North Lincolnshire Council
Air Quality Alerts – Low Santon

Threshold Justification

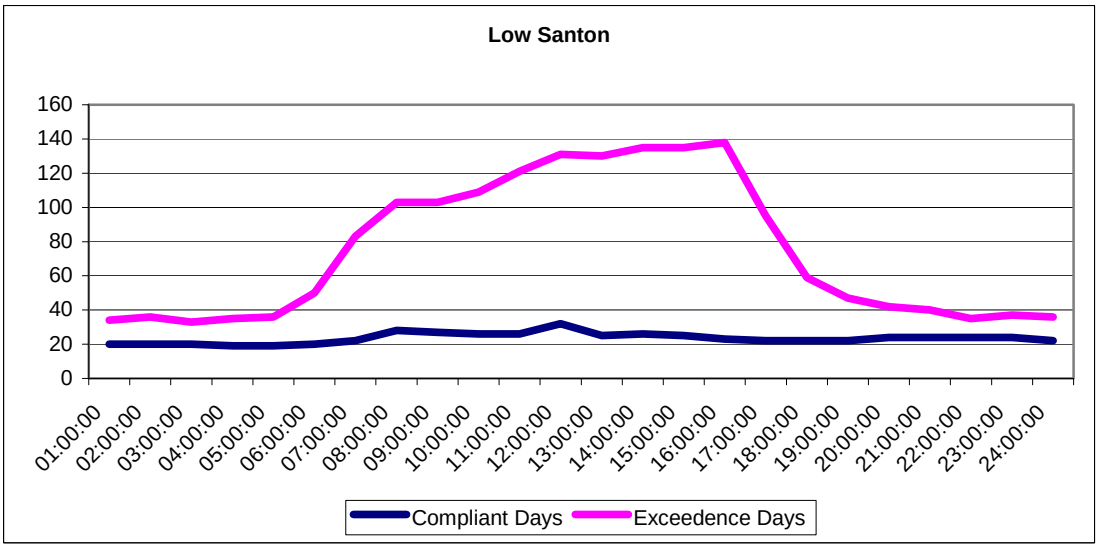
North Lincolnshire Council is proposing to offer a PM_{10} alert service to relevant companies operating around Low Santon. We anticipate these companies will include;

- Tata Steel
- Tarmac
- Heckett Multiserv

Consideration may also wish to be given to informing companies who operate on site to reduce dust levels e.g. sweeping and bowsering.

The idea of these alerts is to offer companies an opportunity to react to elevated levels of PM_{10} by notifying them at the first opportunity that a day shows the signature of an exceedence. It is anticipated that these alerts will arrive before 12:00 noon allowing sufficient time for the operators to make the necessary operational changes to reduce elevated PM_{10} concentrations at Low Santon. The previous hours wind speed and direction will accompany the alert to allow individual plant areas to identify the likely origin of the problem.

An hourly time series plot of exceedance day data revealed that there is a significant jump after 07:00. This significant change highlights the beginning of an exceedence day signature; 80µg/m^3 at 08:00.



Using this as an indicator further work was carried out in order to choose an appropriate threshold which would not overload recipients with messages, lessening the impact, whilst providing a threshold designed to capture the majority of exceedence days.

A check exercise was carried out looking at levels of 70µg/m^3, 80µg/m^3, 90µg/m^3 and 100µg/m^3 in 2009. Days were noted in which these levels were recorded at any point during the 24hr period and at any point before midday.

These days were then cross referenced against days when an exceedence occurred, presenting a % exceedence chance for the day, i.e. on those days where a certain threshold was reached the percentage of days that then went on to be an exceedence day. The results were as follows;

Threshold	Days with Data within 24hr Period	% Exceedence Chance	Days with Data before 12:00	% Exceedence Chance	% Exceedence Missed
>70µg/m^3			167	56%	5%
>80µg/m^3	196	52%	144	65%	7%
>90µg/m^3	174	58%	131	66%	15%
>100µg/m^3	158	61%	120	70%	17%

This exercise was to ensure that messages were kept to a minimum without missing exceedence days. 70µg/m^3 appears too low, 167 messages would have been sent in 2009 compared to the 101 exceedence days. Although only 5% would have been missed only 56% of the days would have gone on to be an exceedence.

80µg/m^3 shows a significant step in the exceedence chance. Of the 144 days with a concentration of 80ug/m^3 before 12:00 65% went on to be an exceedence day. A 9% increase on a 70ug/m^3 threshold but only a 2% increase on the chances of missing an exceedence day.

90µg/m^3 and 100µg/m^3 show a reduction in the number of days with data above the threshold before 12:00 but with marginal increases in the chances of these days going on to be exceedences. The major change at these higher concentrations is the likelihood of missing exceedence days with a near 10% increase on the lower levels.

North Lincolnshire Council propose to set the threshold at **80µg/m^3**. This can be changed should it prove another figure be more valuable.

Ross Thomson
Environmental Protection – November 2010