



Bulletin

Monitoring Results for Air-Borne Nickel Dust in Esperance

2009 – 2011 (August)

Brief Background

The Department of Health (DOH) began reporting on the ambient trends of nickel dust concentration in the Esperance Township in 2009. Five air quality monitoring stations in the Township sample dust as total suspended particles (TSP) and other air quality parameters. The TSP is analysed for nickel and other metals however nickel is the contaminant of concern. Sampling is undertaken to monitor the exposure of the population to air-borne nickel dust; to assess compliance against short term and long term health based guidelines set by the DOH and to assess the effectiveness of abatement strategies undertaken at the port of Esperance.

Reports

The 2009 DOH report and the monthly air quality reports released by the Esperance Port Authority detail the monitoring strategy, monitoring locations, the monitored data, exceedances and health implications of exceeding the DOH guidelines.

The 2009 DOH report can be downloaded from the public health website:

<http://www.public.health.wa.gov.au/>

The monthly air quality monitoring reports are published on the Esperance Port Authority website: <http://www.esperanceport.com.au/>

This Bulletin will be updated with the complete 2011 data when it becomes available early in 2012.

Summary of Annual Air-borne Nickel Dust Concentrations 2009-2011

(Annual Ni guideline – 0.003 µgNi/m³)

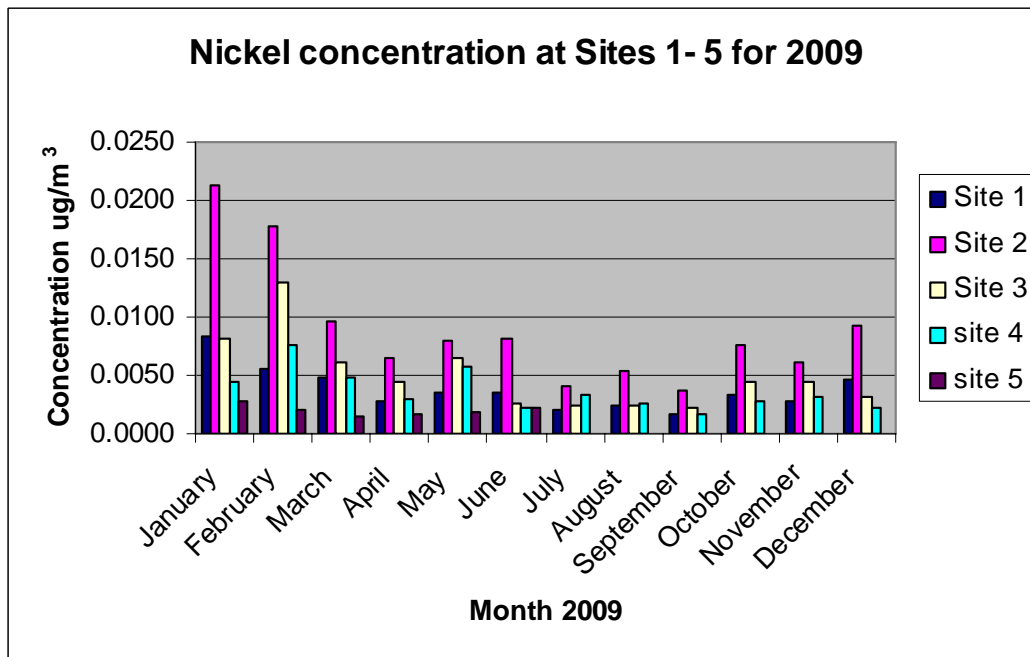
Monitor Site & Year	Annual mean concentration µg/m ³		
	2009	2010	2011*
1	0.0038	0.0032	0.0042
2	0.0090	0.0059	0.0061
3	0.0050	0.0031	0.0032
4	0.0036	0.0028	0.0036
5	0.0020	0.0014	0.0013
Network wide weighted mean	0.0047	0.00328	0.00373

* January – August inclusive

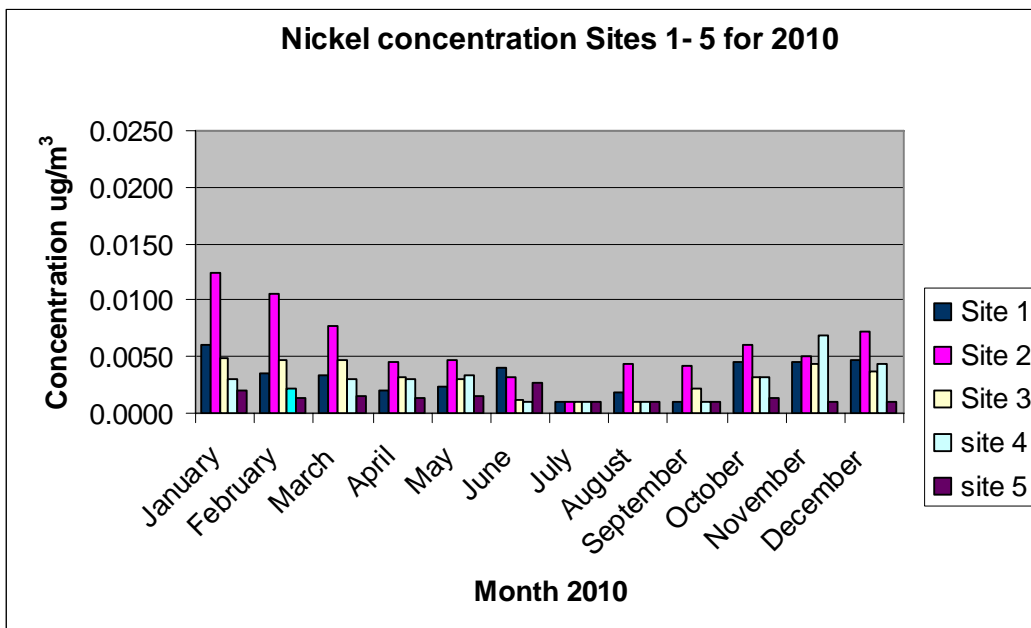


The 2009 and 2010 charts that follow show that monthly fluctuations in the nickel concentration is strongly influenced by season and further analysis of wind direction confirmed the port as the main source of nickel dust. The significant fall in nickel dust concentration across the network from 2009 to 2010 indicates dust abatement strategies at the port have contributed significantly to this fall. As the nickel concentration continues to fall closer to the annual guideline the seasonal fluctuations have become less obvious across the years: charts 2009 -2011 below.

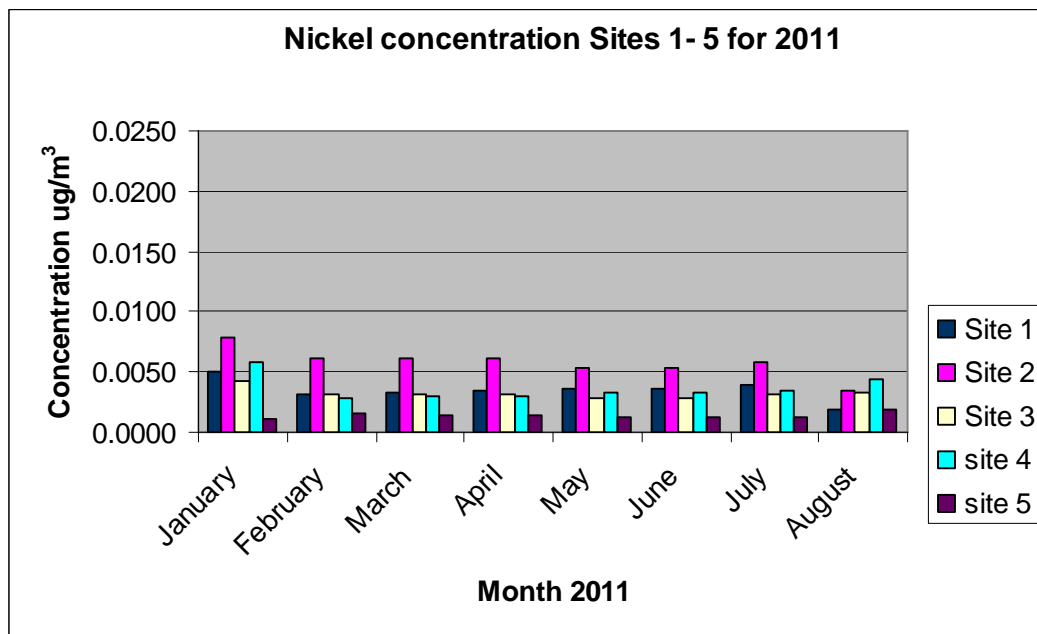
2009



2010

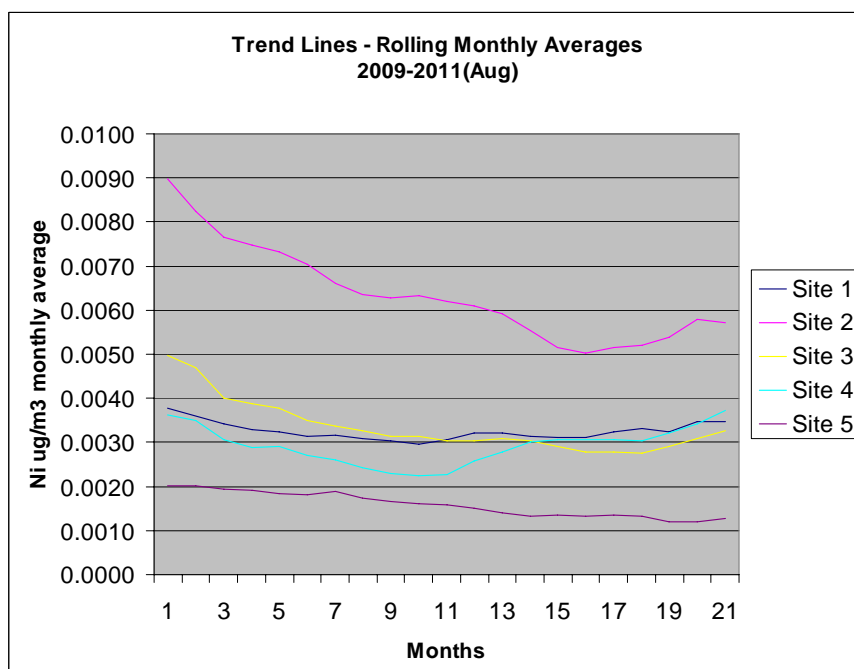


2011

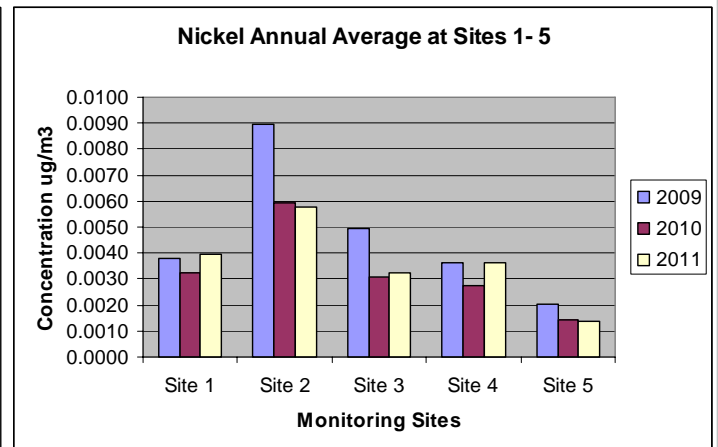
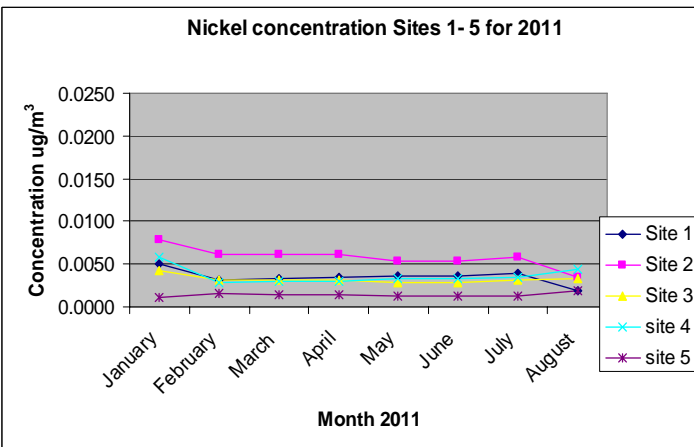
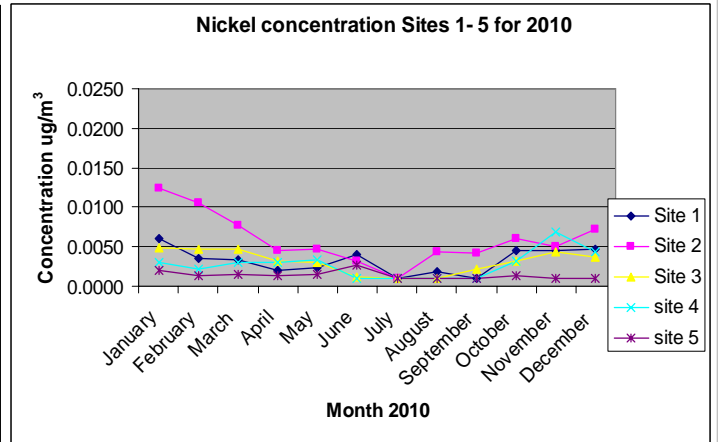
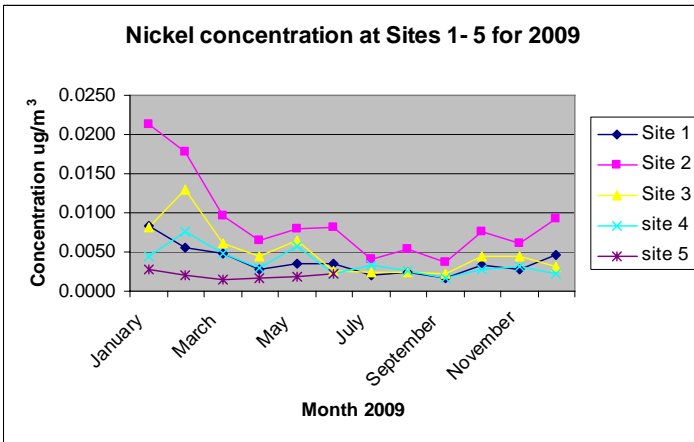


Trend data and factors to consider

The trend data shows that change has occurred and nickel concentration in air-borne dust has significantly decreased since 2009. The temptation is to interpret the change in direction of the trend lines for sites 3 and 4 as a trend reversal however moving averages are sensitive to fluctuations in the data over the time period averaged. Plus, the incomplete 2011 data influences the trend line direction. In this situation the individual year's annual charts more efficiently reflect the changes in nickel concentration.



Individual and combined year's annual charts



The pattern of nickel concentration across the monitoring sites has not altered significantly since 2009. Site 2 consistently reports the higher concentration relative to the other sites and site 5 the lowest. Fluctuations in the nickel concentration are expected with varying wind speed, direction and port operations. No clear association between ship loading of nickel ore concentrate and nickel concentrations is seen after 2009.

Relevance to Health

Nickel sulphate, the type of nickel transported through Esperance, is not acutely toxic when inhaled. It is cleared rapidly from the body. Intermittent inhalation exposure means any excess nickel is excreted thereby lowering the body's overall exposure.

This means that although the annual guideline has been exceeded, exposure at the concentrations recorded in Esperance will not lead to respiratory disease in healthy individuals. The number of days with nickel below the guideline provides sufficient time for excess nickel to be excreted from the body.



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