Ambient Air Monitoring Team

Study of Ambient Air Quality at Silverdale Road 6 July 2017 to 14 February 2018

The Environment Agency is responsible for the regulation of Walleys Landfill Site, in Newcastle-under-Lyme, Staffordshire. The site has been operational since 2005 and accepts non-hazardous commercial and industrial waste. The landfill is located in an urban area, with residential properties within 100 metres of the site boundary. The current operator is Red Industries Ltd.

The requirement to measure emissions to air from the landfill site are set out in the environmental permit. In addition to on site operator monitoring, the Environment Agency carried out an ambient air monitoring study between the 6 July 2017 and 14 February 2018. The aim of the study was to assess the air quality at the nearest residential properties to the site.

What did the study involve?

The Ambient Air Monitoring (AAM) team deployed a Mobile Monitoring Facility (MMF) less than 100 metres to the north of the landfill site, on Silverdale road, between the 6 July 2017 and 14 February 2018 (224 days). Five minute average concentrations of particulate matter, hydrogen sulphide and methane where measured over the monitoring period alongside wind direction and wind speed measurements.

One of the possible impacts associated with landfill sites is nuisance odour. Quantifying and characterising odour is very difficult because each person's sensitivity to odour is different. Measuring odour can be very difficult because the odour is made up of a mixture of different pollutants. Landfill gas is made up of a large proportion of methane (which is odourless), measurements from the gas compound at Walleys Landfill Site show that the gas composition is about 50% methane. Measuring methane therefore helped us to identify if we were seeing a source of gas from the landfill site.

One of the gases we were able to measure which has an associated odour is hydrogen sulphide.

Particulate concentrations were compared against the relevant Air Quality Strategy objectives for human health. Hydrogen sulphide concentrations were compared against the relevant World Health Organisation guidelines for human health and odour. There are no objectives or guidelines for methane emissions, its main environmental impact is from its potential for global warming.

An assessment of the meteorological conditions over the monitoring period was made and showed that the wind frequently came from an easterly direction. The wind directions and pollutant data were used to assess from which directions the highest concentrations were measured. We also looked at how pollutant concentrations varied at different times of the day.

What did the results show?

Comparison of the particulate data from the monitoring at Silverdale with the Air Quality Strategy objectives showed that the monitoring location was subject to concentrations that would meet their respective AQS objectives

The hydrogen sulphide data was compared with its World Health Organisation guidelines and was found to be within the specified health limits. Comparison of the data with the guideline for odour annoyance indicated that there were 34 instances during the monitoring period, on 11 separate days where the 30-minute average hydrogen sulphide concentration was greater than 7µg/m^3. These results suggest that complaints due to odour nuisance from hydrogen sulphide could be expected for less than 1% of the monitoring period.

The highest levels of particulate were seen, not from the direction of the landfill site, but from the direction of residential properties to the south west of the monitoring site.

The highest levels of hydrogen sulphide and methane were seen, not from the direction of the landfill site, but from north of the monitoring site. Slightly lower levels were seen from the direction of the landfill site, which were thought to be emissions from the gas management compound

Further work

The Environment Agency has decided to carry out a further monitoring study at Silverdale. A mobile monitoring facility was installed on the 18 January 2019 near the northern boundary of Walleys Landfill site, on the grounds of Garners Garden Centre. The study will involve continuous monitoring of particulate matter, hydrogen sulphide, methane, oxides of nitrogen and volatile organic compounds over a three to four month period.

This summary relates to information reported in detail in the following output(s):

Report: AAM/TR/2018/04
Title: Study of Ambient Air Quality at Silverdale Road 6 July 2017 to 14 February 2018
Author: Ambient Air Monitoring team
E: AAM@environment-agency.gov.uk.