

Kyushu Island so that we can avoid a concentration of population to certain megalopolis outside of Kyushu. The ultimate means lie in controlling the size of megalopolis. We need to have more decentralized cities throughout the nation so that cities can be more manageable.

Presentation |||||

Mr. Roger Matthews

Manager of Public Development, Auckland

Chairman

Thank you very much, Ms. Aurora Tambunan for your presentation. We would like to call upon the representative from the City of Auckland for the next presentation.



Mr. Roger Matthews (AUCKLAND)

Auckland City is the largest urban authority in the Auckland region and has a population of 350,000 people out of a greater metropolitan population of one million people. The urban area of Auckland City is now fully developed and therefore there is no space within the administrative boundary for refuse landfills, although this has not always been the case. Disposal of the city's solid waste is now achieved by a transfer to a number of landfills around the fringes of the urban area. The main landfill issue for the city does not concern the disposal of solid waste, but rather the management of historic landfills, which were operated with various levels of control, monitoring, and legality up until the early 1980s. Local government in New Zealand has been going through a period of intense reform over the last decade and it is a feature of the New Zealand economy, generally, that central and local government service functions are being corporatized or privatized. Because of its geography, Auckland City has not operated landfills since the 1970s, and until the late 1980s solid waste disposal was carried out by the regional branch of government. In 1989, all service delivery functions of the Auckland Regional Council were transferred to the private sector, or to local, regional government owned companies.

At this time the solid waste disposal functions for the region were transferred to a local government owned company called Northern Disposal Ltd. This company operates two landfills, one to the north and one to the south of the city. Since then, two private companies have entered the now competitive market: Waste Management Ltd. and Waste Care Ltd. These companies operate one landfill each. All four of these landfills are operated with multiple liner systems to contain leachate, leachate

collection and leachate recycling, and treatment facilities. They use daily cover and landfill gas extraction. In the case of the two Northern Disposal Ltd. landfills, the gas is burned in small power stations that supply electricity to the surrounding power grid. There is no public access to any of these landfills and solid refuse is either collected from individual properties across the cities, or privately delivered to transfer stations for sorting, compaction, and trucking to the landfills.

In the 1970s, Auckland City operated a solid waste collection system for the residents of the city, but since then this function has been contracted out to a number of private operators who compete for the city's business. Contracting out this function has led to a fall, in real terms, of the collection costs, in spite of a continued growth in population and solid waste volumes. The collection contracts are let for a number of geographically defined tender areas across the city, for a fixed term, subject to performance conditions. Auckland City Council manages the tender process and monitors the performance of the contractors, but the Council is no longer physically involved in this operation. In residential areas there is a weekly collection of 240 liter council supplied bins, while in commercial areas there is either daily collection, or businesses with large volumes arrange their own collection and disposal. In industrial areas, factories arrange for their own solid waste disposal. The competition in the landfill market has also been successful with efficiency gains and cost control in spite of rapidly rising environmental standards.

Now, I'd like to turn to management of the closed landfills in Auckland City. In 1993 Auckland City undertook a survey to identify old closed landfill sites in the city area. On this map is a marking of the major sites we found within the city area. A total of eighty-five refuse landfills were identified, of which forty-six were wholly or partly owned by the council, the most recent of these having closed in the 1970s. All of these sites were in a predominately undeveloped state, as parks and open space with few buildings sited on them. After investigation, it was found that ten of these sites were of high priority for further investigation and remediation. A further nine had a lower priority. All of the remaining twenty-seven sites posed some environmental risk and may need further assessment in the future.

The objectives of the study of the old landfills in Auckland was to document the cause and extent of any landfill related effects on the environment or on public health, to identify any appropriate measures to avoid, remedy, or mitigate these effects, and to define any requirements for environmental licenses. The further work that was undertaken on the high risk sites involved :

- file search of paper records, where they still exist, to determine age, composition, and management practices at the landfill,

- digging of trial pit excavations to document the cover material and to install shallow ground water monitoring wells, with an average of two shallow wells per site,
- drilling at landfills on potential aquifers to install deeper leachate and ground water monitoring wells, with an average of two ground water wells on each site,
- mapping, sampling and analysis of surface leachate discharges with an average of five sample points around the landfill sites,
- landfill gas monitoring, with an average of ten gas wells per site,
- assessment of leachate and landfill gas related risks to the environment and public health,
- and assessment of subsidence risk to surrounding buildings and roads.

The cover material on the sites was found to be very variable in compaction, composition, and thickness. Generally, it showed poor installation. This has resulted in relatively high infiltration rates at many sites, which has been compounded by variable settling rates forming a hummocky surface that ponds rainwater. The high infiltration rate has, however, allowed generally free gas venting for most of the sites. In a number of the cases, an inadequate thickness of cover material has led to debris coming to the surface and posing a safety hazard. Remedial work on the sites has involved recontouring, removal of dangerous or protruding debris, and in some cases, spreading and compacting of additional cover material.

All of the leachate wells and springs sampled in the study were relatively dilute, except for some isolated hot spots, and in general the landfills do not appear to pose major environmental hazards. The low contaminate content of the leachate was surprising, given the levels quoted in the literature, but it was probably due to high rainfall infiltration rates and the fact that most of these landfills were relatively shallow, allowing water to permeate from the surface through to the base and keep the whole refuse deposit moist. Although the discharges did not pose a major environmental hazard, in a number of cases where discharges were on the banks of streams or estuaries, gravel filled cut-off drains have been installed with collection sumps from which leachate can be pumped to the city's piped sewage system. Of the ten top priority sites, seven were found to be actively producing gas, with high levels at five of these sites. However, the general lack of buildings on the sites means that few buildings are exposed to potential gas build up and subsequent explosion risk. Those few that were exposed had their foundations sealed, where appropriate and practical, and additional ventilation fitted along with gas alarms. The council's records have also been checked to identify pipe and cable conduit systems that might provide gas migration paths. The records have also

to manage those sites. But as every site tends to be very different, they are often developed on a case by case basis. With newer landfills, we now use multiple liner systems and capping. And when permission is sought to open a landfill, the application has to contain details as to how that site will be managed and looked after once filling is finished and it has been closed.

Mr. Park Nam Bae (PUSAN)

I have two questions. First, what about the leachate at land you are presently filling? Leachate often pollutes underground water, so how do you control it? Also, after the landfilling was completed, you had follow-up investigations. Did you plan for these before the landfilling started?

Mr. Roger Matthews (AUCKLAND)

With the old landfills in Auckland City, most of them are shallow and very few of them are over ground water aquifers that could be used. Where there are leachate springs, we have built cut-off drains and sumps so that the leachate can be pumped from those into the sewer system to be treated in the sewage treatment plant. For some of the larger ones we are looking at installing leachate wells to pump from the base of the landfills. However, these old landfills have no liners at the bottom and therefore, they do not hold or pond the leachate very well and it is quite difficult to collect that material. For new sites, we have liner systems and the leachate is collected, as it is in most modern landfills. One of the things which we are practicing is to have good capping systems to restrict water infiltration into the landfills and then recirculating the leachate through the landfill to gain some treatment within the landfill before taking the excess water, as it builds up, into the sewage system.

Mr. Minoru Harada (NAGASAKI)

I have a question on the garbage collection in the City of Auckland. You talked about the residential areas, commercial areas, and industrial areas. The collection modes are different. Do you have any demarcation of the areas? Do you decide whether this is a commercial area or an industrial area by the type of industry? How do you classify the area?

Mr. Roger Matthews (AUCKLAND)

Across a lot of the city we have some degree of segregation of residential areas, commercial areas, and industrial areas. But generally, for our residential homes, the council issues each of the homes with a special 240 liter bin for their non-

recyclable waste material and a smaller bin for recyclable waste. Each household will then put that out in front of the house once a week to be collected. The commercial properties do not have those bins and therefore they are not collected in that way. The larger producers of commercial waste and the industrial waste producers will go to the private sector and arrange collection by private companies for transport either to specialist waste treatment plants or to the more general transfer station.

Mr. Graham Philip Alabaster (HABITAT)

You mentioned that in Auckland the waste collection is totally privatized. I'd just like to ask what efforts you make to control costs among the private contractors. Do you have a yardstick to measure what the private contractor charges?

Mr. Roger Matthews (AUCKLAND)

We have a number of companies that collect refuse within the city. Some of those companies have their own landfills and some of them pay disposal fees to other landfills. The city is broken up into a small number of geographic areas. And those areas are put out to competitive tender. The tender is of a finite period, generally about three to five years. So at each time those areas are going to retendered. The competition between different companies, who have tender contracts in specific areas, and the retendering process has meant that the real cost of collection and disposal of waste material in Auckland has dropped by about 15% over the last five years. At that same time, the actual volume has been increasing at over 5 % a year.

Chairman

Mr. Matthews talked about the privatization of collection. I would like to ask the representative from Ipoh a question. Could you tell us about any examples of the privatization of collection of waste in the City of Ipoh?

Dr. Ngiam Swee Keat. Pmp (IPOH)

We haven't started privatization yet, although we intend to do so in the near future. But we do have two representatives from Kuala Lumpur, who are actually from a private company doing the privatization — Alam Flora. Perhaps they could make a comment to our participants.

Mr. Mohammad Norshah Abu Naning (KUALA LUMPUR)

Actually we took over the operation in Kuala Lumpur. It started in January 1997.

Our concentration area is the central region of Malaysia. We are still waiting for the federal government to implement the solid waste management act. They plan to implement this and to charge to residents by July 1998. Now we have just taken over the operation of the landfill site and refuse collection. Thank you.

Mr. Park Nam Bae (PUSAN)

In the case of our system in Pusan, in order to raise the funds for garbage collection we have tried introducing taxation based on the number of family members. We have also tried to levy tax for waste discharge. However, from 1994, the garbage weight system was introduced. In this system, we charge people and companies depending on the volume of waste discharged. This is actually how the funds are generated. The money comes to the Pusan authority. However, we can only meet 50 % of the budget for waste collection. Therefore, we are going to try to charge more for the garbage discharged and we will further promote recycling activities. Additionally, we are hoping to promote the private sector to participate in garbage treatment facilities.

Mr. Minoru Harada (NAGASAKI)

I would like to ask you about the management of closed landfills. This is related to Professor Matsufuji's presentation. For closed landfill management guidelines, you said you had case by case measures. I would like to ask you how you have come to this point, to the management of closed landfills. Is it a result of an EIA process? Could you give us any history regarding why this management was begun?

Mr. Roger Matthews (AUCKLAND)

The landfills that we have dealt with in Auckland City were established many years ago, before there were environmental rules and requirements for environmental assessment. Essentially, the authorities found some vacant land or hollows they wanted to fill, and the material was dumped and covered over. There was nothing in the way of environmental investigations before those landfills commenced. In many cases, the files of what went into those landfills and exactly where some of them were, are incomplete. Therefore, we did the investigation to fully document how many landfills there were, where they were in the city, and what kind of materials they contained, as well as to look at the leachate and landfill gas that they were producing. When we had that information, we then looked, on a case by case basis, to see which ones had a risk of causing environmental problems. We have dealt with those risks as they arose. For those that are not causing environmental problems at the moment, we will continue to monitor them for a number of years to make sure

that the situation doesn't change. We have certainly learned from these experiences of the past and all modern landfills will be properly engineered, properly controlled and will require environmental impact assessment before they are established, and will require management plans for looking after the site once it is closed.

Mr. Kazunori Oshima (SAGA)

Now you are using some old landfills as sports playing fields. In fact, your very prestigious rugby club is using one as a practice ground. I imagine gas generation will have been observed there. Do you have any kind of health risk management for those players?

Mr. Roger Matthews (AUCKLAND)

Gas being produced at most of the sites is in very low concentrations. And where there is gas being produced at ground level, Auckland is quite a windy city, and it gets dispersed before it can cause any health problems. But certainly, the only areas where concentrations have been a concern is where buildings have been built on old sites allowing gas to build up in foundations and also build up inside buildings when they are left unattended for some time.

Mr. Chen Sihua (GUANGZHOU)

Yes, I have one question. I'd like to ask the representative from Auckland about contracting out to the private sector for waste collection. In the 1970s, Auckland City was doing that and also currently you contract out to private contractors. Are citizens charged for that? Do the citizens pay directly to the private sector or do they pay to the authority of Auckland City?

Mr. Roger Matthews (AUCKLAND)

We use land tax and other funds to pay for the tender process, and to pay the contractors who collect and dispose of the waste material. At the moment, we are looking at taking that a step further and moving to direct charging, either by charging each residential property every time a rubbish bin is collected from in front of their property, or by actually using the systems on the collection trucks to weigh the material so the properties can be charged by weight. As the technology develops we will be looking at moving toward that sort of system, so that each property owner will get a bill every two or three months to charge them for the amount of waste they have produced over the last few months.

Mr. Toshio Kinoshita (JICA)

In your presentation, Mr. Rogers, you talked about the Northern Disposal Company which is owned by the local government. They are collecting and treating garbage. Could you give us more details regarding the management situation of this authority owned company? Is it a purely private company or is it something like a third sector, as we say in Japan? I would like to know the structure or organization of this company.

Mr. Roger Matthews (AUCKLAND)

It is structured as a public company and its only connection with the local government now is the shares we own. The local government acts as a share holder for that company. At the moment we are investigating selling those shares into the private sector. But Northern Disposal Systems have two landfills, one of which has only about two or three years life and the other landfill has about ten years life. So decisions will have to be made about whether Northern Disposal Systems, which owns the transfer stations, will continue in the landfill disposal business or whether they will just become a collection and transfer business. We will probably wait until the board of management of the company has made those decisions before we decide whether or not we will sell our share holding into the private sector.

Mr. Ian Maxwell (AUCKLAND)

There has been a lot of discussion about trying to attract the private sector into waste management and a lot of other government agencies. Certainly in New Zealand, we have done a lot of that over recent years. And it seems to us that the one of the lessons that we have picked up is, there must be an incentive for a private sector operator to come in, there must actually be a profit to be made. Often that means changing the way that the local government operates. There is no profit to be made from an operation if it is in fact provided free by the local authority. So the first movement towards getting the private sector in, is actually changing the way the local government, itself operates. A second lesson has been the need for competition. The point was raised earlier about how we will know if we are, in fact, getting a good deal. The way which New Zealand, at any rate, has adopted, is by competition, by regularly putting out to tender, by having a variety of tenders, so that companies can compete against one another. Effectively, the local government becomes an environmental monitor, that looks at the impact that those operations have on the environment. And central government has a role in terms of insuring competition is fair and equitable. There has been a lot of change within New Zealand both in central government and local government, which is headed down this way.

And it seems to us that these are certainly the two key lessons that we have learned over the last ten years or so. Thank you.

Chairman

Thank you. Do you have any other questions? If not, we would like to close the presentations by cities and we will have a coffee break now.

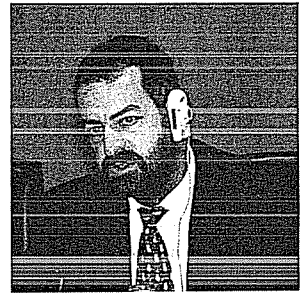
..... *COFFEE BREAK*

United Nations Report ||||||||||||||||||

Mr. Graham Philip Alabaster
Human Settlements Officer
United Nations Centre for Human Settlements (Habitat)

Chairman

Now I would like to resume the session. We will move on to the United Nations Report from the United Nations Centre for Human Settlements (Habitat). The United Nations Centre for Human Settlements established a Fukuoka office on August 1 1997 within this ACROS Building. I understand that several projects are underway, particularly in the Asian region, including technological assistance and model operations in the human resources department and many others. The theme of this conference concerns waste management and we should be able to learn a great deal through the Asian projects. The next speaker is Mr. Graham Philip Alabaster, the Human Settlements Officer of Habitat. He is with the Nairobi Headquarters. Without further adieu, Mr. Alabaster, please.



Mr. Graham Philip Alabaster (HABITAT)

Good afternoon, ladies and gentlemen. I'd like to thank you very much, Fukuoka, for inviting us here this afternoon. I am from the head office of UNCHS in Nairobi. I am the officer there who is responsible for waste management. On behalf of our regional director here in Fukuoka, and the new office that opened in August this year, I'd like to thank you very much for inviting us to this meeting.

The topic of my short intervention this afternoon will be an overview of Habitat's efforts in the Asian-Pacific region and will include some of the conclusions that we have drawn in Habitat over a variety of projects over a number of years, not just here in the Asian-Pacific region, but in some of the other regions of the world. As we've heard in many presentations at this meeting already, there is an increase