

Options for Quarantine Waste Treatment at Auckland International Airport

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1. Executive Summary

Auckland International Airport Limited (AIAL) is required to treat quarantine waste under the Biosecurity Act. The current treatment technology is incineration. The AIAL incinerator (the incinerator) is owned and operated by Waste Resources Ltd – a subsidiary company jointly owned in a 50:50 venture between AIAL and Tredi New Zealand Ltd. AIAL has proposed expanding the incinerator and Tredi has indicated an intention to burn industrial hazardous waste in the incinerator.

The incinerator has been breaching its resource consent conditions (under the Resource Management Act) on dioxin release for over two years. Dioxins have been measured in the incinerator's stack gases at over 17 times the legally permitted levels. More thorough monitoring of stack gases, ashes and scrubber residues could mean that the incinerator may be the largest single dioxin source in New Zealand.

Dioxins are some of the most toxic chemicals known to science, causing cancer, birth defects, diabetes and interference with hormone and immune systems. There is no safe level of dioxins. In recognition of the need to protect public health and the environment against the threat of dioxins, the Stockholm Convention on Persistent Organic Pollutants aims to eliminate dioxins. New Zealand is a signatory to this Convention and, as such, is legally obligated to pursue the Convention's ultimate goal of eliminating dioxins. New Zealand will achieve this goal only by abolishing sources of dioxins, such as the AIAL incinerator.

Dioxin formation can be avoided and regulatory requirements for the treatment of quarantine waste can be met by cleaner treatment technologies such as steam sterilisation. Two non-incineration treatment facilities for quarantine and medical waste have recently been established in Wellington and Auckland.

In addition to being dioxin sources, incinerators also generate and/or release hundreds if not thousands of other pollutants, many of which are not yet identified and have unknown consequences. As more of these pollutants are identified and their effects determined, they too will come under national and international regulations so that owner/operators of incinerators, such as the AIAL incinerator, will be forced to invest in increasingly costly pollution control equipment as well as more stringent treatment of ash and other residues.

The health and environmental impacts of incineration could create future liabilities for AIAL and its shareholders. International perspectives on the responsibilities of corporations are changing and companies are increasingly expected to be held accountable financially and morally for their actions. This future liability is unquantifiable but is likely to be significant. Expansion into hazardous waste incineration would create greater volumes of more toxic pollutants that would dramatically increase liability risks.

The implications for shareholders on the direction AIAL management take are substantial. There is little material difference between the cost of upgrading the incinerator and installing steam sterilisation units. When one takes into account the likely future regulatory restrictions that will be placed on dioxin and other toxin producing technologies, the only clear choice for management is to select a steam sterilisation unit. Doing otherwise will be a bad financial and environmental decision.

Due to the serious nature of the threat to the environment and the health of local communities and the wider public, and the ongoing unlawful operation of the incinerator, AIAL should make an immediate commitment to change to steam sterilisation within 12 months.

2. Introduction

Greenpeace has prepared this report to assist Auckland International Airport Ltd (AIAL) and its shareholders in their review of alternative options for the future of treating quarantine waste from the airport. AIAL is responsible for the treatment of quarantine waste generated by the airport under the requirements of the Biosecurity Act and its aerodrome license.

In this report, we explain why upgrading the pollution control system on a poorly operating incinerator is a high financial and commercial risk and erodes AIAL's standing as a responsible corporate citizen. Regulatory requirements to treat quarantine waste can be met by cleaner technology such as steam sterilisation. The best commercial and environmental option is to close the existing plant.

It is a common misconception that waste disappears when burned. Incinerators create waste. In fact the total mass of emissions and residues is greater than the mass of waste that is fed into an incinerator¹.

Quarantine waste from the airport, together with some off-site clinical waste, is burned in the AIAL incinerator (the incinerator) which is owned and operated by Waste Resources Ltd – a subsidiary company jointly owned in a 50:50 venture between AIAL and Tredi New Zealand Ltd. Tredi is a subsidiary of a French company, Enterprise Miniere et Chemique, which specialises in hazardous waste incineration and disposal. Tredi NZ currently manages the site clearance and transportation of wastes, such as polychlorinated biphenyls (PCB's) and other banned organochlorines from New Zealand, to Tredi's waste treatment sites in France.

The incinerator is located within the international airport area, on Hape Drive, Mangere, Auckland. It was commissioned in 1991 and has a capacity of 10,000 tonnes per annum. The installed cost is reported to have been \$NZD12 million.²

Dioxins, highly toxic chemicals emitted by the incinerator, have been recorded at over 17 times legally permitted levels.³ The incinerator has never met its resource consent conditions on dioxin release and it has now been issued with an abatement notice requiring it to meet these.⁴

The resource consent requires AIAL to keep certain pollutants discharged to air below specified concentrations. The regulated pollutants include dioxins and furans,⁵ mercury, cadmium, lead, chromium, arsenic, hydrogen fluoride, sulphur dioxide, hydrogen chloride and particulate matter.

The high emission levels are the cause of intense local community concern. Even after breaching its consent conditions for over two years, AIAL has only proposed a short term "fix" to upgrade the pollution control equipment. According to the Managing Director of AIAL, the incinerator is coming towards the end of its life⁶ and therefore decisions will need to be taken as to what technology will replace the incinerator.



Auckland airport incinerator

3. Health effects of incinerators

Since industrialisation, the nature of waste has changed dramatically; most products and materials contain many human-made chemicals. This results in a noxious cocktail of pollutants being released during incineration, with some severe consequences for human health and the environment.

3.1 Dioxins

Incinerators generate cancer-causing dioxins as by-products. Some dioxins are the most toxic chemicals known to science. In 1998, the United States Environmental Protection Agency (USEPA) identified medical and municipal waste incinerators as the largest sources of dioxin releases to air⁷, responsible for about 84 percent of dioxin emissions in the United States. In Japan, incinerators are estimated to cause 93 percent of dioxin air emissions; in Switzerland, 85 percent; in Britain, 79 percent; and in Denmark, 70 percent.⁸

The most potent of the dioxins, 2,3,7,8-TCDD, is a known human carcinogen. Studies have found that dioxin exposure suppresses the immune system and interferes with the hormone system. It is associated with testicular atrophy, abnormal testis structure, reduced size of genital organs, lowered fertility, endometriosis, ovarian dysfunction and miscarriage. Other effects of dioxins include birth defects, altered sexual development, organ toxicity (liver, spleen, thymus, skin) diabetes, hormone interference and wasting syndrome,⁹ and many of these are irreversible. The developing foetus is most sensitive to dioxin exposure, while babies and children are also particularly vulnerable.

Dioxins and other persistent organic pollutants such as polychlorinated biphenyls (PCBs) are fat-soluble and tend to bioaccumulate in living organisms and to biomagnify as they move up the food chain through consumption of fatty foods, such as milk, cheese and meat. Once they enter fatty tissue, they may remain in the body for years. In New Zealand it is estimated that 90 percent of human exposure to dioxins is through the food chain. The potential effects

of persistent organic pollutants, such as dioxins, extend well beyond the point of contamination.



Farm near Auckland airport incinerator

The flue gas from incinerators typically contains hundreds and possibly thousands of pollutants. Many cannot be identified but are carried on the finest respirable particulates. A study published in *Chemosphere*¹⁰ identified a total of around 250 different volatile organic compounds (VOCs) in incinerator stack emissions including highly toxic and carcinogenic compounds such as benzene and phenols and other toxic compounds such as phthalates. Incineration can also release PCBs, heavy metals and furans.¹¹

Increased rates of adult cancers, childhood cancers, higher blood levels of dioxins and PCBs and elevated dioxin levels in cows' milk have been documented in proximity to incinerators.¹²

Incineration of chemotherapy drugs could pose serious risks, such as interfering with reproductive processes. Chemotherapy drugs can kill or stop the growth of cells. A World Health Organisation¹³ report notes that they should be safely packaged and returned to the supplier for treatment. If they are incinerated, the temperature should be at least 1200°C and if this does not occur chemotherapy drugs may be emitted from the incinerator in aerosol form. The incinerator operates below this minimum temperature. A method of destruction of chemotherapy drugs used in the United States is chemical degradation.

4. International law - Stockholm Convention on Persistent Organic Pollutants

Over 100 nations, including New Zealand, have signed the Stockholm Convention on Persistent Organic Pollutants (POPs), an international treaty with the aim of ultimately eliminating POPs, including dioxins and furans. The Convention requires parties to prioritise the prevention of dioxin formation

and substitute polluting processes with non-polluting processes. It lists incineration as a major source of dioxin.¹⁴ To meet its obligations under this treaty, that New Zealand should phase out dioxin sources such as incineration.

5. Waste treatment by Auckland International Airport Ltd

Waste entering New Zealand from international aircraft is termed quarantine waste. The waste includes food, plant, plastics and other matter from aircraft, and unused food and waste from the New Zealand flight kitchens.

Waste Resources Ltd also contracts to treat non-quarantine waste. It includes some medical waste, animal carcasses, pharmaceutical drugs and confiscated narcotic drugs. The vast majority of the waste is quarantine waste, at around 84 percent of the total waste treated.

Volume of waste treated at Auckland Airport Incinerator

Type of waste	Quantity per month, tonnes
Airport waste	280.0
Veterinarian waste (cats and dogs)	11.0
Medical waste	23.0
Other waste	19.5
Average tonnage per month	333.5
Total tonnage per annum	4002.0

Source: Auckland Regional Council air quality officer's report from site visit at incinerator (1998) and New Zealand Dioxin Inventory.

6. Alternative methods to treat quarantine waste

Quarantine waste can be treated in other ways aside from incineration. One such method is steam sterilisation, a wet, low heat treatment technique used for many years in medical practices and hospitals to sterilise surgical instruments. The technique has been adapted to destroy pathogens in waste. Because steam sterilisation is a low heat technique it does not produce dioxins.

Steam sterilisation does not physically alter the waste, so it can be shredded to reduce its volume before being compacted and land-filled. There are several types of steam

sterilisation technologies available including autoclaves and retorts.

An autoclave is a metal chamber sealed by a door by which the waste is loaded and surrounded by a steam jacket. Air in the inner chamber is removed by pre-vacuuming or gravity displacement, so that the heat will penetrate the waste thoroughly. The steam is introduced to the inner chamber and the outer jacket.

A retort is similar to an autoclave but has no steam jacket and requires a higher steam temperature.

7. Regulatory Requirements

Medical and quarantine waste is subject to various international conventions, regulatory requirements and standards which govern the collection, containment, transportation

and disposal of such material. The main requirements are outlined below and fall under the Biosecurity Act 1993 (BA) and the Resource Management Act 1991 (RMA).

7.1 Biosecurity Act 1993

The provisions of the BA govern the treatment and disposal of quarantine waste. Ports and airports must have adequate transitional facilities for holding, inspecting, treating, and if necessary, disposing of refuse and imported goods that cannot be given biosecurity clearance under Section 33 of the BA.

At the time the incinerator was commissioned in 1991, quarantine waste was required to be incinerated by law. However biosecurity standards now allow quarantine waste to be steam sterilised¹⁵ as long as it is subjected to a core temperature of 100° Celsius for 30 minutes.

Two non-incineration quarantine and medical waste treatment facilities have recently been established in New Zealand. Nuplex Medismart Ltd installed rotary steam sterilisers (trade name Rotoclave®) in Wellington and Auckland in place of incinerators.

Nuplex contracts to treat quarantine and medical waste from Wellington airport and seaports including Auckland. AIAL has the option to contract out treatment of quarantine waste to waste treatment specialists.

7.2 Resource Management Act 1991

A facility established to treat medical and/or quarantine waste, either by incineration or by steam sterilisation, requires resource consents under the RMA.

AIAL was granted a clean air permit under the Clean Air Act 1972 that was due to expire in 1992. The Clean Air Act was replaced by the RMA and the permit was extended until March 1999. AIAL was granted a ten-year resource consent under the RMA, by Auckland Regional Council (ARC) on 1 November 1999.

The resource consent requires emissions to be maintained “at the minimum practicable level”. There are also limits on the discharge of certain contaminants, including dioxins. Dioxin emissions from the incinerator should be less than 0.1ng/m³ to comply with the

resource consent conditions. It is failing to comply with this standard.

The environmental standards imposed on the airport incinerator are in general less stringent than those in Europe. For example the European limit for hydrogen chloride is 10 mg/Sm³ whereas the airport incinerator is discharging at its standard of 100 mg/Sm³. The hydrogen fluoride level for the airport incinerator is double the European standard of 1mg/Sm³, yet AIAL's testing showed it breached even the New Zealand standard.

The airport incinerator is clearly not a “state of the art” facility as it exceeds some European operating standards as well as breaching a number of binding domestic consent conditions.

7.3 Healthcare waste management

New Zealand Standard 4304:2002, Management of Healthcare Waste sets out the treatment methods for healthcare waste. There are no wastes under that standard

that can only be disposed of by incineration. All waste streams currently treated by the incinerator could be treated in other ways.

7.4 Monitoring requirements of the AIAL incinerator

Current monitoring of the incinerator's emissions are not adequate to accurately assess real pollution levels. The company is required to monitor emissions of metals and dioxins annually, with not less than three separate samples. There is no minimum duration for monitoring specified in the consent. The usual duration of sampling is six hours per sample; however the testing undertaken on the incinerator falls short of standard practice as all tests were of three hours duration or less. This monitoring only takes place under ideal conditions, not in breakdowns or upset conditions and is only a very brief snapshot of actual pollution discharge.

Continuous monitoring is a better method and is now commercially available. For example application of this technology in Belgium showed that actual dioxin emissions were 30-50 times higher when continuously sampled compared to when snapshot sampling was undertaken.¹⁶ Levels of dioxin contamination from incinerators may therefore be grossly underestimated due to inadequate monitoring.

This raises very real health concerns for communities around the incinerator and AIAL should implement a continuous monitoring regime immediately.

Ash and scrubber residues are other unaccounted sources of dioxin release. There is currently no requirement to test the ash for dioxin but estimates have been made for New Zealand in the National Dioxin Inventory.¹⁷ The inventory assumed that the levels in New Zealand would be 15-300 ng/kg for bottom ash. Yet grate ash from a United Kingdom incinerator similar to the New Zealand plant, cited in the Dioxin Inventory, contained 4,000 ng/kg of dioxin. It also estimated 680-4500 ng/kg for gas scrubbing residues but the only New Zealand test of scrubbing residues found dioxin concentrations at 10,000 ng/kg. The Dioxin Inventory may therefore underestimate actual emissions by twenty five times for bottom ash and by four times for scrubber residues.

Inadequate monitoring and underestimates of levels in ash and scrubber residues suggest that the AIAL incinerator could be the largest single dioxin source in New Zealand.

7.5 Incinerator performance

The incinerator is now ten years old, and may not be able to meet the dioxin emission standard, even with an upgrade.

A compliance report for the ARC states "*[I]t is obviously difficult to fix problems associated with dioxin emissions by retrofitting plant, and it appears that the high dioxin emissions may be at least partly caused by the limitations inherent in the original design of the plant.*"¹⁸ There is uncertainty as to whether the incinerator was designed to account for dioxins,

according to a note in the council's files on the incinerator.

Another file note from a site visit comments that there was "*smoke in room and smoke coming from loading of incinerator.*"¹⁹ The site compliance report stated that "*the operators experienced some problems with loading waste into the primary chamber, which caused substantial leakage of smoke into the building.*"²⁰ This raises concerns regarding sub-optimal operation of the incinerator and the health and safety of workers in the plant.

8. Airport or hazardous waste incineration business?

The incinerator was initially built to service the needs of the airport to treat quarantine waste. The role of the incinerator has now changed. By entering into a joint venture with a hazardous waste treatment company, AIAL is seeking to expand the incinerator into a commercial business in its own right. AIAL stated at the announcement of the joint venture that it *“aims to develop new business for the incinerator in areas such as*

*medical and quarantine waste”*²¹ Tredi stated at the same time that it *“will expand the facility’s operations to include hazardous waste generated by local manufacturers.”*²²

Do shareholders in AIAL want to invest in an airport, or do they want to invest in a hazardous waste incineration business with its accompanying exposure to liability?

9. Public disclosure and public opposition

The current incinerator is completely unsuitable for the disposal of hazardous wastes. Community consultation is required under Section 3.1.2d of the Clinical Waste Management Code of Practice for upgrades. An additional resource consent would be

required for hazardous waste incineration that should involve further public consultation. Any move towards expansion or hazardous waste incineration would be highly contentious and strongly opposed by the public and Greenpeace.

10. Trends in the waste treatment industry and environmental law

The market for waste disposal in New Zealand is “small, and possibly diminishing” according to the Commerce Commission.²³

The Commission reported that “significant reductions have occurred in the amount of medical waste available for collection and treatment,” due to improved waste segregation in hospitals.

The capacity of treatment services in New Zealand exceeds the volume of waste available. According to the Commission, the quarantine and medical waste industry has *“substantial excess capacity, both in percentage and in tonnage terms, in the operations of major suppliers of treatment services”*.

Regulations on incinerators are more stringent compared to alternatives such as steam sterilisers.

The Commission stated that:

“...the RMA requirements in relation to the air discharge of contaminants will make it increasingly difficult for existing operators to continue to use, and new entrants to establish, incinerator units, especially in the major metropolitan areas.”

However it continued that:

“...resource consents for autoclaves are more straightforward, and may not involve any major delays or expenditure in terms of the consent procedures....”

Several incinerators have closed in recent years because of high dioxin emissions. Nuplex Medismart (formerly Medical Waste Group) closed its incinerators in Auckland and Wellington and replaced them with steam sterilisers. The company advised the Commerce Commission that the cost associated with upgrading the plant to

comply with emission standards was likely to make it no longer viable²⁴. Other incinerators have also closed, such as those in Canterbury Health, South Auckland Health, Port of Lyttelton and Port of Gisborne. Other plants will be forced to close in future as they reach the end of their economic life.

Environmental regulations and standards are becoming more stringent worldwide, and cover more contaminants. Some persistent organic pollutants and endocrine disrupting chemicals are already slated for elimination under international and regional treaties,²⁵ and more will be added to the Stockholm Convention in the future for elimination. The New Zealand National Environment Standard proposed by the Government includes testing for PCB's, for which the incinerator is not currently tested.

Many pollutants from incinerators are unknown and have unknown consequences. As their effects become more well known and more contaminants come under national and international regulations, AIAL will be forced to continuously invest in upgrades if an incinerator is in place.

International trends are moving away from incineration. For example it is banned in the Philippines due to environmental and health concerns; medical waste incinerators have been phased out in Ireland, and several states in the United States have banned construction of new incinerators.

As the total waste treatment market decreases, overcapacity becomes a greater problem and as regulatory requirements become more stringent and comprehensive, incineration becomes an investment fraught with uncertainties.

11. Future liabilities of corporate polluters

Nations are required to negotiate a legally binding international treaty to address liability and compensation for victims of pollution and environmental damage under Principle 13 of the Rio Declaration (from World Summit on Sustainable Development 1992 or WSSD). It also requires nations to adopt laws to implement the principle. WSSD 2002 obligates States to "*Actively promote corporate responsibility and accountability... including through the full development and effective implementation of inter-governmental agreements and measures.*"²⁶

Although an international instrument is not yet negotiated, the New Zealand Government is obliged to implement corporate accountability principles and ensure that polluters pay and take responsibility for their pollution. The New Zealand Waste Strategy visions and principles state that:

- producers must take responsibility for impacts of production processes and products on the environment
- responsibility to protect the environment extends beyond New Zealand's borders
- full environmental costs must be included in business accounting (triple

bottom line reporting)

- the precautionary principle must be implemented²⁷

Given the evidence of the likelihood of underestimation of dioxin contamination and the potential for possibly thousands of unknown and unregulated chemicals from the incinerator, shareholders should be concerned about future liabilities, both legal and moral, of owning a polluting incinerator. This is particularly so since the incinerator is not necessary and has been operating unlawfully.



Children on farm near incinerator

12. Costs of waste treatment options

Note: Exact costs will vary depending on specifications of the site and technologies and the following estimates should be treated as indicative only. Figures are based

on conversion from foreign currencies, which will not account for differences in labour costs, material and manufacturing costs in New Zealand.

12.1 Costs of steam sterilisation units

Greenpeace has provided estimates for steam steriliser units which fulfill AIAL's needs. These are based on available reports and information from steam steriliser manufacturers.

All of the technologies surveyed meet the biosecurity standards and volumes

generated by AIAL. Some single units cited in this report cannot individually treat the 800kg of waste to be treated per hour, but two units would be installed in these cases. A two-unit system has the additional benefit of continuous operation when one unit requires maintenance.

The presentation of a particular technology or manufacturer does not equate with endorsement of the technology by the authors or Greenpeace.

Manufacturer	Volume	Capital Costs
San-I Pak	2 x 354L units ²⁸	NZD \$ 2,216,165
SterileTechnologies Industries	2 x 450kg/hr	NZD \$ 2,520,904
SterileTechnologies Industries	1 x 900kg/hr	NZD \$ 2,141,923
Tempico Rotoclave	1000 kg/hr	Figure not provided ²⁹
Hydroclave Systems Corporation	907.2 kg/hr	Over NZD \$699,635
Bondtech	2,727 kg/cycle	Over NZD \$765,683

Source: All figures are based on estimates from the manufacturers except the Hydroclave and Bondtech figures which are quoted from the "Health care without harm" report, *Non-incineration medical waste treatment technologies*, August 2001.

Discussions with consultants Knight Sinclair Merz indicates that a "rule of thumb" is to take the capital cost and double it to obtain the installed cost.

AIAL could reduce treatment costs estimated above by reducing the volume of waste needing to be treated. A significant proportion of waste currently incinerated is

food and waste from New Zealand-based flight kitchens. This waste is not a biosecurity risk. It is classified as quarantine waste because aircraft waste is brought into the same area. AIAL could reduce the volume of waste to be treated by keeping actual quarantine waste separate from the flight kitchens.

12.2 Cost of incineration

A New Zealand Government report³⁰ states:

“Total installed costs for autoclave systems are less or equal to those of new waste incinerators. Operating costs for autoclave [steam steriliser] systems are also likely to be similar to those for incinerators.”

An industry spokesperson states:

“In order to comply with regulatory requirements, it is our opinion that incineration would be more expensive in both capital and operation costs [than steam sterilisation].”

Without detailed knowledge of the company's proposals it is not possible to be

specific about the likely costs of upgrades or replacement incinerator plants.

Upgrade costs to enable the incinerator to operate lawfully are substantial. The Ministry for the Environment estimated \$NZD1.8 million to retrofit a large medical waste incinerator emitting dioxin in the range of 0.5 ng - 10 ng/m³, to enable it to meet emission standards of 0.05 ng/m³.³¹ The AIAL incinerator has been operating within this initial range and so similar costs could be expected if the incinerator is upgraded.

The economies of building a new incinerator vary depending on the technical process, waste volume and financing; however it is likely to be a very expensive option. The original reported installation cost for the incinerator in 1991 was \$NZD12 million.

12.3 Cost comparison

Taking into account the uncertainties already identified in assessing the costs of different options, the installed cost of a steam sterilisation unit would be between \$NZD 2 - 5 million. A retrofit or upgrade would cost around \$NZD1.8 million, but with no real certainty of outcome in meeting current or future standards. The new incinerator option is the most expensive, using the reported original 1991 installed cost of \$NZD12 million as a guide, and confirms the view of industry sources

The implications for shareholders on the direction AIAL management take are substantial. There is little material difference between the cost of upgrading the incinerator and installing steam sterilisation units. When one takes into account the likely future regulatory restrictions that will be placed on dioxin and other toxin producing technologies, the only clear choice for management is to select a steam sterilisation unit. Doing otherwise will be a bad financial and environmental decision.

13. Conclusions

The incinerator poses a threat to the health of South Auckland residents and the wider community and environment and is therefore the focus of great public concern. The incinerator has been breaching its resource consent conditions on dioxin release for over two years. An abatement notice has now been issued requiring compliance with the consent conditions by March 2003. Action is urgently required by AIAL to address the issue of quarantine waste treatment.

There are five options available to AIAL:

1. Do nothing and maintain the incinerator as it stands
2. Upgrade the existing incinerator
3. Build a new incinerator
4. Contract out the entire operation to external operators and specialists in waste treatment
5. Replace the incinerator with alternative technology

Maintaining the incinerator as it stands is not a viable option as it is operating unlawfully and according to the AIAL managing director, the facility is approaching the end of its life. Investing in more incineration technology either through an upgrade or a new incinerator facility (options 2 or 3) poses many uncertainties for investors.

Firstly, incineration generates toxic pollution which could pose future liability for AIAL and its shareholders. The emissions are very variable and there is no guarantee that any upgrade would ensure compliance with even current standards.

International perspectives on the responsibilities of corporations are changing and companies are increasingly expected to be held accountable financially and morally for their actions.

This future liability is unquantifiable but is likely to be significant. The incinerator may be producing much more dioxin than has been estimated. Inadequate monitoring and underestimates of levels in ash and scrubber residues suggests that the AIAL incinerator could be the largest single dioxin source in New Zealand. This further expands liability issues for the company.

Many of the chemicals released by the incinerator, such as dioxins and PCBs, bio-accumulate and have chronic or ongoing effects that may not be felt for many years. Expansion into hazardous waste incineration would create greater volumes of more toxic pollutants that would dramatically increase liability risks.

Secondly, incineration is an obsolete technology. International law is evolving to prohibit the release of many chemicals that are generated by incineration. The Stockholm Convention, which New Zealand is a signatory to, aims ultimately to eliminate dioxins and furans and bans 10 other persistent organic pollutants. New Zealand is obliged under international law to prioritise the phase-out and substitution of dioxin sources such as incineration. AIAL should take international trends into consideration when making decisions regarding waste treatment.

Thirdly, market trends are moving away from incineration. Yet Tredi and AIAL have indicated their intentions to expand the incinerator and develop the business opportunities of incineration. This makes little business sense as the industry is already suffering from over capacity and the volume of waste to be treated in New Zealand is reducing further. Regulations on incinerators are already tight and have forced several incinerators to close, in favour of steam sterilisation technology.

Regulations will tighten further as New Zealand catches up with evolving international standards, eliminates dioxins under the Stockholm Convention, and as impacts of unknown chemicals surface. The airport incinerator emissions exceed some current European standards as well as some existing domestic ones. Even upgrading it to reach current international criteria would be an extensive operation. The age and design of the incinerator may mean that an upgrade will not achieve the desired outcome of meeting current resource consent conditions. Investment in incineration technology now will require continuous re-investment to keep up with tightening standards.

Fourthly, the incinerator is reported as being at the end of its life and as a result of its age and design may not be able to be upgraded to reach current, much less future standards. Reports on the ARC file indicate sub-optimal performance, with potential health and safety risks to workers.

Fifthly, upgrading the incinerator and expanding into hazardous waste incineration (as Tredi intends) would be very controversial. Public consultation is required for expansion to occur and would be strongly opposed. This could block the application or at least would be likely to involve costly delays.

Due to these uncertainties, investment in incineration technology is an unwise option.

The fourth option is for AIAL to contract out the treatment of quarantine waste to specialists in waste treatment. This occurs for quarantine waste from the Wellington airport and seaports around the country. This means that AIAL could then focus on its core business, rather than expansion into hazardous waste incineration.

The fifth and final option is to replace the incinerator with alternative technology.

Steam sterilisation does not carry the future uncertainties associated with incineration.

Steam sterilisation is an attractive option for AIAL. Regulations are more straightforward for steam sterilisers and may not involve major delays or expenditure in consent procedures. They are financially competitive relative to incinerators and industry participants consider steam sterilisers to be a cheaper option.

Therefore the most responsible and financially sound option is to close the incinerator and replace it with steam sterilisation technology. Due to the serious nature of the threat to the environment and the health of local communities and the wider public, and the ongoing unlawful operation of the incinerator, AIAL should make an immediate commitment to change to steam sterilisation within 12 months.

AIAL provides an important service for Auckland and is the gateway to New Zealand. AIAL now has a unique opportunity to act in a way that is accountable to the community and environmental interests, as well meeting its obligations to shareholders.

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- ³ Emission result reports are available on the Auckland Regional Council file 8072: permit 9007. Auckland International Airport Emissions, May 2000: A report for Waste Resources Ltd, Auckland International Airport Auckland, ESR Air Quality Group. Auckland International Airport Incinerator Ltd, Dioxin Emission Assessment of Quarantine Incinerator. April 2001, K2 Environmental Ltd. AIAL Ltd, Emission Assessment of Incinerator. January 2001, K2 Environmental Ltd. Waste Resources Ltd, Emission Assessment of Incinerator. September 2001. K2 Environmental Ltd.
- ⁴ Letter dated 22 August 2002: Auckland Regional Council Air Quality Control Officer to General Manager, Waste Resources Ltd: Abatement Notice for non-compliance with Air Discharge Consent 9003 (sic) concerning the discharge of dioxins and furans into air.
- ⁵ The main dioxin of concern is tetrachloro-para-dibenzodioxin, together with pentachlorodibenzofuran. Both of these dioxins and furans have a toxic equivalent rating of one, which means they are the most toxic of the (209) dioxins and furans. Dioxins and furans will be referred herein as dioxin.
- ⁶ Meeting between Greenpeace and AIAL, 26 June, 2002.
- ⁷ U.S. Environmental Protection Agency. 1998. The Inventory of Sources of Dioxin in the United States. EPA/600/P-98/002Aa, Washington, D.C., April 1998.
- ⁸ Dioxin and Furan Inventories: National and Regional Emissions of PCDD/PCDF; UNEP Chemicals, May 1999.
- ⁹ USEPA 1994; Health Assessment Document for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) and related compounds. Part 1, volume iii of iii. EPA/600/BP-91/001c: Birnbaum 1994: The mechanism of dioxin toxicity: relationship to risk assessment. Environmental Health Perspectives, 102 (suppl 9): 157-167
- ¹⁰ K. Jay and L. Steiglit, "Identification and Quantification of Volatile Organic Components in Emissions of Waste Incineration Plants," CHEMOSPHERE Vol. 30, No. 7 (1995), pgs. 1249-1260.
- ¹¹ Incineration and Human Health: State of Knowledge of the Impacts of Waste Incinerators on Human Health. Allsop, Costner, Johnston, Greenpeace Research Laboratories, University of Exeter, UK, 2001.
- ¹² Ibid, Chapters 3 & 4.
- ¹³ Guidelines for safe disposal of unwanted pharmaceuticals in and after emergencies, World Health Organisation 1999.
- ¹⁴ Incineration appears in Part II in Annex C of the Stockholm Convention.
- ¹⁵ MAF Biosecurity Authority Facility and Operator Standard PBC-NZ-STD-FACIL-REFUSE. Other approved methods include deep burial, dry kiln treatment and chemical treatment.
- ¹⁶ De Fre, R. Wevers, M. 1998. Underestimation in dioxin emission inventories. Organohalogen Compounds 36:17-20.
- ¹⁷ New Zealand inventory of dioxin emissions to air, land and water, and reservoir sources. Organochlorines Programme, Ministry for the Environment, March 2000.
- ¹⁸ Air Discharge Permit Compliance Visit report, 26 February 2002. It was also noted that the incinerator was not in compliance with Condition 20 for monitoring of carbon monoxide and oxygen.
- ¹⁹ Undated file note on ARC file part 6; number 8072; resource consent 9007.
- ²⁰ An earlier site compliance report, 18 July 2000, also noted "*there was a considerable amount of fugitive smoke leaking into the building from the loading door and waste hopper*".
- ²¹ AIAL press release, *AIAL Joint Venture with Tredi (NZ) Limited*, 26 June 2001.
- ²² Tredi press release, *Tredi Environnement Expands International Operations*, June 21, 2001
- ²³ Commerce Decision No. 386 Determination pursuant to the Commerce Act 1986 in the matter of an application for clearance of a business acquisition involving: Medical Waste Group Limited and San-I-Pak (NZ) Limited 16 March 2000.
- ²⁴ Commerce Commission decision No 386 16th March 2000
- ²⁵ The OSPAR Convention for prevention of marine pollution in the North Sea, promotes elimination of hazardous substances; the Barcelona Convention aims to *reduce and phase out by the year 2005 inputs to the marine environment of toxic, persistent and bio-accumulative substances*.
- ²⁶ Plan of Implementation of the World Summit on Sustainable Development: Johannesburg, South Africa, September, 2002, paragraph 45, section 3.
- ²⁷ The New Zealand Waste Strategy: Towards zero waste and a sustainable New Zealand, March 2002.
- ²⁸ This is based on correspondence with the manufacturer, who stated that two units would be able to deal with the volume of waste.
- ²⁹ Tempico Rotoclave declined to provide a costing as it is currently in discussions with New Zealand companies for systems to treat quarantine waste. It also stated that the 1000kg/hr unit would process more than that figure because of the higher density of the waste to be treated.
- ³⁰ The Cost-Effectiveness of Reductions in Dioxin Emissions to Air from Selected Sources Economic Analysis for Section 32 of the Resource Management Act-A report prepared for the Ministry for the Environment, Janice C. Wright, Independent Policy Analyst, Philip Millichamp, Sinclair Knight Merz and Simon J. Buckland, Ministry for the Environment, August 2001.
- ³¹ Ibid