


Esperance Port Authority

Air Quality Monitoring

25 June 2009



Department of
Environment and Conservation

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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 has 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 DG13; & DG14 to DG19 from April'09) 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 ; DG14 to DG19 from April '09) monthly;
- ❑ An additional five rainwater tanks and associated deposition gauges, installed by 31 March 2009, were added to the monitoring program, results from these were included in the April report; and
- ❑ Monitoring of each ship loading of bulk nickel concentrate to be reported to DEC.





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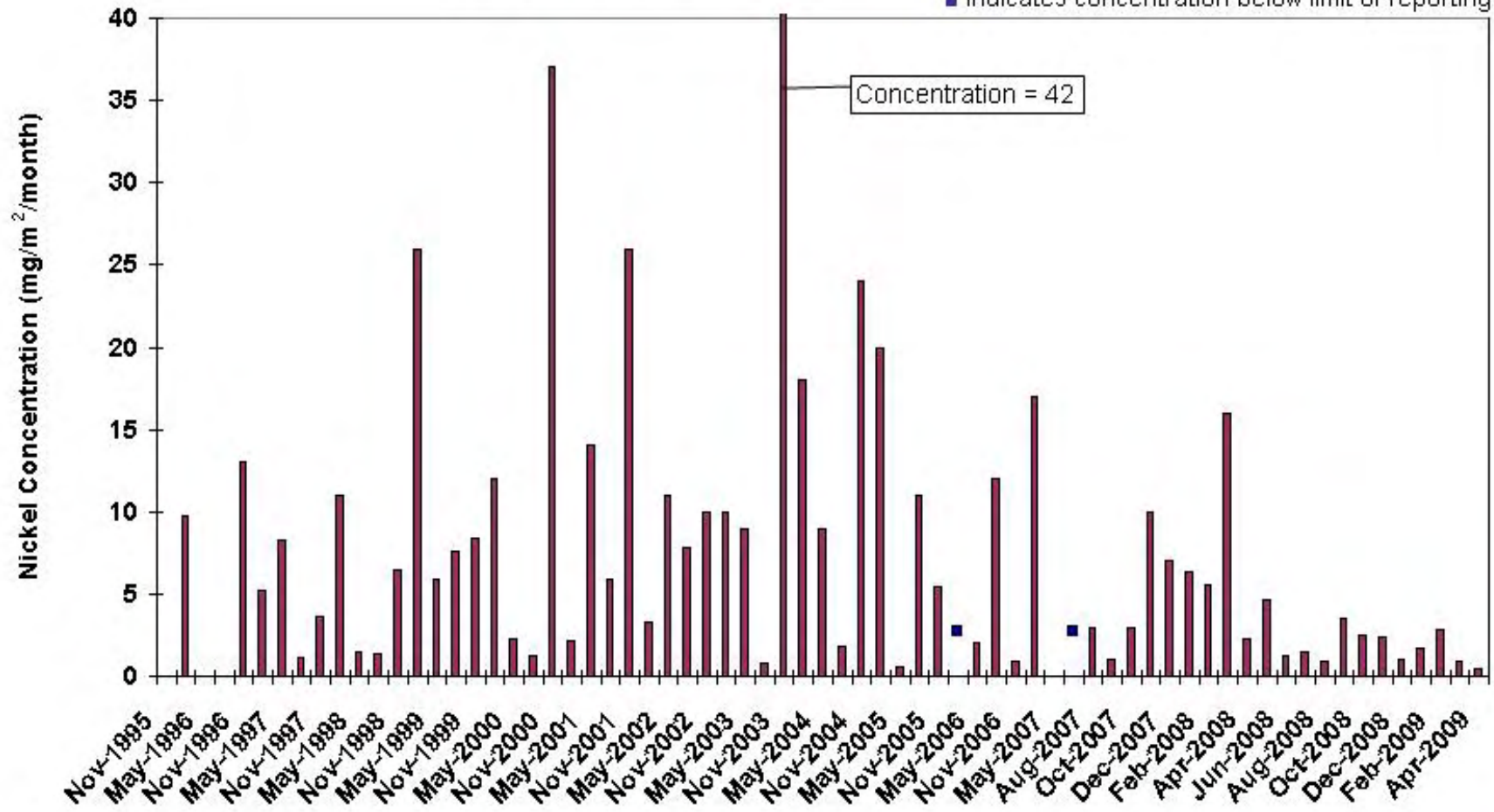
Deposition Gauges Results

- ❑ Over the last 12 months there has been an ongoing 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)

■ indicates concentration below limit of reporting

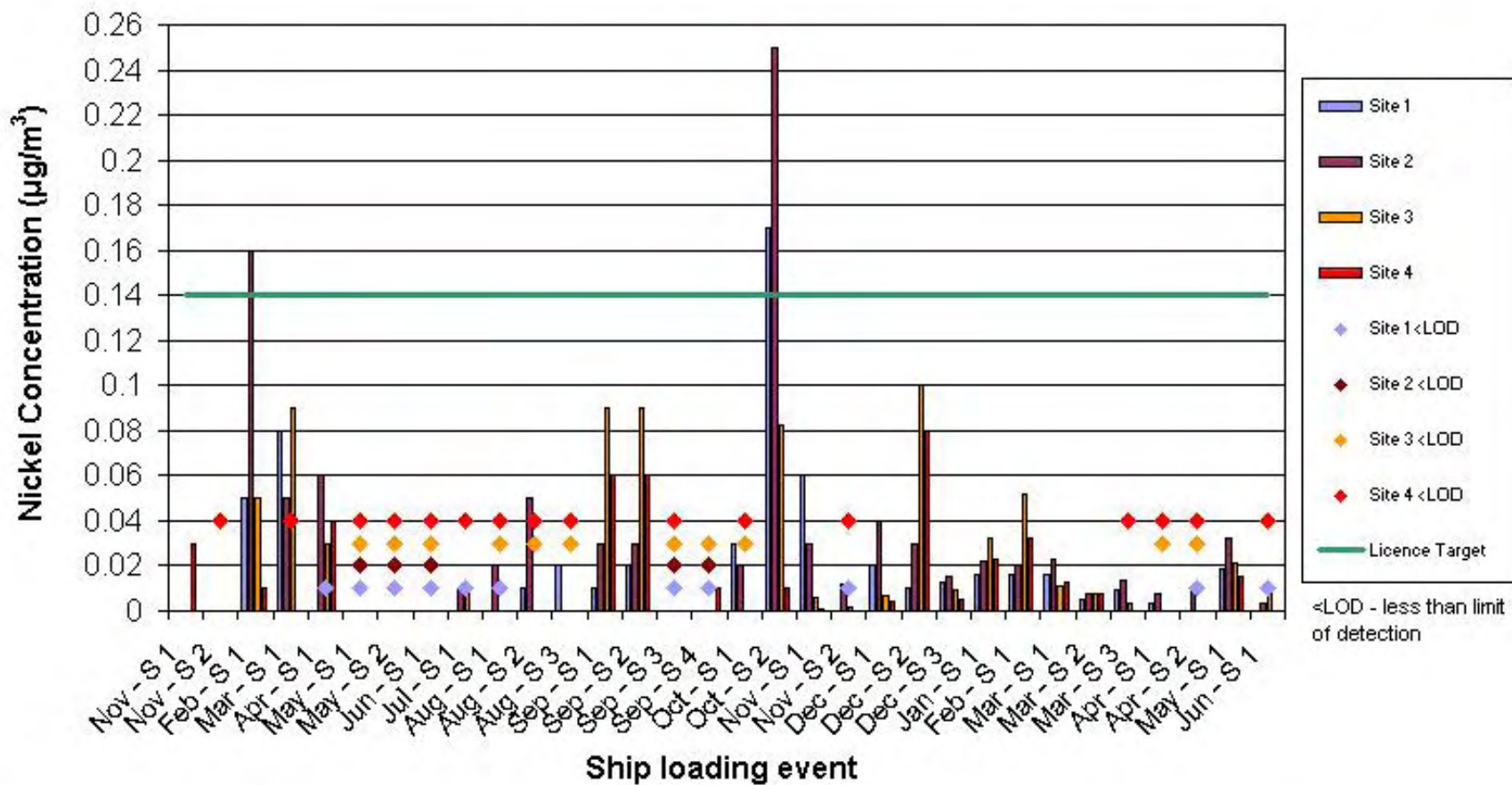


HVAS Nickel Analysis Results

- ❑ Between November 2007 and April 2009 the highest nickel levels (for each highvol site) for each ship loading during this period were graphed.
- ❑ Results indicate that two of the 30 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 (2007-2009)



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.
- ❑ There have been 11 bulk nickel ship loadings since the revised protocol was implemented and none of these exceeded the licence target.





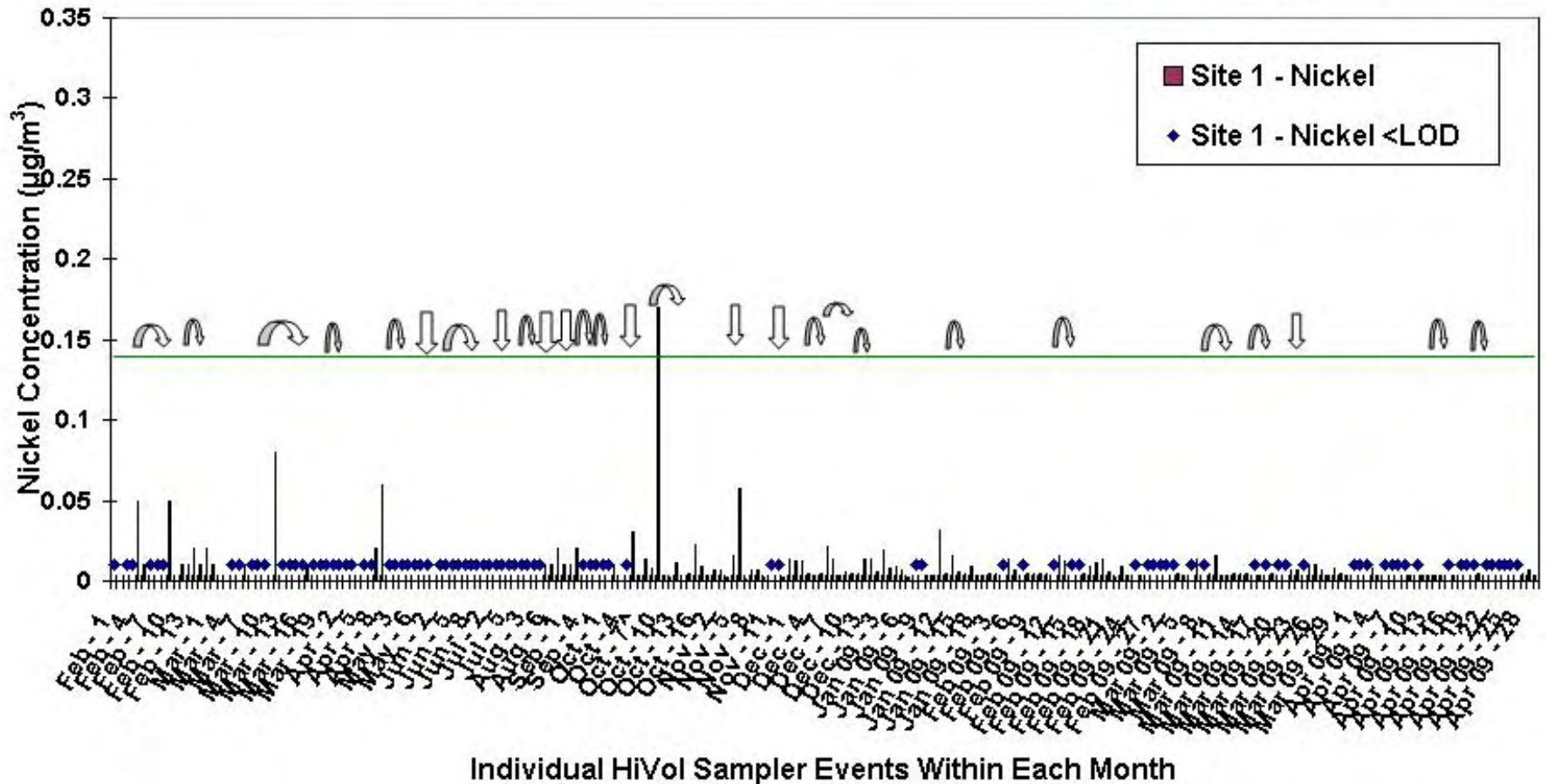
Nickel levels and the annual 0.003ug/m³ guideline

- ▣ Sites 1, 3 and 4 each show numerous 24 hr results where levels less than the guideline were recorded
- ▣ Site 2 has shown some levels below the guideline during March and April



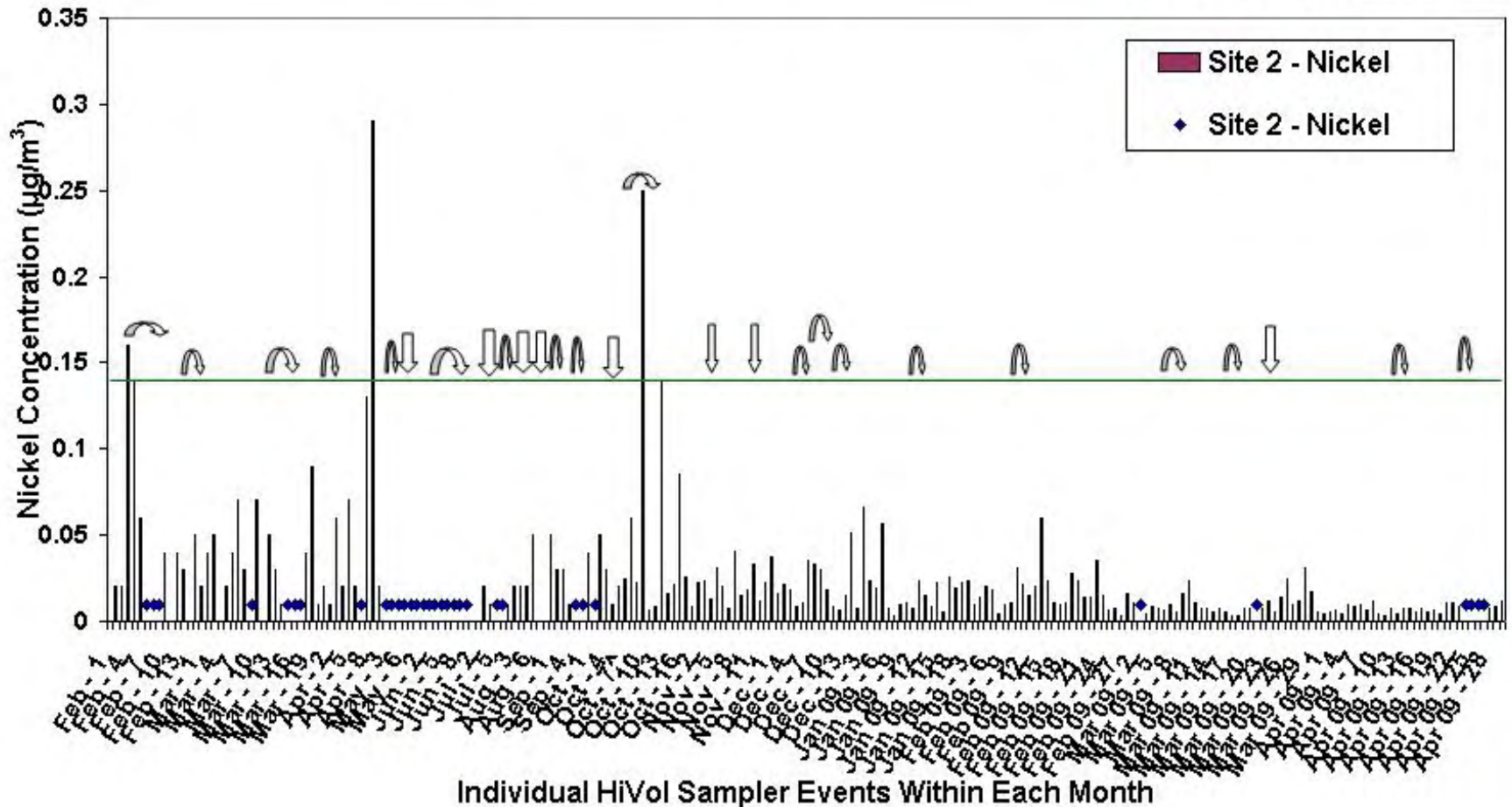
Nickel Levels at Site 1 High Volume Air Sampler (Esperance 2008 - 2009)

 Shiploading events
 Licence Target (0.14 $\mu\text{g}/\text{m}^3$)



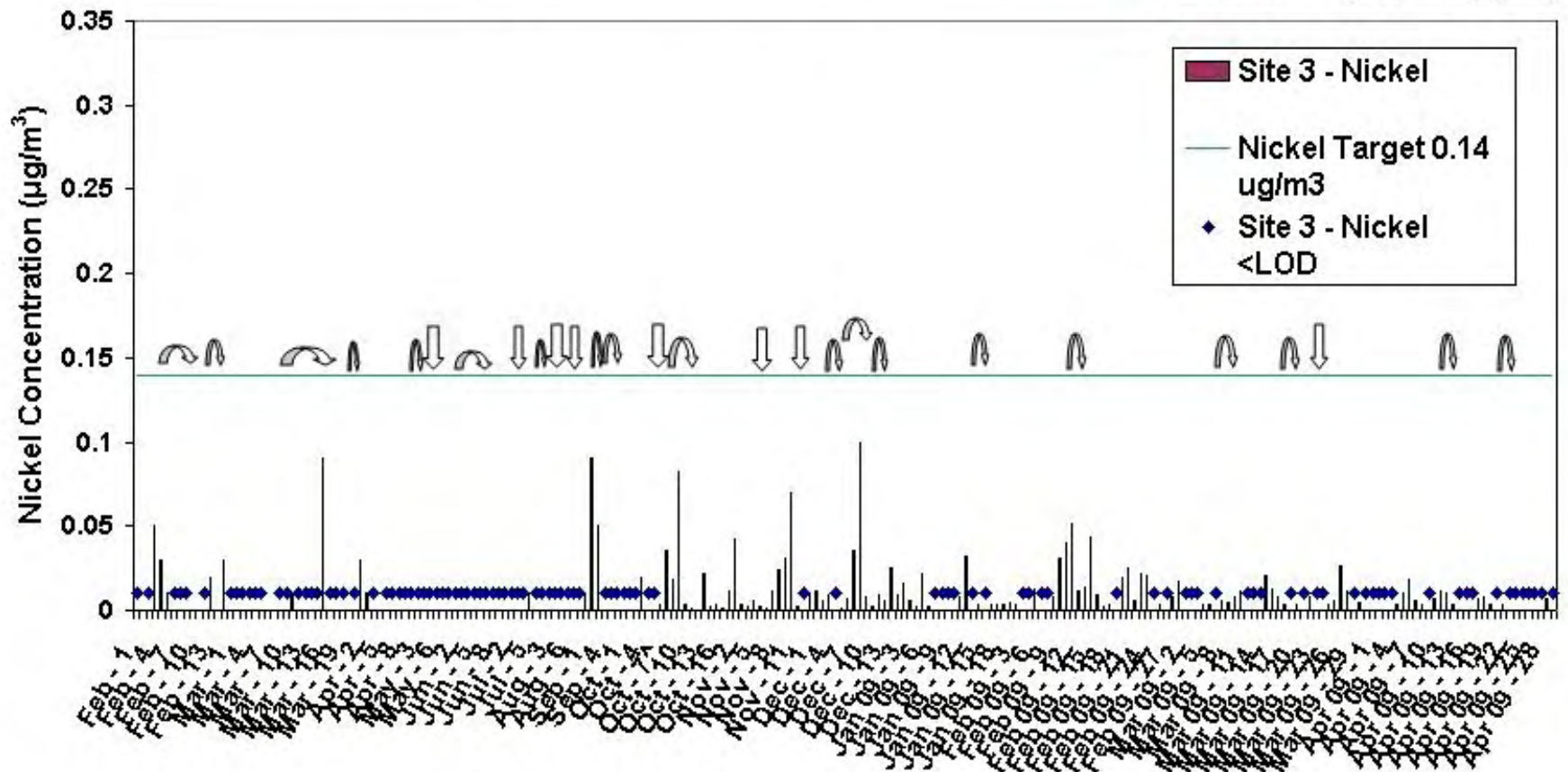
Nickel Levels at Site 2 High Volume Air Sampler (Esperance 2008 - 2009)

Shiploading events ↓
Licence Target ($0.14 \mu\text{g}/\text{m}^3$)



Nickel Levels at Site 3 High Volume Air Sampler (Esperance 2008 - 2009)

↷ Shiploading events ↓
— Licence Target (0.14 $\mu\text{g}/\text{m}^3$)

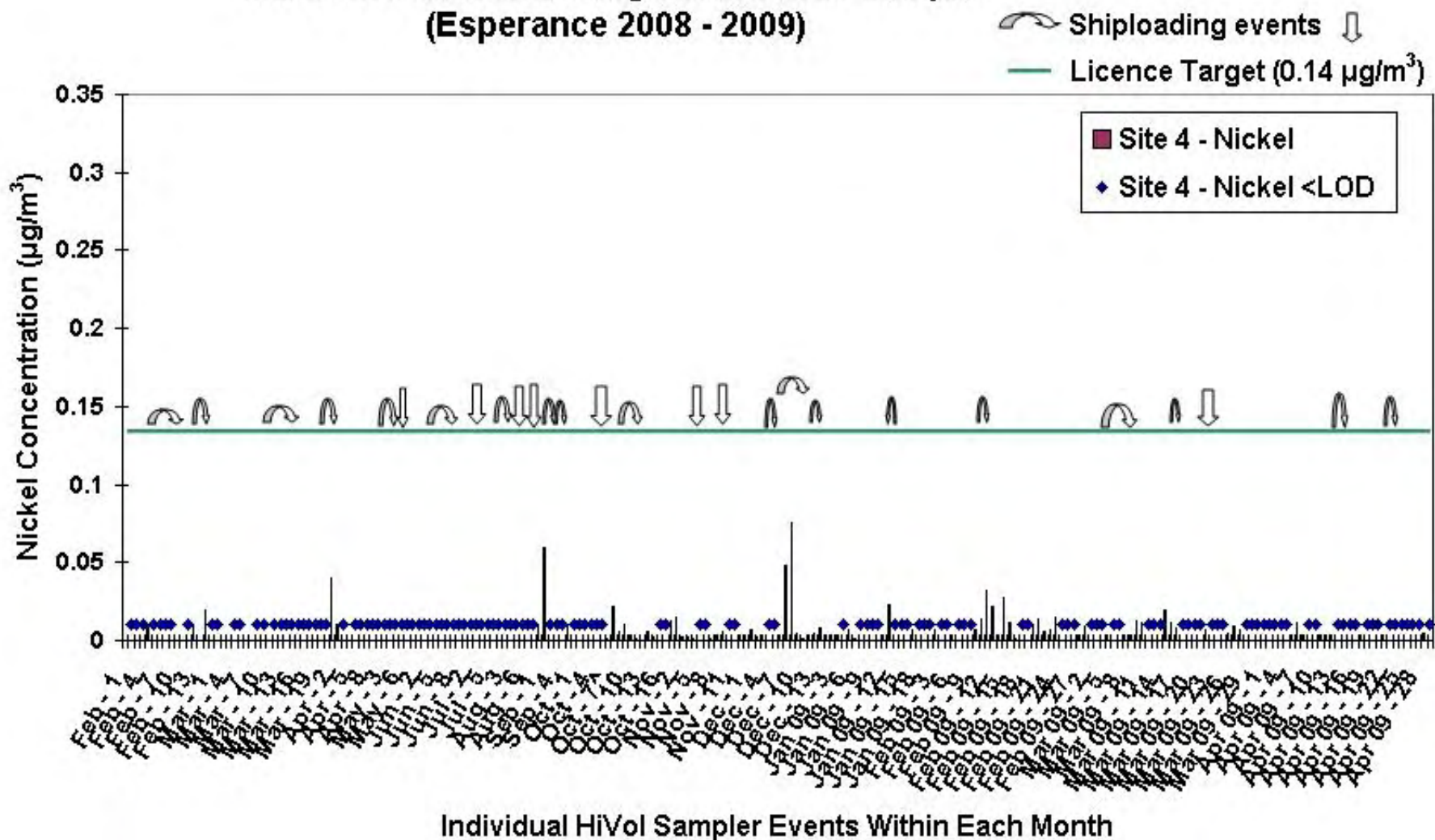


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Nickel Levels at Site 4 High Volume Air Sampler (Esperance 2008 - 2009)



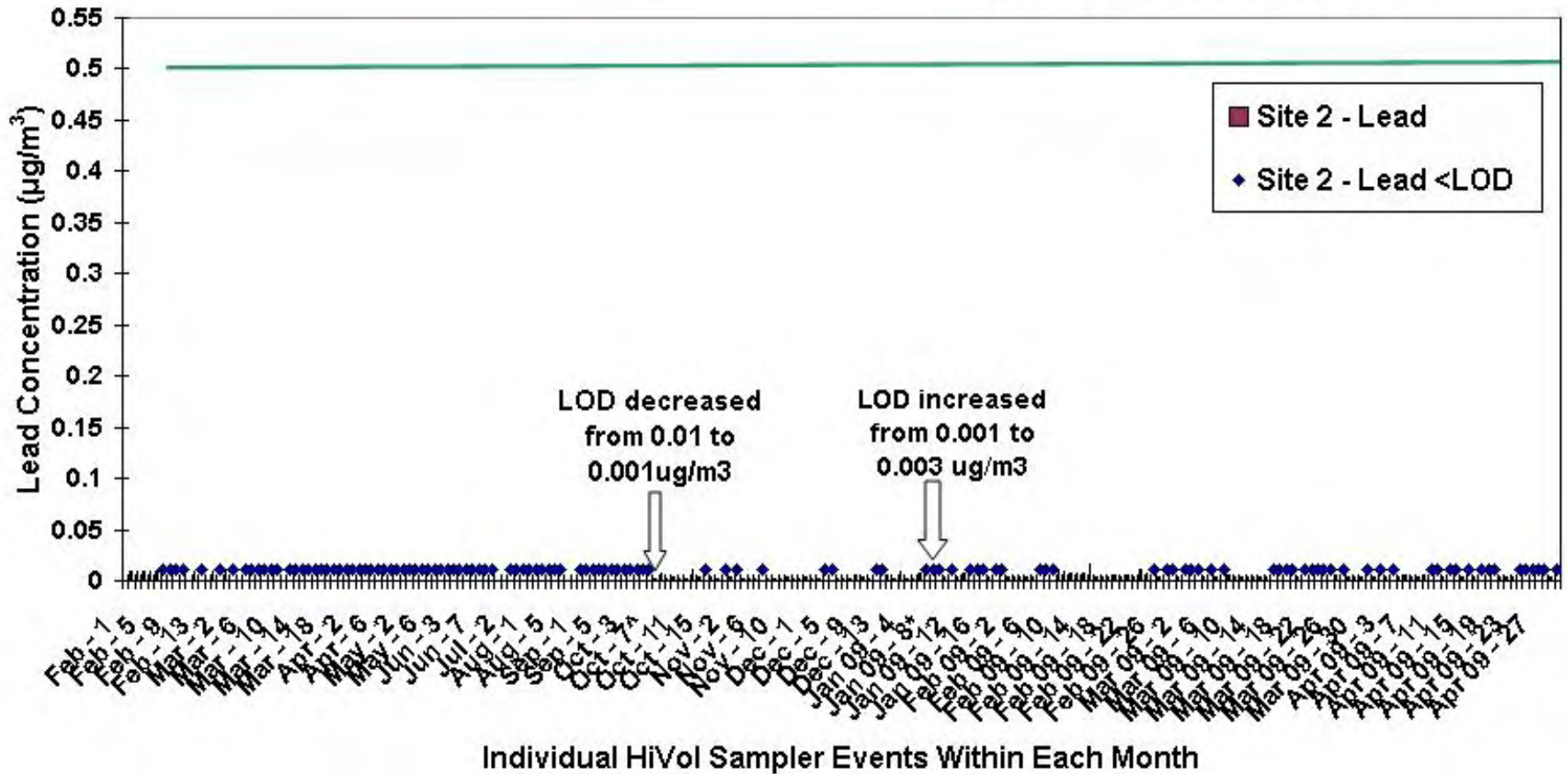
Lead levels from highvols

- ❑ Highvol results 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 2008 - 2009)

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



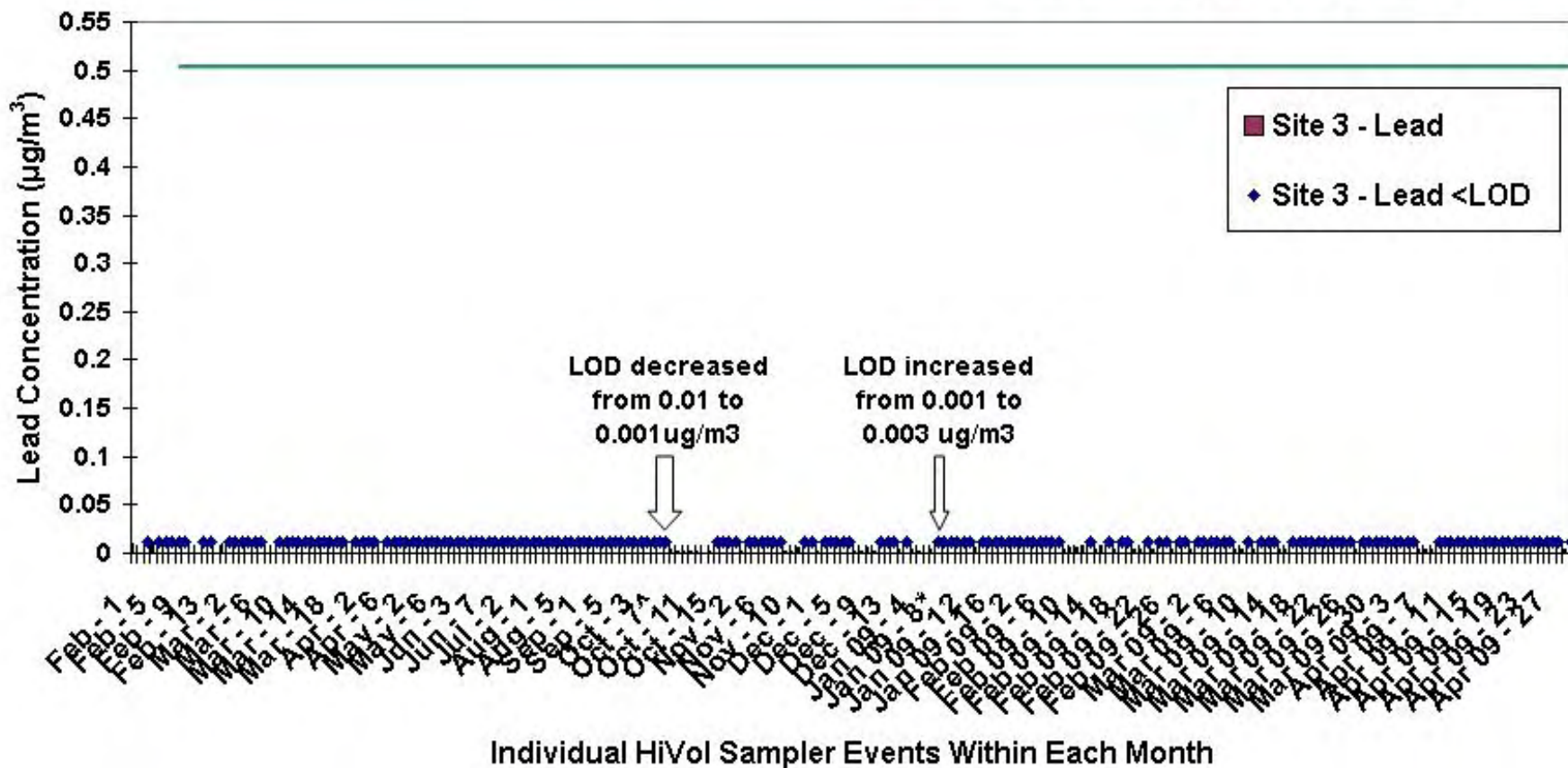
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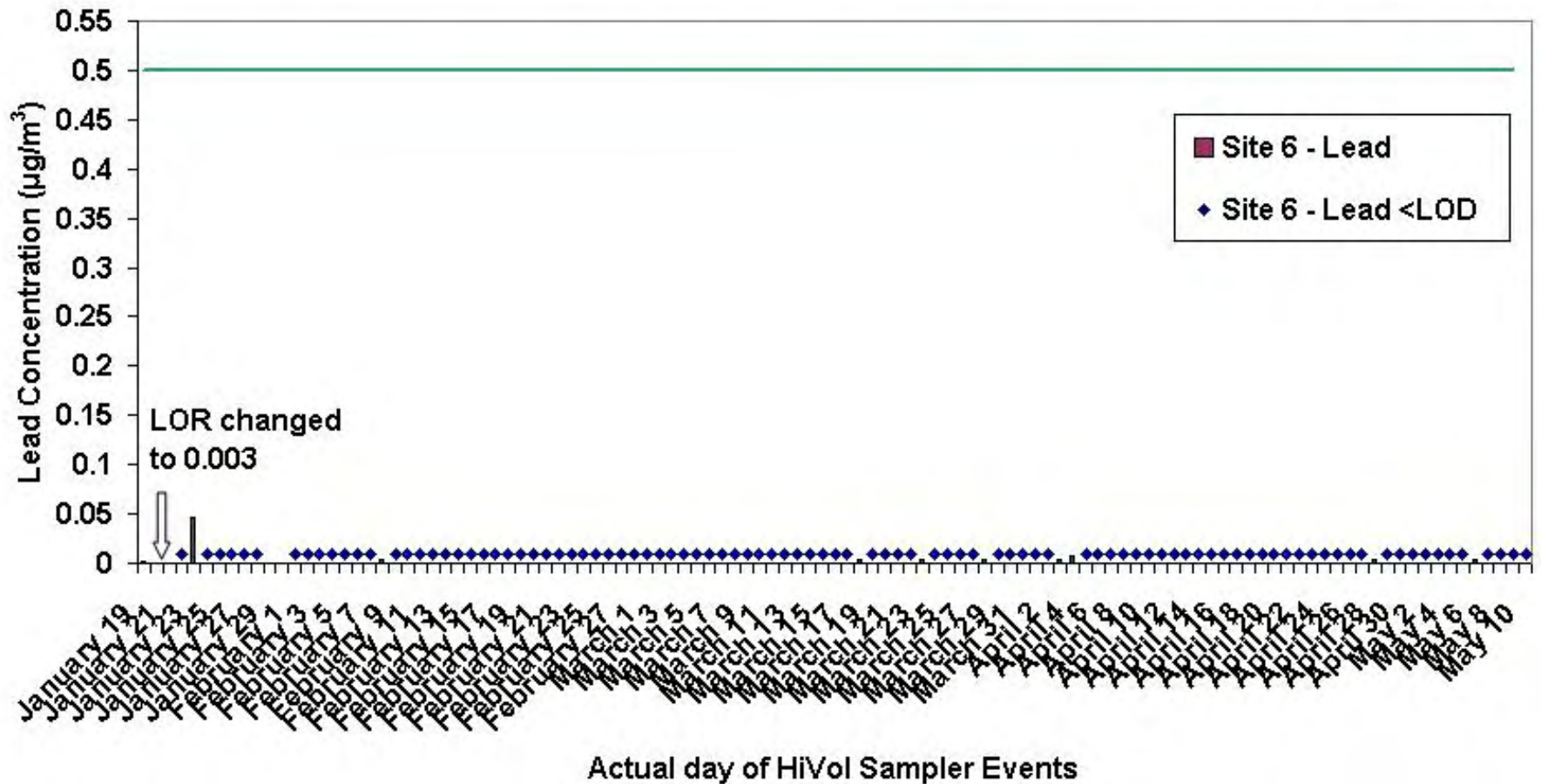
Lead Levels at Site 3 High Volume Air Sampler (Esperance 2008 - 2009)

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



Lead Levels at Site 6 (Lead shed exhaust) High Volume Air Sampler

(Esperance 2009) — NEPM Standard (0.5 µg/m³) (Annual)



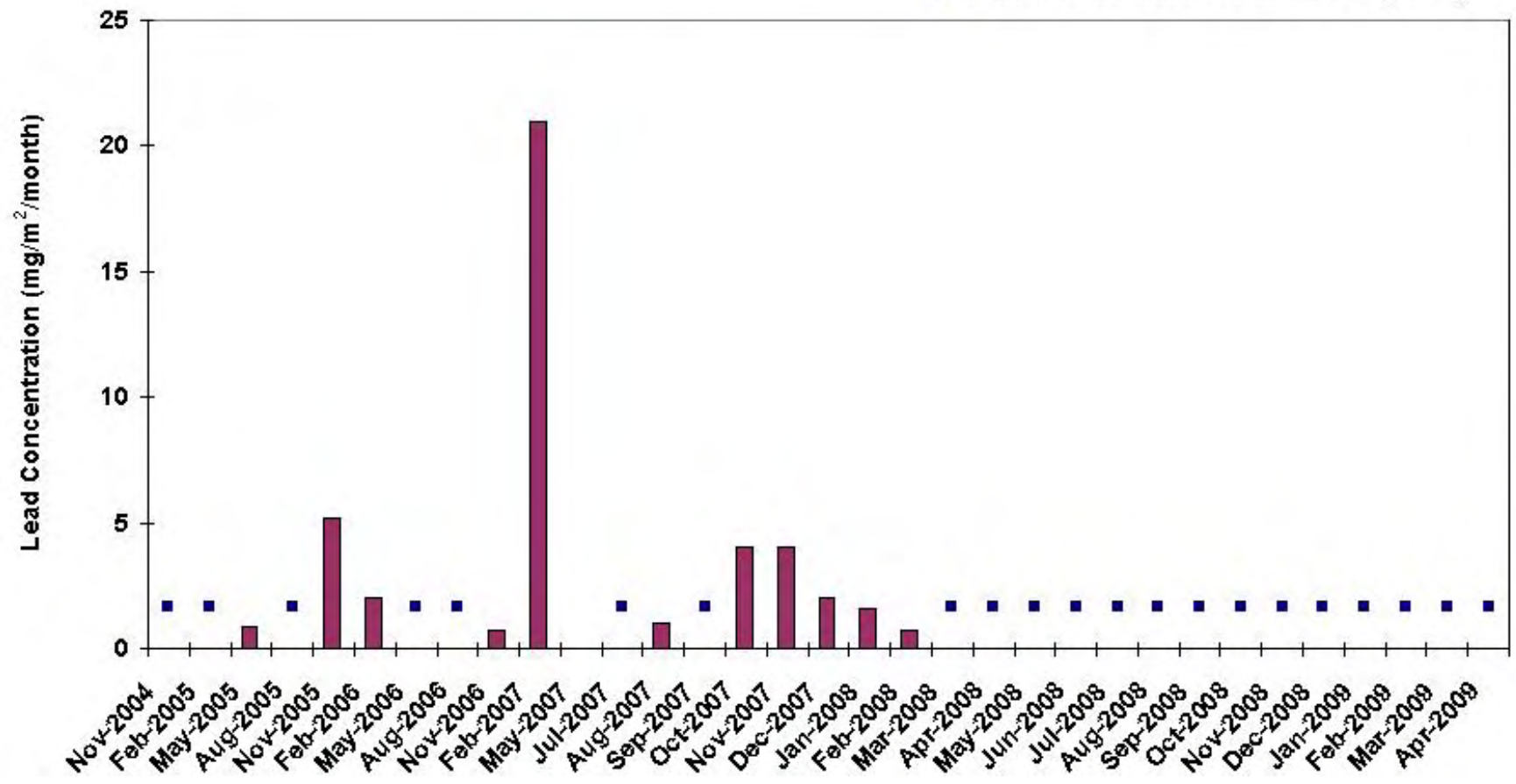
Lead results from Dust Deposition Gauges

- ❑ All community deposition gauges show very low levels of lead dust or below the limit of detection. Five community sites (DG 3, 4, 6, 7 & 8) have shown 16 consecutive months where lead levels were below the limit of detection.
- ❑ These data do not indicate recirculation of lead dust in air is an issue.



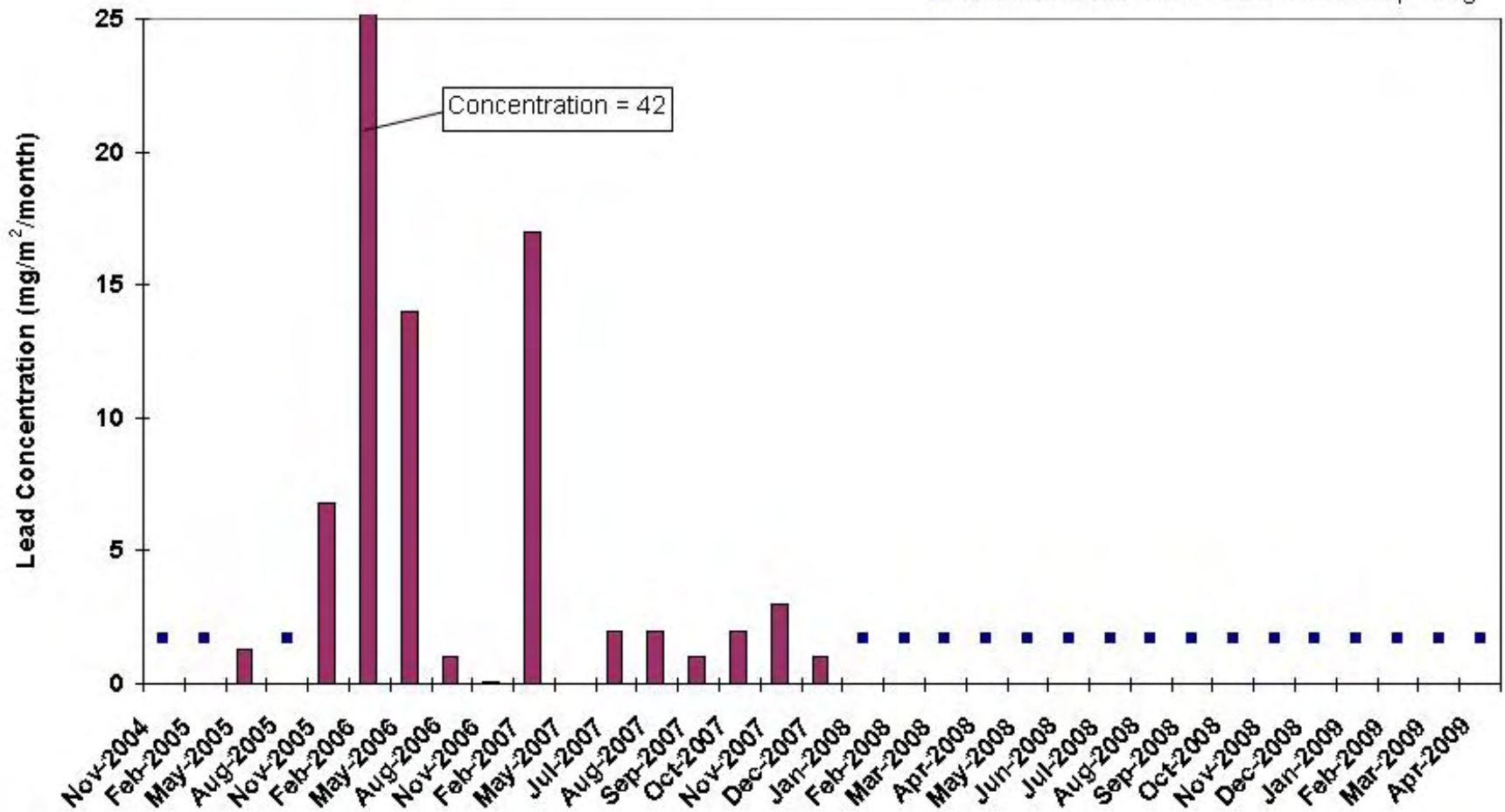
Lead Deposition on Dust Gauge DG1 at Esperance (neighbourhood gauge close to the Port)

■ indicates concentration below limit of reporting



Lead Deposition on Gauge DG4 at Esperance

■ indicates concentration below limit of reporting



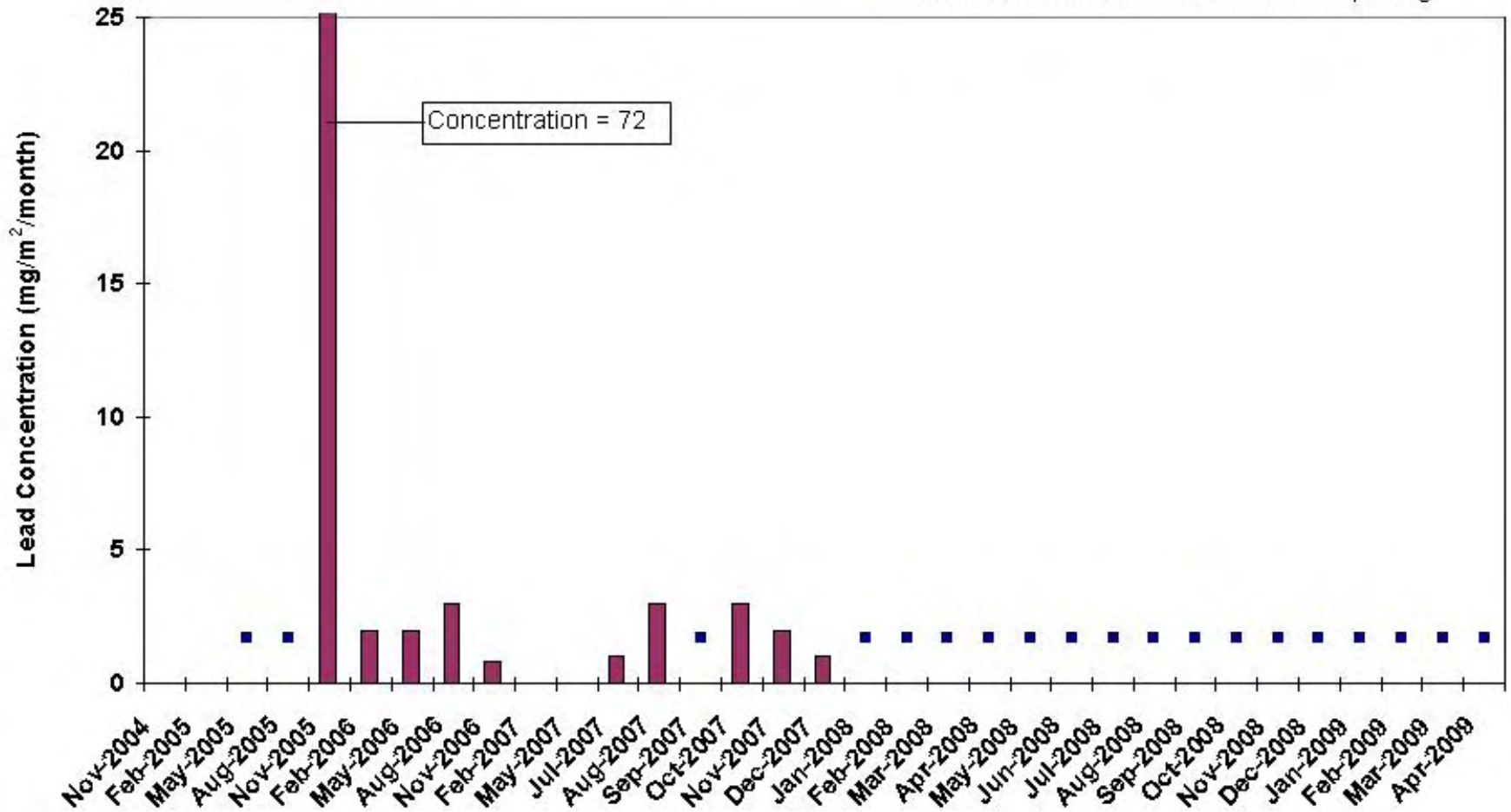
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Lead Deposition on Gauge DG8 at Esperance

■ indicates concentration below limit of reporting



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DEC's March 2009 Vegetation Survey

- ❑ Second year of a 5 year program
- ❑ Resampled the same 17 sites from 2008
- ❑ 4 new transects 3km long @ 500m interval
- ❑ 24 new sites of same species (Acacia Cyclops)
- ❑ 4 new sites at Dempster Head
- ❑ 15 deciduous trees (to assess recirculation)
- ❑ Around 160 samples
- ❑ Report being prepared



Additional High volume Samplers

- ❑ To improve data on nickel and lead levels within the community, three extra highvols will be established.
- ❑ As required under the EPN, a new site is being established by the Port 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 enable better assessment of any lead recirculation via the air



Air Monitoring results from lead shed negative pressure exhaust

- ❑ DEC Osiris monitoring pre-start very low levels of dust, highvol confirmed low lead
- ❑ Osiris and highvol during assembly of bagging machine showed ongoing low levels
- ❑ Highvol (site 6) shows consistent close to or less than limit of detection (0.003ug/m³) of lead during bagging operations
- ❑ Osiris now removed as task met
- ❑ Bagging the lead stockpile is finished and it has been exported; shed clean-up has been completed and demolition commenced.



Air Monitoring results from lead shed negative pressure exhaust

- ❑ The negative pressure unit will be run continuously during demolition activities.
- ❑ Monitoring and reporting on air quality from the exhaust will continue until demolition of the inner shed is complete.

