Origin Energy Resources (Kupe) Limited
Kupe Production Station
Monitoring Programme
Annual Report
2013-2014

Technical Report 2014-125

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Executive summary

Origin Energy Resources (Kupe) Limited (The Company) operates a gas production facility located at Inaha Road at Mania, in the Inaha catchment. This report for the period July 2013–June 2014 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company's environmental performance during the period under review, and the results and environmental effects of the Company's activities.

The Company holds nine resource consents, which include a total of 112 conditions setting out the requirements that the Company must satisfy. The Company holds two consents to allow it to take and use water, one consent to discharge stormwater into the Kapuni stream, and two consents to discharge emissions into the air at this site.

During the monitoring period, Kupe Production Facility demonstrated an overall high level of environmental performance.

The Council's monitoring programme for the year under review included five inspections, three water samples collected for physicochemical analysis, two bio-monitoring surveys of receiving waters, and two ambient air quality analyses.

The monitoring showed that site was managed in a proactive and acceptable manner; this was detailed by the Council's Inspectorate Officer. Bio-monitoring of the Kapuni Stream also indicated the stream had little or no measurable adverse effects as a result of the discharges of storm water from the Site, with the health of the stream rated as 'good' to 'better than expected'. The physio-chemical monitoring of the discharge also detailed no exceedance with relation to the Companies Consented Conditions.

As in previous years, the monitoring indicated no measureable adverse effects had arisen as a result of the exercise of this Consent. There were no unauthorised incidents during the period under review at the Kupe Production Station.

For reference, in the 2013-2014 year, 60% 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 29% demonstrated a good level of environmental performance and compliance with their consents.

This report includes recommendations for the 2014-2015 year.

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1. Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is the Annual Report for the period July 2013-June 2014 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Origin Energy Resources (Kupe) Limited (Origin Energy). The Company operates a gas production station situated on Inaha Road at Manaia, in the Inaha catchment, South Taranaki.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consents held by Origin Energy that relate to abstraction and discharge of water within the Inaha catchment, and the air discharge permit held by Origin Energy 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 Taranaki Regional Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of Origin Energy's use of water, land, and air, and is the fourth combined annual report by the Taranaki Regional Council for the Company's Kupe facility in its operational phase.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about compliance monitoring under the Resource Management Act and the Council's obligations and general approach to monitoring sites though annual programmes, the resource consents held by the Origin Energy in the catchment, the nature of the monitoring programme in place for the period under review, and a description of the activities and operations conducted in the Company'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 interpretations, and their significance for the environment.

Section 4 presents recommendations to be implemented in the 2014-2015 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 *Resource Management Act 1991* (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 social-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);
(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 the 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 and administrative performance

Besides discussing the various details of the performance and extent of compliance by the consent holder/s during the period under review, this report also assigns a rating as to each Company's environmental and administrative performance.

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 the Company'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 2013-2014 year, 60% 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 29% demonstrated a good level of environmental performance and compliance with their consents.

1.2 Process description

Development of the Kupe Production Station, offshore pipelines and offshore platform began in mid 2006. Natural gas and light oil are extracted from the Kupe Field, which is located offshore, approximately 30 km south of Ohawe Beach on the South Taranaki coast. Raw gas and light oil extracted from the field offshore are transported to shore via pipeline, and processed at an onshore production station. The location of the Kupe Field and the production station is shown in Figure 1.

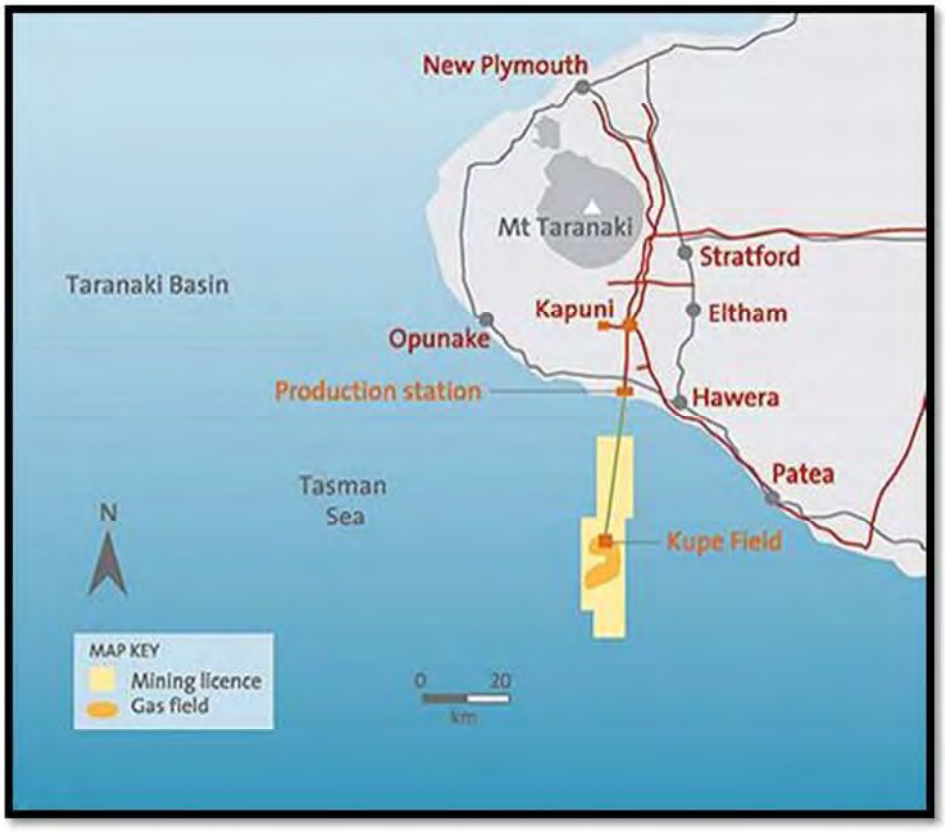

Figure 1 Location of Kupe Gas Project[1]

[1] source: http://www.originenergy.com.au/1222/Kupe-Gas-Project

The offshore platform is situated in approximately 35 metre deep water and comprises a topside deck supported by four legs fixed to the seabed. Installation of the offshore platform commenced in early 2007. The offshore platform and production wells are outside of the 12 nautical mile coastal marine area (CMA) boundary, and therefore outside the jurisdiction of this Council.

The single subsea pipeline enables delivery of the raw natural gas and light oil to the onshore production station. Parallel to the subsea pipeline, utility lines, transfer chemicals and fibre optic from the shore to the offshore platform (Figure 2). Horizontal directional drilling (HDD) was used to install the pipelines under the 40 metre high sea cliffs at the end of Inaha Road in order to link the offshore and onshore components. The HDD entry point is 500 metres inland of the coastline, and the exit point emerges 1,800 metres offshore.

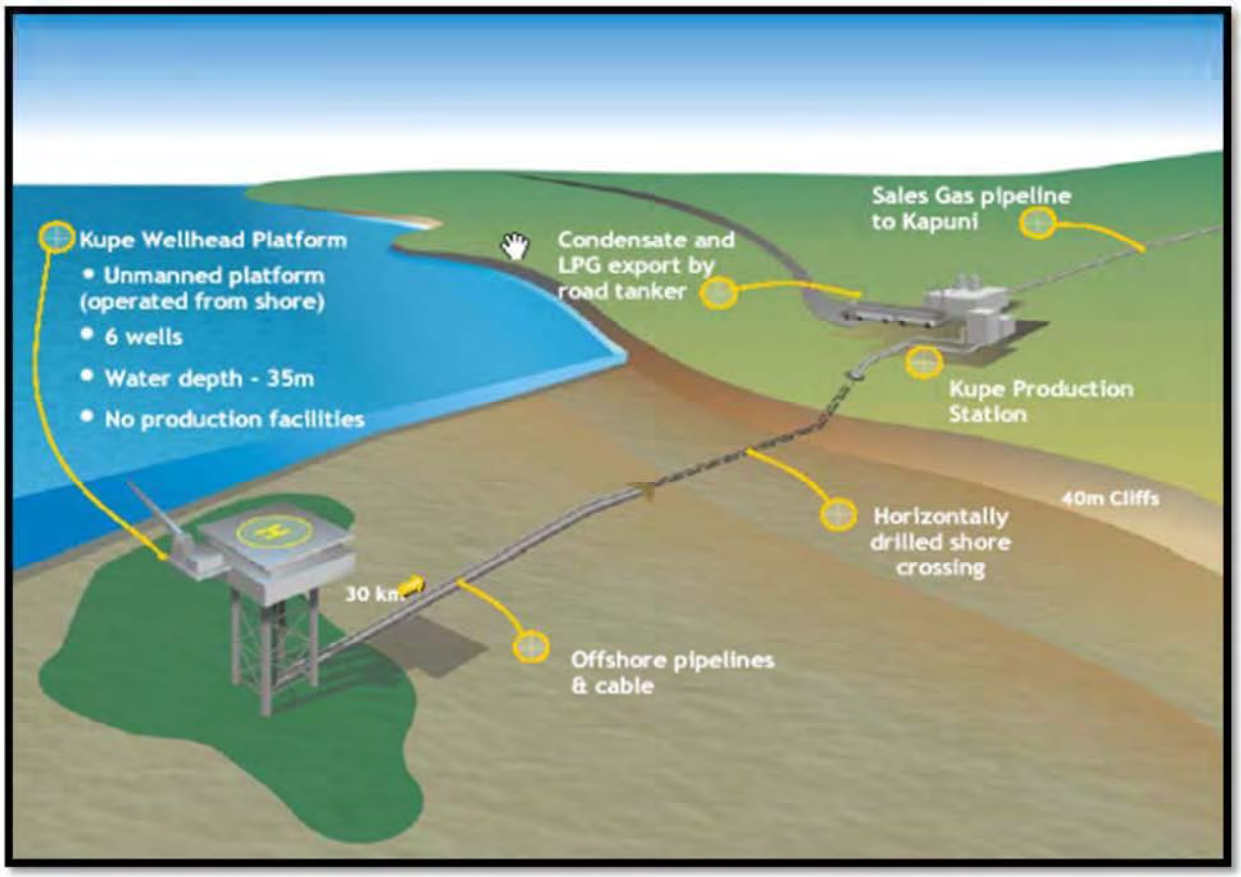

Figure 2 Components of Kupe Gas Project[2]

The production station is located at the southern end of Inaha Road, occupying roughly 19 hectares of land. It processes the raw gas and light oil from the Kupe Field to meet sale specifications. The production station contains storage and truck loading facilities for LPG and condensate export. A low-pressure flare system is located at ground level for operational control and an elevated flare has been installed for use in emergency situations only. A series of ponds provide a natural cleaning system for stormwater before discharging from the site. Commissioning of the production station began in early 2009, with commercial production commencing in November 2009.

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[2] source: http://www.originenergy.com.au/1222/Kupe-Gas-Project

Onshore pipelines have been installed to enable the transfer of raw gas from the HDD shore crossing to the production station, and to transfer the sales gas from the production station to the Kapuni Gas Treatment Plant.

1.3 Resource consents

1.3.1 Water abstraction permit

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.

Permits **6540** and **6541** to take and use groundwater from a bore/s lapsed in June 2010 and have been removed from future monitoring programmes and reports.

Origin Energy holds water permit **6979-1** to install, construct and maintain up to seven water bores for horizontal directional drilling, pipeline hydro-testing, and production station operation purposes. This permit was issued by the Council on 1 November 2006 under Section 87(d) of the RMA. It is due to expire on 1 June 2039.

There are eight special conditions attached to the consent.

Condition 1 requires that the consent is exercised in accordance with the application.

Condition 2 requires the consent holder to supply a bore log for each bore.

Condition 3 states that the bores be cased and sealed.

Condition 4 requires the consent holder to mitigate any adverse environmental effects.

Conditions 5 and 6 deal with decommissioning of the bores.

Conditions 7 and 8 deal with lapse and review of consent.

The permit is attached to this report in Appendix I.

Origin Energy holds water permit **7010-1** to take and use up to 3,500 m^3/day groundwater at a maximum rate of 40 l/s as a combined total from up to seven water bores in a bore field for horizontal directional drilling, pipeline hydro-testing and production station operation purposes. This permit was issued by the Council on 2 November 2006 under Section 87(e) of the RMA. It is due to expire on 1 June 2039. Changes to the conditions of the consent were made on 25 July 2007.

On 13 October 2011 the purpose of the consent was changed slightly so that it now reads: to take and use up to 3,500 m^3/day groundwater at a maximum rate of 40 l/s as a combined total from up to seven water bores in a bore field for the purpose of horizontal directional drilling, pipeline hydro-testing, production station operation at the Kupe production station and operations at the Manutahi-D, Manutahi-C, and Kauri-F wellsites.

The change relates only to the end use of the abstracted groundwater and no increase in consented volume or rate from the Kupe groundwater bores was sought. The

volume of water required for Manutahi was not known at the time of the change, but would be within the current consent limits.

The 12 special conditions attached to the consent were unchanged.

Condition 1 requires that the consent be exercised in accordance with the applications.

Condition 2 requires that the consent holder notify Council prior to the exercise of the consent.

Condition 3 requires that details of pump testing are supplied.

Conditions 4 and 5 deal with the volume and rate of abstraction.

Condition 6 states that the abstraction shall not cause the intrusion of saltwater into any aquifer.

Condition 7 requires the consent holder to maintain daily records of the abstraction.

Conditions 8, 9 and 10 deal with monitoring.

Conditions 11 and 12 deal with lapse and review of consent.

The permit is attached to this report in Appendix I.

1.3.2 Water discharge permit

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.

Origin Energy holds permit **6544** to discharge produced water from hydrocarbon production operations by deepwell injection at the Kupe Production Station site. Although this permit was not exercised during the monitoring period the consent remains current.

Origin Energy holds water discharge permit **6543-1**. A change to the purpose of the consent was made during the period under review to include stormwater from the new Dangerous Goods Storage. The consent purpose now reads: to discharge pipeline hydrotesting water and treated stormwater from the Kupe Production Station via a stormwater/firewater storage pond system, and to discharge stormwater from the Dangerous Goods Storage stormwater system into the Kapuni Stream. This permit was issued by the Taranaki Regional Council on 21 June 2005 under Section 87(e) of the Resource Management Act. It is due to expire on 1 June 2039. Changes to the conditions of the consent were made on 14 December 2006 and 31 January 2013.

There are 11 special conditions attached to the consent.

Condition 1 requires that the consent is exercised in accordance with the application.

Condition 2 requires the consent holder to provide detailed plans of the stormwater catchment and drainage pathways.

Condition 3 required the consent holder to notify the Council prior to the exercise of the consent.

Condition 4 was changed during the period under review and requires the consent holder to review the contingency plan for the site and include, if necessary, the new Dangerous Goods Store.

Condition 5 requires the consent holder to adopt the best practicable option to prevent of minimise environmental effects.

Condition 6 states that water discharged is directed for treatment through the stormwater treatment system.

Condition 7 requires that hazardous substances are bunded.

Condition 8 gives limits of various contaminants not to be exceeded in the discharge, while condition 9 deals with effects below the mixing zone.

Conditions 10 and 11 deal with lapse and review of consent.

1.3.3 Coastal permits

Section 12(1)(b) of the RMA stipulates that no person may erect, reconstruct, place, alter, extend, remove, or demolish any structure that is fixed in, on, under, or over any foreshore or seabed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

Origin Energy holds consent **6531-1** to disturb the seabed and foreshore of the coastal marine area by the process of erection, placement, use, alteration, extension, maintenance, or removal of up to four pipelines and one power/fibre optic cable connecting an offshore wellhead/platform to the foreshore at mean high water spring. Consent **6531** is a restricted coastal activity (RCA) where the consent was issued by the Minister of Conservation on 9 December 2005. It is due to expire on 1 June 2039.

The purpose of the consent was altered slightly on 7 March 2012 and now reads: to disturb the seabed and foreshore of the coastal marine area by the process of erection, placement, use, alteration, extension, maintenance or removal of up to six pipelines and one power/fibre optic cable connecting an offshore wellhead/platform to the foreshore at mean high water spring.

The purpose only was changed, to clarify the fact that there are six pipelines and not four, and as such no changes to conditions were necessary.
There are 12 special conditions attached to the consent.

Condition 1 requires that the consent is exercised in accordance with the application.

Conditions 2, 3 and 5 require the consent holder to provide a detailed pipe laying management plan, a programme of installation and a construction contingency plan.

Condition 4 requires notification prior to maintenance works.

Condition 6 states that the consent holder shall adopt the best practicable option to minimise adverse environmental effects.

Condition 7 requires that disturbance to the seabed in minimised, while condition 8 requires that this disturbance be contained within a 100 m wide disturbance corridor.

Condition 9 states that the disturbance comply with noise standards.

Condition 10 states that work is to cease should archaeological remains be discovered.

Condition 11 requires the consent holder undertake pre and post-lay surveys of the pipeline corridor.

Conditions 12 and 13 deal with lapse and review of the consent.

Origin Energy holds consent **6532-1** to erect, place, use, reconstruct, alter, extend and maintain within the coastal marine area up to four pipelines connecting an offshore wellhead/platform to the foreshore at mean high water spring, with structures situated under the seabed form approximately 1200 metres offshore to mean high water spring, and the related occupation of the seabed. Consent **6532** is a restricted coastal activity (RCA) where the consent was issued by the Minister of Conservation on 9 December 2005. It is due to expire on 1 June 2039.

The purpose of the consent was altered slightly on 7 March 2012 and now reads: to erect, place, use, reconstruct, alter, extend and maintain within the coastal marine area up to six pipelines connecting an offshore wellhead/platform to the foreshore at mean high water spring, with structures situated under the seabed from approximately 1200 metres offshore to mean high water spring, and the related occupation of the seabed

The purpose only was changed, to clarify the fact that there are six pipelines and not four, and as such no changes to conditions were necessary.

There are 12 special conditions attached to the consent.

Condition 1 requires that the consent is exercised in accordance with the application.

Conditions 2, 3 and 5 require the consent holder to provide a detailed pipe laying management plan, a programme of installation and a construction contingency plan.
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Condition 4 requires notification prior to maintenance works.

Condition 6 states that the consent holder shall adopt the best practicable option to minimise adverse environmental effects.

Condition 7 requires that work associated with the structure shall comply with noise standards.

Condition 8 requires the consent holder to survey and map the position of the structures.

Condition 9 requires the consent holder undertake pre and post-lay surveys of the pipeline corridor.

Condition 10 states that the structure shall be removed and the area reinstated, if and when it is no longer required.

Conditions 11 and 12 deal with lapse and review of consent.

Origin Energy holds consent **6533-1** to occupy the coastal marine area for a distance of 250 metres either side of the centre-line of a 100 metre wide pipeline corridor, from the outer limit of the territorial sea of New Zealand to mean high water spring, in a manner that will restrict public access. Consent **6533** is a restricted coastal activity (RCA) where the consent was issued by the Minister of Conservation on 9 December 2005. It is due to expire on 1 June 2039.

There are six special conditions attached to the consent.

Condition 1 requires that the consent is exercised in accordance with the application.

Condition 2 states that public access shall not be restricted unless required, while condition 3 requires notification prior to works involving the restriction of public access.

Condition 4 requires the consent holder to survey and map the position of the structure.

Conditions 5 and 6 deal with lapse and review of the consent.

Origin Energy holds consent **6629-1** to erect, place, reconstruct, alter, extend and maintain within the coastal marine area one power/fibre optic cable connecting an offshore wellhead/platform to the foreshore at mean high water spring, with structures situated under the seabed from approximately 1200 metres offshore to mean high water spring, and the related occupation of the seabed. This consent was issued by the Council on 28 October 2005 under Section 87(e) of the RMA. It is due to expire in June 2039.

The conditions of **6629** are the same as those attached to **6532** (above).

Copies of the permits are attached to this report in Appendix I.

1.3.4 Air discharge pemit

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.

Origin Energy holds air discharge permit **6545-1** to discharge emissions to air from combustion involving the flaring of petroleum products incidental to the treatment of

gas at the Kupe Production Station. This permit was issued by the Council on 21 June 2005 under Section 87(e) of the RMA. It is due to expire on 1 June 2039. Changes to the consent conditions were granted in April 2007.

There are 21 special conditions attached to the consent.

Condition 1 requires that the consent is undertaken in accordance with the application.

Condition 2 requires that the consent holder adopt the best practicable option to minimise environmental effects, while

Condition 3 requires the consent holder to minimise emissions and impacts of contaminants.

Condition 4 requires that the consent holder provide an analysis of a typical gas and/or condensate stream upon request, while condition 5 requires a report be provided in May of each year detailing various aspects of flaring.

Condition 7 requires the consent holder to supply a final site lay-out plan.

Conditions 6 and 8 to 14 deal with flaring, including notification, incidents, and flaring logs.

Conditions 15 and 16 deal with effects beyond the site boundary.

Conditions 17, 18 and 19 limit the discharge of contaminants including carbon monoxide and nitrogen dioxide.

Conditions 20 and 21 deal with lapse and review of the consent.

Origin Energy holds air discharge permit **6546-1** to discharge emissions to air as products of combustion from the Kupe Production Station involving equipment burning natural gas as fuel where the maximum heat release is in excess of 10 megawatts, together with miscellaneous emissions. This permit was issued by the Council on 21 June 2005 under Section 87(e) of the RMA. It is due to expire on 1 June 2039.

There are 17 special conditions attached to the consent. These are similar to consent **6545** above. Copies of the permits are attached to this report in Appendix I.

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the RMA sets out obligations upon the Council to gather information, monitor, and conduct research on the exercise of resource consents, and the effects arising, within the Taranaki region and report upon these.

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.

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 Kupe Production Station site was visited 7 times 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 the consent holder 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 Physiochemical sampling

1.4.4.1 Stormwater

The Site holds Consent **6543-1** which permits the discharge of pipeline hydrotesting water and treated stormwater from the facility via a stormwater/firewater storage pond system, and to discharge stormwater from the Dangerous Good Storage stormwater system into the Kapuni Stream. The facility shall not exceed the concentrations discharge detailed in Table 1.

Table 1 Consent 6543-1 Condition 8

Consent 6543-1 Condition 8.	
Component	Concentration
pH (range)	6.0-9.0
Suspended solids	100 gm^3
Total recoverable hydrocarbons	15 gm^3
Chloride	50 gm^3

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

The stormwater discharge was sampled on one occasion, and the sample analysed for the criteria detailed in Table 1. The Kapuni Stream was also sampled on one occasion, and the sample analysed for same criteria as the discharge. The stream was also

assessed for potential effects arising from the discharge of the storm water, this is detailed in the bio-monitoring survey

1.4.5 Air Quality

The Council undertook sampling of the emissions of ammonia, carbon monoxide and combustible gases from the site on two occasions, while PM_{10} was measured once.

The analysis of ammonia, carbon dioxide and combustible gases were undertaken on two occasions, with both sample runs lasting for a period of 48 hours. The analysis was undertaken through the deployment of a MultiRAE multi gas analyser in two locations.

The deployment locations of the gas meter were chosen to provide average downwind concentrations of gases emitted from the facility.

The analysis of PM_{10} concentrations were undertaken through the use of a "DustTrak", this instrument was placed downwind from the facility and was deployed for a period of 12 hours.

Further information is provided in the Results Section 2.2.4.

1.4.6 Biomonitoring surveys

Two biological surveys were performed (spring and summer) in the Kapuni Stream to determine whether or not the periodic discharge of treated stormwater from the site had caused significant adverse effects on aquatic life.

1.4.7 Data Review

Origin is required to provide various data to the Council as part of consent conditions. This includes: information on new groundwater bores, records of water abstraction, and an air discharge report.

The Council may also request various forms of data from Origin, such as an analysis of the gas/condensate stream.

2. Results

2.1 Inspections

26th August 2013
Perimeter inspection was undertaken during showery / squally weather. The wind south westerly direction . No flaring was evident and no off site odours were noted. No discharge of stormwater to Kapuni Stream and no effects were noted from any previous discharge.

8th October 2013
The spring biological survey was undertaken. This was followed by the physical chemical survey of the stormwater discharge to Kapuni Stream.

The Council had pre-arranged with Origen Kupe Production Station to discharge stormwater from the fire pond to the Kapuni Stream provided that this met with Consent holder operating procedures. The Consent holder tested the stormwater quality prior to agreeing to discharge to the stream.

Stormwater was collected from the fire pond discharge and from the receiving waters upstream and downstream at the end of the mixing zone in the Kapuni Stream.

Macroinvertebrate sampling at three sites was also performed.

18th November 2013
Inspection was undertaken during fine weather. No discharge of site storm water to Kapuni stream was observed and no effects were noted of any previous discharge. Minimal flaring noted, wetland area clear of contaminants and local wildlife observed.

18th January 2014
Perimeter inspection undertaken. Storm water outlet into Kapuni stream was inspected, no water was observed to be discharging at the time of inspection and no visual effects of any previous discharge to surrounding vegetation or within the Kapuni stream noted. No flaring undertaken at the time of inspection. Strong Westerly winds were observed, down wind odour monitoring did not give rise to any off site effects. Ambient monitoring did not give rise to any concerns.

27th January 2014
The Site was inspected after heavy weekend rain, at the time of the inspection the weather was squally with showers. The stormwater system was observed to be clear of contaminants. No discharge to the Kapuni Stream was noted and no effects from any previous discharge were observed. At the time no flaring and no odours or any offsite effects were noted.

4th June 2014
The Site was inspected during a period of fine weather. No stormwater discharge to the Kapuni Stream and no visual effects from any previous discharges had been observed. No off site odours associated with processes of this facility were noted down wind. Stormwater and fire water systems were observed to be operating in a satisfactorily manner. Some fire retardant foam was noted in the stormwater ducting system, this was a result of a fire exercise where the sprinkler system at the truck load

out bay was activated. Injection water extraction areas were inspected and found to be neat and tidy.

2.2 Water

2.2.1 Results of discharge monitoring and receiving waters

One storm water discharge sample was collected during the monitoring period of 2013-2014. The collection of the stormwater discharge was also undertaken in conjunction with surface water samples, these were collected 50 m upstream (KPN000488) and 50 m downstream (KPN000490) of the discharge point (STW002086).

Table 2 Surface water (Upstream and Downstream) and Discharge sample results.

	Date	BOD	Chloride	CONDY	HC	pH	Suspended Solids	Temp	Turbidity
Unit	-	g/m^3	g/m^3	mS/m@ 20°	g/m^3	pH	g/m^3	°C	NTU
Consent 6543-1			50		15	6-9	100		
Upstream (KPN000488)	08/10/13	0.6	18.2	14.7	<0.5	7.8	4	13.1	1.3
Discharge Point (STW002086)	08/10/13	1.7	36.1	16.8	<0.5	7.6	23	16.7	14
Downstream (KPN000490)	08/10/13	1.1	26.2	15.4	<0.5	7.8	13	14.7	3.1

Results from Table 2 show that no exceedance was detected in either the stormwater discharge or in the receiving waters during the annual monitoring of the discharge. The consented criteria are provided in Table 1. Sample location KPN000492 was not utilised during this monitoring period.

Figure 3 Surface water, stormwater discharge and bio-monitoring locations in relation to Consent 6543-1

2.2.2 Provision of Company water abstratcion and discharge data

The Company provides data on abstraction rates for the water which it draws from its consented borefield as well as volumes of stormwater discharged in m^3 into the Kapuni Stream. The supplied data is presented in the following tables .

2.2.2.1 Borefield abstraction data

In line with consent **7010-1** the Company may take and use up to 3,500 m^3/day of groundwater abstracted from its bore network (of seven abstraction bores), at a maximum rate of 40 l/s. This water is utilised for the purpose of horizontal directional drilling, pipeline hydro-testing, production station operation and operations at the Manutahi-D, Manutahi-C and Kauri-F wellsites.

Condition 7 details that the Company must provide the Council with records of the abstraction rates which include the date, the daily rate, volume and pumping hours. The detailed breakdown of the rate of abstraction is detailed in Appendix III as the inclusion of the tabulated data was deemed too large for inclusion in the main body of this report.

A review of the data provided by the Company detailed no exceedance in terms of abstraction rate.

2.2.2.2 Discharge of Stormwater

The Company holds Consent **6543-1** which grants the discharge of pipeline hydrotest water and treated stormwater from the Kupe Production Station via a stormwater/firewater storage pond system, and to discharge stormwater from the Dangeorus Goods Storage stormwater system into the Kapuni Stream. **Table 3** details the total discharge in m^3 throughout the monitoring year.

Table 3 Total Discharged Stormwater m^3 to Kapuni Stream

Date	Total discharged m^3 to Kapuni Stream
Jul -13	2,112.3
Aug- 13	4,388.7
Sep – 13	5,408.6
Oct – 13	4,039.8
Nov – 13	6,980.5
Dec – 13	2,679.6
Jan – 14	2,405.4
Feb – 14	0
Mar – 14	0
Apr – 14	9,269.4
May – 14	1,985
Jun - 14	4,088.9

During the monitoring year 2013-2014 the Company's annual discharge to the Kapuni Stream totaled 43,358 m^3.

2.2.3 Bio-monitoring of the Kapuni Stream

Inline with Consent 6543-1 the Company must adhere to Condition 9 of the consent which details:

'After allowing reasonable mixing, within a mixing zone extending 50 meters downstream of the discharge point, the discharge shall not give rise to any of the following effects in the receiving waters of the Kapuni Stream:

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;
e) Any significant adverse effects on aquatic life. '

2.2.3.1 Methodology

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from riffle habitats at three established sites (sites 1, 2 and 3) in the Kapuni Stream (Table 4, Figure 4) on 8 October 2013. This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001).

Table 4 Bio-monitoring sites in the Kapuni Stream in relation to the Kupe Production Facility

Site No.	Site code	Map reference	GPS location	Location
1	KPN000488	BK29:992187	E1699156 N5618688	Upstream of Production Station stormwater discharge
2	KPN000490	BK29:992186	E1699158 N5618595	50 m downstream of Production Station stormwater discharge
3	KPN000492	BK29:992185	E1699237 N5618533	200 m downstream of Production Station stormwater discharge

Figure 4 Biomonitoring sites in the Kapuni Stream in relation to the Kupe Production Station

Samples were preserved with Kahle's Fluid for later sorting and identification under a stereomicroscope according to Taranaki Regional Council methodology using protocol P1 of NZMWG protocols for sampling macroinvertebrates in wadeable streams (Stark et al. 2001). Macroinvertebrate taxa found in each sample were recorded as:

R (rare)	= less than 5 individuals;
C (common)	= 5-19 individuals;
A (abundant)	= estimated 20-99 individuals;
VA (very abundant)	= estimated 100-499 individuals;
XA (extremely abundant)	= estimated 500 individuals or more.

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams. Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1. Sensitivity scores for certain taxa have been modified in accordance with Taranaki experience. By averaging the scores obtained from a list of taxa taken from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. More 'sensitive' communities inhabit less polluted waterways.

A semi-quantitative MCI value (SQMCIs) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these products, and dividing by the sum of the loading factors (Stark, 1998 and 1999). The loading factors were 1 for rare (R), 5 for common (C), 20 for abundant (A), 100 for very abundant (VA) and 500 for extremely abundant (XA). Unlike the MCI, the SQMCIs is not multiplied by a scaling factor of 20, so that its corresponding range of values is 20 times lower.

Habitat Discussion (October 2013)

At the time of this survey there was a moderately low, uncoloured flow in the Kapuni Stream at all sites upstream and downstream of the production station stormwater outfall. Flow rate at the TRC Normanby Road recorder site was 1670 litres/sec which represented a flow well above the minimum monthly mean October flow (973 litres/sec) but below the average monthly mean October flow (2,462 litres/sec) recorded for the period 1999-2012. The survey was performed seven days after a fresh in excess of 3 times median river flow and 12 days after a fresh in excess of 7 times median flow conditions. Water temperature at each of these three sites was 13.1˚C at the time of this mid morning survey.

Periphyton mats were very thin and there were no patchy filamentous algae present on the predominantly sandy-gravel-cobble-boulder substrates at all three unshaded sites. Patchy moss was recorded at all of the sites. There was no stormwater discharge from the rock rip-rap outfall at the time of the survey (although one occurred later that morning) but there had been discharges of treated stormwater on several occasions over the period since the previous summer survey (CF574).

Results (October 2013)

This spring macroinvertebrate survey (the eighth since completion of the Production Station) indicated that occasional discharges of treated stormwater from the Kupe Production Station over the previous eight month period had not had any recent detrimental effects on the macroinvertebrate communities of the Kapuni Stream. No significant changes in the moderate macroinvertebrate communities' richnesses were recorded between the upstream 'control' site and the two sites downstream of the discharge, during a period of moderate stream flow prior to the time of the survey.

The macroinvertebrate communities of the stream contained significant proportions of 'sensitive' taxa and these communities were numerically dominated by more 'sensitive' than 'tolerant' taxa resulting in relatively high SQMCIs and MCI values for the lower reaches of a ringplain stream near the coast, with MCI scores significantly higher than predicted for such a stream reach.

MCI scores indicated that the stream communities were of 'good' generic health and 'better than expected' for the predicted condition recorded in Taranaki ringplain streams at similar altitudes and distances from the National Park boundary.

Habitat Discussion (February 2014)

At the time of this survey there was a low, uncoloured flow in the Kapuni Stream at all sites upstream and downstream of the production station stormwater outfall. Flow rate at the TRC Normanby Road recorder site was 942 litres/sec which represented a flow well above the minimum monthly mean February flow (321 litres/sec) but below the average monthly mean February flow (1,023 litres/sec) recorded for the period 1999-2012. The survey was performed eight days after a fresh in excess of 3 times median river flow and 29 days after a fresh in excess of 7 times median flow conditions. Water temperature at these three sites ranged from 17.5˚C to 17.7˚C at the time of this late morning survey.

Periphyton mats were very thin at all sites and there were patchy filamentous algae present on the predominantly sandy-gravel-cobble-boulder substrates at only site 3 of the three unshaded sites. Patchy moss was recorded at all of the sites. There was no stormwater discharge from the rock rip-rap outfall at the time of the survey but there had been discharges of treated stormwater on several occasions over the period since the previous spring survey (CF591).

Results (February 2014)

This summer, low flow macroinvertebrate survey (the ninth since completion of the Production Station) indicated that occasional discharges of treated stormwater from the Kupe Production Station over the previous four month period had not had any recent detrimental effects on the macroinvertebrate communities of the Kapuni Stream. No significant changes in the moderate macroinvertebrate communities' richnesses were recorded between the upstream 'control' site and the two sites downstream of the discharge, during a period of low stream flow prior to the time of the survey.

The macroinvertebrate communities of the stream contained significant proportions of 'sensitive' taxa and these communities were numerically dominated by more 'sensitive' than 'tolerant' taxa resulting in relatively high SQMCIs and MCI values for the lower reaches of a ringplain stream near the coast, with MCI scores higher than predicted (sometimes significantly) for such a stream reach.

MCI scores indicated that the stream communities were of 'fair' to 'good' generic health and 'expected' to 'better than expected' for the predicted condition recorded in Taranaki ringplain streams at similar altitudes and distances from the National Park boundary.

2.2.4 Air Quality

Figure 5 Location of Sample Collection Stations

2.2.4.1 MulitRAE muliti gas analyser

During the July 2013 – 30 June 2014 monitoring period, a multi-gas meter was deployed on two occasions in the vicinity of the Kupe Production Station. The deployments lasted approximately forty-eight hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continual measurements of gas concentration for ammonia, carbon monoxide and combustible gases.

The location of the air quality monitoring sites is shown in Figure 5. The results of monitoring undertaken are summarised in Table 5 and the data presented graphically in Figure 6.

Because of the nature of the activities on the site, it was considered that the primary information of interest in respect of gases potentially emitted from the site was the average downwind concentration, rather than any instantaneous peak value. That is, the long-term exposure levels, rather than short-term maxima, are of most interest. The gas meter was therefore set up to create a data set based on recording the average concentration measured during each minute as raw data.

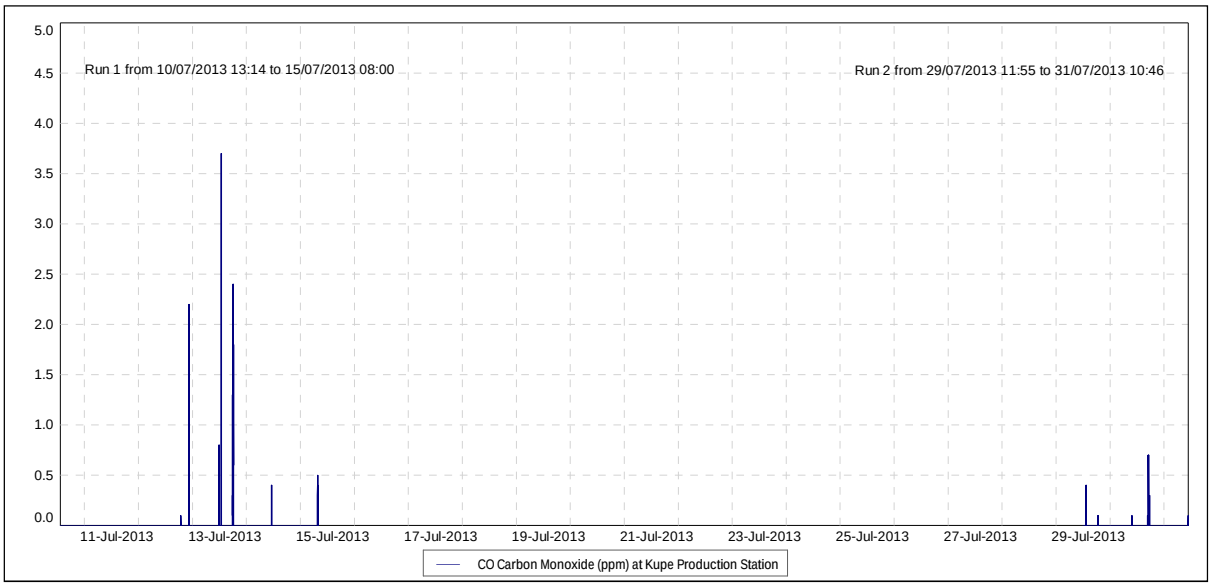

Figure 6 Ambient CO Carbon Monoxide (ppm) at Kupe Production Station

Table 5 Summary of ambient gas monitoring results at Kupe Production Station

Run		1	2	Average
Period (from-to)		10.07.2013 13:14 15.07.2013 08:00	29.07.2013 11:55 31.07.2013 10:46	
Max	CO (ppm)	3.7	0.7	2.2
	LEL (%)	0.1	0.0	0.2
Mean	CO (ppm)	0.2	0.2	0.2
	LEL (%)	0.0	0.0	0.0
Min	CO (ppm)	0.0	0.0	0.0
	LEL (%)	0.0	0.0	0.0

Note: (1) the instrument records in units of ppm. At 15°C
1ppm CO = 0.85 mg/m^3

(2) See text for explanation of LEL. Because the LEL of methane is equivalent to a mixture of approximately 5% methane in air, then the actual concentration of methane in air can be obtained by dividing the % LEL by 20.

Carbon Monoxide (CO)

The consents covering air discharges from the Kupe Production Station have specific limits related to particular gases. Special condition 13 of consent 6546 and special condition 17 of consent 6445 both set a limit on the carbon monoxide concentration at or beyond the production station's boundary. The limit is expressed as 10 mg/m^3 for an eight hour average or 30 mg/m^3 for a 1 hour average exposure. The maximum concentration of carbon monoxide found during the monitoring run was 3.15 mg/m^3 (see note (1)) which complies with the consent condition. This short term spike may have been caused by traffic movement as the monitor was located adjacent to the site entrance.

Lower Explosive Limit (LEL)
LEL% gives the percentage of the lower explosive limit, expressed as methane that is detected in the air sampled. The sensor on the instrument reacts to gases and vapours such as acetone, benzene, butane, methane, propane, carbon monoxide, ethanol, and higher alkanes and alkenes, with varying degrees of sensitivity. The Council's Regional Air Quality Plan has a typical requirement that no discharge shall result in a dangerous level of airborne contaminants, including any risk of explosion. At no time did the level of explosive gases downwind of the Kupe Production Station reach any more than a trivial level during the period monitored.

PM-10 monitoring
In September 2004 the Ministry for the Environment promulgated the National Environmental Standards (NES) relating to certain air pollutants. The NES for inhalable particulate (PM_{10}) is 50 $\mu g/m^3$ (24-hour average).

Particulates can be derived from many sources, including motor vehicles (particularly diesels), solid and oil-burning processes for industry and power generation, incineration and waste burning, photochemical processes, and natural sources such as pollen, abrasion, and sea spray.

PM_{10} particles are linked to adverse health effects that arise primarily from the ability of particles of this size to penetrate the defences of the human body and enter deep into the lungs significantly reducing the exchange of gases across the lung walls. Health effects from inhaling PM_{10} include increased mortality and the aggravation of existing respiratory and cardiovascular conditions such as asthma and chronic pulmonary diseases.

During the reporting period, a "DustTrak" PM_{10} monitor was deployed on one occasion in the vicinity of the plant. The deployment lasted approximately twelve hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continual measurements of PM_{10} concentrations. The location of the PM_{10} monitor during the sampling run is shown in Figure 5.

The details of the sample run are graphically presented in Figure 7.

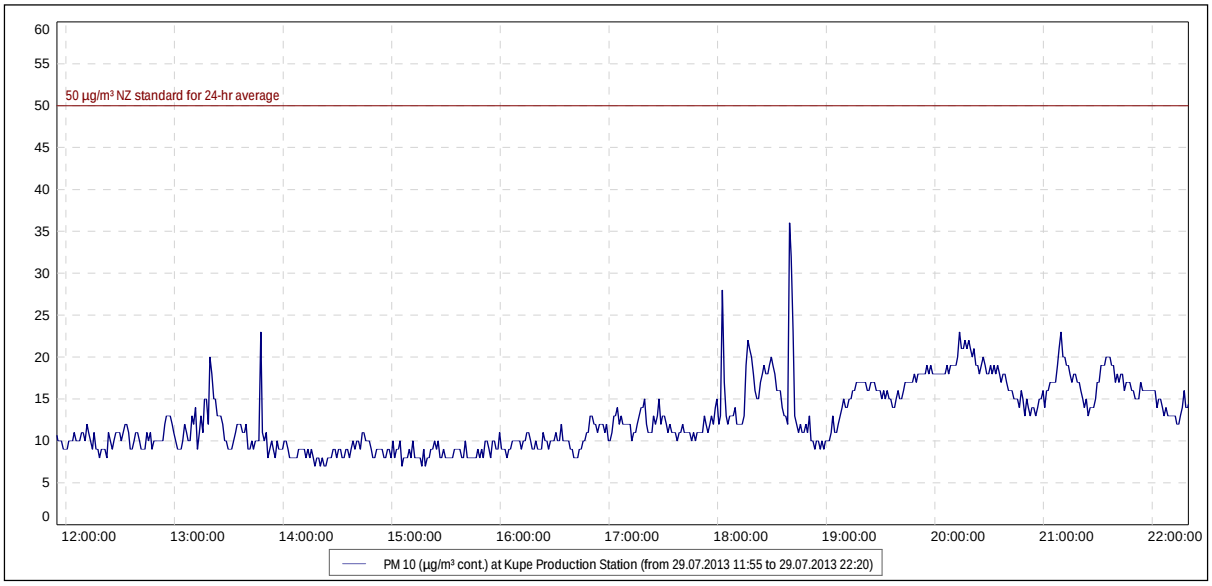

Figure 7 PM_{10} concentration ($\mu g/m^3$) at the Kupe Production Station

The average recorded PM_{10} concentration for the entire 12 hour dataset was 12.6 $\mu g/m^3$. This equates to 25% of the National Environmental Standard for a 24-hour period of 50 $\mu g/m^3$. The maximum recorded PM_{10} concentration over the entire monitoring period was only 36 $\mu g/m^3$.

Background levels of PM_{10} in the region have been found to be around 11 $\mu g/m^3$.

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 the consent holder. 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 courses 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 Unauthorised Incident Register (UIR) 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 2013-2014 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with the Company's conditions in resource consents or provisions in Regional Plans.

3. Discussion

3.1 Discussion of site performance

The Councils own Investigating Officer whom reports in relation to the Companies Consent compliance described the site performance as commendable on one occasion; the routine inspections continual describe the site as consistently clean and well managed. Bunded areas and ring drains continually demonstrated they were being managed in an acceptable manner for example.

They also conduct regular inspections and reviews of all workplace aspects that have the potential to affect Health, Safety or the Environment. This has been evident through the monitoring period as highlighted by the Investigating Officer.

3.2 Environmental effects of exercise of consents

Physio-chemical monitoring of the stormwater discharge in relation to the Kupe site recorded concentrations well below the consent conditions. The receiving waters also were reported to be unaffected by the discharge. Of note, the Company discharged stormwater on request of the Council, as a result a slight increase in the temperature was recorded downstream. However, after suitable mixing this was deemed a negligible effect. The normal discharge of the storm water is often undertaken during periods of higher flow within the Kapuni Stream.

The Company data with regard to the abstraction data from the borefield detailed no exceedance in terms of quantity extracted, in line with consent conditions.

The biannual bio-monitoring of the Kapuni Stream, to detect if any adverse affect had occurred in the species abundance and diversity as a result of the discharge, reported that no affect could be measured and the stream was '*good*' to '*better than expected*' condition.

No exceedance of Carbon Monoxide (CO), significant emission of Lower Explosive Limit (LEL) gas or Particulate Matter 10 (PM_{10}) was detected during the air quality analysis undertaken by the Council.

As such the overall performance and the effects of the exercise of this consent details the site has little or minimal effect on the surrounding environment.

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Tables 6 – 14. .

Table 6 Summary of performance for Consent 6531-1 to disturb the foreshore and seabed to lay pipelines

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application		Yes
2. Pipe laying management plan to be provided	Provided February 2007	Yes
3. Programme of installation to be provided	Provided February 2007	Yes
4. Notification prior to maintenance work	Notification received	Yes
5. Contingency plan to be provided		Yes
6. BPO to prevent or minimise adverse effects		Yes
7. Seabed disturbance to be minimised		Yes
8. Disturbance to be within a 100 m corridor		Yes
9. Disturbance to comply with noise standards		Yes
10. Work to cease on discovery of archaeological remains		N/A
11. Consent holder to undertake pre and post lay monitoring surveys	Surveys complete	Yes
12. Lapse of consent		N/A
13. Optional review provision re environmental effects	Next optional review scheduled in June 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 7 Summary of performance for Consent 6532-1 to erect up to four pipelines

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application		Yes
2. Pipe laying management plan to be provided	Provided February 2007	Yes
3. Programme of installation to be provided		Yes
4. Notification prior to maintenance work	Notification received	Yes
5. Contingency plan to be provided		Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
6. BPO to prevent or minimise adverse effects		Yes
7. Disturbance to comply with noise standards		Yes
8. Survey and map of position of pipeline to be provided	Provided by consent holder	Yes
9. Consent holder to undertake pre and post lay monitoring surveys	Surveys complete	Yes
10. Structures to be removed and area reinstated if and when no longer required		N/A
11. Lapse of consent		N/A
12. Optional review provision re environmental effects	Next optional review scheduled in June 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 8 Summary of performance for Consent 6533-1 to occupy the coastal marine area

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application		Yes
2. Public access to be maintained		Yes
3. Notification prior to works involving restriction of public access		N/A
4. Consent holder to survey and map position of the structure	Provided by consent holder	Yes
5. Lapse of consent		N/A
6. Optional review provision re environmental effects	Next optional review scheduled in June 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 9 Summary of performance for Consent 6543-1 to discharge pipeline hydrotesting water and treated stormwater

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application	Inspections	Yes
2. Plans of stormwater catchment and drainage pathways to be provided on completion of site	Received	Yes
3. Notification prior to exercise of consent	Received	Yes
4. Consent holder to review contingency plan for the site to include Dangerous Goods Store (DGS)	Most recent update review 07/11/2014	N/A
5. Consent holder to adopt BPO	Site inspections	Yes
6. All discharges to be treated through stormwater treatment system (excluding DGS)	Site inspections	Yes
7. All hazardous substance storage areas to be bunded	Site inspections	Yes
8. Limits on contaminants in discharge	Sampling	Yes
9. Effects in receiving water	Site inspections and biomonitoring	Yes
10. Lapse of consent		N/A
11. Optional review provision re environmental effects	Next optional review scheduled in June 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 10 Summary of performance for Consent 6545-1 to discharge emissions to air

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application	Site inspections	Yes
2. Consent holder to adopt BPO	Site inspections	Yes
3. Most appropriate process equipment to minimise emissions	Site inspections	Yes
4. Consent holder to provide analysis of typical gas stream on request	Not requested during period under review	N/A
5. Consent holder to supply Council with report in May each year	Received July 2013	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
6. Consent holder to consult with Council prior to significantly altering equipment or processes		N/A
7. Consent holder to provide a final site layout prior to commencement of production	Received	Yes
8. Notification to neighbours prior to commissioning	Letter sent by Origin Energy in October 2009	Yes
9. Notification of incidents	No incidents reported	Yes
10. Consent holder to supply record of all smoke emitting incidents upon request	Not requested during period under review	N/A
11. Consent holder to maintain a log of all continuous flaring incidents	Report provided	Yes
12. All practicable steps undertaken to minimise flaring	Measures discussed in Flaring report	Yes
13. Prevention of dense black smoke from being discharged from flare	Site inspections	Yes
14. Consent holder to notify Council of continuous flaring	Received	Yes
15. Discharge not to give rise to odour, dust or smoke beyond the boundary	Site inspections	Yes
16. Discharge not to give rise to hazardous, toxic or noxious contaminant beyond the boundary	Site inspections	Yes
17. Limits on carbon monoxide in the discharge	Air monitoring	Yes
18. Limits on nitrogen dioxide in discharge	Not measured during period under review	N/A
19. Limits on other contaminants	Air monitoring	Yes
20. Lapse of consent		N/A
21. Optional review of consent	Next optional review scheduled in June 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 11 Summary of performance for Consent 6546-1 to discharge emissions to air as products of combustion from the Kupe Production Station involving equipment burning natural gas as fuel where the maximum heat release is in excess of 10 megawatts, together with emissions

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application	Site inspections	Yes
2. Consent holder to adopt BPO	Site inspections	Yes
3. Most appropriate process equipment to minimise emissions	Site inspections	Yes
4. Consent holder to provide analysis of typical gas stream on request	Not requested during period under review	N/A
5. Consent holder to supply Council with report in May each year	Received July 2012	Yes
6. Consent holder to consult with Council prior to significantly altering equipment or processes	No alterations	Yes
7. Consent holder to provide a final site layout prior to commencement of production	Received	Yes
8. Notification of incidents	No incidents reported	Yes
9. Consent holder to supply record of all smoke emitting incidents upon request	Not requested during period under review	N/A
10. Discharge not to give rise to dangerous levels of contaminants at or beyond boundary	Air quality monitoring	Yes
11. Discharge not to give rise to odour, dust or smoke beyond the boundary	Air quality monitoring and inspections	Yes
12. Discharge not to give rise to hazardous, toxic or noxious contaminant beyond the boundary	Air quality monitoring	Yes
13. Limits on carbon monoxide in the discharge	Air quality monitoring	Yes
14. Limits on nitrogen dioxide in discharge	Not measured during period under review	Yes
15. Limits on other contaminants	Air quality monitoring	Yes
16. Lapse of consent		N/A
17. Optional review of consent	Next optional review scheduled in June 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 12 Summary of performance for Consent 6629-1 to place a cable on the seabed

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application		Yes
2. Pipe laying management plan to be provided	Provided in 2007	Yes
3. Programme of installation to be provided	Provided in 2007	Yes
4. Notification prior to maintenance work	Notification received	Yes
5. Contingency plan to be provided		Yes
6. BPO to prevent or minimise adverse effects		Yes
7. Works to comply with noise standards		Yes
8. Consent holder to survey and map position of structures	Provided by consent holder	Yes
9. Pre-lay and post-lay monitoring surveys of pipeline corridor	Surveys completed	Yes
10. Structures removed and area reinstated when no longer required		N/A
11. Lapse of consent		N/A
12. Review of consent	Next optional review scheduled in June 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 13 Summary of performance for Consent 6979-1 to install seven water bores

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application		Yes
2. Consent holder to supply bore completion log	Provided in 2007	Yes
3. Bores to be cased and sealed	Site inspections	Yes
4. Consent holder to mitigate any adverse environmental effects		Yes
5. Consent holder to decommission bores when no longer required		N/A
6. Written notification of decommission	Provided in 2007	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
7. Lapse of consent		N/A
8. Review of consent	Next optional review scheduled in June 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 14 Summary of performance for Consent 7010-1 to take and use groundwater

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application		Yes
2. Notification prior to exercise of consent	Notification received in October 2006	Yes
3. Results of pump test to be provided	Provided in March 2007	Yes
4. Volume of abstraction not to exceed 3500m^3 day and 40 l/s	Provision of records by Company, received and detailed in Section 2.2.2	Yes
5. Abstraction not to cause more than 10% lowering of static water level	Not monitored during period under review	N/A
6. Abstraction not to cause the intrusion of saltwater	Not monitored during period under review	N/A
7. Consent holder to maintain daily records of abstraction	Received July 2014	Yes
8. Consent holder to install groundwater monitoring piezometers		Yes
9. Consent holder to install a water meter	Installed in 2007	Yes
10. Consent subject to monitoring by Council	Not monitored during period under review	N/A
11. Lapse of consent		N/A
12. Review of consent	Next optional review scheduled in June 2017	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

During the year, the Company demonstrated a High level of environmental and a High level of administrative performance with the resource consents as defined in Section 1.1.4. This was echoed by the Council's Investigating Officer, whereby the site was described as well managed, which demonstrated a proactive attitude by the Site Management.

The physio-chemical sampling of the stormwater discharge and surface water samples dictated the Company was in compliance with its consent conditions, this was also reflected in the biological health of the Kapuni Stream, whereby Council monitoring staff described the stream communities as 'fair' to 'good' generic health and 'expected' to 'better than expected' for the predicted condition recorded in Taranaki ringplain streams at similar altitudes and distances from the National Park boundary.

3.4 Recommendations from the 2012-2013 Annual Report

In the 2012-2013 Annual Report, it was recommended:

THAT monitoring of consented activities at the Kupe Production Station in the 2012-2013 year continues at the same level as in 2011-2012.

3.5 Alterations to monitoring programmes for 2014-2015

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 the obligations of the Act in terms of monitoring emissions/discharges and effects, and subsequently reporting 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 2014-2015 the monitoring programme will continue with the same degree of analysis, as the current program is fit for purpose. However, for the proposed monitoring period 2014-15, the analysis of the oxides of Nitrogen is proposed as this has not be quantified in this monitoring period or the previous monitoring period.

3.6 Exercise of optional review of consent

Resource consents 6543-1, 6546-1, 6531-1, 6629-1, 6532-1, 6545-1, 6979-1, 6533-1 and 7010-1 provide for an optional review of the consent's conditions in June 2017.

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 or grounds to exercise the review option.

The Company is deemed to have complied with the exercise of there consents as detailed in there original applications.

4. Recommendations

1. THAT monitoring of consented activities at Kupe Production Station in the 2014-2015 year continue at the same level as in 2013-2014 with the inclusion of the analysis of oxides of Nitrogen (NOx) to the air quality monitoring undertaken by the Council.

2. THAT the option for a review of resource consent(s) in June 2017, as set out in the final condition of each of the nine consents held by the Company not be exercised until the proposed date, or until such a time that the Conditions have not been met.

Glossary of common terms and abbreviations

The following abbreviations and terms may be used within this report:

Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
Bund	A wall around a tank to contain its contents in the case of a leak.
CBOD	Carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m^3s^{-1}).
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
E.coli	Escherichia coli, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Ent	Enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre of sample.
F	Fluoride.
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Fresh	Elevated flow in a stream, such as after heavy rainfall.
$g/m^2/day$	$grams/metre^2/day$
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
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.
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.
m^2	$Metres^{2.}$

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.
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).
NO_3	Nitrate, 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 including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
UI	Unauthorised Incident.
UIR	Unauthorised 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.

*an abbreviation for a metal or other analyte may be followed by the letters 'As', to denote the amount of metal recoverable in acidic conditions. This is taken as indicating the total amount of metal that might be solubilised under extreme environmental conditions. The abbreviation may alternatively be followed by the letter 'D', denoting the amount of the metal present in dissolved form rather than in particulate or solid form.

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

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Appendix I

Resource consents held by Origin Energy Kupe Production Station

03-01-011/01

12674

6533-1

Office of Hon Chris Carter
MP for Te Atatu
Minister of Conservation
Minister of Housing
Minister for Ethnic Affairs

- 9 DEC 2005

Peter Canvin
Consents Manager
Taranaki Regional Council
Private Bag 713
Stratford

Dear Mr Canvin

Attached for your information is a copy of the coastal permit that I have recently granted to Origin Energy Resources [Kupe] Limited for the RCA activities associated with laying pipelines for the development of the Kupe Gas Field.

I have made the permit subject to the conditions recommended to me by the Hearing Committee, as amended by the consent order of the Environment Court.

My reasons for the decision are the same as those given by the Hearing Committee and adopted by the Environment Court.

Please note that I have advised the applicant and my appointee on the Hearing Committee, Ms Byrdie Ayres, of my decision. I understand you will be notifying other interested parties of my decision in line with the provisions of section 119A(b) and section 114 of the Resource Management Act 1991.

Yours sincerely

Hon Chris Carter MP
Minister of Conservation

Encl.

Parliament Buildings, Wellington, New Zealand Telephone: 64 4 470 6568, Facsimile: 64 4 472 8034
Email: ccarter@ministers.govt.nz Website: www.beehive.govt.nz

COASTAL PERMIT

TRC – Applications: 3501 (Consent 6531)
3502 (Consent 6532)
3503 (Consent 6533)

Pursuant to the provisions of section 119 of the Resource Management Act 1991, I Chris Carter, Minister of Conservation, hereby grant Origin Energy Resources [Kupe] Limited a coastal permit (No. SAR-05-49-03-08) to: disturb the foreshore and seabed in order to lay up to four pipelines and one power/fibre optic cable connecting an offshore wellhead/platform to the foreshore at mean high water spring; for the containment of more than 50,000 litres of petroleum, petroleum products and chemicals; and for the occupation of the coastal marine area for a pipeline corridor up to 500 metres wide and a length of up to 23 kilometers from mean high water spring to the outer limits of the territorial sea , generally in accordance with the application and subject to the attached conditions of consent.

Dated at Wellington this 9th day of December 2005

Hon Chris Carter

Minister of Conservation

10. Except with the written agreement of the Chief Executive, Taranaki Regional Council, all structures authorised by this consent shall be removed and the area[s] reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Chief Executive, Taranaki Regional Council in writing at least 1 month prior to any structure[s] removal. Reinstatement shall be to the satisfaction of the Chief Executive, Taranaki Regional Council.

11. This consent shall lapse on the expiry of five [5] years after the date of commencement 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.

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 and/or June 2023 and/or June 2029 and/or June 2034, 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.

Application 3503 [consent 6533]: occupy [restricted coastal activity]

3. That application 3503, to occupy the coastal marine area for a distance of 250 metres either side of the centre-line of a 100 metre wide pipeline corridor, from the outer limit of the territorial sea of New Zealand to mean high water spring, in a manner that will restrict public access, be submitted to the Minister of Conservation for approval so that the consent reads:

> to occupy the coastal marine area for a 100 metre wide pipeline corridor, from the outer limit of the territorial sea of New Zealand to mean high water spring

for a period to 1 June 2039, with provision for review in June 2011 and/or June 2017 and/or June 2023 and/or June 2029 and/or June 2034, subject to the following recommended conditions:

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. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 3503. In the case of any contradiction between the documentation submitted in support of application 3503 and the conditions of this consent, the conditions of this consent shall prevail.

2. With the exception of the area required for safety purposes during: construction, inspection, maintenance or removal, of the structure[s] licensed by coastal permit 6532 and 6629; or the disturbance licensed by coastal permit 6531, the exercise of this consent shall not prevent the free passage of any member of the public through the coastal marine area [subject however to any restrictions imposed under the Submarine Cables and Pipelines Protection Act 1996 in relation to fishing operations].

3. The consent holder shall notify the Chief Executive, Taranaki Regional Council in writing at least 48 hours prior to commencement and upon completion of any subsequent maintenance works which would involve restriction of public access within the coastal marine area.

4. The consent holder shall survey and map the position of the structure[s] within 90 days of the completion of their construction, and shall provide a copy of the plan showing the precise location [to within plus or minus 5 metres] of the structure[s] on the seabed, and the location of the occupied areas to the Taranaki Regional Council, the Hydrographic Office, Royal New Zealand Navy, and the Maritime Safety Authority.

5. This consent shall lapse on the expiry of five [5] years after the date of commencement 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.

6. 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 and/or June 2023 and/or June 2029 and/or June

2034, 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.

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:	Origin Energy Resources (Kupe) Limited P O Box 38721 Petone WELLINGTON
Consent Granted Date:	1 November 2006

Conditions of Consent

Consent Granted:	To install, construct and maintain up to seven water bores for horizontal directional drilling, pipeline hydro-testing, and production station operation purposes at or about GR: P21:099-802
Expiry Date:	1 June 2039
Review Date(s):	June 2011, June 2017, June 2023, June 2029, June 2034
Site Location:	Lower Inaha Road, Inaha
Legal Description:	Subdivision 1 Sec 54 Blk VII Waimate SD
Catchment:	Inaha

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 in general accordance with the documentation submitted in support of application 4392. In the case of any contradiction between the documentation submitted in support of application 4392 and the conditions of this consent, the conditions of this consent shall prevail.

2. The consent holder shall, within 28 days of the completion of each bore, provide a bore completion log to the satisfaction of the Chief Executive, Taranaki Regional Council.

3. The bores shall be cased and sealed to prevent the potential for aquifer cross-contamination and/or leakage from the surface.

4. The consent holder shall take all reasonable steps to mitigate any adverse environmental effects that may be caused by structural failure in any of the bores.

5. The consent holder shall properly decommission any bore no longer required.

6. The consent holder shall provide written notification to the Chief Executive, Taranaki Regional Council following the decommissioning of any bore, within 28 days of completion.

7. This consent shall lapse on the expiry of five years after the date of commencement 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.

8. 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 and/or 2023 and/or 2029 and/or 2034 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 1 November 2006

For and on behalf of
Taranaki Regional Council

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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:	Origin Energy Resources (Kupe) Limited P O Box 38721 Petone WELLINGTON
Change To Conditions Date:	2 April 2007 [Granted: 21 June 2005]

Conditions of Consent

Consent Granted:	To discharge emissions to air from combustion involving the flaring of petroleum products incidental to the treatment of gas at the Kupe Production Station at or about GR: P21:098-802
Expiry Date:	1 June 2039
Review Date(s):	June 2007, June 2009, June 2011, June 2017, June 2023, June 2029, June 2034
Site Location:	Kupe Project, west of Inaha Road, east of Kapuni Road [being a paper road] and south of Siggs Road [being a paper road], Inaha, Manaia
Legal Description:	Secs 55 and Pt Secs 53 and Sbdn 1 of Pt Sec 54 [DP 2201] Blk VII Waimate SD

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

Condition 1 – changed

1. The exercise of this consent shall be undertaken in general accordance with the documentation submitted in support of applications 3515 and 4498. In the case of any contradiction between the documentation submitted in support of application 3515 and 4498 and the conditions of this consent, the conditions of this consent shall prevail.

Conditions 2 to 5 – unchanged

2. 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 actual or likely adverse effects on the environment associated with the discharge of contaminants into the environment arising from the emissions to air from the flare.

3. The consent holder shall minimise the emissions and impacts of air contaminants discharged from the flare by the selection of the most appropriate process equipment, process control equipment, emission control equipment, methods of control, supervision and operation, and the proper and effective operation, supervision, control and maintenance of all equipment and processes.

4. The consent holder shall make available to the Chief Executive upon request an analysis of a typical gas and/or condensate stream from the Kupe field, covering sulphur compound content and the content of compounds containing six or more carbon atoms in their molecular structure.

5. The consent holder shall provide to the Taranaki Regional Council during May of each year, for the duration of this consent, a report:

a) detailing gas combustion at the production station flares, including but not restricted to routine operational flaring and flaring logged as per condition 11;

b) detailing any measures that have been undertaken by the consent holder to improve the energy efficiency of the production station;
c) detailing any measures to reduce smoke emissions;
d) detailing any measures to reduce flaring,
e) addressing any other issue relevant to the minimisation or mitigation of emissions from the production station flare; and
f) detailing any complaints received and any measures undertaken to address complaints.

Condition 6 – changed

6. Prior to undertaking any alterations to the plant equipment, processes or operations, which may substantially alter the nature or quantity of flare emissions other than as notified in consent applications 3515 and 4498, the consent holder shall first consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991.

Conditions 7 to 21 – unchanged

7. Prior to the commencement of production, the consent holder shall supply to the Chief Executive, Taranaki Regional Council, a final site lay-out plan, demonstrating configuration of the facilities and equipment so as to avoid or mitigate the potential effects of air emissions.

8. At least 3 days before the commissioning of the plant, the consent holder shall undertake all practicable measures to notify owners or occupiers of properties within 1 kilometre of the boundary of the property on which the production station flare is located, of the possibility of flaring and smoke emissions. The consent holder shall include in the notification a 24-hour contact telephone number for a representative of the consent holder.

9. Any incident having an environmental effect or potential effect which has caused or is liable to cause substantiated complaint or a hazardous situation beyond the boundary of the property on which the production station flare is located, shall be notified to the Taranaki Regional Council, as soon as possible, followed by a written report to the Chief Executive, Taranaki Regional Council, within one week of the incident, with comment about the measures taken to minimise the impact of the incident and to prevent re-occurrence.

10. The consent holder shall keep and make available to the Chief Executive, Taranaki Regional Council, upon request, a record of all smoke emitting incidents, noting time, duration and cause. The consent holder shall also keep, and make available to the Chief Executive, upon request, a record of all complaints received as a result of the exercise of this consent.

11. The consent holder shall keep and maintain a log of all continuous flaring incidents longer than 5 minutes and any intermittent flaring lasting for an aggregate of 10 minutes or longer in any 60-minute period. Such a log shall contain the date, the start and finish times, the quantity and type of material flared, and the reason for flaring.

This log shall be made available to the Chief Executive, Taranaki Regional Council, upon request, and summarised annually in the report required under condition 5. Flaring, under normal operation in the low pressure flare, of rich mono-ethylene glycol degasser vapour, condensate tank vapours, non-condensibles from tri-ethylene glycol/mono-ethylene glycol regeneration and purge gas shall be excluded from this requirement.

12. All practicable steps shall be taken to minimise flaring.

13. Other than in emergencies, the rate of depressurisation of the plant, or sections of the plant, shall be managed to prevent dense black smoke from being discharged from the flare.

14. The consent holder shall, whenever practicable, notify the Chief Executive, Taranaki Regional Council, whenever the continuous flaring of hydrocarbons [other than the flaring of rich mono-ethylene glycol degasser vapour, condensate tank vapours, non-condensibles from tri-ethylene glycol/mono-ethylene glycol regeneration and purge gas] is expected to occur for more than five minutes in duration.

15. The discharges authorised by this consent shall not, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent, give rise to any levels of odour or dust or smoke that are offensive or obnoxious or objectionable at or beyond the site boundary in the opinion of an enforcement officer of the Taranaki Regional Council.

16. The consent holder shall not discharge any contaminant to air from the site at a rate or a quantity such that the contaminant, whether alone or in combination with other contaminants, is or is liable to be hazardous or toxic or noxious at or beyond the boundary of the property where the production station is located, or at any dwellinghouse.

17. The consent holder shall control all discharges of carbon monoxide to the atmosphere from the flare, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent, in order that the maximum ground level concentration of carbon monoxide arising from the exercise of this consent measured under ambient conditions does not exceed 10 milligrams per cubic metre [eight-hour average exposure], or 30 milligrams per cubic metre [one-hour average exposure] at or beyond the boundary of the property on which the production station flare is located.

18. The consent holder shall control all discharges of nitrogen dioxide or its precursors to the atmosphere from the flare, whether alone or in conjunction with any other discharges to the atmosphere from the site arising through the exercise of any other consent, in order that the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 200 micrograms per cubic metre [one hour average exposure], or 100 micrograms per cubic metre [twenty-four hour average exposure], at or beyond the boundary of the property on which the production station flare is located.

19. The consent holder shall control discharges to the atmosphere from the flare of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent, in order that the maximum ground level concentration for any particular contaminant arising from the exercise of this consent, measured at or beyond the boundary of the property on which the production station flare is located, is not increased above background levels:

    a) by more than 1/30th of the relevant Workplace Exposure Standard-Time Weighted Average [exposure averaged over a duration as specified for the Workplace Exposure Standard-Time Weighted Average], or by more than 1/10th of the Workplace Exposure Standard-Short Term Exposure Limit over any short period of time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour]; or
    b) if no Short Term Exposure Limit is set, by more than the General Excursion Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour].

20. This consent shall lapse on the expiry of five [5] years after the date of commencement 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.

21. 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 within six months of receiving a report prepared by the consent holder pursuant to condition 5 of this consent, or by giving notice of review during the month of June 2007 and/or June 2009 and/or June 2011 and/or June 2017 and/or June 2023 and/or June 2029 and/or June 2034, for the purposes of:

    a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was 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 the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; and/or
    c) to alter, add or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant or contaminants; and/or
    d) taking into account any Act of Parliament, regulation, national policy statement or national environmental standard which relates to limiting, recording, or mitigating emissions of carbon dioxide and/or nitrogen dioxide, and which is relevant to the air discharge from the Kupe Production Station.

Signed at Stratford on 2 April 2007

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Coastal Permit

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

Name of Consent Holder:	Origin Energy Resources (Kupe) Limited 12 Waione Street Petone WELLINGTON
Consent Granted Date:	28 October 2005

Conditions of Consent

Consent Granted:	To erect, place, use, reconstruct, alter, extend and maintain within the coastal marine area one power/fibre optic cable connecting an offshore wellhead/platform to the foreshore at mean high water spring, with structures situated under the seabed from approximately 1200 metres offshore to mean high water spring, and the related occupation of the seabed at or about GR: P21:099-794
Expiry Date:	1 June 2039
Review Date(s):	June 2011, June 2017, June 2023, June 2029, June 2034
Site Location:	Kupe Project, offshore pipelines, from mean high water spring directly south of Inaha Road, Inaha, Manaia, to the coastal marine area boundary 22 km further south
Catchment:	Tasman Sea

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. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 3502, and special condition 2. In the case of any contradiction between the documentation submitted in support of application 3502 and the conditions of this consent, the conditions of this consent shall prevail.

2. At least one month prior to the exercise of this consent the consent holder shall provide, to the written satisfaction of the Chief Executive, Taranaki Regional Council, a detailed pipe laying management plan. The purpose of the management plan is to set out the investigations to be undertaken and the procedure to be adopted to minimise the disturbance to the seabed as a result of laying the pipelines. The management plan shall include, as a minimum:

   a) a description of the results of the investigations undertaken by remotely operated vehicle to determine the optimum pipeline route;
   b) a description of the method to be used to remove boulders from the pipeline route;
   c) the timeframe over which the boulder clearing will be undertaken;
   d) confirmation that the proposed activity is generally in accordance with the application and supporting documentation, and will comply with all the conditions of this consent; and
   e) an outline of the measures to be used to ensure that consent conditions will be met.

   The management plan shall be prepared in consultation with interested submitters to the application. However, the consent holder shall not be in breach of this condition if any party choses not to comment on the draft management plan. Nor is the consent holder under any obligation to incorporate any particular suggestions or proposals advanced by any party.

3. At least 10 working days prior to the commencement of works the consent holder shall provide the Taranaki Regional Council with a programme for the installation/construction of the structure[s], including: a schedule of proposed start dates and an estimation of the duration of the works, and details of the contractor including contact information for the project manager.

4. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to commencement and upon completion of any subsequent maintenance works which would involve disturbance of, or deposition, or discharge to, the coastal marine area.

5. Prior to the exercise of this consent the consent holder shall provide, to the satisfaction of the Chief Executive, Taranaki Regional Council, a written construction contingency plan, outlining measures to be undertaken in the event of a spill as a result of works authorised by this consent. Further, prior to the exercise of this consent the consent holder shall provide to the Chief Executive, Taranaki Regional Council, written confirmation of the acceptance by the Maritime Safety Authority of a New Zealand Offshore Installation Site Marine Oil Spill Contingency Plan.

6. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to avoid or minimise the discharge of any contaminants into coastal water or onto the foreshore or seabed and to avoid or minimise any adverse effects on coastal water quality or ecosystems.

7. The construction, use, maintenance and removal of the structure[s] authorised by this consent shall comply with the noise standards as outlined within section 4.4.3 of the Regional Coastal Plan for Taranaki.

8. The consent holder shall survey and map the position of the structure[s], [including details of the structure[s] position in relation to the seabed], within 90 days of the completion of their construction, and shall provide a copy of the plan showing the precise location [to within plus or minus 5 metres] of the structure[s] on/in the seabed, to the Taranaki Regional Council, the Hydrographic Office, Royal New Zealand Navy, and the Maritime Safety Authority.

9. The consent holder shall undertake pre-lay and post-lay monitoring surveys of the pipeline corridor, to the satisfaction of the Chief Executive, Taranaki Regional Council. The monitoring shall include one survey prior to disturbance, one survey immediately following laying of the pipelines, and one survey approximately 1 year following laying of the pipelines. The results of the monitoring shall be provided to the Chief Executive, Taranaki Regional Council, upon request.

10. Except with the written agreement of the Chief Executive, Taranaki Regional Council, all structures authorised by this consent shall be removed and the area[s] reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Chief Executive, Taranaki Regional Council in writing at least 1 month prior to any structure[s] removal. Reinstatement shall be to the satisfaction of the Chief Executive, Taranaki Regional Council.

11. This consent shall lapse on the expiry of five [5] years after the date of commencement 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.

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 and/or June 2023 and/or June 2029 and/or June 2034, 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 28 October 2005

For and on behalf of
Taranaki Regional Council

_____

Director-Resource Management

Consent 6546-1

TARANAKI REGIONAL COUNCIL
CHIEF EXECUTIVE
PRIVATE BAG 713
47 CLOTEN ROAD
STRATFORD
NEW ZEALAND
PHONE: 06-765 7127
FAX: 06-765 5097
www.trc.govt.nz

Please quote our file number on all correspondence

Discharge Permit

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

Name of Consent Holder:	Origin Energy Resources (Kupe) Limited 12 Waione Street Petone WELLINGTON	New Address: Private Mail Bag 2022 New Plymouth 4342
Consent Granted Date:	21 June 2005	

Conditions of Consent

Consent Granted:	To discharge emissions to air as products of combustion from the Kupe Production Station involving equipment burning natural gas as fuel where the maximum heat release is in excess of 10 megawatts, together with miscellaneous emissions at or about GR: P21:098-802
Expiry Date:	1 June 2039
Review Date(s):	June 2007, June 2009, June 2011, June 2017, June 2023, June 2029, June 2034
Site Location:	Kupe Production Station, west of Inaha Road, east of Kapuni Road [being a paper road] and south of Siggs Road [being a paper road], Inaha, Manaia
Legal Description:	Secs 55 56 Pt Secs 53 54 Sbdn 1 of Pt Sec 53 Sbdn 1 of Pt Sec 54 DP 2201 Blk VII Waimate SD Sec 17 Blk VIII Waimate SD

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 generally in accordance with the documentation submitted in support of application 3516. In the case of any contradiction between the documentation submitted in support of application 3516 and the conditions of this consent, the conditions of this consent shall prevail.

2. 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 actual or likely adverse effects on the environment associated with the discharge of contaminants into the environment arising from the emissions to air from the site.

3. The consent holder shall minimise the emissions and impacts of air contaminants discharged from the site by the selection of the most appropriate process equipment, process control equipment, emission control equipment, methods of control, supervision and operation, and the proper and effective operation, supervision, control and maintenance of all equipment and processes.

4. The consent holder shall make available to the Chief Executive, Taranaki Regional Council, upon request an analysis of a typical gas and/or condensate stream from the Kupe field, covering sulphur compound content and the content of compounds containing six or more carbon atoms in their molecular structure.

5. The consent holder shall provide to the Taranaki Regional Council during May of each year, for the duration of this consent, a report:

a) detailing gas combustion at the production station;
b) detailing any measures that have been undertaken by the consent holder to improve the energy efficiency of the production station;
c) detailing any measures to reduce smoke emissions;
d) detailing any measures to reduce flaring;
e) addressing any other issue relevant to the minimisation or mitigation of emissions from the production station; and
f) detailing any complaints received and any measures undertaken to address complaints.

6. Prior to undertaking any alterations to the plant, processes or operations, which may significantly change the nature or quantity of contaminants emitted to air from the site, the consent holder shall first consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991.

7. Prior to the commencement of production, the consent holder shall supply to the Chief Executive, Taranaki Regional Council, a final site lay-out plan, demonstrating configuration of the facilities and equipment so as to avoid or mitigate the potential effects of air emissions.

8. Any incident having an environmental impact or potential environmental impact which has caused or is liable to cause substantiated complaint or a hazardous situation beyond the boundary of the property on which the production station is located, shall be notified to the Taranaki Regional Council, as soon as possible, followed by a written report to the Chief Executive, Taranaki Regional Council, within one week of the incident, with comment about the measures taken to minimise the impact of the incident and to prevent re-occurrence.

9. The consent holder shall keep and make available to the Chief Executive, Taranaki Regional Council, upon request, a record of all smoke emitting incidents and all relief valve releases, noting time, duration and cause. The consent holder shall also keep, and make available to the Chief Executive, upon request, a record of all complaints received as a result of the exercise of this consent.

10. The discharges authorised by this consent shall not, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent, give rise to any dangerous levels of airborne contaminants at or beyond the boundary of the property including but not limited to any risk of fire or explosion.

11. The discharges authorised by this consent shall not, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent, give rise to any levels of odour or dust or smoke that are offensive or obnoxious or objectionable at or beyond the boundary of the property on which the production station is located in the opinion of an enforcement officer of the Taranaki Regional Council.

12. The consent holder shall not discharge any contaminant to air from the site at a rate or a quantity such that the contaminant, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent, is or is liable to be hazardous or toxic or noxious at or beyond the boundary of the property where the production station is located, or at any dwellinghouse.

13. The consent holder shall control all discharges of carbon monoxide to the atmosphere from the site, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent, in order that the maximum ground level concentration of carbon monoxide arising from the exercise of this consent measured under ambient conditions does not exceed 10 milligrams per cubic metre [eight-hour average exposure], or 30 milligrams per cubic metre [one-hour average exposure] at or beyond the boundary of the property on which the production station is located.

14. The consent holder shall control all discharges of nitrogen dioxide or its precursors to the atmosphere from the site, whether alone or in conjunction with any other discharges to the atmosphere from the site arising through the exercise of any other consent, in order that the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 200 micrograms per cubic metre [one hour average exposure], or 100 micrograms per cubic metre [twenty-four hour average exposure], at or beyond the boundary of the property on which the production station is located.

15. The consent holder shall control discharges to the atmosphere from the site of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent, in order that the maximum ground level concentration for any particular contaminant arising from the exercise of this consent, measured at or beyond the boundary of the property on which the production station is located, is not increased above background levels:

    a) by more than 1/30th of the relevant Workplace Exposure Standard-Time Weighted Average [exposure averaged over a duration as specified for the Workplace Exposure Standard-Time Weighted Average], or by more than 1/10th of the Workplace Exposure Standard-Short Term Exposure Limit over any short period of time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour]; or

    b) if no Short Term Exposure Limit is set, by more than the General Excursion Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour].

16. This consent shall lapse on the expiry of five [5] years after the date of commencement 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.

17. 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 within six months of receiving a report prepared by the consent holder pursuant to condition 5 of this consent, or by giving notice of review during the month of June 2007 and/or June 2009 and/or June 2011 and/or June 2017 and/or June 2023 and/or June 2029 and/or June 2034, for the purposes of:

    a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was 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 the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; and/or

c) to alter, add or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant or contaminants; and/or

d) taking into account any Act of Parliament, regulation, national policy statement or national environmental standard which relates to limiting, recording, or mitigating emissions of carbon dioxide and/or nitrogen dioxide, and which is relevant to the air discharge from the Kupe Production Station.

Signed at Stratford on 21 June 2005

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:	Origin Energy Resources (Kupe) Limited Private Bag 2202 NEW PLYMOUTH 4342
Decision Date [Change]:	13 October 2011
Commencement Date [Change]:	13 October 2011 [Granted: 2 November 2006]

Conditions of Consent

Consent Granted:	To take and use up to 3,500 m^3/day groundwater at a maximum rate of 40 l/s as a combined total from up to seven water bores in a bore field for the purpose of horizontal directional drilling, pipeline hydro-testing, production station operation and operations at the Manutahi-D, Manutahi-C, and Kauri-F wellsites at or about (NZTM) 1699935E-5618466N
Expiry Date:	1 June 2039
Review Date(s):	June 2017, June 2023, June 2029, June 2034
Site Location:	Lower Inaha Road, Inaha [Kupe Production Station/Manutahi-D/Manutahi-C/Kauri-F]
Legal Description:	Subdivision 1 Sec 54 Blk VII Waimate Survey District [Site of take & use]
Catchment:	Inaha

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 in general accordance with the documentation submitted in support of applications 4430, 4585 and 6908 and shall ensure the efficient and effective use of water. In the case of any contradiction between the documentation submitted in support of applications 4430, 4585, and 6908 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 seven days prior to the exercise of this consent.

3. Prior to the exercise of this consent, the consent holder shall provide a report to Chief Executive, Taranaki Regional Council, detailing the results of pump testing (24-hour constant discharge at 40 l/s and recovery tests) of the bores used for water supply to show (1) that the abstraction is sustainable, and (2) the effects of the abstraction on flows in the Inaha Stream and the Kapuni Stream.

4. The volume of groundwater abstracted shall not exceed 3,500 cubic metres per day at a rate not exceeding 40 litres per second as a combined total from the bores in the bore field.

5. The abstraction shall not cause more than a 10% lowering of the static water level by interference in any adjacent registered bore located beyond the boundary of the bore field.

6. The abstraction shall not cause the intrusion of saltwater into any freshwater aquifer.

7. The consent holder shall maintain daily records of the abstraction from each bore including date, abstraction rate and daily volume, and pumping hours, and make these records available to the Chief Executive, Taranaki Regional Council, no later than 31 July of each year, or upon request.

8. Prior to the exercise of this consent for any groundwater bore extracting water from an unconfined aquifer, the consent holder shall install groundwater monitoring piezometers between the Kapuni Stream and Inaha Stream and the bore for the purposes of monitoring groundwater levels.

9. The consent holder shall install and maintain a water meter approved by the Chief Executive, Taranaki Regional Council, on each bore for the purposes of accurately recording the abstraction of water.

10. This consent shall be subject to monitoring by the Taranaki Regional Council and the consent holder shall meet all reasonable costs associated with the monitoring.

11. This consent shall lapse on the expiry of five years after the date of commencement 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.

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 and/or 2023 and/or 2029 and/or 2034, 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 13 October 2011

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Coastal Permit

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

Name of Consent Holder:	Origin Energy Resources (Kupe) Limited Private Bag 2202 NEW PLYMOUTH 4342
Decision Date [change]:	7 March 2012
Commencement Date [change]:	7 March 2012 [Granted: 9 December 2005]

Conditions of Consent

Consent Granted:	To erect, place, use, reconstruct, alter, extend and maintain within the coastal marine area up to six pipelines connecting an offshore wellhead/platform to the foreshore at mean high water spring, with structures situated under the seabed from approximately 1200 metres offshore to mean high water spring, and the related occupation of the seabed at or about (NZTM) 1699850E-5617662N
Expiry Date:	1 June 2039
Review Date(s):	June 2011, June 2017, June 2023, June 2029, June 2034
Site Location:	Kupe Project, offshore pipelines, from mean high water spring directly south of Inaha Road, Inaha, Manaia, to the coastal marine area boundary 22 km further south
Legal Description:	Seabed
Catchment:	Tasman Sea

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 [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

Special conditions

1. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of applications 3502 and 6971, and special condition 2. In the case of any contradiction between the documentation submitted in support of applications 3502 and 6971, and the conditions of this consent, the conditions of this consent shall prevail.

2. At least one month prior to the exercise of this consent the consent holder shall provide, to the written satisfaction of the Chief Executive, detailed plans of the activity to confirm that the proposal is generally in accordance with the application and supporting documentation and will comply with all of the conditions of this consent.

3. At least 10 working days prior to the commencement of works the consent holder shall provide the Taranaki Regional Council with a programme for the installation/construction of the pipeline(s), including: a schedule of proposed start dates and an estimation of the duration of the works, and details of the contractor including contact information for the project manager.

4. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to commencement and upon completion of any subsequent maintenance works which would involve disturbance of, or deposition, or discharge to, the coastal marine area.

5. Prior to the exercise of this consent the consent holder shall provide, to the satisfaction of the Chief Executive, Taranaki Regional Council, a written construction contingency plan, outlining measures to be undertaken in the event of a spill as a result of works authorised by this consent. Further, prior to the exercise of this consent the consent holder shall provide to the Chief Executive, Taranaki Regional Council, written confirmation of the acceptance by the Maritime Safety Authority of a New Zealand Offshore Installation Site Marine Oil Spill Contingency Plan.

6. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to avoid or minimise the discharge of any contaminants into coastal water or onto the foreshore or seabed and to avoid or minimise any adverse effects on coastal water quality or ecosystems.

7. The construction, use, maintenance and removal of the structure(s) authorised by this consent shall comply with the noise standards as outlined within section 4.4.3 of the Regional Coastal Plan for Taranaki.

8. The consent holder shall survey and map the position of the pipeline(s), (including details of the pipeline(s) position in relation to the seabed), within 90 days of the completion of their construction, and shall provide a copy of the plan showing the precise location (to within plus or minus 5 metres) of the structure(s) on/in the seabed, to the Taranaki Regional Council, the Hydrographic Office, Royal New Zealand Navy, and the Maritime Safety Authority.

9. The consent holder shall undertake pre-lay and post-lay monitoring surveys of the pipeline corridor, to the satisfaction of the Chief Executive, Taranaki Regional Council. The monitoring shall include one survey prior to disturbance, one survey immediately following laying of the pipelines, and one survey approximately 1 year following laying of the pipelines. The results of the monitoring shall be provided to the Chief Executive, Taranaki Regional Council, upon request.

10. Except with the written agreement of the Chief Executive, Taranaki Regional Council, all structures authorised by this consent shall be removed and the area(s) reinstated, if and when the structure(s) are no longer required. The consent holder shall notify the Chief Executive, Taranaki Regional Council in writing at least 1 month prior to any structure(s) removal. Reinstatement shall be to the satisfaction of the Chief Executive, Taranaki Regional Council.

11. This consent shall lapse on the expiry of five (5) years after the date of commencement 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.

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 and/or June 2023 and/or June 2029 and/or June 2034, 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 7 March 2012

For and on behalf of
Taranaki Regional Council

_____

Director-Resource Management

Coastal Permit

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

Name of Consent Holder:	Origin Energy Resources (Kupe) Limited Private Bag 2202 NEW PLYMOUTH 4342
Decision Date [change]:	7 March 2012
Commencement Date [change]:	7 March 2012 [Granted: 9 December 2005]

Conditions of Consent

Consent Granted:	To disturb the seabed and foreshore of the coastal marine area by the process of erection, placement, use, alteration, extension, maintenance or removal of up to six pipelines and one power/fibre optic cable connecting an offshore wellhead/platform to the foreshore at mean high water spring at or about (NZTM) 1699850E-5617662N
Expiry Date:	1 June 2039
Review Date(s):	June 2011, June 2017, June 2023, June 2029, June 2034
Site Location:	Kupe Project, offshore pipelines, from mean high water spring directly south of Inaha Road, Inaha, Manaia, to the coastal marine area boundary 22 km further south
Legal Description:	Seabed
Catchment:	Tasman Sea

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 [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance to section 36 of the Resource Management Act.

Special conditions

1. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of applications 3501 and 6970, and special condition 2. In the case of any contradiction between the documentation submitted in support of applications 3501 and 6970, and the conditions of this consent, the conditions of this consent shall prevail.

2. At least one month prior to the exercise of this consent the consent holder shall provide, to the written satisfaction of the Chief Executive, Taranaki Regional Council, detailed plans of the activity to confirm that the proposal is generally in accordance with the application and supporting documentation and will comply with all of the conditions of this consent.

3. At least 10 working days prior to the commencement of works the consent holder shall provide the Taranaki Regional Council with a programme for the disturbance associated with installation/construction (or removal) of the pipeline(s) including: a schedule of proposed start dates and an estimation of the duration of the works, and details of the contractor including contact information for the project manager.

4. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to commencement and upon completion of any subsequent maintenance works which would involve disturbance of, or deposition or discharge to, the coastal marine area.

5. Prior to the exercise of this consent the consent holder shall provide to the satisfaction of the Chief Executive, Taranaki Regional Council, a written contingency plan outlining measures to be undertaken in the event of a spill as a result of works authorised by this consent.

6. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to avoid or minimise the discharge of silt, sediments or any other contaminants into coastal water or onto the foreshore or seabed and to avoid or minimise the disturbance of the foreshore or seabed and any adverse effects on coastal water quality or ecosystems.

7. The consent holder shall ensure that the duration, area and volume of seabed disturbance shall, so far as is practicable, be minimised to the satisfaction of the Chief Executive, Taranaki Regional Council.

8. The consent holder shall ensure that all disturbance, including the placement of displaced boulders, shall be contained within a 100 metre wide disturbance corridor. Outside of the 100 metre wide disturbance corridor the exercise of this consent shall not give rise to any significant adverse ecological effects including effects to kaimoana.

9. The disturbance authorised by this consent shall comply with the noise standards as outlined within section 4.4.3 of the Regional Coastal Plan for Taranaki.

10. In the event that any archaeological remains are discovered as a result of works authorised by this consent, the works shall cease immediately at the affected site and tangata whenua and the Chief Executive, Taranaki Regional Council, shall be notified within one working day. Works may recommence at the affected area when advised to do so by the Chief Executive, Taranaki Regional Council. Such advice shall be given after the Chief Executive has considered: tangata whenua interest and values, the consent holder's interests, the interests of the public generally, and any archaeological or scientific evidence. The New Zealand Police, Coroner, and Historic Places Trust shall also be contacted as appropriate, and the work shall not recommence in the affected area until any necessary statutory authorisations or consent have been obtained.

11. The consent holder shall undertake pre-lay and post-lay monitoring surveys of the pipeline corridor, to the satisfaction of the Chief Executive, Taranaki Regional Council. The monitoring shall include one survey prior to disturbance, one survey immediately following laying of the pipelines, and one survey approximately 1 year following laying of the pipelines. The results of the monitoring shall be provided to the Chief Executive, Taranaki Regional Council, upon request.

12. This consent shall lapse on the expiry of five (5) years after the date of commencement 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.

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 2011 and/or June 2017 and/or June 2023 and/or June 2029 and/or June 2034, 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 7 March 2012

For and on behalf of
Taranaki Regional Council

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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:	Origin Energy Resources (Kupe) Limited Private Bag 2202 NEW PLYMOUTH 4342
Decision Date (Change):	31 January 2013
Commencement Date (Change):	31 January 2013 (Granted: 21 June 2005)

Conditions of Consent

Consent Granted:	To discharge pipeline hydrotesting water and treated stormwater from the Kupe Production Station via a stormwater/firewater storage pond system, and to discharge stormwater from the Dangerous Goods Storage stormwater system into the Kapuni Stream at or about (NZTM) 1699150E-5618661N
Expiry Date:	1 June 2039
Review Date(s):	June 2017, June 2023, June 2029, June 2034
Site Location:	Kupe Production Station, 192 Lower Inaha Road, Inaha, Manaia
Legal Description:	Secs 55 & 56 Pt Secs 53 & 54 Blk VII Waimate SD (Discharge source and site)
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 in general accordance with the documentation submitted in support of applications 3513, 4468, 7277 and special condition 2. In the case of any contradiction between the documentation submitted in support of applications 3513, 4468, 7277 and the conditions of this consent, the conditions of this consent shall prevail.

2. Within one month of the completion of the development of the site the consent holder shall provide, to the written satisfaction of the Chief Executive, Taranaki Regional Council, detailed plans of stormwater catchment and drainage pathways, including clean areas, potentially contaminated areas, and bunded areas, and the containment, treatment and discharge systems put into place.

3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent.

4. The consent holder shall review the contingency plan for the site and include, if necessary, the new Dangerous Goods Store. The consent holder shall provide the plan for the written approval of the Chief Executive, Taranaki Regional Council. The plan shall include site specific details relating to contingency planning for the site.

5. 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 of the discharge on any water body.

6. All stormwater and hydrotest water to be discharged under this permit shall be directed for treatment through the stormwater treatment system for discharge, excluding the stormwater discharge from the Dangerous Goods Storage stormwater system, which shall be discharged into the Kapuni Stream, in accordance with the special conditions of this consent.

7. Any above ground hazardous substances storage areas shall be bunded with drainage to sumps, or other appropriate recovery systems, and not directly to the stormwater catchment.

8. The following concentrations shall not be exceeded in the discharge:

Component	**Concentration**
pH (range)	6.0-9.0
suspended solids	100 gm^{-3}
total recoverable hydrocarbons (infrared spectroscopic technique)	15 gm^{-3}
chloride	50 gm^{-3}

This condition shall apply prior to the entry of the treated stormwater into the Kapuni Stream at a designated sampling point(s) approved by the Chief Executive, Taranaki Regional Council.

9. After allowing for reasonable mixing, within a mixing zone extending 50 metres downstream of the discharge point, the discharge shall not give rise to any of the following effects in the receiving waters of the Kapuni Stream:

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;
e) any significant adverse effects on aquatic life.

10. This consent shall lapse on the expiry of five (5) years after the date of commencement 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.

11. 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 and/or June 2023 and/or June 2029 and/or June 2034, 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 31 January 2013

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Appendix II

Biomonitoring reports

To Job Manager, K Brodie
From Scientific Officer, C R Fowles
Doc No 1300339
Report No CF591
Date October 2013

Biomonitoring of the Kapuni Stream in relation to stormwater discharges from the Kupe Production Station of Origin Energy Resources Ltd, surveyed in October 2013

Introduction

This was the first of two scheduled biomonitoring surveys relating to the Kupe Production Station, for the 2013-2014 monitoring year. Special condition 9e of Consent 6543-1 for the discharge of treated stormwater into the Kapuni Stream requires:
" that after allowing for reasonable mixing over 50 metres downstream of the discharge point, 'there shall be no significant adverse effects on aquatic life'."

Stormwater discharges had occurred consistently through the winter months and during September 2013. This (spring) survey provides additional baseline data in relation to the lower reaches of the Kapuni Stream (see Fowles, 2012a). This section of the stream (approximately 700m from the coast) had had no previous macroinvertebrate monitoring history prior to the inaugural Kupe PS monitoring survey of spring 2009 (CF497). [Note: The Kapuni Stream has an extensive macroinvertebrate database (from 1981 to date) for the length of the stream from its upper reaches at Opunake Road to lower-middle reaches at Normanby Rd (approximately 8km upstream of these Kupe Production Station sites) which is monitored in association with industrial usage in mid-catchment (Stark, 2013 and Fowles, 2012a)].

This spring survey was performed on 8 October 2013 during moderate flow conditions following seven stream freshes over the previous three week period.

Methods

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from riffle habitats at three established sites (sites 1, 2 and 3) in the Kapuni Stream (Table 1, Figure 1) on 8 October 2013. This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001).

Table 1 Biomonitoring sites in the Kapuni Stream, sampled in relation to the Kupe Production Station

Site No.	Site code	Map reference	GPS location	Location
1	KPN000488	BK29:992187	E1699156 N5618688	Upstream of Production Station stormwater discharge
2	KPN000490	BK29:992186	E1699158 N5618595	50 m downstream of Production Station stormwater discharge
3	KPN000492	BK29:992185	E1699237 N5618533	200 m downstream of Production Station stormwater discharge

Samples were preserved with Kahle's Fluid for later sorting and identification under a stereomicroscope according to Taranaki Regional Council methodology using protocol P1 of NZMWG protocols for sampling macroinvertebrates in wadeable streams (Stark et al. 2001). Macroinvertebrate taxa found in each sample were recorded as:

R (rare)	= less than 5 individuals;
C (common)	= 5-19 individuals;
A (abundant)	= estimated 20-99 individuals;
VA (very abundant)	= estimated 100-499 individuals;
XA (extremely abundant)	= estimated 500 individuals or more.

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams. Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1. Sensitivity scores for certain taxa have been modified in accordance with Taranaki experience. By averaging the scores obtained from a list of taxa taken from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. More 'sensitive' communities inhabit less polluted waterways.

A semi-quantitative MCI value (SQMCIs) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these products, and dividing by the sum of the loading factors (Stark, 1998 and 1999). The loading factors were 1 for rare (R), 5 for common (C), 20 for abundant (A), 100 for very abundant (VA) and 500 for extremely abundant (XA). Unlike the MCI, the SQMCIs is not multiplied by a scaling factor of 20, so that its corresponding range of values is 20x lower.

Results and discussion

At the time of this survey there was a moderately low, uncoloured flow in the Kapuni Stream at all sites upstream and downstream of the production station stormwater outfall. Flow rate at the TRC Normanby Road recorder site was 1670 litres/sec which represented a flow well above the minimum monthly mean October flow (973 litres/sec) but below the average monthly mean October flow (2,462 litres/sec) recorded for the period 1999-2012. The survey was performed seven days after a fresh in excess of 3x median river flow and 12 days after a fresh in excess of 7x median flow conditions. Water temperature at each of these three sites was 13.1˚C at the time of this mid morning survey.

Periphyton mats were very thin and there were no patchy filamentous algae present on the predominantly sandy-gravel-cobble-boulder substrates at all three unshaded sites. Patchy moss was recorded at all of the sites. There was no stormwater discharge from the rock rip-rap outfall at the time of the survey (although one occurred later that morning) but there had been discharges of treated stormwater on several occasions over the period since the previous summer survey (CF574).

Macroinvertebrate communities

Eight previous macroinvertebrate surveys had been performed at these three sites. The results of these surveys and historical data for the nearest monitored site in the stream (at Normanby Road [Site: KPN000400] some 8 km upstream), are provided for comparative background purposes in Table 2.

Figure 1 Biomonitoring sites in the Kapuni Stream in relation to the Kupe Production Station

Table 2 Numbers of macroinvertebrate taxa and MCI values recorded in previous surveys of the Kapuni Stream at Normanby Road (1982 to 2012 (Stark, 2012)) and at three sites in the lower reaches associated with the Kupe PS (since December 2009)

Site	Number of previous surveys	Numbers of taxa		MCI values	
		Median	Range	Median	Range
KPN000400	25	14	9-26	103	83-136
KPN000488	8	20	12-27	104	99-107
KPN000490	8	19	14-28	104	96-116
KPN000492	8	19	16-27	98	91-106

The results of the current survey are presented in Table 3 and discussed as follows.

Site 1 (upstream of Production Station outfall)

A moderate richness (17 taxa) was found at site 1 which was three taxa more than the median number of taxa from previous surveys at the nearest upstream site at Normanby Road. This richness was three taxa fewer than the median (but five more than the minimum) recorded at this site to date (Table 2). The community was characterised by one 'highly sensitive' taxon [the extremely abundant, ubiquitous mayfly (*Deleatidium*)], two moderately sensitive taxa [stonefly (*Zelandobius) and* stony-cased caddisfly (*Pycnocentrodes*)], but no 'tolerant' taxa. The numerical dominance by 'sensitive' taxa (particularly the mayfly) resulted in a relatively high $SQMCI_s$ value (6.4 units) for the lower reaches of a ringplain stream and indicative of good preceding physicochemical water quality and physical habitat, in the presence of minimal periphyton substrate cover, and less than often found in the lower reaches of ringplain streams.

Table 3 Macroinvertebrate fauna of the Kapuni Stream in relation to the Kupe Production Station stormwater discharge sampled on 8 October 2013

Taxa List	Site Number	MCI score			
	Site Code		KPN000488	KPN000490	KPN000492
	Sample Number		FWB13259	FWB13260	FWB13261
NEMERTEA	Nemertea	3	-	R	-
ANNELIDA (WORMS)	Oligochaeta	1	-	C	-
	Lumbricidae	5	R	-	R
MOLLUSCA	*Potamopyrgus*	4	C	A	C
CRUSTACEA	*Paracalliope*	5	-	-	R
EPHEMEROPTERA (MAYFLIES)	*Austroclima*	7	R	C	C
	Coloburiscus	7	R	A	C
	Deleatidium	8	XA	VA	XA
	Zephlebia group	7	-	R	-
PLECOPTERA (STONEFLIES)	*Zelandobius*	5	A	C	C
COLEOPTERA (BEETLES)	Elmidae	6	C	A	A
MEGALOPTERA (DOBSONFLIES)	*Archichauliodes*	7	R	C	R
TRICHOPTERA (CADDISFLIES)	*Aoteapsyche*	4	R	A	C
	Costachorema	7	C	C	C
	Hydrobiosis	5	-	R	R
	Neurochorema	6	R	-	-
	Beraeoptera	8	C	A	A
	Pycnocentrodes	5	XA	XA	XA
DIPTERA (TRUE FLIES)	*Aphrophila*	5	-	R	R
	Eriopterini	5	-	R	R
	Maoridiamesa	3	C	C	C
	Orthocladiinae	2	R	-	R
	Tanytarsini	3	R	-	-
	Dolichopodidae	3	R	-	-
	Tanyderidae	4	-	R	-
	No of taxa		17	19	18
	MCI		106	106	109
	SQMCIs		6.4	5.5	6.5
	EPT (taxa)		9	10	9
	%EPT (taxa)		53	53	50
'Tolerant' taxa	'Moderately sensitive' taxa	'Highly sensitive' taxa			

R = Rare C = Common A = Abundant VA = Very Abundant XA = Extremely Abundant

The MCI score (106 units) was indicative of the relatively high proportion of 'sensitive' taxa (65% of taxa richness) comprising the community at this site in the lower reaches of a ringplain stream. This score was three units above the median score recorded at the site 8 km upstream at Normanby Road, and also two units above the median recorded by the eight previous surveys at this site (Table 2), and one unit above the score recorded by the preceding summer survey. It was also a very significant 21 units (Stark, 1998) higher than predicted for a site at this altitude (10 m a.s.l.) and a significant 14 units higher than predicted for this site 35.3 km downstream from the National Park in ringplain streams (Stark and Fowles, 2009). This score (106 units) categorised the site as having 'good' generic stream health (TRC, 2013) at the time of this spring survey, and 'better than expected' predictive health (TRC, 2013) for a ringplain site in the lower reaches near the coast.

Site 2 (50 m downstream of Production Station discharges)

A moderate richness of 19 taxa was found at site 2, two taxa more than the richness at the upstream site. The community was characterised by two of the taxa that were dominant at

site 1 with an additional 'highly sensitive' taxon [cased caddisfly (*Beraeoptera*)], two additional 'moderately sensitive' taxa [mayfly (*Coloburiscus*) and elmid beetles], two additional 'tolerant' taxa [snail (*Potamopyrgus*) and net-building caddisfly (*Aoteapsyche*)], and one fewer moderately sensitive taxon. Again, the numerical dominance by several 'sensitive' taxa resulted in the relatively high $SQMCI_s$ value, 0.9 unit lower than the value at the upstream site 1, indicative of good physical habitat and preceding physicochemical water quality, coincident with minimal periphyton substrate cover.

The MCI score (106 units) was identical with the score at site 1, reflecting the relatively high proportion (68% of richness) of 'sensitive' taxa in the community for a site in the lower reaches of a ringplain stream. It was also an insignificant two units higher than the median of the range of scores recorded by the eight previous surveys at this site. This score was indicative of no impacts of preceding stormwater discharges on the macroinvertebrate community at this site. It was significantly (Stark,1998) 21 units above the predicted score for a site 10 m a.s.l. and 14 units higher than predicted for a site 35.4 km downstream from the National Park in ringplain streams (Stark and Fowles, 2009). This MCI score (106 units) categorised the site as having 'good' generic stream health (TRC, 2013) at the time of this spring survey and 'better than expected' predictive health (TRC, 2013) for a site in the lower reaches of a ringplain stream near the coast.

Site 3 (200 m downstream of Production Station discharge)

A moderate richness (18 taxa) was found at this site, one fewer taxon than at site 2 and one more taxon than the richness found at the upstream 'control' site. The community was characterised by two of the same taxa as dominant at site 1 and two additional 'tolerant' taxa which were both characteristic of the community at site 2. The numerical dominance by three 'sensitive' taxa and in particular, the 'highly sensitive' mayfly, *Deleatidium*, resulted in the relatively high $SQMCI_s$ value (6.5 units) which was up to one unit higher than the scores recorded at the upstream sites and well above those typically found in the lower reaches of ringplain streams and rivers near the coast (TRC, 1999 (updated 2013)). The three sites' communities' shared 12 common taxa (48% of the total of 25 taxa found in the surveyed reach), indicative of the relative similarity in community compositions particularly considering the similarities in characteristic taxa at the three sites.

The MCI score (109 units) reflected the relatively high proportion of 'sensitive' taxa (78% of the richness) in the community and was higher (although insignificantly) by three units than the score recorded at the upstream 'control' site. The MCI score was a significant 11 units higher than the median of scores found by the eight previous surveys at this site (Table 2) and was also two units higher than the previous maximum score at this site. The MCI score (109 units) was significantly 24 units (Stark, 1998) above that predicted for a ringplain site at this altitude and 17 units higher than that predicted for a site 35.6 km downstream from the National Park in ringplain streams (Stark and Fowles, 2009). The score categorised this site as having 'good' generic stream health (TRC, 2013) at the time of this spring survey and 'better than expected' predictive health for a site near the mouth of a ringplain stream.

Conclusions

This spring 2013, macroinvertebrate survey of the Kapuni Stream indicated that previous stormwater discharges over the previous eight month period from the Kupe Production Station had not had any recent impacts upon the macroinvertebrate communities downstream of the stormwater outfall. Moderate community richnesses were recorded, coincident with minimal periphyton substrate cover (less extensive than typical of lower

reaches of ringplain streams), and relatively high proportions of 'sensitive' taxa constituted and numerically dominated all communities. This resulted in relatively high $SQMCI_s$ values, above those typical of the lower coastal reaches of ringplain streams and rivers. There were very few significant changes in individual taxon abundances between sites as reflected in the relatively narrow range (1.0 unit) of $SQMCI_s$ values found over this reach of the stream.

This survey has provided further baseline macroinvertebrate fauna data under spring, moderate flow conditions for future reference and comparative monitoring purposes.

The very narrow range of MCI scores (106-109) categorised this reach of the stream as having 'good' generic biological health consistent with good physical habitat and preceding physicochemical water quality and 'better than' predicted health for the lower reaches of a ringplain stream very close to the coast. These scores were also significantly higher than predicted scores for ringplain sites at equivalent altitudes and distances downstream of the National Park indicative of the comparatively better biological health of the lower Kapuni Stream than that of equivalent reaches in the majority of other ringplain rivers and streams in the region (Fowles, 2012a and TRC, 2013).

Summary

The Council's standard 'kick-sampling' technique was used at three established sites to collect streambed macroinvertebrates from the Kapuni Stream. Samples were sorted and identified to provide the number of taxa (richness), MCI score and $SQMCI_s$ score for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The $SQMCI_s$ takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities particularly if non-organic impacts are occurring. Significant differences in either the MCI or the $SQMCI_s$ between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

This spring macroinvertebrate survey (the eighth since completion of the Production Station) indicated that occasional discharges of treated stormwater from the Kupe Production Station over the previous eight month period had not had any recent detrimental effects on the macroinvertebrate communities of the Kapuni Stream. No significant changes in the moderate macroinvertebrate communities' richnesses were recorded between the upstream 'control' site and the two sites downstream of the discharge, during a period of moderate stream flow prior to the time of the survey.

The macroinvertebrate communities of the stream contained significant proportions of 'sensitive' taxa and these communities were numerically dominated by more 'sensitive' than 'tolerant' taxa resulting in relatively high $SQMCI_s$ and MCI values for the lower reaches of a ringplain stream near the coast, with MCI scores significantly higher than predicted for such a stream reach.

MCI scores indicated that the stream communities were of 'good' generic health and 'better than expected' for the predicted condition recorded in Taranaki ringplain streams at similar altitudes and distances from the National Park boundary.

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To Job Manager, K Brodie
From Scientific Officer, C R Fowles
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Biomonitoring of the Kapuni Stream in relation to stormwater discharges from the Kupe Production Station of Origin Energy Resources Ltd, surveyed in February 2014

Introduction

This was the second of two scheduled biomonitoring surveys relating to the Kupe Production Station, for the 2013-2014 monitoring year. Special condition 9e of Consent 6543-1 for the discharge of treated stormwater into the Kapuni Stream requires:
"*that after allowing for reasonable mixing over 50 metres downstream of the discharge point, 'there shall be no significant adverse effects on aquatic life'.*"

Stormwater discharges had occurred consistently through the spring and summer months prior to this survey. This (summer) survey provides additional baseline data in relation to the lower reaches of the Kapuni Stream (see Fowles, 2012a). This section of the stream (approximately 700m from the coast) had had no previous macroinvertebrate monitoring history prior to the inaugural Kupe PS monitoring survey of spring 2009 (CF497). [Note: The Kapuni Stream has an extensive macroinvertebrate database (from 1981 to date) for the length of the stream from its upper reaches at Opunake Road to lower-middle reaches at Normanby Rd (approximately 8km upstream of these Kupe Production Station sites) which is monitored in association with industrial usage in mid-catchment (Stark, 2013 and Fowles, 2012a)].

This summer survey was performed on 3 February 2014 during low flow conditions following three stream freshes over the previous one month period.

Methods

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from riffle habitats at three established sites (sites 1, 2 and 3) in the Kapuni Stream (Table 1, Figure 1) on 3 February 2014. This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001).

Table 1 Biomonitoring sites in the Kapuni Stream, sampled in relation to the Kupe Production Station

Site No.	Site code	Map reference	GPS location	Location
1	KPN000488	BK29:992187	E1699156 N5618688	Upstream of Production Station stormwater discharge
2	KPN000490	BK29:992186	E1699158 N5618595	50 m downstream of Production Station stormwater discharge
3	KPN000492	BK29:992185	E1699237 N5618533	200 m downstream of Production Station stormwater discharge

Samples were preserved with Kahle's Fluid for later sorting and identification under a stereomicroscope according to Taranaki Regional Council methodology using protocol P1 of NZMWG protocols for sampling macroinvertebrates in wadeable streams (Stark et al. 2001). Macroinvertebrate taxa found in each sample were recorded as:

R (rare)	= less than 5 individuals;
C (common)	= 5-19 individuals;
A (abundant)	= estimated 20-99 individuals;
VA (very abundant)	= estimated 100-499 individuals;
XA (extremely abundant)	= estimated 500 individuals or more.

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams. Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1. Sensitivity scores for certain taxa have been modified in accordance with Taranaki experience. By averaging the scores obtained from a list of taxa taken from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. More 'sensitive' communities inhabit less polluted waterways.

A semi-quantitative MCI value (SQMCIs) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these products, and dividing by the sum of the loading factors (Stark, 1998 and 1999). The loading factors were 1 for rare (R), 5 for common (C), 20 for abundant (A), 100 for very abundant (VA) and 500 for extremely abundant (XA). Unlike the MCI, the SQMCIs is not multiplied by a scaling factor of 20, so that its corresponding range of values is 20x lower.

Results and discussion

At the time of this survey there was a low, uncoloured flow in the Kapuni Stream at all sites upstream and downstream of the production station stormwater outfall. Flow rate at the TRC Normanby Road recorder site was 942 litres/sec which represented a flow well above the minimum monthly mean February flow (321 litres/sec) but below the average monthly mean February flow (1,023 litres/sec) recorded for the period 1999-2012. The survey was performed eight days after a fresh in excess of 3x median river flow and 29 days after a fresh in excess of 7x median flow conditions. Water temperature at these three sites ranged from 17.5˚C to 17.7˚C at the time of this late morning survey.

Periphyton mats were very thin at all sites and there were patchy filamentous algae present on the predominantly sandy-gravel-cobble-boulder substrates at only site 3 of the three unshaded sites. Patchy moss was recorded at all of the sites. There was no stormwater discharge from the rock rip-rap outfall at the time of the survey but there had been discharges of treated stormwater on several occasions over the period since the previous spring survey (CF591).

Macroinvertebrate communities

Nine previous macroinvertebrate surveys had been performed at these three sites. The results of these surveys and historical data for the nearest monitored site in the stream (at Normanby Road [Site: KPN000400] some 8 km upstream), are provided for comparative background purposes in Table 2.

Figure 1 Biomonitoring sites in the Kapuni Stream in relation to the Kupe Production Station

Table 2 Numbers of macroinvertebrate taxa and MCI values recorded in previous surveys of the Kapuni Stream at Normanby Road (1982 to 2012 (Stark, 2013)) and at three sites in the lower reaches associated with the Kupe PS (since December 2009)

Site	Number of previous surveys	Numbers of taxa		MCI values	
		Median	Range	Median	Range
KPN000400	26	14	9-26	106	83-136
KPN000488	9	19	12-27	105	99-107
KPN000490	9	19	14-28	106	96-116
KPN000492	9	19	16-27	98	91-109

The results of the current survey are presented in Table 3 and discussed as follows.

Site 1 (upstream of Production Station outfall)

A moderate richness (23 taxa) was found at site 1 which was nine taxa more than the median number of taxa from previous surveys at the nearest upstream site at Normanby Road. This richness was four taxa more than the median (but four fewer than the maximum) recorded at this site to date (Table 2). The community was characterised by one 'highly sensitive' taxon [the extremely abundant, ubiquitous mayfly (*Deleatidium*)], three moderately sensitive taxa [elmid beetles, dobsonfly (*Archichauliodes*), and extremely abundant stony-cased caddisfly (*Pycnocentrodes*)], and two 'tolerant' taxa [snail (*Potamopyrgus*) and net-building caddisfly (*Aoteapsyche*)]. The numerical dominance by 'sensitive' taxa (particularly the mayfly and stony-cased caddisfly) resulted in a relatively high $SQMCI_s$ value (6.2 units) for the lower reaches of a ringplain stream and indicative of good preceding physicochemical water quality and physical habitat, in the presence of minimal periphyton substrate cover, less than typically found in the lower reaches of ringplain streams, particularly in late summer.

Table 3 Macroinvertebrate fauna of the Kapuni Stream in relation to the Kupe Production Station stormwater discharge sampled on 3 February 2014

Taxa List	Site Number	MCI score	1	2	3
	Site Code		KPN000488	KPK000490	KPN000492
	Sample Number		FWB14019	FWB14020	FWB14021
PLATYHELMINTHES (FLATWORMS)	*Cura*	3	-	-	R
NEMERTEA	Nemertea	3	R	R	R
ANNELIDA (WORMS)	Oligochaeta	1	R	C	R
	Lumbricidae	5	R	-	R
MOLLUSCA	*Potamopyrgus*	4	A	XA	VA
CRUSTACEA	*Paracalliope*	5	-	-	R
EPHEMEROPTERA (MAYFLIES)	*Austroclima*	7	C	C	A
	Coloburiscus	7	C	C	C
	Deleatidium	8	XA	XA	XA
PLECOPTERA (STONEFLIES)	*Zelandobius*	5	C	-	-
COLEOPTERA (BEETLES)	Elmidae	6	A	C	A
MEGALOPTERA (DOBSONFLIES)	*Archichauliodes*	7	A	C	C
TRICHOPTERA (CADDISFLIES)	*Aoteapsyche*	4	VA	VA	VA
	Costachorema	7	C	R	A
	Hydrobiosis	5	C	C	C
	Neurochorema	6	-	R	R
	Plectrocnemia	8	-	-	R
	Psilochorema	6	R	R	-
	Beraeoptera	8	C	C	R
	Olinga	9	-	R	-
	Pycnocentrodes	5	XA	XA	XA
	Triplectides	5	-	R	-
DIPTERA (TRUE FLIES)	*Aphrophila*	5	-	-	R
	Eriopterini	5	C	C	C
	Harrisius	6	R	R	-
	Maoridiamesa	3	C	C	A
	Orthocladiinae	2	C	A	A
	Polypedilum	3	-	-	R
	Tanytarsini	3	C	R	R
	Empididae	3	R	-	-
	Ephydridae	4	-	-	R
	Austrosimulium	3	R	R	R
	Tanyderidae	4	-	R	R
		No of taxa	23	24	27
		MCI	98	103	97
		SQMCIs	6.2	5.5	6.0
		EPT (taxa)	10	12	10
		%EPT (taxa)	43	50	37

'Tolerant' taxa | 'Moderately sensitive' taxa | 'Highly sensitive' taxa

R = Rare C = Common A = Abundant VA = Very Abundant XA = Extremely Abundant

The MCI score (98 units) was indicative of the relatively high proportion of 'sensitive' taxa (61% of taxa richness) comprising the community at this site in the lower reaches of a

ringplain stream. This score was eight units lower than the median score recorded at the site 8 km upstream at Normanby Road, one unit below the minimum and seven units below the median recorded by the nine previous surveys at this site (Table 2). The score was also eight units below the score recorded by the preceding spring survey. It was however, a significant 13 units (Stark, 1998) higher than predicted for a site at this altitude (10 m a.s.l.) but an insignificant 6 units higher than predicted for this site 35.3 km downstream from the National Park in ringplain streams (Stark and Fowles, 2009). This score (98 units) categorised the site as having 'fair' generic stream health (TRC, 2014) at the time of this low flow summer survey, and 'expected' predictive health (TRC, 2014) for a ringplain site in the lower reaches near the coast.

Site 2 (50 m downstream of Production Station discharges)

A moderate richness of 24 taxa was found at site 2, one taxon more than the richness at the upstream site. The community was characterised by four of the taxa that were dominant at site 1 with one additional 'tolerant' taxon [orthoclad midges] and two fewer 'moderately sensitive' taxa. Again, the numerical dominance by two 'sensitive' taxa contributed to the relatively high $SQMCI_s$ value, 0.7 unit lower than the value at the upstream site 1, indicative of good physical habitat and preceding physicochemical water quality, coincident with minimal periphyton substrate cover.

The MCI score (103 units) was five units higher than the score at site 1, reflecting the relatively high proportion (63% of richness) of 'sensitive' taxa in the community for a site in the lower reaches of a ringplain stream. It was also an insignificant three units lower than the median of the range of scores recorded by the nine previous surveys at this site. This score was indicative of no impacts of preceding stormwater discharges on the macroinvertebrate community at this site. It was significantly (Stark,1998) 18 units above the predicted score for a site 10 m a.s.l. and 11 units higher than predicted for a site 35.4 km downstream from the National Park in ringplain streams (Stark and Fowles, 2009). This MCI score (103 units) categorised the site as having 'good' generic stream health (TRC, 2014) at the time of this spring survey and 'better than expected' predictive health (TRC, 2014) for a site in the lower reaches of a ringplain stream near the coast.

Site 3 (200 m downstream of Production Station discharge)

A moderately high richness (27 taxa) was found at this site, equal with the maximum richness previously found at this site, three more taxa than at site 2, and four more taxa than the richness found at the upstream 'control' site. The community was characterised by five of the same taxa as dominant at site 1 and four additional (two 'moderately sensitive' and two 'tolerant') taxa only one of which was characteristic of the community at site 2. The numerical dominance by two 'sensitive' taxa and in particular, the 'highly sensitive' mayfly, *Deleatidium*, resulted in the relatively high $SQMCI_s$ value (6.0 units) which was only 0.2 unit lower than the score recorded at the upstream 'control' site and well above those typically found in the lower reaches of ringplain streams and rivers near the coast (TRC, 1999 (updated 2013)). The three sites' communities' shared 18 common taxa (55% of the total of 33 taxa found in the surveyed reach), indicative of the relative similarity in community compositions particularly considering the similarities in characteristic taxa at the three sites.

The MCI score (97 units) reflected the relatively high proportion of 'sensitive' taxa (56% of the richness) in the community and was within one unit of the score recorded at the upstream 'control' site. The MCI score was one unit lower than the median of scores found by the nine previous surveys at this site (Table 2) but was six units higher than the previous

minimum score at this site. The MCI score (97 units) was significantly 12 units (Stark, 1998) above that predicted for a ringplain site at this altitude and 5 units higher than that predicted for a site 35.6 km downstream from the National Park in ringplain streams (Stark and Fowles, 2009). The score categorised this site as having 'fair' generic stream health (TRC, 2014) at the time of this summer survey coincident with patchy periphyton substrate cover, and 'expected' predictive health for a site near the mouth of a ringplain stream.

Conclusions

This summer 2014, macroinvertebrate survey of the Kapuni Stream indicated that previous stormwater discharges over the previous four month period from the Kupe Production Station had not had any recent impacts upon the macroinvertebrate communities downstream of the stormwater outfall. Moderate community richnesses were recorded, coincident with minimal periphyton substrate cover (less extensive than typical of lower reaches of ringplain streams during summer), and relatively high proportions of 'sensitive' taxa constituted and numerically dominated all communities. This resulted in relatively high $SQMCI_s$ values, above those typical of the lower coastal reaches of ringplain streams and rivers. There were very few significant changes in individual taxon abundances between sites as reflected in the relatively narrow range (0.7 unit) of $SQMCI_s$ values found over this reach of the stream.

This survey has provided further baseline macroinvertebrate fauna data under summer, low flow conditions for future reference and comparative monitoring purposes.

The narrow range of MCI scores (97-103) categorised this reach of the stream as having 'fair' to 'good' generic biological health consistent with good physical habitat and preceding physicochemical water quality and 'expected' to 'better than expected' for the predicted health for the lower reaches of a ringplain stream very close to the coast. These scores were also higher than predicted scores for ringplain sites at equivalent altitudes and distances downstream of the National Park indicative of the comparatively better biological health of the lower Kapuni Stream than that of equivalent reaches in the majority of other ringplain rivers and streams in the region (Fowles, 2012a and TRC, 2014).

Summary

The Council's standard 'kick-sampling' technique was used at three established sites to collect streambed macroinvertebrates from the Kapuni Stream. Samples were sorted and identified to provide the number of taxa (richness), MCI score and $SQMCI_s$ score for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The $SQMCI_s$ takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities particularly if non-organic impacts are occurring. Significant differences in either the MCI or the $SQMCI_s$ between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

This summer, low flow macroinvertebrate survey (the ninth since completion of the Production Station) indicated that occasional discharges of treated stormwater from the Kupe Production Station over the previous four month period had not had any recent

detrimental effects on the macroinvertebrate communities of the Kapuni Stream. No significant changes in the moderate macroinvertebrate communities' richnesses were recorded between the upstream 'control' site and the two sites downstream of the discharge, during a period of low stream flow prior to the time of the survey.

The macroinvertebrate communities of the stream contained significant proportions of 'sensitive' taxa and these communities were numerically dominated by more 'sensitive' than 'tolerant' taxa resulting in relatively high $SQMCI_s$ and MCI values for the lower reaches of a ringplain stream near the coast, with MCI scores higher than predicted (sometimes significantly) for such a stream reach.

MCI scores indicated that the stream communities were of 'fair' to 'good' generic health and 'expected' to 'better than expected' for the predicted condition recorded in Taranaki ringplain streams at similar altitudes and distances from the National Park boundary.

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Appendix III
Borefield Abstraction Rates

Kupe Borewater Abstraction Records

	Well DT-1			Well HB-1		
Date	Average Rate	Total Volume	Run Hours	Average Rate	Total Volume	Run Hours
	m3/hr	m3	hr	m3/hr	m3	hr
01-Jul-13	39.482	263.221	06:40:01	-	-	-
02-Jul-13	39.715	93.418	02:21:08	-	-	-
03-Jul-13	39.846	51.921	01:18:11	-	-	-
04-Jul-13	39.723	76.588	01:55:41	-	-	-
05-Jul-13	39.648	51.553	01:18:01	-	-	-
06-Jul-13	39.949	34.190	00:51:21	-	-	-
07-Jul-13	39.835	73.915	01:51:20	-	-	-
08-Jul-13	39.938	34.169	00:51:20	-	-	-
09-Jul-13	39.926	68.440	01:42:51	-	-	-
10-Jul-13	39.797	34.159	00:51:30	-	-	-
11-Jul-13	39.799	74.403	01:52:10	-	-	-
12-Jul-13	39.954	68.932	01:43:31	-	-	-
13-Jul-13	39.882	56.954	01:25:41	-	-	-
14-Jul-13	39.971	35.308	00:53:00	-	-	-
15-Jul-13	39.948	50.379	01:15:40	-	-	-
16-Jul-13	39.838	53.891	01:21:10	-	-	-
17-Jul-13	39.901	51.439	01:17:21	-	-	-
18-Jul-13	39.825	53.874	01:21:10	-	-	-
19-Jul-13	39.923	51.024	01:16:41	-	-	-
20-Jul-13	39.806	68.887	01:43:50	-	-	-
21-Jul-13	39.907	51.214	01:17:00	-	-	-
22-Jul-13	39.871	89.811	02:15:09	-	-	-
23-Jul-13	39.561	169.343	04:16:50	-	-	-
24-Jul-13	39.783	114.488	02:52:40	-	-	-
25-Jul-13	39.773	159.091	04:00:00	-	-	-
26-Jul-13	39.756	121.597	03:03:31	-	-	-
27-Jul-13	39.688	140.220	03:31:59	-	-	-
28-Jul-13	39.714	124.547	03:08:10	11.971	0.931	00:04:40
29-Jul-13	39.915	34.260	00:51:30	-	-	-
30-Jul-13	39.909	51.094	01:16:49	-	-	-
31-Jul-13	39.895	51.420	01:17:20	-	-	-
01-Aug-13	39.951	34.191	00:51:21	-	-	-
02-Aug-13	39.975	32.768	00:49:11	-	-	-
03-Aug-13	39.984	34.331	00:51:31	-	-	-
04-Aug-13	39.939	40.371	01:00:39	-	-	-
05-Aug-13	39.832	133.436	03:21:00	-	-	-
06-Aug-13	39.758	72.017	01:48:41	-	-	-
07-Aug-13	39.912	73.073	01:49:51	-	-	-
08-Aug-13	39.875	128.709	03:13:40	-	-	-
09-Aug-13	39.831	52.555	01:19:10	-	-	-
10-Aug-13	39.718	140.403	03:32:06	-	-	-
11-Aug-13	39.815	32.372	00:48:47	-	-	-
12-Aug-13	39.868	116.547	02:55:24	-	-	-
13-Aug-13	39.812	147.912	03:42:55	-	-	-
14-Aug-13	39.794	149.006	03:44:40	-	-	-
15-Aug-13	39.747	150.177	03:46:42	-	-	-
16-Aug-13	39.707	133.955	03:22:25	-	-	-
17-Aug-13	39.676	148.522	03:44:36	-	-	-
18-Aug-13	39.656	133.058	03:21:19	-	-	-
19-Aug-13	39.734	117.491	02:57:25	-	-	-
20-Aug-13	39.705	150.506	03:47:26	-	-	-
21-Aug-13	39.853	35.989	00:54:11	-	-	-
22-Aug-13	-	-	-	-	-	-
23-Aug-13	40.025	17.144	00:25:42	-	-	-
24-Aug-13	39.956	16.981	00:25:30	-	-	-
25-Aug-13	40.017	34.236	00:51:20	-	-	-
26-Aug-13	39.965	63.511	01:35:21	-	-	-
27-Aug-13	39.918	92.932	02:19:41	-	-	-
28-Aug-13	39.922	96.255	02:24:40	-	-	-
29-Aug-13	39.833	127.919	03:12:41	-	-	-
30-Aug-13	39.802	108.019	02:42:50	-	-	-
31-Aug-13	39.785	110.293	02:46:20	-	-	-
01-Sep-13	39.840	35.314	00:53:11	-	-	-
02-Sep-13	39.773	94.924	02:23:12	-	-	-
03-Sep-13	39.764	153.765	03:52:01	-	-	-
04-Sep-13	39.863	74.423	01:52:01	-	-	-
05-Sep-13	39.786	36.813	00:55:31	-	-	-
06-Sep-13	39.938	36.399	00:54:41	-	-	-
07-Sep-13	39.885	54.409	01:21:51	-	-	-
08-Sep-13	39.955	36.504	00:54:49	-	-	-
09-Sep-13	39.861	92.023	02:18:31	-	-	-
10-Sep-13	39.937	60.505	01:30:54	-	-	-
11-Sep-13	39.964	30.606	00:45:57	-	-	-
12-Sep-13	39.984	17.115	00:25:41	-	-	-
13-Sep-13	40.079	17.145	00:25:40	-	-	-
14-Sep-13	40.050	17.133	00:25:40	-	-	-
15-Sep-13	40.127	17.065	00:25:31	-	-	-
16-Sep-13	40.099	17.053	00:25:31	-	-	-
17-Sep-13	39.890	40.555	01:01:00	-	-	-
18-Sep-13	39.959	73.269	01:50:01	-	-	-
19-Sep-13	40.078	35.180	00:52:40	-	-	-
20-Sep-13	40.099	18.390	00:27:31	-	-	-
21-Sep-13	39.900	34.259	00:51:31	-	-	-
22-Sep-13	40.085	17.816	00:26:40	-	-	-
23-Sep-13	40.038	38.270	00:57:21	-	-	-
24-Sep-13	40.086	35.420	00:53:01	-	-	-
25-Sep-13	40.033	17.025	00:25:31	-	-	-
26-Sep-13	39.898	113.819	02:51:10	-	-	-
27-Sep-13	39.919	132.863	03:19:42	-	-	-
28-Sep-13	39.908	94.559	02:22:10	-	-	-
29-Sep-13	40.022	17.121	00:25:40	-	-	-
30-Sep-13	39.926	118.281	02:57:45	-	-	-
01-Oct-13	39.812	102.040	02:33:47	-	-	-
02-Oct-13	39.544	115.237	02:54:51	-	-	-
03-Oct-13	39.546	99.964	02:31:40	-	-	-

Kupe Borewater Abstraction Records

	Well DT-1			Well HB-1		
Date	Average Rate	Total Volume	Run Hours	Average Rate	Total Volume	Run Hours
	m3/hr	m3	hr	m3/hr	m3	hr
04-Oct-13	-	-	-	-	-	-
05-Oct-13	-	-	-	-	-	-
06-Oct-13	-	-	-	-	-	-
07-Oct-13	39.681	100.085	02:31:20	-	-	-
08-Oct-13	-	-	-	-	-	-
09-Oct-13	-	-	-	-	-	-
10-Oct-13	39.645	110.907	02:47:51	-	-	-
11-Oct-13	39.644	114.858	02:53:50	-	-	-
12-Oct-13	39.698	76.352	01:55:24	-	-	-
13-Oct-13	39.555	123.501	03:07:20	-	-	-
14-Oct-13	39.453	138.260	03:30:16	-	-	-
15-Oct-13	39.601	110.123	02:46:51	-	-	-
16-Oct-13	39.925	21.116	00:31:44	-	-	-
17-Oct-13	39.507	187.077	04:44:07	-	-	-
18-Oct-13	39.444	120.086	03:02:40	-	-	-
19-Oct-13	39.458	120.457	03:03:10	-	-	-
20-Oct-13	39.540	96.203	02:25:59	-	-	-
21-Oct-13	39.538	103.029	02:36:21	-	-	-
22-Oct-13	-	-	-	-	-	-
23-Oct-13	39.572	103.568	02:37:02	-	-	-
24-Oct-13	-	-	-	-	-	-
25-Oct-13	39.562	103.300	02:36:40	-	-	-
26-Oct-13	-	-	-	-	-	-
27-Oct-13	39.544	110.626	02:47:51	-	-	-
28-Oct-13	-	-	-	-	-	-
29-Oct-13	39.673	103.261	02:36:10	-	-	-
30-Oct-13	39.525	136.470	03:27:10	-	-	-
31-Oct-13	-	-	-	-	-	-
01-Nov-13	39.567	192.251	04:51:32	-	-	-
02-Nov-13	39.643	72.359	01:49:31	-	-	-
03-Nov-13	-	-	-	-	-	-
04-Nov-13	39.653	111.590	02:48:51	-	-	-
05-Nov-13	39.567	113.425	02:52:00	-	-	-
06-Nov-13	39.541	207.041	05:14:10	-	-	-
07-Nov-13	-	-	-	-	-	-
08-Nov-13	-	-	-	-	-	-
09-Nov-13	-	-	-	-	-	-
10-Nov-13	39.678	119.915	03:01:20	-	-	-
11-Nov-13	39.628	112.600	02:50:29	-	-	-
12-Nov-13	39.660	110.937	02:47:50	-	-	-
13-Nov-13	39.632	113.942	02:52:30	-	-	-
14-Nov-13	39.589	107.220	02:42:30	-	-	-
15-Nov-13	39.625	111.072	02:48:11	-	-	-
16-Nov-13	39.552	114.590	02:53:50	-	-	-
17-Nov-13	-	-	-	-	-	-
18-Nov-13	39.646	111.119	02:48:10	-	-	-
19-Nov-13	39.572	110.811	02:48:01	-	-	-
20-Nov-13	39.586	100.394	02:32:10	-	-	-
21-Nov-13	-	-	-	-	-	-
22-Nov-13	-	-	-	-	-	-
23-Nov-13	39.645	109.035	02:45:01	-	-	-
24-Nov-13	39.602	112.755	02:50:50	-	-	-
25-Nov-13	39.585	113.597	02:52:11	-	-	-
26-Nov-13	39.560	113.965	02:52:51	-	-	-
27-Nov-13	39.533	121.137	03:03:51	-	-	-
28-Nov-13	39.524	113.741	02:52:40	-	-	-
29-Nov-13	39.481	113.836	02:53:00	-	-	-
30-Nov-13	-	-	-	-	-	-
01-Dec-13	-	-	-	-	-	-
02-Dec-13	-	-	-	-	-	-
03-Dec-13	39.431	182.698	04:38:00	-	-	-
04-Dec-13	-	-	-	-	-	-
05-Dec-13	39.608	100.999	02:33:00	-	-	-
06-Dec-13	-	-	-	-	-	-
07-Dec-13	39.730	61.139	01:32:20	-	-	-
08-Dec-13	-	-	-	-	-	-
09-Dec-13	-	-	-	-	-	-
10-Dec-13	-	-	-	-	-	-
11-Dec-13	39.641	103.617	02:36:50	-	-	-
12-Dec-13	-	-	-	-	-	-
13-Dec-13	-	-	-	-	-	-
14-Dec-13	39.597	121.980	03:04:50	-	-	-
15-Dec-13	-	-	-	-	-	-
16-Dec-13	-	-	-	-	-	-
17-Dec-13	39.682	103.956	02:37:11	-	-	-
18-Dec-13	-	-	-	-	-	-
19-Dec-13	39.632	103.363	02:36:29	-	-	-
20-Dec-13	39.630	103.357	02:36:29	-	-	-
21-Dec-13	40.342	4.303	00:06:24	-	-	-
22-Dec-13	39.560	99.087	02:30:17	-	-	-
23-Dec-13	-	-	-	-	-	-
24-Dec-13	39.594	103.263	02:36:29	-	-	-
25-Dec-13	39.654	89.883	02:16:00	-	-	-
26-Dec-13	39.535	126.535	03:12:02	-	-	-
27-Dec-13	-	-	-	-	-	-
28-Dec-13	39.585	107.879	02:43:31	-	-	-
29-Dec-13	-	-	-	-	-	-
30-Dec-13	-	-	-	-	-	-
31-Dec-13	39.729	76.644	01:55:45	-	-	-
01-Jan-14	39.428	26.680	00:40:36	-	-	-
02-Jan-14	-	-	-	-	-	-
03-Jan-14	39.634	117.482	02:57:51	-	-	-
04-Jan-14	-	-	-	-	-	-
05-Jan-14	-	-	-	-	-	-
06-Jan-14	39.600	111.541	02:49:00	-	-	-
07-Jan-14	39.637	97.442	02:27:30	-	-	-
08-Jan-14	-	-	-	-	-	-
09-Jan-14	39.592	103.380	02:36:40	-	-	-
10-Jan-14	-	-	-	-	-	-

Kupe Borewater Abstraction Records

	Well DT-1			Well HB-1		
Date	Average Rate	Total Volume	Run Hours	Average Rate	Total Volume	Run Hours
	m3/hr	m3	hr	m3/hr	m3	hr
11-Jan-14	-	-	-	-	-	-
12-Jan-14	39.760	69.624	01:45:04	-	-	-
13-Jan-14	39.462	45.008	01:08:26	-	-	-
14-Jan-14	39.671	99.178	02:30:00	-	-	-
15-Jan-14	-	-	-	-	-	-
16-Jan-14	-	-	-	-	-	-
17-Jan-14	39.674	103.494	02:36:31	-	-	-
18-Jan-14	-	-	-	-	-	-
19-Jan-14	39.595	103.936	02:37:30	-	-	-
20-Jan-14	-	-	-	-	-	-
21-Jan-14	-	-	-	-	-	-
22-Jan-14	-	-	-	-	-	-
23-Jan-14	39.627	100.178	02:31:41	-	-	-
24-Jan-14	40.339	1.580	00:02:21	-	-	-
25-Jan-14	-	-	-	-	-	-
26-Jan-14	-	-	-	-	-	-
27-Jan-14	-	-	-	-	-	-
28-Jan-14	39.701	99.252	02:30:00	-	-	-
29-Jan-14	-	-	-	-	-	-
30-Jan-14	-	-	-	-	-	-
31-Jan-14	-	-	-	-	-	-
01-Feb-14	39.654	118.421	02:59:11	-	-	-
02-Feb-14	39.598	114.506	02:53:30	-	-	-
03-Feb-14	-	-	-	-	-	-
04-Feb-14	39.595	101.308	02:33:31	-	-	-
05-Feb-14	-	-	-	-	-	-
06-Feb-14	39.600	117.480	02:58:00	-	-	-
07-Feb-14	39.646	48.676	01:13:40	-	-	-
08-Feb-14	39.550	103.490	02:37:00	-	-	-
09-Feb-14	-	-	-	-	-	-
10-Feb-14	39.544	120.940	03:03:30	-	-	-
11-Feb-14	-	-	-	-	-	-
12-Feb-14	39.606	97.694	02:28:00	-	-	-
13-Feb-14	-	-	-	-	-	-
14-Feb-14	-	-	-	-	-	-
15-Feb-14	39.653	103.648	02:36:50	-	-	-
16-Feb-14	39.597	110.004	02:46:41	-	-	-
17-Feb-14	-	-	-	-	-	-
18-Feb-14	39.476	141.894	03:35:40	-	-	-
19-Feb-14	39.528	96.965	02:27:11	-	-	-
20-Feb-14	-	-	-	-	-	-
21-Feb-14	-	-	-	-	-	-
22-Feb-14	39.577	126.767	03:12:11	-	-	-
23-Feb-14	-	-	-	-	-	-
24-Feb-14	39.604	78.988	01:59:40	-	-	-
25-Feb-14	39.503	122.360	03:05:51	-	-	-
26-Feb-14	-	-	-	-	-	-
27-Feb-14	39.601	151.131	03:48:59	-	-	-
28-Feb-14	39.394	194.255	04:55:52	-	-	-
01-Mar-14	-	-	-	-	-	-
02-Mar-14	39.515	116.250	02:56:31	-	-	-
03-Mar-14	39.457	112.781	02:51:30	-	-	-
04-Mar-14	39.451	134.025	03:23:50	-	-	-
05-Mar-14	39.483	95.747	02:25:30	-	-	-
06-Mar-14	-	-	-	-	-	-
07-Mar-14	39.774	34.471	00:52:00	-	-	-
08-Mar-14	-	-	-	-	-	-
09-Mar-14	-	-	-	-	-	-
10-Mar-14	-	-	-	-	-	-
11-Mar-14	39.564	130.242	03:17:31	-	-	-
12-Mar-14	39.951	258.461	06:28:10	-	-	-
13-Mar-14	-	-	-	-	-	-
14-Mar-14	-	-	-	-	-	-
15-Mar-14	-	-	-	-	-	-
16-Mar-14	39.495	135.162	03:25:20	-	-	-
17-Mar-14	39.852	193.281	04:51:00	-	-	-
18-Mar-14	-	-	-	-	-	-
19-Mar-14	39.479	105.289	02:40:01	-	-	-
20-Mar-14	39.444	99.058	02:30:41	-	-	-
21-Mar-14	39.510	105.361	02:40:00	-	-	-
22-Mar-14	39.487	114.841	02:54:30	-	-	-
23-Mar-14	40.103	271.484	06:46:11	-	-	-
24-Mar-14	39.330	105.436	02:40:51	-	-	-
25-Mar-14	39.464	105.248	02:40:01	-	-	-
26-Mar-14	39.400	108.458	02:45:10	-	-	-
27-Mar-14	39.375	114.407	02:54:20	-	-	-
28-Mar-14	39.375	111.901	02:50:31	-	-	-
29-Mar-14	39.426	96.266	02:26:30	-	-	-
30-Mar-14	-	-	-	-	-	-
31-Mar-14	-	-	-	-	-	-
01-Apr-14	-	-	-	-	-	-
02-Apr-14	39.484	108.911	02:45:30	-	-	-
03-Apr-14	40.761	150.827	03:42:01	-	-	-
04-Apr-14	-	-	-	-	-	-
05-Apr-14	-	-	-	-	-	-
06-Apr-14	39.494	104.013	02:38:01	-	-	-
07-Apr-14	-	-	-	-	-	-
08-Apr-14	-	-	-	-	-	-
09-Apr-14	39.516	102.192	02:35:10	-	-	-
10-Apr-14	39.419	1.555	00:02:22	-	-	-
11-Apr-14	-	-	-	-	-	-
12-Apr-14	-	-	-	-	-	-
13-Apr-14	-	-	-	-	-	-
14-Apr-14	39.575	98.510	02:29:21	-	-	-
15-Apr-14	-	-	-	-	-	-
16-Apr-14	-	-	-	-	-	-
17-Apr-14	39.606	103.538	02:36:51	-	-	-
18-Apr-14	-	-	-	-	-	-
19-Apr-14	-	-	-	-	-	-

Kupe Borewater Abstraction Records

	Well DT-1			Well HB-1		
Date	Average Rate	Total Volume	Run Hours	Average Rate	Total Volume	Run Hours
	m3/hr	m3	hr	m3/hr	m3	hr
20-Apr-14	-	-	-	-	-	-
21-Apr-14	39.542	103.698	02:37:21	-	-	-
22-Apr-14	-	-	-	-	-	-
23-Apr-14	-	-	-	-	-	-
24-Apr-14	-	-	-	-	-	-
25-Apr-14	39.597	103.514	02:36:51	-	-	-
26-Apr-14	-	-	-	-	-	-
27-Apr-14	-	-	-	-	-	-
28-Apr-14	-	-	-	-	-	-
29-Apr-14	39.621	103.785	02:37:10	-	-	-
30-Apr-14	-	-	-	-	-	-
01-May-14	-	-	-	-	-	-
02-May-14	-	-	-	-	-	-
03-May-14	-	-	-	-	-	-
04-May-14	39.652	96.265	02:25:40	-	-	-
05-May-14	-	-	-	-	-	-
06-May-14	-	-	-	-	-	-
07-May-14	-	-	-	-	-	-
08-May-14	39.660	103.788	02:37:01	-	-	-
09-May-14	-	-	-	-	-	-
10-May-14	-	-	-	-	-	-
11-May-14	39.672	104.590	02:38:11	-	-	-
12-May-14	-	-	-	-	-	-
13-May-14	39.631	103.601	02:36:51	-	-	-
14-May-14	-	-	-	-	-	-
15-May-14	39.416	199.914	05:04:19	11.387	17.369	01:31:31
16-May-14	39.114	95.960	02:27:12	-	-	-
17-May-14	-	-	-	-	-	-
18-May-14	-	-	-	-	-	-
19-May-14	39.658	111.164	02:48:11	-	-	-
20-May-14	39.717	15.788	00:23:51	-	-	-
21-May-14	-	-	-	-	-	-
22-May-14	-	-	-	-	-	-
23-May-14	-	-	-	-	-	-
24-May-14	39.678	98.644	02:29:10	-	-	-
25-May-14	-	-	-	-	-	-
26-May-14	-	-	-	-	-	-
27-May-14	-	-	-	-	-	-
28-May-14	-	-	-	-	-	-
29-May-14	39.659	102.465	02:35:01	-	-	-
30-May-14	-	-	-	-	-	-
31-May-14	-	-	-	-	-	-
01-Jun-14	-	-	-	-	-	-
02-Jun-14	39.672	96.964	02:26:39	-	-	-
03-Jun-14	39.446	7.363	00:11:12	-	-	-
04-Jun-14	-	-	-	-	-	-
05-Jun-14	39.679	96.343	02:25:41	-	-	-
06-Jun-14	-	-	-	-	-	-
07-Jun-14	-	-	-	-	-	-
08-Jun-14	39.691	91.620	02:18:30	-	-	-
09-Jun-14	-	-	-	-	-	-
10-Jun-14	-	-	-	-	-	-
11-Jun-14	-	-	-	-	-	-
12-Jun-14	-	-	-	-	-	-
13-Jun-14	39.618	107.420	02:42:41	-	-	-
14-Jun-14	39.786	82.236	02:04:01	-	-	-
15-Jun-14	-	-	-	-	-	-
16-Jun-14	-	-	-	-	-	-
17-Jun-14	-	-	-	-	-	-
18-Jun-14	39.737	104.530	02:37:50	-	-	-
19-Jun-14	-	-	-	-	-	-
20-Jun-14	-	-	-	-	-	-
21-Jun-14	39.668	105.010	02:38:50	-	-	-
22-Jun-14	-	-	-	-	-	-
23-Jun-14	-	-	-	-	-	-
24-Jun-14	-	-	-	-	-	-
25-Jun-14	39.758	104.474	02:37:40	-	-	-
26-Jun-14	39.760	61.297	01:32:30	-	-	-
27-Jun-14	-	-	-	-	-	-
28-Jun-14	-	-	-	-	-	-
29-Jun-14	-	-	-	-	-	-
30-Jun-14	39.697	98.911	02:29:30	-	-	-

Appendix IV
Origin Kupe Annual Flaring Report

Summary of Origin Energy New Zealand 2013-2014 Annual Flaring Report to Taranaki Regional Council for Kupe Production Station

This report summarises flaring at Origin Energy New Zealand (OENZ) Kupe Production Station. A full report was submitted to Taranaki Regional Council to meet the reporting requirements of the air discharge resource consents held for this site.

Flaring at Kupe Production Station

At the KPS over the last twelve months (April 13 – March 14) flaring has regularly occurred each month. The quantities flared each month vary and relate to process incidents at the site. In addition, gas flaring increases during plant maintenance, shutdowns, and when gas flows are off specification.

The quantities flared each month vary and relate to process incidents at the site.

The two months with the highest flaring volumes were September and April 2013. In September 2013 there was vessel inspections completed on a section of the plant which required to be shutdown, purged, and pressured up before coming back on line, an in April there was a plant start up after a plant shutdown. In addition, gas flaring increases during plant maintenance, shutdowns, and when gas flows are off specification.

Figure 1 below shows the total monthly amounts of gas flared at the KPS from April 2013 till the end of March 2014.

The total volume of material flared for this period is 5,767,244 Sm^3. The previous reporting period (2012-2013) volume was 6,643,112 Sm^3.

Figure 1: Kupe Production Station Total Monthly Volumes Flared

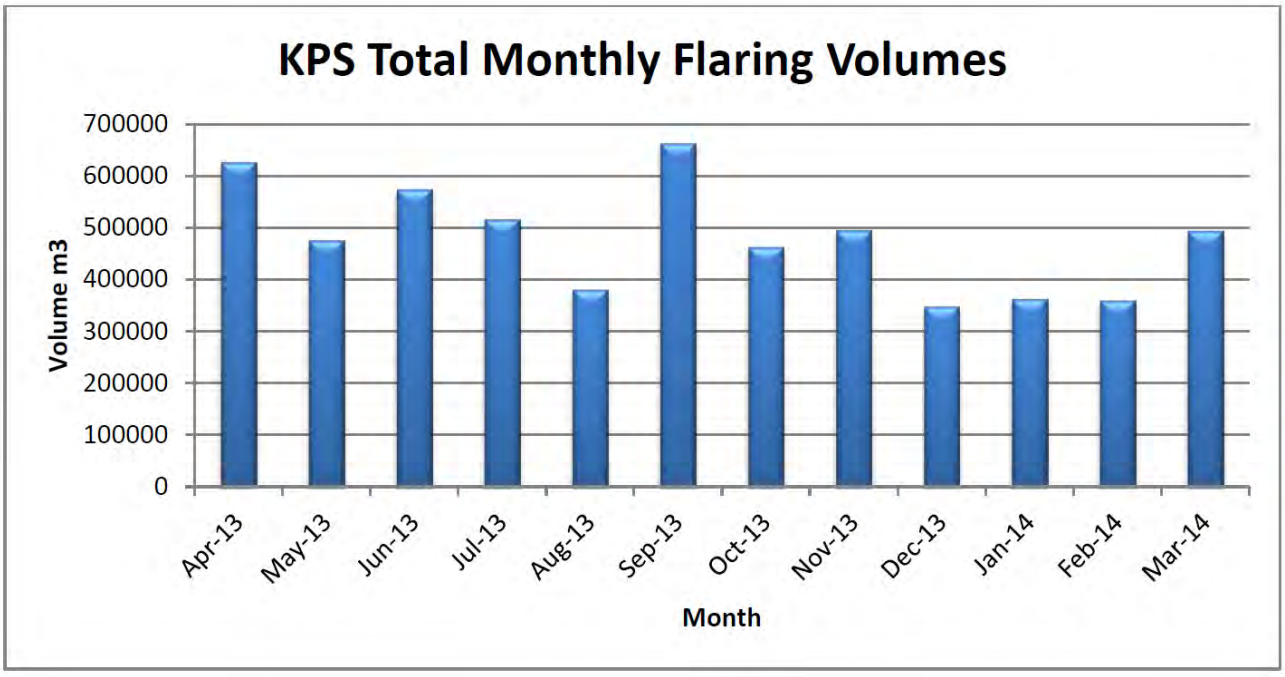
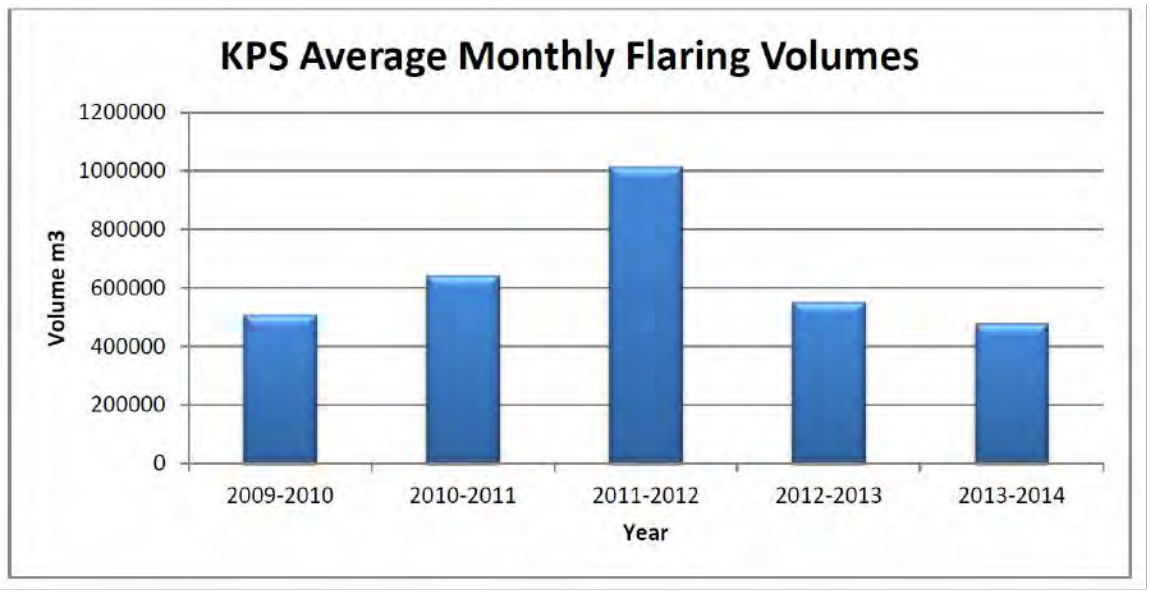


Figure 2 below indicates that the average monthly volumes flared over consecutive reporting periods.

Figure 2: Kupe Production Station Average Monthly Volumes Flared



Appendix V
Taranaki Regional Council Air Quality Report

Memorandum

To Job Manager, Nathan Crook
From Scientific Officer -Air Quality, Brian Cheyne
File FRODO# 1513834
Date June 19, 2015

Ambient air quality monitoring at Kupe Production Station

Figure 1 Air quality monitoring sites in 2013 -2014 monitoring year

MultiRAE -multi gas analyser:

During the July 2013 – 30 June 2014 monitoring period, a multi-gas meter was deployed on two occasions in the vicinity of the Kupe Production Station. The deployments lasted approximately forty-eight hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continual measurements of gas concentration for carbon monoxide and combustible gases.

The location of the air quality monitoring sites is shown in Figure 1. The results of monitoring undertaken are summarized in Table 1 and the data presented graphically in Figure 2.

Because of the nature of the activities on the site, it was considered that the primary information of interest in respect of gases potentially emitted from the site was the average downwind concentration, rather than any instantaneous peak value. That is, the long-term exposure levels, rather than short-term maxima, are of most interest. The gas meter was

therefore set up to create a data set based on recording the average concentration measured during each minute as raw data.

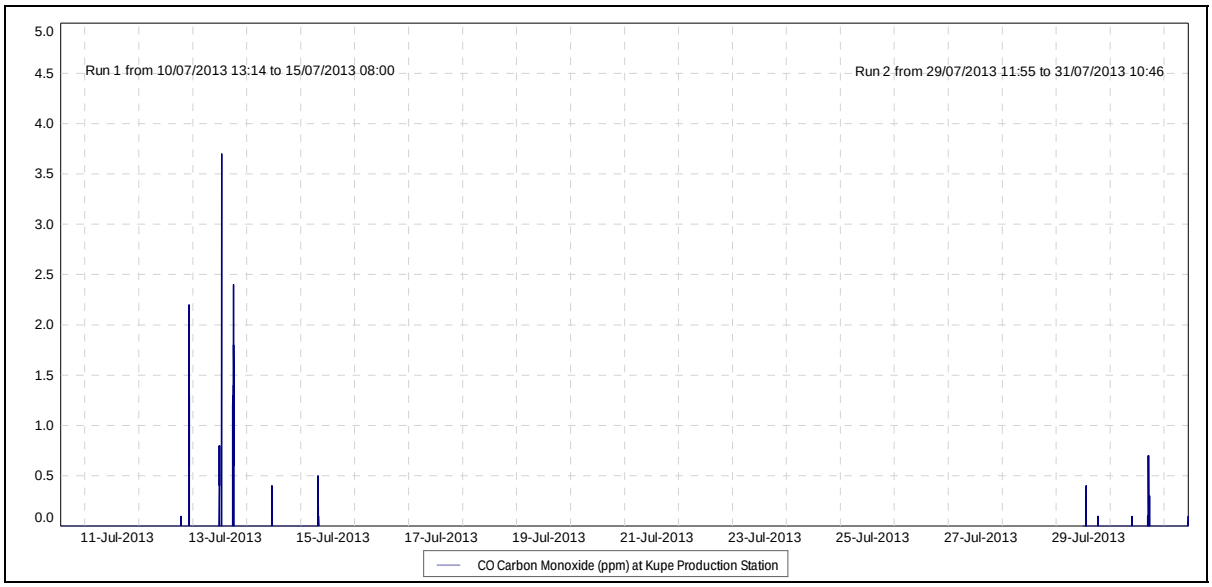


Figure 2 Graphs of ambient gas levels in the vicinity of the Kupe production station

Table 1 Summary of ambient gas monitoring results at Kupe Production Station

Run		1	2	Average
Period (from-to)		10.07.2013 13:14 15.07.2013 08:00	29.07.2013 11:55 31.07.2013 10:46	
Max	CO (ppm)	3.7	0.7	2.2
	LEL (%)	0.1	0.0	0.2
Mean	CO (ppm)	0.2	0.2	0.2
	LEL (%)	0.0	0.0	0.0
Min	CO (ppm)	0.0	0.0	0.0
	LEL (%)	0.0	0.0	0.0

Note: (1) the instrument records in units of ppm. At 15°C
1ppm CO = 0.85 mg/m^3

(2) See text for explanation of LEL. Because the LEL of methane is equivalent to a mixture of approximately 5% methane in air, then the actual concentration of methane in air can be obtained by dividing the % LEL by 20.

Carbon Monoxide (CO)

The consents covering air discharges from the Kupe Production Station have specific limits related to particular gases. Special condition 13 of consent 6546 and special condition 17 of consent 6445 both set a limit on the carbon monoxide concentration at or beyond the production station's boundary. The limit is expressed as 10 mg/m^3 for an eight hour average or 30 mg/m^3 for a 1 hour average exposure. The maximum concentration of carbon monoxide found during the monitoring run was 3.15 mg/m^3 (see note (1)) which complies with the consent condition. This short term spike may have been caused by traffic movement as the monitor was located adjacent to the site entrance.

Lower Explosive Limit (LEL)
LEL% gives the percentage of the lower explosive limit, expressed as methane that is detected in the air sampled. The sensor on the instrument reacts to gases and vapours such as acetone, benzene, butane, methane, propane, carbon monoxide, ethanol, and higher alkanes and alkenes, with varying degrees of sensitivity. The Council's Regional Air Quality Plan has a typical requirement that no discharge shall result in a dangerous level of airborne contaminants, including any risk of explosion. At no time did the level of explosive gases downwind of the Kupe Production Station reach any more than a trivial level during the period monitored.

PM-10 monitoring

In September 2004 the Ministry for the Environment promulgated the National Environmental Standards (NES) relating to certain air pollutants. The NES for inhalable particulate (PM_{10}) is 50 $\mu g/m^3$ (24-hour average).

Particulates can be derived from many sources, including motor vehicles (particularly diesels), solid and oil-burning processes for industry and power generation, incineration and waste burning, photochemical processes, and natural sources such as pollen, abrasion, and sea spray.

PM10 particles are linked to adverse health effects that arise primarily from the ability of particles of this size to penetrate the defences of the human body and enter deep into the lungs significantly reducing the exchange of gases across the lung walls. Health effects from inhaling PM10 include increased mortality and the aggravation of existing respiratory and cardiovascular conditions such as asthma and chronic pulmonary diseases.

During the reporting period, a "DustTrak" PM_{10} monitor was deployed on one occasion in the vicinity of the plant. The deployment lasted approximately twelve hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continual measurements of PM_{10} concentrations. The location of the PM_{10} monitor during the sampling run is shown in Figure 1.

The details of the sample run are graphically presented in Figure 3.

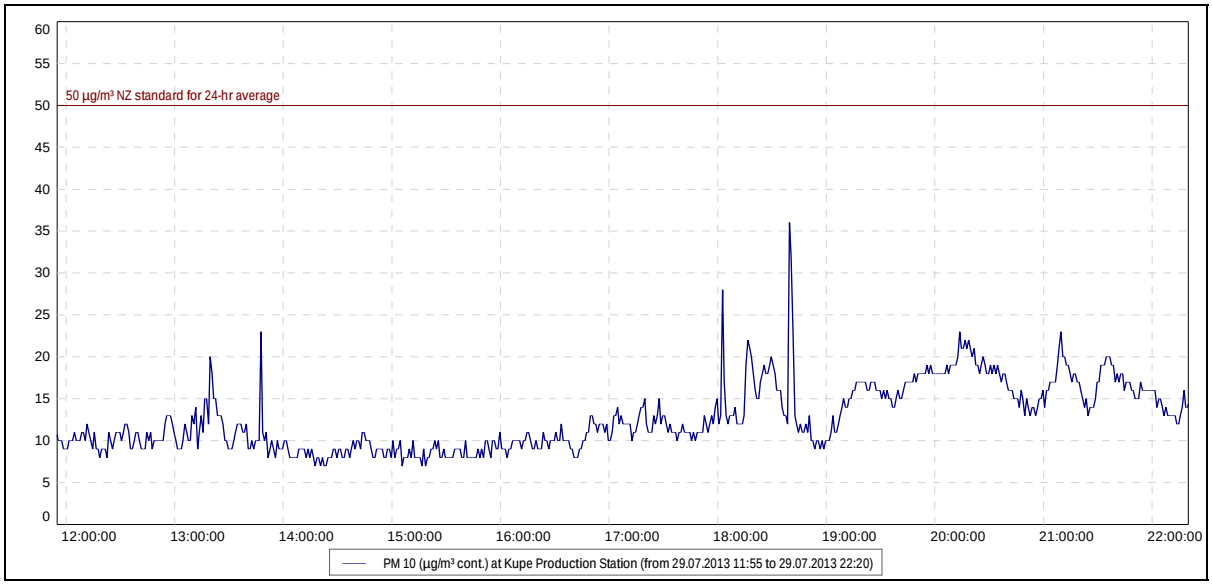


Figure 3 PM10 concentration (µg/m³) at the Kupe Production Station (2013-14)

Findings

The average recorded PM_{10} concentration for the entire 12 hours dataset was 12.6 µg/m³. This equates to 25% of the National Environmental Standard for a 24-hour period of 50 µg/m³. The maximum recorded PM_{10} concentration over the entire monitoring period was only 36 µg/m³.

Background levels of PM_{10} in the region have been found to be around 11 µg/m³.