

Magellan's Transport Route Lead Monitoring Program

Magellan's lead monitoring requirements

Magellan's approval to export sealed shipments of lead carbonate through Fremantle is subject to the Interim Implementation Conditions set by the Minister for Environment on 23 February 2011. Condition 8 requires implementation of an approved Health, Hygiene and Environmental Monitoring Program (Program), to monitor lead levels at sample sites along the transport route from Wiluna to, and through, the Port of Fremantle. Monitoring conducted under this condition includes soil, water, air, and static dust deposition along the 1250 kilometre long road and rail transport corridor from the company's mine site near Wiluna to the Fremantle Port and drainage sediment and benthic sediment monitoring at Fremantle Port.

Tables 9 and 11 of the Program document identify contingency actions to be undertaken by Magellan if monitoring results obtained during transport operations confirm lead levels exceed lead baseline trigger levels (see below).

Derivation of Lead Baseline Trigger Levels

Pre-transport Lead Baseline Trigger Levels

Prior to being used by Magellan, the transport corridor was used for the transport of a range of materials over many years, including leaded petrol, lead based paints and other lead products. Therefore, prior to commencing transport, systematic sampling was undertaken by Magellan along the corridor to establish pre-transport lead baseline levels at each monitoring site for each type of monitoring (see Appendix 1 of the Program). From this sampling, the highest lead level recorded at each site for each type of monitoring was adopted by Magellan as the pre-transport lead baseline trigger level.

See column headed Pre Transport Lead Baseline Trigger Level on the attached table.

Transport Route Lead Baseline Trigger Levels

Under the Program, if monitoring identifies an exceedance of the lead baseline trigger level at any site after transport operations commenced, Magellan is required to undertake isotopic testing to determine if the lead is from the Magellan mine. Isotope testing is able to differentiate Magellan lead from other sources of lead and is a process used throughout the world to identify the source of various materials.

If it is found that the lead does not come from the Magellan mine, the lead level identified then becomes the new lead baseline trigger level for that site. This process is described in Appendix 1 of the Program.

See columns headed Transport Route Lead Baseline Trigger Levels on the attached table, which include the lead baseline trigger levels as they have been amended post commencement of transport operations.

Lead Baseline Trigger Levels under the Interim Implementation Conditions

The Interim Implementation Conditions set by the Minister for Environment on 23 February 2011 set the lead baseline trigger level as the transport route lead baseline trigger levels updated at February 2011. The conditions note that these levels may continue to change as further monitoring results are received (see Condition 21).

The Interim Implementation Conditions also set a ceiling on the lead baseline trigger levels, meaning that the lead baseline trigger level is the lower of the transport route lead baseline trigger level as it is derived from time to time under the Program, or the specific value set out in the Condition 21 of the Interim Implementation Conditions.

See column headed Lead Baseline Trigger Level at February 2011 under Interim Implementation Conditions, on the attached table.

Lead Baseline Trigger Levels beyond February 2011

Changes to the lead baseline trigger levels beyond February 2011 are added to the attached table, in column headed Lead Baseline Trigger Level (date).

Sample sites

Sampling locations for operational monitoring are:

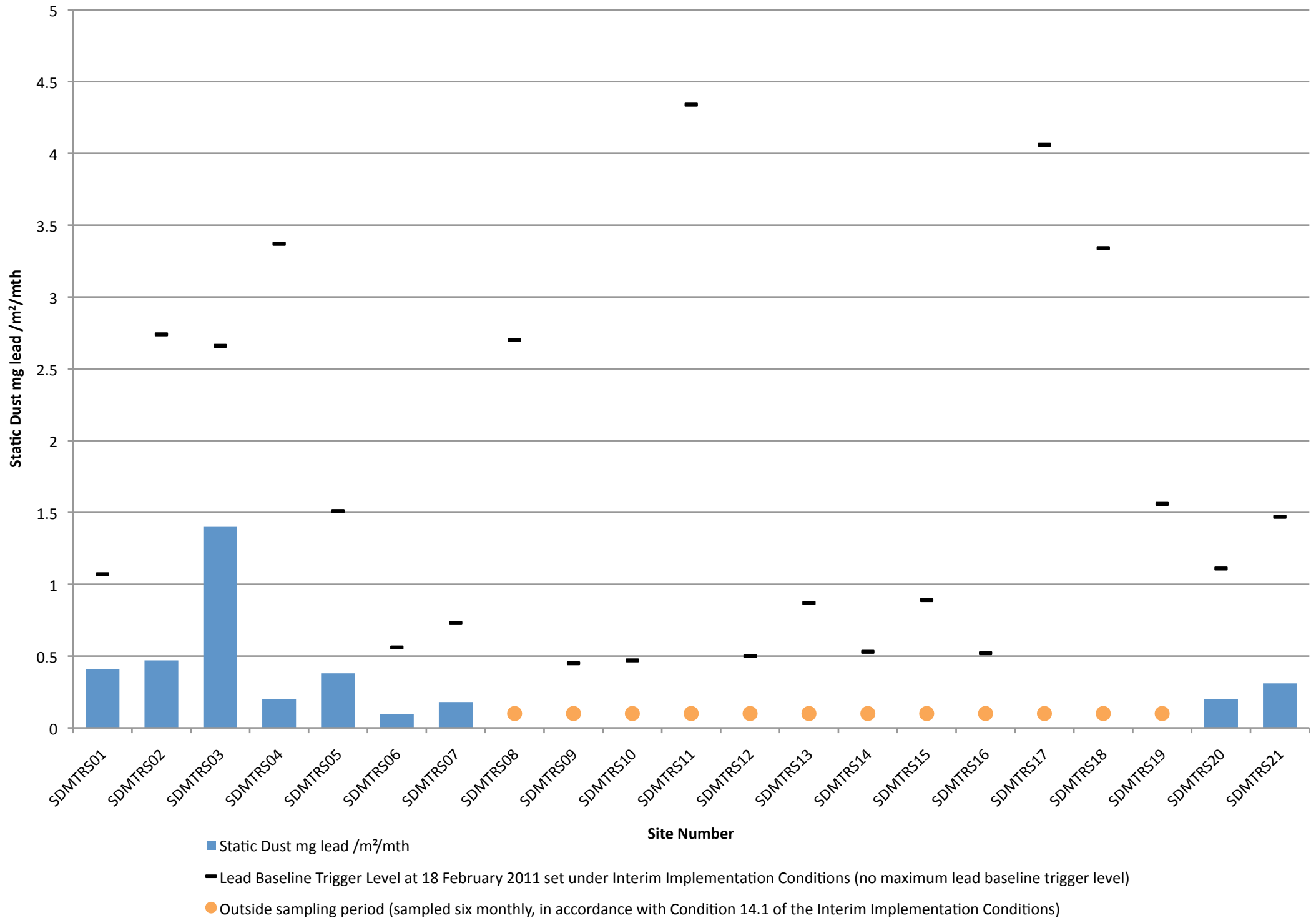
- 21 dust sampling sites along the rail corridor
- 2 air quality sampling sites at Fremantle Port
- 19 rainwater tank sites along the rail corridor
- 251 soil sites along the road and rail corridor
- 15 drainage sumps at Fremantle Port
- 20 marine sediment sites at Fremantle Port.

Air quality monitoring is also undertaken inside one per cent of containers leaving the mine site. These containers are randomly selected by the independent inspector.

For further detail on sampling sites and frequency, see the Program and the tables in this section of the website and the Interim Implementation Conditions.

Static Dust November 2011

Note: As per Interim Implementation Conditions there is no maximum lead baseline trigger level for static dust sampling.



Static Dust Sampling

Frequency of Sampling: Along the transport route, baseline static dust samples were collected nine times prior to the commencement of sealed lead concentrate transportation in September 2009, then monthly at SDMTRS01, SDMTRS07, SDMTRS20 and SDMTRS21 and six-monthly at SDMTRS08 - SDMTRS19 during March/April and September/October.

Site Number	AGD84 Easting	AGD84 Northing	Site Location	Pre Transport Lead Baseline Trigger Level	Transport Route Lead Monitoring															
					Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10	Oct-10	Nov-10	Dec-10	Jan-11
Unit of Measurement				mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	
SDMTRS01	381591	6454322	Fremantle Port	110	120	190#	4600#	<100	<100	130	<100	<100	<100	<100	217	<100	117	<100	<100	
SDMTRS02	380982	6453828	Fremantle Port	140	120	390#	150	<100	<100	<100	<100	<100	100	<100	139	<100	<100	<100	<100	
SDMTRS03	380654	6453299	Fremantle Port	650	170	330	200	150	130	110	<100	<100	140	<100	231	105	<100	119	138	
SDMTRS04	381543	6453336	Fremantle Port	1100	<100	150	140	<100	<100	<100	<100	<100	1000	<100	<100	<100	153	<100	140	
SDMTRS05	382178	6454397	Fremantle Port	840	170	670	200	140	150	170	<100	<100	200	100	215	173	236	314	139	
SDMTRS06	405452	6470914	Midland	170	<100	290#	<100	<100	<100	110	<100	<100	340#	<100	265	115	<100	<100	162	
SDMTRS07	406993	6470568	Midland	440	<100	600#	NA	<100	100	140	<100	<100	350	<100	265	<100	168	122	232	
SDMTRS08	470535	6498088	Northam	1800	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP	<100	249	OSP	LAI	<100	OSP	
SDMTRS09	470035	6498119	Northam	150	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP	<100	271#	OSP	LAI	BB	OSP	
SDMTRS10	567496	6499779	Kellerberrin	300	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP	150	<100	OSP	LAI	257	OSP	
SDMTRS11	568471	6499812	Kellerberrin	<100	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP	<100	<100	OSP	LAI	<100	OSP	
SDMTRS12	616399	6515069	Merredin	190	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP	<100	211#	OSP	LAI	<100	OSP	
SDMTRS13	616365	6515108	Merredin	120	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP	550#	<100	OSP	LAI	207	OSP	
SDMTRS14	720172	6544365	Southern Cross	310	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP	<100	<100	OSP	LAI	178	OSP	
SDMTRS15	720130	6544381	Southern Cross	340	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP	<100	<100	OSP	LAI	268	OSP	
SDMTRS16	352008	6596301	Kalgoorlie	150	OSP	BB	OSP	260#	OSP	<100	OSP	<100	OSP	BB	201	OSP	LAI	<100	OSP	
SDMTRS17	348972	6593826	Kalgoorlie	620	OSP	<100	OSP	<100	OSP	<100	OSP	<100	OSP	<100	113	OSP	LAI	<100	OSP	
SDMTRS18	336266	6805106	Leonora	770	OSP	360	OSP	310	OSP	210	OSP	<100	OSP	200	274	OSP	LAI	448	OSP	
SDMTRS19	336227	6805096	Leonora	410	OSP	240	OSP	170	OSP	240	OSP	<100	OSP	270	276	OSP	LAI	229	OSP	
SDMTRS20	381777	6454719	Fremantle	240	110	190	<100	130	<100	<100	<100	<100	320#	<100	296	<100	<100	<100	105	
SDMTRS21	382184	6453541	Fremantle	257	200	200	180	130	120	180	<100	<100	200	<100	259^	<100	265^	196	163	

Site Number	AGD84 Easting	AGD84 Northing	Site Location	Pre Transport Lead Baseline Trigger Level	Transport Route Lead Monitoring										Lead Baseline Trigger Level	Transport Route Lead Monitoring
					Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11	Oct-11	Nov-11		
Unit of Measurement				mg/kg	mg lead /m ² /mth	mg lead /m ² /mth	mg lead /m ² /mth	mg lead /m ² /mth	mg lead /m ² /mth	mg lead /m ² /mth	mg lead /m ² /mth	mg lead /m ² /mth	mg lead /m ² /mth	mg lead /m ² /mth	mg lead /m ² /mth	
SDMTRS01	381591	6454322	Fremantle Port	110	0.18	0.55	0.33	0.85	0.45	0.56	0.70	0.46	0.50	1.07	0.41	
SDMTRS02	380982	6453828	Fremantle Port	140	<0.001	0.52	0.47	0.72	0.5	0.48	0.75	0.39	0.43	2.74	0.47	
SDMTRS03	380654	6453299	Fremantle Port	650	0.39	1.9	1.7	0.87	1.6	0.68	1.00	1.40	1.20	2.66	1.4	
SDMTRS04	381543	6453336	Fremantle Port	1100	<0.001	0.38	0.32	0.42	0.24	0.26	0.40	0.32	0.23	3.37	0.2	
SDMTRS05	382178	6454397	Fremantle Port	840	<0.001	0.73	0.72	0.98	0.63	2.4#	1.10	0.64	0.47	2.40	0.38	
SDMTRS06	405452	6470914	Midland	170	<0.001	0.41	0.13	0.62#	0.26	0.5	0.16	0.11	0.22	0.62	0.094	
SDMTRS07	406993	6470568	Midland	440	0.24	0.44	0.25	0.64	0.35	0.84#	0.39	0.13	0.23	0.84	0.18	
SDMTRS08	470535	6498088	Northam	1800	OSP	0.17	OSP	0.096	OSP	<0.001	OSP	0.05	OSP	2.70	OSP	
SDMTRS09	470035	6498119	Northam	150	OSP	0.74#	OSP	0.15	OSP	0.073	OSP	0.11	OSP	0.74	OSP	
SDMTRS10	567496	6499779	Kellerberrin	300	OSP	0.33	OSP	0.17	OSP	BB	OSP	0.06	OSP	0.47	OSP	
SDMTRS11	568471	6499812	Kellerberrin	<100	OSP	0.18	OSP	0.14	OSP	0.008	OSP	0.13	OSP	4.34	OSP	
SDMTRS12	616399	6515069	Merredin	190	OSP	0.17	OSP	0.14	OSP	0.022	OSP	0.17	OSP	0.50	OSP	
SDMTRS13	616365	6515108	Merredin	120	OSP	0.13	OSP	0.17	OSP	<0.001	OSP	0.08	OSP	0.87	OSP	
SDMTRS14	720172	6544365	Southern Cross	310	OSP	0.22	OSP	0.15	OSP	<0.001	OSP	0.20	OSP	0.53	OSP	
SDMTRS15	720130	6544381	Southern Cross	340	OSP	0.18	OSP	0.2	OSP	<0.001	OSP	0.06	OSP	0.89	OSP	
SDMTRS16	352008	6596301	Kalgoorlie	150	OSP	0.087	OSP	BB	OSP	<0.001	OSP	BB	OSP	0.52	OSP	
SDMTRS17	348972	6593826	Kalgoorlie	620	OSP	0.24	OSP	0.13	OSP	0.046	OSP	0.13	OSP	4.06	OSP	
SDMTRS18	336266	6805106	Leonora	770	OSP	0.27	OSP	0.14	OSP	<0.001	OSP	0.26	OSP	3.34	OSP	
SDMTRS19	336227	6805096	Leonora	410	OSP	0.27	OSP	0.43	OSP	<0.001	OSP	0.17	OSP	1.56	OSP	
SDMTRS20	381777	6454719	Fremantle	240	<0.001	0.46	0.28	0.59	0.5	0.79	1.40#	0.28	0.34	1.40	0.2	
SDMTRS21	382184	6453541	Fremantle	257	0.26	0.56	0.38	0.68	0.27	0.28	0.36	0.25	0.34	1.47	0.31	

OSP = Outside sampling period (sampled six monthly, in accordance with Condition 14.1 of the Interim Implementation Conditions) BB = Broken bottle MB = Missing bottle NA = No Access to bottle < = Limit of reporting by laboratory is 100

^ For results prior to 22 February 2011 only, indicates above baseline but within Measurement of Uncertainty (MoU). Lead baseline trigger levels were not increased by analytical results within the 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 Metals' monitoring program. There is no allowance for MoU post 23 February 2011.

* This sample is currently undergoing isotopic analysis.

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

LAI - Laboratory analysis incomplete due to the presence of hydrocarbon in one of the SMDTRS samples.

Lead baseline trigger levels at 17 February 2011 or amended as per Appendix 1 of the Health, Hygiene and Environmental Monitoring Program June 2009. From 23 February 2011 data expressed as mg lead /m²/th is required under Interim Implementation Condition #21. Lead baseline trigger levels recalculated from pre 23 February 2011 data.