




Department of
Environment and Conservation

Our environment, our future 

Esperance Port Authority

Air Quality Monitoring

14th October 2010



Environmental Protection Notice

- ❑ On 25 October 2007, the Department of Environment and Conservation (DEC) issued an Environmental Protection Notice to the Esperance Port Authority.
- ❑ The notice required a comprehensive ambient air quality monitoring network to be established.





Environmental Protection Notice

- ❑ The major components of the network were in place by the end of January 2008 and monthly reports have been provided by the Port from February 2008.
- ❑ DEC strengthened and expanded the air quality monitoring network and reporting requirements in the licence issued in January 2009.





The Licence Requires

- ❑ Monitoring of ambient air quality at four sites (Sites 1 to 4) using pairs of High Volume Air Samplers (HVAS) and Tapered Element Oscillating Microbalances to measure particulates;
- ❑ Analysis of filter papers from the HVAS for iron, nickel, lead and sulphur;
- ❑ Monthly analysis of material collected by deposition gauges (DG1 to DG19) located in and around the Port;
- ❑ Monthly reporting to DEC



The Licence Requires

- ❑ Analysis of five rainwater tanks located in the community (adjacent to DG3, DG5, DG8, DG11 and DG12) monthly;
- ❑ Monitoring of each ship loading of bulk nickel concentrate to be reported to DEC.



- An additional five rainwater tanks and associated deposition gauges installed by 31 March 2009 were added to the monitoring program, results from these were first included in the April report





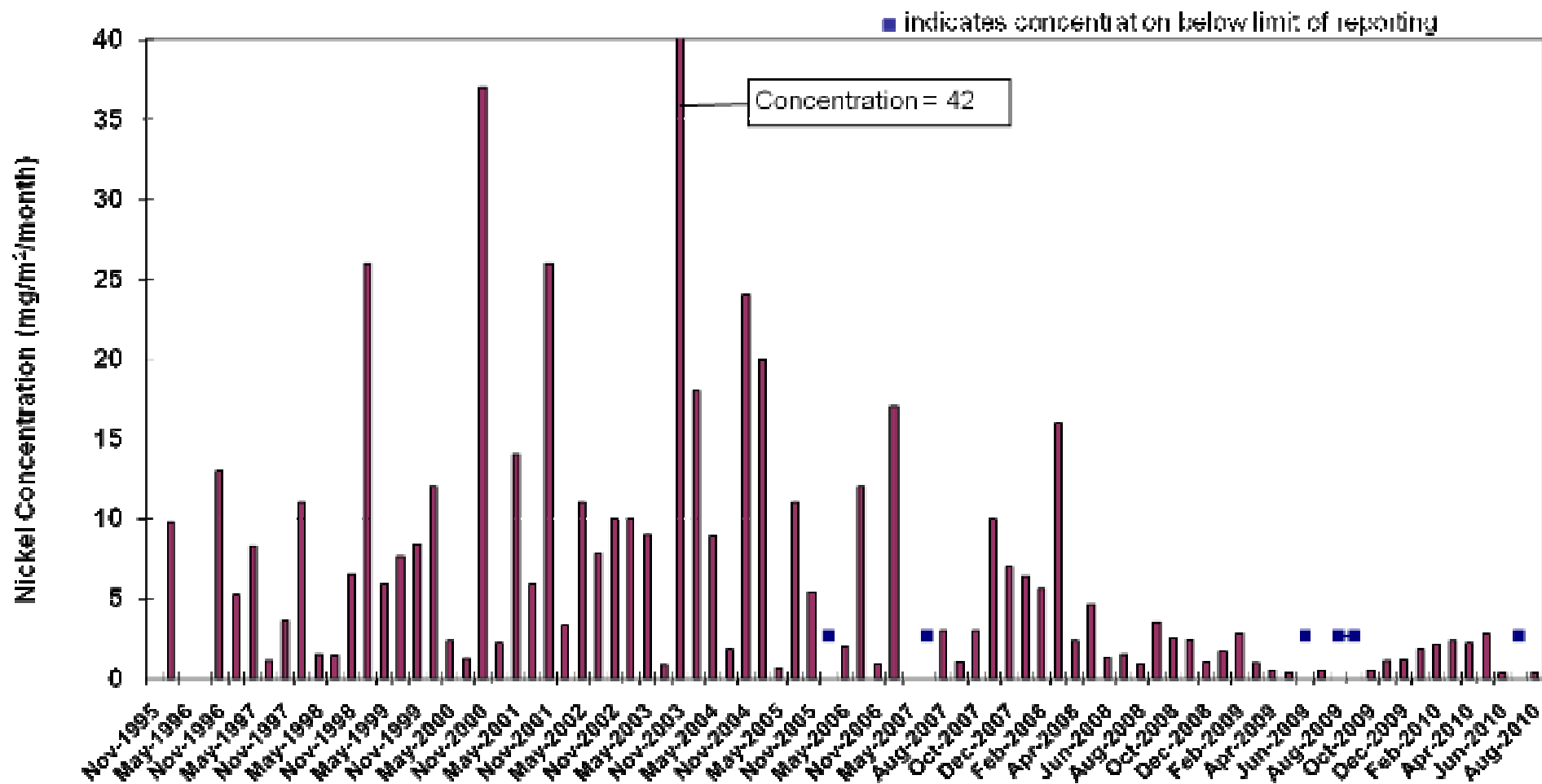
Deposition Gauges Results

- ❑ Over the last 24 months there has been a reduction in nickel deposition when compared to historic data.
- ❑ The next chart gives the nickel results from deposition gauge 1 (DG1), which was installed immediately adjacent to the Port entrance in 1995.





Nickel Deposits on Gauge DG1 at Esperance (neighbourhood gauge close to the Port)





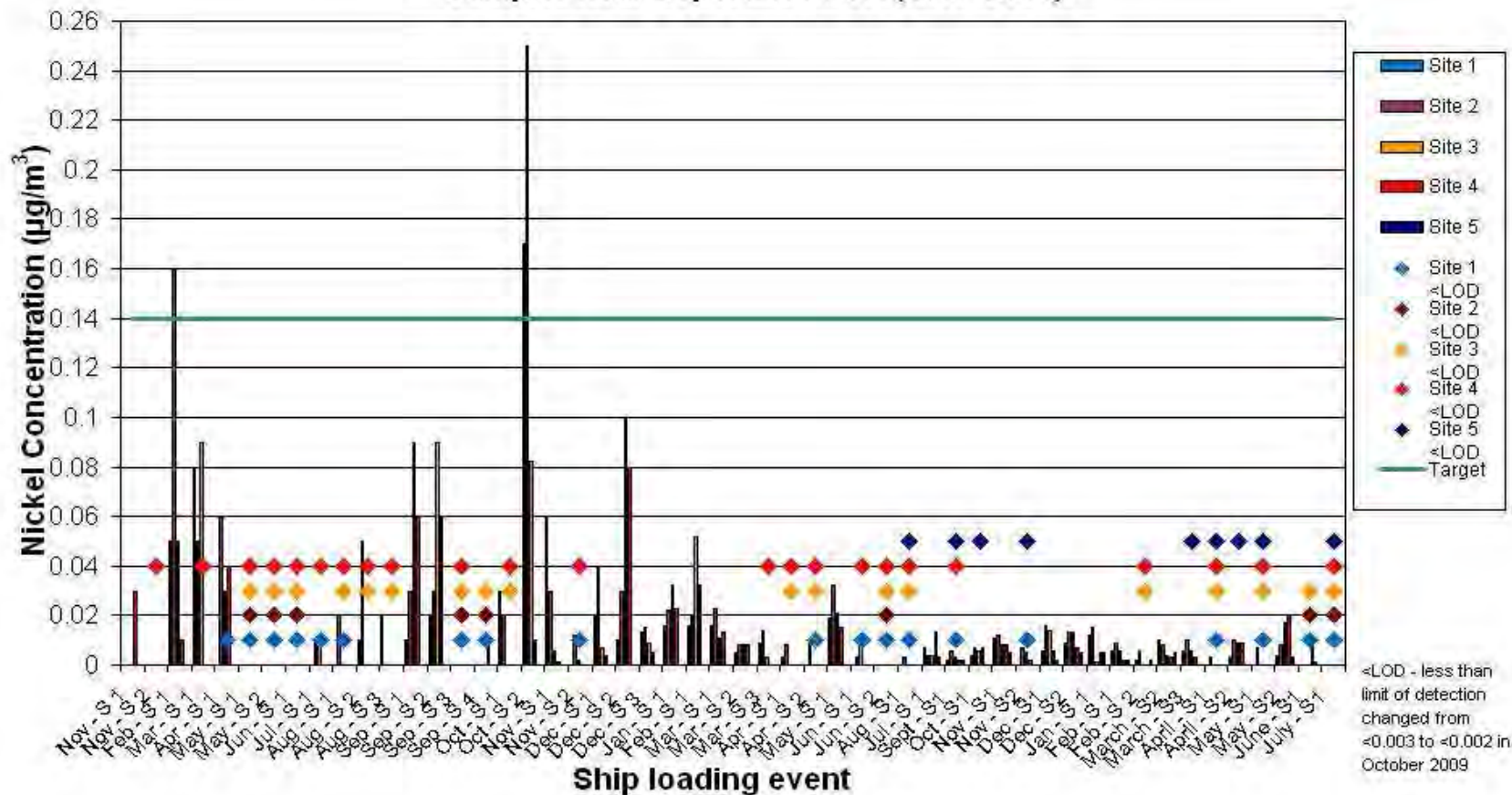


HVAS Nickel Analysis Results

- ❑ Between November 2007 and August 2010 the highest nickel levels (for each highvol site) for each ship loading during this period were recorded.
- ❑ Results indicate that two of the 52 loading events during this period were above the licence target of $0.14 \mu\text{g}/\text{m}^3$ (this target applied from 6 October 2008).
- ❑ In the case of the loading of ship 2 in October 2008 two sites exceeded the target.



Highest Nickel level detected on High Volume Air Sampler near Esperance Port (2007-2010)



<LOD - less than limit of detection changed from <0.003 to <0.002 in October 2009



HVAS Nickel Analysis Results

- ❑ As a result of the licence target being exceeded in October 2008 the Port revised its bulk nickel ship loading protocol.
- ❑ The revised protocol was implemented on 11 December 2008. DEC's licence requires a protocol to be in place pending short term improvements to loading facilities.
- ❑ The licence target has not been exceeded since the revised protocol was implemented.

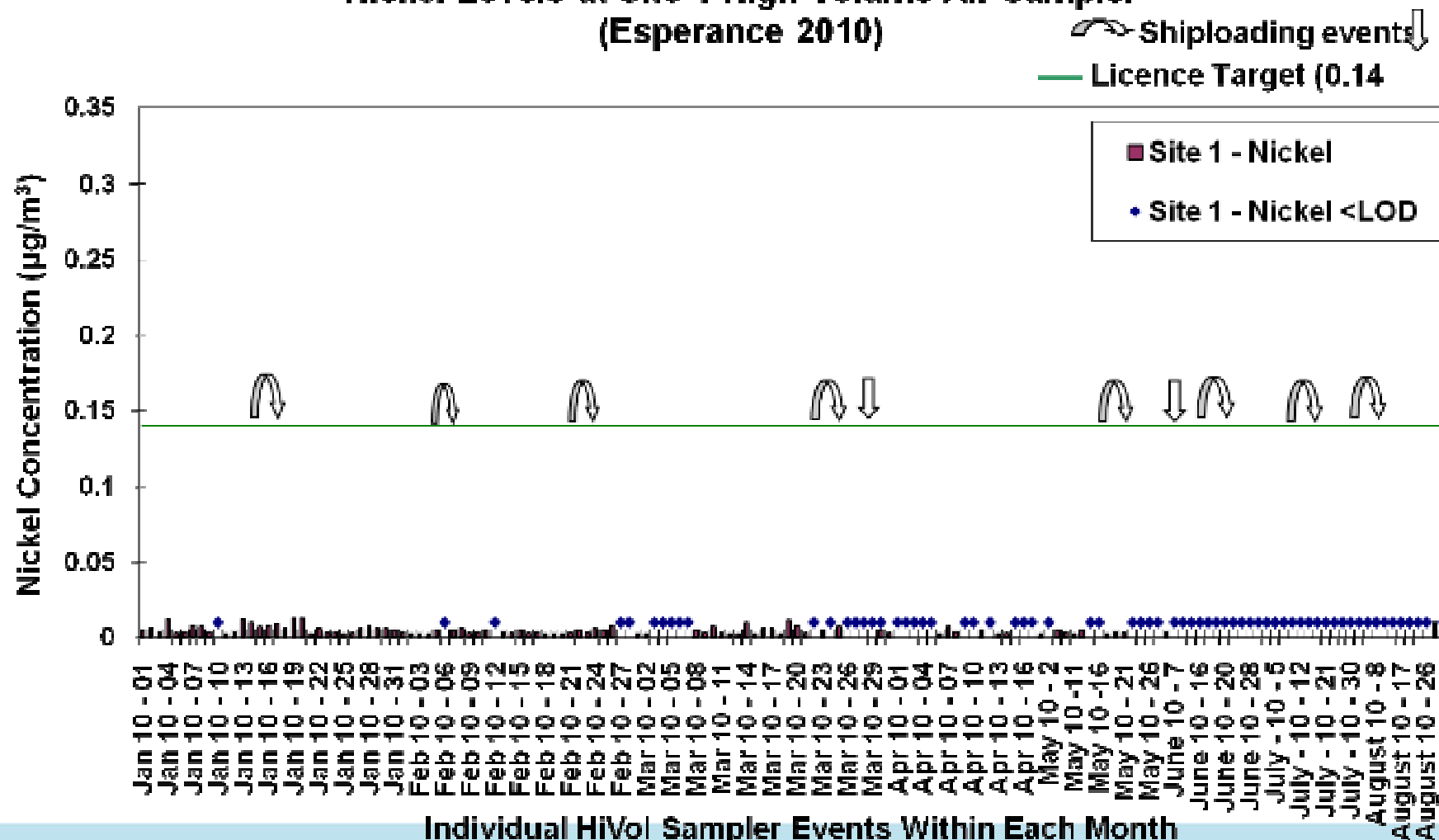


Nickel levels and the annual 0.003ug/m³ guideline

- ❑ Sites 1, 3 and 4 each show numerous 24 hr results where levels less than the guideline were recorded
- ❑ Site 2 has since January 2010 shown 32 days where levels were below the guideline
- ❑ Site 5 (Council Chambers) has since it was installed (July 09), showed most levels below detect with others at very low levels.

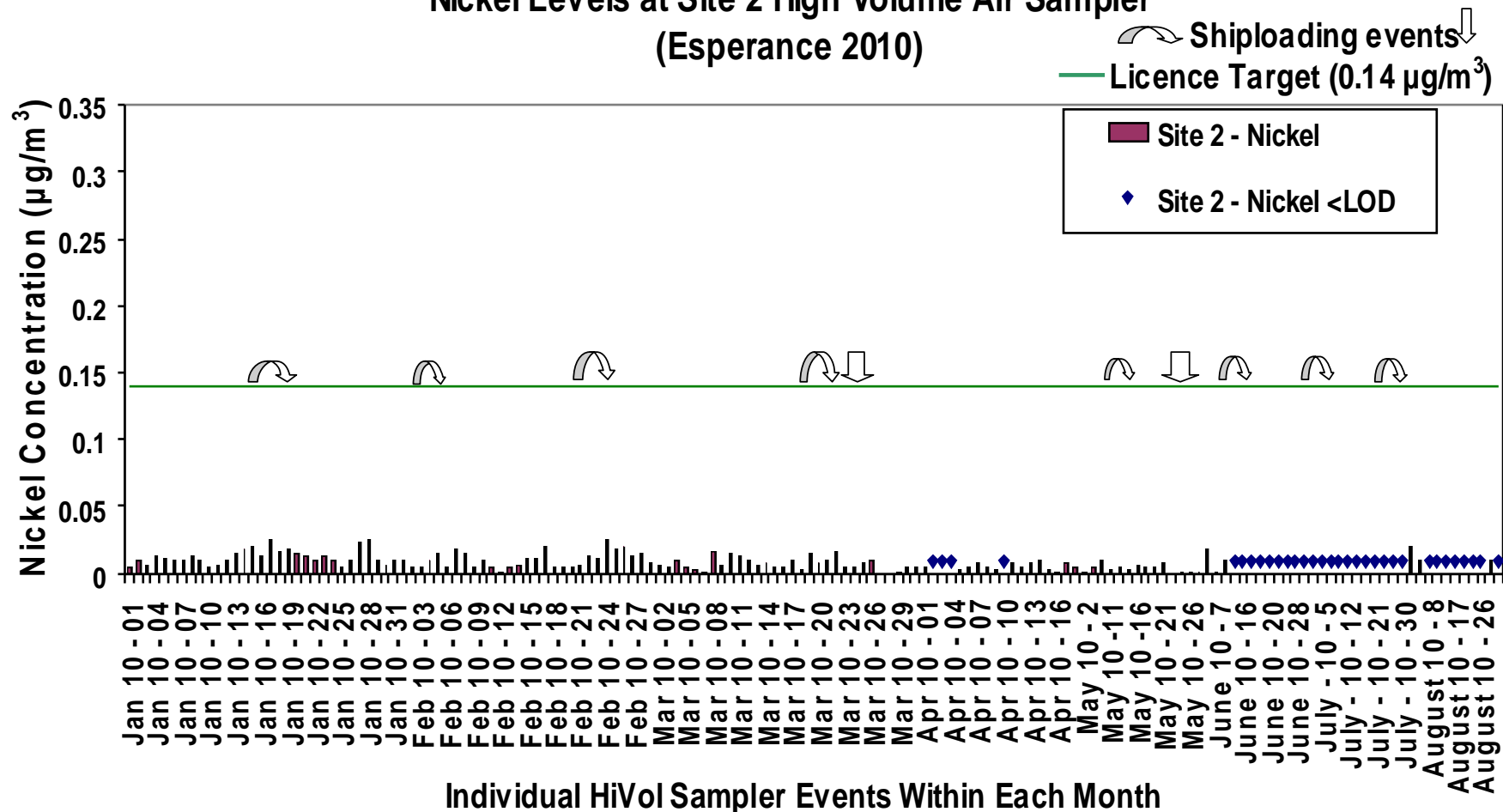


Nickel Levels at Site 1 High Volume Air Sampler (Esperance 2010)



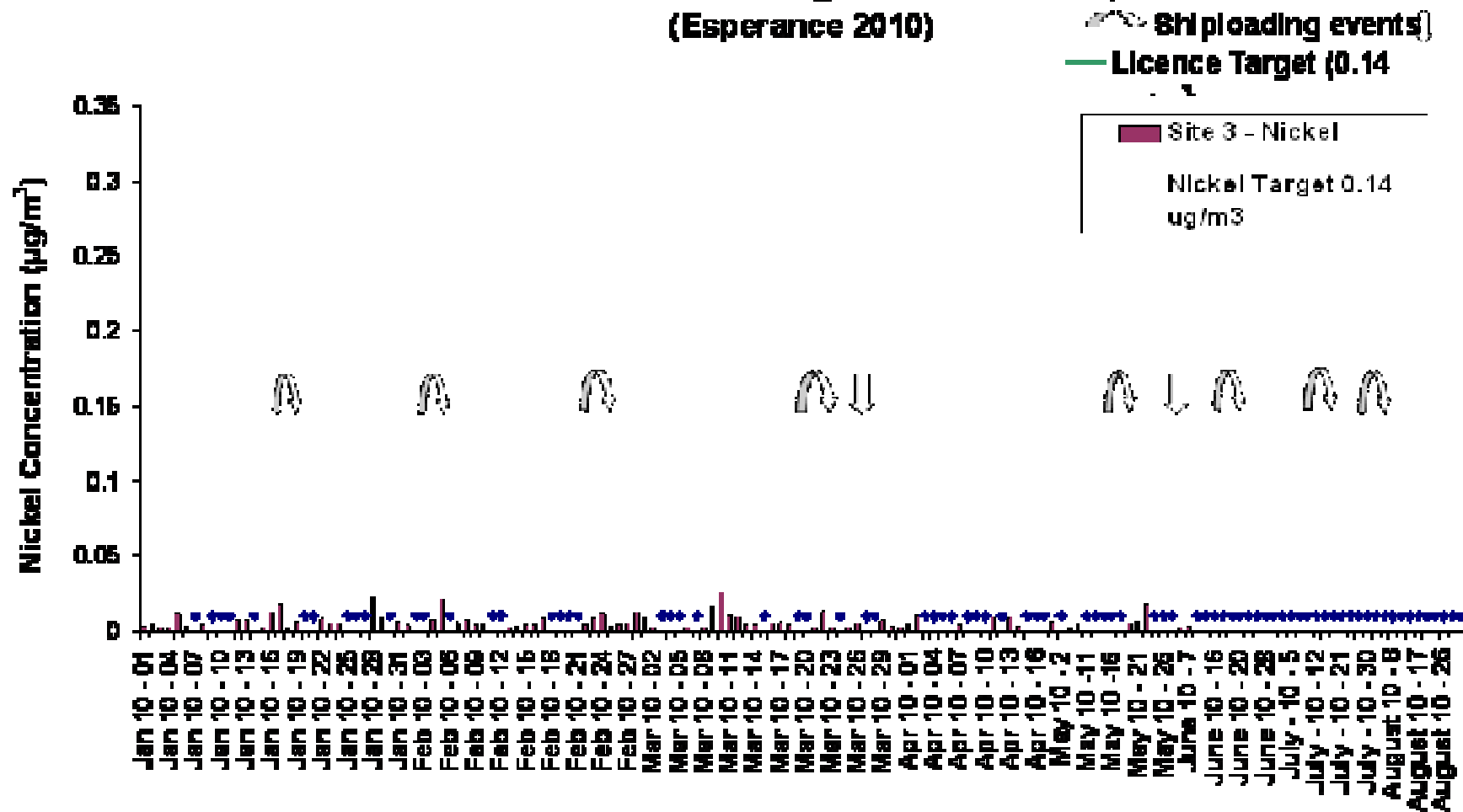


Nickel Levels at Site 2 High Volume Air Sampler (Esperance 2010)





Nickel Levels at Site 3 High Volume Air Sampler (Esperance 2010)

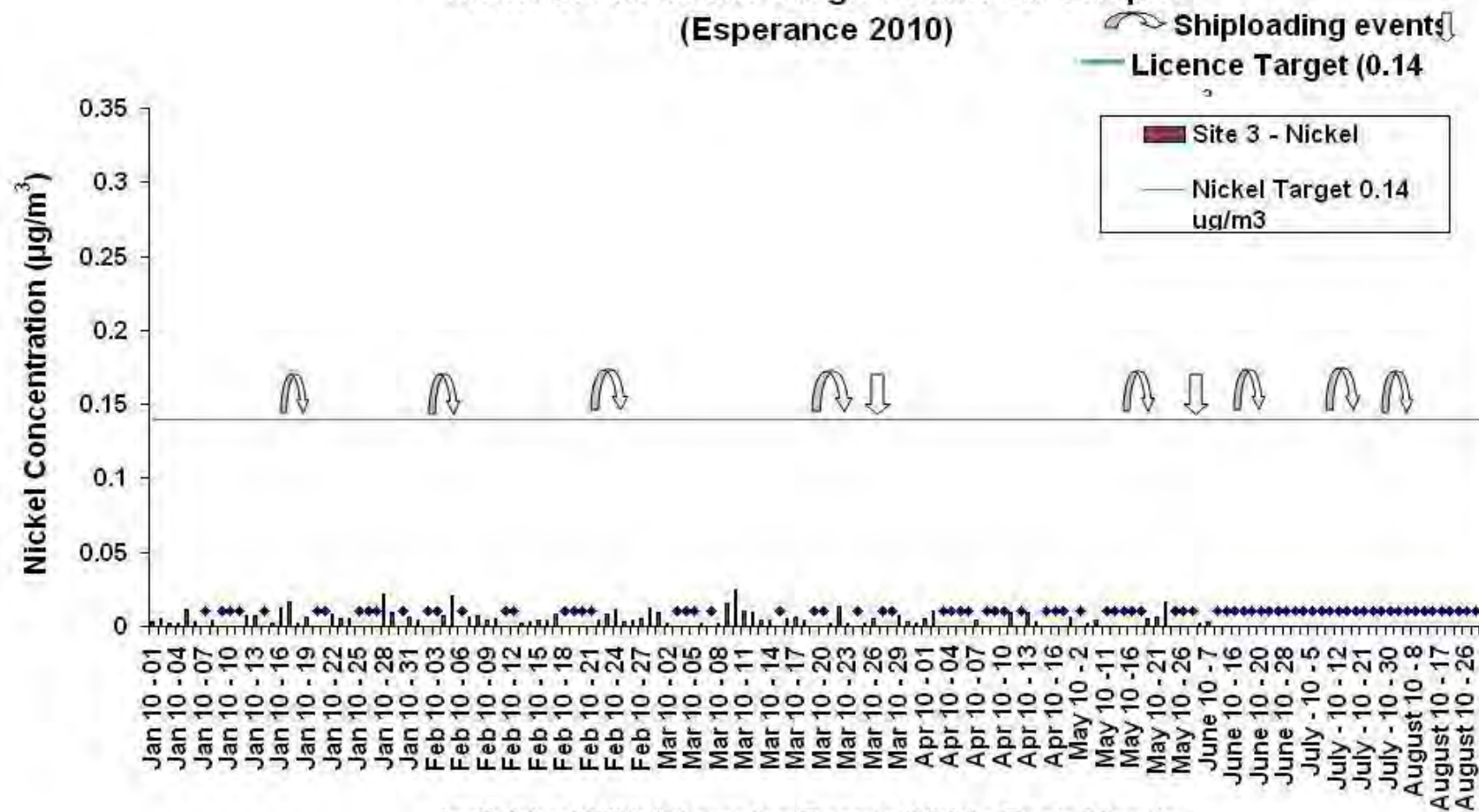


Individual H1Vol Sampler Events Within Each Month








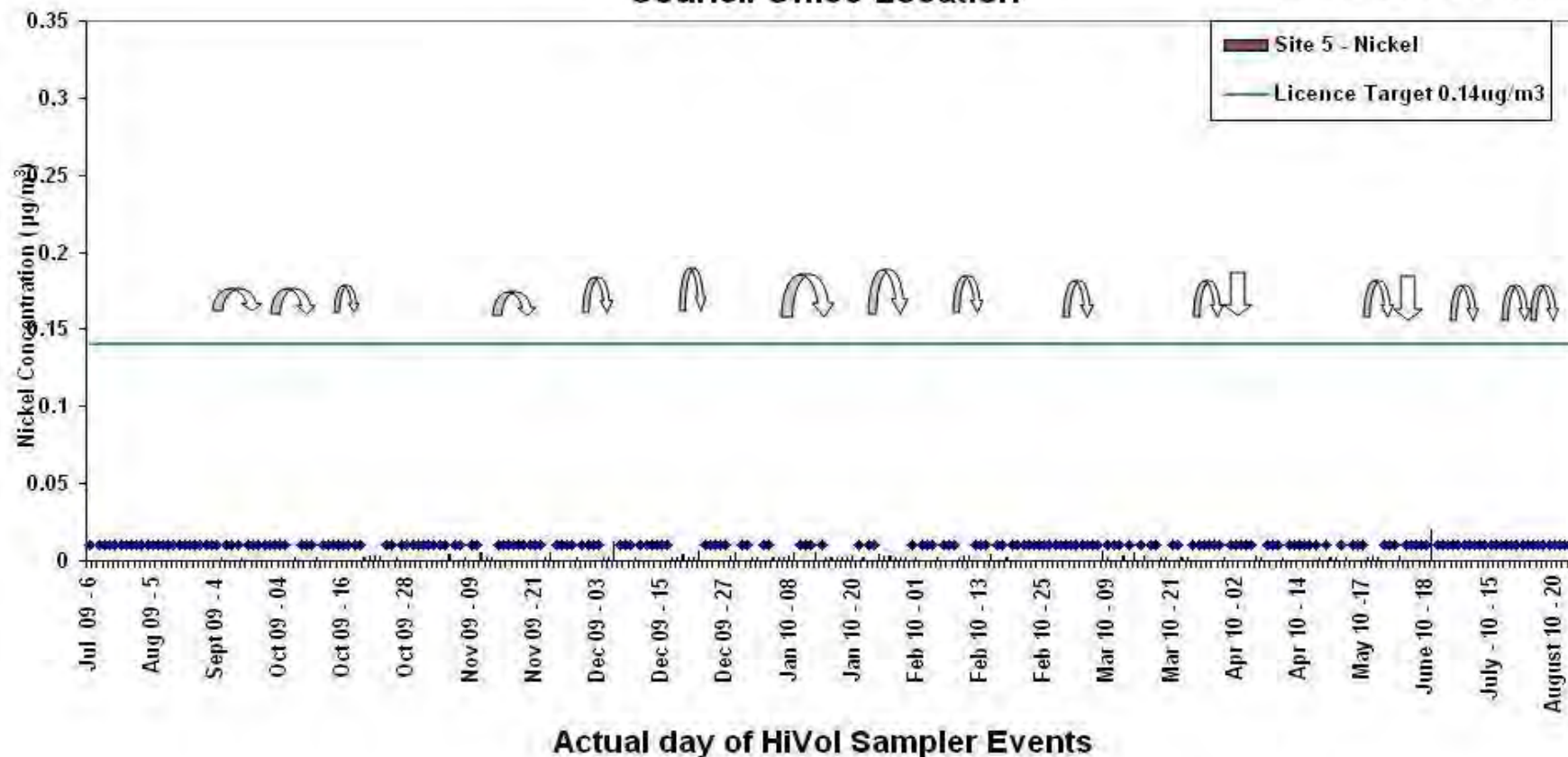
Nickel Levels at Site 3 High Volume Air Sampler (Esperance 2010)





Nickel Levels at Site 5 High Volume Air Sampler (Esperance 13/07/09 Onwards) Council Office Location

 Shiploading events 
 Licence Target (0.14 µg/m³)





Lead levels from highvols

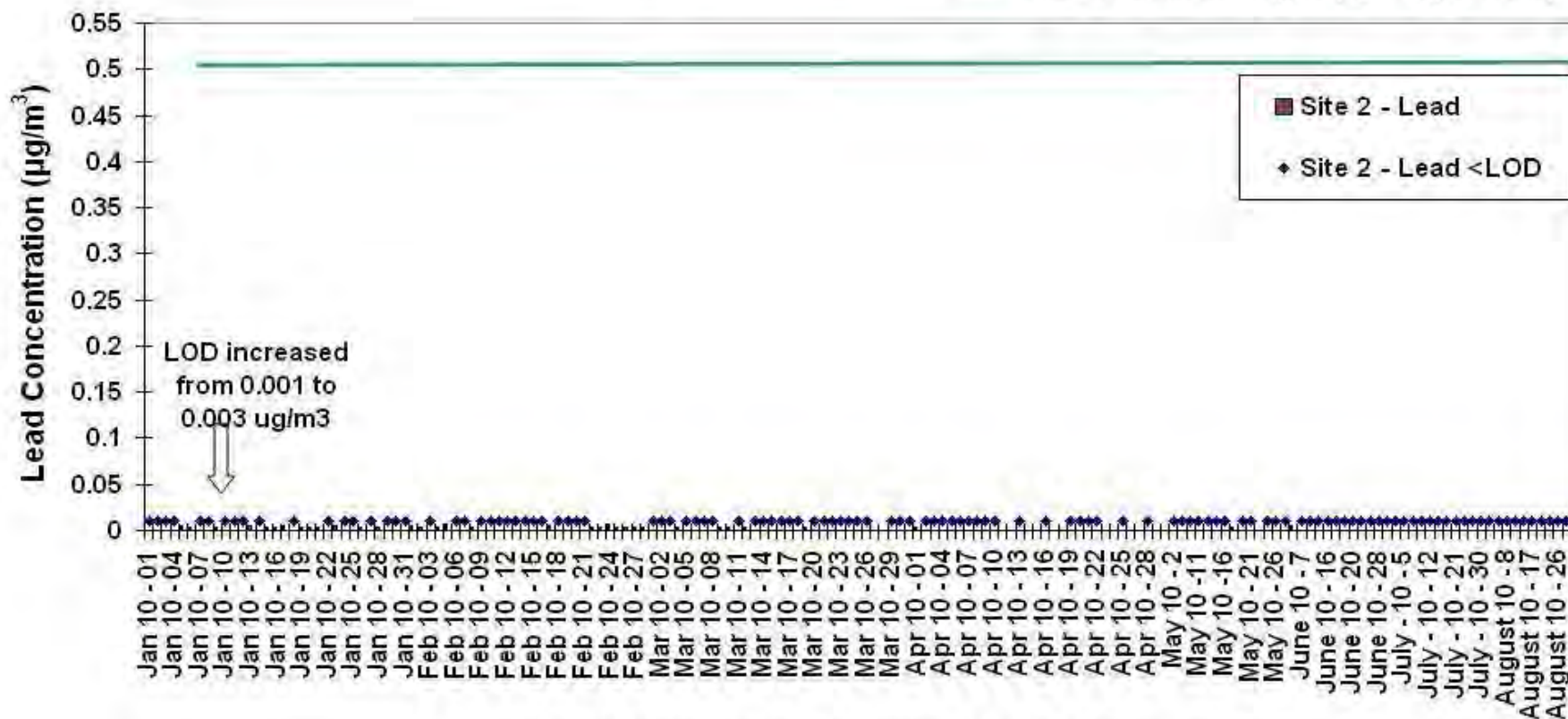
- ❑ All highvol results continue to show very low lead levels and in most cases below level of detect
- ❑ These data do not indicate recirculation of lead dust in air is an issue





Lead Levels at Site 2 High Volume Air Sampler (Esperance 2010)

— NEPM Standard (0.5 $\mu\text{g}/\text{m}^3$) (Annual)

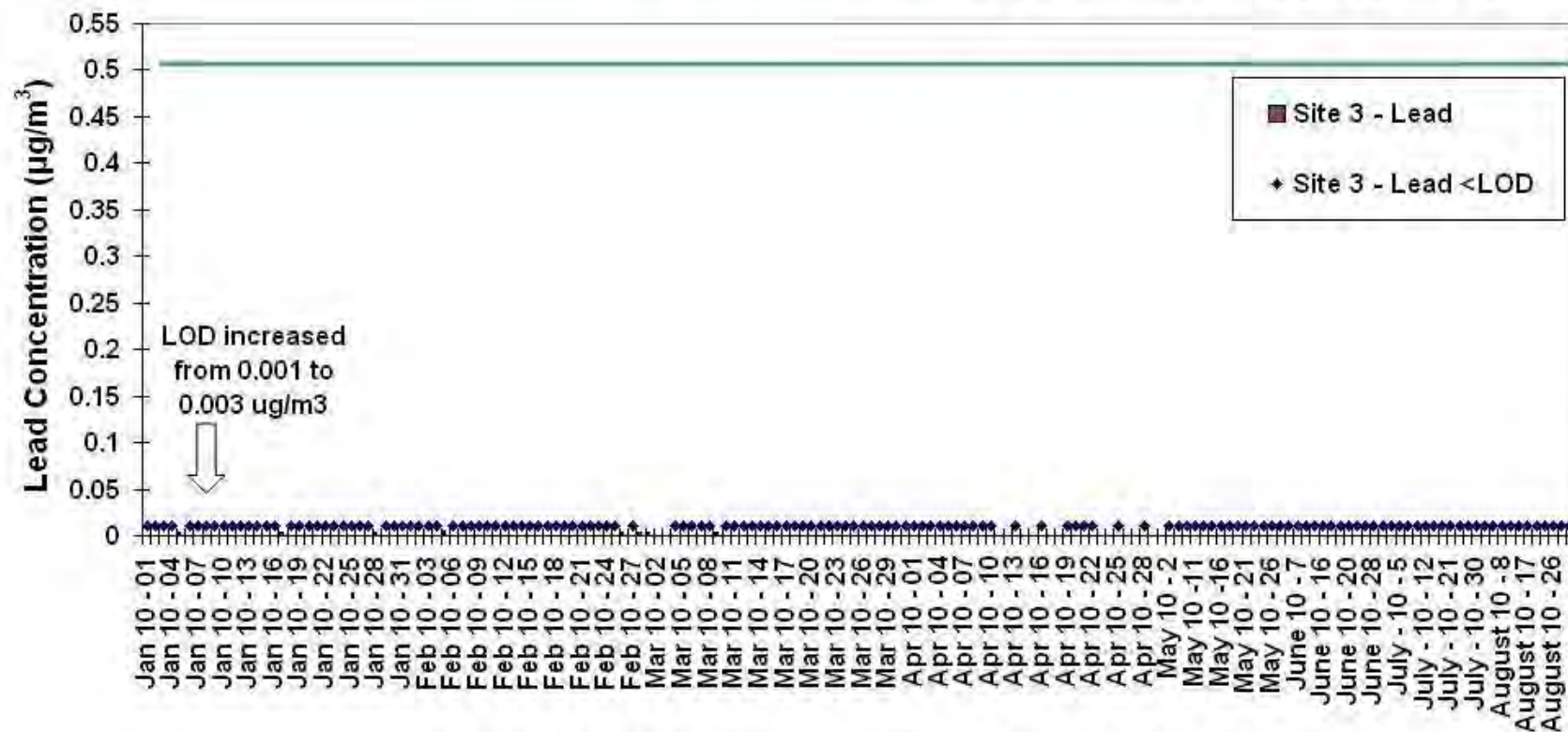


Individual HiVol Sampler Events Within Each Month



Lead Levels at Site 3 High Volume Air Sampler (Esperance 2010)

— NEPM Standard ($0.5 \mu\text{g}/\text{m}^3$) (Annual)



Individual HiVol Sampler Events Within Each Month



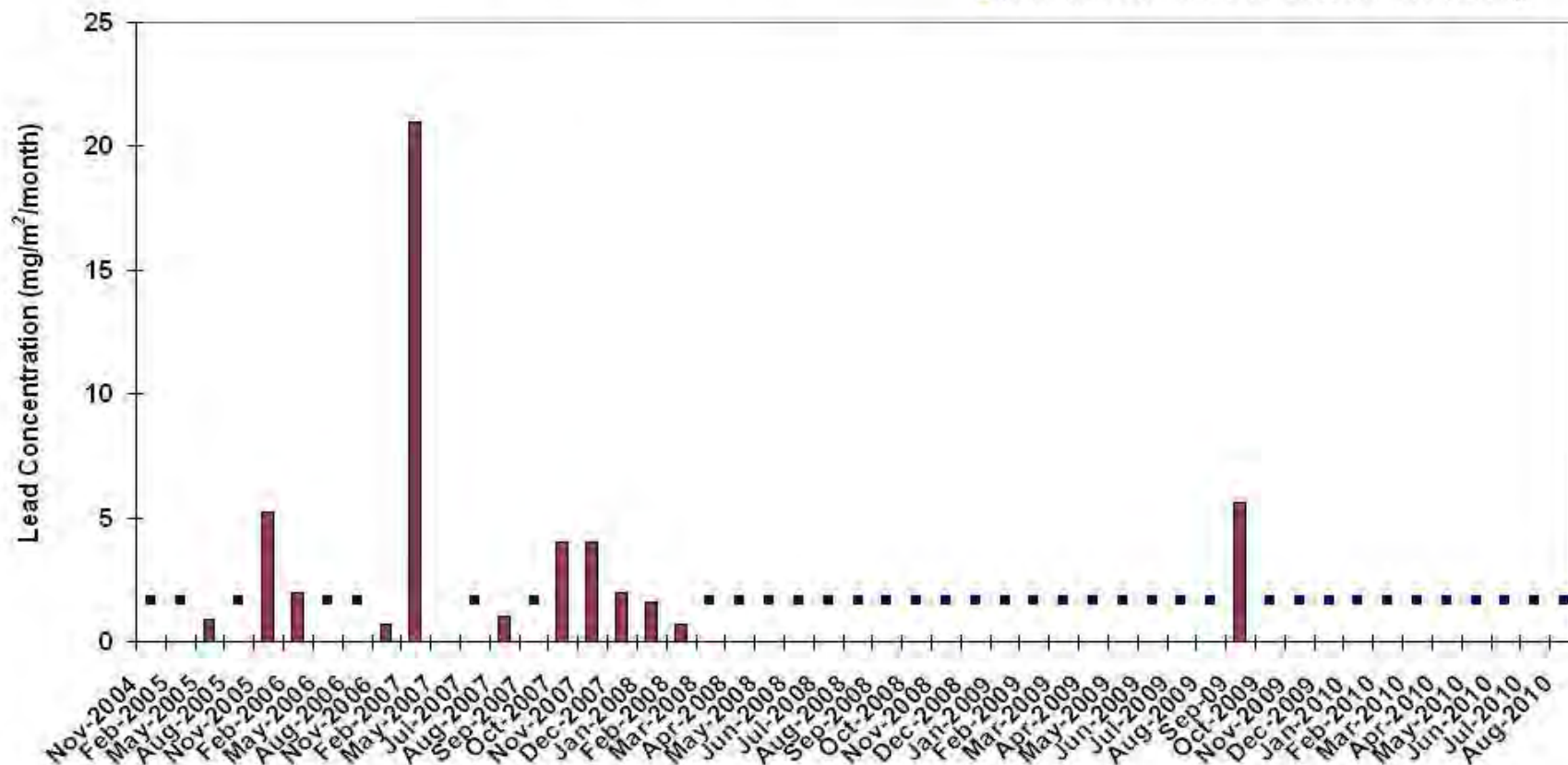
Lead results from Dust Deposition Gauges

- ❑ All community deposition gauges show very low levels of lead dust or below the limit of detection and in many cases for 24 months
- ❑ These data do not indicate recirculation of lead dust in air is an issue
- ❑ One anomalous reading at DG1 in September 2009



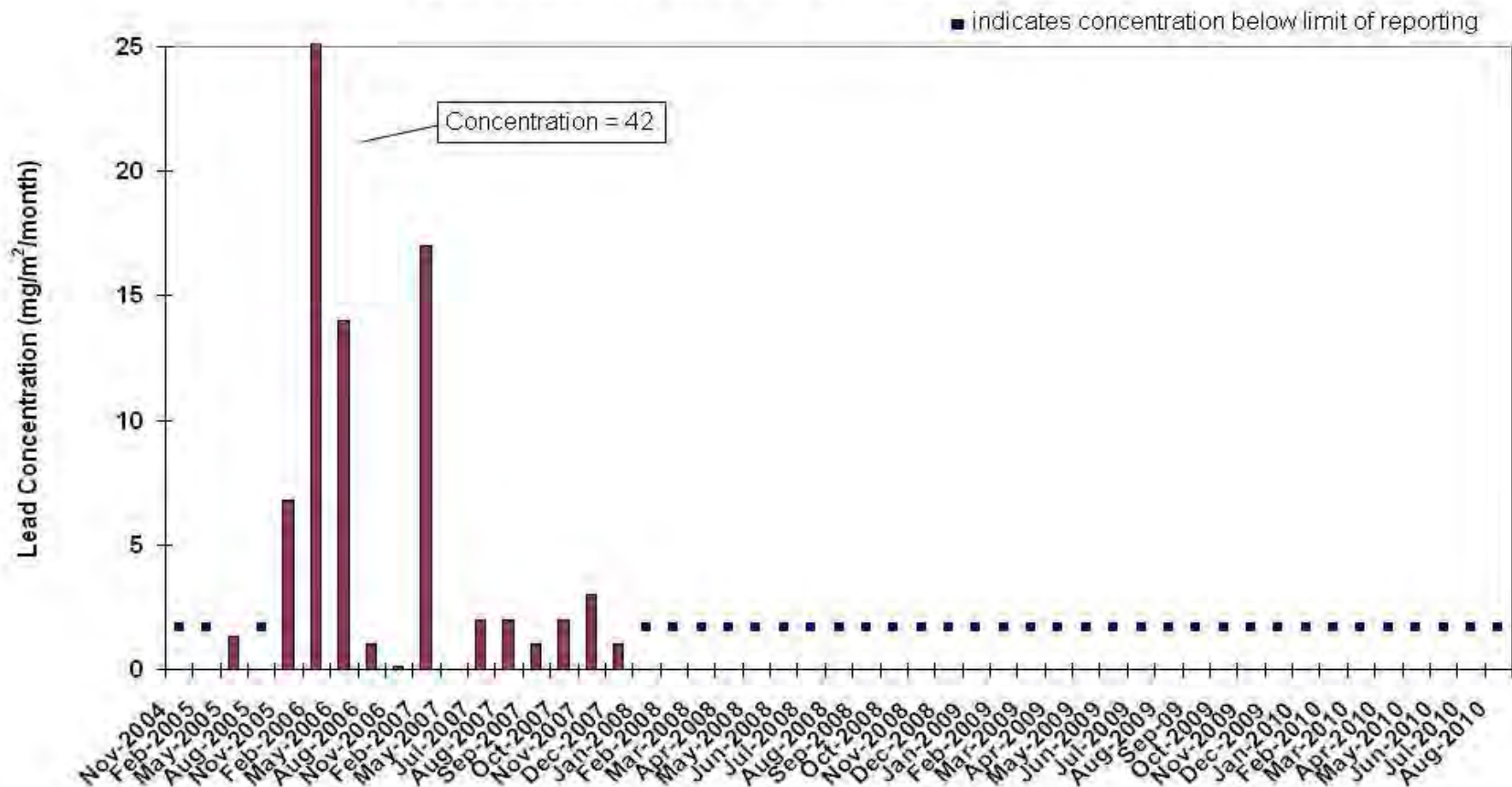
Lead Deposition on Dust Gauge DG1 at Esperance (neighbourhood gauge close to the Port)

■ indicates concentration below limit of reporting



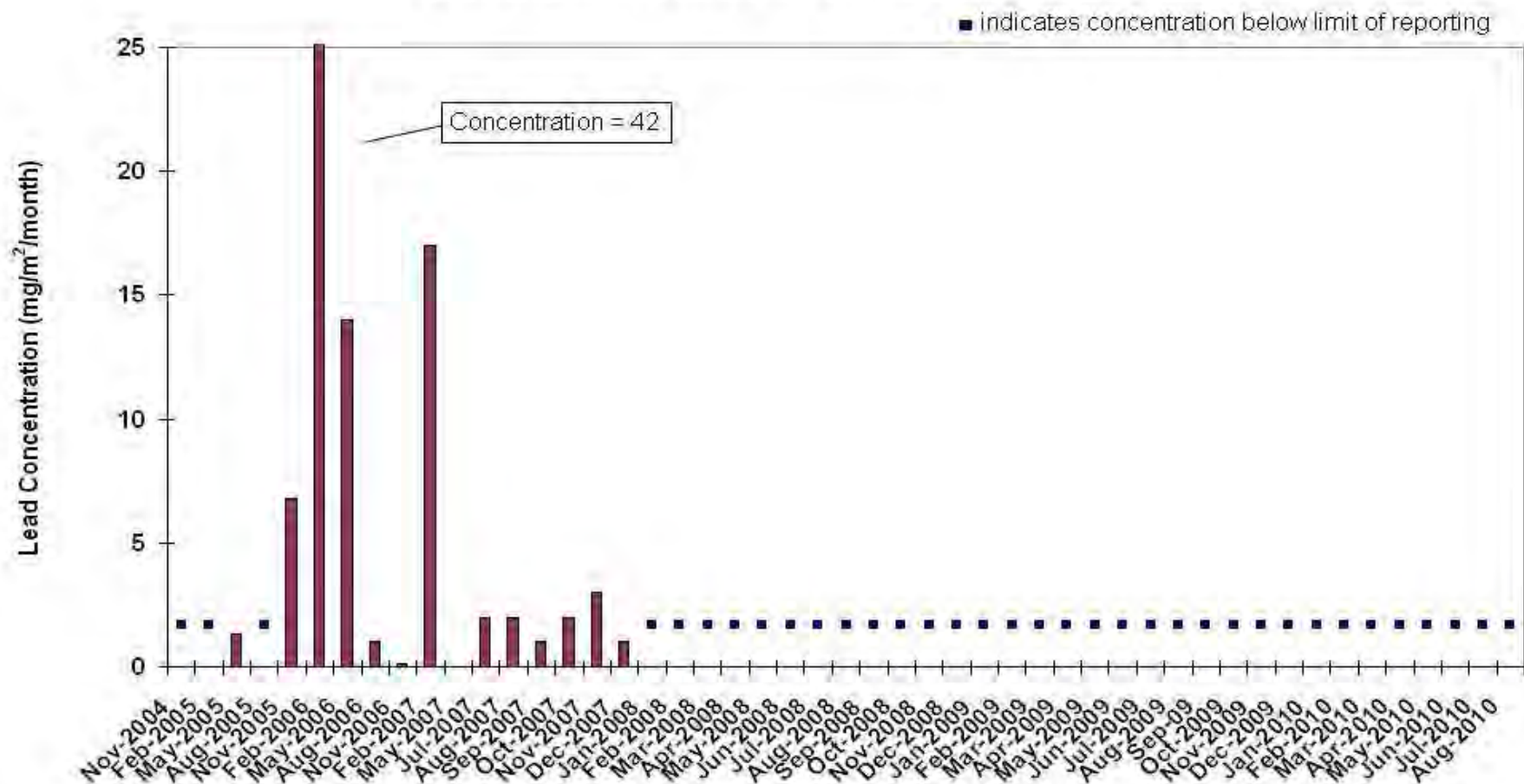


Lead Deposition on Gauge DG4 at Esperance





Lead Deposition on Gauge DG4 at Esperance





DEC's 2010 Vegetation Survey

- ❑ Third year of a 5 year program
- ❑ Resampled the same 17 sites from 2008
- ❑ Resampled 4 transects 3km long @ 500m intervals
- ❑ 24 sites of same species (Acacia Cyclops)
- ❑ 4 sites at Dempster Head
- ❑ 15 deciduous trees (to assess recirculation)
- ❑ About 160 samples taken each year
- ❑ Consolidated report being prepared on all data 2008 to 2010



Additional High volume Samplers

- ❑ To improve data on nickel and lead levels within the community, three extra highvols to be established.
- ❑ As required under the EPN, a new site has been established at the Shire offices
- ❑ Two additional highvols will be established west of the port in the community
- ❑ The extra data will enable better assessment of air quality in the town against the guidelines
- ❑ The extra data will also enable better assessment of any lead recirculation via the air