

Vector Kapuni GTP
Monitoring Programme
Annual Report
2015-2016

Technical Report 2016–84

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Executive summary

Vector Gas Ltd (Vector), operates a gas treatment plant (Kapuni Gas Treatment Plant, KGTP) located on Palmer Road at Kapuni, in the Kapuni catchment. This report for the period July 2015-June 2016 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess Vector's environmental performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of Vector's activities.

Vector holds a total of ten resource consents, which include a total of 88 conditions setting out the requirements that they must satisfy. Vector holds one consent to allow it to take water, two consents to discharge effluent/stormwater into the Kapuni Stream, four consents to discharge to land, two land use permits, and one consent to discharge emissions into the air at this site. Two certificates of compliance are held, in relation to activities permitted under the Regional Freshwater Plan.

During the monitoring period, Vector Gas Ltd demonstrated an overall high level of environmental performance.

The Council's monitoring programme for the year under review included two inspections, six water samples collected for physicochemical analysis, and a review of four biomonitoring and two electric fishing surveys of receiving waters.

Inspections and monitoring undertaken throughout the year indicated that as in previous years the site was clean, well managed with prominent housekeeping evident throughout the facility.

The biological monitoring indicated that the Kapuni Stream was in good health and the impact (if any) of the industrial activity at Kapuni was not discernible.

Compliance was achieved in the inter-laboratory comparisons in as much as both sets of samples indicated that the discharge was below the conditional limits set by the consent. However, there did exist a variation between the samples analysed by Vector and the Council on one occasion of the two and this will be addressed in the upcoming monitoring period.

There were no unauthorised incidents recording non-compliance in respect of this consent holder during the period under review.

During the year, Vector demonstrated a high level of environmental and administrative performance with the resource consents.

For reference, in the 2015-2016 year, 71% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 24% demonstrated a good level of environmental performance and compliance with their consents.

In terms of overall environmental and compliance performance by the consent holder over the last several years, this report shows that the consent holder's performance is remains at a high level.

This report includes recommendations for the 2016-2017 year, including a recommendation relating to an optional review of consents 1123-3, 1125-4, 1225-3, 4087-2, 5090-1, 5091-1, 7043-1, 7281-1 and 7755-1.

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1. Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report for the period July 2015 to June 2016 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Vector Gas Ltd (Vector). Vector operates a gas treatment plant (KGTP) situated on Palmer Road at Kapuni, in the Kapuni catchment.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consents held by Vector that relate to abstractions and discharges of water within the Kapuni catchment, and the air discharge permit held by Vector to cover emissions to air from the site.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of Vector's use of water, land, and air, and is the twenty-sixth combined annual report by the Council for this consent holder.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about:

- consent compliance monitoring under the RMA and the Council's obligations;
- the Council's approach to monitoring sites through annual programmes;
- the resource consents held by Vector in the Kapuni catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at Vector's site.

Section 2 presents the results of monitoring during the period under review, including scientific and technical data.

Section 3 discusses the results, their interpretation, and their significance for the environment.

Section 4 presents recommendations to be implemented in the 2016-2017 monitoring year.

A glossary of common abbreviations and scientific terms, and a bibliography, are presented at the end of the report.

1.1.3 The Resource Management Act (1991) and monitoring

The RMA primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

- (a) the neighbourhood or the wider community around an activity, and may include cultural and socio-economic effects;
- (b) physical effects on the locality, including landscape, amenity and visual effects;
- (c) ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
- (d) natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and
- (e) risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' inasmuch as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the RMA to assess the effects of the exercise of consents. In accordance with Section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, enables the Council to continually re-evaluate its approach and that of consent holders to resource management and, ultimately, through the refinement of methods and considered responsible resource utilisation, to move closer to achieving sustainable development of the region's resources.

1.1.4 Evaluation of environmental performance

Besides discussing the various details of the performance and extent of compliance by Vector, this report also assigns them a rating for their environmental and administrative performance during the period under review.

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year.

Administrative performance is concerned with Vector's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

Events that were beyond the control of the consent holder and unforeseeable (that is a defence under the provisions of the RMA can be established) may be excluded with regard to the performance rating applied. For example loss of data due to a flood destroying deployed field equipment.

The categories used by the Council for this monitoring period, and their interpretation, are as follows:

Environmental Performance

- **High:** No or inconsequential (short-term duration, less than minor in severity) breaches of consent or regional plan parameters resulting from the activity; no

adverse effects of significance noted or likely in the receiving environment. The Council did not record any verified unauthorised incidents involving significant environmental impacts and was not obliged to issue any abatement notices or infringement notices in relation to such impacts.

- **Good:** Likely or actual adverse effects of activities on the receiving environment were negligible or minor at most. There were some such issues noted during monitoring, from self reports, or in response to unauthorised incident reports, but these items were not critical, and follow-up inspections showed they have been dealt with. These minor issues were resolved positively, co-operatively, and quickly. The Council was not obliged to issue any abatement notices or infringement notices in relation to the minor non-compliant effects; however abatement notices may have been issued to mitigate an identified potential for an environmental effect to occur.

For example:

- High suspended solid values recorded in discharge samples, however the discharge was to land or to receiving waters that were in high flow at the time;
 - Strong odour beyond boundary but no residential properties or other recipient nearby.
- **Improvement required:** Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self reports, or in response to unauthorised incident reports. Cumulative adverse effects of a persistent minor non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.
 - **Poor:** Likely or actual adverse effects of activities on the receiving environment were significant. There were some items noted during monitoring, from self reports, or in response to unauthorised incident reports. Cumulative adverse effects of a persistent moderate non-compliant activity could elevate an 'improvement required' issue to this level. Typically there were grounds for either a prosecution or an infringement notice in respect of effects.

Administrative performance

- **High:** The administrative requirements of the resource consents were met, or any failure to do this had trivial consequences and were addressed promptly and co-operatively.
- **Good:** Perhaps some administrative requirements of the resource consents were not met at a particular time, however this was addressed without repeated interventions from the Council staff. Alternatively adequate reason was provided for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.
- **Improvement required:** Repeated interventions to meet the administrative requirements of the resource consents were made by Council staff. These

matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance.

- **Poor:** Material failings to meet the administrative requirements of the resource consents. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.

For reference, in the 2015-2016 year, 71% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 24% demonstrated a good level of environmental performance and compliance with their consents.

1.2 Process description

The Kapuni Gas Treatment Plant (KGTP) is owned and operated by Vector and was built in 1969-70. The original plant was designed to process high carbon dioxide Kapuni gas to a quality suitable for use in general domestic, commercial and industrial appliances. The process involves the removal of carbon dioxide from the gas, which is then dried and chilled to remove some of the heavier hydrocarbons which could affect pipeline operation and appliance efficiency. The pipeline quality gas is then distributed via the transmission distribution network.

The first of several plant expansions occurred in 1973 with the addition of plant to process the heavier hydrocarbons into LPG (liquefied petroleum gas) and natural gas. In 1979-80, further additions were made to process Maui gas and to recover, purify and liquefy some of the carbon dioxide from the gas. The liquid carbon dioxide is used in the beverage, food processing and refrigeration markets.



Photo 1 Vector Kapuni gas treatment plant during three-train operation

In 1985, the gas treatment plant was expanded with the installation of the low temperature separation (LTS) gas conditioning plant which processes the high carbon dioxide content Kapuni gas for water and heavy hydrocarbon removal only. The conditioned gas was supplied to the region's methanol plants so that it could be blended with the much lower carbon dioxide content Maui gas for more efficient methanol production. Methanex reduced its production capacity and as a result the gas conditioning plant was mothballed in May 2005.

During 1997, the KGTP refrigeration systems were upgraded, enabling more natural gas liquids to be removed from the raw gas. Reliability and efficiencies were further improved with the completion in 1998 of a \$25 million, three-year refurbishment of the plant's processes and control systems.

NGC and Todd Energy are 50:50 partners in Kapuni Energy which has developed a \$37 million, 25MW cogeneration plant within Vector's gas treatment plant complex at Kapuni. It provides the electricity and steam requirements of the KGTP and Fonterra's Lactose factory at Kapuni. It also exports excess electricity into the national grid.

During the 2004-2005 period, NGC completed a \$7 million upgrade of the treatment plant, involving re-commissioning one of the plant's three process trains, adding a further 100 tonnes of LPG storage, and installing a reverse osmosis water treatment plant.

In April 2006 NGC changed its name to Vector Gas Ltd. NGC remains a legal entity holding previously issued consents, but consents applied for after this date were granted in the name of Vector Gas Ltd.

The gas supply for the plant comes from the adjacent Kapuni Gas Production Station operated by Shell Todd Oil Services Ltd.

Water is drawn from the Kapuni Stream via the intake structure and raw water supply line for Hawera water treatment plant. Water discharges are from the gas treatment process, plant utilities, domestic effluent and site stormwater. Solid waste discharges are from settling basins for water treatment and waste storage. Air discharges are from the gas treatment process.

1.3 Resource consents

A summary of the consents held by Vector Ltd/ Vector Gas Trading Ltd in relation to activities at its Kapuni gas treatment plant is given in below and the consents are discussed in Sections 1.3.1 to 1.3.5. A copy of each of the consents can be found in Appendix I.

Table 1 Summary of resource consents held for operation of KGTP

Consent number	Purpose	Volume	Next review date	Expiry date
1123-3	Discharge cooling and wastewater to Kapuni Stream		2017	2035
1125-4	Take from Kapuni Stream	3,900 m ³ /day (52/58 L/s)	2017	2035
1225-3	Discharge treated sewage and process wastes to land	13.5 m ³ /day (0.97 L/s)	2017	2035
4087-2	Discharge emissions to air		2017	2029
5090-1	Structures for pipeline crossings (Motumate/Waiokura)		2017	2032
5091-1	Discharge steam pipeline construction materials		2017	2032
5496-1	Discharge steam pipeline ingress water to land	8 m ³ /day	-	2017
7043-1	Discharge stormwater/settling ponds sludges to land		2017	2023
7281-1	Remove weir structure from Kapuni Stream		2017	2023
7633-0	Structures in, on, over or under Kapuni Stream		-	--
7755-1	Discharge stormwater (non-process areas) to Kapuni Stream		2017	2035
7756-0	Discharge stormwater from LPG load-out to land		-	-

1.3.1 Water abstraction permits

Section 14 of the RMA stipulates that no person may take, use, dam or divert any water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or it falls within some particular categories set out in Section 14.

Vector Ltd holds water permit **1125-4** to take water from Kapuni Stream for the operation of a gas processing facility and related ancillary purposes and downstream uses. This permit was issued by the Council on 19 June 2012 under Section 87(d) of the RMA. It is due to expire on 1 June 2035.

Condition 1 sets maximum abstraction rates under normal and emergency conditions.

Condition 2 defines three take location alternatives.

Condition 3 limits the duration of abstraction for emergency or other purposes.

Condition 4 relates to best practicable option.

Conditions 5 to 10 relate to water metering and provision of records.

Condition 11 addresses intake screening for fish protection.

Condition 12 requires financial contribution to Council for providing riparian planting and fencing in the Kapuni catchment.

Condition 13 is a review condition.

1.3.2 Water discharge permits

Section 15(1)(a) of the RMA stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations.

Vector Ltd holds water discharge permit **1123-3** to discharge process effluent and stormwater to the Kapuni Stream. This permit was issued by the Council on 18 June 2012 under Section 87(e) of the RMA. It expires on 1 June 2035.

Condition 1 relates to best practicable option.

Condition 2 limits the stormwater catchment area.

Conditions 3 to 9 refer to discharge composition and effects of the discharge on the Kapuni Stream.

Conditions 10 and 11 relate to an effluent and stormwater management plan.

Conditions 12 and 13 relate to treatment and cleaning chemicals.

Conditions 14 and 15 are review conditions.

Vector Ltd holds water discharge permit **7755-1** to discharge stormwater from non-process areas to the Kapuni Stream. This permit was issued by the Council on 20 June 2012 under Section 87(e) of the RMA. It expires on 1 June 2035.

Condition 1 relates to best practicable option.

Condition 2 limits the stormwater catchment area.

Condition 3 refers to effects of the discharge on the Kapuni Stream.

Condition 4 relates to a contingency plan in case of spillage or accidental discharge.

Condition 5 requires a stormwater management plan.

Conditions 6 and 7 deal with lapse of consent and review of conditions.

1.3.3 Air discharge permit

Section 15(1)(c) of the RMA stipulates that no person may discharge any contaminant from any industrial or trade premises into air, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

Vector Gas Trading Ltd holds air discharge permit **4087-2** to cover the discharge of emissions to air from the treatment of natural gas and other related activities. This permit was issued by the Council on 7 February 1996 under Section 87(e) of the RMA. Consent conditions were varied on 27 January 1997. It is due to expire on 1 June 2029.

Condition 1 relates to best practicable option.

Conditions 2, 8, 9, 11, 12, 13, 14 and 15 relate to minimisation of emissions.

Conditions 3 to 7 relate to notification and reporting.

Conditions 10 and 16 are review conditions.

Condition 17 relates to provision of a contingency plan.

1.3.4 Discharges of wastes to land

Sections 15(1)(b) and (d) of the RMA stipulate that no person may discharge any contaminant onto land if it may then enter water, or from any industrial or trade premises onto land under any circumstances, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

Vector Ltd holds discharge permit **1225-3** to discharge from an aerated sewage treatment plant onto and into land. This permit was issued by the Council on 20 June 2012 under Section 87(e) of the RMA. It is due to expire on 1 June 2035.

Condition 1 relates to best practicable option.

Condition 2 prohibits direct discharge to surface water.

Condition 3 addresses maximum daily discharge volume and minimum disposal area.

Condition 4 is a review condition.

Vector Gas Trading Ltd holds discharge permit **5091-1** to cover the discharge of minor amounts of earth material and associated stormwater onto land and into various streams associated with constructions for steam and electricity supply to the Kapuni lactose plant. This permit was issued by the Council on 27 January 1997 under Section 87(e) of the RMA. It is due to expire in June 2032.

Condition 1 relates to the discharge and its effects.

Condition 2 relates to notification.

Condition 3 is a review condition.

Vector Gas Trading Ltd holds discharge permit **7043-1** to cover the discharge of sludge from stormwater and filter backwash ponds onto land. This consent was issued by the Council under Section 87(a) of the RMA on 29 January 2007. It is due to expire on 1 June 2023.

Consent 7043-1 was varied on 12 August 2009 to allow the inclusion of sludge from the northern settling pond, and again on 25 January 2010 to allow the inclusion of some liquid from the ponds.

Condition 1 relates to best practicable option.

Conditions 2 and 5 require exercise of consent in accordance with documentation supplied.

Condition 3 relates to sludge source, and condition 6 controls discharge location.

Condition 4 allows discharge of liquids at times when the Kapuni Stream flow is low.

Condition 7 relates to records.

Condition 8 addresses soil relocation.

Condition 9 addresses effects on surface water.

Conditions 10 and 11 relate to guidelines for industrial sites and notification of the District Council.

Condition 12 is a review condition.

1.3.5 Land use permits

Section 13(1)(a) of the RMA stipulates that no person may use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on under, or over the bed of any lake or river, unless the activity is expressly allowed for by a resource consent, or a rule in a Regional Plan and in any relevant proposed regional plan.

Vector Gas Trading Ltd holds land use consent **5090-1** related to pipeline and various structures over the beds of various streams in connection with pipelines to the Kapuni lactose plant. This consent was issued by the Council under Section 87(a) of the RMA on 16 August 1996. It is due to expire on 1 June 2032.

Conditions 1 and 2 relate to notification and provision of information to the Council.

Conditions 3 and 4 relate to maintenance.

Condition 5 relate to fish passage and condition 6 related to reinstatement.

Conditions 7 and 8 are review conditions.

Vector Gas Trading Ltd holds land use consent **7281-1** related to removal of a weir from the Kapuni Stream. This consent was issued by the Council under Section 87(a) of the RMA on 10 April 2008. It is due to expire on 1 June 2023.

Condition 1 requires exercise of consent in accordance with documentation supplied.

Condition 2 relates to notification and condition 3 relates to best practicable option.

Conditions 4, 5 and 6 relate to riverbed disturbance, control and mitigation of sediment, and removal of demolition material.

Condition 7 stipulates dates between which works may occur and condition 8 prohibits the use of explosives.

Conditions 9 and 10 address lapse and review of consent.

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the RMA sets obligations upon the Council to gather information, monitor and conduct research on the exercise of resource consents within the Taranaki region. The Council is also required to assess the effects arising from the exercising of these consents and report upon them.

The Council may therefore make and record measurements of physical and chemical parameters, take samples for analysis, carry out surveys and inspections, conduct investigations, and seek information from consent holders.

The monitoring programme for the Vector site consisted of four primary components.

1.4.2 Programme liaison and management

There is generally a significant investment of time and resources by the Council in:

- ongoing liaison with resource consent holders over consent conditions and their interpretation and application;
- in discussion over monitoring requirements;
- preparation for any reviews;
- renewals;
- new consents;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.4.3 Site inspections

The Vector site was visited twice during the monitoring period. With regard to consents for the abstraction of or discharge to water, the main points of interest were plant processes with potential or actual discharges to receiving watercourses, including contaminated stormwater and process wastewaters. Air inspections focused on plant processes with associated actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. Sources of data being collected by Vector were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council. The neighbourhood was surveyed for environmental effects.

1.4.4 Chemical sampling

The Council undertook sampling of both the discharges from the site and the water quality upstream and downstream of the discharge point and mixing zone.

The effluent discharge was sampled on two occasions during the monitoring period, and the sample analysed for temperature, conductivity, turbidity, pH, un-ionised ammonia, sodium, potassium, vanadium, dissolved phosphorus, chlorine and total hydrocarbons.

The Kapuni Stream above and below the discharge point was sampled concurrently, and the samples analysed for temperature, conductivity, turbidity, pH, un-ionised ammonia, sodium, potassium, vanadium and dissolved phosphorus.

1.4.5 Biomonitoring surveys

Biological surveys were performed on four occasions during the monitoring period in the Kapuni Stream to determine whether or not the discharge of stormwater and wastewater from the site has had a detrimental effect upon the communities of the stream.

Two electric fishing surveys were also undertaken in the Kapuni Stream.

2. Results

2.1 Water

2.1.1 Inspections

Two inspections were undertaken during the monitoring year, on 7 October 2015 and 10 May 2016. On each occasion the inspecting officer was accompanied by one or more staff members of Vector.

The various subjects of inspection, including areas for gas processing and transmission, product load-out and storage, treatment systems for raw, cooling and boiler waters, process effluent, stormwater and sewage, chemical stores, and discharge and receiving water monitoring stations and records, were generally managed satisfactorily.

2.1.2 Results of abstraction monitoring

Water for Vector's KGTP is drawn from the Kapuni Stream about 1.4 km above the plant via the intake structure and raw water supply line for Hawera water treatment plant. South Taranaki District Council (STDC) holds land use permit 7413-1 for the structure and water permit 0146-2 to take. Under its own water permit 1125-4, Vector must install and maintain a meter and datalogger at the point where the water enters the supply line for the KGTP. The monitoring equipment must be certified by an appropriately qualified person at least every five years.

The water permit conditions are consistent with the Resource Management (Measurement and Reporting of Water Takes) Regulations 2011, which required Vector by 10 November 2012 to keep daily records of volume taken, and thereafter supply by 31 July each year the record for the preceding 1 July to 30 June period. By stipulating a monitoring point other than the take location, the grant of consent 1125-4 constitutes an approval by Council under the Regulations.

Volumes supplied to Vector have been measured and recorded on STDC's supervisory control and data acquisition (SCADA) system since 6 January 2010. Telemetry directly to Council was connected in January 2014.

The daily abstraction record for 2015-2016 is presented in Figure 1.

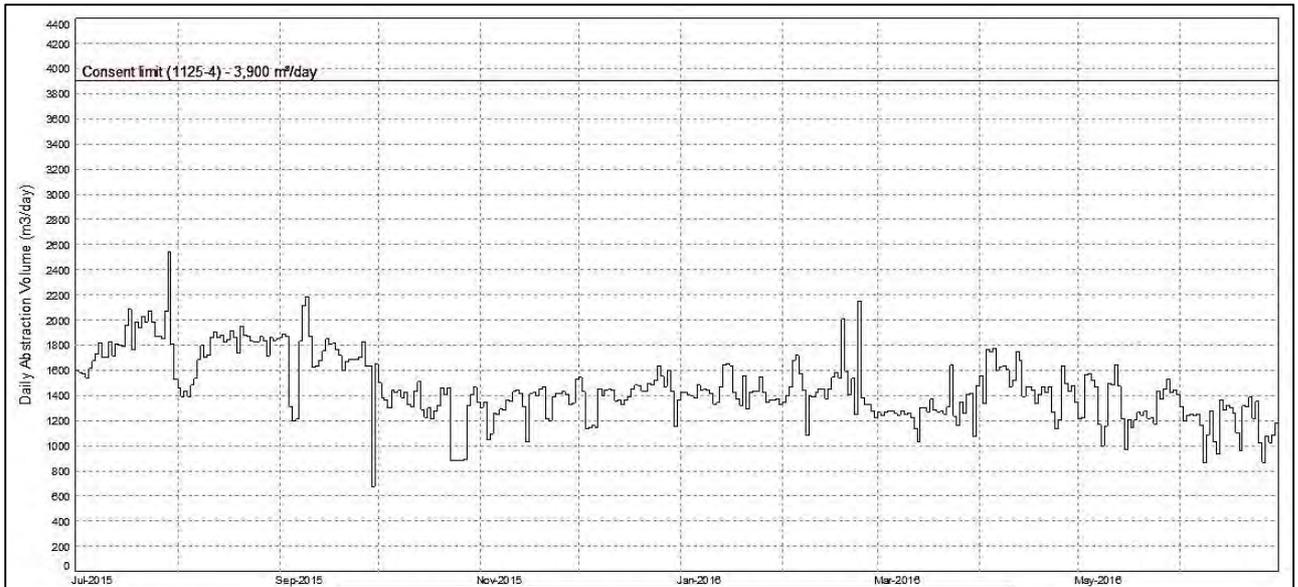


Figure 1 Daily water abstraction by Vector KGTP 1 July 2015 to 30 June 2016, m³/d

The record shows that the limit of 3,900 m³/day on maximum abstraction volume was complied with throughout the 2015-2016 monitoring period.

In 2015-2016, the maximum recorded daily volume was 2,548 m³, or 65% of the limit, on 29 July 2015. The recorded annual volume abstracted was 498,460 m³, a reduction from 2014-2015 (602,076 m³) of 17%.

Consent 1125-4 provides for the taking of water from two alternative locations near KGTP for up to five days, or such longer period as approved by the Chief Executive of Council, for emergency or other purposes. This option was not exercised during the 2015-2016 monitoring period.

2.1.3 Provision of consent holder data

Monitoring of the discharge basins and the Kapuni Stream is undertaken by Vector prior to each discharge and one hour following commencement of the discharges authorised by discharge consent 1123-3. Consent 1123-3 requires the preparation of an effluent disposal management plan including reporting on the exercise of the consents. Vector provided discharge data in relation to these consents for the monitoring period. Twice during the monitoring year the Council carried out inter-laboratory comparisons with the Vector site laboratory. The results are discussed in Section 2.1.4.



Photo 2 Vector Kapuni gas treatment plant site showing sampling locations

The following comments are made based on the data which have been provided to the Council.

Temperature

Temperature is recorded continuously by Vector both upstream and downstream of the discharge point. In 2015-2016, the maximum temperature differential recorded was 1.1°C, on 22 February 2016. This was within consent limits.

pH

Consent **1123-3** requires the pH to be within the range 6.5-9.0. Results provided by Vector show that compliance was achieved throughout the monitoring period. In 2015-2016, the maximum recorded pH at the downstream sampling site was 8.02 on 3 July 2015. The corresponding upstream pH was 7.70. The minimum pH recorded downstream was 6.50 on 6 August 2015. The corresponding upstream pH value was 6.59.

Ammonia

Special condition 6 of consent **1123-3** limits the concentration of ammonia to 0.025 g/m³ as un-ionised ammonia and to not more than 0.006 g/m³ unless the discharge is in accordance with the agreement with Ballance to limit the maximum concentration of un-ionised ammonia in the Kapuni Stream.

Results provided by Vector show that compliance was achieved throughout the monitoring period. In 2015-2016, the maximum recorded downstream un-ionised

ammonia concentration was 0.005 g/m³ (total ammonia 0.205 g/m³, 7.9 pH, 16.0 °C) on 4 May 2016.

Sodium

Special condition 7 of Vector's discharge permit **1123-3** limits the sodium concentration of the Kapuni Stream to 40 g/m³. The sodium concentration is further Ltd to 22 g/m³ in accordance with the agreement with Ballance.

Results provided by Vector show that compliance was achieved throughout the monitoring period. In 2015-2016, the maximum recorded downstream sodium concentration was 21 g/m³ on 2 January 2016; the corresponding upstream value was 10 g/m³.

Vanadium

Special condition 8, of Vector's discharge permit **1123-3** limits the vanadium concentration to 0.08 g/m³ when measured at a point 50 metres downstream of the discharge.

In 2015-2016, the maximum calculated downstream vanadium concentration post discharge was 0.07 on 22 January 2016 and 8 April 2016 and the corresponding upstream concentration was 0.01 g/m³. This showed that compliance with vanadium limits was achieved throughout the monitoring period.

Water treatment chemicals

Special condition 12 of consent **1123-3** requires the consent holder to notify the Council of any change in water treatment chemical or increase in maximum concentration of any water treatment chemical at least one month prior to change of a water treatment programme.

During the 2015-2016 monitoring period, Vector notified the Council of one proposed change in water treatment chemical.

On 23 July 2015, Vector notified Council of the intention to use a "new" chemical on site starting in the next three to four months as part of a plant trial to lower steam use.

The new chemical, Piperazine, was actually already being used on site but in a different form in another product.

As a result, new signs were erected in the chemical storage shed for the piperazine, however there was no new hazard introduced.

2.1.4 Results of receiving environment monitoring

The Council carried out compliance monitoring checks of Vector's method of wastewater discharge, and monitoring of the discharge and the Kapuni Stream on 12 May and 1 August 2016. Split samples were collected from Vector's discharge point, and from the Kapuni Stream both upstream and downstream of the discharge point. The Council and Vector carried out inter-laboratory analyses on the discharge, upstream and downstream samples. Results are shown in Table 2.

Table 2 Results of inter-laboratory comparisons, 2015-2016

12-May-16	units	U/s of discharge KPN000290		D/s of discharge KPN000293		KGTP discharge IND002008 (A-705)	
		TRC	Vector	TRC	Vector	TRC	Vector
Time	NZST	1450		1435		1445	
Temperature	°C	14.7	18.5	15.1	18.2	20.8	21.2
Conductivity, 20°C	mS/m	6.4	-	8.1	-	39.1	-
pH	pH	7.6	7.3	7.6	7.4	7.6	7.3
Ammonia, total	g/m ³ N	0.017	0.085	0.051	0.119	0.334	0.853
Ammonia, unionised	g/m ³ NH ₃	0.00022	<0.001	0.00067	<0.001	0.00665	0.00690
Sodium	g/m ³	6.2	7.0	9.8	11.0	69.2	62.0
Potassium	g/m ³	2.8	-	2.9	-	7.5	8.0
Vanadium, dissolved	g/m ³	0.002	0.010	0.004	0.040	0.034	0.290
Zinc, dissolved	g/m ³	-	-	-	-	0.129	-
Phosphorus, Diss.	g/m ³	0.024	-	0.155	-	2.77	-
Hydrocarbons, total	g/m ³	-	-	-	-	<0.5	-
Turbidity	NTU	40	-	40	-	9.6	-
Chlorine, free	g/m ³	-	-	-	-	<0.1	-
1-Aug-16	units	U/s of discharge KPN000290		D/s of discharge KPN000293		KGTP discharge IND002008 (A-705)	
		TRC	Vector	TRC	Vector	TRC	Vector
Time	NZST	1400		1350		1350	
Temperature	°C	10.7	10.1	10.5	10.2	12.7	12.3
Conductivity, 20°C	mS/m	9.6	-	9.7	-	17.4	-
pH	pH	7.5	7.0	7.5	7.1	7.1	7.1
Ammonia, total	g/m ³ N	0.022	0.0085	0.024	0.0171	0.033	0.5456
Ammonia, unionised	g/m ³ NH ₃	0.00017	<0.001	0.00018	<0.001	0.00012	0.0012
Sodium	g/m ³	8.5	9.2	8.8	9.6	30.5	30.0
Potassium	g/m ³	3.4	3.6	3.4	3.7	3.2	3.0
Vanadium, dissolved	g/m ³	0.001	0.010	0.003	0.010	0.203	0.120
Zinc, dissolved	g/m ³	-	-	-	-	0.138	-
Phosphorus, diss.	g/m ³	0.019	-	0.024	-	0.493	-
Hydrocarbons, total	g/m ³	-	-	-	-	-	-
Turbidity	NTU	6.9	-	6.8	-	5.3	-
Chlorine, free	g/m ³	-	-	-	-	<0.1	-

* Inferred vanadium, based on potassium concentration, upstream value of 0.01 g/m³ assumed.

All results were within consent limits; however agreement between the laboratories was often poor.

There was poor agreement with vanadium results. Vector infers vanadium concentration based on the ratio between vanadium and potassium in the Benfield solution (the source of vanadium in KGTP effluent, used in CO₂ stripping), as testing for potassium is much quicker, allowing faster decisions on effluent release. This may lead to some inaccuracies, as potassium in the effluent may come from other sources, whereby the receiving water vanadium concentration is overestimated. (Council employs the more accurate, relatively slow, vanadium-specific gallic acid method).

Variations were also apparent in the temperature differential between both sets of results, this is indicative of a field and a laboratory analysed temperature set. This is why in the case of IND002008 in the November 2015 sample that a differential of four degrees centigrade was reported. Moving forward Vector will address this by collecting field measurements of temperature.

There were also some differences on ammonia for the receiving water. However, the concentrations were so low that this was not relevant to determination of compliance with the consent limit.

pH variation was also apparent for the receiving water, with Vector results being lower by up to 0.5 units (upstream) and up to 0.4 units (downstream). The pH value is important in the determination of compliance with the consent limit on un-ionised ammonia concentration.

Low pH value leads to a false low value for the un-ionised ammonia concentration calculated for the receiving water, potentially giving an incorrect result of compliance with the limit.

The Council will be addressing the variations in inter-laboratory comparisons with Vector in the upcoming monitoring period.

2.1.4.1 Biomonitoring

Four biomonitoring surveys were carried out during 2015-2016 monitoring period. The surveys were undertaken for Vector and Ballance AgriNutrients Kapuni Ltd by a consultant (Stark Environmental Ltd) and reviewed by Council Scientific Officers. The surveys were undertaken on 23 July and 14-15 October 2015, and 25 January and 19 April 2016. A copy of the reviews is attached as Appendix II.

Overall, the MCI scores for all sites were similar to or greater than respective means. Site 2 (located in the tributary), which often recorded below average MCI scores in previous surveys, recorded above average scores in the surveys reviewed herein. The general conclusion was that the Kapuni Stream was in good health and the impact (if any) of the industrial activity at Kapuni was not discernible.

Vector's consultants also carried out two electric fishing surveys during the 2015-2016 monitoring period. Their reports were also reviewed by Council Scientific Officers. The reports concluded that there is no indication that the petrochemical

industries are having any significant adverse effect on fish communities in the Kapuni Catchment. A copy of the reviews is included in Appendix II.

Fish passage

Until the 2007-2008 review period, Vector maintained a concrete v-notch weir across the Kapuni Stream at the gas treatment plant site for control of water level at a (disused) water intake structure, and for measurement of stream flow rate in order to calculate allowable effluent discharge rate from both the gas treatment plant and the ammonia urea plant. The weir was installed in 1985.

Fish surveys in the Kapuni Stream have indicated that the weir and four other nearby structures are potential barriers to the migration of native fish within the stream. The other structures are a rail bridge (New Zealand Railways Corporation), a ford (STOS) and the effluent diffusers for the gas treatment plant (Vector) and ammonia urea plant (Ballance AgriNutrients Ltd).

In 2001, the four companies engaged a consultant to prepare a report with the object of improving fish passage. The report was completed in October 2001. The initial report recommended building a fish passage to allow fish to pass the weir. NGC investigated this option but found that the cost would be very high and would not guarantee passage of the fish due to the changing nature of the stream.

A long period of further investigations ensued, during which time the gas treatment plant effluent diffuser was removed, the ammonia urea plant effluent diffuser was taken by a flood, and rocks were laid at the STOS ford to aid fish passage. It was decided in April 2006 to remove the v-notch weir and to install a hydrometric station of new design that would sit above the water at the downstream monitoring point. (The Flo-Dar flow measuring system combines radar-based velocity measurement with ultrasonic-based pulse echo depth measurement). The new system would be operated in parallel with the Council's hydrometric station at Normanby Road for a period of about 12 months, after which the weir would be removed.

The Flo-Dar was installed in December 2006, after the stream bed had been profiled. The instrument was mounted on a swinging arm to avoid damage during floods. After initial problems with calibration, the instrument became operational in April 2007, but "validation" was not completed until March 2008. The streambed had to be re-profiled following a large flood, and a profiling procedure was drawn up. The weir was removed in April 2008 under consent 7281. A hydraulic rock breaker was used to fracture the weir into large sections which were removed from the stream bed by a 20-tonne excavator. This method minimised the discharge of fine material. Erosion protection works, in the form of boulder placement, was carried out along the adjacent right bank above the effluent catch ponds.

This action represented the removal of the second-to-last barrier to fish passage identified in the 2001 report. Consent **7422-1** was issued to New Zealand Railways Corporation on 4 May 2009 to maintain the weir at its rail bridge and to install a fish pass, which was required to be in place by 23 October 2012. The consent was transferred to Kiwi Rail Holdings and changed in relation to design of the fish pass in February 2014.

The removal of the v-notch weir at the Vector site didn't appear to lead to any additional negative impact on sedimentation downstream. The removal of the weir will have improved fish passage in this reach of the Kapuni Stream, and this may result in improved fish communities. Kiwi Rail installed a new fish pass at the railway bridge in March 2014, which also may lead to improved fish communities.

2.2 Air

2.2.1 Inspections

No issues with dust or odour were noted during the inspections on 7 October 2015 and 10 May 2016.

2.2.2 Provision of consent holder data

Triennial air discharge report

Special condition 4 of air discharge permit **4087** states:

THAT the consent holder shall provide to the General Manager, Taranaki Regional Council, by 1 June 1999 and every three years thereafter a written report:

- (a) reviewing any technological advances in the reduction or mitigation of discharges to air from the site, and the costs and benefits of these advances; and*
- (b) detailing an inventory of the discharges to air from the site of such contaminants as the General Manager may from time to time specify following consultation with the consent holder; and*
- (c) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the site's activities and processes; and*
- (d) addressing any other issue relevant to the minimisation or mitigation of discharges of contaminants to air from the site that the General Manager, Taranaki Regional Council, considers should be included.*

Such reports have previously been provided in 1999, 2002, 2005, 2009 and 2011. The latest report was received on 30 September 2014 and accepted by Council. The highlights of the 2014 report are summarised below.

To fulfil the requirements of special condition 4, NGC provided:

1. a summary of annual emissions of carbon dioxide from the gas treatment plant for the period 2004-2013;
2. a summary of plant process and operational enhancements as measured by efficiency of steam use;
3. the results of annual on-site air monitoring for metal deposition;
4. significant flaring from the site within the past six years.

Council did not require an inventory of discharges to air from the site, as there had been no significant change in processing since the last detailed inventory was taken for the 2009 report.

The next report is due in 2017.

Carbon dioxide emissions

Annual CO₂ emissions in calendar years since 2009 are shown in Figure 2. The amounts released to atmosphere from the Benfield process and from fuel combustion are distinguished. The reduction in 2013 is a reflection of reduced quantities of gas processed by the plant compared to previous years.

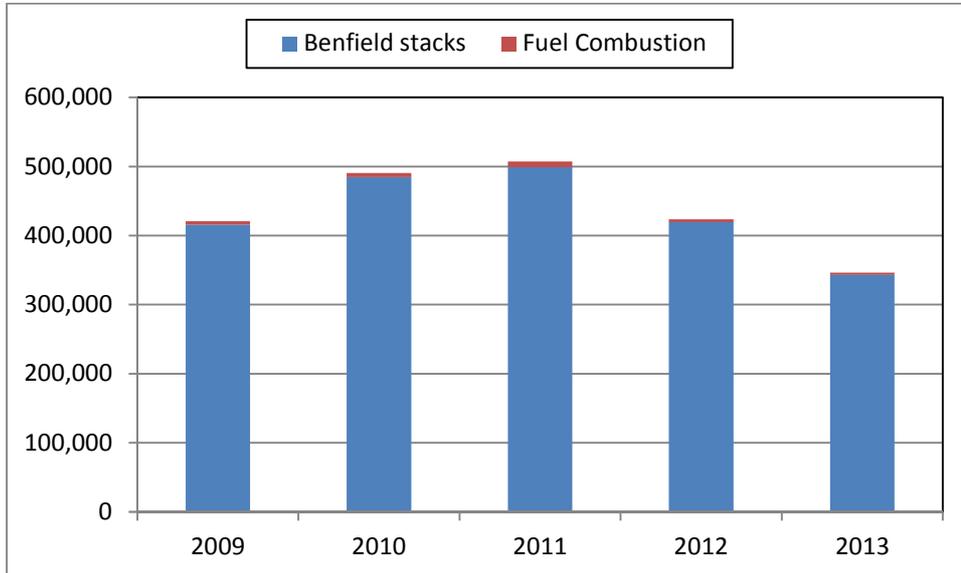


Figure 2 Annual CO₂ emissions, tonnes

Processing and operational enhancements

The efficiency of steam use in the Benfield CO₂ removal plant is a key performance indicator (KPI) for the operation of the gas treatment plant in relation to fuel use. Annual steam use per CO₂ loading since 2000-2001 is depicted in Figure 3. Vector reports that the continual improvement in steam use efficiency from 2009 onwards is not due to any particular process improvement, but rather a continued focus on consistently running the plant at higher efficiency targets from year to year, and that further improvements are likely to be small as maximum efficiency is approached.

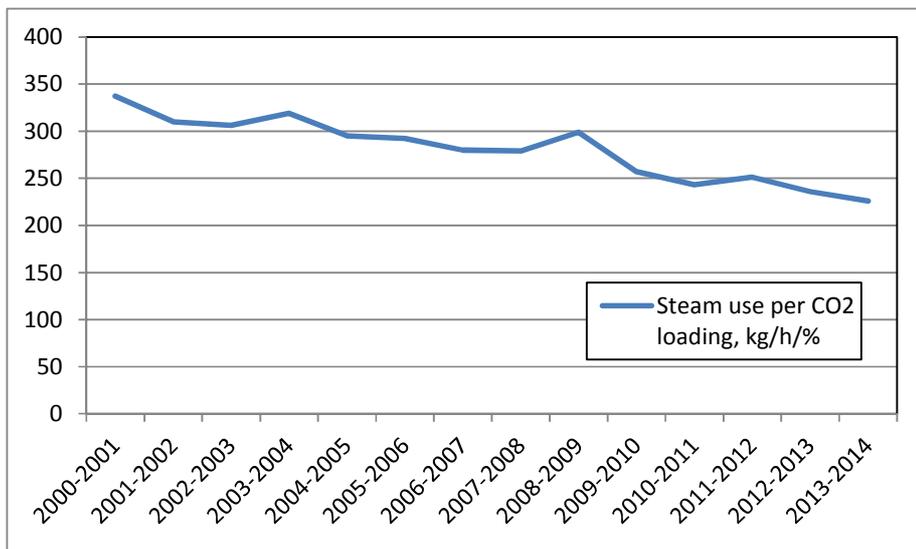


Figure 3 Annual steam use per CO₂ loading

Metals deposition

Monitoring of metal deposition, for potassium, vanadium and zinc, is conducted annually at three sites around KGTP by deployment of air deposition gauges. The locations of the sites are immediately east and south of the processing area, that is, downwind and crosswind relative to the prevailing westerly wind, and beside Palmer Road to the southwest. There are no guidelines or standards for metals deposition. The data gathered since 2008 are given in Appendix III. While there is considerable variation in some of the samples, the data do not show any significant change in metal deposition rates over time.

Flaring

Flaring occurs solely as a safety measure. Vector states that any flaring is a financial loss; hence there is a strong drive to minimise any flaring activity. The largest flaring episodes occur during the emergency shutdown (ESD) tests, which have been carried out annually since 1997, normally in February.

2.3 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with Vector. During the year matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The incident register includes events where the company concerned has itself notified the Council. The register contains details of any investigation and corrective action taken.

Complaints may be alleged to be associated with a particular site. If there is potentially an issue of legal liability, the Council must be able to prove by investigation that the identified company is indeed the source of the incident (or that the allegation cannot be proven).

In the 2015-2016 period, it was not necessary for the Council to undertake significant additional investigations and interventions, or record incidents, in association with Vector's conditions in resource consents or provisions in Regional Plans.

3. Discussion

3.1 Discussion of plant performance

Visual monitoring of the KGTP was undertaken during site inspections. Oil separators, the waste water treatment plant, stormwater ponds, chemical and oil stores were inspected, as was the facility associated with the North Island wide transmission network and associated odorant facility, the Kapuni Stream was also observed.

The site was described as clean, well managed with prominent housekeeping evident through out the facility.

Monthly effluent data was provided in a timely fashion and in a workable format.

Inter-laboratory comparison data did reveal variations between Vector and Council results which will be addressed in the upcoming monitoring period. pH variation had been cited as an issue by the laboratory of Vector, and the Council will work with Vector to mitigate this issue moving forward.

During site inspections no emissions of smoke, dust or odour that were offensive or objectionable were detected from operations at the KGTP. Vector has also been proactive in informing the Council when they intend to undertake site operations which have the potential to generate abnormal odour or noise.

No incident was recorded by Council in relation to activities at the KGTP during the 2015-2016 monitoring period.

3.2 Environmental effects of exercise of consents

Monitoring by the Council and a review of the results supplied by Vector indicated general compliance was achieved with the relevant conditions of discharge consents.

In terms of the analysis provided by Vector, no exceedance in the consent conditions was found; however, there existed a variation between the inter-laboratory comparison samples undertaken. The variation was apparent in the November 2015 inter-laboratory and less so in the more recently collected August 2016 sample.

Moving forward this variation will be discussed and addressed in the upcoming monitoring period.

The biological monitoring of the Kapuni Stream indicated that overall, the MCI scores for all sites were similar to or greater than respective means. Site 2 (located in the tributary), which often recorded below average MCI scores in previous surveys, recorded above average scores in the surveys reviewed herein.

The general conclusion was that the Kapuni Stream was in good health and the impact (if any) of the industrial activity at Kapuni was not discernible.

During site inspections, no adverse environmental effects were detected from air discharges at the site. No potential or adverse environmental effects on air quality were observed in the 2015-2016 review period.

3.3 Evaluation of performance

A tabular summary of Vectors's compliance record for the year under review is set out in Table 3 to Table 12.

Table 3 Summary of performance for Consent 1125-4

Purpose: To take water from the Kapuni Stream in association with the operation of a gas processing facility		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limits to volume of water abstracted	Volume measurement by Vector and review of records by Council	Yes
2. Defines three take locations	Inspection by Council	Yes
3. Limit take duration at alternative locations	Inspection and review of Vector records	N/A
4. Adopt best practicable option to prevent or minimise adverse effects	Inspection and review of Vector records	Yes
5. Installation and maintenance of water meter and data logger	Inspection by Council. Telemetry to Council via STDC system established January 2014	Yes
6. Certification of water measuring equipment	Provision of certificate. Certification testing carried out 30 October 2014	Yes
7. Notification of equipment failure	No problems reported during monitoring period	N/A
8. Metering equipment accessible to Council	Inspection	Yes
9. Details of take recording	Records in format required	Yes
10. Notification of details of emergency takes	Not required during period under review	N/A
11. Fish screen	Check screen, and intake design	Yes
12. Financial contributions for riparian planting and fencing in Kapuni catchment	Payments received, no further obligation	N/A
13. Option for Council to review consent conditions	Option next available June 2017, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administration performance in respect of this consent		High

N/A = not applicable

Table 4 Summary of performance for Consent 1123-3

Purpose: To discharge process effluent and stormwater to the Kapuni Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option to prevent or minimise adverse effects	Inspection and liaison with consent holder	Yes
2. Limit on stormwater catchment area	Inspection	Yes
3. Monitor temperature from discharge and keep within limits	Company records and measurement, with review and checking by Council	Yes
4. Monitor pH levels and keep within range	Company records and sampling, with review and checking by Council	Yes
5. Discharge cannot produce visible effects on the surface of Kapuni Stream	Inspection	Yes
6. Concentration of un-ionised ammonia in Kapuni Stream not to exceed limits	Company records and sampling, with review and checking by Council	Yes
7. Concentration of sodium in Kapuni Stream not to exceed limits	Company records and sampling, with review and checking by Council	Yes
8. Concentration of vanadium in Kapuni Stream not to exceed limit	Company records and sampling, with review and checking by Council	Yes
9. Discharge not to contain free available chlorine	Company records and sampling, with review and checking by Council	Yes
10. Submission of effluent disposal management plan to Council	Provision of plan as required	Yes
11. Effluent disposal management plan to be followed	Company records, inspection and sampling	Yes
12. Provision of programmes of water treatment and notification of any changes	Inspection and provision of information. Chemical changes notified	Yes
13. Review of programmes of chemical cleaning treatment and notification of any changes	Inspection and provision of information	Yes
14. Optional review provision re water treatment or chemical cleaning programmes	N/A	N/A
15. Option for Council to review consent conditions	Option next available June 2017, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administration performance in respect of this consent		High

N/A = not applicable

Table 5 Summary of performance for Consent 1225-3

Purpose: To discharge domestic sewage, tri-ethylene glycol, methanol and some water treatment chemicals (i.e. phosphate corrosion inhibitor) from an aerated sewage treatment plant onto and into land		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option to prevent or minimise adverse effects	Inspection and liaison with consent holder	Yes
2. No direct discharge to surface water	Inspection	Yes
3. Discharge limit	Data provided by consent holder	Yes
4. Option for Council to review consent conditions	Option next available June 2017, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administration performance in respect of this consent		High

N/A = not applicable

Table 6 Summary of performance for Consent 5091-1

Purpose: To discharge minor amounts of earth material and associated stormwater onto land and into various streams between and including the Motumate Stream and an unnamed tributary of the Waiokura Stream associated with the construction of two above ground pipelines, an electrical ring main and associated structures for steam and electricity supply purposes		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Every practicable measure to prevent contamination of watercourses and to minimise streambed disturbance	No works undertaken during monitoring period	N/A
2. Notification of construction or maintenance work	No maintenance undertaken during monitoring period	N/A
3. Option for Council to review conditions of consent	Option next available June 2017, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		N/A
Overall assessment of administration performance in respect of this consent		N/A

N/A = not applicable

Table 7 Summary of performance for Consent 5496-1

Purpose: To discharge up to 8 cubic metres/day of ingress water from a stream pipeline onto land in the vicinity of unnamed tributaries of the Kapuni, Waiokura and Motumate Streams		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Discharge to be in accordance to submission	Inspection	Yes
2. No contaminants to enter surface water body	Inspection	Yes
3. No adverse effects will occur to groundwater	Inspection and sampling	Yes
4. Option for Council to review conditions of consent	Consent expires in June 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administration performance in respect of this consent		High

N/A = not applicable

Table 8 Summary of performance for Consent 7043-1

Purpose: To discharge sludge, and some liquid, from two stormwater retention ponds, a filter backwash pond and a settlement pond onto and into land		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option to minimise adverse effect	Inspection and company records	Yes
2. Exercise to be in accordance to submission	Inspection	Yes
3. Specific sludge sources	Inspection	Yes
4. Liquids may be discharged as alternative when stream in low flow	Action not required during period under review	N/A
5. Disposal area specified	Inspection	Yes
6. Minimum distance to and no discharge to surface water	Inspection	Yes
7. Keeping of records	Inspection and company records	Yes
8. Relocation of soil to approval of Council	Inspection, no soil moved	N/A
9. No adverse effects on any water body	Inspection and biomonitoring	Yes
10. Compliance with soil and groundwater guidelines	Sampling and provision of records	Yes
11. Advice to District Council on land use	Company records	Yes

Purpose: To discharge sludge, and some liquid, from two stormwater retention ponds, a filter backwash pond and a settlement pond onto and into land		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
12. Option for Council to review conditions of consent	Option next available June 2017, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administration performance in respect of this consent		High

N/A = not applicable

Table 9 Summary of performance for Consent 4087-2

Purpose: To discharge emissions into the air from the treatment of natural gas, cogeneration, other on-site activities and other related and ancillary activities		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option to prevent or minimise adverse effects	Inspection and records	Yes
2. Emissions maintained to a minimum	Inspection, company records and sampling	Yes
3. Approval for alterations affecting discharge to be gained from Council	Notifications	Yes
4. Three yearly written report to Council	Report received September 2014, next due 2017	Yes
5. Written report reviewing technological advances	Report received when required	Yes
6. Written report evaluating risk to human health	Report received when required	Yes
7. Annual report on gross emission of carbon dioxide	Change to RMA- no longer required	N/A
8. Control of discharges to air of carbon monoxide	Company records	Yes
9. Control of discharges to air of nitrogen dioxide	Company records	Yes
10. Option for Council to review conditions re excess of carbon monoxide or nitrogen dioxide limits	Not exercised	N/A
11. Concentration of benzene not to exceed limits	Not required in this period as the LTS is not in operation	N/A
12. Control all other discharges as to not exceed limits	Company records and sampling	Yes
13. Discharge of odour	Inspection	Yes
14. Depressurisation to avoid dense black smoke	Inspection and company records	Yes

Purpose: To discharge emissions into the air from the treatment of natural gas, cogeneration, other on-site activities and other related and ancillary activities		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
15. No adverse ecological effect on eco-systems	Inspection and biomonitoring	Yes
16. Notice to review consent conditions	Option next available June 2017, recommendation attached in section 3.6	N/A
17. Site contingency plan	Annual update of plan	Yes
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administration performance in respect of this consent		High

N/A = not applicable

Table 10 Summary of performance for Consent 5090-1

Purpose: To erect, place, use and maintain two above ground pipelines, an electrical ring main and associated structures over beds of various streams between and including the Motumate Stream and an unnamed tributary of the Waiohira Stream for steam and electricity supply purposes		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Structures constructed and maintained according to submission	Inspection	Yes
2. Notification of initial construction and maintenance work	No maintenance undertaken during monitoring period	N/A
3. Option for Council to review conditions of consent	Option next available June 2017, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administration performance in respect of this consent		High

N/A = not applicable

Table 11 Summary of performance for Consent 7281-1

Purpose: To remove a weir structure in the Kapuni Stream and undertake works for river bank protection purposes		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent to be exercised in accordance with documentation submitted	Weir has previously been removed	N/A
2. Notification prior to commencement and upon completion of works	Notification given 10 April 2008	Yes
3. Adoption of best practicable option to minimise adverse environmental effects	Weir has previously been removed	N/A
4. Minimisation of bed disturbance	Weir has previously been removed	N/A

Purpose: To remove a weir structure in the Kapuni Stream and undertake works for river bank protection purposes		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
5. Reasonable steps to minimise sediment effects	Weir has previously been removed	N/A
6. Removal of materials from streambed	Weir has previously been removed	N/A
7. Works prohibited between 10 May and 1 November, without permission	Weir has previously been removed	N/A
8. Use of explosives prohibited	Weir has previously been removed	N/A
9. Lapse of consent if not exercised	Consent was exercised	N/A
10. Option for Council to review conditions of consent	Option next available June 2017, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		N/A
Overall assessment of administration performance in respect of this consent		N/A

N/A = not applicable

Table 12 Summary of performance for Consent 7755-1

Purpose: To discharge stormwater from site areas of a natural gas treatment plant where no industrial processes occur (e.g. landscaped areas and roads) into the Kapuni Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option to prevent or minimise adverse effects	Inspection and liaison with consent holder	Yes
2. Limit on stormwater catchment area	Inspection	Yes
3. Controls on effect of discharge in receiving water	Inspection and biological monitoring by Council	Yes
4. Discharge cannot produce visible effects on the surface of Kapuni Stream	Inspection	Yes
5. Maintenance of contingency plan	Receipt and review of plan	Yes
6. Maintenance of stormwater management plan	Receipt and review of plan	Yes
7. Provision for lapse of consent	NA	N/A
8. Option for Council to review consent conditions	Option next available June 2017, recommendation attached in section 3.6	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administration performance in respect of this consent		High

N/A = not applicable

During the period under review, Vector demonstrated a high level of environmental and high level of administrative performance with the resource consents as defined in Section 1.1.4.

3.4 Recommendations from the 2014-2015 Annual Report

In the 2014-2015 Annual Report, it was recommended:

1. THAT monitoring of air emissions from the Vector Kapuni gas treatment plant in the 2015-2016 year continue at the same level as in 2014-2015.
2. THAT monitoring of abstractions for and discharges from the Vector Kapuni gas treatment plant in the 2015-2016 year continue at the same level as in 2014-2015.

These recommendations were implemented.

3.5 Alterations to monitoring programmes for 2016-2017

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account:

- the extent of information made available by previous authorities;
- its relevance under the RMA;
- its obligations to monitor emissions/ discharges and effects under the RMA; and
- to report to the regional community.

The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki emitting to the atmosphere/discharging to the environment.

It is proposed that for 2016-2017 that the monitoring programme remain unchanged from that of 2015-2016.

3.6 Exercise of optional review of consents

Conditions on resource consents 1123-3, 1125-4, 1225-3, 4087-2, 5090-1, 5091-1, 7043-1, 7281-1 and 7755-1 provide for an optional review of the consent in June 2017. The Council may review the consents for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of the consents.

Based on the results of monitoring in the year under review, and in previous years as set out in earlier annual compliance monitoring reports, it is considered that there are no grounds that require a review to be pursued.

4. Recommendations

1. THAT monitoring of air emissions from the Vector Kapuni gas treatment plant in the 2016-2017 year continue at the same level as in 2015-2016.
2. THAT monitoring of abstractions for and discharges from the Vector Kapuni gas treatment plant in the 2016-2017 year continue at the same level as in 2015-2016.
3. THAT the option for a review of resource consents 1123-3, 1125-4, 1225-3, 4087-2, 5090-1, 5091-1, 7043-1, 7281-1 and 7755-1 in June 2017, as set out in conditions of the consents, not be exercised, on the grounds that the current conditions are considered to be adequate.

Glossary of common terms and abbreviations

The following abbreviations and terms are used within this report:

AUP	Ammonia urea plant
Ballance	Ballance Agri-Nutrients Ltd
Biomonitoring bund	Assessing the health of the environment using aquatic organisms A wall around a tank to contain its contents in the case of a leak
Condy	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m
DRP	Dissolved reactive phosphorus
fresh	Elevated flow in a stream, such as after heavy rainfall
g/m ³	Grammes per cubic metre, and equivalent to milligrammes per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures
KGTP	Kapuni gas treatment plant
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred
Incident register	Incident register – contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident
l/s	Litres per second
MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats
mS/m	Millisiemens per metre
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
NGC	Natural Gas Corporation Ltd
NH ₄	Ammonium, normally expressed in terms of the mass of nitrogen (N)
NH ₃	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N)
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons)
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents

a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5

Physicochemical	Measurement of both physical properties(e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment
PM ₁₀	Relatively fine airborne particles (less than 10 micrometre diameter
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15)
RMA	Resource Management Act 1991 and subsequent amendments
STOS	Shell Todd Oil Services Ltd
Temp	Temperature, measured in °C (degrees Celsius)
Turb	Turbidity, expressed in NTU

For further information on analytical methods, contact the Council's laboratory

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Appendix I

Resource consents held by Vector for Kapuni GTP

(For a copy of the signed resource consent
please contact the TRC consent department)

Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: Vector Limited
 P O Box 593
 HAWERA 4640

Decision Date: 18 June 2012

Commencement
Date: 18 June 2012

Conditions of Consent

Consent Granted: To discharge process effluent and stormwater to the
 Kapuni Stream at or about (NZTM) 1700945E-5629537N

Expiry Date: 1 June 2035

Review Date(s): June 2017, June 2023, June 2029

Site Location: Kapuni Gas Treatment Plant, 298 Palmer Road, Kapuni

Legal Description: Pt Lot 1 DP 5227 Blk XVI Kaupokonui SD
 (Discharge source & site)

Catchment: Kapuni

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General condition

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The discharge of stormwater shall be from a catchment area not exceeding 3.37 ha.
3. The discharge shall not raise the temperature of the Kapuni Stream by greater than 2 degrees Celsius, when measured 50 metres downstream of the discharge point and all practicable steps shall be taken by the consent holder to minimise the temperature rise in the Kapuni Stream. Further, the consent holder shall continuously monitor the temperature of the wastewater, and receiving water upstream and downstream of the discharge point.
4. The discharge shall not cause the pH of the Kapuni Stream to be outside the range 6.5 to 9.0 when measured 50 metres downstream of the discharge point. Further, the consent holder shall continuously monitor the pH of the wastewater, and receiving water upstream and downstream of the discharge point.
5. After allowing for reasonable mixing, within a mixing zone extending 50 metres downstream of the discharge point, the discharge shall not produce any visible oil or hydrocarbon films, scums or foams on the surface of the Kapuni Stream.
6. The discharge shall not cause the concentration of un-ionised ammonia in the Kapuni Stream to exceed 0.006 grams per cubic metre when measured 50 metres downstream of the discharge point, unless agreement is given by the holder of consent 0598-3. In any case, the discharge shall not cause the concentration of un-ionised ammonia in the Kapuni Stream to exceed 0.025 grams per cubic metre.
7. The discharge shall not cause the concentration of sodium in the Kapuni Stream to exceed 15 grams per cubic metre when measured 50 metres downstream of the discharge point, unless agreement is given by the holder of consent 0598-3. In any case, the discharge shall not cause the concentration of sodium in the Kapuni Stream to exceed 40 grams per cubic metre.
8. The discharge shall not cause the total vanadium concentration of the Kapuni Stream to exceed 0.08 grams per cubic metre when measured 50 metres downstream of the discharge point.
9. The discharge shall not contain free available chlorine.

Consent 1123-3

10. Prior to the exercise of this consent, the consent holder shall submit an effluent and stormwater management plan for approval by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The management plan shall detail the procedures and processes that will be followed to ensure that the conditions of this consent are met, including but not limited to:
 - i) controlling the effluent and stormwater discharge rate;
 - ii) measuring and recording the discharge;
 - iii) measuring and recording the Kapuni Stream (chemical and biological);
 - iv) calibration of monitoring equipment;
 - v) co-ordination with the holder of consent 0598-3 on discharge of ammonia and sodium;
 - vi) minimisation of free phosphate in the discharge, and how this can be achieved;
 - vii) minimisation of the temperature increase to the receiving environment;
 - viii) contingency events (including discharging in extended low flow events and the use of alternative receiving environments); and
 - ix) reporting on exercise of consent.
11. The consent shall be exercised in accordance with the approved effluent and stormwater management plan required by condition 10. Within one months notice given by the Taranaki Regional Council, the consent holder shall review the management plan and resubmit the plan for approval by the Chief Executive, Taranaki Regional Council.
12. The consent holder shall forward to the Chief Executive, Taranaki Regional Council, details of any programmes of water treatment used at the Gas Treatment Plant, including raw water, boiler water and cooling water. Further, the consent holder shall notify the Chief Executive, Taranaki Regional Council, of any change in water treatment chemical, or increase in maximum concentration of any water treatment chemical, at least one month prior to change of a water treatment programme.
13. The consent holder shall forward to the Chief Executive, Taranaki Regional Council, details of any programmes of chemical cleaning used at the gas treatment plant. Further, the consent holder shall notify the Chief Executive, Taranaki Regional Council, of any change in chemical cleaning agent, or increase in concentration of any chemical cleaning agent used, where the effluent is to be disposed of to the Kapuni Stream, at least one month prior to change of a chemical cleaning programme.
14. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice within three months of notification of proposed changes in water treatment or chemical cleaning programmes under special conditions 12 and 13, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Consent 1123-3

15. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017, and/or June 2023 and/or June 2029 for the purpose of:
- a. ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or
 - b. requiring any data collected in accordance with the conditions of this consent to be transmitted directly to the Council's computer system, in a format suitable for providing a 'real time' record over the internet.

Signed at Stratford on 18 June 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Water Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: Vector Limited
 P O Box 593
 HAWERA 4640

Decision Date: 19 June 2012

Commencement
Date: 19 June 2012

Conditions of Consent

Consent Granted: To take water from the Kapuni Stream in association with
 the operation of a gas processing facility at or about
 (NZTM) 1701464E-5630826N

Expiry Date: 1 June 2035

Review Date(s): June 2017, June 2020, June 2023, June 2029

Site Location: Kapuni Gas Treatment Plant, 298 Palmer Road, Kapuni

Legal Description: Adjacent to Lots 1 & 2 DP 10570 Blk XVI Kaupokonui SD
 (Site of take)
 Pt Lot 1 DP 5227 Blk XVI Kaupokonui SD (Site of use)

Catchment: Kapuni

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General condition

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The volume of water taken from the Kapuni Stream shall not exceed 3,900 m³ at a rate no greater than:
 - (a) 52 litres/second under normal operating conditions; or
 - (b) 58 litres/second in the event of an emergency shutdown situation, or equipment breakdown/failure; or
 - (c) 58 litres/second in the event that the taking of water under 1(a) or 1(b) cannot occur.
2. Water shall be taken from the South Taranaki District Council intake structure, except at times when water is taken in accordance with special condition 1(c), when water shall be taken from the Kapuni Stream at or about the following locations:
 - (a) (NZTM) 1701160E-5629699N; or
 - (b) (NZTM) 1700943E-5629620N; or
 - (c) (NZTM) 1700952E-5629494N.
3. The taking of water from an alternative location, as specified in special condition 1(c) of this consent, shall only be exercised for up to five days (120 hours) per calendar year, or such longer period as approved by the Chief Executive, Taranaki Regional Council for emergency or other purposes.
4. At all times the consent holder shall adopt the best practicable option as defined in the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the taking of water from the Kapuni Stream, including, but not limited to, the efficient and conservative use of water.
5. Before exercising this consent, the consent holder shall install, and thereafter maintain, a water meter and a datalogger at the point where the water enters the supply line for the Kapuni Gas Treatment Plant (i.e. (NZTM) 1701293E-5629885N). The water meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of $\pm 5\%$. Records of the date, the time and the rate and volume of water taken at intervals not exceeding 15 minutes, shall be made available to the Chief Executive, Taranaki Regional Council at all reasonable times.

Note: Water meters and dataloggers must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters and dataloggers have a limited lifespan.

Consent 1125-4

6. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring and recording equipment required by the conditions of this consent ('the equipment'):
 - (a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or
 - (b) has been tested and shown to be operating to an accuracy of $\pm 5\%$.The documentation shall be provided:
 - (i) within 30 days of the installation of a water meter or datalogger;
 - (ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and
 - (iii) no less frequently than once every five years.
7. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.
8. The water meter and datalogger shall be accessible to Taranaki Regional Council officers at all reasonable times for inspection and/or data retrieval.
9. The records of water taken shall:
 - (a) be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing;
 - (b) specifically record the water taken as 'zero' when no water is taken; and
 - (c) for each 12-month period ending on 30 June, be provided to the Chief Executive, Taranaki Regional Council within one month after end of that period.
10. At times when water is taken from an alternative location, as specified in special condition 1(c) of this consent, the consent holder shall advise the Chief Executive, Taranaki Regional Council, within 12 hours of taking water, and within 2 days of ceasing, shall provide details of the length and time the take occurred and the volume and rate of take (cubic metres per day and litres per second).
11. The consent holder shall ensure that the intake is screened to avoid fish entering the intake or being trapped against the screen.
12. The consent holder shall make three annual payments of \$16,667 (plus GST) to the Taranaki Regional Council as a financial contribution for the purpose of providing riparian planting and fencing in the Kapuni Stream catchment. These payments shall be made no later than 1 September each year from 2012 to 2014.

Consent 1125-4

13. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2020 and/or June 2023 and/or June 2029 for the purposes of:
- (a) ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or
 - (b) to require any data collected in accordance with the conditions of this consent to be transmitted directly to the Council's computer system, in a format suitable for providing a 'real time' record over the internet.

Signed at Stratford on 19 June 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: Vector Limited
 P O Box 593
 HAWERA 4640

Decision Date: 20 June 2012

Commencement
Date: 20 June 2012

Conditions of Consent

Consent Granted: To discharge domestic sewage, tri-ethylene glycol,
 methanol and some water treatment chemicals (i.e.
 phosphate corrosion inhibitors) from an aerated sewage
 treatment plant onto and into land at or about (NZTM)
 1700726E-5629194N

Expiry Date: 1 June 2035

Review Date(s): June 2017, June 2023, June 2029

Site Location: Kapuni Gas Treatment Plant, 298 Palmer Road, Kapuni

Legal Description: Lot 1 DP 18183 Blk XVI Kaupokonui SD
 (Discharge source & site)

Catchment: Kapuni

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General condition

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. There shall be no direct discharge of any contaminant into a surface water body.
3. The discharge shall not exceed 13.5 m³ per day (0.97 litres per second), which shall be spread as evenly as practicable to a disposal area of not less than 1,325 m².
4. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 and/or June 2029, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 20 June 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: Vector Gas Trading Limited
 101 Carlton Gore Road
 Newmarket
 Auckland 1023

Decision Date 27 January 1997
(Change):

Commencement Date 27 January 1997 (Granted Date: 7 February 1996)
(Change):

Conditions of Consent

Consent Granted: To discharge emissions into the air from the treatment of
 natural gas, cogeneration, other on-site activities and other
 related and ancillary activities

Expiry Date: 1 June 2029

Review Date(s): June 2017, June 2023

Site Location: Kapuni Gas Treatment Plant, Palmer Road, Kapuni

Legal Description: Pt Lot 1 DP 5527 Lot 1 DP 9987 Lot 1 DP 15254 Blk XVI
 Kaupokonui SD

Grid Reference (NZTM) 1700840E-5629660N

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- (a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- (b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- (c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - (i) the administration, monitoring and supervision of this consent;
 - (ii) charges for the carrying out of the Council's functions under section 35 in relation to this consent; and
 - (iii) charges authorised by regulations.

Special conditions

- 1) That the consent holder shall at all times adopt the best practicable option to prevent or minimise any actual or likely adverse effects on the environment arising from discharges to air from the site. 'Best practicable option' shall be determined by the Chief Executive, Taranaki Regional Council, taking into account the information supplied by the consent holder under conditions 4, 5 and 6 of this consent, and following review as set out under condition 16 of this consent.
- 2) That the consent holder shall at all times operate, maintain, supervise, monitor and control all processes so that emissions authorised by this consent are maintained at a practicable minimum.
- 3) That prior to undertaking any alterations to the plant, processes or operations which may significantly change the nature or quantity of contaminants discharged to air from the site, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991.
- 4) That the consent holder shall provide to the Chief Executive, Taranaki Regional Council, by 1 June 1999 and every three years thereafter a written report:
 - (a) reviewing any technological advances in the reduction or mitigation of discharges to air from the site, and the costs and benefits of these advances; and
 - (b) detailing an inventory of the discharges to air from the site of such contaminants as the Chief Executive may from time to time specify following consultation with the consent holder; and
 - (c) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the site's activities and processes; and
 - (d) addressing any other issue relevant to the minimisation or mitigation of discharges of contaminants to air from the site that the Chief Executive, Taranaki Regional Council, considers should be included.

Consent 4087-2

- 5) That in addition to the requirements of condition 4, the consent holder shall provide to the Chief Executive, Taranaki Regional Council, by 1 June 1996 a written report reviewing any technological advances in the reduction or mitigation of discharges of benzene, toluene, ethyl benzene, and xylene, from the glycol towers, and discussing how these might be applicable and/or implemented at the Gas Treatment Plant, and the costs and benefits of these advances.
- 6) That by 1 June 1996 the consent holder shall provide to the Chief Executive, Taranaki Regional Council, a written report evaluating the risk to human health presented by the discharge to air of benzene, toluene, ethyl benzene, and xylene from the site. The report shall be to such detail as is required by the Chief Executive, Taranaki Regional Council.
- 7) That the consent holder shall provide to the Chief Executive, Taranaki Regional Council, on an annual basis the gross emissions of carbon dioxide from the site.
- 8) That the consent holder shall control all discharges to air from the site of carbon monoxide, in order that the maximum concentration of carbon monoxide measured under ambient conditions at or beyond the site boundary arising from discharges to air from the site does not exceed 30 mg/m³ (one-hour average exposure) or 10 mg/m³ (eight-hour average exposure).
- 9) That the consent holder shall control all discharges to air from the site of nitrogen dioxide, in order that the maximum ambient concentration of nitrogen dioxide measured under ambient conditions at or beyond the site boundary arising from discharge to air from the site does not exceed 300 µg/m³ (one-hour average exposure) or 100 µg/m³ (twenty-hour average exposure).
- 10) That should an off-site concentration of carbon monoxide or of nitrogen dioxide in the vicinity of the site be found to exceed a limit established in condition 8 or 9 above, then the Taranaki Regional Council may review any or all of the conditions of this consent pursuant to section 128(1)(a) of the Resource Management Act.
- 11) That the consent holder shall control all discharges of benzene to air from the site, in order that the maximum concentration measured under ambient conditions at or beyond the site boundary arising from discharges to air from the site, shall not exceed 16 µg/m³ (annual average of twenty-four-hour average exposure), nor 3.2 mg/m³ at any time, nor 0.32 mg/m³ (any eight-hour average exposure).
- 12) That the consent holder shall control all discharges to air from the site other than of carbon dioxide, carbon monoxide, nitrogen oxides and benzene, so that the maximum concentration measured under ambient conditions at or beyond the boundary of the site, arising from the exercise of this consent, does not exceed:
 - (a) more than 1/30th of the relevant Occupation Threshold Value (Time Weighted Average); or
 - (b) the Short Term Exposure Limit at any time (Workplace Exposure Standards and Biological Exposure Indices for New Zealand, 1992, Department of Labour).
- 13) That the discharges authorised by this consent shall not give rise to an odour at or beyond the boundary of the site that in the opinion of at least one officer of the Taranaki Regional Council is offensive or obnoxious or objectionable.

Consent 4087-2

- 14) That whenever practicable depressurisation of the plant or sections of the plant shall be so controlled as to avoid dense black smoke from being discharged from any flare.
- 15) That the discharges authorised by this consent shall not give rise to any significant adverse ecological effect on any ecosystems, including but not limited to habitats, plants, animals, microflora and microfauna.
- 16) That pursuant to the provisions of section 128(1)(a) of the Resource Management Act the Council may within six months of receiving a report prepared by the consent holder subject to conditions 4, 5, or 6 of this consent or otherwise by giving notice of review during June 1999 and/or June 2005 and/or June 2011 and/or June 2017 and/or June 2023 serve notice that it intends to review any condition of this resource consent for the purposes of:
 - (a) dealing with any significant adverse effect on the environment arising from the exercise of this consent; or
 - (b) requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge.
- 17) That the consent holder shall prepare a site contingency plan to the satisfaction of the Chief Executive, Taranaki Regional Council, no later than six months after the granting of this consent. The contingency plan shall be reviewed and if necessary updated to the satisfaction of the Chief Executive, Taranaki Regional Council, annually.

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Land Use Consent
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: Vector Gas Trading Limited
 101 Carlton Gore Road
 Newmarket
 Auckland 1023

Decision Date: 27 January 1997

Commencement Date: 27 January 1997

Conditions of Consent

Consent Granted: To erect place use and maintain two above ground pipelines, an electrical ring main and associated structures over beds of various streams between and including the Motumate Stream and an unnamed tributary of the Waiokura Stream for steam and electricity supply purposes

Expiry Date: 1 June 2032

Review Date(s): June 2017, June 2023

Site Location: Palmer Road To Manaia Road, Kapuni

Legal Description: Various

Grid Reference (NZTM) 1700840E-5629760N

Catchment: Waiokura
 Motumate

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- (a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- (b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- (c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - (i) the administration, monitoring and supervision of this consent;
 - (ii) charges for the carrying out of the Council's functions under section 35 in relation to this consent; and
 - (iii) charges authorised by regulations.

Special conditions

- 1. That the structures licensed by this consent shall be constructed and maintained in accordance with the documentation submitted in support of application 96/322.
- 2. That the consent holder shall notify the Taranaki Regional Council at least 48 hours prior to, and again upon completion of initial construction works, and again 48 hours prior to and upon completion of any subsequent maintenance works which may result in disturbance of the stream beds and/or discharges to the streams.
- 3. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 1999 and/or June 2005 and/or June 2011 and/or June 2017 and/or June 2023 and/or June 2029, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects of the discharge on the receiving environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at the time.

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: Vector Gas Trading Limited
101 Carlton Gore Road
Newmarket
Auckland 1023

Decision Date: 27 January 1997

Commencement Date: 27 January 1997

Conditions of Consent

Consent Granted: To discharge minor amounts earth material and associated stormwater onto land and into various streams between and including the Motumate Stream and an unnamed tributary of the Waiokura Stream associated with the construction of two above ground pipelines, an electrical ring main and associated structures for steam and electricity supply purposes

Expiry Date: 1 June 2032

Review Date(s): June 2017, June 2023, June 2029

Site Location: Palmer Road To Manaia Road, Kapuni

Legal Description: Various

Grid Reference (NZTM) 1700840E-5629760N

Catchment: Waikoura
Motumate

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- (a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- (b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- (c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - (i) the administration, monitoring and supervision of this consent;
 - (ii) charges for the carrying out of the Council's functions under section 35 in relation to this consent; and
 - (iii) charges authorised by regulations.

Special conditions

- 1. That during the exercise of this consent, the consent holder must observe every practicable measure to prevent the discharge or placement of silt and/or organics and/or cement products and/or any other contaminants into the watercourse, and to minimise disturbance of the stream bed.
- 2. That the consent holder shall notify the Taranaki Regional Council at least 48 hours prior to, and again upon completion of, any exercise of this consent.
- 3. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 1999 and/or June 2005 and/or June 2011 and/or June 2017 and/or June 2023 and/or June 2029, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects of the discharge on the receiving environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at the time.

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: Vector Gas Trading Limited
 101 Carlton Gore Road
 Newmarket
 Auckland 1023

Decision Date: 24 June 1999

Commencement Date: 24 June 1999

Conditions of Consent

Consent Granted: To discharge up to 8 cubic metres/day of ingress water from
 a steam pipeline onto land in the vicinity of unnamed
 tributaries of the Kapuni, Waiokura and Motumate Streams

Expiry Date: 1 June 2017

Site Location: Palmer Road to Manaia Road, Kapuni

Legal Description: Various

Grid Reference (NZTM) 1700740E-5629660N

Catchment: Kapuni
 Waiokura
 Motumate

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council (hereinafter the Chief Executive), the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) That unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) That the consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

- 1. That the consent holder shall ensure that the discharge of ingress water takes place in accordance with the information submitted in support of application 671.
- 2. That the exercise of this consent, including the design and management of the discharge system, shall not lead or be liable to lead to contaminants entering a surface water body.
- 3. That no adverse effects shall occur to groundwater in the vicinity of the discharge, as a result of the exercise of this consent.
- 4. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2005 and/or June 2011, for the purposed of ensuring that the conditions are adequate to deal with an significant adverse effects on the environment arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: Vector Gas Trading Limited
 101 Carlton Gore Road
 Newmarket
 Auckland 1023

Decision Date 25 January 2010
(Change):

Commencement Date 25 January 2010 (Granted Date: 29 January 2007)
(Change):

Conditions of Consent

Consent Granted: To discharge sludge, and some liquid, from two stormwater retention ponds, a filter backwash pond and a settlement pond onto and into land

Expiry Date: 1 June 2023

Review Date(s): June 2017

Site Location: Kapuni Gas Treatment plant, 298 Palmer Road, Kapuni

Legal Description: Lot 1 DP 15254 Lot 1 DP 18183 Blk XVI Kaupokonui SD

Grid Reference (NZTM) 1700973E-5629335N

Catchment: Kapuni

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of applications 4506 and 6313. In the case of any contradiction between the documentation submitted in support of applications 4506 and 6313 and the conditions of this consent, the conditions of this consent shall prevail.
3. The consent holder shall ensure that only sludge generated in the stormwater retention ponds, filter backwash ponds and from settlement of Kapuni Stream water in the northern pond is discharged.
4. During times when the Kapuni Stream is in low flow, or when equipment failure prevents discharge to the stream, the discharge may include liquids [excluding demineralisation wastes] that normally reside in these ponds as an alternative to discharging them to the stream.
5. No disposal shall occur outside the area specified in application 4506.
6. The discharge onto and into land shall occur a minimum of 25 metres from any surface water body or property boundary. Discharge shall be onto and into land and there shall be no discharge of any contaminant to surface water.
7. The consent holder shall keep records of the following:
 - a) Analysis of a representative sample of sludge each time the stormwater ponds and filter backwash pond is de-sludged, and soil quality after each discharge (analysing for arsenic, cadmium, chromium, copper, lead, nickel, mercury and zinc)
 - b) Volumes of material discharged
 - c) Dates and times of discharge events

and shall provide the results to the Chief Executive, Taranaki Regional Council, on request.

Consent 7043-1

8. Any relocation of soil from within the defined disposal area shall only occur if it can be shown to the satisfaction of the Chief Executive, Taranaki Regional Council that the standards, terms, and conditions of Rule 29 of the Regional Freshwater Plan for Taranaki will be complied with.
9. The discharge authorised by this consent shall not give rise to any of the following effects in any water body:
 - a) the production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - b) any conspicuous change in the colour or visual clarity;
 - c) any emission of objectionable odour;
 - d) the rendering of fresh water unsuitable for consumption by farm animals;
 - e) any significant adverse effects on aquatic life.
10. At all times, the consent holder shall comply with the guidelines for industrial sites developed by the Australian National Environmental Protection Council (Assessment of Site Contamination) Schedule B(1): Guideline on the Investigation Levels for Soil and Groundwater (1999).
11. The consent holder shall advise the South Taranaki District Council that the disposal area is being used for disposal of contaminated silts at levels and rates expected to result in the soil of that area exceeding agricultural land use guidelines, but not exceeding industrial land use guidelines.
12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Land Use Consent
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: Vector Gas Trading Limited
101 Carlton Gore Road
Newmarket
Auckland 1023

Decision Date: 10 April 2008

Commencement Date: 10 April 2008

Conditions of Consent

Consent Granted: To remove a weir structure in the Kapuni Stream and undertake works for river bank protection purposes

Expiry Date: 1 June 2023

Review Date(s): June 2017

Site Location: Kapuni Gas Treatment Plant, 318 Palmer Road, Kapuni

Legal Description: Pt Lot 1 DP 5227 Lot 1 DP 9987 Blk XVI Kaupokonui SD

Grid Reference (NZTM) 1700900E-5629580N

Catchment: Kapuni

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General conditions

- a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.
- b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.
- c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:
 - i) the administration, monitoring and supervision of this consent; and
 - ii) charges authorised by regulations.

Special conditions

1. The exercise of this consent shall be undertaken substantially in accordance with the documentation submitted in support of application 4950. In the case of any contradiction between the documentation submitted in support of application 4950 and the conditions of this consent, the conditions of this consent shall prevail.
2. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of weir removal and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the river bed or discharges to water. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable if the consent holder does not have access to email.
3. The consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to avoid or minimise the discharge of sediments or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
4. The consent holder shall ensure that the area and volume of the riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
5. The consent holder shall take all reasonable steps to:
 - a) minimise the amount of sediment discharged to streams;
 - b) minimise the amount of sediment that becomes suspended in streams; and
 - c) mitigate the effects of any sediment in the stream

Undertaking work in accordance with *Guidelines for Earthworks in the Taranaki Region*, by Taranaki Regional Council, will achieve compliance with this condition.

Consent 7281-1

6. The consent holder shall ensure that all concrete, steel, rubble and any other materials from the demolition is removed from the streambed.
7. Any instream work shall take place only between 1 November and 10 May inclusive, except where this is waived in writing by the Chief Executive, Taranaki Regional Council.
8. The consent holder shall not use explosives in the removal of the structure.
9. This consent shall lapse five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
10. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2011 and/or June 2017, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Transferred at Stratford on 1 September 2015

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Discharge Permit
Pursuant to the Resource Management Act 1991
a resource consent is hereby granted by the
Taranaki Regional Council

Name of
Consent Holder: Vector Limited
 P O Box 593
 HAWERA 4640

Decision Date: 20 June 2012

Commencement
Date: 20 June 2012

Conditions of Consent

Consent Granted: To discharge stormwater from site areas of a natural gas treatment plant where no industrial processes occur (e.g. landscaped areas and roads) into the Kapuni Stream at or about (NZTM) 1700830E-5629418N

Expiry Date: 1 June 2035

Review Date(s): June 2017, June 2023, June 2029

Site Location: Kapuni Gas Treatment Plant, 298 Palmer Road, Kapuni

Legal Description: Pt Lot 1 DP 5227 Blk XVI Kaupokonui SD
(Discharge source & site)

Catchment: Kapuni

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*

General condition

- a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The stormwater discharged shall be from a catchment area not exceeding 9.39 ha.
3. After allowing for reasonable mixing, the discharge shall not, either by itself or in combination with other discharges, give rise to any or all of the following effects in the receiving water:
 - a. the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - b. any conspicuous change in the colour or visual clarity;
 - c. any emission of objectionable odour;
 - d. the rendering of fresh water unsuitable for consumption by farm animals; and
 - e. any significant adverse effects on aquatic life.
4. The consent holder shall maintain a contingency plan (which is incorporated into the contingency plan for the entire site). The contingency plan shall be adhered to in the event of a spill or emergency and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council, detail measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not authorised by this consent and measures to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.
5. The consent holder shall maintain a stormwater management plan (which is incorporated into the stormwater management plan for the entire site). This plan shall be adhered to at all times and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council document how the site is to be managed in order to minimise the contaminants that become entrained in the stormwater.
6. This consent shall lapse on 30 June 2017, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

Consent 7755-1

7. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 and/or June 2029, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 20 June 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Appendix II

Biomonitoring report review

Memorandum

To J Kitto, Scientific Officer
From B Thomas, Scientific Officer
Document 1726365
Date 09 August 2016

Review of Stark Environmental Reports: Kapuni macroinvertebrate biomonitoring and electric fishing in relation to Ballance Agri-Nutrients Kapuni Ltd and Vector Ltd – July 2015 – April 2016

Four macroinvertebrate surveys were scheduled for the 2015-2016 monitoring period. In this memo, four reports of the 2015-2016 monitoring period are reviewed which detail the macroinvertebrate monitoring of regular sites on the Kapuni Stream and tributaries as per the following table. Refer to the reports for further details.

Survey date	Report Number	Number of sites	
		Kapuni Stream	tributaries
23 July 2015	2015-10	7	3
14-15 October 2015	2015-15	11	2
25 January 2016	2016-01	7	3
19 April 2016	2016-07	7	3

Macroinvertebrate monitoring

Biomonitoring in July 2015 was undertaken while flows were receding following rain on the mountain. Flows during this survey, averaging approximately 2,620 l/sec were higher than that during the October 2015 survey (average of 1,700 l/sec), but much higher than during the January 2016 survey which saw an average flow of 314 l/sec. The average flow at the time of the April 2016 survey was 492 l/sec. There was little mention in the reports of habitat conditions, although it was noted that there was no obvious periphyton growth on the streambed during the July 2015 survey. There was particular mention made in the April 2016 report, that a larger fresh which occurred 17-19 February inundated the Kapuni Stream bed with sand from erosion on the mountain which would have been sufficient to affect the macroinvertebrate communities, and degrade habitat quality.

Targets for MCI values have been set for the Kapuni main stem and gully system. For the Kapuni stream a MCI target of 100 has been obtained from historical data and the expected mild enrichment in the mid-catchment. The gully system previously had a MCI target of 72, lower than the main stem, however the characteristic weedy habitat in these streams tends to support lower scoring taxa.

Recent research on the MCI has seen the development of a varied index, to assess the health of soft-bottomed streams. This is referred to as the MCI-sb in the reviewed reports. This index is relevant to the gully system (sites 2, 3, and 5). The target has consequently been reviewed for these sites, and is now 80 for sites 2 and 3, and 73 for site 5.

During all four surveys, all Kapuni Stream sites and all tributary sites sampled exceeded their respective MCI targets. The July 2016 survey recorded no new seasonal or overall extremes while the October 2015 survey recorded two new seasonal maximum MCI scores, at sites 3 and 9. The January 2016 survey also recorded new seasonal maximum MCI score at site 7 while the April 2016 survey recorded no new seasonal or overall extremes. All sites in all surveys recorded MCI values similar to or higher than their respective overall and seasonal mean MCI scores. This includes site 2 which was frequently an exception to this pattern. This indicates the deterioration recorded at site 2 in previous surveys was not apparent in the 2015-2016 monitoring period.

Linear trends in MCI values at the sites are also reported, by plotting MCI and taxa richness versus time using the LOWESS (Locally Weighted Scatterplot Smoothing) method (used with Tension = 0.4). The statistical significance of the trends was assessed using Mann-Kendall tests in STATISTICA 8. The Benjamini-Hochberg false discovery rate (FDR) was also used, to control the overall Type-I error rate in time series analyses. All sites exhibited a statistically significant positive trend in all surveys, with such significantly positive trends being strong enough to avoid elimination by the FDR.

Some additional analysis was done, where recorded MCI scores were compared with that predicted using relationships developed between MCI scores and altitude for ringplain streams. There were three predicted values provided, the first based on a relationship developed using all generic ringplain data, the second using Kapuni Stream data collected since 1981 only and the third using Kapuni Stream data collected since 2000. The latter predicts the highest MCI scores, and this is the relationship against which the reported results were compared. Across all reviewed reports all sites recorded an MCI score within 10.8 units of this predicted score. 10.8 units is the standard error that can be applied to the sampling method used.

All four surveys recorded numbers of taxa that were similar to or below the overall mean for the respective sites. Most values were within the range of values previously recorded, although there were two new seasonal minimum values recorded at site 5 in October 2015 and site 9 in April 2016. Decreasing taxa richness has been recorded for some time now. Long term trends in taxa richness are also evident at some sites in the Kapuni Stream. This trending, undertaken for the July and October 2014 surveys, showed a statistically significant ($P < 0.05$) negative trend in taxa richness at all sites except for site 3. After the October 2014 survey, the need for this trending was reconsidered. As the relationship between taxon richness and stream health is not straight-forward, as both highly polluted and pristine waters can produce low taxa richness, it was decided to discontinue the trending of taxon richness.

There was some variation in the dominant taxa over the period covered by the reports. However, *Coloburiscus* and *Deleatidium* mayflies, and *Beraeoptera* and *Pycnocentroides* caddisfly larvae were the best-represented taxa at sites in the Kapuni Stream, recorded as at least 'abundant' in all four surveys. Amphipods and snails continued to be dominant in the tributary.

Overall, the MCI scores for all sites were similar to or greater than respective means. Site 2 (located in the tributary), which often recorded below average MCI-sb scores in previous surveys, recorded above average scores in the surveys reviewed herein. The general

conclusion was that the Kapuni Stream was in good health and the impact (if any) of the industrial activity at Kapuni was not discernible.

Electric Fishing

Reports 2015-14 and 2016-06 detail the monitoring of fish communities undertaken in the Kapuni Stream in October 2015 (11 sites), and April 2016 (7 sites). The area of streambed fished at each site in the Kapuni Stream was approximately 45 m², while the tributary was not fished in either survey.

All sites were surveyed for fish using the single pass electric fishing technique. The results of these surveys are given in Tables 1 and 2.

Table 1 Results of fish survey in the Kapuni Stream conducted on 14-15 October 2015

Site	Brown trout	Redfin bully	Koaro	Torrentfish	Eels	Koura	Total no. of species
O	-	-	3	-	-	-	1
P	-	-	1	-	1	-	2
E	-	-	-	-	-	-	0
9	-	-	-	-	2	-	1
11	5	-	-	1	2	-	3
12	1	-	-	-	1	-	2
10	-	1	-	-	-	-	1
6	1	-	-	-	1	-	2
7	-	1	-	-	-	-	1
8/K	1	-	-	-	1	-	2
N	10	-	-	-	1	-	2
5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<i>Total abundance</i>	18	2	4	1	9	0	

Table 2 Results of fish survey in the Kapuni Stream conducted on 19 April 2016

Site	Brown trout	Redfin bully	Koaro	Torrentfish	Eels	Koura	Total no. of species
O	N/A	N/A	N/A	N/A	N/A	N/A	N/A
P	N/A	N/A	N/A	N/A	N/A	N/A	N/A
E	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	-	-	-	-	5	1	2
11	-	-	-	-	1	-	1
12	-	-	-	-	1	-	1
10	-	-	-	-	2	-	1
6	-	-	-	-	2	-	1
7	-	-	-	-	-	-	0
8/K	-	-	-	-	-	-	0
N	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<i>Total abundance</i>	0	0	0	0	11	1	

A total of 34 fish, comprising six taxa, were caught at eleven sites during the October 2015 survey. During the April 2016 survey, 12 fish were caught, comprising two taxa. The October 2015 results were within the range (8-221) of total fish numbers and variety (3-8 taxa) recorded in previous years, but the April 2016 survey is notable, recording the lowest species richness to date (2).

In October 2015, trout parr were most abundant comprising 53% of the total number of fish recorded. Eels (27%), koaro (12%), redfin bully (6%) and torrentfish (3%) were present also. Eels are normally the dominant fish recorded from the Kapuni Stream; this was only the second occasion where trout have outnumbered eels.

In April 2016, eels were the most abundant, comprising 92% of the total number of fish recorded. Koura (8%) were present also. Trout which were abundant in October 2015, were not recorded. The poor results are likely the result of sedimentation (which degrades fish and macroinvertebrate habitat quality) and the effects of freshes.

It has been noted in previous reports that fine sand has been a dominant feature on the streambed, due in part to the erosion on the mountain. This has continued in both reports reviewed and it is likely to have reduced the suitability of habitat for some taxa, such as koura. It is thought that this reduction in available habitat is also responsible for a reduction in the numbers of brown trout recorded per site. The catch per unit effort has dropped from a high of 4.27 brown trout per site in 1982 - 1983 to less than 0.5 from late 2008 to mid 2012. An improvement was recorded in the October 2015 survey reported herein, with 18 recorded in total, however none were recorded during the April 2016 survey. Trout records may increase in the near future, as Fish and Game is now more actively stocking this river than has happened in the recent past.

One additional point worth noting is the fact that the v-notch weir at the Vector site has been removed. It is noted in the report that there didn't appear to be any additional negative impact on sedimentation downstream. The weir's removal will have improved fish passage in this reach of the Kapuni Stream, and this may result in improved fish communities. Furthermore, New Zealand Railways Corporation has undertaken works to improve fish passage at the railway bridge, which also may lead to improved fish communities.

In short, these electric fishing results from the Kapuni catchment do not provide any conclusive indication that the petrochemical industries are having any significant adverse effects on fish communities in the Kapuni catchment.

Appendix III
Metal deposition monitoring
2008-2015

Deposition Analysis for Trace Metals

Metal		Site 1 - Settling Pond	Site 2 - Admin. car park/building	Site 3 - Opposite Maintenance
	Year	$\mu\text{g}/\text{m}^2/\text{day}$	$\mu\text{g}/\text{m}^2/\text{day}$	$\mu\text{g}/\text{m}^2/\text{day}$
Total Potassium	2008	14741	3827	5099
	2009	10043	0	3599
	2010	13210	8962	5468
	2011	4456	5606	6688
	2012	7882	4719	3583
	2013	10616	2803	6984
	2014	2500	13100	1800
	2015	14500	7600	5100
Total Vanadium	2008	428	53	144
	2009	388	45	114
	2010	198	41	125
	2011	90	55	150
	2012	139	34	80
	2013	191	12	59
	2014	0	0	0
	2015	300	0	100
Total Zinc	2008	55	212	174
	2009	57	909	106
	2010	330	205	46
	2011	53	266	172
	2012	76	93	97
	2013	110	47	283
	2014	200	100	100
	2015	0	100	0