence.
Plume from emission stacks	Local residents (nearest residential receptor is approximately 600 m to the north-east of the site). Industrial park workers located 50 m east and south of the site.	Visual	Visible plumes are not anticipated to occur for the majority of operational time due to the fuel being combusted and resulting high exhaust gas temperatures The generators will not be in operation for the majority of the time and therefore there would be zero visible plume during this time. Any visible plumes observed during testing will be reported and investigated.	Very Low	Low – Minor visual disturbance of short duration.	Very Low

Table 3-6 Accidents risk assessment and management plan

Hazard What has the potential to cause harm?	**Receptor** What is at risk? What do I wish to protect?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will you take to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**What is the overall risk?** What is the risk that still remains? The balance of probability and consequence.
Operator error	Air/Water/Land Local residents (nearest residential receptor is approximately 600 m to the north-east of the site). Depending on nature of incident, Ancient Woodland located circa 1.2km from the site. The Little Wittenham Special Area of Conservation (SAC) (SSSI) 5.5 km northwest. Culham Brake SSSI is located 4.5 km north of the site. Site drainage system. Watercourse located on the eastern and western boundaries of the site. Moor Ditch 900 m to the east of the Site	Variable - dependent on nature of the error	The installation will be automatically controlled which will minimise potential for operator error on site. The automatic control system will include alarms and warning lights to alert of potential operational problems. The only anticipated manual tasks will be the connection of the fuel delivery vehicles to the main top up tanks. This will be undertaken within bunded areas by trained operators. All staff (including contractors) will be qualified for the role to be carried out and trained specifically to carry out their responsibilities in relation to the installation.	Low	Low	Low
Loss of power	None	N/A	The function of the installation is to operate in the event of loss of power from the grid.	N/A	N/A	N/A
Loss of fuel storage tank or delivery vehicle load	Site drainage system. Watercourse located on the eastern and western boundaries of the site. Moor Ditch 900 m to the east of the Site	Surface water drainage system	A release from fuel storage tanks/belly tanks would require multiple failure events. Fuels are contained within suitably designed tanks and bunded in accordance with oil storage regulation and CIRIA guidance. Fuel deliveries will be attended by trained personnel. Small spillages of fuel would be managed via the interceptor. However, should a significant failure of the unloading station tanks and simultaneously the associated bunding or a complete loss of a fuel delivery vehicle then the penstock valves would be closed and any oil not contained within the interceptor would be held within the drainage system. Following an incident, arrangements will be made to pump out potentially contaminated water and to flush the drains before opening the penstock valve. .	Very low	High	Low
Fire causing emissions to air	Site workers Local residents (nearest residential receptor is approximately 600 m to the north-east of the site). Depending on nature of incident, Ancient Woodland located circa 1.2km from the site. The Little Wittenham Special Area of Conservation (SAC) (SSSI) 5.5 km northwest. Culham Brake SSSI is located 4.5 km north of the site	Direct release of combustion gases to air	Each generator will be fitted with a weighted slam-shut valve with a fusible link across the top of each generator. In the event of a fire, the link will melt and the valve will drop, shutting off the fuel supply. These systems will link to the site security office where personnel will alert relevant employees and call the Fire and Rescue Service (FRS) to attend if necessary. Further fire management procedures will be set out in the AMP. Fire procedures will be kept onsite within the site office and copies will also be provided to the FRS and maintenance contractor.	Very Low	Low - Medium	Very Low
Fire causing emissions to water	Site drainage system. Watercourse located on the eastern and western boundaries of the site. Moor Ditch 900 m to the east of the Site	Surface water drainage system	It is unlikely that firefighting using water/foam would be used to tackle a fire at the installation. Should a fire occur in one of the generators then the likely approach would be to stop the fuel feed and allow the fire to burn out residual fuel as described above. . Any firewater run off would be directed to the surface water drainage system that serves the generator compounds and the wider data centre site . Manual penstock valves on the inlet to the attenuation basins will be closed in the event of a fire and firewater would be held within the drainage system. Following an incident arrangements will be made to pump out potentially contaminated water and to flush the drains before opening the penstock valves. Contaminated water will be held within a tank and taken to a suitably permitted offsite treatment facility for disposal. .	Very low	Medium	Very Low

Hazard What has the potential to cause harm?	**Receptor** What is at risk? What do I wish to protect?	**Pathway** How can the hazard get to the receptor?	**Risk management** What measures will you take to reduce the risk? If it occurs – who is responsible for what?	**Probability of exposure** How likely is this contact?	**Consequence** What is the harm that can be caused?	**What is the overall risk?** What is the risk that still remains? The balance of probability and consequence.
Vandalism	Air/water/land Local residents (nearest residential receptor is approximately 600 m to the north-east of the site). Depending on nature of incident, Ancient Woodland located circa 1.2km from the site. The Little Wittenham Special Area of Conservation (SAC) (SSSI) 5.5 km northwest. Culham Brake SSSI is located 4.5 km north of the site. Site drainage system. Watercourse located on the eastern and western boundaries of the site. Moor Ditch 900 m to the east of the Site	Various	A security gate and pedestrian controlled entry systems is to be located at the main entrance to the site. The site will be staffed by security personnel at this entrance 24 hours a day. The site is surrounded by an outer perimeter and inner perimeter both of which are bound by high security fencing. The wider data centre site is surrounded by 2.5 m high weldmesh fencing with 300mm razor wire. The internal fence is a 2.1 m high double wired panel system 300 mm razor wire. The substation compound, CIWB and generator compounds for the data centre buildings will also have a fence.	Very Low	Low to Medium - depending on nature of the event.	Very Low
Flooding	Buildings and structures on site; neighbouring land	Surface water drainage system; local surface watercourses	An assessment of flood risk shows that the site is located in a flood zone 1 and has a low probability of flooding. The drainage system includes manual penstock valves on the inlet to the attenuation basins which can be closed in the event of a fire or spillage to prevent contamination of clean surface water in the attenuation pond, and ensure all contamination is held within the installation boundary. Oil interceptors (class 1) are included within the surface water drainage system, and these will be regularly emptied and maintained.	Low	Low	Low

4 EMISSIONS TO AIR

4.1.1 This section provides a screening assessments of point source emissions to air that could arise from operation of the Installation. The assessment has been completed in accordance with the EA's Risk Assessments for your environmental permit[2] and using the EA's H1 software tool.

4.1.2 The scope of the assessment has covered the following aspects:

- Release point characteristics;
- Air emissions inventory and mass flows;
- Emissions screening for further assessment.

4.1.3 The H1 software file is included in Appendix A of this document.

4.1.4 Note the assessment of emissions to air has been competed for emissions arising from the combustion of diesel. Either diesel or HVO will be used as fuel for the generators. Emissions from HVO will be similar or lower than for diesel and therefore the assessment on emissions from diesel firing is considered conservative.

4.2 Release Points

4.2.1 Emissions to air from the installation will result from exhaust gases generated from combustion of diesel within the generators. Exhaust gases will primarily comprise water vapour and carbon dioxide, however low levels of the following gases will be present:

- Nitrogen oxides (NOx);
- Particulates;
- Sulphur dioxide (SO_2); and
- Hydrocarbons.

4.2.2 Each of the 129 generators will have its own stack as in Tabe below:.

Table 4-1: Point Source Emissions to Air

Emission Point Reference	Generator	Easting	Northing	Stack Height (m)	Efflux Velocity (m/s)	Normalised Flow Rate (Nm^3/h)*
A1	DCA House	451492	191723	33	34.85	871.04
A2	DCA Main 1	451494	191736	33	36.88	1004.97
A3	DCA Main 2	451492	191729	33	36.88	1004.97
A4	DCA Main 3	451494	191750	33	36.88	1004.97
A5	DCA Main 4	451494	191749	33	36.88	1004.97
A6	DCA Main 5	451496	191756	33	36.88	1004.97
A7	DCA Main 6	451496	191755	33	36.88	1004.97
A8	DCA Main 7	451497	191763	33	36.88	1004.97
A9	DCA Main 8	451497	191762	33	36.88	1004.97
A10	DCA Main 9	451502	191780	33	36.88	1004.97
A11	DCA Main 10	451502	191779	33	36.88	1004.97
A12	DCA Main 11	451503	191786	33	36.88	1004.97

[2] Risk assessments for your environmental permit - GOV.UK

Emission Point Reference	Generator	Easting	Northing	Stack Height (m)	Efflux Velocity (m/s)	Normalised Flow Rate (Nm^3/h)*
A13	DCA Main 12	451503	191786	33	36.88	1004.97
A14	DCA Main 13	451505	191793	33	36.88	1004.97
A15	DCA Main 14	451505	191792	33	36.88	1004.97
A16	DCA Main 15	451510	191810	33	36.88	1004.97
A17	DCA Main 16	451510	191809	33	36.88	1004.97
A18	DCA Main 17	451512	191817	33	36.88	1004.97
A19	DCA Main 18	451511	191816	33	36.88	1004.97
A20	DCA Main 19	451513	191823	33	36.88	1004.97
A21	DCA Main 20	451513	191822	33	36.88	1004.97
A22	DCA Main 21	451518	191840	33	36.88	1004.97
A23	DCA Main 22	451518	191839	33	36.88	1004.97
A24	DCA Main 23	451519	191847	33	36.88	1004.97
A25	DCA Main 24	451519	191846	33	36.88	1004.97
A26	DCA Main 25	451521	191853	33	36.88	1004.97
A27	DCA Main 26	451521	191853	33	36.88	1004.97
A28	DCA Main 27	451526	191870	33	36.88	1004.97
A29	DCA Main 28	451525	191869	33	36.88	1004.97
A30	DCA Main 29	451527	191877	33	36.88	1004.97
A31	DCA Main 30	451527	191876	33	36.88	1004.97
A32	DCA Main 31	451529	191884	33	36.88	1004.97
A33	DCA Main 32	451529	191883	33	36.88	1004.97
A34	DCA Main 33	451533	191900	33	36.88	1004.97
A35	DCA Main 34	451533	191900	33	36.88	1004.97
A36	DCA Main 35	451535	191907	33	36.88	1004.97
A37	DCA Main 36	451535	191906	33	36.88	1004.97
A38	DCA Main 37	451537	191914	33	36.88	1004.97
A39	DCA Main 38	451537	191913	33	36.88	1004.97
A40	DCB House	451408	191935	33	34.85	871.04
A41	DCB Main 1	451402	191935	33	36.88	1004.97
A42	DCB Main 2	451395	191936	33	36.88	1004.97
A43	DCB Main 3	451382	191937	33	36.88	1004.97
A44	DCB Main 4	451381	191937	33	36.88	1004.97
A45	DCB Main 5	451375	191939	33	36.88	1004.97
A46	DCB Main 6	451374	191939	33	36.88	1004.97
A47	DCB Main 7	451368	191940	33	36.88	1004.97
A48	DCB Main 8	451367	191941	33	36.88	1004.97
A49	DCB Main 9	451351	191945	33	36.88	1004.97
A50	DCB Main 10	451350	191945	33	36.88	1004.97
A51	DCB Main 11	451344	191947	33	36.88	1004.97
A52	DCB Main 12	451343	191947	33	36.88	1004.97

Emission Point Reference	Generator	Easting	Northing	Stack Height (m)	Efflux Velocity (m/s)	Normalised Flow Rate (Nm^3/h)*
A53	DCB Main 13	451337	191948	33	36.88	1004.97
A54	DCB Main 14	451336	191948	33	36.88	1004.97
A55	DCB Main 15	451319	191952	33	36.88	1004.97
A56	DCB Main 16	451319	191952	33	36.88	1004.97
A57	DCB Main 17	451313	191954	33	36.88	1004.97
A58	DCB Main 18	451312	191954	33	36.88	1004.97
A59	DCB Main 19	451306	191956	33	36.88	1004.97
A60	DCB Main 20	451305	191956	33	36.88	1004.97
A61	DCB Main 21	451288	191960	33	36.88	1004.97
A62	DCB Main 22	451287	191960	33	36.88	1004.97
A63	DCB Main 23	451282	191962	33	36.88	1004.97
A64	DCB Main 24	451281	191962	33	36.88	1004.97
A65	DCB Main 25	451274	191964	33	36.88	1004.97
A66	DCB Main 26	451274	191964	33	36.88	1004.97
A67	DCB Main 27	451257	191968	33	36.88	1004.97
A68	DCB Main 28	451256	191968	33	36.88	1004.97
A69	DCB Main 29	451250	191969	33	36.88	1004.97
A70	DCB Main 30	451249	191970	33	36.88	1004.97
A71	DCB Main 31	451243	191971	33	36.88	1004.97
A72	DCB Main 32	451242	191971	33	36.88	1004.97
A73	DCB Main 33	451226	191975	33	36.88	1004.97
A74	DCB Main 34	451225	191975	33	36.88	1004.97
A75	DCB Main 35	451219	191977	33	36.88	1004.97
A76	DCB Main 36	451218	191977	33	36.88	1004.97
A77	DCB Main 37	451212	191979	33	36.88	1004.97
A78	DCB Main 38	451211	191979	33	36.88	1004.97
A79	DCC House	451371	191792	33	34.85	871.04
A80	DCC Main 1	451365	191792	33	36.88	1004.97
A81	DCC Main 2	451358	191793	33	36.88	1004.97
A82	DCC Main 3	451343	191794	33	36.88	1004.97
A83	DCC Main 4	451344	191794	33	36.88	1004.97
A84	DCC Main 5	451336	191796	33	36.88	1004.97
A85	DCC Main 6	451337	191796	33	36.88	1004.97
A86	DCC Main 7	451329	191798	33	36.88	1004.97
A87	DCC Main 8	451330	191797	33	36.88	1004.97
A88	DCC Main 9	451312	191802	33	36.88	1004.97
A89	DCC Main 10	451313	191802	33	36.88	1004.97
A90	DCC Main 11	451305	191804	33	36.88	1004.97
A91	DCC Main 12	451306	191804	33	36.88	1004.97
A92	DCC Main 13	451298	191805	33	36.88	1004.97

Emission Point Reference	Generator	Easting	Northing	Stack Height (m)	Efflux Velocity (m/s)	Normalised Flow Rate (Nm^3/h)*
A93	DCC Main 14	451299	191805	33	36.88	1004.97
A94	DCC Main 15	451281	191809	33	36.88	1004.97
A95	DCC Main 16	451281	191809	33	36.88	1004.97
A96	DCC Main 17	451274	191811	33	36.88	1004.97
A97	DCC Main 18	451275	191811	33	36.88	1004.97
A98	DCC Main 19	451267	191813	33	36.88	1004.97
A99	DCC Main 20	451268	191812	33	36.88	1004.97
A100	DCC Main 21	451250	191817	33	36.88	1004.97
A101	DCC Main 22	451250	191817	33	36.88	1004.97
A102	DCC Main 23	451243	191819	33	36.88	1004.97
A103	DCC Main 24	451243	191819	33	36.88	1004.97
A104	DCC Main 25	451236	191821	33	36.88	1004.97
A105	DCC Main 26	451236	191820	33	36.88	1004.97
A106	DCC Main 27	451218	191825	33	36.88	1004.97
A107	DCC Main 28	451219	191825	33	36.88	1004.97
A108	DCC Main 29	451212	191827	33	36.88	1004.97
A109	DCC Main 30	451212	191826	33	36.88	1004.97
A110	DCC Main 31	451205	191828	33	36.88	1004.97
A111	DCC Main 32	451205	191828	33	36.88	1004.97
A112	DCC Main 33	451187	191832	33	36.88	1004.97
A113	DCC Main 34	451188	191832	33	36.88	1004.97
A114	DCC Main 35	451181	191834	33	36.88	1004.97
A115	DCC Main 36	451181	191834	33	36.88	1004.97
A116	DCC Main 37	451174	191836	33	36.88	1004.97
A117	DCC Main 38	451174	191836	33	36.88	1004.97
A118	DCD House	451545	191758	18	34.85	871.04
A119	DCD Main 1	451554	191778	18	36.88	1004.97
A120	DCD Main 2	451554	191779	18	36.88	1004.97
A121	DCD Main 3	451559	191797	18	36.88	1004.97
A122	DCD Main 4	451559	191796	18	36.88	1004.97
A123	DCD Main 5	451564	191816	18	36.88	1004.97
A124	DCD Main 6	451564	191817	18	36.88	1004.97
A125	DCD Main 7	451582	191832	18	36.88	1004.97
A126	DCD Main 8	451581	191832	18	36.88	1004.97
A127	CIWB 1	451304	191848	11.3	18.53	167.57
A128	CIWB 2	451295	191850	11.3	18.53	167.57
A129	Substation	451591	191868	9.4	18.53	167.57

4.2.3 Due to the number of engines, The EA's H1 tool does not support inputting the 129 engines individually. Therefore, for the purpose of the assessment the engines have been grouped into groups of 4 engines where the engine type and stack height is the same. The flow rates have been aggregated where appropriate to reflect this

4.3 Emission Screening

4.3.1 Estimated emissions have been screened for significance against appropriate environmental standards for long-term and short-term exposure. Emissions standards are based on statutory air quality limits where available, and upon human health protection Environmental Assessment Levels (EALs) as given in H1 guidance.

4.3.2 Modelled concentrations have been included based on the data presented in the air quality assessment (Appendix E – Air Quality Assessment to the supporting information document).

4.3.3 A first stage of screening assesses process contributions which are lower than 1% of the relevant EAL for long-term exposure. Process contributions lower than 10% of the relevant EAL for short-term exposure are screened out as insignificant.

4.3.4 A second stage of screening assesses the predicted environmental concentration (PEC) against EALs for those pollutants that do not screen out at stage one. Assumed background concentrations are taken from air quality modelling, details of which are given in Appendix E to the main application. PECs which are lower than 70% of the relevant long-term EAL and lower than 20% of the relevant short-term EAL minus 2 * the background concentration are screened out as insignificant. Those not screened out as insignificant are recommended for further detailed assessment.

Stage 1

4.3.5 Figures 4-1 – 4-10 below shows the output of the H1 emissions screening of process contributions for Carbon Monoxide. Nitrogen Dioxide, Benzene, PM_{10} and Sulphur Monoxide are all potentially significant and have been carried through to Test 2.

Short term EALs

4.3.6 For the 72 hour outage scenario, the stage 1 screening assessment indicates that for Carbon Monoxide. Nitrogen Dioxide, Benzene, PM_{10} and Sulphur Monoxide, the PCs exceeds 10% of the short term EAL. Therefore, a second stage assessment is required.

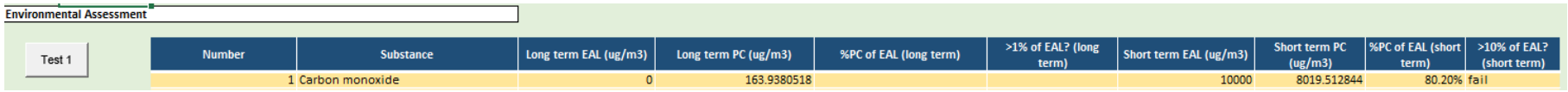
4.3.7 For the testing and Maintenance scenarios, the stage 1 screening assessment indicates that for Carbon Monoxide, Nitrogen Dioxide, Benzene, PM_{10} and Sulphur Monoxide, the PCs exceeds 10% of the short term EAL. Therefore, a second stage assessment is required.

Long term EALs

4.3.8 For the 72 hour outage scenario, the stage 1 screening assessment indicates that for Nitrogen Dioxide and Benzene, the PCs exceeds 1% of the long term EAL. Therefore, a second stage assessment is required.

4.3.9 For the testing and maintenance scenario, the stage 1 screening assessment indicates that for Nitrogen Dioxide and Benzene, the PCs exceeds 1% of the long term EAL. Therefore, a second stage assessment is required.

Figure 4-1 Air Impact Screening Stage 1 CO Outage Scenario

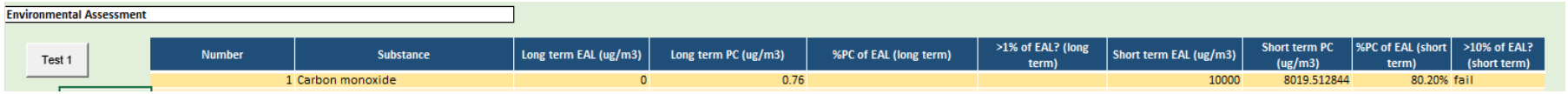


Environmental Assessment

Test 1

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
1	Carbon monoxide	0	163.9380518			10000	8019.512844	80.20%	fail

Figure 4-2: Air Impact Screening Stage 1 CO Testing & Maintenance Scenario

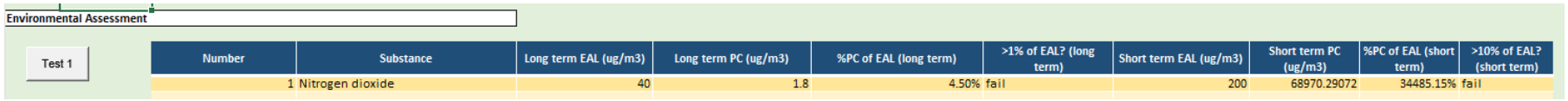


Environmental Assessment

Test 1

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
1	Carbon monoxide	0	0.76			10000	8019.512844	80.20%	fail

Figure 4-3 Air Impact Screening Stage 1: NOx Outage Scenario



Environmental Assessment

Test 1

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
1	Nitrogen dioxide	40	1.8	4.50%	fail	200	68970.29072	34485.15%	fail

Figure 4-4:Air Impact Screening Assessment Stage 1 NOx Testing & Maintenance Scenario

Environmental Assessment

Test 1

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
1	Nitrogen dioxide	40	0.89	2.23%	fail	200	68970.29072	34485.15%	fail

Figure 4-5: Air Impact Screening Assessment Stage 1 SO_2 Outage Scenario

Environmental Assessment

Test 1

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
1	Sulphur dioxide (15 min mean)	0	161.1854493			266	2440.556272	917.50%	fail

Figure 4-6: Air Impact Screening Assessment Stage 1 SO_2 Testing & Maintenance Scenario

Environmental Assessment

Test 1

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
1	Sulphur dioxide (24 hr mean)	0	161.1489339			125	2315.313956	1852.25%	fail

Figure 4-7: Air Impact Assessment Screening Stage 1: PM_{10} Outage Scenario

Environmental Assessment

Test 1

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
1	Particulates (PM10)	40	0.06	0.15%	pass	50	2699.702284	5399.40%	fail

Figure 4-8 Air Impact Assessment Screening Stage 1 PM_{10} Testing & Maintenance Scenario

Environmental Assessment

Test 1

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
1	Particulates (PM10)	40	0.03	0.08%	pass	50	2699.702284	5399.40%	fail

Figure 4-9: Air Impact Screening Assessment Stage 1: Benzene Outage Scenario

Environmental Assessment

Test 1

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
1	Benzene	5	0.18	3.60%	fail	30	3342.591412	11141.97%	fail

Figure 4-10: Air Impact Screening Assessment Stage 1: Benzene Testing & Maintenance Scenario

Environmental Assessment

Test 1

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	%PC of EAL (long term)	>1% of EAL? (long term)	Short term EAL (ug/m3)	Short term PC (ug/m3)	%PC of EAL (short term)	>10% of EAL? (short term)
1	Benzene	5	0.08	1.60%	fail	30	3342.591412	11141.97%	fail

Stage 2

4.3.10 Figures 4-11– 4-20 below shows the output of the Stage 2 H1 emissions screening of process contributions for Carbon Monoxide. Nitrogen Dioxide, Benzene, PM_{10} and Sulphur Monoxide.

4.3.11 Detailed modelling is presented in an Air Quality Impact Assessment, details of which are given in Appendix E of the main application supporting information.

4.3.12 Note the short term calculations are not reading the modelled concentration in the EA H1 Tool. Therefore, the numbers are significantly over predicting results. However, dispersion modelling has been undertaken. Please see Air Quality Assessment in Appendix E to the main application for assessment of short term effects

Short term EALs

4.3.13 For the 72 hour outage scenario, the stage 2 screening assessment indicates that short term Carbon Monoxide, Nitrogen Dioxide, Benzene, PM_{10} and Sulphur Monoxide fail at Stage 2 and cannot be screened as insignificant. Therefore, detailed modelling is required.

4.3.14 For the testing and maintenance scenario, the stage 2 screening assessment indicates that short term Carbon Monoxide, Nitrogen Dioxide, Benzene, PM_{10} and Sulphur Monoxide fail at Stage 2 and cannot be screened as insignificant. Therefore, detailed modelling is required.

Long term EAL's

4.3.15 For the 72 hour outage scenario, the stage 2 screening assessment indicates that long term NOx and benzene fail at Stage and cannot be screened as insignificant. Therefore, detailed modelling is required.

4.3.16 For the testing and maintenance scenario, the stage 2 screening assessment indicates that long term NOx and benzene fail at Stage and cannot be screened as insignificant. Therefore, detailed modelling is required.

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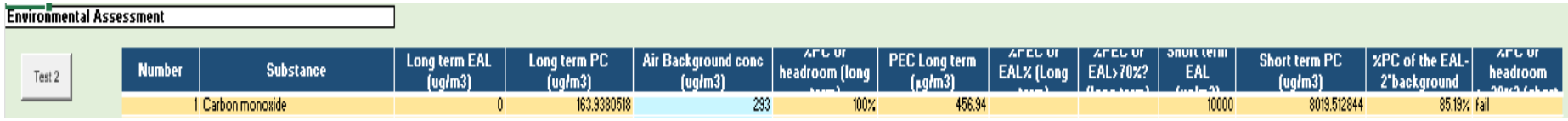
Figure 4-11 Air Impact Screening Assessment Stage 2: CO Outage Scenario

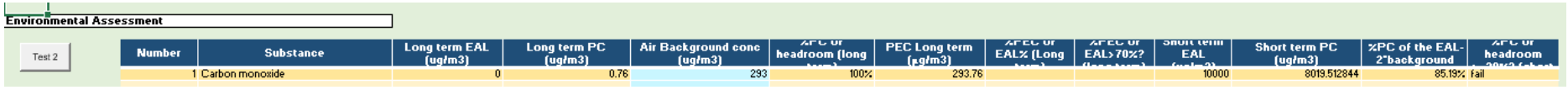


Environmental Assessment

Test 2

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long	PEC Long term (µg/m3)	%PEC of EAL% (Long	%PEC of EAL>70%?	Short term EAL	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom
1	Carbon monoxide	0	163.9380518	293	100%	456.94			10000	8019.512844	85.19%	fail

Figure 4-12 Air Impact Screening Assessment Stage 2 CO Testing & Maintenance Scenario

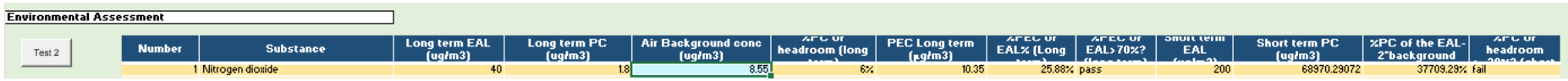


Environmental Assessment

Test 2

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long	PEC Long term (µg/m3)	%PEC of EAL% (Long	%PEC of EAL>70%?	Short term EAL	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom
1	Carbon monoxide	0	0.76	293	100%	293.76			10000	8019.512844	85.19%	fail

Figure 4-13 Air Impact Screening Assessment Stage 2: NO_x Outage Scenario

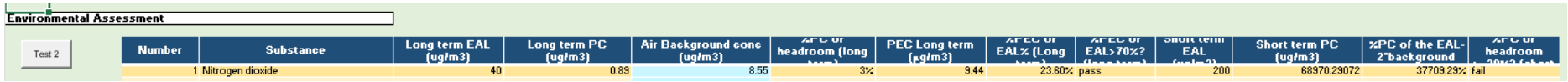


Environmental Assessment

Test 2

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long	PEC Long term (µg/m3)	%PEC of EAL% (Long	%PEC of EAL>70%?	Short term EAL	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom
1	Nitrogen dioxide	40	1.8	8.55	6%	10.35	25.88%	pass	200	68970.29072	37709.29%	fail

Figure 4-14 Air Impact Screening Assessment Stage 2 NO_x Testing & Maintenance Scenario

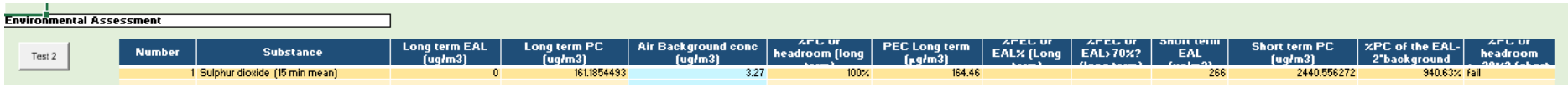


Environmental Assessment

Test 2

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long	PEC Long term (µg/m3)	%PEC of EAL% (Long	%PEC of EAL>70%?	Short term EAL	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom
1	Nitrogen dioxide	40	0.89	8.55	3%	9.44	23.60%	pass	200	68970.29072	37709.29%	fail

Figure 4-15: Air Impact Screening Assessment Stage 2 SO_2 Outage Scenario

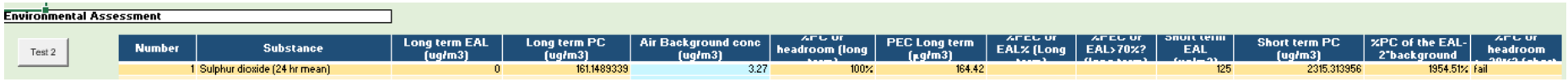


Environmental Assessment

Test 2

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long	PEC Long term (µg/m3)	%PEC of EAL% (Long	%PEC of EAL>70%?	Short term EAL	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom
1	Sulphur dioxide (15 min mean)	0	161.1854493	3.27	100%	164.46			266	2440.556272	940.63%	fail

Figure 4-16: Air Impact Screening Assessment Stage 2 SO_2 Testing & Maintenance Scenario

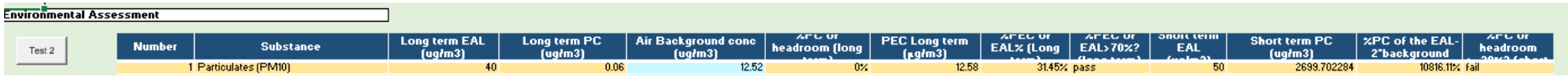


Environmental Assessment

Test 2

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long	PEC Long term (µg/m3)	%PEC of EAL% (Long	%PEC of EAL>70%?	Short term EAL	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom
1	Sulphur dioxide (24 hr mean)	0	161.1489339	3.27	100%	164.42			125	2315.313956	1954.51%	fail

Figure 4-17: Air Impact Screening Assessment Stage 2: PM10 Outage Scenario

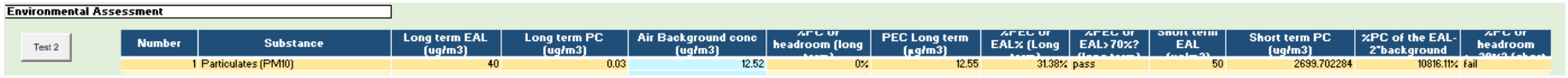


Environmental Assessment

Test 2

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long	PEC Long term (µg/m3)	%PEC of EAL% (Long	%PEC of EAL>70%?	Short term EAL	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom
1	Particulates (PM10)	40	0.06	12.52	0%	12.58	31.45%	pass	50	2699.702284	10816.11%	fail

Figure 4-18 Air Impact Screening Assessment Stage 2 PM10 Testing & Maintenance Scenario

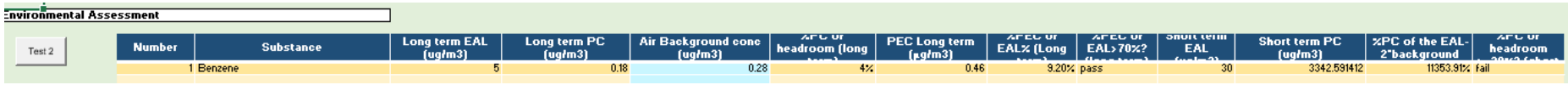


Environmental Assessment

Test 2

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long	PEC Long term (µg/m3)	%PEC of EAL% (Long	%PEC of EAL>70%?	Short term EAL	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom
1	Particulates (PM10)	40	0.03	12.52	0%	12.55	31.38%	pass	50	2699.702284	10816.11%	fail

Figure 4-19: Air Impact Screening Assessment Stage 2: Benzene Outage Scenario

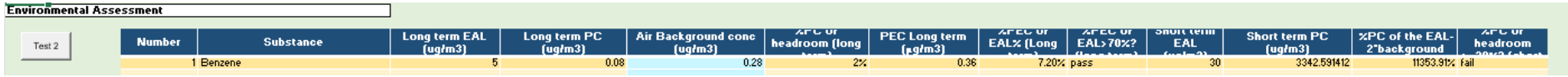


Environmental Assessment

Test 2

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long	PEC Long term (µg/m3)	%PEC of EAL% (Long	%PEC of EAL>70%?	Short term EAL	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom
1	Benzene	5	0.18	0.28	4%	0.46	9.20%	pass	30	3342.591412	11353.91%	fail

Figure 4-20: Air Impact Screening Assessment Stage 2 Benzene Maintenance & Testing Scenario



Environmental Assessment

Test 2

Number	Substance	Long term EAL (ug/m3)	Long term PC (ug/m3)	Air Background conc (ug/m3)	%PC of headroom (long	PEC Long term (µg/m3)	%PEC of EAL% (Long	%PEC of EAL>70%?	Short term EAL	Short term PC (ug/m3)	%PC of the EAL-2*background	%PC of headroom
1	Benzene	5	0.08	0.28	2%	0.36	7.20%	pass	30	3342.591412	11353.91%	fail

5 CONCLUSIONS

5.1.1 The following hazards from the operation of the proposed installation have been assessed:

- odour;
- noise and vibration;
- fugitive emissions;
- visible plumes; and
- accidents.

5.1.2 The assessment has concluded that the overall risks associated with the identified hazards, including the proposed management measures are very low to low.

5.1.3 The H1 risk assessment software tool has been used to support this Environmental Risk Assessment. The completed H1 software can be found within the Appendix E to this Environmental Risk Assessment. Stack emissions to air for relevant air pollutants have been subject to detailed modelling and it has been concluded that under normal operation, the resulting air quality effect of the proposed development is considered to be 'not significant' overall.

5.1.4 In the event of a 72-hour outage scenario, there are potentially significant impacts at human health and ecological receptors which are subject to detailed explanation and analysis in the air quality assessment report accompanying this application. Due to a 72-hour outage scenario being highly unlikely to occur, no additional mitigation is considered to be required in regard to air quality.

Appendix A – H1 Assessment