‘Magellan Lead Carbonate Project, Wiluna – To Facilitate the Export of Containerised Lead from the Port of Fremantle’ EPA Bulletin 1276

A submission on behalf of the South Fremantle/Hamilton Hill Residents’ Association Incorporated

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January 2008

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Introduction

This report identifies several significant deficiencies in the Magellan Metals' proposal to transport lead concentrate through Fremantle. Importantly, many of these deficiencies were identified as part of the Education and Health Standing Committee (2007) *Inquiry into the cause and extent of lead pollution in the Esperance area* (the Esperance Inquiry), yet appear to have been disregarded in the EPA assessment of the proposal, and deemed by the proponent as irrelevant.

A government review of the findings and recommendations of the Esperance Inquiry has proposed to implement changes to regulatory practice, argue for strengthening of legislative provisions and variations to air quality standards. This remains an ongoing process. Without these modifications there remain many questions over the capacity of the proponent to carry out the proposal in a manner which is protective of environmental and public health.

1. EPA's terms of reference for the assessment

The EPA's terms of reference for the assessment of Magellan Metals' proposal fail to allow for adequate reflection on the findings of the Education and Health Standing Committee (2007) *Inquiry into the cause and extent of lead pollution in the Esperance area* (the Esperance Inquiry).

Importantly, failures of process by the EPA, regulatory agencies and other parties to the export of lead carbonate through Esperance - matters clearly of high priority in supporting a safe lead transport program - are not considered as part of the overall assessment process. The capacity of the EPA and regulatory agencies to review and monitor the Magellan proposal, or to assess the many socio-political components of the project, without the recommended changes proposed in the Esperance Inquiry having been implemented, is highly questionable.

Despite a number of initiatives being proposed under the *Response of the WA government to the WA Legislative Assembly Education and Health Standing Committee in relation to the cause and extent of lead pollution in the Esperance area* (Government of Western Australia, 2007), many of these are yet to be fully implemented. Some important and clearly relevant initiatives proposed as part of the WA government response include;

- Health Impact Assessment as part of the approvals process
- Amendments to the Port Authorities Act
- Strengthening the provisions to the Dangerous Goods Code
- Strengthening licensing conditions
- Improved environmental monitoring
- Improvements in EPA and DEC procedures, especially in matters of public concern.

Furthermore, Magellan Metals' dismissal of any consideration of the findings and recommendations of the Esperance Inquiry, demonstrated in the proponent's response to questions raised in the City of Fremantle's submission, highlights a refusal by Magellan Metals to reflect on or take responsibility for the outcome at Esperance, making them unsuitable to manage a much larger operation in Fremantle. The Magellan Metals response (see EPA Bulletin 1276 Appendix 5: J1) makes it very clear that it does not believe that the findings of the Esperance Inquiry are at all pertinent to the new proposal. Magellan Metals have in fact implied that the Esperance Port was responsible for the pollution caused at Esperance[1], despite the Esperance Inquiry identifying "…regulatory failures, combined with the irresponsible and possibly unlawful conduct of the Esperance Port Authority, Magellan Metals Pty Ltd, and BIS Industrial Logistics, exposed workers and the community to unacceptable and avoidable health and environmental risks." (Education and Health Standing Committee, 2007 pxxiv) and noting that "…despite the Magellan lead carbonate being classified as hazardous and as a dangerous good, Magellan, BIS Industrial Logistics and the, Esperance Port all failed to treat the product accordingly." (pxxviii) As an indicator of Magellan Metals' trustworthiness and capability as a transporter of hazardous goods, the Esperance Inquiry provides a damning assessment.

Other pertinent findings of the Esperance Inquiry, too numerous to list in text, are detailed in Appendix 1. In view of these findings, it seems obvious that the recommendations of the

[1]Magellan Metals (Ivernia) quote the following in their news release of 7 September 2007 "The Esperance Port Authority was responsible for the environmental management of emissions produced during the outloading of lead concentrate at the Port."

Esperance Inquiry be re-visited as part of the EPA approvals process to assess whether all the necessary changes have been adequately considered. In particular, the Esperance Inquiry recommends changes to and/or strengthening of;

- approvals processes
- regulatory overview and control
- regulatory funding
- legislative review (recommendation 9, 10, 14)
- legal enforceability of proponent commitments (r. 18)
- community consultative practices
- dust and biological monitoring
- public accessibility to proponent and departmental documents
- enforceability provisions of the Australian Dangerous Goods Code
- provisions for community monitoring and domestic lead clean-up (r. 42)
- medical registers of exposures to hazardous substances (r.45)

As previously noted, the WA government is in the process of implementing the recommendations of the Esperance Inquiry, however, many of these changes will take some time to fully implement, especially where legislation and national health guidelines and standards need to be reviewed. Without these recommended measures being undertaken, there will continue to exist opportunities for further pollution releases and thus environmental and public health impacts. For example, while "Magellan has committed to undertaking the handling and transport of its product in accordance with the *Dangerous Goods (Transport) Act 1998*" (WA Environmental Protection Authority, 2007 p5), under Finding 166 of the Esperance Inquiry[2], it is under no legal obligation to do so and thus failure to handle the product in accordance with the Act does not constitute a breach.

Finding 123 of the Esperance Inquiry further highlights the inadequacy of the EPA assessment. Finding 123 states;

> *The apparent tolerance of the Esperance Port Authority and Magellan Metals Pty Ltd for the potential of short-term exposure to lead pollution is consistent with the National Environmental Protection Measure standard for lead in ambient air, which provided for samples to be taken every six days and averaged over a year. The Committee believes that the current National Environmental Protection Measure for lead in ambient air is inadequate and notes that a review is underway which includes an assessment of this measure. (Education and Health Standing Committee, 2007 p265)*

However, the EPA's environmental objectives for the Fremantle proposal merely;

- Ensure that lead emissions do not cause unacceptable environmental or health impacts; and
- Ensure that the lead emissions at the mine site do not exceed ambient standards for lead. (WA Environmental Protection Authority, 2007 p7)

Environmental and public health impacts could then occur, as they did in Esperance, if the current ambient air quality standard is the EPA's benchmark for Magellan's practices.

[2] Finding 166: The Committee accepts the Esperance Port's proposition that a Material Safety Data Sheet's classification of material as a dangerous good does not, in itself, impose any legal obligation to handle the product in accordance with dangerous goods legislation and regulations. (p313)

In addition to these identified problems with the reliability of current air quality standards for lead, there exist no Australian standards for lead in soil, only 'investigation levels', and the blood lead levels deemed acceptable by the World Health Organisation, ie 10µg/dl, have been shown in more recent US research (Menke, Muntner, Batuman, Silbergeld, & Guallar, 2006) to be grossly inadequate for both children and adults. Chronic and life threatening health impacts have now been demonstrated at levels as low as 2µg/dl. These research findings are supported by the American Academy of Paediatrics, the US Centres for Disease Control and leading Australian lead expert Dr Peter Baghurst. The WA Department of Health chose to use a level half the World Health Organisation standard as a health target in the assessment of children at Esperance. A discussion on lead research findings and the relevance of current health guidances is discussed in more detail in section 5.

Thus, there remain questions over the legal enforceability of certain elements of the Magellan proposal, current air quality standards are inadequate to clearly identify environmental pollution by lead, and national and world standards and guidelines on the human health impacts of lead have been deemed merely "an achievable target…a pragmatic level" (Baghurst cited in Edwards, 2006) rather than a proven health standard.

Failure by the EPA to provide sufficient time to allow the recommendations of the Esperance Inquiry to be implemented is thus highly problematic.

In addition to this, Magellan Metals have cited documents which are yet to be considered, namely, the Emergency Response Plan and the Health, Hygiene and Environmental Management Plan. These two documents are crucial to a fuller understanding of the achievability of a safe lead transport program and ought to have been part of the EPA assessment process. The key issue here is whether Magellan Metals can safely manage the transport of lead through Fremantle – these two documents will provide vital evidence on whether Magellan *can* safely handle the product and adequately manage any pollution releases.

Whether or not the Magellan Metal's proposal clearly meets these criteria, especially within the context of the implementation of recommendations of the Esperance Inquiry and in the absence of crucial information needed to assess the proposal in its entirety, needs to be carefully considered. Approval of this proposal by the EPA in the absence of the necessary corrections to practice, standards and legislation will only serve to increase the suspicion by local communities of this project and increase the level of mistrust the public have in the control and regulation of such proposals.

2. Operational matters beyond the control of the EPA, regulatory agencies and proponent

It is of concern that operational matters outside the control of the EPA, regulatory agencies and Magellan Metals are not being more carefully considered. This failure to consider broader context issues as part of environmental assessments and practice is widely acknowledged (Linnerooth & Davis, 1987; Wynne, 1987) and has been found to be a key factor in hazardous substances accidents/incidents.

For example, Wynne[3] (1988) writes;

> *"…after the Bhopal tragedy, many countries urgently reviewed the industrial production, transportation and use of the extremely toxic methyl isocyanate (MIC) whose emission caused the damage. In France, a factory near Beziers in the South was found by an official inquiry to be importing MIC via Marseilles. Although the factory was apparently controlling the risks more or less satisfactorily, at another node in the technological system (namely Marseilles docks), things were rather different. There, it seems, contextualization of part of the technology-risk system had taken place according to local norms and other realities. The unloading of MIC from freighters was observed to be highly unsafe because barrels were being unloaded as rapidly as possible in accordance with normal productivity procedures and incentives – they could have been barrels of inert oil as far as their treatment by crane operators was concerned. Indeed, this was precisely the point. The dock operators did deal routinely with a variety of materials, many of them harmless, chemically speaking, and all to be unloaded or loaded as fast as possible. Their local practical norms cross-cut the required norm of extremely careful and deliberate handling, as seen from the overall perspective of the management of the technology-risks of MIC. This local 'contextualization' was therefore only on part of the technology, fragmenting the overall system by generating informal operating rules in one part of it which were at odds with its proper management. Again, local subsystem behaviour (contextualization) was underdetermined in that system. It was part of another cross-cutting system."*

Wynne argues that the transport and loading of MIC is not an isolated example, rather a typical one, thus demonstrating that the absolute control of management practices throughout an entire process is not easily achievable.

> *"…this inherent ambiguity means that a fundamentally different - lesser - level of control and controllability is possible from that which is engraved in public consciousness by 'formalist' images of technology. In this more ambiguous world, it may be far more difficult to distinguish safe and unsafe actions or conditions, and it becomes more complicated to define responsibility or negligence on the part of those in 'charge'."*

In Esperance, provision for the monitoring, reporting and handling of lead (and nickel) spills was found to be deficient – some of these areas of deficiency were neither the responsibility of the proponent, nor the regulator. Nevertheless, a significant accident occurred as a result of a failure to consider, or inability to act on, all of these 'outside' factors. Assessment of the

[3] Brian Wynne is a Professor of Science Studies and Research Director of the Centre for the Study of Environmental Change at Lancaster University UK. His work has covered the management of hazardous waste, risk assessment, public risk perceptions, and public understanding of science, focusing on the relations between expert and lay knowledge and policy decision-making. His academic career spans more than 30 years.

proposal for the transport of lead through Fremantle is no different – several outside or contextual factors are not being considered. Some of these are briefly discussed:

2.1 Fremantle Port

Key areas for further assessment include;

1. Inspection
2. Cargo management and handling
3. Emergency response at the port
4. Lead control expertise and monitoring

2.1.1 Inspection

Use of "[v]isual inspection by stevedores of the containers at the Port of Fremantle…" (WA Environmental Protection Authority, 2007 p9) The role of port stevedores (not in the employ of Magellan) in these management issues cannot be adequately assessed or controlled. This element in the management of the program is however critical to the safety and success of the program. The sheer volume of containers moving through Fremantle Port – 5,550 containers and 14,560 land container moves per week (Fremantle Ports, 2004) – should alert the EPA to the potential for failures on the part of port stevedores.

2.1.2 Cargo management and handling

The storage and management of cargo containers at the port is not well detailed. The export by Magellan Metals of more than 100 containers per week will result in stockpiling of the containers. Under the normal operations of a large port there are opportunities for damage to containers while they are in stockpile. Can it be assumed that any equipment capable of puncturing a container be excluded from the lead cargo stockpile area? Will Magellan's cargo be physically separated from other port activities, and will forklifts and other machinery, capable of damaging and/or puncturing the containers be excluded from these 'lead cargo stockpile zones'? Importantly, will the Port be able to easily isolate and contain lead dust from a punctured and leaking container once it is in stockpile (especially if the container is located under many other containers)?

Whether the bulk bags are water-tight also needs to be considered under periods of stockpiling – Magellan Metals have been vague in their response to question B10 (WA Environmental Protection Authority, 2007) from the Department of Health as to whether the bulk bags are air and water-tight. In view of likely stockpiling measures, this is significant and needs to be adequately addressed.

Furthermore, under strike conditions, container stockpiles may be left for more extended periods. What will the management procedures be if the lead cargo is left unattended for more extended periods?

9,000 tonnes of lead carbonate are presently still being stockpiled in sheds at Esperance Port (WA Department of Environment and Conservation, 2007). In the event of a licence suspension at Fremantle Port, will Magellan's lead carbonate cargo be left, as in Esperance?

2.1.3 Emergency response at the Port

Fremantle Ports' preparedness for a spill, or as in the case of Esperance, flooding of the harbour after excessive rain, does not appear to be adequately addressed on the Port's website, as indicated in Magellan's response to question H1 (WA Environmental Protection Authority, 2007) from the City of Fremantle. The impact of a spill at the harbour under severe weather conditions could result in lead carbonate being washed into the harbour. This matter needs to

be specifically addressed by Fremantle Ports and the EPA prior to any approvals to the Magellan Metals' project.

Importantly, the Fremantle Ports' website, which according to Magellan Metals details its emergency response to various hazards, has not been updated in recent years and tends to focus on oil spills. Whether Fremantle Ports can adequately manage a lead carbonate spill under wet or windy conditions is not demonstrated by any information provided on its website.

At Esperance Port (see Esperance Inquiry finding 69) a significant pollution incident occurred after lead carbonate was washed into the harbour as a result of inadequate bunding and stormwater management systems. There is no information provided detailing Fremantle Ports' provisions for bunding along the berths or its stormwater management practices. Furthermore, there are questions over Fremantle Ports' berth cleaning practices. Does it use wash-down as per Esperance? If so, how is this wash-down water managed?

Guidelines provided on the Fremantle Ports' website which pertain to these matters, are largely in draft form and lack the necessary detail to enable an adequate assessment of port pollution management processes.

2.1.4 Lead control expertise and monitoring

Firstly, there is no information provided on the Fremantle Ports' website that demonstrates that it is fully conversant with the long term impacts of lead pollution.

Lead is a serious environmental pollutant. It does not break down in the environment and the lead compound in question is known to be highly biologically active. One accident could have the impact of endangering the health of people living within the vicinity of the spill, a spill could impact the local fishing and tourist industries, and wildlife could be impacted at many points along the freight rail route. If the DoH and DEC lacked the necessary expertise to appropriately manage a lead pollution release (as demonstrated at Esperance and discussed in section 5.3), one must question whether Fremantle Ports can adequately comprehend the risks and manage a spill.

Secondly, there is no evidence provided on the adequacy of the Ports' monitoring processes. How many monitors will be located around the Port, where will they be located, how have their numbers and their placement been justified? Furthermore, while Magellan Metals have committed to public accessibility of its monitoring data, there is no such public accessibility requirement for Fremantle Ports.

2.2 Rail transport

Doubts have been raised over the containment of lead in the bulk bags under real conditions, for example, in the event of a rail accident. The tests undertaken by Magellan Metals do not appear to represent real case scenarios for accidents during transport, unloading and storage. In particular, the poor consideration of local wind strengths is a major failing. In the event of a spill along the coastal rail route, heavy winds could rapidly spread the lead carbonate into the adjacent residential areas or marine environment. In the event of heavy rain, lead could be washed into the soils or could run-off into nearby environmentally sensitive areas. Under severe weather conditions it would not be possible for FESA to respond quickly enough to avert an environmental or public health disaster.

Magellan's response to question B4 (WA Environmental Protection Authority, 2007), raised by both the City of Fremantle and Department of Health, makes light of the possibility of a puncture to a cargo container - "the use of bulk bags which are individually sealed inside the containers means that even if a breach occurs only the product in a particular bag which is also breached is at risk of escaping into the environment." It needs to be acknowledged here that each bag contains up to 2 tonnes of lead carbonate concentrate. One breach from one bag alone, could cause significant environmental and public health impacts.

Furthermore, the risk of a rail incident in Fremantle is increased due to the lack of boom-gate controlled rail crossings in the South Fremantle area (eg Rollinson Rd and Ocean Rd). These crossings are heavily traversed due to their proximity to the beach, and with the increasing level of residential redevelopment of this area, are expected to be more heavily traversed in future years. Due to the proximity of these uncontrolled crossings to a popular public beach and dog beach, the unpredictability of the movements of children and pets also needs to be considered as part of the wider risk assessment.

Relevant rail incident data (after DOCEP) is provided in Table one. This data demonstrates that train derailments occur regularly in WA and that other incidents which could lead to a spill or public and environmental exposure to the contents of a container are also occurring in WA. One incident involving the delivery of a container of hazardous materials to the wrong premises may be pertinent when considering any unattended stockpiling of containers at the Port.

3. Rail and port buffer issues

3.1 Noise and vibration along the freight route

In its submission as part of the MRS Amendment 1008/33 for land in the South Beach development, Fremantle Ports (then FPA) detailed its concerns over the rezoning of land for residential purposes.

> *"The FPA was one of the submitters and raised strong concerns regarding the development of land for residential purposes within close proximity to the only freight rail line to the Fremantle Port. The FPA suggested that in order to minimise land use conflict, the land use either side of the rail corridor should have compatible uses and reservations, such as commercial, industrial or open space…The FPA states that the rail corridor should not be compromised as it will become a critical factor in the ability of the Inner Harbour to expand its capacity. It also states that some of the cargo transported by rail contains hazardous materials and that the factor of risk requires detailed consideration." (WA Planning Commission, 2000)*

Problems associated with building so close to the rail corridor were deemed at the time of the MRS Amendment to be problems that could be resolved largely through noise attenuation in buildings and adequate risk management practices. However, Fremantle Ports noted that the study upon which these resolutions were made "…[make] assumptions regarding the type, size, time and frequency of freight operation on this rail line, all of which may not be sufficiently conservative." (WA Planning Commission, 2000)

Furthermore, LandCorp stated;

> *"the conditions proposed to be included in the MRS appear to be grossly inadequate. No consideration has been given to the noise generated by industrial traffic and traffic management relevant to the Industrial/Urban interface. Full recognition should be given to industrial traffic which will be utilising Rollinson Road including semi-trailers etc…Prior experience with the establishment of a container depot on Lot 452 Tydeman Road, North Fremantle resulted in community angst and substantial amendments to operating procedures by the lessee. The EPA imposed conditions to ensure that the activities of the company did not adversely impact upon residential areas. In this case, in accordance with the State Industrial Buffer 5AA policy…No credibility has been given to existing industry buffer zones required by industry…" (WA Planning Commission, 2000)*

Vibration issues associated with the freight rail line were considered by the WAPC to be manageable or "below perception levels" when trains travelled at less than 40km/hr and if not travelling over "small imperfections such as crossing points." It is clear from these statements that the proponent's consultant had not observed the actual freight activities or examined the route, which did contain a number of rail crossings in close proximity to current and proposed residential areas.

Many of these unresolved issues concerning the proximity of the freight railway to future residential areas were directed to the structure planning process, which occurred up to 6 years after the MRS Amendment process. These issues remain largely unaddressed by the structure planning process by the City of Cockburn.

The increase in pedestrian traffic, as discussed in section 2.2, as a result of increased residential development and the risks at uncontrolled rail crossings in the area, was never considered as part of this MRS Amendment.

Magellan Metals' claim that "[t]here is no material increase expected to the existing number of trains entering the port or their operating hours"[4] (WA Environmental Protection Authority, 2007 p6), does not clearly represent or acknowledge the considerable increases in freight transport over the last decade. Based on Fremantle Ports data presented as part of MRS Amendment 1008/33, in 1999 there were 2-3 train movements/week, which rose to 6 trips/week in 2000. (WA Planning Commission, 2000) The increase in rail freight movement at the time of this MRS Amendment was anticipated to increase to 21 trips/week, 24 hours a day. Magellan's operations alone, which will include approximately 6 trips/week, amounts to a significant increase in the overall freight traffic, assuming these projections by the Fremantle Ports to be accurate.

The failure to consider the impact of building high density residential development so close to the rail corridor at the time of the MRS Amendment 1008/33 is apparent. Local residents, Fremantle Ports and LandCorp all raised serious concerns over this element of the development proposal. These concerns were dismissed, decisions were deferred and many issues were overlooked. As part of the Magellan proposal, there needs to be more serious consideration of the potential risks and impacts to these new residents, existing residents close to the freight rail link and the users of the surrounding recreational areas, which are becoming increasingly busy with both vehicular and pedestrian traffic.

3.2 Fremantle port buffer

Over recent years there have been increases in the residential redevelopment and residential density within the Fremantle port buffer area. This factor, combined with the failure by Fremantle Ports to specifically detail its management procedures concerning a lead spill, presents increased opportunities for public health impacts in the event of an accident in the area. Increasing urbanization of the port buffer area presents some complex management problems.

Furthermore, although inner harbour activities are noted by Fremantle Ports for their risk to the public in the event of a release of hazardous substances, the rail freight route which services the port is not similarly considered, despite concerns raised by Fremantle Ports in MRS Amendment 1008/33.

3.3 Soil monitoring along the freight route

> *"Magellan has proposed to undertake a base-line soil-sampling program along the transport route, which will be undertaken prior to the commencement of container transport along the route, and will be repeated annually for the life of the project." (WA Environmental Protection Authority, 2007 p6)*

The undertaking of soil-sampling along the transport route is applauded, however, the monitoring program needs to be released for public scrutiny prior to implementation. Methodological approaches, sampling times and test results need to be available for public comment. One particular area of concern is the proposal to sample in the long term on an

[4] "Trains will carry approximately 20 containers in total, transporting 125 containers per week into the port from Magellan Mine…" (WA Environmental Protection Authority, 2007)

approximately 10km grid - this is inadequate for the Perth metropolitan area, given the high population density along parts of the rail transport route.

It is reasonable to expect that sampling rates along the Fremantle sections of the route be well below 500m intervals and use purposive sampling methods, for example, at known contamination hotspots, recreational areas, residential areas and environmentally sensitive areas. As part of its base-line sampling program it is important that Magellan adequately characterise the rail route for contamination, so that any pre-existing contamination is not attributed to its own activities. Conversely, base-line monitoring is also essential to ensure that Magellan does not claim that other sources of lead are responsible for its own spills and impacts.

In the event that high levels of lead are measured in the rail corridor prior to activities (it is known that the rail corridors do contain lead and other pollutants in the Fremantle area), the potential impact of increased lead burden to the local community will need to be adequately considered. Even low levels of lead release by Magellan's activities cannot be tolerated given the overall lead burden of the Fremantle community.

Ongoing monitoring on a yearly basis also needs to be more closely assessed for its adequacy – seasonal changes are likely to affect soil contamination composition test results[5], and such long periods between monitoring does not offer the opportunity for a prompt response to any failures of the pollution minimisation strategies.

Furthermore, if soil monitoring is to take place, then biological monitoring should also be undertaken. Biological monitoring provides data on actual exposures by plants, animals and importantly the public. Biological monitoring can provide more accurate data on impact where failures in soil sampling methodology and failures of air quality monitoring have occurred. In Esperance, soil contamination was not considered the main route of exposure for birds or the human population, rather fine dust build-up on plants, in and around homes and in water sources. Dust deposition and rainwater tank sampling are therefore critical monitoring tools. Failure to consider these options further demonstrates a poor understanding of or reflection on the Esperance pollution exposure pathways information.

[5]Under certain conditions small lead spills may not be as readily identified, for example if heavy rains have leached lead further into the soil or washed it beyond the test site.

4. Community concerns over regulatory failures

In my communications with Fremantle community members, as part of my doctoral research into the management of contaminated sites in WA, there are a number of themes which regularly arise. Similar community sentiment was highlighted as part of the Esperance Inquiry and this is all consistent with international research in the area. The central themes include;

- Concerns over public health, particularly children's
- Failure by government agencies to respond to health and other concerns over environmental pollution
- Failed transparency of process at both private and government levels
- Lack of accountability of private and government organisations
- Failed community consultative and participatory processes
- Poor legislative provisions to empower and protect communities
- Failed acknowledgement of social, political and ethical considerations
- Poor consideration of local context, at social, political and environmental levels
- Approvals systems favouring big industries over local elected democracies

In this section I will discuss some of these issues through the experience of other environmental pollution incidents in Perth.

4.1 Local experience of contamination

In recent years private development companies have been undertaking remediation and redevelopment of contaminated lands in the Fremantle area. As part of these remedial works, high levels of contamination have been identified at a number of locations. Of particular interest is the land near South Beach, which has housed a number of polluting industries since the 19th Century. Of particular note is the Fremantle Smelting Works, which operated a primary lead and gold smelter (1898-1920) overlooking South Fremantle Dog Beach (also referred to as C.Y. O'Connor Beach).

As a result of past smelting operations, land in the area is heavily contaminated with lead, arsenic, mercury, cadmium, chromium and a number of other pollutants. Development companies have claimed to have remediated much of the old smelter lands, however, there is evidence that contaminants remain in some soils. Residual heavy metals and other contaminants contained in soils, in groundwater and from other unremediated sites continue to be a source of exposure for local residents.

There is also evidence that the local marine environment is contaminated with lead. Lead has been isolated from sea creatures off South Beach[6], demonstrating the bio-availability of the locally occurring lead compounds, yet the DoH have failed to respond to this, other than to dismiss the seriousness of their own findings. There is also a reference to a lead 'slag reef' off South Beach in departmental documents (WA Department of Health, 2004), but the potential risks from this have not been investigated.

The identification of the lead smelting history of the area and of lead pollution in the area, has resulted in ongoing concerns by local residents that their health could be impacted and/or that their homes and gardens may be contaminated.

[6] Health Department tests 2004 found high levels of lead sea squirts off South Beach

It is widely accepted that lead smelting industries are highly polluting and a number of US studies have demonstrated that lead contamination can extend for many kilometres around old smelter sites. Accordingly, the local community have requested a community blood monitoring program be initiated and that residential soil and deposition testing be initiated. The government, however, refused to initiate such programs and dismissed the community's concerns by merely claiming there was no evidence to support such a program, despite no testing or monitoring of the problem. It can only be assumed that this refusal was because uncovering pollution would send the Fremantle community into a panic, and remedial works would ultimately be too costly. As with Esperance, there is a trend of downplaying or dismissing the risks, without any evidence upon which to base these 'reassurances'.

Nevertheless, some community members have undertaken private testing of their garden soil and some children in the area have been blood tested privately and as part of the Fremantle Lead Study.

The first Fremantle Lead Study (Willis, Rossi, Bulsara, & Slattery, 1995) revealed a significant problem in the Fremantle area, but at this point had not assessed the impact of the lead smelting industry. The second Study findings (to be released) demonstrated an improvement from the earlier Study, suggesting that lead from petrol might have been a significant contributor to the earlier findings. In both studies, however, children living closest to the old smelter site had the highest blood lead readings. It is of note that the level of support and ongoing monitoring of children identified with blood lead levels above 5µg/dl was not to the same standard as for Esperance.

Private testing by some local residents (both children and adults) living on the most southern boundary of South Fremantle have shown that blood-lead levels above 5µg/dl are relatively common and revealed that some residential soils were contaminated with lead in excess of 300mg/kg. Lead exposure in these cases does not appear to be associated with renovation work, rather, proximity to the smelter site, exposure to residential soils and use of the surrounding areas (eg playing on the beach, eating fish caught from the local groyne). Many houses in the area pre-date or are linked to the smelting industry and may have residual lead contamination in ceilings etc. There has been no follow-up by government agencies on these matters. No biological or deposited dust testing for other pollutants known from the area has been undertaken either. The risks from a combination of pollutant exposures have never been assessed.

Furthermore, dust associated with remedial works in the South Beach area of South Fremantle has caused a great deal of anxiety for local residents. Residents regularly reported seeing clouds of dust coming off the redevelopment sites, and despite monitoring, dust events were never 'detected'. It was interesting, albeit bewildering, to listen to LandCorp's assertions (Duckworth, 2005) that no dust was coming off one of the sites 'because the monitors said so', despite the counter claims by a number of local residents that they had observed the dust clouds and were experiencing considerable dust build-up around their homes during remedial works.

This information offers a number of important points with regard to the Magellan Metals' proposal;

- The experience of the local community amid contamination fears is that government agencies respond poorly and are generally dismissive of community concerns.

- Blood-lead load is already high in this area due to exposure to pollutants from past industrial activities - additional exposure from Magellan's activities is simply not acceptable.
- Monitoring for dust has been ineffective locally. There is no reason to believe that Magellan's monitoring will fare any better under local wind conditions and in the absence of inadequate numbers of monitoring stations.

The Magellan Fremantle project remains a very high profile one, given the Esperance lead pollution incident and in view of the Inquiry findings. Fremantle residents have raised valid concerns relating to the adequacy of the Magellan proposal, in view of the fact that all the checks and balances were apparently in place at Esperance and that pollution impacts occurred despite ongoing reassurances by regulatory agencies. It remains that if it were not for the unfortunate deaths of thousands of birds, the full extent of the lead spills may still not have been uncovered. And it may well be that lead sensitive populations of birds, such as those that prompted the investigation at Esperance (ie Purple Crowned Lorikeets), do not exist in Fremantle, to warn locals and officials of pollution events.

4.2 Other failed pollution responses in Perth

In addition to the local experience of pollution response, I would like to briefly outline a number of other failures in regulation. These accounts demonstrate that despite some serious pollution releases in Perth, attempts to improve the system have continued to fail. This is perhaps explained by the Esperance Inquiry's finding 152 that "…the Committee has concerns that the commonly adopted approach of the Department of Environment and Conservation was one which was characterised by the lack of a compliance culture." (p289)

In their European research Linnerooth and Davis (1987 p150) note the gap between "…formal regulatory systems and the general compliance with these systems…" The Western Australian situation is apparently not any different.

In 2002 the WA Auditor General's Office issued their report *Grounds for improvement: Government owned and controlled contaminated sites* (2002) and identified a number of areas for consideration. Importantly this report identified the significance for government agencies in losing public trust over matters involving contaminated sites.

> *"When the redevelopment of past industrial sites for residential use has commenced, without first identifying the full extent of land contamination and assessing the potential health risks, the subsequent costs of trying to put things right have been high. The community's resultant loss of confidence in government and its agencies can be a further significant, if intangible cost. (Auditor General for Western Australia, 2002 p4)*

4.2.1 Bellevue – Waste Control Pty Ltd

Lloyd-Smith and Bell (2003) detail the management of the Bellevue Waste Control Site, the release of contamination and the subsequent assessment and cleanup of contamination. Their account highlights mismanagement of the waste control industry by government agencies, leading to spills and release of toxic fumes and eventually a massive explosion which resulted in the release of toxic particulate material.

Evacuation of the area on the night was a failure, FESA were not informed of the toxic nature of the site and so exacerbated the problem by treating the fire as a factory fire and not a hazardous waste facility. As a result of poorly informed control measures, toxic waste was washed off site by the actions of fire-fighters attempting to control the fire. To make matters

worse, health surveillance of nearby residents was not undertaken after the fire, and government officials claimed that there was no risk, "despite obvious and serious contamination".

Despite independent testing on behalf of the community which showed mercury and PCB contamination, government officials have either denied or downplayed this information.

Strengthening of legislative provisions after this contamination event was to have resulted in better controls.

4.2.2 Brookdale Liquid Waste Treatment Facility

An excerpt from a media report (Flint, 2005) on the Brookdale facility provides a shocking account of government mismanagement of the site and the poor response to community contamination fears.

> *"Sick families near the former Brookdale toxic waste plant can now argue that it did damage their health. Although the WA Government closed the plant at the end of 2003 after community outrage, it has always insisted that the facility posed no risk to people's health or the environment. It continued to say there was no plausible 'exposure pathway' or 'route of transmission' for people to get sick from the plant…But these claims have been shown to be incorrect with biological waste, containing heavy metals above the standards, from the plant being used to fertilise soils in the area…The mixing of waste streams is supported by anecdotal evidence from former workers at the facility, which was operated by the Department of Health (1988-1994) and the Department of Environment (1994-2003). The toxic sludge, which came out of the industrial plant, had to be disposed of in approved landfill sites. But sludge which came out of the biological plant was sold as fertiliser. In the early days of the plant, trailer loads of sludge were taken away by members of the public – sometimes in exchange for cartons of beer…the sludge was not tested before leaving the plant, despite the known health risks associated with sewage sludge, such as disease-causing pathogens that survive treatment…Environment Minister Judy Edwards recently confirmed there was no requirement for the sludge to be declared safe before sale. She said: 'Rather, it was required to ensure that septage sludge was transported to an approved landfill facility or sold as soil conditioner. As such the onus was on the sludge receiver to confirm it was suitable for their landfill or use…*
>
> *[In January 2002,] …a survey of 358 people – including 14 chronic case studies – was conducted by Denise Edmands as part of her doctorate studies in environmental psychology at Edith Cowan University. It cited a high incidence of eye, throat and immune system problems. Most of the complaints were from people living within a 3km radius of the waste plant…As part of a suite of tests being conducted in response to community demands, the DEP commissioned consultants GHD to monitor air quality around the plant… GHD concluded that there was no 'on going emission from the facility due to passive storage of hazardous chemicals'. GHD's report was stuffed with assurances that all results - not just some of them - could be treated with the highest confidence because of the highly sensitive and accurate methods used. The DEP, which reviewed GHD's report, issued a statement claiming the test results 'should help allay long-standing concerns about air quality in Brookdale'. [In] Jan 2003 The Sunday Times revealed that GHD and the DEP had misread the air monitoring results. Levels of lead had been detected at Forrestdale Primary School – and were 75 times higher than the World Health Organisation and Australian guidelines. DEP chief Roger Payne said the blunder was a 'monumental stuff-up'. He apologised at a public meeting of 300 angry residents, many of whom blockaded the plant the following day.*

It is not until this that the Health Department organised the blood tests for local children and convened a panel of medical experts to review the results. Soil, air and groundwater were also resampled. The panel concluded there was no evidence that the plant was a source of heavy metal exposure and Forrestdale Primary School could be re-opened. The community remained sceptical and demands for the plant's closure intensified…Arsenic, lead, chromium and other toxic metals were detected in local roof gutters, but the Health Department's expert said the results were 'unremarkable'. The GHD lead figures were described as aberrant. The CSIRO confirmed the consultant used faulty methodology…

A sick resident paid for Dr Mark Donohoe, one of Australia's leading experts in environmental medicine, to fly to Perth and look into the health complaints. The Sydney-based doctor examined 29 people during two days in Perth and left convinced that people were genuinely sick, saying their symptoms suggested chemical exposure. People had overactive immune responses, consistent with 'environmental triggers'. Dr Donohoe walked around the plant's perimeter and was bowled over by the smell. He was also less than complementary about the physical state of the plant. 'I have not seen anything quite like this before,' he said.

Further DoH studies revealed an increased rate of diabetes and nosebleeds in the area. 'The nosebleeds do stand out and we haven't been able to explain that', said Michael Jackson, the department's executive director of population health. The department declined a request from residents to include Dr Donohoe on a review panel to evaluate the results…[In Oct 2004] the site was reduced to rubble by a salvage contractor in contravention of the decommissioning plan. Pollution testing bores were damaged in the wrecking spree. After reading about the unscheduled demolition in this newspaper, an unhappy Dr Edwards inspected the site and ordered improved security." (Flint, 2005)

4.2.3 Minim Cove

Minim Cove is located on the Swan River's edge at Mosman Park. The redevelopment site was a former fertiliser plant. This site was redeveloped for residential purposes.

"There have been several breaches of ministerial conditions during the site construction, including stockpiling contaminated soils and excessive dust emissions…Residents of Mosman Park have contacted both developers [LandCorp and Octennial Holdings] to discuss compensation for the dust problems from the site. The site is required to be hydro-mulched, although nearby residents say this is not always done promptly." (The Post newspaper, no date)

A media notice from a number of community action groups including the Minim Cove Protection Group stated;

"Our respective groups have strived, unsuccessfully, to have the Minister address serious contamination and pollution issues which threaten the health of present and future generations of Western Australians. Instead of ensuring that these matters receive urgent and appropriate action, the Minister has seen fit to ignore them, to procrastinate or to place commercial interests above those of public health and welfare." (WA Legislative Council Hansard, 1997)

4.2.4 Midland Saleyards Remediation

Serious problems identified with dust monitoring and dust control at this Midland site are noted in the DoE briefing notes between the Ministerial Liaison Unit and Policy/Ministerial Officer (TS1605 2/3/04). The following dot points are excerpts from this document.

- *…[There was] visible dust from other, non- remediation work on the site, and…a high volume sampler part was found to be dislodged.*
- *…benzene levels directly adjacent to the coal dam exceeded the action levels.*
- *DoE has serious concerns about the accuracy of the results and the methods used. The first report containing monitoring results was provided to DoE on or after 9 February 2004. This report contained monitoring data for December 2003, January 2004 and (part of) February 2004. It is important to note that the Ministerial Conditions relating to site remediation did not come into affect until 23 December 2003, and December monitoring was considered by the proponent to represent "background" conditions. As noted…[the] site visit by DoE during December 2003 indicated that dust control measures on the site were inadequate (visible dust emitted from the site) prior to commencement of the remediation.*
- *The December 2003 monitoring results show exceedences of the target levels for dust (as PM_{10}) on 16 occasions, with a number of other days showing levels near or at the target and other days when no monitoring was performed. As noted, remediation activities had not started on the site at this time and the high "background" levels appear to be due to the state of the site (large bare areas, limited works underway, limited dust control measures in place).*
- *…the use of the NEPM standards is considered to be an appropriate interim position given the location of sensitive receptors (eg workers in the MRA and adjacent offices, students at the primary school)…*
- *The DoE Air Quality has assessed the dust monitoring results…and found a number of inconsistencies in the report. For example, two sets of readings show PM_{10} levels higher than the total suspended particulate TSP level, which is technically not possible…*
- *Limited data provided by MRA's consultants have indicated that the methodology for calibration of the PM_{10} high volume air samplers may be incorrect and not to Australian Standards.*
- *The air monitoring consultant has identified errors in the current dataset and is currently preparing an amended dataset for AQMB review.*

In summary, data was provided too long after exceedences were noted, the background monitoring was inadequate to determine the true background dust levels for the area, there was an apparent non-adherence to Australian Standards, and the consultants were slow in providing supporting information on methodologies on calibration.

Furthermore, departmental documents highlight a number of inconsistent beliefs between the AQMB and the Audit Branch which stated;

> *"…there is one thing you should be aware of and that was that the original air quality management plan and monitoring had already been approved and they had a clearance letter for starting remediation last year….makes it difficult to threaten them with anything or stop the work." (WA Department of Environment, 2004a)*

AQMB, however, stated in response to Audit branch that it;

> *"…reviewed draft versions of the ENV DAQMP and provided 2 memos to Audit Branch (27/4/03 and 5/8/03). We raised a number of concerns in these memos, but did not review revised drafts or review/approve final documentation. Note that a similar situation*

occurred for Helena West – the Minister's office (Leanne Taylor) chased us up directly to query this, as I understand that AQMB approval was an audit condition." (WA Department of Environment, 2004b)

Following this another email was sent from the AQMB stating;

"Please note that AQMB continues to be concerned about the management of Midland. Remediation activities have commenced at BCD, and in effect we are providing retrospective advice as to the adequacy of the monitoring strategy at this site, notwithstanding the existing approvals for remediation activities.

AQMB provided initial advice a year ago in the Draft ENV DAQMP, but we had no involvement or knowledge of actual activities underway. Given the information provided and the history of the monitoring program at Helena West, we have concerns about current activities and, importantly, the apparent failure of the developer to incorporate learnings from Helena West into the current works." (WA Department of Environment, 2004c)

A media statement reiterating these issues, states "…there appeared to be significant dust management challenges on the site that need to be urgently addressed...[but] The Department of Health advises that the reported levels for the metals and other monitored parameters do not indicate a public health risk." (WA Department of Environment, 2004d)

Other internal emails reveal;

- Failures on the part of agencies to honour the community's right to know about asbestos data and that the MRA contractor's failure to monitor dust in accordance with Australian Standards constituted a breach of Ministerial Conditions – "If you do not intend to pursue enforcement in this case, you should have a response prepared to clearly outline why it was not appropriate." (WA Department of Environment, 2004e)
- "DoE has serious concerns about the accuracy of the results and the methods used."

A letter from the Department of Health to the Department of Environment revealed even further problems with this remediation. In particular: "The consultant's comments related to asbestos levels and the NEPM health risk assessment exposure duration shows a lack of knowledge about the toxicological profile of asbestos." An important typographical error for the asbestos response level was noted and poor cross referencing for samples were said to be "…considered very unsatisfactory and the consultant should be requested to improve presentation of this information in any further reports." (WA Department of Health, 2003a)

4.2.5 Robb Jetty Remediation

The Robb Jetty site adjoins the South Fremantle Landfill Site and land previously containing the Fremantle Smelting Works. It was found to have lead and other heavy metals contamination. This site was redeveloped for residential purposes.

The following information is derived from a local community member's 'vigil notes' (http://au.geocities.com/southbeachleadvigil/) and details the many problems encountered as part of the Robb Jetty remediation;

- Four community based scientists claim inadequate testing to adequately characterise the soil contamination – many samples but few sampling sites.
- Failure to adequately site monitors according to Australian Standard.

- Monitoring only offered during work hours.
- No soil testing was undertaken in deep excavations.
- Failures to adequately test site soils – dark, visibly suspicious soils untested and returned to site or left in situ.
- Untested (and potentially contaminated) soils from deep excavations were being used as surface soil in final landscaping.
- Vibration complaints by residents.
- Multiple public sightings of dust leaving the site.
- Dust build-up on residential outdoor furniture noted.
- Dust still leaving site even after the water trucks had gone through.
- There were difficulties for Council environmental staff gaining access to the site.
- Raised lead levels in a baby living close to the site[7].
- Soil testing undertaken by a community member, showed raised lead levels in soils claimed by the proponent to be clean. (Wilson, 2006)

4.2.6 ANI-Bradken site remediation

The ANI-Bradken site redevelopment demonstrated questionable government approvals process at multiple layers. Some of these issues are briefly discussed below.

As part of the MRS Amendment process for this site, the EPA apparently only relied on the proponent's information on past contaminating industrial processes. A local community member uncovered the full site history via a simple search of the Fremantle local history library. Other documentary evidence including photographs and DOLA aerial map representations were, however, readily available. It was finally revealed that the Minister for Planning and the proponent had known of the lead smelter from the outset – they did not pass this information on to the EPA to include as part of its assessment. It is likely that revealing this information may have seriously impacted on the MRS Amendment decision for the area.

Concerned local residents went to the Supreme Court to have their independent scientific evidence considered by the WA government and despite the Supreme Court finding in their favour, the government agencies involved still dismissed their concerns. A number of families living near the site, including at least 20 children, left the area for the duration of the remediation. Only now are these families starting to return. This disruption to the local community has been ignored by the government.

Community and local council reports highlighted many errors and questionable practices in the proponent's environmental management plan, including non-adherence to NEPC and other guidances. None of the recommendations of these reports were considered by the proponent. The Responsible Authority did not respond to the highlighted and often serious errors in the environmental management plan.

Noted breaches of the dust management plan were dismissed as 'dust coming from other sites' or 'due to extreme wind conditions' (and therefore not the responsibility of the proponent).

Contaminated material (rubble) from the site was observed by a community member being dumped at the Coogee redevelopment site, instead of going to landfill.

[7] This baby had the highest blood-lead reading in the second Fremantle Lead Study. There were no other noted risk factors identified – he lived in a relatively new lead-paint free home, he was breast fed and his mother did not have high blood-lead levels, he was not crawling and so could not pick dust up from surfaces. These high readings corresponded to dust producing events at the Robb Jetty site.

4.2.7 South Fremantle Dog Beach

Independent reviews of the environmental testing program for this site highlighted flaws in sampling methodologies and application of relevant guidance statements. Government agencies failed to pick-up on these testing anomalies and approved the use of Health-based Investigation Levels that were too high for the site in question, being a public beach with maximum opportunities for exposure to soil contaminants, especially by children. Information accessed via FOI has revealed that government agencies did not accurately apply national standards and had only superficially evaluated the testing program, concluding that the site did not require remediation and did not pose a health threat to the public.

People and animals using this beach regularly reported breaking out in rashes. The Department of Health undertook a number of sampling programs in response to community concerns, and despite finding evidence of lead contamination in the water concluded that the rashes were most likely as a result of exposure to algae. None of the DoH tests isolated any toxic algae. A local veterinarian found high levels of sulphur on the skin of a dog who had suffered severe irritation after using the beach. No further investigations by the DoH were ever undertaken in regard to this.

Smelter waste contained within the dunes at the South Fremantle Dog Beach continues to be further exposed and washed into the ocean after storm events.

4.2.8 South Fremantle Landfill Site

The South Fremantle Landfill Site remains unremediated and awaiting a comprehensive management plan. The site is known to be contaminated with hazardous waste, medical and quarantine waste, US naval ships' waste, unexploded ordnance, abattoir and putrescible waste. Parts of this unremediated site were approved for residential development in the 1980's- the Fremantle Chalet Village - where many residents complain of bad odours, 'ooze' coming from the soil, and industrial and medical waste apparent when the soils are excavated as part of service upgrades (eg as part of normal gas, water and electrical repairs).

There are reports that excavation works at parts of the Site during the 1990's resulted in illness within the nearby community.

Despite local residents revealing the quarantine history of the site to regulators, it was not until the City of Fremantle made official requests for information to AQIS, that the strict quarantine requirements became officially recognised. Many activities undertaken at the site had already occurred in breach of commonwealth quarantine requirements. Proposals for the site which relied on practices that would result in breaches of the commonwealth *Quarantine Act 1908*, were halted.

The greater area of the landfill site is presently being considered for management options – with residential redevelopment of the site one of the proposed options.

EPA guidance statements for buffers surrounding landfill sites (WA Environmental Protection Authority, 2005) do not allow for the inclusion of inoperative sites. Despite identified high methane levels and the many other hazards (Dunnett, 2004) associated with this site, no buffer between the adjacent housing development was considered necessary by the EPA or regulatory agencies. Some residential sites at the new South Beach Village complex back directly onto the landfill site.

Groundwater under the site is known to be contaminated. This contaminated groundwater discharges on to the nearby South Fremantle Dog Beach.

4.3 Monitoring and general dust control issues

4.3.1 Responsibility for lead contamination

There is very little data available on existing lead contamination along rail routes and in residential areas. It is of concern that if an environmental breach did occur, this will be put down to pre-existing contamination. This issue was a point of contention in Esperance, when high blood lead levels were claimed to be from other sources, and that the impact of Magellan's lead was only a contributing element in the overall picture.

Adequate base-line monitoring is therefore an important element of the program. Testing at a high level, as proposed in section 3.3, will provide a more accurate picture and avoid future disputes.

4.3.2 Dust monitoring and management under strong winds

The strong wind conditions along the Fremantle freight route and at the harbour present challenges in dust monitoring and emergency response. As was demonstrated at Esperance, under strong wind conditions, lead dust was carried a significant distance from the port operations, causing bird deaths, water contamination, aquatic food-chain impacts and raised human blood-lead levels. Lead cleanup in Esperance is ongoing.

There are also concerns over the reliability of dust monitoring under windy conditions. Similar dust monitoring programs have failed to identify high dust levels in the South Fremantle area, when dust clouds have been present and obvious. (see Section 4.2.5)

Modelling for potential deposition zones in the event of a release, as part of the management and monitoring program does not appear to have been undertaken.

4.4 Appointment of independent auditor

There is lack of clarity over the role of the independent auditor:

- Will this appointment merely be to audit processes or to oversee operations on a more regular basis?
- Will the auditor play a role in undertaking, overseeing or merely auditing the dust monitoring program - will the auditor's job be hands-on or just an administrative function?
- Will the Fremantle Port monitoring be audited as part of the process?
- Who will be inspecting the bulk bags at Fremantle - stevedores or the auditor?
- Importantly, if the auditor *is* independent, she/he ought to be available for meetings and other interactions with community representatives – will the auditor consult with community representatives and readily enable public participation as part of the audit process?

While there are noted improvements to the conditions under which the independent auditor will be appointed, namely through the regulatory agency, it is under estimated by the EPA the future employment drawcard that large companies, such as Magellan, hold. That is, for an auditor, however they are appointed, to act in a manner that opposes or highlights flaws in an operation, would not be in a that auditor's (or their company's) best interests given the future

prospects for employment by Magellan other large companies. To highlight flaws or irregularities in process could mean a loss of future employment opportunities in the industry. The 'public service' directive of a private company, working on behalf of another private company also remains in question.

Furthermore, under the present system, where regulatory agencies play a role in recommending or appointing 'independent' auditors, any failure of the role of the auditor then places the regulatory body in the difficult position of defending the failed auditor's actions or findings, since it (the regulatory body) has been instrumental to the appointment of that auditor.

A major finding of the Esperance Inquiry was that WA regulatory agencies were unable to carry out their functions as environmental or public health regulators at many levels. Under recommendation from the Esperance Inquiry, changes to support the better functioning of the regulators were needed. The best opportunities for 'independently' overseeing and auditing the operations of Magellan Metals, with a focus on acting in the community's best interests, still remain within the public regulatory agencies and government-based scientific organisations, under well supported funding provisions.

4.5 Submissions to the EPA on Magellan's proposal

There is a noted trend by the EPA and regulatory agencies to have proponents' representatives respond to submissions, without apparent oversight by the EPA. In many of the responses from Magellan Metals there is an obvious attempt to deviate from submitters' questions or comments, resulting in no real clarification of the issues under review. Furthermore, there have been past problems where government agencies have not undertaken a review of issues contained within these proponent response documents, with a resultant failure to make necessary changes to highlighted problems or errors in an environmental management plan[8].

The following submissions (WA Environmental Protection Authority, 2007) require further review:

G1: Questions over the methods of inspection of the bulk bags other than visual, is not answered – there *are* no apparent methods other than visual checks offered.

G10: There is no apparent justification for a 10km sampling interval along the freight route, which given the population density of the Perth metropolitan area and especially Fremantle, should necessitate a much higher sampling rate.

B6: This response merely attempts to explain why additional safety measures to eliminate the potential for dust were unnecessary because the bulk bags were sufficient (albeit unproven in the local context). This response to a valid and practical suggestion only appears to demonstrate attempts by Magellan Metals at cost cutting, without regard for taking on board community and local government suggestions.

[8] For example, as part of the assessment of remedial works for the South Beach Village, the issue of added risks from mixtures of chemicals was regularly raised by community members. Despite this, a NEPC directive which specified that consideration of chemical mixtures ought to undertaken, and documented comments by the DoH that the issue of chemical mixtures needed to be addressed by the proponent (WA Department of Health, 2005), this requirement was overlooked by DEC and no action was ever taken by the proponent of this project.

B7: Magellan Metals fails to address questions over the unproven nature of the proposed transport, instead merely referring to Fremantle Ports' capacity to handle 'other' dangerous goods. The Port's capacity to specifically deal with a lead spill or similar are not detailed on the Fremantle Ports' website as claimed by Magellan. The nature of a lead spill and the response to a lead spill are quite different to oil, acid and alkali spills.

B8: Magellan Metals does not answer the question over potential dangers associated with the proximity of the freight route to residential areas and only refers to the responsibilities of Fremantle Ports, which do not extend to the entire freight route in the City of Fremantle and surrounds. It is of interest that Fremantle Ports have made submissions in the past to the EPA expressing their concerns about the increasing residential development within the port buffer areas and along the freight route, given the hazardous goods being transported. (see section 3)

B10: Questions on whether the bulk bags are air and water tight have not been answered. This matter is important within the context of accidental loss of a bag into the harbour or Fremantle Waters or in the event of stockpiling under extreme weather conditions. While Fremantle Ports appears well prepared for an oil spill event, it has not demonstrated its preparedness for a lead spill, especially if directly into the harbour or ocean.

G7: The use of a government appointed inspector needs further follow-up by the EPA (see also section 4.4).

G9: Follow-up is required by the EPA and regulatory agencies on the provision for random checks by a government inspector.

G12: The anticipated need for "refinements to the process" demonstrates the proponent's own understanding of the unproven and experimental nature of this proposal.

H7: There is no supporting information provided as part of the EPA document to substantiate the DOCEP claim that "the proposed Emergency Response Plan should be adequate." In view of the lack of lead cleanup provisions by Fremantle Ports, this claim needs further examination.

I3: While the provision for monitoring at the Fremantle port is briefly outlined, there is no provision made for public access to Fremantle Ports monitoring methodologies and results.

J1: The City of Fremantle notes the need for further consideration of the Esperance Inquiry findings and recommendation. Magellan Metals states;

> *"Consideration and approval of the Fremantle proposal does not depend on further consideration of the Inquiry's findings. The Parliamentary Inquiry was commissioned to look into the cause and extent of lead pollution in Esperance…[and that]…the Fremantle proposal addresses all of the maters raised by the Committee in its report…*"

This statement is clearly a blatant misrepresentation of the intent and broader application of the information gained from the Inquiry. As detailed in Appendix 1, and Section 1 of this document, there were numerous findings by the Esperance Inquiry pertinent to the Fremantle proposal and many recommendations which have been presented with the goal of ensuring that this disaster does not happen again. To date, many of the recommendations, which would support safer practice, have not been implemented. It remains that in the event of a spill, the safeguards necessary to prevent another environmental and public health disaster are not yet in place.

L1: There is no supporting evidence provided to substantiate the Department of Water's claim that "[m]inimal risk [is] posed by the proposed method of transport with respect to public drinking water source areas and waterways." The freight route passes along wetlands, over the Helena R., near the eastern reaches of the Swan R., over the Jandakot Mound, and of course, loading operations will take place at the mouth of the Swan R. Again the adequacy of monitoring and emergency response remains a crucial element. The overall response to the Esperance lead pollution, however, highlights the inadequacy of emergency response – in particular, regulatory agencies have been slow to identify problems, biological testing was inadequately undertaken and cleanup has still not been completed.

Additionally, there are a number of documents cited by Magellan Metals which are not publicly accessible, for example, the Emergency Response Plan and the Health, Hygiene and Environmental Management Plan. These two documents are crucial to a fuller understanding of the achievability of a safe lead transport program and ought to have been part of the EPA assessment process.

5. Impacts of lead

5.1 Human impacts – an overview

The exposure of children to lead has been identified by the US Agency for Toxic Substances and Disease Registry (ATSDR) as a serious health problem. The 2005 US CERCLA[9] Priority List of Hazardous Substances lists lead second only to arsenic.

There are "…complex and interactive factors [that need to be considered] when evaluating the impact of lead-contaminated soil on public health." (Xintaras, 1992) Correlations between lead soil levels and the effects of lead laden dust on human blood lead levels are available, however there are many factors influencing the rate of uptake of lead by the human body. In Australia Health-based Investigation Levels (HIL) are generally set to reflect the data available on health impacts at the time, and to best represent those groups most at risk from lead because of their specific biology and/or behaviours. They are not, however, health standards. As highlighted in the Esperance Inquiry, soil guidance values vary considerably from country to country, however, the range considered to prevent lead toxicity in children is within the range of 100-250 mg/kg. As more research is undertaken, even lower soil guidance levels are likely to be implemented.

It is worthy of note that the Australian HIL-A for lead in residential areas is set at 300mg/kg - this level correlates to human absorption rates maintaining blood lead levels below 25µg/dl, thus representing an outdated blood-lead standard. Current guidelines used in Australia maintain that blood lead levels below 10µg/dl are protective of children's health. Recent research has, however, identified that (often imperceptible) health impacts in children occur at levels below 10µg/dl. In fact, this research has determined that levels of lead as low as 2µg/dl have serious long term impacts on cardio-vascular health in adults. It is of interest that for the Esperance Inquiry, health officials have utilised a children's blood-lead 'standard' at 5µg/dl – half that of the national guidance. This is probably a reflection on these more recent research updates and an understanding that guidance statements are regularly well behind current research findings. Nevertheless, the 5µg/dl level still only reflects "an achievable target…a pragmatic level" (Baghurst cited in Edwards, 2006) rather than a proven health standard. "New evidence suggests there is [even] a measurable IQ decrease with blood lead levels between 1 and 10 µg/dl." (WA Department of Health, 2003b) Ostro (2000) states that "[b]ased on current information it is not possible to identify a clear threshold for blood lead levels associated with adverse health effects in humans." That is, there is no safe exposure to lead. While current blood-lead guidelines remain at 10µg/dl, it is likely that these guidances will be lowered significantly as new evidence presents. (National Research Council, 1993)

Lee and Jones-Lee (1994) detailed the problem of use of pollutant guidance levels. With reference to US contaminated sites (Superfund sites) they noted;

- a high degree of uncertainty about the reliability of the current standards that are used as cleanup objectives;
- that existing standards are subject to future revision; and
- there is often a significant lag time of five to ten years or even longer for new information to be incorporated into new standards or public policy. (p8)

[9] Comprehensive Environmental Response, Compensation and Liability Act

Furthermore, seasonal variation complicates the assessment of risk for lead exposure, with blood lead levels often increasing over summer – possibly due to increased exposure to outdoor sources. It also needs to be taken into account that elevations in blood lead levels may not reach a new level after exposure for 60-120 days (Tola, Hernberg, Asp, & Nikkanen, 1973). Because of the way lead is stored in the body, even after exposure is stopped, a person's blood lead level may take several months or sometimes years to drop significantly. (ATSDR, 1990)

Pre-school children and foetuses are identified as the most vulnerable to the effects of lead. (US Agency for Toxic Substances and Disease Registry (ATSDR), 1988) This is due to a number of factors;

- The developing nervous system of the foetus is susceptible to the neurotoxic effects of lead. (Xintaras, 1992)
- Young children more commonly exhibit pica behaviours, that is, eating soil and non-food items. (Xintaras, 1992)
- Young children are more likely to be exposed to lead in soil and on surfaces due to their play behaviours and their hand to mouth behaviours. (Xintaras, 1992)
- Children are physically closer to the soil and therefore more likely to inhale dust stirred up through normal activities.
- Children have a faster metabolic rate, resulting in a proportionally higher intake of lead via food. (Ostro, 2000)
- Children have a faster resting inhalation rate and tend to breathe through their mouths when at play, reducing the amount of organic lead particulate matter trapped in the nasal passages. (Ostro, 2000)
- Lead is more efficiently absorbed via the gastro-intestinal tract of children (50% relative absorption), compared to adults (15%), especially when below 2 years of age. (Ostro, 2000)
- Children have a less developed blood-brain barrier and therefore greater neurologic sensitivity. (Ostro, 2000)
- Nutritional deficiencies of iron (Chisholm, 1981; Watson, Hume, & Moore, 1980; Yip & et al, 1981) and calcium (Heard & Chamberlain, 1982; Mahaffey & et al, 1976), which are prevalent in children, facilitate lead absorption and exacerbate the toxic effects of lead. (Xintaras, 1992) Zinc deficiency can also enhance lead absorption. (Markowitz & Rosen, 1981)
- Children have a longer lifetime of exposure and so carcinogens have a greater impact.

Mahaffey *et al (1976)* cited 2-3 year old children as most at risk, reporting that this group had the highest blood lead concentrations in their study. Ostro (2000) cites studies in which children between 1 and 2 years old have the highest blood lead levels.

The demonstrated effects of lead on children include impaired mental and physical development, decreased haeme biosynthesis, elevated hearing threshold, and decreased serum levels of vitamin D. The neurotoxic effects of lead include impaired academic performance and deficits in motor skills, which may persist after blood lead has returned to normal. (Needleman, Schell, Bellinger, Leviton, & Allred, 1990) No threshold levels have been established for these effects, but lead toxicity may occur at very low levels. (US Agency for Toxic Substances and Disease Registry (ATSDR), 1988)

In addition to these effects, it is known that lead derived from the maternal skeleton can impact on the developing foetus and that lead can be passed to the infant through breastfeeding. Lead has been found to be more toxic in the presence of alcohol (Flora &

Tandon, 1987). There is also some indication of lead having carcinogenic properties and effects on male fertility. The list of people most vulnerable to lead toxicity include children, pregnant women (and the foetus), the elderly, smokers, alcoholics, people with genetic diseases affecting haeme synthesis, those with nutritional deficiencies, neurological and kidney dysfunctions. (US Agency for Toxic Substances and Disease Registry (ATSDR), 1988) This list is not exhaustive.

In vitro and in vivo studies have shown that even submicromolar concentrations of lead cause changes in neurotransmission and brain mitochondrial function, within minutes of exposure. (Ostro, 2000) This information is significant in defining the risks from even low dose, acute exposure from any release of lead-laden dust from the proposed Magellan lead transport through Fremantle.

Further to this, lead has been found to "…interact with a number of other metals in the bodies of animals with resultant synergistic, additive or antagonistic effects." (US Agency for Toxic Substances and Disease Registry (ATSDR)) For example, lead exacerbates the toxic effects of mercury (Congui et al., 1979) and manganese facilitates the absorption of lead. (Chandra, Murthy, Saxena, & Lal, 1983) A low calcium diet has been shown to promote genetic damage by lead. (Deknudt & Gerber, 1979)

Because lead affects the function of cytochrome P450 enzymic systems, and because these systems are important in the body's detoxification of many harmful chemicals, lead then affects the body's capacity to deal with the detoxification of such chemicals. Hepatic cytochrome P450 plays a key role in the metabolism of both therapeutic and foreign chemicals, including commonly used drugs such as caffeine, alcohol, antibiotics, painkillers and anti-inflammatories. The body's ability to cope with commonly used drugs is therefore impaired in the presence of lead.

Reagan and Silbergeld (Reagan & Silbergeld, 1989) argue that "the literature as a whole supports a low soil lead standard of 100µg/g[10] or so" but also noted that soil type be taken into account – "…the standard should be lower for sandy soil or soils having a low content of organic matter."

Even low levels of lead released by Magellan's operations cannot be tolerated within the Fremantle context of;

- pre-existing contamination by heavy metals known to interact and exacerbate the effects of lead;
- pre-existing lead contamination, where additional sources will result in additional impact;
- local soil types which may intensify exposures; and
- current guidances and 'standards' which are known to be inadequate and under-protective.

5.2 Exposure pathways

The enHealth Council detail some of the 'default exposure assumptions' used in the development of HIL exposure settings. These include the direct soil exposure pathways;

- direct soil and dust ingestion;
- direct soil dermal contact; and
- direct soil particulate inhalation.

[10] µg/g and mg/kg correspond to the same concentration factor.

And the indirect soil exposure pathway;

- uptake into and consumption of home grown fruit and vegetables.

A further indirect soil exposure pathway includes the uptake of contaminants by trees and shrubs from contaminated soil and water and through dust directly deposited onto plants.

Heavy metals, such as lead, are also known to bio-accumulate and concentrate in marine algae. Marine water contaminated by heavy metal pollutants provides a clear pathway into the marine food chain and back to humans and land animals.

Although the direct ingestion of soil as a pathway for exposure is acknowledged, especially in young children who exhibit pica behaviours, ingestion may also occur by means other than eating soil directly. For example, toys, play equipment, food utensils or any surfaces that have collected dust, can be a source of heavy metal exposure. Any hand to mouth behaviours, or the placing of contaminated items in the mouth, then maximise the opportunities for ingestion of heavy metals. The soil-to-indoor dust transfer rate and the biological activity (and therefore the rate of biological uptake) of lead compounds (after US EPA, 2004) need to be well defined to assist with the risk assessment.

Specific dust deposition risks are identified at recreational areas along the South Fremantle rail route. In particular, children's play areas, outdoor restaurants and parked cars (dust collects both inside and out) are a noted risk for dust deposition. There is also a trend for travellers and others to park or camp overnight in the public carparks adjacent to the freight rail line near South Beach – the deposition of any dust inside their mobile homes or campervans will pose a significant risk. The deposition of lead-dust in and around homes in Esperance is cited as a major pathway for exposure after the Magellan pollution releases; nevertheless, other deposition zones need further assessment as part of the monitoring strategy.

The build-up of contaminated dust in recreational and residential areas, over the 10 year duration of Magellan Metals' operations, must also be taken into account, since lead does not degrade in the environment. For example, even small amounts of lead dust, released regularly over the duration of the lead transport, may build-up on play equipment or in soils, to levels that are a significant health risk to young children.

In view of the high lead load already known to exist in the Fremantle area, further sources of lead from Magellan's operations must be assessed in light of adding to the blood-lead load. Much lower response levels to lead pollution must be applicable in such areas.

The enHealth Council (Taylor & Langley, 2001 p15) state;

> *[t]here remains a need to ensure a good general understanding of the use and intention of 'investigation levels'. Some regulatory authorities have noted that since specific soil response criteria have not been established in this country, the health-based investigation levels tend to be seen as de facto acceptance criteria by many consultants. However, there are likely to be occasional instances where the existing investigation criteria are inadequately protective of ecosystems or groundwater resources, and perhaps even under-protective of humans if all possible exposure pathways are investigated and taken into account. Hence there always remains a need to consider sites on their respective merits, rather than unthinkingly comparing soil sample analytical results to established criteria.*

5.3 The Esperance Inquiry

It must be reiterated that the Fremantle community's experience of pollution management under the WA government has been one of poor regard for social and ethical components of the debate. Added to this, the inadequacy of regulation and flagrant disregard for health and safety in lead handling in Esperance only further reinforces the belief that there have been few improvements over the years and that high risk proposals continue to be poorly managed.

5.3.1 Failures of process

The lead pollution in Esperance was caused by many failures at multiple levels. The following points represent some of the key problems:

- Unsafe handling of the hazardous cargo during both transport and port operations
- Inadequate physical safeguards
- Failed monitoring
- Failed reporting
- Failed regulation
- Inadequately protective legislative provisions
- Failed recognition of local context, for example, local winds, pre-existing nickel contamination
- Slow and inadequate emergency response
- Poor responses to community and especially to indigenous peoples
- Poor community outreach programs
- Poor biological monitoring program
- Poor understanding by health officials of the impacts of lead and exposure pathways
- Erroneous application of safety measures by regulatory officials
- Poor understanding of the contextual elements of the pollution problem

5.3.2 Impacts of failures of process

Elevated blood lead levels detected in the Esperance community suggested that there had been long term exposure to lead pollution, rather than from a number of discrete or short term exposures. The Magellan operations at Esperance had been resulting in lead releases, possibly for the entire period of their operations in Esperance. It took the death of thousands of birds to highlight the problem and prompt action.

Esperance Port workers blood lead levels on average increased nearly 5µg/dl in two years, yet this did not prompt further investigation of pollution management at the port. In fact, when this result should have triggered wider community investigation, the Department of Health merely reassured the public by stating;

> *"while the investigation was only in its early stages, the results [of the blood lead testing in March, principally of port workers] confirmed the view that while it was apparent that lead had found its way into the bird population, the Department of Health had not seen evidence that human health had been affected" (Education and Health Standing Committee, 2007 p16)*

This statement also raises concerns over the Department of Health's (and DEC's) understanding of the often subtle effects of lead exposure and the long term life threatening impacts. This combined with advice to residents to empty contaminated rainwater tanks onto their gardens and advice to indigenous communities (with limited access to water) to wash collected bush tucker, all amounts to identified incompetence and an incapacity to deal with a lead pollution incident.

It is of interest that DEC soil testing in June 2007 did not reveal significantly high levels of lead;

> *"While only one sample recorded a significant value above the 300mg/kg Australian Soil Ecological Investigation Level (EIL) and Health Investigation Level, there were seven between 101 and 200mg/kg, and it should be noted that the soil guideline for lead in residential properties and parks in Canada is 140mg/kg. While the levels are generally low the sampling process was extremely restricted. The higher values of lead are, except in one instance, located in closer proximity to the Port with three along the railway line; the four higher values for nickel are all along the railway line. Testing along the transport route through to Wiluna was not included." (Education and Health Standing Committee, 2007 p23)*

However, swabs for fine particle dust in a around homes and rainwater tank sampling in Esperance revealed a different picture. It was concluded that the bird deaths in Esperance were probably as a result of exposure to these fine particles of lead which had deposited on the birds' food sources.

The presence of lead in fish and sea worms further demonstrated the bioavailability of the lead, and despite one fish sample having a lead level four times the recommended level, the Department of Health advised that *"...*eating the fish does not pose a risk to human health" (Education and Health Standing Committee, 2007 p30) "It is of note that the Department continues to advise people not to eat crustaceans or other shellfish taken from around the area as a precautionary measure." (Education and Health Standing Committee, 2007 p30)

The Esperance Inquiry also identified another dimension to the pollution problem – "…how these pollution incidents have been experienced and perceived by local community members." The following dot points offer a summary of the issues identified:

- Medical symptoms experienced but not initially identified as a result of lead exposure
- Anxiety over the contamination of household rainwater supplies
- People told not to drink rainwater
- Noise from trains experienced by residents along the freight route
- No wildlife in gardens noted
- Dead birds
- Constant dusting and cleaning
- Children unable to play in backyards
- No apparent duty of care by Magellan and Esperance Port for residents, tourists and visitors
- Dust contamination inside homes eg in mattresses
- Professional decontamination of houses necessary
- Increased paranoia and anxiety resulting from recommended dusting, cleaning and decontamination regime.
- Drop in house values
- People very unhappy living under an imposed pollution regime
- Mothers being told to stop breastfeeding
- Children were traumatized by the death of so many birds and believed they or their families would also die;

"I do not want to become too emotive but I mentioned it is the impact on families and sometimes you cannot always predict what that will be. I would like to recount something that happened four days ago in my own family. I have a young boy, Lachie, who is five years of age. He asked me if Mia [18 *month old sister with elevated blood lead levels] was going to die. I was really floored. His logic came from what he was witnessing. I had not really looked at the true impact of what it is like in the life of a five-year-old. He is watching the news and the media and hearing conversations between me and my husband. Lachie just related birds, lead, dead. He thought of Mia and lead. Obviously, there were reassurances but it was quite profound for me just to look at it from that particular angle. I do not want to become too emotive but it needs to be recognised that people are viewing it in different ways, and so are children." (Education and Health Standing Committee, 2007 p37-38)*

Whatever the reasons underlying the events that are the subject of this inquiry, there are two overwhelming themes apparent from the submissions and testimonies of the people of Esperance this Committee: a profound sense of betrayal of trust, and an acute concern for those children exposed to lead pollution. (Education and Health Standing Committee, 2007 p39)

Appendix

Appendix 1: Key findings of the Esperance Inquiry

"Finding 18
Industry regulation by the Department of Environment and Conservation is grossly inadequate. (p85)
Finding 20
Recently announced increases of fees payable for licensed premises under the *Environmental Protection Act 1986* are unlikely to ensure sufficient resourcing for the Department of Environment and Conservation to undertake adequate industry regulation. (p87)
Finding 21
The current monitoring of compliance by those projects assessed as likely to have a significant environmental impact under Part IV of the *Environmental Protection Act 1986* is inadequate. (p90)
Finding 22
The Committee is concerned that the existing legislative provisions available to the Department of Health may not be adequate to respond appropriately to public health emergencies. (p94)
Finding 23
There were critical failures by the Environmental Protection Authority, the Department of Environment and Conservation and Magellan Metals Pty Ltd to implement Department of Health recommendations and advice in the environmental approval processes associated with the events that are the subject of this inquiry. (p107)
Finding 26
Ministerial conditions required that Magellan Metals Pty Ltd undertake a review of the Port facilities to identify potential pathways for lead to enter the environment prior to those facilities being used to handle lead concentrate. The review was to be addressed in the Health, Hygiene and Environment Management Plan. The Environmental Protection Authority assessed the application to vary the Magellan proposal to allow export through the Esperance Port on the basis that Magellan would comply with the conditions. (p108)
Finding 28
The original Environmental Protection Authority Bulletin on the proposed export of Magellan lead concentrate through Geraldton included significant detail on standards to be incorporated into the Port's environmental licence by the then Department of Environmental Protection. The Environmental Protection Authority did not recommend that these standards be included as conditions or proponent commitments in the original Ministerial Statement for Geraldton. Subsequently, the Ministerial Statement for Geraldton was varied so that the concentrate could be exported through Esperance, subject to the original conditions and proponent commitments, but without reference to the original Environmental Protection Authority Bulletin. As a result the Environmental Protection Authority did not assess whether the variation to the Esperance Port's environmental licence to allow the handling of the lead concentrate met the standards outlined in its Bulletin assessing the original proposal. (p109)
Finding 29
The decision to vary the Magellan proposal to allow the export of lead concentrate through Esperance instead of Geraldton, in the absence of community consultation, appears to be within the existing legislative provisions in the *Environmental Protection Act 1986.* (p113)
Finding 31
Magellan Metals Pty Ltd did not undertake annual roadside monitoring surveys and sampling of rainwater tanks within 50 metres of the proposed route *'initially and ongoing'*, as it committed to do in the Health, Hygiene and Environment Management Plan. (p115)
Finding 33
Magellan did not comply with proponent commitment 13 in the Ministerial Statement as it did not prepare a sampling program to monitor dust produced during transfer of mineral products from storage areas via loading facilities to ships. (p116)
Finding 36
The Environmental Protection Authority assessed Magellan Metals Pty Ltd as being compliant with proponent commitment 14, and appears to have either overlooked or underestimated the requirement to refer the dust monitoring program to the Department of Health. (p118)
Finding 40
It is unclear on what basis the Environmental Protection Authority assessed Magellan Metals Pty Ltd as compliant with the requirement to undertake a: *review of* [the Port's] *equipment, procedures and monitoring programs to identify potential pathways for lead to enter the environment and if appropriate additional equipment, management or revised procedures are to be determined*. (p123)
Finding 41

The reference to covered conveyor systems as 'closed' in publicly available Department of Environment and Conservation's port licensing documents was misleading. (p124)

Finding 42

The Committee is concerned that the licence conditions for the Esperance Port Authority, and other ports, do not appear to incorporate current standards relating to environmental management and monitoring. (p134)

Finding 47

The inclusion of the term *'pelleted lead carbonate'* in the preamble to the Esperance Port Authority's environmental licence did not amount to an environmental approval requiring the transport and export of lead carbonate in a pelleted form. (p139)

Finding 50

Although there had been specific reference to community consultation by both the Esperance Port Authority and Magellan Metals Pty Ltd in applications to vary relevant environmental approvals to transport and handle the Magellan lead concentrate, there was no advice to the Esperance community by the Port or Magellan when the information upon which public consultation occurred was superseded. (p158)

Finding 52

These results were not responded to or effectively scrutinised by the Department of Environment and Conservation. (p163)

Finding 53

The Committee believes that the Esperance community had to rely on an inadequate dust monitoring regime for the Esperance Port with no publicly available results. (p166)

Finding 55

The Committee believes that the Department of Environment and Conservation, the Esperance Port Authority and Magellan Metals Pty Ltd all failed substantially in meeting their responsibilities regarding the effectiveness of dust management, monitoring and reporting lead levels in the Esperance area. (p178)

Finding 67

When an independent Occupational Health and Safety Consultant conducted an inspection of the Esperance Port's nickel outloading process on 23 March 2005, to assess its adequacy for handling lead concentrate, he reported that there was *'considerable spillage'* evident and concluded:
It can be assumed that some spillage would have entered the harbour [as] *there is no spillage catchment pans fitted to these conveyors.* (p179)

Finding 68

On 12 May 2005, the Esperance Port's dirty water treatment plant was identified as the highest priority by the Port's workforce in relation to '*things that need addressing with regards to lead handling'*. The Esperance Port's workforce also identified a series of modifications to the ship loader spill trays and conveyor underpans in a list of five priority items. (p181)

Finding 69

Until the recent installation of bunding along the edge of berth 2 (the heavy metals berth) rain at Esperance Port would cause any product on the berth face to wash into the harbour. (p182)

Finding 70

Until the time the Esperance Port started to handle bulk lead concentrate it was the practice, if not the policy, at the Port to wash down berth 2 after ship loading and for the water to run off directly into the harbour, or into the storm water drain located at berth 2 and from there into the harbour. (p183)

Finding 71

The Heavy Metals Ship Loading Procedure of the Esperance Port Authority from August 2005 was that, in relation to the clean up after nickel loading, the berth face was to be cleaned with a bobcat and broom attachment and the residue placed back into the nickel shed. For lead, the procedure was that the *'Mobivac'* was to *'vacuum up berth face and place residue back into lead shed'.* There is also evidence that an industrial wet sweeper was used to clean the Port from July 2005. (p184)

Finding 72

Although contrary to the Esperance Port Authority policy after August 2005, on the balance of the evidence before it, the Committee concludes that, on occasion, the heavy metal berth was cleaned by being washed down. The infrastructure of the berth was such that the water would run off the sloped berth into the harbour, or into the storm water drain on the berth, and directly from there into the harbour. (p187)

Finding 78

Contrary to the Esperance Port Authority view of the cause the elevated levels of lead and nickel recorded near the outlet beneath berth 1 in March 2007 (refer to Finding 74), there was evidence at that location of elevated benthic levels of nickel since May 2005 and elevated lead levels since September 2005. (p192)

Finding 85

The failure by the Esperance Port Authority to notify the Department of Environment and Conservation of a spill of between 60 and 100 kilograms of lead concentrate into the harbour on11 January 2006 was potentially a breach of section 72 of the *Environmental Protection Act2006*. (p192)

Finding 86

There was a significant spill of lead concentrate during loading of the MV POS Auckland on 5December 2006, which required more than four hours to clean it from the wharf near berth 2. (p193)

Finding 87

No evidence was provided to the Committee by the Esperance Port Authority to explain its apparent assessment of the significant spill of lead concentrate on 5 December 2006 as an operational spill rather than an environmental spill, requiring it to be reported to the Department of Environment and Conservation under section 72 of the *Environmental Protection Act 1986*. (p193)

Finding 88

There was no evidence provided to the Committee by the Esperance Port Authority of any formal process of investigation of the significant spill of lead concentrate on 5 December 2006. (p198)

Finding 90

The outcome of the environmental approval processes applicable to the transport and handling of Magellan's lead concentrate resulted in the imposition of only minimal environmental monitoring requirements on the Esperance Port Authority. If the Port had been subject to more rigorous regulatory requirements, particularly in relation to the monitoring of air quality, it may have better identified and addressed the potential for lead pollution. (p198)

Finding 91

Although the regulatory framework may not have consistently addressed the risks associated with the potential for lead pollution, the evidence of the Esperance Port Authority was that it had made itself reasonably aware of the potential damage to the community should lead dust escape from the Port environment. (p199)

Finding 92

Dust monitoring results from 1995 to 2004 indicated the consistent presence of nickel beyond the Port's boundaries. This should have alerted the Esperance Port Authority to the potential for lead pollution if it adopted the same processes for handling lead concentrate as it did for handling nickel concentrate. (p199)

Finding 93

The failure of the Department of Environment and Conservation to set compliance targets other than those associated with *'nuisance'* arising from the *'soiling'* characteristics of dust to monitor lead may have affected the Esperance Port's efforts to reduce the risk associated with potential lead pollution arising from lead dust escaping the Port's boundary. (p200)

Finding 94

The ongoing problems and complaints about the odour associated with nickel, and in particular the unloading of nickel kibbles, should have alerted the Esperance Port Authority to the potential for lead pollution if it adopted the same processes for handling lead concentrate. (p201)

Finding 95

The Esperance Port Authority's recognition of potential lead pollution arising from *'invisible'* particulates escaping the Port's boundary may have been reduced by:

- the Department of Environment and Conservation not requiring monitoring of *'invisible'* particles (particles with a diameter less than 10 microns, respirable particles) when the Esperance Port Authority commenced handling lead concentrate; and
- the inclusion of a condition in the Esperance Port Authority licence requiring it *'to prevent or minimise the emission of **visible** dust past the boundary of the premises'.* (p205)

Finding 99

The Committee is of the view that the elevated nickel levels in rainwater tanks near the Port should have alerted the Esperance Port Authority to the risk of lead pollution if it adopted the same processes for handling lead concentrate. This was because the Port expected lead concentrate to behave in the same manner as nickel concentrate, and the water quality guidelines applicable to lead are half the level for nickel. Furthermore, the lead content of the Magellan product was high in comparison to the nickel content in the nickel products being handled by the Port. (p221)

Finding 110

The typically strong winds of Esperance increased the potential for lead pollution during outloading and when in a south-easterly or north-easterly direction were more likely to impact on the population living close to the Port. (p225)

Finding 111

After a major dust incident during the loading of the MV Lemmergracht with lead concentrate on 10 October 2006, the Esperance Port Authority identified small box hulled vessels as unsuitable and as having the potential for more dust generation. By allowing the same vessel back into the Port to be loaded with lead concentrate again on 11 December 2006, the Esperance Port Authority failed to properly exercise its responsibilities in relation to potential lead pollution. (p229)

Finding 116

After the incident during the loading of the MV Lemmergracht on the night of 11 December2006, the Esperance Port Authority continued to rely upon identifying visible dust as a means for monitoring dust emissions while outloading lead concentrate at night. In doing so the Esperance Port Authority failed to properly exercise its responsibilities in relation to potential lead pollution. (p234)

Finding 118
The major dust incidents associated with the outloading of Magellan's lead concentrate by the Esperance Port Authority on 11 to 12 December 2006 and 5 March 2007 were each followed within days by reports of large numbers of native bird deaths. (p234)

Finding 119
The Esperance Port Authority did not notify the Department of Environment and Conservation of any of the major dust incidents associated with outloading Magellan's lead concentrate (refer Finding 117). (p249)

Finding 121
Although the blood lead levels of individuals working at the Esperance Port were, other than in one instance, not above National Occupational Health and Safety Commission guidelines, they showed that:

- when baseline testing was conducted prior to the Port handling the Magellan lead concentrate, no Port worker had a blood lead level in double digits; when testing was conducted in March 2007, almost one in five did; and
- when baseline testing was conducted prior to the Port handling Magellan lead concentrate, the average was 2.84µg/dl; the average of blood lead level from tests in March 2007 was 7.91µg/dl; almost tripling the blood lead levels across the workplace in just two years. (p253)

Finding 123
The apparent tolerance of the Esperance Port Authority and Magellan Metals Pty Ltd for the potential of short-term exposure to lead pollution is consistent with the National Environmental Protection Measure standard for lead in ambient air, which provided for samples to be taken every six days and averaged over a year. The Committee believes that the current National Environmental Protection Measure for lead in ambient air is inadequate and notes that a review is underway which includes an assessment of this measure. (p265)

Finding 138
The Department of Environment and Conservation's responsibilities in relation to the Esperance Port Authority processes, practices and procedures, including the legal and regulatory framework, were not adequate or properly exercised (refer to Findings 17, 18, 21, 23, 41, 42,47, 52, 53, 61, 90, 93, 95, 98, 142, 143, 144, 149, 150 and 152). (p272)

Finding 141
When the Esperance Port Authority was given the opportunity to develop new options for dust monitoring as a result of complaints from Esperance residents in 2002, it incorrectly advised the Department of Environmental Protection that a decision to change to deposition gauges from the original high volume sampling undertaken by the Port in conjunction with the Department in1995 was due to *'a lack of correlation in the data'.* In fact, high volume sampling results were found to *'correlate extremely well to activities and weather conditions'*. The Port only proposed modifications to its dust depositional gauge sampling and analysis, which in the Committee's view was an inadequate dust monitoring program. (p273)

Finding 142
When management of the Department of Environmental Protection's industry regulation function for Esperance premises was transferred from its Goldfields to its Albany Office, the Esperance Port Authority's environmental reporting conditions were varied so that it needed only to provide dust monitoring results on an annual rather than a six-monthly basis. This was due to the Department's resourcing issues and was standard practice for the region. (p278)

Finding 146
When the new Albany-based Environmental Officer from the Department of Environment had the opportunity to inspect the Esperance Port Authority in May 2005 she noted that the Port's: *Licence is very focussed towards the management of iron ore, need to ensure comparable measures are taken for lead and nickel. Discussed the possibility for further dust monitoring to capture extreme dust conditions that may attribute to some dust complaints and the high levels of nickel in rainwater tanks. (p*279)

Finding 147
On 25 August 2005, the Albany-based Environmental Officer from the Department of Environment and Conservation wrote to the Department of Health seeking advice on the health impacts of dust issues at Esperance Port. The memo, which was copied to two other Department of Environment and Conservation officers and the Esperance Port Authority's Environmental Consultant, highlighted the elevated nickel levels in rainwater tanks surrounding the Port. (p280)

Finding 148
On 21 September 2005, the Department of Health's acting Toxicologist responded by letter to the Department of Environment and Conservation's memo of 25 August 2005 and advised that lead carbonate was *'highly soluble and the contamination of rainwater tanks by fugitive dust emissions may therefore cause a serious health concern'.* The persistent nickel in rainwater tanks, in spite of Esperance Port Authority's dust management measures, was also noted as was the proposal to use the identical measures for the management of the lead. The letter supported the Department of Environment and Conservation's recommendation of a dust risk assessment and highlighted a number of issues which did not appear in the Port's existing dust management plan including:

• restricting the duration of dust generating activities;
• minimising handling;

• restricting on-site vehicle speeds;
• reducing drop-heights wherever practicable;
• considering guideline values and monitoring methods for respirable particles;
• specifying conditions and contingency triggers for use of water sprays on stockpiles and conveyors; and
• on-site dust monitoring facilities and assessment methods such as *'dust-trak monitoring'*.

The letter also highlighted that the Port's licensing conditions were not *'sufficient to ensure adequate protection of public health'*. Monitoring and reporting were *'environmentally focussed and do not provide useful information for health risk assessment'*. (p282)

Finding 149

Critical advice about the Esperance Port Authority's environmental licence and dust monitoring regime received from the Department of Health in September 2005 was not followed up by the Department of Environment until February 2007. (p286)

Finding 150

The evidence available to the Committee indicates that individual officers of the Department of Environment and Conservation responded genuinely to public complaints concerning the operations of the Esperance Port Authority, and pursued various strategies to address these. However, these responses were often delayed and overall were ineffective in managing the risks highlighted by the complaints. (p286)

Finding 151

The major impediment to effective industry regulation by the Department of Environment and Conservation was constant restructuring which, combined with insufficient resources, resulted in ongoing staffing changes and a loss of corporate knowledge. This led to a lack of experience and capability in monitoring the complex and diverse operations subject to the Department's regulatory powers. (p289)

Finding 152

Inadequate resourcing limited the capacity of the Department of Environment and Conservation and the Environmental Protection Authority to do anything other than rely upon self-regulation. However, the Committee has concerns that the commonly adopted approach of the Department of Environment and Conservation was one which was characterised by the lack of a compliance culture. (p289)

Finding 153

The Committee notes that recent Department of Environment and Conservation data on enforcement activities indicates that the Department's implementation of the 'Robinson Review' recommendations could be contributing to the adoption of a more robust regulatory approach within the Department. (p310)

Finding 166

The Committee accepts the Esperance Port's proposition that a Material Safety Data Sheet's classification of material as a dangerous good does not, in itself, impose any legal obligation to handle the product in accordance with dangerous goods legislation and regulations. (p313)

Finding 170

Magellan Metals Pty Ltd's *'mining of the lead ore, cerussite, producing a high concentration lead carbonate (77%), is unique in the developed world'*, and the concentrate potentially has '*significantly higher bioactivity than* [the] *galena (lead sulphide) concentrates that are produced in other areas of the state'*. (p326)

Finding 179

Although the response to the lead pollution in the Esperance area was relatively rapid, the Committee has concerns about aspects of that response; specifically:

- the initial proposal to empty contaminated rainwater tanks onto residents gardens;
- the lack of support and information for parents whose children had elevated lead levels;
- the lack of early and specific advice to expectant and nursing mothers; and
- the provision of free HEPA vacuum cleaners without any assistance in terms of the difficult and extensive work involved in cleaning entire houses, including ceilings.(Refer to Findings 10, 11, 180, 184, 187, 188 and Recommendations 2 and 42 also.) (p327)

Finding 180

The initial government response to lead pollution in the Esperance area lacked coordination; in particular there was a lack of clear delineation of the various agencies' responsibilities, extended delays in providing information and results to community members, and unnecessary impediments to the sharing of relevant information. (p330)

Finding 185

Dust is considered a major source of lead intake in children under two years of age. (p331)

Finding 186

The Committee believes that the ceiling space is a potential source of household recontamination if not cleaned. (p333)

Finding 187

Only approximately one-third of children under the age of five years in the Esperance area were included in the original blood testing; approximately half of those identified as having elevated blood lead levels participated in follow-up testing. The Committee has concerns that although very reliable, the invasive nature of the Department

of Health's preferred venous blood testing may have hindered, and possibly continues to hinder, the broader participation of children in the blood lead monitoring program. (p334)

Finding 188

The initial results for the retesting of children with elevated blood lead levels available to the Committee indicate that:

- eighty-nine per cent of the original group of children tested with elevated blood lead levels (79 of 83) had elevated blood lead levels of between five and nine micrograms per decilitre;
- approximately half of the children with elevated blood lead levels were retested (45 out of 83); and
- only sixty four per cent of the children retested (29 of 45) three months later had blood lead levels that declined to under five micrograms per decilitre.

With a half life for lead in blood of approximately one month, it might have been expected that a greater proportion of children would have reduced blood lead content to under five micrograms per decilitre. While the Committee has insufficient information to draw any conclusions about the results these do not appear altogether positive. This data is consistent with some ongoing exposure, or with longer-term exposures. (p334)

Finding 189

There is evidence that prolonged exposure to lead can result in health impacts, particularly cognitive deficits, for children with blood lead levels of under 10 micrograms per decilitre. There have been no equivalent studies of children exposed for shorter periods, such as occurred in Esperance, with a potential maximum exposure of approximately two years (p335)

Finding 190

While it is the case that no studies are available which demonstrate the affects of exposure to lead pollution, such as occurred in Esperance, it is equally the case that there are no studies which can reassure members of the Esperance community that there will be no long-term impact as a result of the exposure.

Finding 191

Factors such as family circumstance and educational opportunities are potentially far more important to a child's cognitive ability than exposure to lead. (p337)

Finding 192

The Committee supports the undertakings made by the Minister for Planning and Infrastructure, on behalf of government, that government will:

- not rely upon the statute of limitations in relation to legal actions arising as a result of potentially adverse consequences from exposure to lead pollution; and
- not rely upon legalities relating to the identification of the responsible government agency.

The Committee takes it that these undertakings are not confined only to potential legal action pursued on behalf of the children who were contaminated by the Magellan lead concentrate, but extend to all those potentially affected by lead pollution."

Tables

Table 1: Dangerous goods incidents 2001-2006

(after DOCEP)

Date	Place	Details
20/02/06	near Darrine	Suspected broken axel on rail wagon transporting cyanide. Wagon derailed.
25/04/06	Kewdale	Pesticide spill from freight container at rail yard
28/04/06	Kewdale	Pesticide spill from freight container at rail yard
04/08/06	Bayswater	Freight container loaded with sodium cyanide delivered to wrong premises.
30/01/05	Merredin	Dangerous goods spilled following train derailment
20/10/05	Kwinana	Rainwater contact with sodium cyanide stored in a sea container, causing leakage onto limestone hardstand beneath
22/06/04	Kwinana	Spill of 1.7million litres of sodium hydroxide during ship unloading operations
27/07/04	Forrest	Shipping container on a rail carriage destroyed by fire
28/05/03	Fremantle Port	Leaking drums from shipping container. Damage to drum caused by poor stowage during transport.
09/08/02	Fremantle Port	During Shipment, inclement weather caused 2 large steel crusher jaws to break free and pierce the side of a freight container, puncturing a 200l drum.
22/03/01	Carrabin	A section of a freight train derailed following bearing failure, as it passed through a siding. This led to a number of wagons overturning and the spillage of contents

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