

Summary of Magellan's Response to Condition 9

Condition 9 of Magellan Metals' approval to transport lead carbonate concentrate from its mine-site at Wiluna through the Port of Fremantle requires the company to develop and implement a Health, Hygiene and Environmental (HHE) Monitoring Program. The specific conditions related to the HHE Monitoring Program are outlined below, while the remainder of this document summarises Magellan's plans for meeting the conditions. The full plan is available on www.magellanmetals.com.au.

SUMMARY OF CONDITIONS

The list below sets out the range of areas in which conditions have been applied to the sealed shipment process by the Minister for Environment.

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Implementation

CONDITION 2

Proponent Commitments

CONDITION 3

Proponent

CONDITION 4

Commencement

CONDITION 5

Compliance Reporting

CONDITION 6

Dust control - Health, Hygiene and Environmental Management Program

CONDITION 7

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CONDITION 8

Subterranean Fauna (Stygofauna) Sampling Plan

CONDITION 9

Health, Hygiene and Environmental Monitoring Program

CONDITION 10

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CONDITION 11

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CONDITION 12

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Performance review

CONDITION 14

Performance Bond

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Definitions

9 Health, Hygiene and Environmental Monitoring Program

9-1 Prior to removing shipping containers of lead carbonate concentrate from the mine-site at any time after 1 January 2009, the proponent shall prepare a Health, Hygiene and Environmental Monitoring Program to the requirements of the Minister for Environment on advice of the CEO, the Department of Health and the Department of Mines and Petroleum.

This Health, Hygiene and Environmental Monitoring Program shall:

1. detail the baseline and periodic (maximum interval of 12 months) soil sampling program along the transport route, at the Leonora storage area and at the Port;
2. detail and address the monitoring of airborne lead dust around the bagging machine and in the concentrate storage shed;
3. address monitoring of fixed soil sampling, dust deposition and air quality sampling sites and shall include, but not be limited to, having monitoring sites located within the Port and adjacent to the transport route so as to provide an early warning of any fugitive dust; and
4. address monitoring lead in the Port marine environment.

9-1 The proponent shall implement the Health, Hygiene and Environmental Monitoring Program required by Condition 9-1.

9-2 Revisions to the Health, Hygiene and Environmental Monitoring Program may be approved by the Minister for Environment on advice of the CEO, the Department of Health and the Department of Mines and Petroleum.

9-3 The proponent shall implement revisions of the Health, Hygiene and Environmental Monitoring Program required by Condition 9-3.

Health, Hygiene and Environmental Monitoring Program objectives

1. Meet the requirements of Condition 9-1 (outlined above).
2. Determine whether lead levels in the environment along the transport route and/or at the Port of Fremantle increase as a result of Magellan's activities.
3. Determine the effectiveness of the packaging, hygiene and transport methods in containing lead carbonate and preventing releases.
4. Meet the EPA objectives of ensuring that:
 - i. the health of the public is protected from lead contamination
 - ii. the mine-site is managed in the long-term and rehabilitated to protect the public and the environment from the adverse impacts of lead.

Monitoring approach

The HHE Monitoring Program is based on a two-tiered approach that involves:

- dust deposition, air quality and soil sampling to identify any changes in lead levels in the environment.
- determining by isotope analysis if any increases in lead in the environment are due to Magellan's activities.

Mine-site monitoring

Risks and monitoring rationale

To meet its responsibilities to provide a safe working environment for its employees, Magellan undertakes monitoring at its mine-site near Wiluna, including dust and soil monitoring. Magellan also undertakes occupational air quality monitoring within the bagging shed using personal monitors and establish an inspection process for the sealed bags.

Static dust deposition

Static dust deposition monitors are used to identify trends in dust deposition and rely on the passive deposition and capture of dust. Static dust deposition monitoring is undertaken monthly at a number of locations within and surrounding the Magellan mine-site. The samples are analysed by a National Association of Testing Authorities (NATA) accredited organisation.

High volume air sampling

High volume sampling allows airborne particulate concentrations to be determined. The results are reported as total suspended particulates in $\mu\text{g}/\text{m}^3$ of lead in the air. This sampling occurs at:

- the Magellan accommodation village
- downwind of the concentrate storage area.

Sampling is undertaken every sixth day for a continuous period of 24 hours at both locations as per the requirements of the National Environmental Protection (Ambient Air Quality) Measure. The concentration of lead on the sampler filter papers is analysed by a NATA accredited laboratory.

Soil sampling

Soil sampling is conducted on a quarterly basis to detect changes in surface lead levels in and around the Magellan mine. Sampling is undertaken at fixed monitoring points at the mine-site from the surface 20mm of the soil, with several samples taken at one location and then analysed as a composite sample. All soil samples are analysed by a NATA accredited laboratory.

Occupational monitoring

At the mine-site, a range of activities are performed, including mining, concentrating, stockpiling, bagging and containerisation of lead carbonate concentrate.

To provide a safe working environment, Magellan undertakes occupational air quality monitoring within the lead concentrate storage shed using personal air quality monitors that collect dust samples. The results are compared with the lead exposure standard of $0.15\text{mg}/\text{m}^3$ of lead in the air. Magellan also undertakes biological monitoring of the levels of lead in blood of relevant employees. Based on the results, the bagging operation's dust control equipment and procedures are evaluated and, if required, modified.

Inspection of bulk bags

Magellan has engaged an accredited Independent Inspector to monitor the packaging and loading process at the mine-site, including inspecting all bags and containers after packing for the presence of lead carbonate dust. The Independent Inspector will also place dust monitors at random in containers at the mine-site. The monitors will be removed at the Port of Fremantle (see following page for more detail).

Parameter	Monitoring description	Frequency	Location
Static dust deposition	Dust deposited in gauges to provide an indication of trends in dust deposition.	Monthly.	15 locations around the mine-site.
High volume air sampling	High volume sampling to collect dust samples and determine airborne particulate concentrations.	Every 6 days for 24 hours continuously per site.	1. Accommodation village. 2. Downwind of the concentrate storage area.
Soil sampling	Soil surface samples taken to detect changes in surface lead levels in and around the Magellan mine.	Quarterly.	1. 27 sampling sites around the concentrate storage area. 2. 43 radial sampling sites around the mine-site.
Occupational monitoring	Personal air quality monitors used to collect dust samples for comparison with lead exposure standard.	Ongoing.	1. Within concentrate storage shed. 2. Various locations around the mine-site.
	Biological (blood) monitoring.	Monthly.	Mine-site (all employees and contractors).
Inspection of bulk bags	As per Condition 10 of Statement 783.	All bags to be inspected after vacuuming.	Within concentrate storage shed.

Transport monitoring (from mine-site to the Port)

Risks and monitoring rationale

The transport of lead concentrate has been designed to have an inherently low risk of releasing the material into the environment. Monitoring along the transport route is being undertaken primarily to check the integrity and effectiveness of the processes and procedures for packaging and hygiene.

The HHE Monitoring Program during transport will include:

- soil sampling every 10km along the route and every 0.5km within residential zones
- dust deposition monitoring in towns adjacent to the route
- water in rainwater tanks in selected locations
- installation of lead monitoring equipment into a minimum of 1 in 100 containers, which is retrieved at the Port of Fremantle for lead analysis.

Baseline sampling

Magellan has completed a baseline sampling program using the methods detailed below. The same locations will be used for monitoring during transport operations. A baseline lead level has now been established and a trigger level assigned to every one of the above sites for air, water and soil monitoring, as well as within the containers.

Sampling in rainwater tanks

Regular sampling in rainwater tanks will provide an ongoing and measurable record of any lead releases, which is appropriate given the intermittent nature of the potential sources of lead dust (passing trucks or trains).

Two rainwater tanks, one on each side of the route in Leonora, Kalgoorlie, Southern Cross, Merredin, Kellerberrin, Northam, Midland and Fremantle, have been sampled prior to commencing lead carbonate concentrate transportation, to establish baseline levels. The tanks will be monitored quarterly for the first 12 months of transport. The monitoring frequency will then reduce to six-monthly intervals.

Static dust deposition

Static dust deposition monitors will continuously sample dust in towns along the transport route. One dust monitor will be placed on each side of the transport route in each major town. The dust deposition gauges will be collected monthly for analysis.

Soil sampling

Soil sampling will be conducted every 10km along the route (and every 0.5km within residential zones) at fixed monitoring sites from undisturbed areas of soil within 50m of the transport route. Three samples will be taken within 1m² at each site from the surface 20mm of soil. The samples will be combined to provide a composite sample for analysis. Ongoing monitoring results will be compared to the baseline sample at the same site.

Air quality monitoring within containers

The Independent Inspector will carry out random dust monitoring inside containers, without the knowledge of the company, by placing dust monitors inside a minimum of 1% of containers (approximately two per week). Magellan personnel will have no prior knowledge of which containers will be selected. The dust monitoring equipment will be installed immediately prior to the closure, locking and transport of the containers to prevent any potential interference. At the Port, the containers with monitoring equipment will be briefly opened and the monitors removed. The samples will be sent to a NATA accredited laboratory for testing.

Parameter	Monitoring description	Frequency	Location
Water sampling in rainwater tanks	Water samples will be taken from selected clean tanks within 200m of the transport route with a catchment >10m ² .	Prior to, and quarterly after the re-commencement of lead concentrate transportation. Six monthly after the first year.	Two tanks in each of the following towns: Leonora, Kalgoorlie, Southern Cross, Merredin, Kellerberrin, Northam, Midland and Fremantle.
Static dust deposition	Dust deposition gauges will be used to collect samples in order to analyse the dust deposition rate and the concentration of lead within the deposited dust (mg/kg).	Once prior to the re-commencement of lead concentrate transportation. Then sampling after 3 months, then 6 months and then 6 monthly thereafter (i.e. at 3, 6, 12, 18, 24 etc months after re-commencement of transport).	One dust deposition gauge will be installed on each side of the route at each of the following locations: Leonora, Kalgoorlie, Southern Cross, Merredin, Kellerberrin, Northam, Midland and Fremantle.
Soil sampling	Soil sampling will be undertaken at fixed sites from undisturbed areas of soil within 50m of the transport route. The surface 20mm of soil will be taken and analysed for lead concentration in ppm.	Once, prior to the re-commencement of lead concentrate transportation. Then sampling at 3, 6, 12 months and annually thereafter.	Every 10km along the transport route and every 0.5km within residential areas.
Air quality monitoring within containers	Battery powered air samplers measure operating time and flow rates so that the volume of air sampled can be calculated in order to determine the amount of lead in the air in mg/m ³ .	Containers will be selected at random by the Independent Inspector. On average, a minimum of 1 in 100 containers will have dust monitors installed.	Within containers during transport from the mine to the Port. The air quality monitors will be removed at the Port of Fremantle.

If elevated lead levels are recorded along the transport route, isotope testing can be undertaken to determine if the lead originates from Magellan.

Port of Fremantle monitoring (unloading, storage and loading)

Risks and monitoring rationale

During transport operations the monitoring program at the Port of Fremantle will include:

- soil sampling at the rail terminal. This is the only area within the Port where there is exposed soil
- dust deposition monitoring at four sites within the Port
- high volume air sampling
- sampling of marine sediment where the stormwater drains enter the marine environment
- sampling of soil within drainage sumps.

Baseline sampling

Magellan has completed a baseline sampling program using the methods detailed below. The same locations will be used for monitoring during transport operations.

A baseline lead level has now been established and a trigger level assigned to every one of the above sites for air, water, soil and sediment monitoring.

High volume air sampling

High volume sampling of airborne particulates will be undertaken at the Port of Fremantle.

Monitoring will be undertaken at five sites every six days continuously for 24 hours, for one month at each site. Four sites are within the Port and one is on the Fremantle (eastern) side of the Inner Harbour, between the bridges, opposite the residential area. During operation, sampling will be undertaken daily for a continuous 24 hour period at the eastern side of the Inner Harbour and adjacent to the residential area, between the bridges.

After the first six months, on agreement with relevant Government agencies, sampling will be reduced to a continuous 24 hour period every six days with an additional 24 hour sampling period (within six days) during the loading and unloading of shipping containers.

Static dust deposition

Dust deposition monitors will be installed at each of the high volume sampling sites, where practicable. Dust deposition monitoring at the Port of Fremantle will be undertaken for at least one month prior to re-commencing transport. During operation, samples will be analysed monthly.

Soil sampling

Soil sampling will be undertaken at four locations at the terminal.

Drainage sumps

Soil samples will be taken from sumps within the logistics services contractor area and the stevedores' operating areas. If sufficient material is available, three samples will be taken from the top 20mm of sediment and then combined into a composite sample for analysis.

Marine sediments

The marine monitoring program will target stormwater drainage outlet sites within the Inner Harbour and will consist of:

- sampling all 18 drainage outlet sites in the Inner Harbour and the single drainage outlet on the western beach. Sediment cores will be taken by hand by divers and the top 30 – 50mm of each core will be analysed for lead content
- during operation, sediment monitoring will occur every six months at the same drainage outlet sites.

Public reporting

Magellan will report:

- all monitoring results, inspection reports and other relevant information on Magellan's website as soon as they become available
- monitoring results, including baseline sampling (airborne particulates, dust deposition, soil and marine sediments) in the Magellan Annual Environmental Report submitted to Government agencies in accordance with the site licence conditions. The Report will be publicly available upon request from either Magellan or the aforementioned government agencies.

Community reference group

Magellan will report the findings of all inspections, auditing and monitoring to an appropriate reference group with relevant community representation, as determined by the Minister for Environment. Until otherwise determined, the reference group will be the Fremantle Ports Inner Harbour Community Liaison Group.

Port of Fremantle monitoring (unloading, storage and loading)

Parameter	Monitoring description	Frequency	Location
High volume air sampling	<p>A mobile high volume sampler will be operated within the Port of Fremantle to monitor air quality at five sites.</p> <p>The filter papers will be analysed for lead in dust content.</p>	<p>Baseline: 24 hours continuously every six days at each site for one month.</p>	<p>Five sites (one in between and at each end of the stevedores, one on the eastern side of the Inner Harbour and one between the bridges opposite the residential area.</p>
		<p>Operation: 24 hours continuously every day for six months.</p> <p>After the first six months, on agreement with the DEC, DoH and DMP, sampling will be reduced to a continuous 24 period every six days with an additional 24 hour sampling period (within six days) at a time during the loading and unloading of Magellan's shipping containers.</p>	<p>Site adjacent to the residential area between the bridges and the site at the eastern side of the Inner Harbour.</p>
Static dust deposition	<p>Dust deposition gauges will be used to collect samples to determine the dust deposition rate and the concentration of lead in dust (mg/kg).</p>	<p>Baseline: dust samples to be collected for at least one month prior to re-commencement of transport.</p> <p>Operating: monthly.</p>	<p>Dust deposition gauges will be installed at each of the high volume air monitoring sites.</p>
Soil sampling	<p>Soil sampling will be conducted at fixed sites from an undisturbed area of soil within 50m of the rail line. The top 20mm of soil will be sampled at three sites within 1m² and the composite sample analysed for lead content.</p>	<p>Soil sampling to be conducted once prior to re-commencement of transport and annually thereafter.</p>	<p>Four locations within the area of exposed soil where the rail enters the Port of Fremantle.</p>
Sediment sampling within drainage sumps	<p>Sediment samples will be taken from drainage sumps within the stevedores' operating areas and the rail head. If sufficient material is available, three samples will be taken from the top 20mm of sediment and then combined into a composite sample for analysis. The samples will be sent to a NATA accredited laboratory for analysis for lead content.</p>	<p>Sediment sampling to be conducted once prior to re-commencement of transport and six-monthly thereafter.</p>	<p>At drainage sumps that exist within the stevedores' operating areas and the rail head.</p>
Marine sediment baseline monitoring	<p>Divers will sample marine sediment using a 400mm long, 45mm diameter polycarbonate tube. Three cores within 1m² will be taken and the top 30 to 50mm of the cores will be sent to a NATA accredited laboratory for analysis for lead content.</p>	<p>Marine sediment sampling will be conducted once prior to re-commencement of transport and every six months thereafter.</p>	<p>At each drainage outlet from Berths 4 through 10 (approximately 18) and at the single discharge outlet to the ocean on the western beach.</p>