

Explaining Operational Sampling Lead Levels

What are Magellan's lead monitoring requirements?

Magellan's approval to export sealed shipments of lead carbonate through Fremantle is subject to the implementation conditions set out in Statement 783 published on 2 February 2009 by the Minister for Environment. Condition 9-1 of Statement 783 requires implementation of a Health, Hygiene and Environmental Monitoring Program (Program). One of the key requirements is that lead monitoring results during transport operations must not exceed the baseline levels along the 1250 kilometre long road and rail corridor from the company's mine site near Wiluna to the Fremantle Port.

The approved Program to verify compliance with this condition has been designed to determine whether Magellan lead has entered the environment. The transport corridor has been used to transport a range of materials over many years. Those materials would have included many materials which would have contained lead including lead in petrol and lead based paints. Therefore, prior to commencing transport of Magellan lead, Magellan Metals carried out systematic sampling along the transport route from Wiluna to Fremantle to determine the existing levels of lead in the environment.

The pre-commencement sampling program established baseline lead trigger levels, which, if they are exceeded (once transport commences), trigger contingency measures as required under Statement 783. The monitoring undertaken includes soil, water, air, static dust deposition and benthic sediment monitoring at Fremantle Port.

Sampling program

Baseline sampling and derivation of 'trigger' levels is described under the Baseline Sampling section of this website. The trigger levels with which operational sampling (that is, samples taken after commencement of lead carbonate transport) results are compared in the tables in the Operational Sampling section are those established during baseline sampling.

Sample sites

Sampling locations for operational monitoring are:

- 21 dust sampling sites along the rail corridor
- 2 air quality sampling sites at Fremantle Port
- 19 rainwater tank sites along the rail corridor
- 251 soil sites along the road and rail corridor
- 15 drainage sumps at Fremantle Port
- 20 marine sediment sites at Fremantle Port.

For sampling frequency, see the Health, Hygiene and Environmental Monitoring Program.

Trigger levels have been established at each site for each parameter monitored. In addition, air quality monitoring is being undertaken inside independently and randomly selected containers during the sealed shipments.

Why does Magellan monitor static dust deposition?

Static dust deposition monitoring is undertaken to determine the concentration of lead in dust deposited at sampling sites. If Magellan lead carbonate is released into the environment in even very small quantities, it would immediately cause a significant spike in lead concentration levels in dust collected in the static dust deposition monitors. If levels of lead concentration in dust are greater than baseline trigger levels Magellan is required to 'fingerprint' the lead present by isotope analysis to determine if the lead is of Magellan origin. This technique can readily differentiate Magellan lead from other lead sources.

What do the monitoring results mean?

The table on the next page highlights the general locality of the sampling, the specific location using GPS points, the relevant trigger level established for each site, and shows operational monitoring data for each at each sample date.

To establish the baseline levels, monitoring was carried out using a series of depositional dust gauges [21 in total] and reported on a monthly basis. The results are reported as a concentration of lead in the total dust i.e. as mg/kg, and trigger levels were

established from the data (see Baseline and Operational Sampling sections of this website). Note that trigger levels may change as a result of isotope testing results. If the trigger level at any site changes, the tables below will be updated accordingly on the website tables.

There are no health guidelines for safe levels of dust deposition measured by this technique and it is not appropriate to compare these data with the Health Investigational Levels such as for soils.

Five High Volume air samplers, two of which were co-located with the static dust deposition gauges in areas of sensitivity and are now permanently deployed, were used to establish baseline ambient lead dust in the air and provide guidance as to any health risk. In Australia the Ambient Air Quality National Environment Protection Measure (NEPM) specifies an ambient standard of 0.5 $\mu\text{g}/\text{m}^3$ for lead, based on the protection of human health. The baseline airborne lead results from the High-Volume Air Samplers were all well below the Ambient Air Quality National Environment Protection Measure for lead.

The Department of Health has reviewed the results of the baseline lead monitoring along the transport route and advised that the levels found do not present as a risk to public health.

Static Dust Sampling

Site Number	AGD84 Easting	AGD84 Northing	Site Location	Lead (mg/kg) Trigger Level	Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10
SDMTRS01	381591	6454322	Fremantle Port	4600	120^	190#	4600#	<100	<100	130	<100	<100	<100
SDMTRS02	380982	6453828	Fremantle Port	390	120	390#	150	<100	<100	<100	<100	<100	100
SDMTRS03	380654	6453299	Fremantle Port	650	170	330	200	150	130	110	<100	<100	140
SDMTRS04	381543	6453336	Fremantle Port	1100	<100	150	140	<100	<100	<100	<100	<100	1000
SDMTRS05	382178	6454397	Fremantle Port	840	170	670	200	140	150	170	<100	<100	200
SDMTRS06	405452	6470914	Midland	340	<100	290#	<100	<100	<100	110	<100	<100	340#
SDMTRS07	406993	6470568	Midland	600	<100	600#	NA	<100	100	140	<100	<100	350
SDMTRS08	470535	6498088	Northam	1800	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP
SDMTRS09	470035	6498119	Northam	150	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP
SDMTRS10	567496	6499779	Kellerberrin	300	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP
SDMTRS11	568471	6499812	Kellerberrin	640	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP
SDMTRS12	616399	6515069	Merredin	190	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP
SDMTRS13	616365	6515108	Merredin	120	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP
SDMTRS14	720172	6544365	Southern Cross	310	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP
SDMTRS15	720130	6544381	Southern Cross	340	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP
SDMTRS16	352008	6596301	Kalgoorlie	260	OSP	BB	OSP	260#	OSP	<100	OSP	<100	OSP
SDMTRS17	348972	6593826	Kalgoorlie	620	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP
SDMTRS18	336266	6805106	Leonora	770	OSP	360	OSP	310	OSP	210	OSP	<100	OSP
SDMTRS19	336227	6805096	Leonora	410	OSP	240	OSP	170	OSP	240	OSP	<100	OSP
SDMTRS20	381777	6454719	Fremantle	320	110	190	<100	130	<100	<100	<100	<100	320#
SDMTRS21	382184	6453541	Fremantle	257	200	200	180	130	120	180	<100	<100	200

OSP = Outside sampling period BB = Broken bottle MB = Missing bottle NA = No Access to bottle

^ Above baseline but within Measurement of Uncertainty (MoU). MoU is a measure of precision around monitoring data results. Some imprecision arises from laboratory analysis techniques, equipment and other sources, in particular when very low concentrations are being measured, such as those in samples from the Magellan monitoring program. For very low concentrations, the uncertainty around a particular value is typically in the order of 10-20% of the measured value, depending on the value and what is being analysed.

This sample was isotopically analysed and has been determined not to be Magellan Metals' lead. The lead reading then becomes Magellan Metals' revised trigger level for the monitoring location.