
REPORT 4
(1215/52/IM)

MANAGING BIOSOLIDS

1. Purpose of Report

This report seeks Committee approval to continue to landfill dewatered biosolids at the Southern Landfill.

2. Executive Summary

The Council stopped composting sewage sludge at the Southern Landfill site late in 2008. Sludge is currently being disposed of in the landfill, with resultant methane being captured and converted into electricity.

The Council's application for the renewal of the resource consent for the sludge dewatering plant, planned for 2008, was postponed to later this year so that the issue of odour emissions from Carey's Gully could be addressed. The Council's processing and landfilling of the sludge since September 2008 appears to have successfully mitigated the issue and this report seeks Committee approval to continue to landfill dewatered biosolids at the Southern Landfill.

Providing continuity of treatment during the planned development of the landfill over the next few years is seen as an important step in maintaining the goodwill that has been established with the local community.

There are a number of technologies emerging that could be used to dispose of biosolids in a way that is preferable to landfilling. But on balance, the time is not right to be committing to these technologies and it is proposed that sewage sludge continues to be disposed of in the landfill while the Council undertakes further exploration of options to optimise environmental and economic outcomes.

3. Recommendations

It is recommended that the Committee:

- 1. Receive the information.*
- 2. Note that the current practice of landfilling sludge appears to have greatly reduced odour in the vicinity of Carey's Gully.*

3. *Agree that continuing to landfill sludge is the best option for the time being.*
4. *Note that officers will remain abreast of developments and will provide annual updates to the Strategy and Policy Committee so the Committee can make well-informed and timely decisions on future option(s) for the disposal of biosolids in the Wellington District.*

4. Background

In 1998 the Council introduced disposal of the city's biosolids in what was expected to be an environmentally and commercially sustainable model - composting the dewatered sludge with green waste to produce a marketable product. The composting plant produced some 25,000 cubic metres of compost a year.

In December 2007 the Council agreed to discontinue composting sewage sludge because:

- Product sales did not meet anticipated levels so the expected offsetting of the cost to ratepayers for the combined composting and biosolids disposal operation was not achieved.
- Odour from composting and compost stockpiles proved difficult to control and alienated local residents.
- The contract price was proposed to increase by \$1.5m to \$3.4m per annum, plus capital upgrades, with no guarantee that odour would be mitigated or sales improved.

Officers were tasked with investigating alternative models of sludge disposal, focussing on a joint initiative with Porirua City Council, and reporting back to Council.

The Council's planned application for the renewal of the resource consent for the sludge dewatering plant, planned for 2008, was postponed to later this year as the community needed assurance that the odour emissions from Carey's Gully would be addressed. A process failure experienced at the composting plant in 2008 had caused particular concern.

The Council's processing and landfilling of the sludge since September 2008 appears to have successfully mitigated the issues with odours emissions.

Further development of the landfill over the next few years is planned. Providing continuity of treatment during this is seen as an important step in maintaining the goodwill that has been established with the local community, for whom odour is a sensitive issue.

5. Discussion

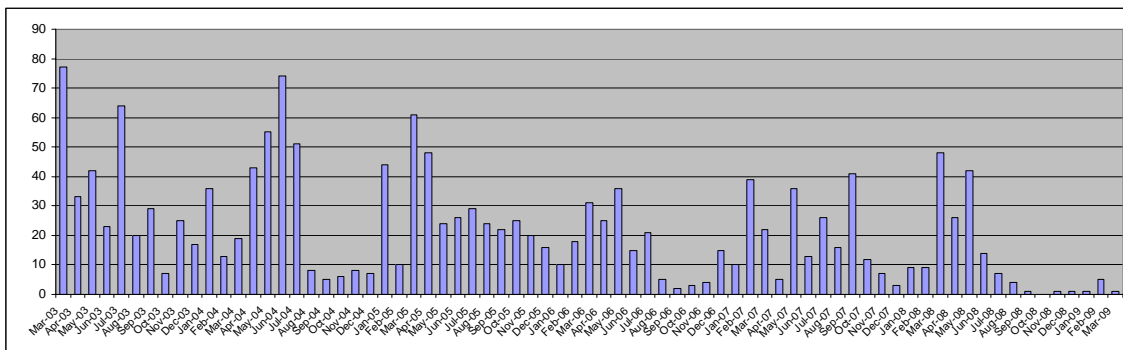
5.1 Current disposal

From late 2008 sewage sludge has been disposed of in the landfill. It is mixed with general waste and covered with soil. Methane is then extracted from the decomposing waste and used to generate electricity that is supplied to the national grid. Kitchen waste and garden waste continue to be composted on site.

Intermittent odours from the previous process, the commercial composting of the dewatered sludge with green waste, had resulted in a significant number of complaints from nearby residents.

Table 1 shows the positive effect the change in process has had on the number of odour complaints being received.

Table 1: Odour complaints received between January 2002 and March 2009



5.2 Options

Since the decision to end the composting operation was made in 2007, officers have continued to monitor the development of alternative technologies with the potential to offer environmental and economic improvements for the Council's disposal of biosolids. In line with its waste management plans, the Council seeks to reduce the volume of waste to landfill, while also minimising the environmental impacts of waste.

The following proven options appropriate to the Wellington environment have been assessed:

- **anaerobic digestion** combined with heat and power generation – the controlled use of microbes to break down the sludge, producing heat and methane gas which can be used to drive an electricity generator
- **thermal drying** – the artificial drying of sludge to greatly reduce the volume and the use of the dry sludge to generate gas to generate electricity

- **anaerobic digestion combined with thermal drying** – a combination of the two processes above
- **transporting biosolids offsite** to a regional joint facility – based on the above processes.

These options were evaluated against environmental, economic, social and cultural criteria and compared against the status quo option of landfilling sludge. The high level results, with indicative costs, excluding resource consent costs, are presented in Table 2. Each option takes into account the waste minimisation levy to be introduced from 1 July 2009.

While the landfilling operation is directly under the Council’s control, as owner and operator of the Southern Landfill, the alternative approaches would likely be managed on a contractual basis. Each of the options carries a risk of potential odour generation and management of this risk would be an important consideration in any contracts.

Table 2: Comparison of disposal options

Option	Capex	Opex	Comment	Rank
Landfilling		\$1.8m	Opex is internal revenue for landfill, costs are fixed Odour potential - mitigated under direct Council control Gas is captured and converted to energy Brings forward Stage 4 of landfill	Status quo
Anaerobic digestion CHP	\$18m	\$1.7m	Net carbon sink 60% mass requiring landfilling Odour potential Needs to be proven with WCC sludge characteristics, NaCl	1
Thermal drying	\$14m	\$1.9m	Energy intensive Generates 3000 tonnes for co-disposal to landfill Odour potential	2
Combination	\$25m	\$1.6m	Multiple processes involved Generate 4800 tonnes for co-disposal to landfill Odour potential	3
Trucking offsite	\$12m	\$2.4m	Reliant on third party co-operation Transportation of raw sludge undesirable Energy intensive Odour potential	4

5.3 Recommended approach

Technological development for the disposal of sludge is rapid and uncertain at present. Landfilling is currently the preferred option for the short term because:

- Odour is successfully under control, and continuing with this current approach until longer term options are clearer will mitigate the local community feelings of uncertainty about potential odour impacts.
- Additional methane would be captured with a commensurate increase in electricity production in future years.
- It is not considered prudent for Wellington to plan for large scale or long-term investments in the current economic environment and with the present rapid development of new technologies. Significant commitment has been made in Europe and the United States of America to research and development of alternative methods for sludge treatment. Emerging technologies are being refined and optimised with promising results. This trend is expected to accelerate, with rapid improvement in scalability and affordability.
- Future regional waste infrastructure investments are being investigated.

5.4 Emergent technologies

The following emerging technologies were not shortlisted because they are currently experimental and not fully proven, although there are early plants operational in Europe and the USA:

- **Pyrolysis** - the superheating of material in the absence of oxygen to produce energy and reduce the mass to be disposed. Currently the set-up cost is around \$60m but this is reducing as the technology becomes more widespread.
- **Biochar** - charcoal produced as a by-product of biomass pyrolysis and which can be used for the sequestration of carbon. This has been proven with forest waste and there are various ongoing trials with municipal and sewage waste.
- **Plasma gasification** – the use of radiant energy to disintegrate waste into its basic elements by tearing apart the material's molecular bonds. Plants are established in the USA but not yet fully proven.
- **Microwave drying** - showing promising results and potential due to its simplicity, with some plants in operation.

These technologies are emerging quickly and may have utility for Wellington, but most likely on a regional basis.

5.4 Regulatory uncertainty

The Council has set targets for the reduction of greenhouse gas emissions from its own activities and within the Wellington District. However, the timing for the integration of waste into the Emissions Trading Scheme (ETS), planned for September 2013, has yet to be confirmed and the financial impact of the ETS is still unknown. The ETS may accelerate development and uptake of new technologies. Currently, the Council is looking into more effective gas extraction systems for the landfill to mitigate potential financial impacts from the ETS.

6. Conclusion

Current resource consent applications and rapid development of technology mean a cautious approach to biosolids disposal is prudent while future options are considered.

Options for the sustainable disposal of sewage sludge have been considered and continuing to landfill sewage sludge is recommended at this time.

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Supporting Information

1) Strategic Fit / Strategic Outcome

The broad aim is consistent with the Council's long term LTCCP outcomes – 4.3, 4.5, and 4.6, however it is inconsistent with the Solid Waste Management Plan.

2) LTCCP/Annual Plan reference and long term financial impact

This report relates to Annual Plan project c347 and is expected to be cost neutral.

3) Treaty of Waitangi considerations

No significant Treaty implications have been identified.

4) Decision-Making

This is not a significant decision.

5) Consultation

Not required as Council is not making a decision or commencing an initiative that relates to Part 6 of the Local Government Act 2002.

Disposal of human waste is of concern to mana whenua, their preference being disposal to land.

6) Legal Implications

Legal advice has not been received for this report.

7) Consistency with existing policy

The report is inconsistent with the Solid Waste Management Plan. Our policy objective is to divert material away from the landfill, rather than into it. However given the current economic situation and the opportunity for resource recovery of methane for electricity generation, this inconsistency is considered to be pragmatic.