

20 August 2003
File: WGN030283 [22817]

Non-notified resource consent application officer's report

Application granted with conditions

Date Granted: 20 August 2003

Applicant: Mighty River Power Limited
PO Box 445
HAMILTON

Consent Granted: **WGN030283 [22817]: Controlled Activity**
To discharge to air contaminants associated with the operation of the Silverstream landfill gas generation facility.

Location: Silverstream Landfill, Reynolds Bach Drive, Silverstream, Upper Hutt

Map Reference: At or about map reference NZMS 260:R27;776.032

Legal Description: Lot 1 DP27329

Duration of Consent: WGN030283 [22817]: 15 years.

Conditions Relate to: Monitoring, discharge quality and review.

Report prepared by:

Recommendation approved:

HARLEY O'HAGAN
Resource Advisor, Consents Management

LUCI RYAN
Manager, Consents Management

Reasons for decision: resource consent WGN030283 [22817]

1. Background

Discharge permit WGN930165, to discharge emissions into air from a gas to electricity plant, was granted to the Silverstream Landfill Gas Joint Venture on 30 November 1993.

The joint venture originally included Hutt City Council (HCC), Natural Gas Corporation (NGC) and Mighty River Power. Mighty River Power bought out NGC's share of the venture in 2002, giving it 93% of the ownership.

The Silverstream landfill gas generation facility collects gas produced by the Silverstream landfill, and combusts it to generate electricity. That electricity supplements the supply from the Haywards Substation.

Consent WGN930165 expires on 30 November 2003, and Mighty River Power is now applying for a renewal of that consent.

2. Proposal

2.1 Location

The landfill gas generation plant is located at the end of Reynolds Bach Drive in Lower Hutt, adjacent to the Silverstream Landfill weigh bridge. The landfill itself is located approximately 200 metres south of the plant. The plant is at an elevation of approximately 150m in a gully sided with hills reaching about 200m to the west and 250m to the east.

The nearest property boundary not owned by HCC is about 350m to the north-east. This is near to the ridgeline and is planted with pine forest. The nearest dwelling is on Lord Street, Stokes Valley, approximately 600 metres west north west of the plant.

2.2 Plant

There are no changes proposed to the existing power generating plant. The plant comprises three nominal 920kW gas engines, each with a maximum generation capacity of 1000kW (1MW). The station also has capacity for a fourth engine. Design features of the plant include:

- Waukesha model 7100 GL V12 turbocharged intercooled engines
- Low pressure gas inlet
- Lean combustion for low nitrogen oxide (NOx) emissions
- Closed circuit water cooling for engine jacket intercooler and lube oil cooling, with water-to-air heat exchangers
- Separate gas silencers / exhausts

- Fully automatic operation

Gas collected in bores in the landfill is treated by filtration, drying and cooling to remove particulates and moisture, and is fed into each engine via a manifold. The methane concentration in the landfill gas is typically around 50%.

The exhaust discharges through silencers on the roof of the 6m high building. There are no chimneys.

The plant is attended by an operator for 8 hours every working day, and a daily log is kept of plant management. The plant runs 24 hours a day and the engines consume up to 520m³ of landfill gas every hour. The exhaust temperatures are monitored to provide an indication of combustion efficiency, and are maintained typically between 520 and 535°C.

2.3 Maintenance

The applicant states that the silencer/ exhaust systems and engines are all in good condition. Each engine has a minor service approximately every 2,500 hours, and a major service every 10,000 hours.

2.4 Supplementation with natural gas

HCC are proposing to expand the landfill. The applicant expects to be part of this process, with gas produced in the new area being combusted in the gas generation plant. Methane will continue to be produced in the existing landfill area after it stops receiving waste in 2005 for the next 20 or 30 years, but production will decline over that time. Gas production in the new landfill area may take 30 years to reach full production.

The applicant therefore seeks the option of supplementing the landfill gas supply with natural gas at times of low landfill gas production. Over time, natural gas could become the primary fuel source, eventually replacing landfill gas as it becomes uneconomic to collect it from the landfill.

2.5 Monitoring

The current consent required the consent holder to monitor emissions for carbon monoxide (CO), nitrogen oxides (NO_x), hydrochloric acid (HCl), sulphur oxides (SO_x) and particulates. The monitoring was required to establish baseline air discharge contaminant levels, to validate the dispersion model described in the consent application, and to enable comparison with the established baseline levels.

On 10 December 1999, the Manager, Consents Management Department, Wellington Regional Council, approved a recommendation by Resource Advisor, Peter Day, to modify the monitoring requirements on consent WGN930165. The consent holder was no longer required to monitor particulates and HCl, as *“these contaminants are sufficiently below those levels indicated in condition 11 that the contaminants are unlikely to result in any adverse effects on air quality beyond the boundary of the plant.”*

However, at that time CO, NO_x and SO_x concentrations had exceeded the baseline levels indicated in the consent. Mr Day stated that while he was “satisfied with the assessment Kingston Morrison has made of the potential adverse effects on air quality of these emissions... the plant should still continue to analyse for these compounds.”

The monitoring results are outlined below.

Contaminant	Mean Concentration							Baseline Levels
	Jan-95	Dec-96	Apr-98	Jun-98	Dec-98	Dec-99	Feb-03	
CO – ppmv	497	550	660	980	470	870	434	500
NO ₂ – ppmv	57	90	116	135	80	32	64	50
HCl - mg/Nm ³	3.7	4	7	-	5	-	-	20
SO ₂ - mg/Nm ³	7.9	30	33	-	19	33	47	20
Particulate - mg/Nm ³	<5	10	12	-	13	-	-	20
O ₂ - %	8.5	8.2	8.7	9.5	9.8	9	10.1	-
Exhaust Temperature - °C	404	385	381	389	366	-	-	-

Note: ppmv is parts per million by volume, and mg/Nm³ is mg/m³ at standard temperature and pressure (STP). HCl, SO₂ and particulates were not tested for in June 1998, as three sets of tests were done in that year. Monitoring of HCl and particulates was not required from 1999. Monitoring 1999 and 2003 was not required as part of the agreed testing programme.

The applicant considers that the monitoring conducted to date has established that the effects of the contaminant levels are insignificant, and that monitoring is no longer necessary.

3. Consultation

The applicant consulted with Hutt City Council, the landowner, with which Mighty River Power Limited is in partnership in the landfill gas generation venture.

In accordance with the agreement between tangata whenua and the Wellington Regional Council in relation to consultation for non-notified consents, the applications were sent to Wellington Tenth Trust and Te Runanganui o Taranaki Whanui ki te Upoko o te Ika a Maui. Neither iwi expressed any concern over the proposal.

4. Environmental effects

The environmental effects of the proposal arise from the discharge of combustion gases to air.

4.1 Location

The prevailing wind is a north-westerly, although it tends to swirl a lot due to the topography. This carries any odour away from the nearest house on Lord Street. The nearest house to the Southwest is approximately 1.5 km away in Pinehaven Road.

There are no nearby industries other than the landfill. The gullies surrounding Tip Stream below the discharge point provide habitat for some native bush, while the hills above are planted in plantation pine.

4.2 Health effects

The main contaminants that will be produced from the combustion of landfill gas are carbon monoxide (CO), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), and particulates.

The following table of health effects from these contaminants is adapted from the Ministry for the Environment's (MfE) Ambient Air Quality Guidelines, May 2002.

Contaminant	Key health effects
Carbon monoxide	Reduced birth weight, decreased work capacity, increased duration of angina, decrease in visual perception, decreased manual dexterity, and decreased ability to learn.
Nitrogen dioxide	Apparent contribution to morbidity and mortality, especially in young children, asthmatics and those with chronic inflammatory airway disease.
Sulphur dioxide	Daily mortality, hospital admissions and emergency room attendances for respiratory and cardiovascular disease, increases in respiratory symptoms and decreases in lung function.
Fine particulates (PM ₁₀)	Mortality, morbidity, hospitalisation, work-affected days, increased use of medication. There is no evidence of a threshold below which adverse health effects will not be observed.

However, I consider that there will be no significant adverse health effects arising from the operation of the plant due to the low concentrations of the contaminants in the discharge and the location of the plant. I have recommended Condition 3 to ensure that the discharge causes no noxious or dangerous effects beyond the boundary.

4.3 Odour

During the almost ten years since consent WGN930165 was granted, there have been no problems arising with odour from the plant. Due to the secluded location of the plant, and the good compliance history, I do not consider that any effects of odour from the plant would be any more than minor. I have recommended Condition 3 to ensure that there is no nuisance odour from the plant beyond the boundary.

4.4 Dispersion modelling

In 1999, Kingston Morrison remodelled the discharge using the original Ausplume model from the 1993 consent application, but inputting the maximum contaminant concentrations encountered during monitoring. The modelling assumes that four engines are operating. The results were as follows:

Contaminant	Predicted Max 1 hr Average Ground Level Concentrations (mg/m ³) for Distance Downwind (m)						
	10	20	50	100	200	300	500
CO	12300	2270	1270	725	363	273	183
NO ₂	406	76	41	24	12	12	6
SO ₂	532	98	55	32	16	12	8

The Ministry for the Environment's (MfE) Ambient Air Quality Guidelines, May 2002, gives 1 hour average guideline values for the contaminants listed above. They are:

- CO – 30,000 µg/m³
- NO₂ - 200 µg/m³
- SO₂ – 350 µg/m³

MfE has several Environmental Performance Indicator (EPI) categories for ambient air based on these guideline values. The categories are as follows:

- **Excellent** - contaminant concentration less than 10% of its guideline value;
- **Good** - contaminant concentration is between 10% and 33% of its guideline value;
- **Acceptable** - contaminant concentration is between 33% and 66% of its guideline value;
- **Alert** - contaminant concentration is between 66% and 100% of its guideline value;
- **Action** – contaminant concentration exceeds its guideline value.

The modelling data above estimates that less than 20m from the discharge point, the CO concentration will be within the *excellent* EPI category, and that the SO₂ and NO₂ concentrations will be within the *good* EPI category.

To minimise the effects on ambient air quality, I have recommended Conditions 2 and 3, which are taken from the standards listed under Rule 7 of the Regional Air Quality

Management Plan, and relate to the quality and effects of the discharge. Should monitoring or inspections show that these standards are not being met, and the activity does not in fact qualify as a controlled activity under Rule 7, a review of the consent conditions can be undertaken, in accordance with recommended Conditions 7 and 9.

4.5 Monitoring and recording

The applicant has requested that the requirement for discharge monitoring be left from the new consent.

Although the applicant has a good compliance history, and past monitoring has shown acceptable levels of contaminants, I do not consider that the complete removal of monitoring requirements would be appropriate.

The generators are currently discharging acceptable levels of contaminants, but it is possible that their condition and combustion efficiency may deteriorate over the term of consent. Regular maintenance should ensure that the engines are operated efficiently, but with no monitoring programme, it is impossible to assess the efficiency of the combustion, or the effects of the discharge on ambient air quality.

I have recommended condition 4, which requires the consent holder to monitor levels of relevant contaminants in the discharge every five years. This will provide evidence that the effects of the discharge continue to be minor and that the permit holder is operating within the bounds of their permit.

Condition 4 is less onerous than the monitoring conditions on the previous consent, WGN930165 [1364], and takes into account the good compliance history.

I have also recommended conditions 5 and 6, which require the permit holder to record any complaints received or incidents that occur that may cause a breach of the consent conditions. The conditions also require the permit holder to notify GWRC of any such complaints or incidents within 24 hours or on the next working day.

4.6 Compliance history

The consent holder has a good compliance history for the original consent WGN930165 [1364], with full compliance with all conditions relating to environmental effects. In April 1999, a compliance rating of “*mainly complying*” was given due to late reporting of reasons for the NO_x level exceeding the baseline levels indicated in the consent. Note that these baseline levels were not emission limits.

4.7 Combustion of natural gas

The applicant wishes to have the option of using natural gas as a fuel source for electricity generation in the event that landfill gas production drops to uneconomical levels. Natural gas is a purer gas than landfill gas, and burns cleaner. I consider that it is reasonable to allow the use of natural gas as a fuel source, and that the adverse environmental effects of using this fuel will be minor, and less than those of using landfill gas.

4.8 Positive effects

The collection and combustion of landfill gas for the production of electricity has two main positive effects. These are the provision of electricity, and the reduction of discharges of greenhouse gases (namely methane) into the atmosphere. However these effects may be slightly offset by the management of the landfill for the production rather than prevention of landfill gas, in order to supply the plant with fuel.

4.9 Summary of effects

Due to the location and topography of the landfill gas generation site, and the modelling and monitoring data that shows that the contaminant concentrations in the discharge are minimal, I consider that the adverse environmental effects of this proposal will be no more than minor.

5. Statutory framework

5.1 Resource Management Act 1991

In my view, the proposal is consistent with the purpose and principles of the Resource Management Act 1991 (the Act) and in particular Part II Section 5, under which the life-supporting capacity of air is to be safeguarded. Therefore, I consider that the consent should be granted, subject to the recommended conditions.

Section 15 of the Resource Management Act (1991) (the Act), states that *“no person may discharge any contaminant from any industrial or trade premises into air unless the discharge is expressly allowed by a rule in a regional plan and in any relevant proposed regional plan, a resource consent, or regulations.”*

5.2 Regional plans

Rule 7 of the Regional Air Quality Management Plan (RAQMP), *‘Medium sized internal or external combustion engines, heating appliances and electrical generation plants’*, classifies the discharge to air as a **controlled activity**.

In order to meet this rule, the activity shall comply with the following standards and terms.

The person(s) responsible for the activity shall ensure that:

- (i) there is no discharge of particulates of a concentration greater than 250 mg/m³ (at STP), measured at the point of discharge; and
- (ii) there is no smoke, dust, odour, gas or vapour from the discharge, which is noxious, dangerous, offensive or objectionable at or beyond the boundary of the property.

The rule states that the Wellington Regional Council reserves the right to exercise control over:

- the height and design of chimneys/discharge points (see Appendix 3);
- the taking and supplying of samples; the carrying out of measurements, samples, analyses, surveys, investigations or inspections, at the consent holder's expense;
- the provision of information to the Wellington Regional Council at specified times, at the consent holder's expense;
- compliance with monitoring, sampling and analysis conditions at the consent holder's expense;
- and the payment of administrative charges and financial contributions.

Appendix 3 of the RAQMP contains *Guidelines for setting chimney heights*. Due to the location of the plant and its surrounding topography, I consider that the current discharge points level with the plant's roof are sufficient to minimise adverse effects.

Policy 4.2.1 of the RAQMP is *'to have regard to the Regional Ambient Air Quality Guidelines in Appendix 2, in managing the Region's air resource.'*

In processing this application, I have had regard to both Appendix 2 and the MfE Ambient Air Quality Guidelines, May 2002. The MfE guidelines are more up to date than the RAQMP guidelines, and therefore I consider them to be of most relevance.

Policy 4.2.9 lists the matters to be given particular consideration when assessing an application for resource consent to discharge contaminants to air. Policy 4.2.10 describes the approach to be adopted when placing conditions on air discharge permits. I have followed these policies in assessing the application and recommending conditions.

5.3 Regional Policy Statement

I consider that the proposal is consistent with the objectives and policies of the Regional Policy Statement for the Wellington Region (RPS). In particular, the proposal is consistent with:

Objective 8.3.3 of the RPS, which reads:

"The adverse effects of the discharge of contaminants into air on human health, local or global environmental systems and public amenity are avoided, remedied or mitigated."

And Policy 8.4.8, which reads:

"To avoid, remedy or mitigate the adverse effects of local and global air pollution on human health."

6. Reasons for waiver of notification

Notification under section 93 of the Act is not required as I am satisfied that the activity is classified as a controlled activity by the RAQMP, and written

approval has been given by Hutt City Council (land owner and business partner of the applicant for the facility), who I consider to be the only affected party.

7. Term of consent

The applicant seeks a 35 year term for discharge permit WGN030283 [22817]. However, I recommend that the consent be granted for a term of 15 years. This term is 50% longer than the term of the original consent, WGN930165, and recognises the applicant's compliance history and the minor nature of the environmental effects. It also takes into account the fact that technological advances in the area of environmental management are likely, and that the applicant's control methods are likely not to be the best practicable option in 15 years time, and will allow adjustment of consent requirements in the event of changes to environmental standards.

8. Recommendation

That, under Sections 105 and 108 of the Resource Management Act 1991, Mighty River Power Limited be granted the following consent:

Discharge permit WGN030283 [22817], to discharge to air contaminants associated with the operation of the Silverstream landfill gas generation facility, at or about map reference NZMS 260:R27;776.032, for a term of 15 years, subject to the following conditions:

- (1) *The location, design, and operation of the Silverstream Landfill gas generation plant shall be carried out in accordance with the application dated 29 May 2003.*

Note: Any change from the location, design concepts and parameters, implementation and/or operation may require a new resource consent or a change in consent conditions pursuant to section 127 of the Resource Management Act 1991.

- (2) *The permit holder shall ensure that there is no discharge of particulates at a concentration greater than 250 mg/m³ (at STP), measured at the point of discharge.*
- (3) *The permit holder shall ensure that there is no smoke, dust, odour, gas or vapour from the discharge, which is noxious, dangerous, offensive or objectionable at or beyond the boundary of the property.*
- (4) *The permit holder shall measure the concentrations of CO, NO_x and SO_x in the air discharge within three months of the fourth, ninth and fourteenth anniversaries of the granting of this consent.*

The results of the monitoring shall be submitted to the Manager, Consents Management, Wellington Regional Council, within one month of the testing being undertaken.

- (5) *The permit holder shall keep a permanent record of any complaints received alleging adverse effects from the permit holder's operations. The complaints record shall contain the following where practicable:*

- (a) *the name and address of the complainant, if supplied;*
- (b) *identification of the nature of the complaint;*
- (c) *date and time of the complaint and alleged event;*
- (d) *weather conditions at the time of the alleged event;*
- (e) *results of the permit holder's investigations; and,*
- (f) *any mitigation measures adopted.*

The complaints record shall be made available to the Wellington Regional Council on request.

The permit holder shall notify the Manager, Consents Management, Wellington Regional Council, of any complaints received, which relate to the exercise of this permit, within 24 hours of being received, or on the next working day.

- (6) *The permit holder shall keep a permanent record of any incident that results, or could result, in an adverse effect on the environment beyond the boundary of the permit holder's site.*

The permit holder shall notify the Manager, Consents Management, Wellington Regional Council, of any such incident within 24 hours of the incident being brought to the attention of the permit holder or on the next working day.

The permit holder shall forward an incident report to the Manager, Consents Management, Wellington Regional Council within seven working days of the incident occurring, unless otherwise agreed with the Manager, Consents Management, Wellington Regional Council.

The report shall describe reasons for the incident, measures taken to mitigate the incident, and measures to prevent recurrence.

Note: For the purposes of this permit, incidents include, but are not limited to, events such as power or mechanical failure or unusual discharges.

Review Condition

- (7) *The Wellington Regional Council may review any or all conditions of this permit by giving notice of its intention to do so pursuant to section 128 of the Resource Management Act 1991, at any time within three months of the third, sixth, ninth and twelfth anniversaries of the date of the granting of this permit for any of the following purposes:*

- (a) *To deal with any adverse effects on the environment which may arise from the exercise of this permit, and which are appropriate to deal with at a later stage.*

- (b) *To review the adequacy of monitoring requirements for this consent so as to incorporate into the permit any modification which may become necessary to deal with any adverse effects on the environment arising from the exercise of this permit.*
- (8) *The permit holder may apply at any time, pursuant to section 127 of the Resource Management Act 1991, for the change or cancellation of any consent condition, other than that relating to the term of the permit.*

Costs

- (9) *The Wellington Regional Council shall be entitled to recover from the permit holder the costs of the conduct of any review, calculated in accordance with and limited to that council's scale of charges in-force and applicable at that time pursuant to section 36 of the Resource Management Act 1991.*

9. Reason for conditions

The conditions that have been recommended are in accordance with the standards and items that GWRC shall exercise control over listed in Rule 7 of the RAQMP. They have been recommended to minimise the adverse effects of the discharge on the surrounding environment, and to allow review of those conditions in the event that unexpected adverse effects arise.

Application Lodged:	04/06/03	Application Officially Received:	04/06/03
Application stopped:	02/07/03	Application Started:	20/08/03
Decision to be Notified by:	20/08/03	Decision Notified:	20/08/03
Time Taken to Process Application: 20 working days			
