

10 AIR QUALITY AND HUMAN HEALTH

10.1 Introduction

10.1.1 The assessment and control of emissions to air from the proposed Barr Killoch Energy Recovery Park is a key aspect of the planning application and Environmental Statement for the development, being an important issue in its own right and informing the assessments of ecological and health issues.

10.1.2 The air quality impact assessment for the proposed facility is set out in full in Appendix 10.1, and was carried out as follows:

- a) Outline review of the policy context for air quality
- b) Assessment of baseline air quality
- c) Identification of potentially sensitive locations
- d) Dispersion modelling study of emissions to forecast air concentrations and deposition rates at potentially sensitive locations
- e) Evaluation of forecast levels of released substances against relevant standards, guidelines, critical levels and critical loads
- f) Assessment of plume visibility
- g) Assessment of road traffic emissions on air quality
- h) Assessment of abnormal operating conditions/accidental releases
- i) Mitigation measures
- j) Conclusions

10.1.3 The main focus of the air quality assessment was the evaluation of modelled levels against relevant standards and guidelines. Levels of relevant substances were forecast at sensitive receptors to enable an assessment of the effects on air quality with regard to human health risks to be evaluated. Levels of relevant released substances were also forecast at designated habitat sites in the local area to enable an assessment of the potential effects on habitat sites due to emissions to air from the proposed facility to be carried out.

10.1.4 The study used a wide range of information on baseline air quality to characterise baseline conditions in the vicinity of the proposed facility. A state-of-the-art computer model was used to forecast the levels of substances emitted from the proposed facility that would result in the local area. The forecast levels of released

substances combined with baseline levels were assessed against relevant air quality standards and guidelines.

10.2 Air quality

10.2.1 In all cases, modelled levels of released substances when combined with background levels were forecast to comply with standards and guidelines for air quality at all locations in the vicinity of the proposed facility. The proposed development is forecast to have no significant effects on air quality due to road traffic emissions, and no significant cumulative effects are forecast to occur. No amenity issues such as odours or dusts would be expected to arise outside the site boundary, and emissions to air from the proposed facility are forecast to have no significant effects at designated habitat sites.

10.2.2 The study was carried out using a highly conservative approach to ensure that any air quality effects are more likely to be over-estimated than under-estimated.

10.2.3 Using a set of independent criteria, the impact of the proposed facility can be described as “negligible”.

10.2.4 On the basis of this assessment, it was concluded that the proposed facility will have no significant adverse effects on air quality. Consequently, it was concluded that no further mitigation is necessary, other than the extensive mitigation and control measures already built into the proposed facility. Emissions monitoring will be specified under the terms of the Pollution Prevention and Control permit for the proposed facility. If considered useful, an ambient air quality monitoring programme could also be specified under the remit of the PPC Permit.

10.3 Human Health Risk Assessment

10.3.1 A detailed human health risk assessment to identify potential health risks associated with exposure to emissions from the proposed Barr Killoch Energy Recovery Park has been completed in line with best practice methodologies. The health risk assessment for the proposed facility is set out in full in Appendix 10.2.

10.3.2 The health risks associated with the treatment of approximately 85,000 tonnes per annum of residual waste by gasification at the proposed facility were analysed. The study was carried out in accordance with independent guidance for health risk prioritisation and assessment, developed for use in Scotland. Following the

approach in this guidance, attention was focused mainly on assessing the health effects of dioxin and furan concentrations.

- 10.3.3 A simplified conceptual model was built for the site identifying all relevant sources, receptors and pathways of exposure relevant to each of the receptors. In the absence of specific information in relation to the nature of the local receptors, all default pathways of exposure were assumed to exist for each receptor, to ensure that all potentially significant exposure pathways were assessed.
- 10.3.4 Dioxin and furan concentrations in the different receiving media were calculated from the particle phase and vapour phase air concentrations and deposition to the soil, using the "Industrial Risk Assessment Program-Human Health" system. The estimated concentrations were based on a number of conservative assumptions to ensure that the study provided a worst-case assessment.
- 10.3.5 The level of exposure to dioxins and furans emitted from the proposed facility was quantified at selected sensitive receptors within the vicinity of the site. In residential locations, the key exposure pathways include the ingestion of soils and home-grown produce. On agricultural premises and at allotments, potential exposure through the ingestion of home-grown produce, and ingestion of beef, milk, pork, poultry and eggs was included. Both residential and agricultural receptor points were considered to be fisher locations, where key exposure pathways include the ingestion of soils and home grown produce and the ingestion of fish caught in local waterbodies. In view of the importance of dairy farming in the local area, dioxin and furan concentrations in cows' milk were also modelled in order to assess forecast levels against the standard set in Commission Regulation (EU) No.1259/2011.
- 10.3.6 Estimated intake of dioxins and furans, and associated health risks were assessed against relevant standards and guidelines, and against background exposure levels.
- 10.3.7 For the assessment of exposure to dioxins and furans, the risk posed by the proposed facility was evaluated by comparing estimated worst-case forecast intake against the UK Tolerable Daily Intake (TDI) value of 2 picograms per kilogram body weight per day. Infant intake in breast milk was assessed against UK data on background infant intakes of dioxins and furans in breast milk.
- 10.3.8 Background exposure to dioxins and furans is dependent on a wide range of complex individual factors, and will vary from one individual to another. For

context, the levels of dioxins and furans in soil due to the proposed facility were evaluated against the average rural and urban soil concentration of dioxins and furans as reported in the UK Soil and Herbage Pollutant Survey.

- 10.3.9 The health profile of the population of East Ayrshire was taken from the 2010 East Ayrshire Health and Wellbeing Profile. The health of people in East Ayrshire is relatively poor when compared with other regions of the United Kingdom. Life expectancy for both men and women and all-cause mortality at all ages are significantly worse than the average across Scotland. Rates of chronic obstructive pulmonary disease (COPD), emergency hospitalisations and the proportion of patients hospitalised with asthma are significantly higher than the Scotland average. However mortality rates from cancer, coronary heart disease and cerebrovascular disease are at similar levels to the Scotland average.
- 10.3.10 The health priorities for East Ayrshire include managing the use of alcohol and drugs, chronic diseases including asthma and diabetes and the hospitalisation of older patients.
- 10.3.11 No significant risks to public health would be posed during the construction phase of the development.
- 10.3.12 The risks to health during the operational phase were found to comply with the relevant benchmarks at all potentially sensitive locations.
- 10.3.13 The greatest intake was predicted to result if an individual could theoretically consume only beef, pork, poultry, eggs, milk and vegetables produced at a farm close to the site. The highest theoretically possible intake of dioxins and furans was predicted to be 0.035 picograms per kilogram body weight per day (pg/kg-day). Despite the worst-case approach adopted in the assessment, this incremental intake associated with the proposed facility is a small fraction (1.76 %) of the recommended tolerable daily intake for dioxins of 2 pg/kg-day, and would not be detectable in practice. Similarly, the potential exposure of infants via breast milk and the contribution of the proposed facility to dioxins and furans in cows' milk were assessed, and it was found that the proposed facility would have no significant or detectable influence on exposure in this way.
- 10.3.14 The proposed facility includes extensive measures to control emissions to air, ensuring compliance with the demanding standards set out in the Industrial



Emissions Directive. The health risk assessment found no requirement for further mitigation, over and above that described in the Environmental Statement.

- 10.3.15 Barr propose to conduct milk sampling and laboratory analysis to determine levels of dioxins and furans in and around local farms prior to, and after, site operation.
- 10.3.16 It was concluded that emissions to air from the proposed Barr Killoch Energy Recovery Park will not pose unacceptable health risks to the residential or farm locations identified in the vicinity of the proposed facility.