

Auckland Regional Public Health Service

Rātonga Hauora ā Iwi o Tamaki Makaurau



Working with the people of Auckland, Counties Manukau and Waitemata

Auckland Regional Public Health Service

Cornwall Complex
Floor 2, Building 15
Greenlane Clinical Centre
Private Bag 92 605
Symonds Street
Auckland 1150
New Zealand
Telephone: 09-623 4600
Facsimile: 09-623 4633

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Waste Minimisation Discussion Document Submissions
Ministry for the Environment
PO Box 10362
Wellington 6143

Submission on the Waste Minimisation Discussion Document

1. Thank you for the opportunity for the Auckland Regional Public Health Service (ARPHS) to provide a submission to the Waste Minimisation Discussion Document from the Ministry for the Environment.
2. The following submission represents the views of the Auckland Regional Public Health Service and does not necessarily reflect the views of the three District Health Boards. Please refer to Appendix 1 for more information on ARPHS.
3. ARPHS understands that all submissions will be available under the Official Information Act 1982, except if grounds set out under the Act apply.
4. The primary contact point for this submission is:

Eriata Peri
Maori Policy Analyst
Public Health Intelligence & Infrastructure
Auckland Regional Public Health Service
Private Bag 92 605
Symonds Street
Auckland 1150
09 623 4600 ext 27222
EriataP@adhb.govt.nz

1.0 EXECUTIVE SUMMARY AND KEY RECOMMENDATIONS

5. ARPHS undertakes a range of activities with respect to contaminated land, air quality, drinking water, recreational water and Resource Management Act submissions. ARPHS' interest in the Waste Minimisation Discussion Document (Waste Document) is focused on removing items from our environment that can potentially cause harm to the health of the public.
6. ARPHS is eager to see progress in providing infrastructure and processing for environmentally harmful products that currently have no destination other than the landfill, the sewage system or *ad hoc* disposal in countryside fly-tips (illegal roadside dumping).
7. ARPHS recommends that items to be included in the priority products list are:
 - Pharmaceuticals due to the effects of their accumulation in the environment
 - Batteries because of heavy metal content (lead, cadmium and nickel)
 - E-waste due to heavy metal content
 - Mercury vapour light bulbs and other small toxic household items because of heavy metal or radioactive content
 - Tyres, which are also regarded as a priority product in terms of:
 - their on-going and unremitting volume
 - real and potential harm to human life
 - tyre fire emissions including dioxins
 - energy products produced from their pyrolysis
 - steel and carbon black replacing imports
 - potential jobs produced in the New Zealand market
 - emerging technology to market overseas
 - the Tyre Track scheme, as the muted beginning of recycling, requiring upgrading and completion.
8. ARPHS would like to see the scope, parameters and actions set prior to monitoring if resources are low. Establishing baselines is necessary but a distinction must be made between baselines and ongoing monitoring without implementing programmes to achieve change.

Recommendation: ARPHS recommends the Ministry for the Environment revise and rewrite targets to achieve more positive progress, with initial establishment of strong definitions being a priority.

2.0 WASTE MINIMISATION AND PUBLIC HEALTH

9. Waste has a considerable influence on the health of a population. As the composition of waste becomes increasingly complex, more problems are emerging with waste's interaction with humans.
 10. Liquid, gaseous and solid wastes may contain hazardous materials posing harm to the public. Other wastes can provide a medium to support pathogens and encourage disease vectors.
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11. In addition, both liquid and solid waste collection as well as treatment and disposal systems that are unregulated (or regulated but not adequately enforced), have the potential to pose a real threat to public health.
12. Waste materials that accumulate in water and soil and ultimately, in the human body, are a concern. Small emissions from diverse sources can accumulate to reach dangerous levels over time.
13. The minimisation of liquid and solid waste is included within the Public Health Service Handbook¹ as a service category.

3.0 SPECIFIC COMMENTS ON THE WASTE DOCUMENT

14. The five sections in the Waste document from the Ministry for the Environment (MfE) are addressed as follows:

Part 1 - Revising the targets for the New Zealand Waste Strategy

15. A comparison of the 30 targets in the 2002 Waste document and the 14 new targets in the current Waste document does not demonstrate progress. The 30 targets from the 2002 “*New Zealand Waste Strategy towards zero waste and a sustainable New Zealand*”² have been replaced with 14 targets that will not significantly improve the environment.
16. For example the 2002 target, which was:

By December 2005, an integrated comprehensive national hazardous waste management policy will be in place that covers the reduction, transport, treatment and disposal of hazardous waste to effectively manage risks to people and the environment.

has been replaced with:

By 2011, the Ministry for Environment (MfE) will have investigated the need for, and propose, if warranted, regulatory standards for storage, transport, recycling, recovery, treatment and disposal of hazardous wastes.

17. In between the development of the Waste Strategy (2002) and the current Waste document (2009), MfE published in 2007 “*Working towards a Comprehensive Policy Framework for Managing Contaminated Land in New Zealand: Position Paper*”³ in which three initiatives were considered by MfE to be of high priority. The first of these projects “*nationally consistent methods and numbers that protect human health, delivered via a standard and guidance*” was to be completed by 2007.
18. Prior to this, in 1996 the OECD was recommending specific legislation and by implication the control, treatment and disposal of hazardous waste.⁴

¹ Ministry of Health - Public Health Directorate, Public Health Service Handbook 2003-2004 at page 16
[http://www.moh.govt.nz/moh.nsf/0/B13E45ADA9BC8943CC256EC4000A8749/\\$File/2003-04Handbook.pdf](http://www.moh.govt.nz/moh.nsf/0/B13E45ADA9BC8943CC256EC4000A8749/$File/2003-04Handbook.pdf)

² New Zealand Waste Strategy, towards zero waste and a sustainable New Zealand² 2002 MfE

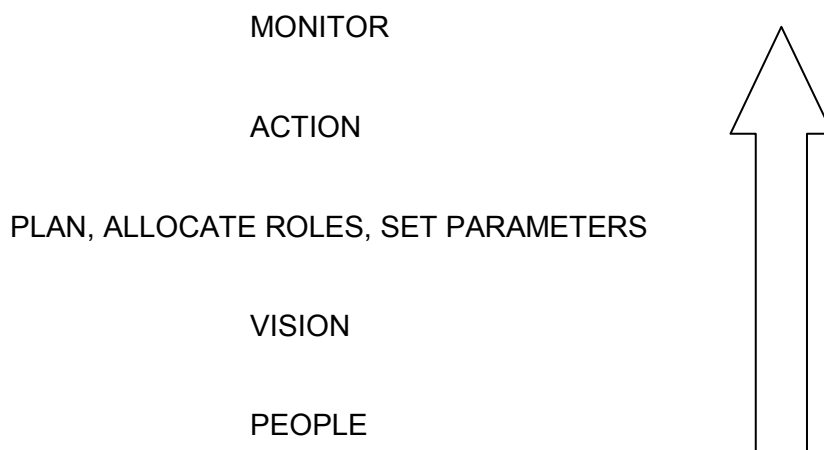
³ <http://www.mfe.govt.nz/publications/hazardous/policy-framework-contaminated-land-sep07/html/page1.html> accessed on 1 May 09

⁴ Management of hazardous Waste , towards sustainable waste management in new Zealand, centre for Advanced Engineering

19. This represents a span of at least 15 years of documented attempts to address hazardous waste minimisation. There are no guarantees, allocated funding, or assurances in place to show that tight procedures, clearly written policies and definitive actions will be put in place this time. ARPHS would like to express a preference for action over target setting and measurement in these cases.
20. In the recent Australian Government waste policy discussion document⁵, consideration is given to state territory measures. Such consideration is not evident in Target I of the Waste document, which is:

By 2015, reduce the quantity of waste (tonnes) disposed to landfill per person per year by 20% relative to an established 2010 baseline.

21. This contrasts starkly with the 73% of New Zealand Territorial Authorities which have passed resolutions to move towards zero waste. Even in a difficult environment without a national policy structure and infrastructure, some Territorial Authorities have made significant progress. Opotiki District Council provides one of the best examples with 90% diversion of waste from landfill.
22. Overseas, large cities, such as Vancouver, and some in northern Italy are also achieving significant diversion. Whilst it is true more infrastructure is essential, in New Zealand, leadership, education, and a quest for progress are viewed as even more essential.
23. ARPHS would like to see more setting of parameters and action prior to monitoring if resources are low. The hierarchy illustrated below puts the monitoring at the end of the process rather than at the beginning. Establishment of baselines to work against is necessary. The distinction must be made between baselines and action,⁶ on one hand, and ongoing monitoring without programmes achieving change on the other. If not, all that will be achieved is counting waste and not implementing programmes to eliminate that waste.



⁵ <http://www.environment.gov.au/wastepolicy/consultation/pubs/nwp-consultation-paper.pdf> accessed on 24.04.09

⁶ <http://www.crc.govt.nz/NR/rdonlyres/09F105B6-2A32-4BD4-AB2F-6C2E3554D0D8/0/waste.pdf> accessed on 8th May 2009

Recommendation: ARPHS recommends that MfE revise and rewrite targets to achieve more positive progress. The initial establishment of definitions is mandatory.

TARGET	MfE PROPOSAL	COMMENTS and SUGGESTIONS
1	By 2015, reduce the quantity of waste (tonnes) disposed to landfill per person per year by 20 per cent relative to an established 2010 baseline	The current rate of global climate change makes this suggestion inadequate. ARPHS suggests by 2010: Baseline measures in place for all waste streams By 2011: Monitoring waste streams where reduction activities are taking place By 2020: Aim for Zero Waste.
2	By 2010, have a system in place for the ongoing monitoring of the composition of waste to landfill.	Less emphasis on counting waste and more on reducing waste is needed. The origin of the waste needs recording to facilitate reduction schemes
3	By 2012, have a system in place for the ongoing monitoring of the composition of organic waste, the amount disposed of at landfills and diverted from the waste stream.	It is well established that there are large amounts of organic waste entering the landfills in New Zealand. ⁶ Australian figures ⁷ from 2008 are 64% organic for municipal waste and 78% organic for commercial and industrial streams. ⁸ Monitoring expenses could be used to establish diversion schemes such as biogas and banning in-sink maceration systems immediately. This has significant carbon charge implications for the Emissions Trading Scheme. ARPHS strongly suggests that diversion systems are established to mitigate the effects of climate change and avoid landfill levies.
4	By 2012, have a system in place for the ongoing monitoring of the generation and composition of	The potential for accumulation of Tanalized™ (CCA treated) timber and tyres in many cleanfills is a concern for ARPHS as the situation contributes to the creation of new

⁷ <http://www.environment.gov.au/wastepolicy/consultation/pubs/nwp-consultation-paper.pdf> accessed on 24.04.09

⁸ <http://www.environment.gov.au/wastepolicy/consultation/pubs/nwp-consultation-paper.pdf> accessed on 24.04.09

	construction and demolition waste, the amount diverted from the waste stream and the amount disposed of.	contaminated land sites. All cleanfills must be registered and monitored. Effort must be put into diversion as well as monitoring.
5	By 2012, the Ministry for the Environment will have established a national tracking system for all hazardous waste.	As the current system focuses on liquid waste, there needs to be mechanisms to track gaseous waste e.g. gaseous waste from landfills. ARPHS recommends emphasis on toxic waste especially where background levels are already high in New Zealand e.g. dioxin.
6	By 2011, the Ministry for the Environment will have investigated the need for, and propose if warranted, regulatory standards for storage, transport, recycling, recovery, treatment and disposal of hazardous wastes.	ARPHS believes there is an absolute need for the control of hazardous waste quickly ie by 2010. Standards and definitions are essential for hazardous waste regulation to progress. Once in place, all consents through the Resource Management Act will be regulated to this standard.
7	By 2012, specific industries will develop at least three accredited product stewardship schemes that increase the recovery or recycling of the hazardous components of waste.	ARPHS strongly recommends that development of the product stewardship schemes begins in 2009/2010. ARPHS suggests that the number of schemes made a priority should be dependant on the risk to the population and accordingly advises that the schemes are developed and implemented for at least the five suggested priority product categories suggested.
8	By 2014, specific industries will develop at least two other accredited product stewardship schemes that result in a reduction in hazardous substance production at source.	ARPHS commends the strategy but strongly suggests the 2014 date be revisited to begin much sooner. See the comment above.
9	By 2015, regional councils will have established satisfactory systems to record information on contaminated sites and will have assessed which sites pose a high environmental risk.	ARPHS recommends the immediate establishment of systems to prevent the creation of newly created contaminated sites. Targets 4, 6, 7 as suggested by ARPHS should ensure this.
10	By 2020, regional councils	ARPHS suggests the development and

	will have investigated all contaminated sites identified by 2015 as high risk, and will be implementing an action plan for their management and/or remediation.	implementation of an action plan by end of 2010.
11	By 2015, all waste disposal facilities (including wastewater treatment plants, landfills, clean fills and onsite wastewater systems) will be meeting existing regulatory standards and will be consented if this is a requirement.	ARPHS would like to see the development of standards, guidelines, protocols for all landfills and cleanfills.
12	By 2010, the Ministry for the Environment will assess the need for a national environmental standard addressing environmental management of solid waste disposal facilities.	Waste treatment sites have been omitted, and should be included in the standards. Clean-fills are often a permitted activity and need not be monitored and regulated.
13	By 2012, the Ministry for the Environment will have implemented a waste monitoring and reporting programme to generate consistent data on national waste streams including waste to cleanfills and other disposal sites (e.g., industrial landfills).	Limited resources mean a baseline measurement and then action on the waste streams is preferable to counting waste.
14	By 2012, the Ministry for the Environment will work with local authorities to develop a national reporting template that councils will use to report to the Ministry on progress against their waste management and minimisation plans and other waste-related activities.	As above.

24. ARPHS' recommendations arising from the MfE Targets:

Recommendation: ARPHS recommends emphasis on toxic waste especially where background levels are already high in New Zealand e.g. dioxin

Recommendation: ARPHS recommends the number of schemes made a priority is dependant on the risk to the population and accordingly recommend schemes are developed and implemented for at least five new products.

Recommendation: ARPHS recommends a much faster implementation of accredited product stewardship schemes integrated with national standards and the Resource Management Act.

Recommendation: ARPHS believes it is important to put systems in place so that no more contaminated sites are created.

Part 2 - Identifying Products that are Priorities for Product Stewardship

25. ARPHS' interest is in removing from our environment those items which can potentially cause the most harm to the health of New Zealanders.
26. The advent of the Waste Minimisation Act presents the opportunity to initiate the removal of harmful product classes from our environment.
27. ARPHS is keen to see progress in providing infrastructure and processing for environmentally harmful products that currently have no destination other than landfill, the sewage system or are disposed of in countryside fly-tips.
28. Items ARPHS would like to see in the priority products list include:
 - Pharmaceuticals
 - Batteries
 - Tyres
 - E-waste
 - Mercury vapour light-bulbs and other small toxic household items.

Pharmaceutical waste

29. Recent advances in analytical technology have led researchers to discover trace amounts of pharmaceuticals in wastewater effluents, rivers, lakes, and ground water. Pharmaceuticals have also been detected in soil samples and fish tissue. Based on the wealth of published occurrence data, it seems probable that most, if not all, urban wastewater is contaminated with pharmaceutical compounds, differing only in the type and abundance of the substances present.
 30. Pharmaceutical waste presents a problem to the aquatic environment because these compounds are specifically designed to affect biological organisms. While environmental concentrations are below acutely toxic levels, the main concern is the chronic and/or synergistic effects of the pharmaceutical "cocktail" humans have created in the water. Endocrine disruption is the most widespread and documented effect that pharmaceuticals have on aquatic organisms.
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31. The presence of synthetic oestrogens, and “oestrogen mimetics” among other known endocrine disruptors, has contributed to the feminization of male fish in waters receiving treated wastewater effluents.¹¹ Also of concern is the development of antibiotic resistant bacteria populations such as MRSA (Methicillin-Resistant *Streptococcus Aureus*) which is an example of a bacterium resistant to penicillin.⁹ A number of studies have shown a decrease in antibiotic effectiveness due to their widespread presence in the environment. This poses a serious public health threat.
32. The endocrine disruptors of these chemicals have also been demonstrated by their environmental impacts. Reproductive and developmental abnormalities have been found in birds, frogs, seals, polar bears, marine molluscs, alligators, fish, and many more species.¹⁰
33. Although it is difficult to isolate the effects of pharmaceuticals from other environmental factors there is concern over the longevity of the compounds and their cumulative effect.
34. In New Zealand, surveys in Dunedin have studied prescribed pharmaceuticals returned from households¹¹ to pharmacies. This showed that a large quantity of prescribed drugs is accumulated in households. Some individuals return them to chemists but the vast majority are presumed to send them to landfill or put them into the sewage system.
35. A US study¹² using data collected by Coroner’s cases gives a wealth of knowledge and some methods of quantifying the amount tipped down the drain.
36. At New Zealand hospitals, wheelie bins of dispensed, but unused drugs are taken for disposal every few days.
37. The American Environmental Protection Agency is proposing to tighten up collection rules for its hazardous pharmaceutical waste, providing a streamlined system that is fully protective of public health and the environment.¹³ Pharmac and the Pharmacy Association of New Zealand are aware of the problem, both in over-prescribing (thus wasting drugs and money) and the disposal of drugs into the environment.
38. ARPHS offers the suggestion of discussing with MfE matters of managing pharmaceutical waste.

Batteries

39. A battery is a portable power source, converting chemical energy into electricity. Within the last few years there has been a huge growth in the number and diversity of batteries available.
40. The EU annual market for batteries is about 800,000 tonnes of automotive batteries, 190,000 tonnes of industrial batteries and 160,000 tonnes of consumer batteries.¹⁴ Australians discard about 8,000 tonnes of used batteries (not automotive), with 97%

⁹ <http://www.bren.ucsb.edu/research/documents/PharmaceuticalsBrief.pdf>

¹⁰ Environ Health Perspect. 2005 October; 113(10): A670–A677

¹¹ Braund,R, Yuen,Y,jung J. Identification and Quaantification of Medication returned to Otago Pharmacies Nzfp vol 34 no 4 August 2007

¹² Ruhoy,I.S and Daugton,C.G. Types and Quantities of leftover drugs enetering the environment via disposal to sewage-revealed by Coroner records. Sci.Total Environ.,2007,388(1-3):137-148 accessed at

www.epa.gov/nerlesd1/bios/ddaugton/SOTE2007.pdf

¹³ <http://www.epa.gov/epawaste/hazard/wastetypes/universal/pharm.htm> accessed on 16 April 09

¹⁴ Warmer Bulletin 117 Journal for Sustainable Waste Management October 2008

of them disposed into the usual rubbish collection. Most batteries are small so they are easily disposed of in household trash.

41. The metals contained in the batteries can contaminate the environment. Mercury, lead and cadmium are the most dangerous substances found in batteries. All of these elements have well known detrimental effects.
42. The Danish Environmental Protection Agency has reported that nickel-cadmium (Ni-Cad) batteries are the largest source of cadmium pollution, and expect this source to account for up to 90% of the future human exposure to that metal in the future.⁵ In New Zealand it is considered that natural cadmium in the soil, from geothermal sources, or cadmium applied with fertiliser (as an unintended consequence) is the biggest contribution to dietary intake.¹⁵ Some concern is being expressed at the build up of cadmium in our soils and the effect this will have on the export of food stuffs.¹⁶
43. Additionally, the resources contained within discarded batteries are valuable and, if recycled, represent considerable carbon savings.
44. Several collection systems have been successfully used overseas. These methods include: retail take-back (particularly good with button cells), community drop off, and postal and kerbside collections (in a bag attached to the recycling bin).

Recommendation: ARPHS recommends an extension of the, already well established, wheelie bin system in most urban areas where bags of used batteries and other small toxic items could be attached to the bins at regular intervals.

45. In addition, regulation could be used to halt sales of low quality batteries from hardware and other retail outlets and sales of rechargeable batteries encouraged using economic instruments.
46. Battery bars in supermarkets could be required to have a returns slot and commercial collections may be set up around such places as jewellery shops and electronic stores.

Waste Tyres

47. New Zealand citizens generate about four million waste car tyres annually. This statistic does not include an estimated equal amount of truck, tractor, earthmover and other large tyres also disposed of every year in the country. Attempts by the MfE funded Tyre Track to voluntarily manage the 40,000 tonne annual waste passenger car tyre production have not been successful. Tyres have been tracked under the scheme but the lack of a process to utilise the potential resources in a tyre has left the end point undefined. The emergence of a pyrolysis process in Auckland has meant that this loop could be closed in the future.
48. Banned from landfill unless they are processed, many tyres accumulate in the landscape. They retain pooled water providing ideal mosquito breeding habitat, which pose a potential health risk. They provide an opportunity for exotic mosquitoes, which can carry significant diseases, to establish themselves locally. These mosquitoes are

¹⁵ <http://www.maf.govt.nz/mafnet/rural-nz/sustainable-resource-use/land-management/cadmium-in-nz/report-one/cadmium-report-1.pdf>

regularly being intercepted at our borders. Fewer breeding opportunities will lessen the risk of successful establishment. This danger is heightened by climate change which will increase the range of suitable geographic locations for exotic mosquitoes within New Zealand.

49. For example, establishment of mosquitoes capable of carrying diseases such as dengue fever, lymphatic filariasis and the West Nile Virus would have significant economic effects in terms of workforce debilitation and cost to the health system.
50. The petro-chemical composition of tyres renders them flammable with the release of toxic gases¹⁶. Analysis of air samples from a large US tyre fire, the Rhinehart case, identified 34 different emissions from an open tyre fire, including 25 compounds classed as carcinogens. These emissions from an open tyre fire can pose significant short term and long term health hazards to exposed people. These health effects include irritation of the skin, eyes and mucous membranes, respiratory effects, central nervous system depression, and cancer.
51. Other problems arise when the pollutants from open tyre fires contaminate land and enter water ways and the water table. Water used to extinguish the fire can transport combustion products (including hydrocarbons and carbon black) from the fire to wetlands or other waters.¹⁷
52. In addition, although water can control a large tyre fire, it is not sufficient to extinguish the fire. Wetting agents or excavators are required to extinguish the fire. An Australia government study² estimated that the cost of a typical tyre fire would be \$A300,000 (\$A 2001 value). The large waste tyre pile, currently on crown land in Napier, is considered to be such a large potential hazard that the local council is employing a 24 hour guard to prevent arson and further dumping of tyres.
53. A proportion of tyres have already been tracked back to the tyre industry, and the public have become accustomed to the concept. The mandatory collection and processing of these tyres is merely an extension of this process with the capability already existing within New Zealand.
54. Furthermore it is inconsistent that waste tyres are considered hazardous waste¹⁸ when they are exported from New Zealand, but not treated as such in the country.

Recommendation: Tyres must be a priority product, in terms of their impact on the environment and potential for conversion to useful products.

55. ARPHS recommends that tyres are a priority product because of:
 - on-going and relentless build-up of numbers
 - tyre fire emissions including dioxins
 - real and potential harm to human life from mosquitoes
 - energy products produced from their pyrolysis
 - steel and carbon black replacing imports

¹⁶ <http://www.p2pays.org/ref/11/10504/html/intro/openfire.htm> accessed on 21.04.09

¹⁷ <http://www.environment.gov.au/settlements/publications/waste/tyres/national-approach/pubs/national-approach.pdf> accessed on 21.04.09

¹⁸ Cedric Hooper MED pers com

- jobs produced in the New Zealand market
- emerging technology to market overseas
- the Tyre Track scheme, as the muted beginning of recycling, requiring upgrading and completion.

Recommendation: In the light of well-founded scientific information concerning the toxicity of dioxin-like compounds, and data on body burdens present in the New Zealand population, ARPHS recommends:

- A precautionary approach should be adopted concerning dioxin-like compounds in New Zealand.
- A goal of ongoing reduction in population body burdens of dioxin-like compounds should be stated.
- Identifying a tolerable daily intake is not recommended.
- A health exposure criterion (HEC) should be established to regulate point sources of exposure.
- Application of the HEC should involve consideration of the plausible maximally exposed person from the point source activity.
- The New Zealand population burden of dioxin-like compounds should be monitored periodically, perhaps every 5 to 10 years.
- Policies and the HEC should be reviewed after consideration of trends revealed by future population monitoring.
<http://www.mfe.govt.nz/publications/hazardous/dioxin-evaluation-exec-sum-feb01.html>

E-waste

56. The proper management of discarded electronic devices or E-waste is an important issue because of the magnitude of the waste stream, and because the devices themselves contain a variety of toxic metals. While recycling of E-waste is still developing, much of the current waste is being disposed of in landfills.
 57. Electronic waste is one of the fastest growing waste streams in the world. Rapid technological advances mean that the average computer has a life span of less than five years. The problem arises at the end of its useful life and is compounded by the hazardous nature of the waste. Computers contain an array of substances such as lead, mercury, cadmium, hexavalent chromium and brominated flame retardants. These have all been shown to be harmful to humans and damaging to the environment.
 58. In New Zealand most redundant electronic equipment is being landfilled.
 59. The lack of available data on the amount of E-waste generated makes it hard to determine the extent of the problem. The problem of E-waste in New Zealand is shown by information from the Computer Access NZ Trust which found that approximately 830,000 new computers were sold on the local market in 2005. There
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are also an estimated 10 million cathode ray tubes currently in use or stored awaiting a disposal option for the country.

60. Millions of cathode ray tubes (CRTs) exist in New Zealand as they make up the display device in most computers and televisions. They contain within them many toxic materials such as lead, barium, cadmium, mercury and arsenic. They are currently being replaced by liquid crystal and plasma flat panel displays and the disposal rate is accelerating.
61. The collection of computers on E-waste days is not adequate recycling. The population needs a system which is convenient and as easy to use as the existing waste process.
62. CRTs in televisions and computer monitors are one of the most common components of discarded electronics in the solid waste stream and are commonly seen in inorganic waste collections in the Auckland region. CRTs present a disposal problem because they are a major source of lead. In a US study using the Environmental Protection Agency's Toxicity Leaching Procedure (TCLP), lead leachability from CRTs was analysed. CRT samples produced an average concentration of 18.5mg/L lead, which exceeds the US regulatory limit of 5.0 mg/L. Most lead was found in the funnel, which is the part most often broken off by individuals collecting the copper for recycling.¹⁹

Mercury containing lamps, light-emitting diodes and smoke alarms

63. ARPHS would like a collection system for mercury containing lamps of all kinds. This includes tubular fluorescent, compact fluorescent, industrial mercury vapour lamps, halide lamps and light-emitting diodes (LEDs). Small items causing concern, such as smoke alarms which have a radioactive component, could also be included in the same collection system. Ionisation smoke alarms contain a radioactive source (americium-241) while photoelectric smoke alarms contain a light-sensitive cell. The amount of americium-241 contained in a domestic ionisation alarm is very small, typically 37 kBq (kilobecquerels) or 1 microcurie.²⁰
64. Most compact fluorescent lamps low-energy bulbs contain a small amount of mercury, ranging from 6 to 8 mg of mercury²¹ on average per bulb, which is considered a very small risk²² if just one bulb breaks at a time. However the cumulative gaseous emission of mercury from many bulbs sent to the landfill must be considered. A collection system exists in New Zealand and therefore should be implemented for this.
65. Mercury is toxic by inhalation, has a danger from cumulative effects, is very toxic to aquatic organisms and may cause long term effects in the aquatic environment. In humans, it mainly affects the central nervous system and kidneys. It is estimated that 22% of the yearly world consumption of mercury is used in electrical and electronic equipment. Furthermore it is also used in medical equipment, data transmission, telecommunications, mobile phone batteries and some light sources.²³

23 Townsend, TG, Musson, S, Yong-Chul Jang, Il-Hyun Chung. [Characterisation of Lead Leachability from Cathode Ray Tubes](http://www.crtprocessing.com/documents/CRTDec99.pdf). State University System of Florida <http://www.crtprocessing.com/documents/CRTDec99.pdf> accessed on 30th April 09

²⁰ <http://www.nrl.moh.govt.nz/publications/is8.asp> accessed on 30 April 09

²¹ http://news.bbc.co.uk/2/hi/uk_news/7172662.stm

²² http://www.boston.com/news/local/articles/2008/02/26/mercury_leaks_found_as_new_bulbs_break/

²³ <http://www.defra.gov.uk/environment/waste/topics/electrical/pdf/weee-hazwaste.pdf> accessed on 29 April 09

66. Whether an exposure to one or more of the various forms of mercury will harm a person's health depends on a number of factors (below). Almost all people have at least trace amounts of methyl mercury in their tissues, reflecting methyl mercury's widespread presence in the environment and people's exposure through the consumption of fish and shellfish.
67. People may be exposed to mercury in any of its forms under different circumstances. Factors that determine the severity of health effects from mercury exposure include the:
- chemical form of mercury;
 - dose;
 - age of the person exposed (the foetus is the most susceptible);
 - duration of exposure;
 - route of exposure - inhalation, ingestion, dermal contact, etc;
 - health of the person exposed.
68. Mercury exists in three chemical forms - methyl mercury, elemental mercury and other forms.²⁴ They each have specific and serious effects on human health.
69. LEDs are very long lasting, use even less electricity than compact fluorescent lighting and are expected to be used extensively in housing in the future. They can contain very small amounts of carcinogen and so should be included in the small goods hazardous waste collection. For instance, Gallium arsenide GaAs has been used to produce (near-infrared) laser diodes since the early 1960s. The toxicological properties of gallium arsenide have not been thoroughly investigated. On one hand, due to its arsenic content, it is considered highly toxic and carcinogenic.²⁵ On the other hand, the crystal is stable enough that ingested pieces may be passed with negligible absorption by the body. When ground into very fine particles, such as in wafer-polishing processes, the high surface area enables more reaction with water, releasing some arsine and/or dissolved arsenic.

Recommendation: ARPHS recommends that small household items with adverse effects on human health are collected through the existing recyclable system.

General Comments

70. ARPHS would like to see a continuation of and improvement in the existing programmes for agricultural chemicals, oil, and refrigerant gases. In the case of the latter ARPHS would like to see an expansion of the regulations to incorporate those chemicals still creating a problem.

Recommendation: ARPHS recommends prioritising schemes which limit further contamination of the New Zealand environment with a view to reducing the future risk to human health.

²⁴ ²⁴ <http://www.epa.gov/hg/effects.htm>, accessed on the 30th April 2009

²⁵ http://www.chemie.de/lexikon/e/Gallium%28II%29_arsenide/#_note-4/ accessed on 5 th May 2009

71. Market forces will largely take care of lead acid batteries, thousands of which are exported to the Philippines and Korea from New Zealand for processing each year. New Zealand is a signatory to the Basel Convention, which controls the export of hazardous waste. We have an obligation to ensure the destination of such products is to a facility which deals with these products responsibly.
72. Plaster board as proposed in the Waste document, is a product which does not come high on a risk register for human health and may not be appropriate for inclusion in the priority product list.

Part 3 – Identifying funding criteria for the Waste Minimisation Fund

73. ARPHS strongly recommends that waste minimisation funds be used for establishing product stewardship schemes. Setting up such schemes is time consuming. Education to gain cooperation for such schemes takes considerable resources and time prior to the scheme being self supporting, even if it is a priority product.
 74. ARPHS endorses funding which supports the development of infrastructure in New Zealand that can then process a significant waste stream for local re-use. This preserves jobs and keeps resources in the country. A good example of this is anaerobic digestion of organic waste. This process requires significant capital to set up, but will use the organic waste to produce gas which can be used as heat and electricity, or cleaned, compressed and used as CNG for transport. This is used extensively for taxis in Sweden, and buses in Leon, France
 75. Auckland has approximately 180,000 tonnes of organic waste per annum. Collected and routed to digestion facilities on rail, the methane generated from this waste could be put to good economic use and concurrently mitigate fossil carbon dioxide emission. Additionally, this process produces compost for carbon sequestration in the soil. The capital cost and slow payback time for that capital has stopped the development of anaerobic respiration facilities in New Zealand. Feasibility studies have shown that larger plants are economically feasible once established in the market.
 76. Other infrastructure plants which would provide employment and save imports and landfill space are tyre pyrolysis and plastic to diesel plants.
 77. ARPHS would like to support these initiatives in the following priority order:
 - Targeting of waste streams which cause human and environmental harm.
 - A weighting towards reduction of harm as well as dollar benefit to New Zealand such as producing resources locally rather than importing them. An example is the pyrolysis of tyres producing gas and liquid hydrocarbons, as well as steel and carbon black, which is currently imported for the steel making process.
 - Evaluation of the contribution the suggested infrastructure would make to the planned vision for resources in New Zealand. For instance, how many of a particular re-processing plant are required locally.
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- ARPHS suggests creating competitions for encouraging commercial equality. Where the resource processing application is commercial, and competitors are blocking funding by invoking anti-competitive laws, ARPHS recommends that the Waste Minimisation Fund follow the British example of running a “competition”. For instance, when it is established that large urban areas require anaerobic digestion facilities, then all industries have the opportunity to tender and the best option is chosen.
- The scale of the project is significant - large new infrastructure is required.
- Legacy waste could include the piles of fly-tipped tyres, although there is a danger of legacy waste being “created” to avoid costs.
- Repayment is an option particularly for a large or commercial project that proves to be commercially successful. For example, after five years an agreement could be made for repayment of principal with no interest. This money could be reinvested in new ventures, compensating in part, for the shrinking of the fund as waste gets diverted from landfill. This should be discretionary, not done on commercial rates and conditions, and guard against damaging the viability of the process.

Part 4 - Monitoring Waste in New Zealand

78. ARPHS believes that the best course to take in an environment of limited funds and personnel is as follows:
- Obtain agreement on the definitions of classes of waste.
 - Obtain agreement on the classes of wastes to be monitored and their derivation i.e are they from a transfer station, industry or domestic.
 - Measure baseline data, making distinctions based on the origin of the waste.
 - Only monitor those wastes where a diversion programme is underway to gauge improvements.
 - Take steps to prevent diversion of waste from landfill to clean-fills, and industrial landfills that fall outside of the definition of a “disposal facility” in the Waste Minimisation Act. (This loop-hole needs to be closed as soon as possible.)

Part 5 - Improving the operation of the waste levy

79. It is important to ensure that small competent New Zealand firms have a chance to participate. Many larger projects are currently going to large conglomerates with branches in New Zealand because of the weighting in the tender allocation process.
80. National direction, in terms of specific plans and priorities (what is planned where and what is most important), will focus the applications and give a better basis for allocations.
81. Cover for landfills should not be free of levy if it contains anything other than clean soil. It should not include contaminants.
82. Floc from cars crushed and processed without the removal of components that are recyclable, and/or hazardous should not be allowed. For instance, mercury switches
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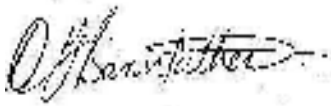
should be removed, as should seats containing recyclable polyurethane foam and plastic components.

4.0 CONCLUSION

83. New Zealand has made disappointing progress over the past few years with the control and removal of waste, particularly hazardous waste from the environment.
84. The Waste Minimisation Act brings with it a chance to improve the environment, and with it the health of New Zealanders.
85. ARPHS' recommendations are aimed at making the most of this opportunity.

Yours sincerely

Dr Julia Peters
Acting Service Manager
Auckland Regional Public Health Service



Dr Denise Barnfather
Medical Officer of Health
Auckland Regional Public Health Service

APPENDIX 1 - AUCKLAND REGIONAL PUBLIC HEALTH SERVICE

Auckland Regional Public Health Service (ARPHS) provides public health services for the three district health boards (DHBs) in the Auckland region (Auckland, Counties Manukau and Waitemata District Health Boards), with the primary governance mechanism for the Service resting with Auckland District Health Board.

ARPHS has a statutory obligation under the New Zealand Public Health and Disability Act 2000 to improve, promote and protect the health of people and communities in the Auckland region. The Medical Officer of Health has an enforcement and regulatory role under the Health Act 1956 and other legislative designations to protect the health of the community.

ARPHS' primary role is to improve population health. It actively seeks to influence any initiatives or proposals that may affect population health in the Auckland region to maximise their positive impact and minimise possible negative effects on population health.

The Auckland region faces a number of public health challenges through changing demographics, increasingly diverse communities, increasing incidence of lifestyle-related health conditions such as obesity and type 2 diabetes, outstanding infrastructure needs, the balancing of transport needs, and the reconciliation of urban design and urban intensification issues.
