Government of **Western Australia**
Department of **Transport**

Esperance Cleanup and Recovery Project

Lead Cleanup and Recovery Plan

An Overview of the Sampling and Cleaning Process

Updated April 2011

Lead Cleanup and Removal Plan

Contents

Lead Cleanup and Removal Plan

1. Background to the Project

Between 2005 and 2007 lead carbonate mined near Wiluna north of Kalgoorlie was exported through the Port of Esperance. The material was handled in bulk, and this resulted in dust containing lead escaping during the container unloading, storage and ship loading processes, which led to contamination of areas in and around the Esperance town site.

In December 2006 the Esperance community reported a large number of dead birds around the town. Subsequent testing showed the dead birds had high levels of lead in their bodies, and testing of rainwater tanks showed that many of those tanks had levels of lead and nickel exceeding Australian Drinking Water Guidelines.

The Department of Health subsequently carried out the largest blood lead survey ever conducted in Western Australia. Of those tested 33 had blood lead levels in excess of the internationally recognised health guidelines for lead as published by the World Health Organisation. Many of these were children.

In April 2007 the State Government commissioned a parliamentary inquiry and report into the cause and extent of the lead contamination in Esperance. The inquiry sought submissions and conducted an extensive series of hearings that included government officers, board members and senior officers of the Port of Esperance, representatives of the mining industry, councillors and staff of the Shire of Esperance and members of the Esperance community. The report, including recommendations and findings, was tabled in the Western Australian Legislative Assembly in September 2007.

In December 2008 a steering committee for the cleanup project was established and includes Esperance community and business representatives, representatives of the Shire of Esperance, Port of Esperance and relevant State Government agencies such as the Department of Health, the Department of Environment and Conservation and the Department of Transport (formally Department for Planning and Infrastructure). The committee first met on 11 December 2008.

In January 2009, a project director was appointed and an office established in Esperance to manage the clean up and recovery project, known as the Esperance Cleanup and Recovery Project (ECRP). Transport has been given the role as responsible agency for the ECRP.

2. The ECRP Mission

The Western Australian State Government is committed to cleaning up the Esperance townsite of lead contamination, including cleaning of homes - inside and out - and ceiling voids. This will be carried out comprehensively and systematically with sampling before and after cleaning to validate the cleaning process.

3. Cleanup Guidelines

The ECRP will cleanup residues of lead carbonate (and in some cases nickel where a guideline for nickel exists) if the readings exceed the following standards or guidelines[1]:

Area being sampled	**Nickel**	**Lead**	**Units**
Roof Spaces	N/A	Relative[2]	-
Roof surfaces	N/A	1.0	µg/cm^2
Gutters	600	300	mg/kg
Rainwater tanks[3]	0.02	0.01	mg/L
Internal and external surfaces readily accessed by adults	N/A	0.4	µg/cm^2
Internal and external surfaces readily accessed by young children	N/A	0.04	µg/cm^2
Carpets	N/A	0.04	µg/cm^2
Soils	600	300	mg/kg

[1] ECRP cleanup standards and guidelines were developed and recommended by the Department of Health and other agencies and endorsed by the ECRP Steering Committee (see www.oncue.org.au ECRP website for steering committee minutes).
[2] "Relative" means that the ceiling dust readings are considered in the context of (1) concentration of the lead in mg/kg; (2) loading of the lead in µg/cm^2; (3) proximity to the port; (2) wind direction and plume modelling; (3) local soil results and internal dust values; (4) roof construction (including presence or absence of sarking); (5) age of house or premises; and (6) any pathways from the ceiling.
[3] Source:-Australian Drinking Water Guidelines

4. Sampling

The ECRP has identified a likely area of contamination across the townsite, based on the results of broad soil sampling and computer modelling conducted in 2009. To ensure that the detailed sampling is approached in a systematic manner, the likely area of contamination has been divided into 11 stages, as shown in the map below:

Detailed sampling is undertaken at all residential and commercial premises within the likely area of contamination to identify which properties will require cleaning by the ECRP and the specific areas at each premises that require cleaning.

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Not all premises in Esperance within the likely area of contamination will require cleaning.

To ensure that the cleaning is directed at only those areas that require cleaning, up to 40 samples are taken from each premise. These samples are then sent to the ChemCentre laboratory in Perth for testing and analysis against the guidelines. The waiting time for results is around 10-12 weeks.

ECRP Samplers taking soil samples

Laboratory technicians at the ChemCentre in Perth

5. Cleaning Scope of Work

Based on the results of the sampling, an individual cleaning work order is created for each of the affected premises. This is developed in conjunction with any special requirements from the client. The cleaning contractors then contact the occupier directly to make a time for the cleaning. There may be up to three different bookings to make, depending on whether roof space cleaning, gutter cleaning or internal/external cleaning is required.

6. Cleaning Procedures

Detailed cleaning procedures are listed in the relevant Contract Specifications (available from the Project Manager on request) but the following provides a brief summary:

- **Roof spaces** – Access to the roof space is usually through the roof but can sometimes be through the manhole. If insulation is present, this is first rolled up in small sections and bagged in asbestos-grade plastic. As the bag exits the roof space, it is immediately bagged a second time and taken to a temporary waste disposal site at Wylie Bay. The dust on the ceiling is sucked up and captured with an industrial, truck-mounted HEPA vacuum cleaner. The captured dust is bagged once within the vacuum system and bagged again in asbestos-grade plastic before being transported to a temporary site at Wylie Bay. All bags of insulation and dust are then taken by shipping container to Red Hill in Perth, which is a licensed Class 3 waste disposal facility. The roof space or ceiling void is then visually inspected by the ECRP sampling team, who will determine if the cleaning is successful. If insulation was present, it is replaced immediately after the cleaning with insulation batts of the same or better quality. We do not use blow-in or foil backed insulation.
- **Roof Surfaces** - Cleaned by applying a bio-degradable detergent solution, scrubbing and then rinsing with fresh water. The run-off water is captured, contained in a licensed waste truck and transported to a licensed waste disposal facility away from Esperance. The cleaning is then validated by the ECRP sampling team who conduct swab tests to ensure the readings are within the guidelines.
- **Rainwater Tanks** – Rainwater tanks are cleaned if the water sample exceeds the guidelines. They can also cleaned as a precautionary measure if the water sample is OK but the gutters exceed the guidelines and there is significant sludge present in the bottom of the tank. The cleaning process starts by draining the tank into a licensed

liquid waste truck then removing any loose bulk material with an industrial vacuum. It is then scrubbed with a bio-degradable detergent solution and finally rinsed with fresh tap water. The rinse water is also captured and contained in the licensed waste truck and transported to a licensed waste disposal facility away from Esperance. The cleaning is then visually inspected by the ECRP sampling team, who determine if there are no remaining residues in the tank and the cleaning is successful. In some case the rainwater tank is either too small or too deteriorated to clean thoroughly and the ECRP will replace the tank in these instances.

- **Gutters** – These are cleaned by firstly removing loose bulk material with an industrial vacuum, then scrubbing with a bio-degradable detergent solution and finally rinsing with fresh water. The run-off water is captured, contained in a licensed waste truck and transported to a licensed waste disposal facility away from Esperance. The cleaning is then visually inspected by the ECRP sampling team, who determine if there are no residues of sludge remaining in the gutters and the cleaning is successful. The roof surface is sometimes sampled after the gutters are cleaned to ensure there was no contamination during cleaning.
- **Internal and external surfaces** – These are cleaned by either vacuuming (to remove loose bulk material), scrubbing with a detergent solution, wet wiping or a combination of all three methods wherever appropriate. The cleaning is then validated by the ECRP sampling team who conduct further swab tests of the affected area.
- **Carpets** - The carpets are cleaned using a domestic-type vacuum cleaner with a motorised head and a HEPA filter. The operator uses a methodical approach which includes going over the carpet at least four times in a cross-hatch pattern. The higher the reading, the more often the operator repeats this process. The cleaning is then validated by the ECRP sampling team conducting dust extraction tests. If necessary, this process is repeated until the samples show that the levels of lead in the carpet no longer exceed the guideline.
- **Soil removal** – This is carried out by firstly investigating the boundary extent of the affected soil, digging it out to a depth of approximately 200mm (or further if the testing shows levels of lead that still exceed the guidelines) and removing it from the premises for disposal at a licensed facility outside of Esperance. The soil removal is then validated by the ECRP sampling team who conducted further validation tests around the affected area. The results of those tests are reported to the client.

7. Validation Sampling

Immediately after the cleaning, the ECRP Sampling Team takes samples or, depending on the type of cleaning, visually inspects the area to ensure it meets the standards and guidelines. External surfaces, including roof surfaces, internal surfaces and carpets can be sampled using the same techniques that were used to take the initial samples.

After cleaning roof spaces, gutters and rainwater tanks, however, there is not enough bulk material remaining (i.e. bulk dust, sludge or water) to provide a sample. Swabs are not taken as a substitute because there are different guidelines for bulk samples and swab samples and the two cannot be readily compared. Therefore, the cleaning in these cases must be visually inspected.

Clients who had rainwater tanks cleaned or replaced will be contacted again by the ECRP, after a period of significant rainfall, to offer a follow-up rainwater tank sample.

8. Identifying Other Sources of Lead

The ECRP sampling team have identified numerous sources of lead other than from ship loading events at the port or rail movements.

For example, some glazed floor tiles contain a lead-based protective coating which may be trafficked into adjacent carpets. Cleaning conducted by the ECRP in these circumstances would not, therefore, be effective in permanently reducing the levels of lead in the carpets.

In another example, lead may be inherent in and part of the make up of the material being sampled. Older style window sills, for instance, may contain lead-based paint, which is a localised, ongoing source of lead in that area. Although the ECRP cleaning is effective in removing deposited lead dust from the area, the validation sample results may show a reduction but still exceed the guidelines. Any further cleaning by the ECRP, however, would not be effective in further reducing the levels of lead in that area.

8.1 Common Sources of Lead

Some common sources of lead include:

- Paint containing lead was used in many Australian houses. Houses built before 1970 are most at risk, but those built more recently may also have paint containing lead in some areas.

- Exhaust emissions from leaded petrol driven vehicles were another source of lead particles which not only polluted the air, but settled on soil and in roof spaces and ceiling voids.
- Workers such as furniture restorers, lead lighters, car battery and radiator workers and painters can bring home lead dust on their clothes. Hobbyists such as fishermen making sinkers, shooters at indoor firing ranges or miniature collectors are also at risk.
- Sources of lead on roof surfaces, in gutters and rainwater tanks may include deteriorated lead flashing around chimneys and other roof penetrations, leaded paint, ceramic tiles, leaded PVC roofing materials, lead washers used on the bolts holding the sheet roofing down, some galvanized iron sheeting and guttering, leaded PVC pipes or guttering, copper pipes potentially lead soldered, leaded brass or leaded bronze components, galvanized tanks and tanks with lead solder. Sometimes the source of the lead from rainwater tanks is within the outlet tap (eg leaded brass or leaded bronze fittings or lead solder).


Lead flashing around roof penetrations

- Lead has also been detected in the composition of some flyscreens, window tracks, door tracks and floor tiles.

8.2 XRF analysis

Handheld XRF analysers can measure the lead concentration in metals, plastics, tiles, paint and wood stains within seconds. This helps the ECRP sampling and validation team to identify other local sources of lead, even when the lead is inherent in the material such as lead-based paint.


Handheld XRF Field Analyser

When a sample is measured using XRF technology, each element present in the sample emits its own unique fluorescent x-ray energy spectrum. By simultaneously measuring the fluorescent x-rays emitted

by the different elements in the sample, handheld XRF analysers rapidly determine those elements present in the sample and their relative concentrations – in other words, the elemental chemistry of the sample.

Where the source of lead is found by XRF Analysis to be inherent in the surface material being sampled, the ECRP reports the likely source to client and concludes that further cleaning would not be effective in reducing the levels of lead in the material.

8.3 Isotopic or "fingerprint" testing

The ChemCentre in Perth can, in some cases, identify the primary source or origin of lead in a sample. This testing is based on the fact that lead extracted from a particular mine exhibits a specific isotope or atomic mass.

As there are often several sources of lead in the one sample, however, it can be difficult to positively identify the source as definitely Magellan or not. In some cases, testing has pointed to Magellan as the only source but in other cases it can be difficult to pinpoint.

Although isotopic testing is a useful tool, it is only one of the investigative methods used by the ECRP to determine which premises were affected by Magellan lead.

9. Health Surveillance

The ECRP regularly monitors the levels of exposure to lead dust with blood-lead level testing of staff and contractors. The health surveillance program is carried out under the supervision of an appointed medical practitioner (Dr. Charles Douglas from the Department of Health in Kalgoorlie). The health surveillance program requires all Contractor Personnel to undergo:

- Base-line blood-lead level testing;
- Monthly blood-lead level testing; and
- End of Contract blood-lead level testing.

The ECRP has also arranged to offer free blood lead level testing for our clients as part of the "closeout" package sent out after their premises has been successfully cleaned.

10. Safety and Environmental Management

The cleaning contractors supply all supervision, personnel and equipment to ensure that all work is performed in a safe manner and in accordance with the Occupational Safety and Health Act, including the Regulations and relevant Codes of Practice. This includes the following activities:

- **Project risk assessment** – Together with the Western Australian government insurers, RiskCover, the ECRP conducted an overarching risk assessment. This identified all high-risk elements of the project, such as working at heights and replacement of insulation, and identified ways to treat those risks.
- **Contractor safety management plans** – All contractors have in place an Esperance Cleanup Safety Management Plan. The plans describe the responsibilities and procedures for all aspects of the cleaning works and are regularly audited by the ECRP. The plans are available to any client upon request.
- **Contractor risk assessments** - To ensure that the cleaners respond immediately to any newly identified risks, the contractor management team attend and contribute to risk workshops as and when required by the ECRP and immediately implement any action items arising.
- **Job-specific risk assessments** - All contractors attend pre-start or “toolbox” meetings are conducted with the ECRP work supervisors prior to commencing work at each of the premises to ensure that any risks are identified prior to commencement of the work. As the job progresses, all workers are encouraged to review and amend the risk assessment as necessary.
- **Training** - The ECRP ensures that all contractor personnel, including sub-contractors, are, appropriately trained and competent for their respective tasks. All contractors are provided with an induction and job-specific training relevant to the cleaning works, which includes reference to routes of entry of inorganic lead into the body, personal hygiene and the proper use of the required personal protective equipment.
- **Working at Heights** - The ECRP considers working at heights or operating elevated work platforms to be a high risk activity, which requires all roof space cleaners and roof surface cleaners to hold a current Working at Heights and or Elevated Work Platform ticket.
- **Electrical Hazards** – The Federal Government Insulation Program revealed the critical dangers associated with working in roof spaces.

Our samplers take vacuum samples from just within the access hole in the roof space but do not fully enter the roof space. Their exposure to potential electrical hazards is therefore very limited. The contract cleaners, on the other hand, crawl around inside the roof space and must control the hazard by following strict electrical isolation procedures before entering the roof space.

- **Personal Protective Equipment** - All contractor personnel are appropriately equipped with personal protective equipment, including but not limited to disposable coveralls, dust mask with P2 rating (as required), disposable gloves, safety harnesses and fall restraints. All equipment and materials used are of commercial quality and labourers and operators have a complete understanding of equipment and materials used.
- **Safety for the community** - Traffic and pedestrian management, if and when required, is applied in accordance with any government regulations and local government authority requirements. All appropriate legislation and local government authority regulations are complied with for the transportation and disposal of waste materials and, when the disposal site is outside the Shire of Esperance, all affected local government authorities are contacted, and approval by the authority is given, prior to the transportation regardless of whether the waste material is or is not classified as controlled waste.
- **Safety for our clients** - Ladders, scaffolding, elevated work platforms, vacuum cleaners, hoses, pipes and all other equipment used in the cleaning are safely stored away from access by unauthorised persons when not in use. The Contractor must not, without the prior approval of the ECRP and notification of the client, bring or store any poisonous, corrosive or flammable liquids, gas, oil or other dangerous substance upon the premises to be cleaned.
- **Security for our clients** – All contractor personnel provide the ECRP with a police clearance. If any police clearance evidences that any contractor has committed a criminal offence punishable by imprisonment or detention, then the ECRP may request (and have requested) that the contractor remove that person from the project to ensure that the safety of our clients or their property is not put at risk.
- **Asbestos** – From time-to-time, the roof space cleaners do work around asbestos products, such as roof spaces that contain remnants of asbestos roof sheeting, asbestos insulation or other asbestos products. For that purpose, the roof space cleaners are

licensed asbestos removal contractors with asbestos policies, procedures and Asbestos Removal Liability insurance cover. However:

- There will be no removal or replacement or disturbance of asbestos sheeting or products, without prior approval from the ECRP and notification of the client and relevant regulatory authorities.
- The cleaning of asbestos roofs to remove any lead residues is not a viable, practical or safe option. The Department of Health has advised that to disturb or attempt to clean the asbestos roof surfaces would create a greater health risk than might be posed by any lead residues that might be present. There will be no cleaning, under any circumstances, of unsealed asbestos surfaces.
- In those cases where an asbestos roof surface exceeds the guidelines for lead, the ECRP can offer a financial contribution to the owner towards the cost of replacing the asbestos roof. The contribution would be commensurate with the cost of cleaning a roof of the same surface area as the asbestos roof. The contribution would be paid after the completion of the replacement, which must be prior to the completion of the ECRP.

- **Environmental Management** – A recent study[4] on the remobilisation of lead in Esperance found that the ECRP cleanup of lead contamination in homes and premises can proceed with the confidence that there will be no significant recontamination of lead residues in the town. The ECRP cleaning procedures ensure that no localised recontamination takes place as a result of the cleaning and that the cleaning is followed up with exhaustive validation testing.

11. Communication and reporting

The ECRP Communications Plan outlines the dissemination of information and the various mediums to be used, such as:

- **Website** - Site no longer active The website will contain up to date, accurate and relevant information in relation to the project as it unfolds.

[4] "Remobilisation of Lead and Nickel Residues in Esperance", Jim Malcolm, 26 June 2009. Available in full at: Site no longer active

- **Project updates** - Regular project updates are produced by the ECRP Director on a monthly basis. These are emailed directly to interested parties, are published on the website and made available in hard copy at the ECRP office at Unit 2B, 113 Dempster Street.
- **Mail out** - Direct mail to clients is the first and last point of official contact relating to the cleanup of premises. This correspondence includes specific issues such as the request for consent to sample, results of the sampling and the cleaning report.
- **Telephone contact** - Direct contact by telephone or in person may be appropriate where required.
- **Presentations** - The ECRP will respond positively to requests for presentations to interest groups such as schools, Rotary, Lions, Chamber of Commerce and Industry forums etc. The ECRP will also provide static displays at Agricultural Shows and other similar opportunities in order to provide broad community information on the project.

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12. Quick guide to the sampling and cleaning process

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 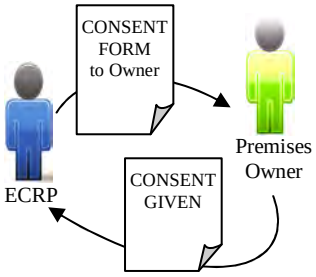
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<td>2. Telephone booking for sampling
 
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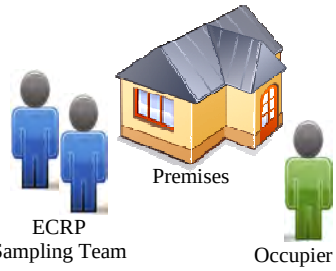
<td>3. Conduct sampling and analysis
 
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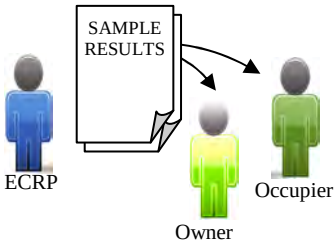
<td>4. Issue results and any offer of cleaning (8-10 weeks)
 
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<td>5. Telephone booking for site visit to scope the works
 
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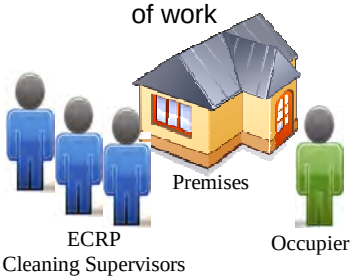
<td>6. Visit the site with the occupier and create a scope of work
 
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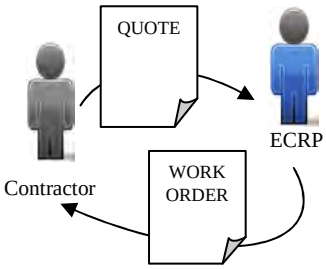
<td>7. Quotes and Work Orders are created
 
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<td>8. Multiple telephone bookings for different aspects of the cleaning
 
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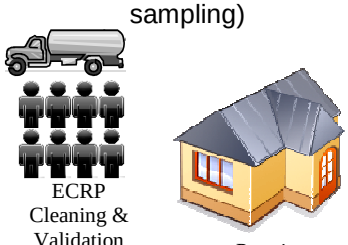
<td>9. Cleaning (immediately followed by validation sampling)
 
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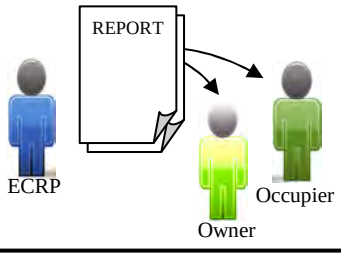
<td>10. Cleaning Report and Feedback Request sent out (8 -10 weeks)
 
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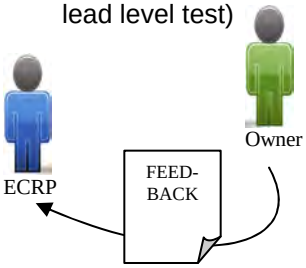
<td>11. Feedback received (and maybe request for blood lead level test)
 
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 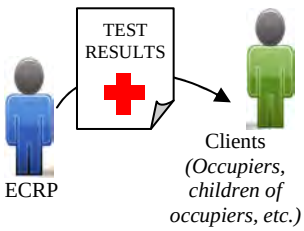
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