HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

6.5.5 ES Volume E - Off-Site Power Station Facilities: AECC, ESL and MEEG E5 - Air quality

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5 Air quality

5.1 Introduction

5.1.1 This chapter describes the assessment of potential air quality effects resulting from the construction, operation and decommissioning of the Off-Site Power Station Facilities.

5.1.2 The potential emission sources that are considered in this chapter include emissions of pollutants from construction plant and machinery, operational combustion plant, dust emissions and odour emissions. The chapter excludes the air quality effects associated with emissions from traffic. These are considered in the assessment contained within chapter C4 (air quality effects of traffic) (Application Reference Number: 6.3.4), which covers project-wide effects of road traffic upon air quality.

5.1.3 Please refer to chapter B5 (air quality) (Application Reference Number: 6.2.5) for the technical basis for the assessment including a summary of legislation, policy and guidance; key points arising in consultation that have guided the air quality assessment; and assessment methodologies and criteria.

5.1.4 The chapter is supported by appendix E5-1 (Construction Dust Assessment – Off-Site Power Station Facilities) (Application Reference Number: 6.5.13), which is cross-referenced in the text where relevant.

5.2 Study areas

5.2.1 This section describes the study areas relevant to the air quality assessment for the Off-Site Power Station Facilities.

5.2.2 The approach for defining the study area is described in chapter B5 (Application Reference Number: 6.2.5). For dust emissions during the construction and decommissioning of the Off-Site Power Station Facilities, the assessment of human receptors focuses on areas extending up to 350m from the site boundary (as represented by the Order Limits – see figure E5-1, Application Reference Number: 6.5.27). This distance is based on Institute of Air Quality Management (IAQM) guidance for identifying when an assessment of dust effect is required [RD1]. Potential effects at distances greater than 350m will be less than those effects at locations closer to the site boundary and any mitigation measures applied to protect sensitive receptors within 350m would help to reduce any possible effects beyond 350m. The effects of 'trackout' also need to be determined up to 50m from the edge of the local road network, within 500m of the Off-Site Power Station Facilities site entrance. Trackout is defined as the transport of dust or mud from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. In line with the IAQM guidance [RD1], the assessment has also considered relevant ecological receptors up to 50m from the site boundary, as shown on figure E5-1 (Application Reference Number: 6.5.27).

5.2.3 A qualitative assessment of emissions from plant and machinery (i.e. Non-road Mobile Machinery) during construction and decommissioning of the Off-Site Power Station Facilities has been carried out which considers the potential effects at the nearest receptors based on the scale of the activities. Therefore, it was not necessary to define a specific study area for the assessment of emissions from plant and machinery.

5.2.4 As described in chapter B5 (Application Reference Number: 6.2.5), the study area for the assessment of emissions of odour is limited to the closest adjacent land users that are shown on figure E5-1 (Application Reference Number: 6.5.27).

5.2.5 A qualitative assessment of emissions from combustion sources within the site during operation of the Off-Site Power Station Facilities, including the on-site back-up generator and mobile emergency equipment, has been carried out which considers the potential effects at the nearest receptors based on a number of factors. Therefore, it was not necessary to define a specific study area for this aspect.

5.3 Baseline environment

5.3.1 This section provides a summary of the baseline conditions for air quality within the study area described in section 5.2.

5.3.2 The detailed methodology and approach followed to define the baseline is outlined in appendix B5-1 (Baseline Data Synopsis Report – air quality) (Application Reference Number: 6.2.18).

Identification of key air quality receptors

5.3.3 This section considers the sensitive receptors that are either close to, or within, the relevant study area for the assessment of the proposed Off-Site Power Station Facilities. This includes both human and ecological receptors.

Human receptors

5.3.4 The Off-Site Power Station Facilities site is bounded by the existing A5025 road to the west, residential and storage buildings to the north, and farmland to the south and east. There are residential properties located to the north and south of the existing entrance, as well as some scattered properties outside of the site boundary, to the south and east of the site.

5.3.5 The nearest human receptors are:

- a number of residential properties within 50m to the north, northeast and southwest of the site, including Tyn Rardd, number one and two Pen y Graig and Hen-shop; and
- the nearest property within the village of Llanfaethlu is located approximately 300m to the southwest.

5.3.6 There is also a Public Right of Way located immediately opposite the Off-Site Power Station Facilities within 10m of the site boundary, and a further three Public Rights of Way within 250m of the site boundary.

5.3.7 Llanfaethlu Primary School, which is approximately 120m to the southwest of the Off-Site Power Station Facilities (on the opposite side of the A5025), opened in autumn 2017 and has been considered in this assessment.

5.3.8 For the assessment of emissions of dust, a receptor count has been carried out for sensitive receptors within 350m of the Off-Site Power Station Facilities. This count identified that there are five highly sensitive receptors, such as residential properties, within 20m from the Off-Site Power Station Facilities. The full counts used to inform the sensitivity of the area are provided in appendix E5-1 (Application Reference Number: 6.5.13).

5.3.9 Figure E5-1 (Application Reference Number: 6.5.27) shows the location of the human receptors within the study area.

Ecological receptors

5.3.10 The nearest relevant ecological receptors are Llyn Garreg-Lwyd Site of Special Scientific Interest (located approximately 700m to the northwest to the site), an area of Ancient Woodland (ID 26028) and the Coed Carreglwyd Wildlife Site (both located approximately 640m to the northwest of the site). As shown on figure E5-1 (Application Reference Number: 6.5.27), these sites lie well outside the study area of 50m considered for this assessment.

Existing air quality

5.3.11 The review of existing air quality set out in this chapter considers dust deposition, particulate matter (which includes PM_{10} and $PM_{2.5}$[1]), nitrogen dioxide (NO_2), carbon monoxide (CO) and sulphur dioxide (SO_2).

5.3.12 The review of baseline conditions indicates that the existing air quality in the vicinity of the proposed Off-Site Power Station Facilities appears to be good, and concentrations of air pollutants are generally well within the relevant Air Quality Objectives (AQOs). Through the Local Air Quality Management process, the Isle of Anglesey County Council (IACC) has not identified any relevant exposure areas where the AQOs are exceeded, or could potentially be exceeded in the vicinity of the Off-Site Power Station Facilities, or close to the A5025.

5.3.13 The review of baseline air quality for the Wylfa Newydd Project, including in the vicinity of the Off-Site Power Station Facilities, is set out in appendix B5-1 (Application Reference Number: 6.2.18). This appendix also sets out all of the references from which the source data have been derived. The data available for each pollutant to describe the air quality baseline in the vicinity of the Off-Site Power Station Facilities are discussed in more detail below.

Nitrogen dioxide measurements

5.3.14 To characterise the environmental baseline, an air quality monitoring survey was initiated by Horizon Nuclear Power Wylfa Limited with the IACC in

[1] PM_{10} and $PM_{2.5}$ are particulate matter with an aerodynamic diameter of 10 microns or less and 2.5 microns or less, respectively.

February 2016. The survey focused on NO_2, and comprised diffusion tube measurements at locations in the vicinity of the Off-Site Power Station Facilities. Measurements were also carried out in the vicinity of the Associated Development site locations and adjacent to the road network which would experience increases in traffic flows as a result of the Wylfa Newydd Project.

5.3.15 One of the measurement locations, diffusion tube ID F in Llanfaethlu, is approximately 160m southwest of the Off-Site Power Station Facilities. The average NO_2 concentration recorded in 2016 at this location was 9.5µg/m^3. The measured concentration is low and well within the annual mean AQO of 40µg/m^3. Other 2016 measurements at other monitoring locations close to the A5025 at Cefn Coch and Llanfachraeth were also of similar magnitude, 7.0µg/m^3 [2] and 9.9µg/m^3, respectively, and well within the annual mean AQO. The locations of the measurements are shown in appendix B5-1 (Application Reference Number: 6.2.18) or shown in figure E5-1 (Application Reference Number: 6.5.27) where these are within or close to the study areas.

PM_{10} and $PM_{2.5}$ measurements

5.3.16 The nearest measurements of PM_{10} and $PM_{2.5}$ were recorded by the IACC in 2013/14 and 2016 at, or close to, the Wylfa Newydd Development Area approximately 7km to the north-northeast of the Off-Site Power Station Facilities. The recorded annual mean concentrations were 14.4µg/m^3 and 14.9µg/m^3 for PM_{10} and 7.8µg/m^3 and 7.4µg/m^3 for $PM_{2.5}$, respectively. The IACC has undertaken PM_{10} and $PM_{2.5}$ monitoring at Llynfaes, but this is located 10km to the southeast near to a quarry and is not representative of background conditions. The IACC has also carried out monitoring located within Llangefni, over 18km southeast of the Off-Site Power Station Facilities. However, this is an urban background monitoring location and not representative of conditions at the Off-Site Power Station Facilities.

5.3.17 The measured concentrations are all relatively low and are well within the PM_{10} and $PM_{2.5}$ annual mean AQOs of 40µg/m^3 and 25µg/m^3, respectively.

SO_2 and CO measurements

5.3.18 In common with most local authorities across the UK, no relevant measurements of SO_2 and CO have been undertaken by the IACC.

5.3.19 In general, concentrations of these pollutants are relatively low and are highly unlikely to exceed the AQOs. Most local authorities across the UK do not monitor these pollutants unless there is a specific requirement such as the presence of a significant industrial source. Concentrations would be expected to be well below the relevant AQOs in the vicinity of the Off-Site Power Station Facilities.

[2] Micrograms per cubic metre, the principal unit of measurement for the concentration of an air pollutant in ambient air.

Dust deposition measurements

5.3.20 In 2012, 2013 and 2016, the IACC carried out measurements of dust deposition at several locations in the vicinity of the Wylfa Newydd Development Area approximately 7km to the north-northeast of the Off-Site Power Station Facilities. The measured dust deposition rates ranged from 25.8mg/m^2/day (milligrams per square meter per day) to 35.8mg/m^2/day based on monthly measurements. These were reported by the IACC to be indicative of dust deposition levels for 'open country', and are well below the levels of dust deposition that could possibly affect amenity. Suggested guidelines for the level of dust deposition which may give rise to complaints range from 140mg/m^2/day for open countryside to 200mg/m^2/day for residential areas and outskirts of towns [RD2]. Dust deposition rates above 200mg/m^2/day could also affect sensitive vegetation [RD3]. The value for indicating when complaints are likely, based on site-specific baseline measurement data in the vicinity of the Wylfa Newydd Development Area, would be lower than the 140mg/m^2/day value as the baseline measurements are generally lower than the UK-wide rural dataset. The measurements are also below the levels of dust deposition rates that could potentially affect sensitive vegetation.

5.3.21 The dust deposition measurements recorded in the vicinity of the Wylfa Newydd Development Area would be broadly representative of the dust deposition in most rural locations on Anglesey that are not close to specific sources of dust. As there are no significant sources of dust emissions near to the Off-Site Power Station Facilities, the dust deposition in the vicinity of the site would be expected to be similar.

Background mapping data

5.3.22 The Department for Environment, Food and Rural Affairs and the devolved administrations produce empirically derived background maps of pollutant concentrations. The 2013 background map [RD4] concentrations for NO_2, PM_{10} and $PM_{2.5}$ and 2001 background map [RD5] concentrations for SO_2 and CO for the 1km by 1km grid square representing the Off-Site Power Station Facilities and surrounding area are shown in Table E5-1.

Table E5-1 Summary of background map concentrations

Pollutant	Annual mean concentration (µg/m^3)
NO_2	4.8
PM_{10}	11.0
$PM_{2.5}$	7.5
SO_2	1.9
CO	138

5.3.23 The background map concentrations would generally be representative of concentrations experienced away from pollution sources. For example, NO_2 concentrations measured close to a road would be higher than the background map concentration for the same 1km by 1km grid square. This

is evidenced in the comparison of the 2013 background map [RD4] concentration representing the grid square where the Llanfaethlu roadside diffusion tube is located with the monitored concentration. The background map concentration for this location is 4.8µg/m^3 compared to the higher roadside measurement of 9.5µg/m^3. As there are several human receptors in the vicinity of the Off-Site Power Station Facilities which are close to the A5025, the measured roadside NO_2 concentrations are considered to be more representative of existing concentrations of NO_2 at locations close to location Off-Site Power Station Facilities, than the background map.

5.3.24 The background map PM_{10} concentrations are also lower than the measured PM_{10} concentrations recorded at the Wylfa Newydd Development Area (14.4µg/m^3 and 14.9µg/m^3). Although these measurements are likely to contain some contribution from sea salt particles which could explain the higher concentrations, the background map concentrations are not considered to be representative of existing PM_{10} concentrations at receptors close to the Off-Site Power Station Facilities. For $PM_{2.5}$, the background map concentrations are similar to the measured concentrations [RD4].

5.3.25 For CO and SO_2, in the absence of monitored data, the background map concentrations are considered to be representative of the existing air quality concentrations. These pollutants are not generally associated with road traffic emissions for roads with relatively low traffic flows such as the A5025. Unlike NO_2, the concentrations of these pollutants would be similar to the background concentrations.

Evolution of the air quality baseline

5.3.26 The evolution of baseline air quality is summarised in section 5.4 of chapter B5 (Application Reference Number: 6.2.5) and described in more detail in appendix B5-1 (Application Reference Number: 6.2.18). This concluded that using existing data to represent the background concentrations of pollutants for the future year assessments was a suitably conservative approach.

5.3.27 The existing concentrations of pollutants at receptors close to the A5025 would increase due to the additional road traffic associated with the Wylfa Newydd Project. This is assessed within chapter C4 (Application Reference Number: 6.3.4).

Summary

5.3.28 Air quality in the vicinity of the Off-Site Power Station Facilities and surrounding area is generally good and concentrations of pollutants are well below the relevant AQOs.

5.3.29 The construction dust assessment requires the existing PM_{10} concentration to determine the sensitivity of the area for the assessment of potential human health effects. The highest measured PM_{10} concentration recorded close to the Wylfa Newydd Development Area (a concentration of 14.9µg/m^3) was used to represent the background PM_{10} concentration at the receptor locations close to the Off-Site Power Station Facilities. In accordance with the IAQM methodology [RD1], the contribution from other local sources was also taken into account. In this case, the contribution to

the background concentration from road traffic emissions on the A5025 which was anticipated to occur during the construction phase of the Off-Site Power Station Facilities was included using dispersion modelling. This resulted in a maximum predicted total PM_{10} concentration of 15.7µg/m^3 at any of the relevant receptors to be considered as part of the construction dust assessment. Details of the dispersion modelling of road traffic emissions are provided in chapter C4 (Application Reference Number: 6.3.4).

5.4 Design basis and activities

5.4.1 This section sets out the design basis for the assessment of effects. It sets out where any assumptions have been made to enable the assessment to be carried out at this stage in the evolution of the design. This section also identifies the embedded and good practice mitigation that would be adopted to reduce adverse effects as inherent design features or by implementation of standard industry good working practice.

5.4.2 As described in chapter E1 (proposed development) (Application Reference Number: 6.5.1), the application for development consent is based on a parameter approach. The assessment described within this chapter has taken into consideration the flexibility afforded by the parameters. A worst case scenario has therefore been assessed from an air quality perspective within the parameters described in chapter E1 (Application Reference Number: 6.5.1).

5.4.3 The potential emission sources of air pollutants and dust associated with the proposed Off-Site Power Station Facilities that are considered within this chapter are set out below:

- construction phase – emissions of pollutants to air from plant and machinery (primarily Non-road Mobile Machinery), dust emissions generated by activities such as demolition of existing buildings and structures, earthworks or vehicle movements on dusty surfaces, and odour emissions from any remediation of ground contamination;
- operation phase – emissions of pollutants to air from combustion plant associated with the operation of the Off-Site Power Station Facilities; and
- decommissioning phase – emissions of air pollutants from plant and machinery and dust generated from decommissioning activities.

Construction

5.4.4 The design and construction of the Off-Site Power Station Facilities would be in accordance with the description provided in chapter E1 (Application Reference Number: 6.5.1). The main elements that could affect air quality relate to the emissions of pollutants or dust during the construction of the Off-Site Power Station Facilities.

Basis of assessment and assumptions

5.4.5 For dust emissions, the assessment was undertaken on the basis that all activities, as categorised within the IAQM guidance [RD1] (i.e. demolition, earthworks, construction and trackout) take place at the construction boundary of the Off-Site Power Station Facilities. This represents a conservative assumption, as in practice most activities would not take place at the site boundary, thus increasing the distance between the source and the receptor.

5.4.6 The construction plant and machinery operating on site at the various stages over the construction period are anticipated to consist of a mixture of the following types:

- 20 tonne bulldozer;
- 22 tonne and 20 tonne excavator;
- 23 tonne dumper truck;
- tipper lorry;
- 8 tonne wheeled backhoe loader;
- vibratory roller;
- road planer;
- fork lift;
- 105 tonne and 55 tonne mobile crane;
- piling rig;
- concrete pump;
- cement mixer; and
- wheel wash.

5.4.7 An average of eight construction plant items are anticipated to be in operation simultaneously during the period where the main construction plant are operating. The maximum number of plant and machinery in operation at any one time during the construction is 14, which occurs for just two months of the construction programme during the overlap of piling, erecting structures and site road surface construction.

5.4.8 It is noted that electrical power would be installed from the start on a permanent basis during construction so no electrical generators are required.

5.4.9 The plant number and types were estimated by experienced construction engineers based on the proposed construction activities and programme. There is potential for minor variations in the plant types or plant numbers from those presented. However, any minor variations in the plant type or number would not affect the outcome of the assessment presented in this chapter.

Embedded mitigation

5.4.10 No embedded mitigation has been identified for air quality during construction of the Off-Site Power Station Facilities.

Good practice mitigation

5.4.11 The assessment process has identified the good practice mitigation which would be required to control the effects of dust emissions during construction. A suite of good practice mitigation measures recommended by the IAQM guidance [RD1] is set out in section 7 of appendix E5-1 (Application Reference Number: 6.5.13). The relevant and appropriate measures to mitigate dust emissions generated by the construction works have been taken forward from those set out in appendix E5-1 (Application Reference Number: 6.5.13) to the air quality management strategies within the Wylfa Newydd Code of Construction Practice (CoCP) (Application Reference Number: 8.6) and Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9). A summary of some of the measures are set out below.

- Plan site layout so that machinery and dust generating activities are located as far as practicable from nearby sensitive receptors.
- Manage earthworks and exposed areas/soil stockpiles to prevent wind whipping using methods such as covering, re-vegetating, or other alternative methods of dust suppression such as water suppression.
- Control site runoff of water or mud.
- Comprehensive measures and working methods to prevent and reduce dust emissions at their source, including but not limited to:
  - where there is a risk of dust nuisance, use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques;
  - ensuring an adequate water supply for effective dust/particulate matter suppression/mitigation;
  - where there is a risk of dust nuisance, enclosing chutes and conveyors and covering skips, where practicable;
  - where there is a risk of dust nuisance, reducing drop heights from loading shovels, hoppers and other loading or handling equipment during material movement or transfer;
  - ensuring equipment is readily available on site to clean any dry spillages, clean up spillages as soon as reasonably practicable using wet cleaning methods where appropriate;
  - using water suppression during demolition activities and on internal site haul roads;
  - sheeting of vehicles containing dusty/friable materials when entering and leaving the site; and

  - implementing a wheel wash system (with rumble grids) to reduce trackout.

- Dust deposition monitoring survey and visual inspections of the site and works (including the site boundary and off-site locations) to ensure compliance with dust management procedures and effectiveness of the mitigation measures and dust controls.
- Develop and implement procedures for liaising with stakeholders (including the local community and the IACC), including procedures and protocols for receiving complaints and subsequent investigations and responses.
- Construction workers would be trained as appropriate to increase their awareness of environmental concerns including dust management.

5.4.12 The measures to control dust emissions and monitor the effectiveness of the mitigation are specified within the air quality management strategies in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9). This has been developed and informed by the measures recommended as part of the IAQM guidance [RD1].

5.4.13 The mitigation which is considered to represent good practice for the control of emissions from plant and machinery includes the following:

- no idling engines;
- use lower power settings where practicable;
- using mains electricity or battery-powered equipment where practicable to avoid the use of petrol or diesel generators;
- the average emissions across the fleet of relevant Non-road Mobile Machinery would be equivalent to the EU Stage IIIB emission standards (EC Directive 97/68/EC) introduced in January 2011 for the engine sizes relevant to the works; and
- maintenance of construction plant and machinery in accordance with the manufacturers' instructions to reduce the risk of elevated emissions due to poor engine/emissions abatement performance, and to ensure that any malfunctions are swiftly repaired.

5.4.14 The mitigation measures to reduce pollutant emissions are included in the air quality management strategies within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9).

5.4.15 The requirement for any remediation activities associated with ground contamination from the previous uses of the land at the Off-Site Power Station Facilities would be identified following a ground investigation within a risk assessment. If remediation is required, then the excavation and remediation of areas containing ground contamination would be a potential source of odour. The good practice mitigation measures discussed in chapter E7 (Soils and geology) (Application Reference Number: 6.5.7) and set out in the waste and materials management strategies, including soils

and land contamination in the Wylfa Newydd CoCP (Application Reference Number: 8.6), would mitigate the risk of odour emissions during remediation works. The strategy also includes processes and procedures to be put in place that clearly define methods for dealing with any areas of unexpected contamination to manage immediate risks and prevent any contamination, airborne contamination or odour spreading from the affected area.

Operation

5.4.16 The key element of the design that is of relevance to the air quality assessment during operation of the Off-Site Power Station Facilities is the operation of the standby diesel generator.

5.4.17 Traffic-related air quality effects are assessed in chapter C4 (Application Reference Number: 6.3.4).

Basis of assessment and assumptions

5.4.18 The Off-Site Power Station Facilities will include a diesel generator which will act as a back-up to the incoming mains electrical supply for the Off-Site Power Station Facilities. The exact size of the standby generator would be determined at the detailed design stage but is not expected to be larger than approximately 1.2MW_{th} (Megawatts thermal input) based on preliminary design information on the electricity demand of the Off-Site Power Station Facilities of up to approximately 500kW_e (kilowatts electrical). The standby generator will only be operated during an emergency when there is a failure of mains electrical power to the Off-Site Power Station Facilities. Following the initial acceptance test during commissioning, the standby generator would be periodically tested, typically for one hour every month, and up to a two-hour full load test every three months.

5.4.19 The standby generator has the potential to lead to increases in concentrations of pollutants associated with the combustion of diesel fuel, typically NO_2, PM_{10}, $PM_{2.5}$, SO_2 and CO at nearby sensitive human receptors. Emissions of NOx and SO_2 could also potentially affect nearby ecological sites. However, as the generator is only expected to typically operate for 16 hours a year (i.e. less than the permitted 18 exceedances of the one-hour mean AQO for NO_2), a qualitative assessment has been undertaken based on the consideration of the size of the generator, frequency of operation, relative location to nearby sensitive receptors, effectiveness of dispersion and prevailing weather conditions.

5.4.20 The location of the standby generator adjacent to the Mobile Emergency Equipment Garage (MEEG)/Alternative Emergency Control Centre (AECC) building is based on the layout shown in figure A2-2 (Application Reference Number: 6.1.10) of chapter A2 (project overview and introduction to the developments) (Application Reference Number: 6.1.2). The location is assumed to remain constant in relation to the MEEG/AECC building and is unlikely to differ considerably from this within the Parameter Plan zone latitude of the MEEG/AECC building.

Embedded mitigation

5.4.21 The stack height for the standby diesel generator would extend approximately 3m above the roof of the standby generator enclosure, representing a total height above ground level of up to approximately 6m as set out in volume 3 of the Design and Access Statement (Associated Developments and Off-Site Power Station Facilities) (Application Reference Number: 8.2.3). NOx emissions would be taken into account in the selection and procurement of the standby generator (i.e. through selecting equipment which has good combustion controls and complies with the relevant European or international emissions standards for emergency generating sets) as set out in the air quality strategy within the Wylfa Newydd Code of Operational Practice (CoOP) (Application Reference Number: 8.13).

5.4.22 The fuel used in the standby generator would be ultra-low sulphur diesel (0.001% sulphur content), where this does not compromise safety and operational requirements, which would reduce emissions of sulphur dioxide from the generator exhaust by a factor of 100 compared to standard gas oil with a sulphur content of 0.1%, as set out in the air quality strategy within the Wylfa Newydd CoOP (Application Reference Number: 8.13).

Good practice mitigation

5.4.23 It is anticipated that routine maintenance testing of the mobile emergency response plant stored in the MEEG building at the Off-Site Power Station Facilities, including diesel-fuelled mobile generators and pumps, would take place at the main Power Station Site (testing is anticipated to be undertaken once per month) as set out in the noise and vibration strategy within the Wylfa Newydd CoCP (Application Reference Number: 8.13). Therefore, as testing of the mobile emergency response plant would not be carried out at the Off-Site Power Station Facilities, emissions from these plant are not included in this assessment. Emissions from these plant are considered in the assessment set out in chapter D5 (air quality (excluding emissions from traffic), Application Reference Number: 6.4.5).

5.4.24 The generator would be operated in line with the selected equipment manufacturer's operating procedures. This would include regular maintenance to ensure that the generator continues to operate at optimum combustion conditions and emissions are kept to a minimum, as set out in the air quality strategy within the Wylfa Newydd CoOP (Application Reference Number: 8.13).

Decommissioning

5.4.25 The decommissioning of the Off-Site Power Station Facilities would be in accordance with the description provided in chapter E1 (Application Reference Number: 6.5.1). The main elements that could affect air quality relate to the emissions of dust during the decommissioning.

Basis of assessment and assumptions

5.4.26 The potential effects on air quality during the decommissioning of the Off-Site Power Station Facilities would be very similar to the construction phase.

There would also be some demolition activities required for the removal of the Off-Site Power Station Facilities buildings which could lead to dust emissions.

5.4.27 A detailed programme of decommissioning works, including plant list and quantities of materials to be moved or processed are not available, since these activities would commence at the end of the 60-year operating stage of the Power Station.

5.4.28 For the purposes of this assessment, it has been assumed that the magnitude of air quality effects associated with the decommissioning activities would be less than that associated with the construction activities due to the following:

- there would be less requirement for earthworks compared to the construction stage; and
- not all construction materials brought to the site would need to be removed.

Embedded mitigation

5.4.29 No embedded mitigation has been identified for air quality during decommissioning of the Off-Site Power Station Facilities.

Good practice mitigation

5.4.30 A range of good practice mitigation measures, such as those detailed for the construction phase regarding emissions of dust as set out in paragraphs 5.4.11 to 5.4.13, would also be employed during the decommissioning stage.

5.5 Assessment of effects

5.5.1 This section presents the findings of the assessment of effects associated with the construction, operation and decommissioning of the Off-Site Power Station Facilities.

Construction

Emissions of dust

5.5.2 The assessment of the potential effects from dust emissions during the construction of the proposed Off-Site Power Station Facilities is set out in full in appendix E5-1 (Application Reference Number: 6.5.13).

Human receptors

5.5.3 The assessment has identified that there are potentially sensitive dust receptors located near to the Off-Site Power Station Facilities. The sensitivity of the area, which takes into consideration the number and distance of receptors from the site and baseline conditions, is summarised as being low sensitivity with respect to emissions of PM_{10} and $PM_{2.5}$ and medium to high sensitivity with respect to changes in dust deposition rates and associated effects on amenity.

5.5.4 Consideration of the meteorological conditions has identified that there is the potential for dust generated on-site to be blown towards receptors, with the receptors located to the east and northeast being downwind more frequently.

5.5.5 The scale of the works has been used to determine the dust emission magnitude for the different types of dust generating activities. Prior to good practice mitigation measures being implemented, these are medium dust emission magnitudes for demolition, earthworks and trackout activities, and a small dust emission magnitude for construction activities.

5.5.6 When combining the sensitivity of the area and the dust emission magnitudes following the IAQM guidance [RD1], it is considered that the demolition, earthworks, and trackout activities proposed are predicted to be a low risk for human health effects as there is limited potential for emissions of PM_{10} and $PM_{2.5}$ to increase baseline concentrations to a value that is above the AQOs set for the protection of human health. For potential dust soiling effects, there is predicted to be a medium risk from demolition, earthworks and trackout. Although these are not high-risk activities, there is still the potential for infrequent, short-term episodes when baseline dust deposition rates could be increased by an amount that residents of the nearby residential properties could perceive. There is a low risk of construction activities causing significant dust soiling effects.

5.5.7 The dust risks summarised above for each activity were used to identify the recommended level of good practice mitigation and control measures as part of the dust assessment (appendix E5-1, Application Reference Number: 6.5.13). The proposed mitigation measures to be implemented are set out in the air quality management strategies within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Off-Site Power Station Facilities

sub-CoCP (Application Reference Number: 8.9) and summarised earlier in this chapter. Some measures set out in appendix E5-1 (Application Reference Number: 6.5.13) that are considered to be not applicable or practicable (as the IAQM guidance covers a wide variety of development types and locations) have not been taken forward into the air quality management strategies within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9). Other measures have also been amended to make them specific to the construction activities.

5.5.8 Although the risks of causing dust annoyance during demolition, earthworks and trackout are medium, mitigation methods are available to manage emissions of dust for all activities so that the potential for significant Off-Site effects do not occur (i.e. during extended periods of dry weather and high wind speeds or other abnormal events). Such measures are considered to be normal good practice that would be adopted by any contractor meeting the requirements of the air quality management strategies within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9). It is considered that there are no potentially dust generating activities proposed that could not be managed using normal good practices [RD1] so as to prevent significant effects at any off-site receptor, including those located within 20m of the boundary.

5.5.9 This should be considered in conjunction with the analysis of local climatic conditions which shows that the likelihood of dust being emitted by wind erosion and being transported to off-site receptor locations is relatively low.

5.5.10 IAQM guidance [RD1] notes that with the application of good practice mitigation measures of the type available for use on this project, the environmental effect will not be significant at any off-site receptor. IAQM guidance [RD1] also notes that, even with mitigation measures in place, such as is proposed in the air quality management strategies within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9), occasional impacts may occur. The air quality management strategies within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9) provides a framework by which the level of mitigation is adapted to respond proactively to the changing risk of dust emissions, so that significant effects are prevented.

5.5.11 Therefore, with the mitigation measures applied as specified in the air quality management strategies within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9), notwithstanding the measures amended or not taken forward from the appendix E5-1 (Application Reference Number: 6.5.13), the likely effect of dust emissions on human health and amenity during construction is concluded to be not significant.

Ecological receptors

5.5.12 The risks of effects from dust during the construction of the Off-Site Power Station Facilities on relevant ecological receptors were screened out from the assessment, as there are no relevant ecological receptors within 50m of the site, or within 50m of the access roads up to 500m from the site entrance. On this basis, the effects of dust on the nearest relevant ecological receptors, the Llyn Garreg-Lwyd Site of Special Scientific Interest, an area of ancient woodland (ID 26028) and Coed Carreglwyd Wildlife Site (between approximately 640m to 700m to the northwest), would be negligible, and not significant.

Emissions of odour

5.5.13 If contamination is identified during the ground investigation, which would be carried out prior to construction works commencing, it is only likely to cover a relatively small area with a relatively low scale of the potentially odorous contamination. Therefore, taking into account the implementation of good practice mitigation (summarised in paragraph 5.4.15 and described further in chapter E7 (Application Reference Number: 6.5.7)) the source odour potential is considered to be small.

5.5.14 The closest high sensitivity receptors are within 15m northeast of the site boundary and 20m of the northwest site boundary. Given the close proximity of these receptors, the wind direction range that could blow odours towards these closest receptors would range from southeast to southwest (see wind rose in appendix E5-1 (Application Reference Number: 6.5.13)). The frequency of the wind blowing towards these directions, based on 22.5^{o} sectors ranges from 2.1% (from the southeast) to a maximum of 14.8% from the south-southwest. Therefore, based on the close proximity of the receptors and the high frequency of winds from the source to the receptor, the odour flux to the receptor is described as a highly effective pathway in accordance with IAQM guidance [RD6].

5.5.15 Based on the criteria set out in IAQM guidance [RD6], a small source odour potential and highly effective pathway would lead to a low risk of odour exposure at the closest high sensitivity receptor. As set out in chapter B5 (Application Reference Number: 6.2.5), this is considered to be a small adverse odour effect.

5.5.16 Based on the small adverse odour effects at the closest receptors associated with the excavation of potentially odorous contaminated materials, the potential for odour effects is not significant.

Emissions from plant and machinery

Human and ecological receptors

5.5.17 IAQM guidance [RD1] specifies the following in relation to the assessment of emissions to air from construction plant and machinery:

"Experience of assessing the exhaust emissions from on-site plant (also known as Non-road Mobile Machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed."

5.5.18 Based on the phased construction programme, together with the relatively low number and size of plant and machinery items anticipated to operate simultaneously on-site over an area of approximately one hectare (an average of eight and maximum of 14 plant numbers, as discussed in paragraph 5.4.6) and low existing air quality concentrations, the potential effect on local air quality at human and ecological receptors in the vicinity of the site would be negligible. On this basis, and in line with IAQM guidance [RD1], this aspect was screened out from requiring a detailed assessment, and the effect on air quality from construction plant and machinery emissions is considered to be not significant.

Operation

Emissions from combustion plant

5.5.19 The back-up diesel generator will be housed in a bespoke enclosure supplied by the manufacturer. As shown in figure A2-2 (Application Reference Number: 6.1.10) of chapter A2 (Application Reference Number: 6.1.2), the generator would be located approximately 2m to the west of the MEEG/AECC building. The generator exhaust flue will extend above the roof of the enclosure and terminate at a height of up to approximately 6m above ground level.

Human and ecological receptors

5.5.20 The nearest residential property is approximately 45m to the northwest of the proposed standby diesel generator location. The frequency of the wind blowing towards this direction (i.e. wind blowing from the south-southeast and southeast) is approximately 6% of the time in the year (see wind rose in appendix E5-1, Application Reference Number: 6.5.13). The next-closest receptor is approximately 50m to the east of the proposed standby diesel generator location. The frequency of the wind blowing in this direction is approximately 8%. Another residential property is located approximately 80m west-southwest/southwest of the generator location. The frequency of the wind blowing towards this location is approximately 9% of the time.

5.5.21 As discussed previously, the generator would be tested for a total of 16 hours each year. Therefore, the change in concentrations of emitted pollutants at nearby receptors, particularly those of highest concern including NO_2 and PM_{10}/$PM_{2.5}$, would not be perceptible on an annual mean basis. For NO_2, there is no risk of exceeding the one-hour mean AQO from routine

testing only as the generator would not normally operate for more than 18 hours in a year (i.e. the number of exceedances permitted by the AQO). Therefore, operation of the generator during periods of mains electricity power failure is unlikely to be frequent enough to increase the risk of exceeding the AQOs. The inclusion of a short stack, if required, would reduce the peak concentrations of NO_2 at nearby human receptors during operation of the standby generator.

5.5.22 Given its relatively small size, infrequent and short-term use, the inclusion of a short stack if required, distance to the nearest sensitive locations, and frequency of wind blowing towards each of the nearby receptors, there is unlikely to be a perceptible change in annual, 24-hour and eight-hour mean concentrations of NO_2, PM_{10}, $PM_{2.5}$, SO_2 and CO at nearby sensitive human receptors. The risk of exceeding the shorter-term AQOs (i.e. the one-hour mean AQO for NO_2 and the 15-minute and one-hour mean AQOs for SO_2) is extremely low due to the anticipated infrequent, short-term use and use of ultra-low sulphur diesel as the fuel. Therefore, emissions from the back-up generator are considered to be not significant at both human and ecological receptors.

Decommissioning

Emissions of dust

Human and ecological receptors

5.5.23 The potential for generating dust emissions is likely to be lower than during the construction stage, as most of the decommissioning activities would include the demolition/removal of the buildings/structures. The amount of earthworks would be smaller than required for the construction stage.

5.5.24 Therefore, taking into account that similar good practice mitigation measures to those proposed for the construction phase would be implemented, it is concluded that the effects at both human and ecological receptors are categorised as not significant.

5.5.25 It is envisaged that the decommissioning would be undertaken in accordance with measures and strategies similar to those set out in the air quality management strategies within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9) for the construction stage, and including other relevant good practice guidelines in force at the time of decommissioning.

5.5.26 In summary, it is assumed that there could still be a medium risk of effect for some of the decommissioning activities, but it is envisaged that these would be effectively mitigated to a not significant effect by the implementation of the good practice mitigation measures, similar to those which would be used for the construction phase.

Emissions from plant and machinery

5.5.27 The decommissioning activities would be similar in scale than those during the construction stage. As these would be in the future, emissions of pollutants from the plant and machinery would be similar or lower than during construction (as more stringent emission standards are introduced for newer plant over the next 60 years).

5.5.28 The plant list and programme for the decommissioning activities have not yet been compiled, and therefore no assessment has been undertaken. However, these decommissioning activities are likely to be lesser in scale than those during the construction stage. On this basis, this aspect has been screened out from requiring a detailed assessment in line with the IAQM guidance [RD1], and the effect is considered to be not significant.

5.6 Additional mitigation

5.6.1 In accordance with chapter B1 (introduction to the assessment process) (Application Reference Number: 6.2.1), embedded and good practice mitigation measures relevant to air quality were taken into account when determining the 'pre-mitigation' significance of effects. These are detailed in the design basis and activities section of this chapter.

5.6.2 As no potentially significant effects have been identified, no additional mitigation measures are proposed.

5.7 Residual effects

5.7.1 This assessment has shown that, taking into account the good practice mitigation, there are no potentially significant effects and there is no requirement for additional mitigation.

5.8 References

Table E5-2 Schedule of references

ID	Reference
RD1	Institute of Air Quality Management. 2016. *IAQM Guidance on the assessment of dust from demolition and construction*. Version 1.1. London: Institute of Air Quality Management.
RD2	Vallack, H. W. and Shillito, D. E. 1998. Suggested guidelines for deposited ambient dust. *Atmospheric Environment*, 32(16), pp. 2737–2744.
RD3	Environment Agency. 2003. *Assessment of noise disturbance upon birds and dust on vegetation and invertebrate species*. Report Ref. 6502-E.075EA.
RD4	Department for Environment, Food and Rural Affairs. 2013. *Background Mapping data for local authorities – 2013.* [Online] Accessed: January 2018]. Available from: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013
RD5	Department for Environment, Food and Rural Affairs. 2001. *Background Mapping data for local authorities – 2001.* [Online] Accessed: January 2018]. Available from: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2001
RD6	Institute of Air Quality Management. 2014. *IAQM Guidance on the assessment of odour for planning*. London: Institute of Air Quality Management.