Origin Energy Resources NZ Limited
Rimu & Waihapa Production Stations
Monitoring Programmes
Biennial Report
2011-2013

Technical Report 2013-55

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Executive summary

Origin Energy Resources NZ Limited operates the Rimu Production Station, located at Mokoia in the Manawapou catchment, and the Waihapa Production Station, located at Stratford, in the Patea catchment. The Rimu Production Station processes oil and gas from the Kauri, Manutahi and Rimu wells. The Waihapa Production Station processes oil and gas from wells in the surrounding Tariki, Ahuroa, Waihapa and Ngaere [TAWN] fields. This report for the period July 2011-June 2013 describes the monitoring programme implemented by the Taranaki Regional Council to assess the Company's environmental performance during the period under review, and the results and effects of its activities.

The Company holds six resource consents for the Rimu Production Station, which include a total of 58 conditions setting out the requirements that must be satisfied. There is one consent to discharge stormwater, two consents to discharge emissions to air and three consents to take and use water.

The Company holds three resource consents for the Waihapa Production Station, which include a total of 33 conditions setting out the requirements that must be satisfied. There is one consent to discharge stormwater, one consent to take and use water, and one consent to discharge emissions to air.

The Council's monitoring programme for the period under review included: eleven inspections of Rimu Production Station and ten of Waihapa Production Station, three water samples collected for physicochemical analysis at the Rimu Production Station, and three at the Waihapa Production Station, two biological surveys of receiving waters in relation to the Waihapa Production Station, and one ambient air quality survey at the Waihapa Production Station.

The monitoring showed that the Company's production stations were well managed and maintained. There appeared to be no adverse environmental effects resulting from activities at either the Waihapa site or the Rimu site. This is in line with the findings in previous monitoring years.

During the period under review, the Company demonstrated a high level of environmental performance and compliance with the resource consents for the Waihapa Production Station, and a high level of environmental performance and compliance overall for the Rimu Production Station.

For reference, in the 2012-2013 year, 35% 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 59% demonstrated a good level of environmental performance and compliance with their consents.

This report includes recommendations for the 2013-2014 monitoring period.

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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 Biennial Report for the period July 2011-June 2013 by the Taranaki Regional Council on the monitoring programme associated with resource consents held by Origin Energy Resources NZ Limited [Origin Energy] for the Rimu and Waihapa Production Stations. The Rimu Production Station is located on Mokoia Road, Mokoia in the Manawapou catchment. The Waihapa Production Station is located on Bird Road, Stratford in the Patea catchment.

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 abstractions and discharges of water within the Manawapou and Patea catchments, and the results of the Council's monitoring programme associated with the air discharge permits held by Origin Energy to cover emissions to air from the sites.

One of the intents of the Resource Management Act (1991) 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 has generally integrated its environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of use of both water and air, and is the tenth combined report by the Taranaki Regional Council for the Rimu and Waihapa production stations.

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 through monitoring programmes, a summary of the resource consents held by Origin Energy, and the nature of the monitoring programmes in place for the period under review.

Section 2 contains a description of the activities and operations conducted within the Manawapou catchment and sets out the resource consents held by Origin Energy in relation to the Rimu Production Station. It presents the results of monitoring during the period under review, including scientific and technical data. It also discusses the results, their interpretation, and their significance for the environment.

Section 3 contains a description of the activities and operations conducted within the Patea catchment and sets out the resource consents held by Origin Energy in relation to the Waihapa Production Station. It presents the results of monitoring during the period under review, including scientific and technical data. It also discusses the results, their interpretation, and their significance for the environment.

Section 4 presents recommendations to be implemented in the 2013-2014 monitoring year.

1.1.3 The Resource Management Act (1991) and monitoring

The Resource Management Act 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 a discharge, and may include cultural and socio-economic effects;
(b) physical effects on the locality, including landscape, amenity and visual effects;
(c) ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
(d) natural and physical resources having special significance (e.g., 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 Taranaki Regional Council is recognising the comprehensive meaning of `effects' inasmuch as is appropriate for each discharge source. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the Resource Management Act to assess the effects of the exercise of consents. In accordance with section 35 of the Resource Management Act 1991, the Council undertakes compliance monitoring for consents and rules in regional plans; and maintains an overview of performance of resource users against regional plans and consents.

Compliance monitoring, including impact monitoring, also enables the Council to continuously assess its own performance in resource management as well as that of resource users particularly consent holders. It further enables the Council to continually re-evaluate its approach and that of consent holders to resource management, and, ultimately, through the refinement of methods, to move closer to achieving sustainable development of the region's resources.

1.1.4 Evaluation of environmental performance

Besides discussing the various details of the performance and extent of compliance by the consent holder(s) during the period under review, this report also assigns an overall rating. The categories used by the Council, and their interpretation, are as follows:

- a **high** level of environmental performance and compliance indicates that essentially there were no adverse environmental effects to be concerned about, and no, or inconsequential (such as data supplied after a deadline) non-compliance with conditions.

- a **good** level of environmental performance and compliance indicates that adverse environmental effects of activities during the monitoring period were negligible or minor at most, or, 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, or, there were perhaps some items noted on inspection notices for attention but these items were not urgent nor critical, and follow-up inspections showed they have been dealt with, and any inconsequential non compliances with conditions were resolved positively, co-operatively, and quickly.

- **improvement desirable (environmental)** or **improvement desirable (administrative compliance)** (as appropriate) indicates that the Council may have been obliged to record a verified unauthorised incident involving measurable environmental impacts, and/or, there were measurable environmental effects arising from activities and intervention by Council staff was required and there were matters that required urgent intervention, took some time to resolve, or remained unresolved at the end of the period under review, and/or, there were on-going issues around meeting resource consent conditions even in the absence of environmental effects. Abatement notices may have been issued.

- **poor performance (environmental)** or **poor performance (administrative compliance)** indicates generally that the Council was obliged to record a verified unauthorised incident involving significant environmental impacts, or there were material failings to comply with resource consent conditions that required significant intervention by the Council even in the absence of environmental effects. Typically there were grounds for either a prosecution or an infringement notice.

For reference, in the 2012-2013 year, 35% 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 59% demonstrated a good level of environmental performance and compliance with their consents.

1.2 Resource consents

1.2.1 Production stations

A summary of the consents for activities at the Rimu and Waihapa Production Stations is given in Tables 1 and 2. These consents are discussed in more detail in Sections 2.2 and 3.2. Copies of the consents are attached in Appendix I.

Table 1 Resource consents for activities at the Rimu Production Station

Consent number	Purpose of consent	Issue date	Next review	Expiry
5744-1	Discharge treated stormwater	24/01/2001	-	2016
5745-1	Discharge emissions to air	24/01/2001	-	2016
5746-1	Discharge emissions to air	24/01/2001	-	2016
5749-1	Take and use surface water	24/01/2001	-	2016
5891-1	Take and use surface water	10/10/2001	-	2016
5946-1	Take and use groundwater	18/01/2002	-	2016

Table 2 Resource consents for activities at the Waihapa Production Station

Consent number	Purpose of consent	Issue date	Next review	Expiry
3457-2	Discharge treated stormwater	27/07/2009	2016	2028
3767-2	Take and use surface water	25/11/1999	-	2016
4049-3	Discharge emissions to air	6/10/2009	2011	2028

1.2.2 Wellsites

Origin Energy also hold consents for production activities at wellsites associated with the Rimu and Waihapa Production Stations. Details of these consents are summarised in Tables 3 and 4.

Table 3 Consents for production activities at wellsites associated with the Rimu Production Station

Wellsite	Consent number	Purpose	Issue date	Expiry
Kauri-A	5730-1	To discharge treated stormwater and treated site water from hydrocarbon exploration and production operations at the Kauri Te Pakakohi-A wellsite onto and into land	01/12/2000	2022
	5731-1	To discharge emissions into the air from the flaring of hydrocarbons and miscellaneous emissions associated with hydrocarbon exploration and production testing operations involving up to 32 zones and from production flaring at the Kauri Te Pakakohi-A wellsite	01/12/2000	2022
Kauri-A & F	6129-1	To discharge emissions to air from flaring [at either the Kauri-F or Kauri Te Pakakohi-A wellsites] associated with production activities and miscellaneous emissions at the Kauri-F wellsite	06/03/2003	2022
Kauri-B	5921-1	To discharge treated stormwater, uncontaminated treated site water, and uncontaminated treated production water from hydrocarbon exploration and production operations at the Kauri-B wellsite onto and into land and into an unnamed tributary of the Mangaroa Stream	30/11/2001	2016
	5923-1	To discharge emissions into the air from long-term hydrocarbon processing facilities and miscellaneous emissions at the Kauri-B wellsite	30/11/2001	2016
Kauri-C	5928-1	To discharge treated stormwater, uncontaminated treated site water, and uncontaminated treated production water from hydrocarbon exploration and production operations from the Kauri-C wellsite onto and into land in the vicinity of the Kaikura Stream	07/12/2001	2016
	5930-1	To discharge emissions into the air from long-term hydrocarbon processing facilities and miscellaneous emissions at the Kauri-C wellsite	07/12/2001	2016
Kauri-D	5951-1	To discharge treated stormwater, uncontaminated treated site water, and uncontaminated treated production water from hydrocarbon exploration and production operations at the Kauri-D wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	28/01/2002	2016
	5953-1	To discharge emissions into the air from long-term hydrocarbon processing facilities and miscellaneous emissions at the Kauri-D wellsite	28/01/2002	2016
	5958-1	To take and use water from an unnamed lake between the Mangaroa Stream and the Waikaikai Stream for pipeline testing purposes	22/03/2002	2016
Kauri-F	6130-1	To discharge emissions to air from flaring associated with production activities and miscellaneous emissions at the Kauri-F wellsite	26/02/2003	2022
Kauri-E	6140-1	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Kauri-E wellsite onto and into land and into the Waikaikai Stream	24/04/2003	2022

Wellsite	Consent number	Purpose	Issue date	Expiry
	6141-1	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Kauri-E Wellsite onto and into land and into the Mangaroa Stream	22/04/2003	2022
Manutahi-A	6299-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-A wellsite	05/04/2004	2022
	6300-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-A wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	05/04/2004	2022
Manutahi-B	6305-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-B wellsite	21/04/2004	2022
	6306-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-B wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	20/04/2004	2022
Manutahi-C	6311-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-C wellsite	06/04/2004	2022
	6312-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-C wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	06/04/2004	2022
Manutahi-D	6317-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-D wellsite	20/04/2004	2022
	6318-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-D wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	20/04/2004	2022
Manutahi-E	6323-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-E wellsite	08/06/2004	2022
	6324-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-E wellsite onto and into land in the vicinity of the Mangaroa Stream and Lake Kaikoura	13/07/2004	2022
Manutahi-F	6329-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-F wellsite	09/06/2004	2022
	6330-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-F wellsite onto and into land in the vicinity of the Mangaroa Stream and Lake Kaikoura	16/07/2004	2022
Manutahi-G	6335-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-G wellsite	01/06/2004	2022

Wellsite	Consent number	Purpose	Issue date	Expiry
	6336-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-G wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	01/06/2004	2022
Manutahi-H	6341-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-H wellsite	02/06/2004	2022
	6342-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-H wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	02/06/2004	2022
Rimu-A	5322-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Pohutakawa-A wellsite onto and into land in the vicinity of the Waikaikai Stream	28/05/1998	2016
	5324-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Pohutakawa-A wellsite	28/05/1998	2016
Rimu-B	5625-1	To discharge up to 50 cubic metres/day of treated stormwater from hydrocarbon exploration and production operations into an unnamed tributary of the Manawapou River	27/06/2000	2022
	5626-1	To discharge emissions into the air from the flaring of hydrocarbons and miscellaneous emissions associated with hydrocarbon exploration and production testing operations involving up to 19 zones and from production flaring at the Rimu-A wellsite	27/06/2000	2022
Rimu-B & C	5934-1	To discharge treated stormwater and treated site water from hydrocarbon exploration and production operations at the Rimu-B wellsite onto and into land and into an unnamed tributary of the Manawapou River	21/05/2002	2016
Pohutukawa-A	6749-1	To discharge emissions into the air from the flaring of hydrocarbons and miscellaneous emissions associated with hydrocarbon exploration and production testing operations involving up to 10 zones and from production flaring at the Rimu-B wellsite	28/11/2005	2022
	6751-1	To take water from the unnamed southern tributary of the Mangaroa Stream for pipeline testing purposes	28/11/2005	2022

Table 4 Consents for production activities at wellsites associated with Waihapa Production Station

Wellsite	Consent number	Purpose	Issue date	Expiry
Goss-A	6561-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Goss-A wellsite	31/03/2005	2022
	6562-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Goss-A wellsite onto and into land in the vicinity of an unnamed tributary of the Ngaere Stream in the Patea catchment	31/03/2005	2022
Kupara North	5273-1	To discharge up to 50 cubic metres/day of treated stormwater from hydrocarbon exploration and production operations into an unnamed tributary of Lake Ratapiko in the Waitara Catchment	04/02/1998	2016

Wellsite	Consent number	Purpose	Issue date	Expiry
	5456-3	To discharge emissions into the air from the flaring of gas together with miscellaneous emissions arising from hydrocarbon production operations from the Tariki-2C well on the Kupara North wellsite	27/08/2007	2021
Ngaere-F	4162-2	To discharge treated stormwater and produced water from hydrocarbon exploration and production operations onto and into land in the vicinity of the Patea River	9/09/2010	2028
Piakau-A	5046-1	To discharge up to 50 cubic metres/day [2 litres/second] of treated stormwater and treated wellsite water from hydrocarbon exploration and production operations into an unnamed tributary of the Makara Stream a tributary of the Makino Stream in the Waitara Catchment.	27/11/1996	2015
Tariki-A	3679-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Tariki-A wellsite onto and into land and into and unnamed tributary of the Mako Stream in the Waitara catchment	09/06/2003	2033
Tariki-B	3680-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Tariki-B wellsite onto and into land and into and unnamed tributary of the Mako Stream in the Waitara catchment	09/06/2003	2033
Tariki-D	6202-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities from the Tariki-D wellsite	10/09/2003	2021
Tariki-D	6203-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Tariki-D wellsite onto and into land and into an unnamed tributary of Lake Ratapiko in the Waitara catchment	10/09/2003	2021
	4201-2	To discharge treated stormwater and produced water from hydrocarbon exploration and production operations into an unnamed tributary of the Patea River	16/09/2010	2028
Waihapa-B	3684-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Waihapa-B wellsite onto and into land and into an unnamed tributary of the Ngaere Stream in the Patea catchment	09/06/2003	2034
Waihapa-C	3685-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Waihapa-C wellsite onto and into land and into an unnamed tributary in the Patea catchment	09/06/2003	2034
Waihapa-D	3686-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water form hydrocarbon exploration and production operations at the Waihapa-D wellsite onto and into land and into an unnamed tributary of the Ngaere Stream in the Patea catchment	09/06/2003	2034
Waihapa-E	3687-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Waihapa-E wellsite onto and into land and into an unnamed tributary of the Ngaere Stream in the Patea catchment	09/06/2003	2034
Waihapa-B	4093-2	To discharge treated stormwater and produced water from hydrocarbon exploration and production operations onto and into land in the vicinity of the Ngaere Stream	10/09/2010	2028

Wellsite	Consent number	Purpose	Issue date	Expiry
Waihapa-G	6848-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Waihapa-G wellsite	06/04/2006	2022
Waihapa-G	6849-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Waihapa-G wellsite onto and into land in the vicinity of an unnamed tributary of the Ngaere Stream in the Patea catchment	04/04/2006	2022
Waihapa-H	6854-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Waihapa-H wellsite	03/04/2006	2022
Waihapa-H	6855-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Waihapa-H wellsite onto and into land	03/04/2006	2022
Various	7518-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at established wellsites [Waihapa-A, B, C, D, E and F; Toko-B, D and E, Tariki-A and Ahuroa-B], together with miscellaneous emissions	06/10/2009	2028
	6561-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Goss-A wellsite	31/03/2005	2022
Goss-H	6562-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Goss-A wellsite onto and into land in the vicinity of an unnamed tributary of the Ngaere Stream in the Patea catchment	31/03/2005	2022
	5273-1	To discharge up to 50 cubic metres/day of treated stormwater from hydrocarbon exploration and production operations into an unnamed tributary of Lake Ratapiko in the Waitara Catchment	04/02/1998	2016
Tariki-2C	5456-3	To discharge emissions into the air from the flaring of gas together with miscellaneous emissions arising from hydrocarbon production operations from the Tariki-2C well on the Kupara North wellsite	27/08/2007	2021

Figures 1 and 2 show the location of wellsites associated with the Rimu and Waihapa Production Stations.

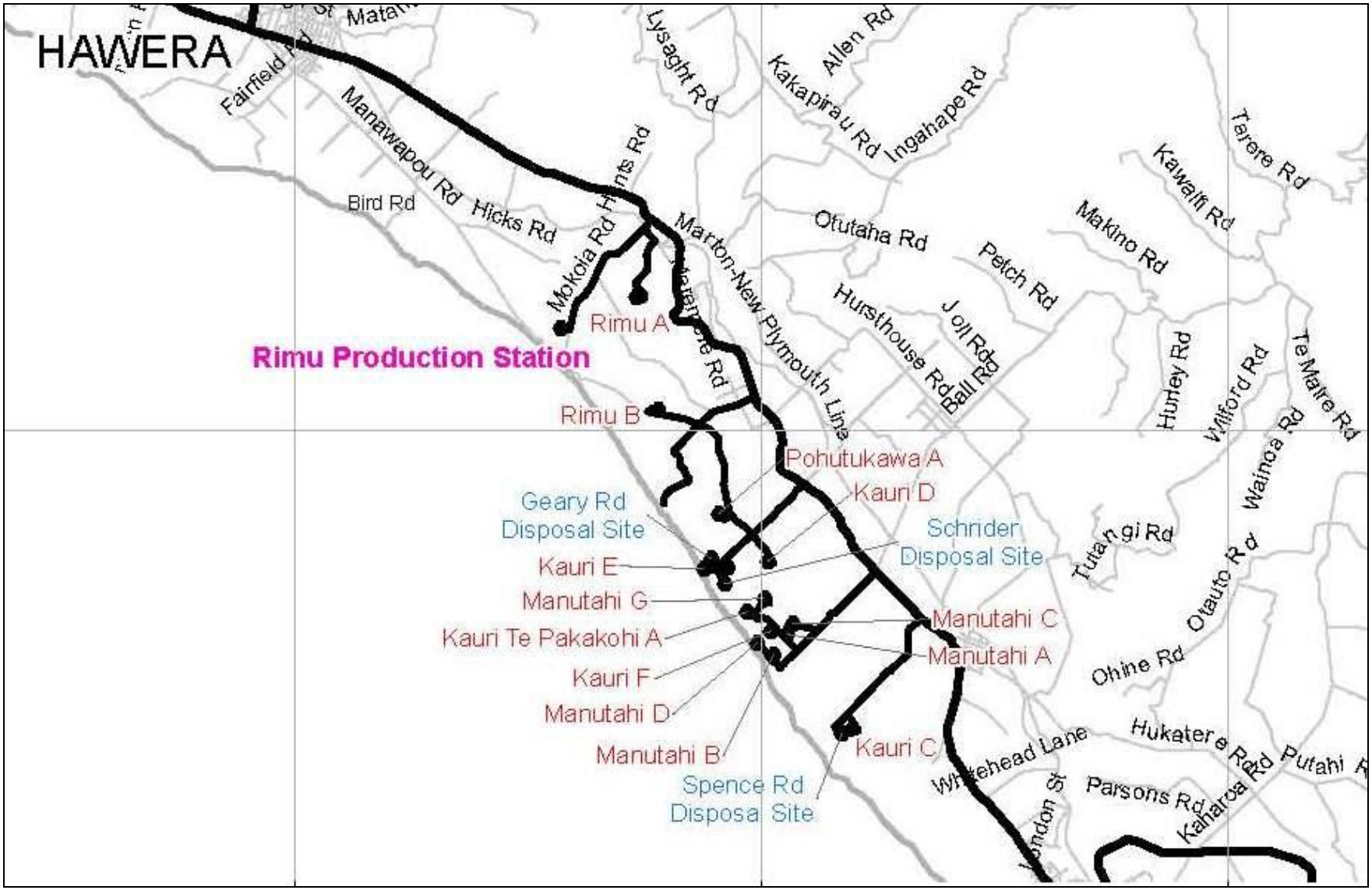

Figure 1 Location of wellsites associated with the Rimu Production Station

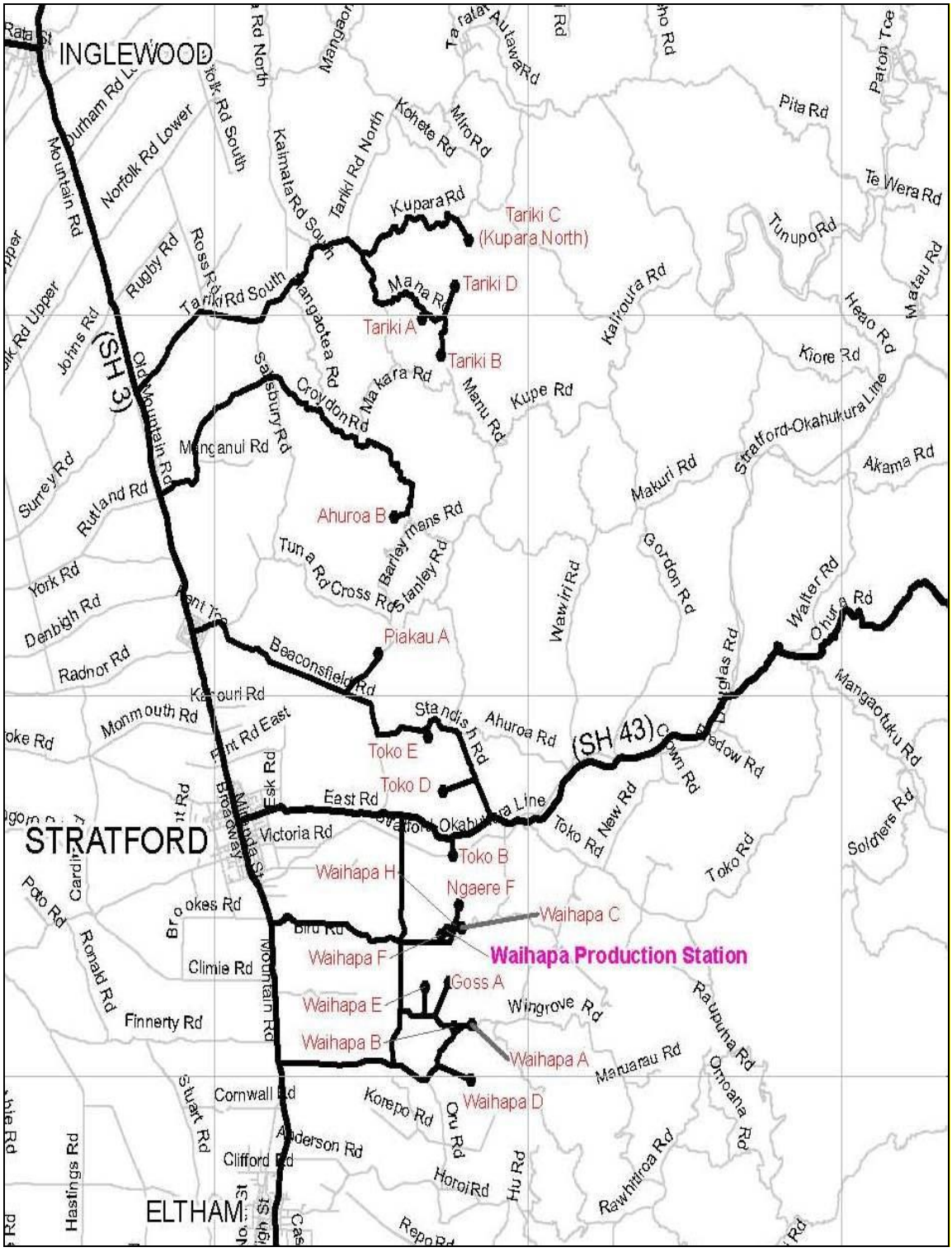

Figure 2 Location of wellsites associated with the Waihapa Production Station

1.3 Monitoring programmes

1.3.1 Introduction

Section 35 of the Resource Management Act sets out an obligation for the Taranaki Regional Council to: gather information, monitor, and conduct research on the exercise of resource consents, and the effects arising, within the Taranaki region.

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

The monitoring programme for the Rimu Production Station consisted of three primary components. The monitoring programme for the Waihapa Production Station consisted of five primary components.

1.3.2 Programme liaison and management

There is generally a significant investment of time and resources by the Taranaki Regional 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, or new consents, advice on the Council's environmental management strategies and the content of regional plans, and consultation on associated matters.

1.3.3 Site inspections

The Rimu site was visited eleven times and the Waihapa site was visited ten 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.

1.3.4 Stormwater sampling

The Taranaki Regional Council undertook sampling of the stormwater discharges from the production stations and the water quality upstream and downstream of the discharge points and mixing zones, in the unnamed tributary of the Manawapou River, and in the Ngaere Stream. Samples from the Rimu Production Station were analysed for hydrocarbons, conductivity, pH and suspended solids. Samples from the Waihapa Production Station were analysed for alkalinity, chloride, conductivity, hydrocarbons, pH and suspended solids.

1.3.5 Biomonitoring survey

Two biomonitoring surveys were carried out in the Ngaere Stream to determine whether or not the discharge of treated stormwater and API separator discharges from the Waihapa Production Station were having a detrimental effect upon the communities of the stream. Two additional surveys could not be completed due to inclement weather delays.

1.3.6 Air monitoring

Ambient gas monitoring was undertaken at the Waihapa Production Station using a multi-gas meter deployed in the vicinity of the plant on one occasion during the monitoring year. The instrument was placed in a down-wind position at the start of the deployment. Monitoring consisted of continual measurements of gas concentrations for the gases of interest (carbon monoxide and combustible gases).

2. Rimu Production Station

2.1 Process description

The Rimu Production Station processes oil and gas recovered from the Rimu , Kauri and Manutahi wells and encompasses a condensate plant, gas plant and LPG plant. The oil and gas are separated and treated to produce an oil suitable for export from the site; gas suitable for export into Vector's pipeline; and LPG suitable for sale and export. Construction started in May 2001 and the plant was commissioned between February and April 2002.

The Rimu Production Station is situated on Mokoia Road, between the coast and State Highway 3, south east of Hawera. The production station covers approximately 6 hectares on an area of 15.5 hectares of land owned by the Company. The land is situated on top of a coastal terrace. The closest residential dwelling is approximately 800 metres from the production station. The surrounding land use is largely pastoral.

Photo 1 Rimu Production Station

2.2 Resource consents

2.2.1 Water abstraction permits

Section 14 of the Resource Management Act 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.

Origin Energy holds water permit **5749-1** to take water from the Manawapou River for hydrostatic testing of pipelines and crude oil tanks. This permit was issued by the Taranaki Regional Council on 24 January 2001 as a resource consent under Section

87(d) of the Resource Management Act to Swift Energy NZ Ltd [Swift]. It was transferred to Origin Energy on 11 April 2008 and is due to expire on 1 June 2016.

Condition 1 imposes limits upon the volume abstracted.

Condition 2 requires the use of a measuring and recording device and provides for the supply of abstraction data to the Council.

Condition 3 allows the Council to temporarily suspend or reduce abstraction during times of extreme low flow.

Condition 4 is a review provision.

A copy of the permit is attached to this report in Appendix I.

Origin Energy holds water permit **5891-1** to take up to 4000 cubic metres of water from the Tangahoe River for the purpose of hydrostatic testing of crude oil tanks and filling of an onsite firewater pond; to take up to 1000 cubic metres a month from the Tangahoe River to top up the fire water pond during dry periods; and to take up to 4000 cubic metres of water from the Tangahoe River for the purpose of refilling the fire water pond in the event it is depleted during fire fighting activities. This permit was issued by the Taranaki Regional Council on 10 October 2001 as a resource consent under section 87(d) of the Resource Management Act to Swift. It was transferred to Origin Energy on 11 April 2008 and is due to expire on 1 June 2016.

Condition 1 requires the consent holder to notify the Council 48 hours prior to abstraction taking place.

Condition 2 requires the consent holder to adopt the best practicable option to prevent of minimise any adverse effects.

Condition 3 limits the abstraction to 2,160 cubic/metres a day.

Condition 4 requires the consent holder to ensure the intake structure is screened to avoid the entrapment of fish.

Condition 5 requires the consent holder to maintain records of abstraction, and make records available to Council.

Condition 6 is a review provision.

A copy of the permit is attached to this report in Appendix I.

Origin Energy Resources NZ Limited holds water permit **5946-1** to take and use groundwater from a bore within the Manawapou catchment for on-site purposes at the Rimu Production Station. This permit was issued by the Taranaki Regional Council on 18 January 2002 as a resource consent under Section 87(d) of the Resource Management Act to Swift. It was transferred to Origin Energy on 11 April 2008 and is due to expire on 1 June 2016.

Condition 1 requires the adoption of the best practicable option.

Condition 2 imposes limits upon the volume extracted.

Condition 3 requires that there is no intrusion of saltwater into any freshwater aquifers.

Condition 4 requires the recording of abstraction data and provides for the supply of this data to Council.

Condition 5 is a review condition.

A copy of the permit is attached to this report in Appendix I.

2.2.2 Water discharge permit

Section 15(1)(a) of the Resource Management Act 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 water discharge permit **5744-1** to discharge treated stormwater from the Rimu Production Station onto and into land and into an unnamed tributary of the Manawapou River. This permit was issued by the Taranaki Regional Council on 24 January 2001 (varied 2 February 2001) as a resource consent under Section 87(e) of the Resource Management Act to Swift. It was transferred from to Origin Energy on 11 April 2008 and is due to expire on 1 June 2016.

Condition 1 requires the adoption of best practicable option.

Condition 2 imposes a limit on the stormwater catchment area.

Condition 3 requires the preparation of a contingency plan.

Condition 4 requires that the design, management and maintenance of the stormwater system be in accordance with the information submitted in support of the application.

Condition 5 deals with storage of hazardous substances.

Condition 6 imposes limits on significant potential contaminants in the discharge and condition 7 protects the receiving water from adverse effects.

Condition 8 deals with reinstatement of the site.

Condition 9 is a review provision.

A copy of the permit is attached to this report in Appendix I.

2.2.3 Air discharge permits

Section 15(1)(c) of the Resource Management Act 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 **5745-1** to discharge emissions into the air from combustion involving the flaring of petroleum products incidental to the

treatment of gas at the Rimu Production Station. This permit was issued by the Taranaki Regional Council on 24 January 2001 (varied 3 June 2005) as a resource consent under Section 87(e) of the Resource Management Act to Swift. It was transferred to Origin Energy on 11 April 2008 and is due to expire on 1 June 2016.

Conditions 1 and 2 require adoption of the best practicable option.

Condition 3 requires the treatment of flaring gas to reduce smoke emission.

Condition 4 deals with reporting requirements.

Condition 5 requires maintenance of equipment.

Condition 6 prohibits off-site offensive or objectionable odours.

Condition 7 requires consultation with the council prior to alterations.

Conditions 8, 9, and 14 deal with notification requirements.

Conditions 10 and 13 set out records which need to be kept.

Condition 11 requires flaring to be minimised as much as practicable.

Condition 12 deals with depressurisation of the plant.

Condition 15 requires an analysis of the gas and crude oil stream.

Conditions 16, 17 and 18 require the consent holder to control emissions from the flare.

Condition 19 is a review provision.

A copy of the permit is attached to this report in Appendix I.

Origin Energy holds air discharge permit **5746-1** to discharge emissions into the air from the Rimu Production Station. This permit was issued by the Taranaki Regional Council on 24 January 2001 (varied 3 June 2005) as a resource consent under Section 87(e) of the Resource Management Act to Swift. It was transferred to Origin Energy on 11 April 2008 and is due to expire on 1 June 2016.

Conditions 1 and 2 require the adoption of the best practicable option.

Condition 3 details reporting requirements.

Condition 4 requires maintenance of equipment.

Condition 5 prohibits discharge of offensive odours or dust beyond the site boundary.

Conditions 6, 7, and 8 deal with notification requirements.

Conditions 9 to 13 require the consent holder to control emissions from the flare.

Condition 14 requires the preparation of a report on treatment and/or reduction of BTEX emissions from the site.

Condition 15 is a review provision.

A copy of the permit is attached to this report in Appendix I.

2.3 Results

2.3.1 Inspections

The Rimu Production Station was inspected on 11 occasions during the 2011-2013 monitoring period. Inspections were carried out on 30 August 2011, 26 October 2011, 13 February 2012, 13 June 2012, 27 June 2012, 13 August 2012, 30 October 2012, 12 December 2012, 11 February 2013, 29 April 2013, and 4 June 2013. The site was found to be in good order and generally well managed, with ring drains, bunded areas, and the firewater pond found to all be in good order. Separators were free from contaminants and overall site management was good. A downstream inspection of the Manawapou River showed no evidence of adverse environmental effects. The associated wellsites were inspected on 30 June 2011, 13 July 2011, 31 August 2011, 6 September 2011, 13 September 2011, 19 September 2011 and April 2013. Particular attention was paid to offsite stormwater discharges; all sites were secure, and no effects were noted from any stormwater discharges.

2.3.2 Results of discharge monitoring

Stormwater from the production station site, including potentially contaminated stormwater from the production area and tank storage area, is treated through an API separator and then directed into a polyethylene lined storage pond located at the southern edge of the site. The pond has a storage capacity of 3600m^3 and it serves as a settlement pond and a fire water source in the event of an emergency.
Water from the stormwater pond is discharged by pipe towards the eastern edge of the site. The stormwater is discharged into an unnamed tributary of the Manawapou River. A sample was taken of the discharge from the pond on 16 September 2011. The results are shown in Table 5.

Table 5 Results for Rimu Production Station stormwater discharge [site IND001048]

	Conductivity mS/m	Hydrocarbons g/m^3	pH	Suspended solids g/m^3
Consent 5744-1 limits	-	*15*	*6.5-8.5*	*100*
16 September 2011	14.9	<0.5	7.7	5

The results comply with the limits set out in the consent conditions.

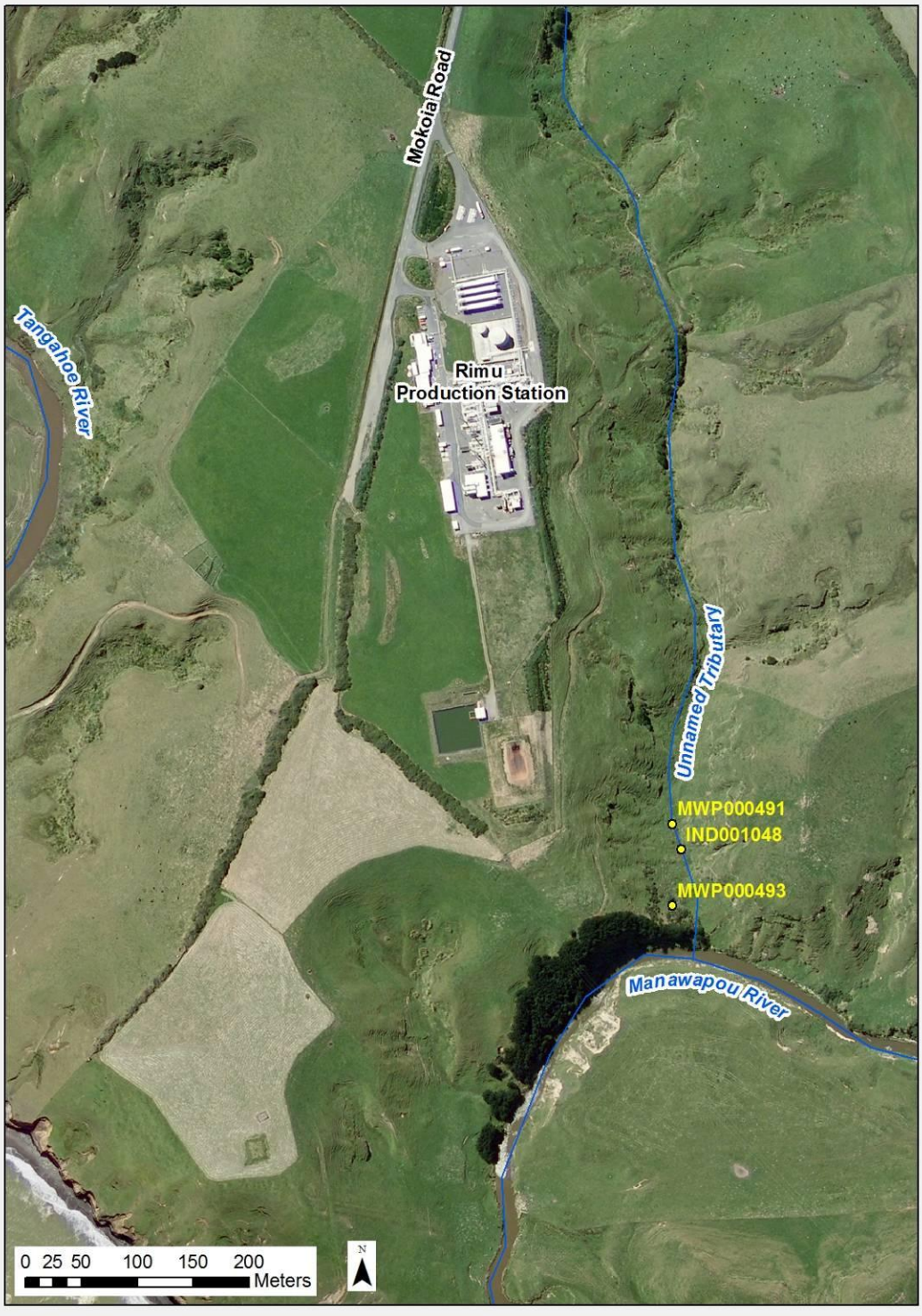

Figure 3 Rimu Production Station sampling sites

2.3.3 Results of receiving environment monitoring

Samples from the unnamed tributary of the Manawapou River into which the treated stormwater is discharged were also collected on 16 September 2011. The results are presented in Table 6.

Table 6 Results for sites upstream and downstream of the Rimu Production Station stormwater discharge 16 September 2011

Parameter	Units	Upstream [MWP000491)	Downstream [MWP000493]
Conductivity	mS/m	30.5	30.3
Hydrocarbons	g/m³	<0.5	<0.5
pH	pH	7.8	7.8
Suspended solids	g/m³	22	24

The results indicate little difference in water quality between the upstream and downstream sites. No hydrocarbons were detected in any of the samples.

2.3.4 Air

2.3.4.1 Inspections

Inspections in relation to emissions and their effects were conducted at the same time as the inspections described above. Matters checked included the flare for smoke or odour, other odour sources, compliance with plans and documentation relating to control of emission sources, potential dust, on-site records and notification procedures. No odours or excessive emissions were detected on any of the plant inspections.

2.3.4.2 Receiving environment monitoring

Air quality monitoring was not carried out at the Rimu Production Station by the Council in the 2011-2013 monitoring period.

2.3.4.3 Flaring report

Origin Energy provided the Council with an annual report on flaring and emissions as required by consents 5745-1 and 5746-1.

At production stations a pilot flare is maintained at all times for safety purposes, meaning a small amount of gas is continually flared. Other flaring occurs intermittently, for example during process upsets, plant shutdowns and start-ups. At wellsites, flaring generally occurs after drilling is complete and while the well is being tested, or during well workovers. Once a well has been tested and deemed commercially viable, it is generally connected to a production facility for processing, which virtually eliminates the need for flaring at the wellsite.

The Rimu flaring summary report is attached in Appendix IV.

2.4 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 such as 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 Taranaki Regional 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 2011-2013 period, it was not necessary for the Council to undertake significant additional investigations and interventions, or record incidents.

There were no incidents recorded by the Council that were associated with non-compliance by Origin Energy in relation to the Rimu Production station with conditions in resource consents or provisions in Regional Plans.

2.5 Discussion

2.5.1 Discussion of plant performance

Inspections of the Rimu Production Station during the 2011-2013 monitoring period found that the site was well managed and there were no issues with consent non-compliance.

2.5.2 Environmental effects of exercise of consents

Stormwater discharge monitoring showed that discharges from the site complied with consent conditions. Receiving water monitoring showed that the discharges were not causing any adverse effects on the unnamed tributary of the Manawapou River at the time of sampling. No offensive or objectionable odours were detected beyond the boundary during inspections and there were no complaints from neighbours in relation to flaring and emissions from the site.

2.5.3 Evaluation of performance

A tabular summary of the Company's compliance record for the period under review is set out in Tables 7-12.

Table 7 Summary of performance for Consent 5744-1 To discharge treated stormwater onto and into land and into an unnamed tributary of the Manawapou River

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option to minimise adverse effects	Site inspections	Yes
2. Limit on stormwater catchment area	Site inspections	Yes
3. Preparation of contingency plan	Plan approved 16 August 2010	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Design and maintenance of stormwater system in accordance with information supplied	Site inspections	Yes
5. Bunding of above ground hazardous substances storage areas	Site inspections	Yes
6. Concentration limits upon potential contaminants in discharge	Physicochemical sampling of discharge	Yes
7. Effects not to occur in receiving waters beyond the established mixing zone	Physicochemical sampling of receiving waters	Yes
8. Notification of Council prior to reinstatement of site and reinstatement to minimise effects	Site inspections and liaison with consent holder	N/A
9. Optional review provision re environmental effects	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

Table 8 Summary of performance for Consent 5745-1 To discharge emissions into the air from combustion involving the flaring of petroleum products incidental to the treatment of gas at the Rimu Production Station

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option to minimise adverse effects	Site inspections	Yes
2. Minimise emissions by appropriate selection, operation, supervision, control, and maintenance of equipment	Site inspections	Yes
3. Treatment of flaring gas by effective liquid separation and recovery	Site inspections	Yes
4. Provision of annual report on flaring to council	Received and reviewed annual report on flaring	Yes
5. Appropriate maintenance and operation of equipment	Site inspections	Yes
6. No offensive, obnoxious or objectionable odours beyond site boundary	Site inspections	Yes
7. Consultation with Council prior to significant alterations to plant, processes, or operations	Site inspections and liaison with consent holder	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
8. Notification of flaring more than five minutes in duration	Liaison with consent holder	Yes
9. Notification to Council of incidents or hazardous situations	Liaison with consent holder	Yes
10. Maintenance of log of continuous flaring incidents	Site inspections and liaison with consent holder	Yes
11. All practicable steps taken to minimise flaring	Site inspections and liaison with consent holder	Yes
12. Depressurisation of plant to prevent dense black smoke being discharged from the flare	Site inspections and liaison with consent holder	Yes
13. Provision of record of smoke emitting events to Council	Inspections of site, liaison with consent holder	Yes
14. Notification of neighbours of flaring and smoke emissions and provision of 24 hour contact telephone number	Liaison with consent holder	Yes
15. Provision of analysis of typical gas and crude oil stream	Not requested	N/A
16. Limit on maximum ground level concentration of carbon monoxide	Not monitored during period under review	N/A
17. Limit on maximum ground level concentration of nitrogen dioxide	Not monitored during period under review	N/A
18. Limit on maximum ground level concentration for any contaminant	Not monitored during period under review	N/A
19. Optional review provision re environmental effects	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

Table 9 Summary of performance for Consent 5746-1 To discharge emissions into the air from the Rimu Production Station

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option	Site inspections	Yes
2. Minimise emissions by appropriate operation, control and maintenance of equipment	Site inspections	Yes
3. Provision of annual report on flaring	Report received and accepted	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Appropriate maintenance and operation of equipment	Site inspections	Yes
5. No offensive, obnoxious or objectionable odours or dust beyond site boundary	Site inspections	Yes
6. Consultation with Council prior to significant alterations to plant, processes, or operations	Site inspections and liaison with consent holder	Yes
7. Notification of Council of incidents or hazardous situations	Liaison with consent holder	Yes
8. Provision of record of smoke emitting events to Council	Liaison with consent holder	Yes
9. No dangerous levels of airborne contaminants at or beyond the site boundary	Not monitored in year under review	N/A
10. No noxious or toxic levels of airborne contaminants at or beyond the site boundary	Not monitored during period under review	N/A
11. Limit on maximum ground level concentration of carbon monoxide	Not monitored during period under review	N/A
12. Limit on maximum ground level concentration of nitrogen oxides	Not monitored during period under review	N/A
13. Limit on maximum ground level concentration for any contaminant	Not monitored during period under review	N/A
14. Provision of a report on treatment / reduction of BTEX emissions from the site within 6 months	Report received October 2001	Yes
15. Optional review provision	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

Table 10 Summary of performance for Consent 5749-1 To take water from the Manawapou River for hydrostatic testing of pipelines and crude oil tanks

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on abstraction rate and volume	Consent not exercised in monitoring year under review	N/A
2. Provision of abstraction data	Consent not exercised in monitoring year under review	N/A

Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Right of Council to temporarily suspend or reduce abstraction during extreme low flow events	Consent not exercised in monitoring year under review	N/A
4. Optional review provision re environmental effects	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A**

Table 11 Summary of performance for Consent 5891-1 To take up to 4000 cubic metres of water from the Tangahoe River for the purposes of hydrostatic testing of crude oil tanks and filling of an onsite fire water pond; to take up to 1000 cubic metres of water per month from the Tangahoe River for top up of the fire water pond during dry periods; and to take up to 4000 cubic metres of water for the purpose of refilling the fire water pond in the event that it is depleted during fire fighting activities

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notify the Council 48 hrs prior to abstraction	Consent not exercised in monitoring year under review	N/A
2. Adoption of best practicable option	Consent not exercised in monitoring year under review	N/A
3. Limit on abstraction volume and rate	Consent not exercised in monitoring year under review	N/A
4. Screening of intake	Consent not exercised in monitoring year under review	N/A
5. Provision of abstraction data	Consent not exercised in monitoring year under review	N/A
6. Optional review provision re environmental effects	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A**

Table 12 Summary of performance for Consent 5946-1 To take and use groundwater from a bore within the Manawapou catchment for on-site purposes at the Rimu Production Station

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option to prevent adverse effects	Bore no longer in use	N/A
2. Limit on abstraction rate and volume	Bore no longer in use	N/A
3. Abstraction not to cause saltwater intrusion	Bore no longer in use	N/A
4. Provision of abstraction data	Bore no longer in use	N/A
5. Optional review provision re environmental effects	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A**

During the 2011-2013 monitoring period, Origin Energy demonstrated a high level of compliance with the resource consents associated with the Rimu Production Station.

2.5.4 Recommendations from the 2010-2011 Annual Report

In the 2010-2011 Annual Report, it was recommended:

THAT the monitoring programme for the Rimu Production Station in the 2011-2013 period remains unchanged from that for 2010-2011 monitoring year.

A reduced programme was implemented due to weather and staffing constraints.

2.5.5 Alterations to monitoring programmes for 2013-2014

In designing and implementing the monitoring programmes for air/water discharges in the region, the Taranaki Regional Council has taken into account the extent of information made available by previous authorities, its relevance under the Resource Management Act, the obligations of the Act in terms of monitoring emissions/discharges and effects, and subsequently reporting to the regional community, 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 2013-2014, the programme remain unchanged from that for 2011-2013. A recommendation to this effect is attached to this report.

2.5.6 Exercise of optional review of consents

None of the resource consents held by Origin Energy for the Rimu Production Station provide no further options for review prior to expiry.

2.6 Recommendation

In the 2013-2014 monitoring period it is recommended:

THAT the monitoring programme for the Rimu Production Station in the 2013-2014 period remains unchanged from that for 2011-2013.

3. Waihapa Production Station

3.1 Process description

Photo 2 Waihapa Production Station

The Waihapa Production Station is located approximately 7.5km east of Stratford in a rural area which is predominantly used for dairying. The production station processes oil and gas from wells in the surrounding Tariki, Ahuroa, Waihapa, and Ngaere (TAWN) fields by separating the oil, gas and water components of each wellsite's production. The produced oil is temporarily stored on site prior to being piped to the Omata tank farm in New Plymouth. The gas is processed further to remove any remaining moisture using glycol strippers and is then compressed and piped to end users. The produced water is disposed of by deep well injection. At the conclusion of the monitoring period, the Company were in negotiations to transfer ownership of the site to New Zealand Energy Corp.

3.2 Resource consents

3.2.1 Water abstraction permit

Section 14 of the Resource Management Act 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.

Origin Energy holds water permit **3767-2** to take water from the Ngaere Stream in the Patea catchment for utility and firewater purposes at the Waihapa Production Station.

This permit was issued by the Taranaki Regional Council on 25 November 1999 as a resource consent under Section 87(d) of the Resource Management Act to Swift. It was transferred to Origin Energy on 11 April 2008 and is due to expire on 1 June 2016.

Condition 1 imposes limits upon the volume of water to be abstracted.

Condition 2 requires the use of an accurate measuring and recording device and supply of abstraction data to the Council.

Condition 3 is a review provision.

A copy of the permit is attached to this report in Appendix I.

3.2.2 Water discharge permit

Section 15(1)(a) of the Resource Management Act 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 water discharge permit **3457-2** to discharge treated impounded stormwater [including washdown water and minor quantities of process water subject to potential contamination by hydrocarbons] from the Waihapa Production Station into the Ngaere Stream and to discharge treated stormwater from perimeter drains to land where it may enter the Ngaere Stream. This permit was issued by the Taranaki Regional Council on 27 September 2009 as a resource consent under Section 87(e) of the Resource Management Act. It is due to expire on 1 June 2028.

Condition 1 requires the adoption of the best practicable option.

Condition 2 limits the stormwater catchment area to 5 hectares.

Condition 3 requires maintenance of a contingency plan.

Condition 4 relates to management and maintenance of the stormwater treatment system.

Condition 5 requires all stormwater and produced water to be treated.

Condition 6 requires hazardous substance storage areas to be bunded.

Conditions 7, 8 and 9 impose limits upon contaminants in the discharge and adverse effects on the receiving waters.

Condition 10 concerns the provision of sampling results.

Condition 11 requires the consent holder to remedy any erosion.

Condition 12 is a review provision.

A copy of the permit is attached to this report in Appendix I.

3.2.3 Air discharge permit

Section 15(1)(c) of the Resource Management Act 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 **4049-3** to discharge emissions into the air from the flaring of hydrocarbons at the Waihapa Production Station in association with production, processing and maintenance activities and in emergency situations, together with miscellaneous emissions. This permit was issued by the Taranaki Regional Council on 6 October 2009 as a resource consent under Section 87(e) of the Resource Management Act. It is due to expire on 1 June 2028.

Condition 1 requires the adoption of the best practicable option.

Conditions 2 to 5 concern record keeping and reporting.

Conditions 6 to 9 concern information and notifications.

Conditions 10 to 12 require the consent holder to take steps to minimise the effects of emissions and flaring.

Conditions 13 to 17 relate to levels of contaminants at or beyond the boundary

Condition 18 is a review provision.

A copy of the permit is attached to this report in Appendix I.

3.3 Results

3.3.1 Inspections

The Waihapa Production Station was inspected on ten occasions during the 2011-2013 monitoring period. Inspections were carried out on 19 September 2011, 7 February 2012, 2 May 2012, 12 June 2012, 27 June 2012, 29 October 2012, 11 December 2012, 11 February 2013, 14 May 2013 and 22 May 2013. The site was found to be in good order and generally well managed, with on each occasion ring drains, skimmer pits/separators and bunded areas were all in good order and no issues were noted. The associated wellsites were inspected on 22 September 2011, 2 May 2012, 27 January 2013, 18 June 2013 and 26 June 2013. The inspections showed that all wellsites were well maintained and secure. Stormwater systems were maintained in such a way so as not to pose any threat to receiving waters and some sites were not in use and had not been utilized for some time.

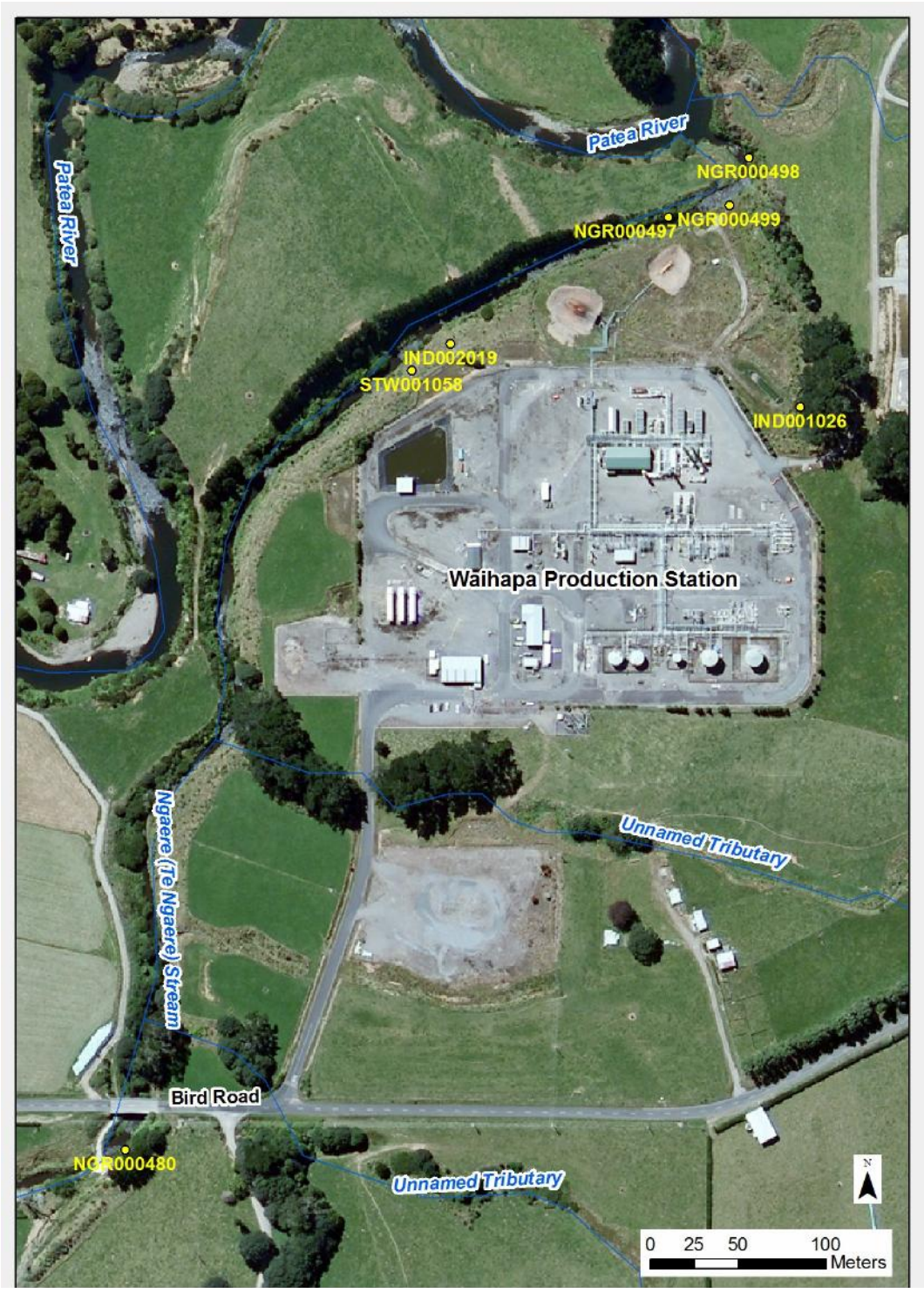

Figure 4 Monitoring sites at the Waihapa Production Station

3.3.2 Results of discharge monitoring

Samples were collected from the three discharge points at the Waihapa Production Station.

The results are shown in Tables 13-15, along with a summary of previous monitoring data. The location of the sampling sites is shown in Figure 4.

Table 13 Results for stormwater discharge from the firewater pond [site STW001058]

Date	Alkalinity g/m³ $CaCO_3$	Chloride g/m³	Conductivity mS/m	Hydrocarbons g/m³	pH	Suspended Solids g/m³
Consent 3457-2 limits	-	50	-	15	6 - 9	100
12 Oct 2011	53	16.4	16.8	<0.5	6.6	<2
No. samples	28	28	28	29	28	28
Minimum	3	0.6	1.0	<0.5	6.5	<2
Maximum	184	71.6	37.8	7.4	9.2	13
Median	58	16.4	19.0	0.5	7.0	2

Table 14 Results for the API separator discharge [site IND001026]

Date	Alkalinity g/m³ $CaCO_3$	Chloride g/m³	Conductivity mS/m	Hydrocarbons g/m³	pH	Suspended Solids g/m³
Consent 3457-2 limits	-	50	-	15	6 - 9	100
12 Oct 2011	7	2.4	2.9	0.6	6.2	12
No. samples	5	5	5	5	5	5
Minimum	7	1	2.4	0.5	6.2	4
Maximum	12	4.5	4.1	0.9	7.3	12
Median	9	2.8	2.9	0.6	6.8	5

Table 15 Results for stormwater discharge [site IND002019]

Date	Alkalinity g/m³ $CaCO_3$	Chloride g/m³	Conductivity mS/m	Hydrocarbons g/m³	pH	Suspended Solids g/m³
Consent 3457-2 limits	-	50	-	15	6 - 9	100
12 Oct 2011	3	1.7	1.7	<0.5	6.8	4
No. samples	24	27	27	28	27	27
Minimum	1	1	1	0.5	6.5	2
Maximum	119	66	35.4	0.8	7.7	14
Median	10	5	4.5	0.5	7.1	3

The above results for the three discharges from the site all comply with the limits specified in consent 3457-2. In addition to the Council's monitoring, Origin Energy provided the results of their own monitoring for the firewater pond. These results are summarised in Table 16.

Table 16 Results of Origin Energy monitoring for WPS firewater pond

	Chloride (g/m³)	Hydrocarbons (g/m³)	pH	Suspended solids (g/m³)
No. samples	104	104	104	104
Maximum	346	BLD	9.96	31
Median	48.65	BLD	7.09	10

BLD = below limit of detection

There were several exceedances of the chloride and pH discharge limits in the samples taken by Origin Energy. It should be noted, however, that these samples are taken from the firewater pond itself, not from the discharge. Water is manually released from the Waihapa firewater pond to maintain the level.

Prior to discharge it is tested to ensure that it complies with consent limits. If any parameters exceed the consent limits then there is capacity to wait for further rain to dilute any contaminants. The water is then retested and only released once it complies.

It is therefore unlikely that any actual discharge from the firewater pond would have caused any adverse effects in the Ngaere Stream, as discharges usually only occurs after persistent rain fall, resulting in substantial dilution, and water is only released once tests show it complies with discharge consent conditions.

3.3.3 Results of receiving environment monitoring

Samples were collected from three sites in the Ngaere Stream, in conjunction with stormwater discharge sampling. Figure 4 identifies the sampling localities and the results are shown in Table 1.

Table 17 Results for the Ngaere Stream [sites NGR000480, NGR000497, NGR000498]

Date	Site	Alkalinity g/m^3	Chloride g/m^3	Conductivity mS/m	Hydrocarbons g/m^3	pH	Suspended solids g/m^3
12- Oct-11	NGR000480	33	16.2	14.5	<0.5	7.0	17
	NGR000497	34	16.1	14.5	<0.5	7.0	19
	NGR000498	34	16.2	14.4	0.5	7.0	13

For the Ngaere Stream there was no significant difference between the upstream and downstream sites. The discharge complied with the consent in respect of receiving environment quality.

3.3.4 Biomonitoring

The Council's standard 'kick-sampling' technique was used on a total of two occasions at three established sites to collect streambed macroinvertebrates from the Ngaere Stream, to assess whether the discharges from the Waihapa Production Station had had any detrimental effects on the macroinvertebrate communities of this stream. An additional two surveys were not completed due to delays caused by inclement weather. Samples were sorted and identified to provide the number of taxa (richness) and MCI and SQMCI$_S$ scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects or 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 may indicate the degree of adverse effects (if any) of the discharges being monitored.

The late summer macroinvertebrate survey indicated that the discharge of treated stormwater and API separator discharges from the Waihapa Production Station site had not had any recent detrimental effects on the macroinvertebrate communities of the Ngaere Stream. The MCI scores for each site were all significantly higher than their respective historical medians, and were amongst the highest scores recorded for each site. The only significant changes in the macroinvertebrate communities

related to abundances of individual taxa, mainly as a result of habitat changes between sites. $SQMCI_S$ scores were not significantly different between sites 3 (NGR000480) and 5 (NGR000498), but a significant decrease between sites 3 and 4 (NGR000497) was coincident with more extensive periphyton substrate downstream at the more open site 4. The macroinvertebrate communities of the stream contained moderately low proportions of 'tolerant' taxa at all sites. In addition, communities at all sites had a number of common dominant taxa, although there was some variation as a result of variations in periphyton growth b etween sites. There was no significant change in MCI values between sites, despite some differences in habitat. In addition, taxonomic richness (numbers of taxa) was relatively consistent across all three sites. The MCI scores indicated that the stream communities were of good 'health', and better than typical conditions in comparison with median values recorded from past surveys. The lack of significant differences between the three sites indicated no recent impacts from any of the Waihapa Production Station discharges.

The spring macroinvertebrate survey indicated that the discharge of treated stormwater and API separator discharges from the Waihapa Production Station site had not had any recent detrimental effects on the macroinvertebrate communities of the Ngaere Stream. The MCI scores for each site were all significantly higher than their respective historical medians, and were amongst the highest scores recorded for each site with two sites' scores a few units in excess of historical maxima. The only significant changes in the macroinvertebrate communities related to abundances of individual taxa, mainly as a result of subtle habitat changes between sites. $SQMCI_S$ scores were not significantly different between sites 3 and 4, but a marginally significant decrease between sites 3 and 5 was coincident with less shading at the downstream site. The macroinvertebrate communities of the stream contained relatively lower proportions of 'tolerant' taxa at all sites. In addition, communities at all sites had a number of common dominant taxa (they shared six of the eleven dominant taxa through the surveyed reach), although there was some variation as a result of subtle variations in habitat between sites. There were no significant changes in MCI values between sites, despite some differences in habitat. In addition, taxonomic richness (numbers of taxa) was relatively consistent across all three sites. The MCI scores indicated that the stream communities were of good 'health', and better than typical conditions in comparison with median values recorded from past surveys. The absence of significant differences between the three sites indicated no recent impacts from any of the Waihapa Production Station discharges.

The complete biomonitoring reports can be found in Appendix II.

3.3.5 Air

3.3.5.1 Inspections

Inspections in relation to emissions and their effects were conducted at the same time as the inspections described above. Matters checked included flaring for smoke or odour, other odour sources, compliance with plans and documentation relating to control of emission sources, potential dust, on-site records and notification procedures.

3.3.5.2 Results of receiving environment monitoring

During the monitoring period, a multi-gas meter was deployed on one occasion in the vicinity of the Waihapa Production Station. The deployment lasted approximately twenty-four hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continuous measurements of gas concentrations for the gases of interest (carbon monoxide and combustible gases). The results are presented in Table 18.

Table 18 Results of ambient gas monitoring at the Waihapa Production Station

Carbon Monoxide (ppm)		
Max	Mean	Min
4.0	0.2	0.0
Lower Explosive Limit (%)		
Max	Mean	Min
0.3	0.0	0.0

These results comply with the consent conditions. The complete ambient gas monitoring report can be found in Appendix III.

3.3.5.3 Flaring report

Origin Energy provided the Council with an annual report on flaring and emissions as required by consent 4049-3.

At production stations a pilot flare is maintained at all times for safety purposes, meaning a small amount of gas is continually flared (pilot flare). Other flaring occurs intermittently, for example during process upsets, plant shutdowns and start-ups.

At wellsites, flaring generally occurs after drilling is complete and while the well is being tested, or during well workovers. Once a well has been tested and deemed commercially viable, it is generally connected to a production facility for processing, which virtually eliminates the need for flaring at the wellsite.

The Waihapa flaring summary report is attached in Appendix IV.

3.4 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 eg 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 Taranaki Regional 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 2011-2013 monitoring period, it was not necessary for the Council to undertake significant additional investigations and interventions, or record incidents.

There were no incidents recorded by the Council that were associated with non-compliance by Origin Energy in relation to the Waihapa Production station with conditions in resource consents or provisions in Regional Plans.

3.5 Discussion

3.5.1 Discussion of plant performance

Inspections of the Waihapa Production Station during the 2011-2013 monitoring period found that the site was well managed. There were no compliance issues noted and there were no unauthorised incidents in relation to the site.

3.5.2 Environmental effects of exercise of consents

Stormwater discharge monitoring conducted by the Council showed that discharges from the site complied with consent conditions. Monitoring conducted by Origin Energy on the firewater pond contents showed concentrations that would have exceeded the pH and chloride limits on several occasions, had discharge occurred. Contents of the pond were then held to provide for in-pond dilution, to avoid off-specification discharge.

Receiving water monitoring showed that the discharges were not causing any adverse effects on the unnamed tributary of the Ngaere Stream at the time of sampling. This was supported by the findings of the macroinvertebrate survey carried out in the stream.

Ambient air quality monitoring at the site showed that levels of carbon monoxide and combustible gases were all below levels of concern at the time of sampling. No offensive or objectionable odours were detected beyond the boundary during inspections and there were no complaints from neighbours in relation to flaring and emissions from the site.

These results are consistent with the findings from previous years.

3.5.3 Evaluation of performance

A tabular summary of the Company's compliance record for the period under review is set out in Tables 19-21 below.

Table 19 Summary of performance for Consent 3457-2 To discharge treated impounded stormwater [including washdown water and minor quantities of process water subject to potential contamination by hydrocarbons] from the Waihapa Production Station into the Ngaere Stream and to discharge treated stormwater from perimeter drains to land where it may enter the Ngaere Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option	Site inspections	Yes
2. Catchment area not to exceed 5 ha	Site inspections	Yes
3. Maintenance of a contingency plan	Plan approved	Yes
4. Maintenance and management of the stormwater system in accordance with application documentation	Site inspections and liaison with consent holder	Yes
5. All stormwater and produced water to be treated	Site inspections	Yes
6. Bunding of hazardous substances	Site inspections	Yes
7. Limits on contaminants in the discharge	Sampling	Yes
8. Limit on temperature increase in receiving water	Sampling	Yes
9. Discharge shall not have certain effects on the receiving water	Sampling and inspection	Yes
10. Monitoring data to be made available upon request	Data received	Yes
11. Consent holder to remedy any erosion	Site inspections - no erosion noted	Yes
12. Review option	Next option for review June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

Table 20 Summary of performance for Consent 3767-2 To take water from the Ngaere Stream for utility and firewater purposes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on abstraction rate and volume	Pump capacity less than limit	Yes
2. Provision of abstraction data	Data received	Yes
3. Optional review provision	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High

Table 21 Summary of performance for Consent 4049-3 To discharge emissions into the air from the flaring of hydrocarbons at the Waihapa Production Station in association with production, processing and maintenance activities and in emergency situations, together with miscellaneous emissions

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of best practicable option	Site inspections	Yes
2. Provision of monthly flaring information	Information received	Yes
3. Annual report on flaring and emissions	Report received	Yes
4. Maintenance of a flaring log	Site inspections	Yes
5. Record of smoke emitting incidents and complaints	Site inspections	Yes
6. Analysis of typical gas/condensate stream to be made available	Not requested	N/A
7. Consultation prior to plant alterations	Liaison with consent holder	Yes
8. Notification of hazardous situations beyond the site boundary	Liaison with consent holder	Yes
9. Notification prior to flaring	Notifications received	Yes
10. Minimise emissions	Site inspections and liaison with consent holder	Yes
11. Minimise flaring	Site inspections and liaison with consent holder	Yes
12. Control of plant depressurisation rate	Site inspections	Yes
13. No offensive/objectionable/obnoxious odour/dust/smoke at or beyond the site boundary	Site inspections	Yes
14. Discharged contaminants shall not be hazardous/toxic/noxious at or beyond the site boundary	Site inspections and air monitoring	Yes
15. Limit on carbon monoxide at or beyond the site boundary	Air monitoring	Yes
16. Limit on nitrogen dioxide at or beyond the site boundary	Not monitored in period under review	N/A
17. Limit on contaminants at or beyond the site boundary	Air monitoring	Yes
18. Review option	Next option for review June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**

During the 2011-2013 monitoring period, Origin Energy demonstrated a high level of environmental performance and compliance with the consents associated with the Waihapa Production Station. There were no unauthorised incidents in relation to activities at the site or at related wellsites. Occasional potentially non-complying salinity in the firepond's contents was managed for potential effects by avoiding subsequent discharge to receiving waters, until the pond contents had returned to within specification.

3.5.4 Recommendation from the 2010-2011 Annual Report

In the 2010-2011 Annual Report, it was recommended:

THAT the monitoring programme for the Waihapa Production Station in the 2011-2013 monitoring period, remain unchanged from that for 2010-2011.

A reduced programme was implemented due to weather and staffing constraints.

3.5.5 Alterations to monitoring programmes for 2013-2014

In designing and implementing the monitoring programmes for air/water discharges in the region, the Taranaki Regional Council has taken into account the extent of information made available by previous authorities, its relevance under the Resource Management Act, the obligations of the Act in terms of monitoring emissions/discharges and effects, and subsequently reporting to the regional community, 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 2013-2014, the programme remain unchanged from that for 2011-2013. A recommendation to this effect is attached to this report.

3.6 Recommendation

THAT the monitoring programme for the Waihapa Production Station in the 2013-2014 monitoring period, remain unchanged from that for 2011-2013.

4. Summary of recommendations

It is recommended in the 2013-2014 monitoring period:

1. THAT the monitoring programme for the Rimu Production Station in the 2013-2014 year remains unchanged from that for 2011-2013.

2. THAT the monitoring programme for the Waihapa Production Station in the 2013-2014 year, remain unchanged from that for 2011-2013.

Glossary of common terms and abbreviations

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

Al*	aluminium
As*	arsenic
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
cfu	colony forming units. A measure of the concentration of bacteria
COD	chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Condy	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m
Cu*	copper
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 the number of colonies per 100 ml
Ent	Enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as the number of colonies per 100 ml
F	Fluoride
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as the number of colonies per 100 ml
fresh	elevated flow in a stream, such as after heavy rainfall
g/m^3	grammes per cubic metre, and equivalent to milligrammes per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures
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
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	ammoniacal nitrogen, normally expressed in terms of the mass of nitrogen (N)
NH_3	unionised ammonia nitrogen, 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)
Pb*	lead
pH	a numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment
PM_{10}	relatively fine airborne particles (less than 10 micrometre diameter
resource consent	refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15)
RMA	Resource Management Act 1991 and subsequent amendments
SS	suspended solids,
Temp	temperature, measured in °C
Turb	turbidity, expressed in NTU
UI	an event recorded by the Council on the basis that it had potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan
UIR	Unauthorised Incident Register
Zn*	zinc

*an abbreviation for a metal or other analyte may be followed by the letter '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 for the Rimu & Waihapa Production Stations

Rimu Production Station

Consent 5744-1

TARANAKI REGIONAL COUNCIL
CHIEF EXECUTIVE
PRIVATE BAG 713
47 CLOTEN ROAD
STRATFORD
NEW ZEALAND
PHONE: 06-765 7127
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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 NZ [Rimu] Limited Private Bag 2022 NEW PLYMOUTH 4342
Change To Conditions Date:	2 February 2001 [Granted: 24 January 2001]

Conditions of Consent

Consent Granted:	To discharge treated stormwater from the Rimu Production Station onto and into land and into an unnamed tributary of the Manawapou River at or about (NZTM) 1715752E-5610471N
Expiry Date:	1 June 2016
Review Date(s):	June 2004, June 2010
Site Location:	Rimu Production Station, Mokoia Road, Mokoia [Property owner: Geoffrey Hawken Limited]
Legal Description:	Sec 586 Patea Dist Blk XIV Hawera SD
Catchment:	Manawapou

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

General conditions

a) That on receipt of a requirement from the Chief Executive, Taranaki Regional Council 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 consent holder shall at all times adopt the best practicable option, as defined in the Resource Management Act 1991, to prevent or minimise any adverse effects of the discharge on the receiving environment.

2. The maximum stormwater catchment area shall be no more than 15.53 hectares.

3. Prior to the exercise of this consent, the consent holder shall prepare a contingency plan to be approved by the Chief Executive, Taranaki Regional Council, outlining measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not licensed by this consent and measures to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

4. The design, management and maintenance of the stormwater system shall be generally undertaken in accordance with the information submitted in support of the application.

5. Any above ground hazardous substances storage areas shall be bunded with drainage to appropriate recovery systems and discharged only after testing to ensure the conditions of the consent can be met.

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

Component	Concentration
pH (range)	6.5-8.5
suspended solids	100 gm^{-3}
total recoverable hydrocarbons [infrared spectroscopic technique]	15 gm^{-3}

This condition shall apply prior to the discharge of the treated stormwater into the receiving environment, at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

7. After allowing for reasonable mixing, within a mixing zone extending 80 metres downstream of the discharge point, the discharge shall not give rise to any of the following effects in the receiving waters of the Manawapou River:

   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.

8. The Chief Executive, Taranaki Regional Council, shall be advised 48 hours prior to the reinstatement of the site and the reinstatement shall be carried out so as to minimise effects on stormwater quality.

9. 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 2004 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 1 December 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 5745-1

TARANAKI REGIONAL COUNCIL
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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 NZ [Rimu] Limited Private Bag 2022 NEW PLYMOUTH 4342
Change To Conditions Date:	3 June 2005 [Granted: 24 January 2001]

Conditions of Consent

Consent Granted:	To discharge emissions into the air from combustion involving the flaring of petroleum products incidental to the treatment of gas at the Rimu Production Station at or about (NZTM) 1715752E-5610471N
Expiry Date:	1 June 2016
Review Date(s):	June 2004, June 2010
Site Location:	Rimu Production Station, Mokoia Road, Mokoia [Property owner: Geoffrey Hawken Limited]
Legal Description:	Sec 586 Patea Dist Blk XIV Hawera 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 consent holder shall 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 effect on the environment associated with the discharge of contaminants into the environment from the flare emission.

2. 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.

3. All gas being flared must first be treated by effective liquid separation and recovery, as far as is practicable, to ensure that smoke emission during flaring is minimised.

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

i) detailing gas combustion in the flare;
ii) detailing smoke emissions as required under condition 13;
iii) detailing any measures to reduce smoke emissions;
iv) detailing any measures to reduce flaring; and
v) addressing any other issue relevant to the minimisation or mitigation of emissions from the flare.

5. All equipment used to avoid, remedy or mitigate any effect on the environment from the discharge of emissions into the air shall be maintained in good condition and shall be operated within design parameters at all times that the flare is in operation.

6. The discharges authorised by this consent shall not give rise to any offensive or obnoxious or objectionable odour at or beyond the site boundary in the opinion of an enforcement officer of the Taranaki Regional Council.

7. 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 flare, the consent holder shall first consult with the Chief Executive and shall obtain any necessary approvals under the Resource Management Act 1991.

8. The consent holder shall, whenever practicable, notify the Chief Executive whenever the continuous flaring of hydrocarbons [other than purge gas] is expected to occur for more than five minutes in duration.

9. Any incident having an environment impact or potential impact which has caused or is liable to cause substantiated complaint or a hazardous situation beyond the boundary of the consent holder's premises, shall be notified to the Taranaki Regional Council, as soon as possible, followed by a written report to the Chief Executive 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 maintain a log of all continuous flaring incidents longer than 2 minutes and any intermittent flaring lasting for an aggregate of 4 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 upon request, and summarised annually in the report required under condition 4.

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

12. Other than in emergencies, depressurisation of the plant, or sections of the plant, shall be carried out over a sufficient period of time to prevent dense black smoke from being discharged from the flare.

13. The consent holder shall keep and make available to the Chief Executive, 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.

14. 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 site 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.

15. The consent holder shall make available to the Chief Executive an analysis of a typical gas and crude oil stream from the field, covering sulphur compound content and the content of carbon compounds of structure C_6 or higher number of compounds.

16. The consent holder shall control all emissions 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 mg/m^3 [eight-hour average exposure], or 30 mg/m^3 one-hour average exposure] at or beyond the boundary of the site.

17. The consent holder shall control all emissions of nitrogen oxides 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 nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 30 $\mu g/m^3$ [24-hour average exposure], or 95 $\mu g/m^3$ [4-hour average exposure] at or beyond the boundary of the site.

18. The consent holder shall control emissions to the atmosphere from the flare of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides 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 for any particular contaminant arising from the exercise of this consent measured at or beyond the boundary of the site is not increased above background levels:

    a) by more than $1/30^{th}$ of the relevant Occupational Threshold Value-Time Weighted Average, or by more than the Short Term Exposure Limit at any time [all terms as defined in Workplace Exposure Standards and Biological Exposure Indices for New Zealand, 1992, Department of Labour]; or
    b) if no Short Term Exposure Limit is set, by more than three times the Time Weighted Average at any time [all terms as defined in Workplace Exposure Standards and Biological Exposure Indices for New Zealand, 1992 Department of Labour].

19. Subject to the provisions of this condition, the Council may within six months of receiving a report prepared by the consent holder pursuant to condition 4 of this consent, or in June 2004 and/or June 2010, serve notice that it intends to review the conditions of this resource consent in accordance with section 128(1)(a) of the Resource Management Act 1991 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; 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.

Transferred at Stratford on 1 December 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 5746-1

TARANAKI REGIONAL COUNCIL

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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 NZ [Rimu] Limited Private Bag 2022 NEW PLYMOUTH 4342
Change To Conditions Date:	3 June 2005 [Granted: 24 January 2001]

Conditions of Consent

Consent Granted:	To discharge emissions into the air from the Rimu Production Station at or about (NZTM) 1715752E-5610471N
Expiry Date:	1 June 2016
Review Date(s):	June 2004, June 2010
Site Location:	Rimu Production Station, Mokoia Road, Mokoia [Property owner: Geoffrey Hawken Limited]
Legal Description:	Sec 586 Patea Dist Blk XIV Hawera 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 consent holder shall 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 effect on the environment associated with the discharge of contaminants into the environment from the site.

2. 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.

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

i) detailing gas combustion at the site;
ii) detailing any measures that have been undertaken by the consent holder to improve the energy efficiency of the plant;
iii) detailing any measures to reduce smoke emissions; and
iv) detailing any measures to reduce flaring.

4. All equipment used to avoid, remedy or mitigate any effect on the environment from the discharge of emissions into the air shall be maintained in good condition and shall be operated within design parameters at all times that the plant is in operation.

5. The discharges authorised by this consent shall not, whether alone or in conjunction with any emissions from the flare, give rise to any levels of odour or dust 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.

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 and shall obtain any necessary approvals under the Resource Management Act 1991.

7. Any incident having an environment impact or potential impact which has caused or is liable to cause substantiated complaint or a hazardous situation beyond the boundary of the consent holder's premises, shall be notified to the Taranaki Regional Council, as soon as possible, followed by a written report to the Chief Executive within one week of the incident, with comment about the measures taken to minimise the impact of the incident and to prevent re-occurrence.

8. The consent holder shall keep and make available to the Chief Executive, 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.

9. The discharges authorised by this consent shall not, whether alone or in conjunction with any emissions from the flare, 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.

10. The discharges authorised by this consent shall not, whether alone or in conjunction with any emissions from the flare, give rise to any noxious or toxic levels of airborne contaminants at or beyond the boundary of the site.

11. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the site, whether alone or in conjunction with any emissions from the flare, 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 mg/m^3 [eight-hour average exposure], or 30 mg/m^3 one-hour average exposure] at or beyond the boundary of the site.

12. The consent holder shall control all emissions of nitrogen oxides to the atmosphere from the site, whether alone or in conjunction with any emissions from the flare, 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 30 $\mu g/m^3$ [24-hour average exposure], or 95 $\mu g/m^3$ [4-hour average exposure] at or beyond the boundary of the site.

13. The consent holder shall control emissions to the atmosphere from the site of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, whether alone or in conjunction with any emissions from the flare, 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 site is not increased above background levels:

a) by more than 1/30th of the relevant Occupational Threshold Value-Time Weighted Average, or by more than the Short Term Exposure Limit at any time [all terms as defined in Workplace Exposure Standards and Biological Exposure Indices for New Zealand, 1992, Department of Labour]; or

b) if no Short Term Exposure Limit is set, by more than three times the Time Weighted Average at any time [all terms as defined in Workplace Exposure Standards and Biological Exposure Indices for New Zealand, 1992 Department of Labour].

14. The consent holder shall within 6 months of the granting of this consent provide to the Chief Executive a report on options for the treatment and/or reduction of BTEX emissions from the site.

15. Subject to the provisions of this condition, the Council may within six months of receiving a report prepared by the consent holder pursuant to condition 3 of this consent, or in June 2004 and/or June 2010, serve notice that it intends to review the conditions of this resource consent in accordance with section 128(1)(a) of the Resource Management Act 1991 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.

Transferred at Stratford on 1 December 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 5749-1

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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 NZ [Rimu] Limited Private Bag 2022 NEW PLYMOUTH 4342
Consent Granted Date:	24 January 2001

Conditions of Consent

Consent Granted:	To take water from the Manawapou River for hydrostatic testing of pipelines and crude oil tanks at or about (NZTM) 1716152E-5609871N
Expiry Date:	1 June 2016
Review Date(s):	June 2004, June 2010
Site Location:	Rimu Production Station, Mokoia Road, Mokoia [Property owner: Geoffrey Hawken Limited]
Legal Description:	Sec 586 Patea Dist Blk XIV Hawera SD
Catchment:	Manawapou

For General, Standard and Special conditions pertaining to this consent please see reverse side of this document
www.trc.govt.nz

General conditions

a) That 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) 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 abstraction shall not exceed a total of 3,120 cubic metres, at a maximum abstraction rate of 25 litres/second, from the Manawapou River.

2. The resource consent holder shall accurately record total volumes and rates of abstraction and make such records available to the Chief Executive, Taranaki Regional Council, upon request.

3. The Taranaki Regional Council reserves the right to temporarily suspend or reduce the abstraction during extreme low flow events in accordance with section 329 of the Resource Management Act 1991.

4. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2004 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 1 December 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 5891-1

TARANAKI REGIONAL COUNCIL

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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 NZ [Rimu] Limited Private Bag 2022 NEW PLYMOUTH 4342
Consent Granted Date:	10 October 2001

Conditions of Consent

Consent Granted:	To take up to 4000 cubic metres of water from the Tangahoe River for the purposes of hydrostatic testing of crude oil tanks and filling of an onsite fire water pond; to take up to 1000 cubic metres of water per month from the Tangahoe River for top up of the fire water pond during dry periods; and to take up to 4000 cubic metres of water for the purpose of refilling the fire water pond in the event that it is depleted during fire fighting activities at or about (NZTM) 1715352E-5610170N
Expiry Date:	1 June 2016
Review Date(s):	June 2004, June 2010
Site Location:	Rimu Production Station, Mokoia Road, Mokoia
Legal Description:	Sec 586 Patea Dist Blk XIV Hawera SD
Catchment:	Tangahoe

For General, Standard and Special conditions pertaining to this consent please see reverse side of this document
www.trc.govt.nz

General conditions

a) That 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) 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 consent holder shall notify the Taranaki Regional Council in writing at least 48 hours prior to any abstraction activity.

2. At all times the consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of water from the Tangahoe River, including, but not limited to, the efficient and conservative use of water.

3. The volume of water abstracted shall not exceed 2,160 cubic metres/day, at a rate no greater than 25 litres per second.

4. The consent holder shall ensure that the intake structure is appropriately screened to avoid the entrapment of freshwater fish.

5. The resource consent holder shall maintain records of abstraction including date, pumping rates and volumes abstracted, and shall make these records available to the Chief Executive, Taranaki Regional Council, upon request.

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 2004 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 1 December 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 5946-1

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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 NZ [Rimu] Limited Private Bag 2022 NEW PLYMOUTH 4342
Consent Granted Date:	18 January 2002

Conditions of Consent

Consent Granted:	To take and use groundwater from a bore within the Manawapou catchment for on-site purposes at the Rimu Production Station at or about (NZTM) 1715752E-5610471N
Expiry Date:	1 June 2016
Review Date(s):	June 2004, June 2010
Site Location:	Rimu Production Station, Mokoia Road, Mokoia [Property owner: Geoffrey Hawken Limited]
Legal Description:	Lot 2 DP 9677 Sec 586 Patea Dist Blk XIV Hawera SD
Catchment:	Manawapou

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. At all times the consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of groundwater from a bore within the Manawapou catchment, including, but not limited to, the efficient and conservative use of groundwater.

2. The volume of water abstracted shall not exceed 150 cubic metres/day, at a rate no greater than 2 litres per second.

3. The abstraction shall be managed so not to cause the intrusion of saltwater into any freshwater aquifers.

4. The resource consent holder shall maintain records of abstraction including date, pumping rates and volumes abstracted, and shall make these records available to the Chief Executive, Taranaki Regional Council, upon request.

5. 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 2004 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 1 December 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Waihapa Production Station

Consent 3457-2

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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 NZ [Tawn] Limited Private Bag 2022 NEW PLYMOUTH 4342
Consent Granted Date:	27 July 2009

Conditions of Consent

Consent Granted:	To discharge treated impounded stormwater [including washdown water and minor quantities of process water subject to potential contamination by hydrocarbons] from the Waihapa Production Station into the Ngaere Stream and to discharge treated stormwater from perimeter drains to land where it may enter the Ngaere Stream at or about (NZTM) 1717334E-5642168N
Expiry Date:	1 June 2028
Review Date(s):	June 2016, June 2022
Site Location:	Waihapa Production Station, Bird Road, Stratford
Legal Description:	Sec 10 Blk III Ngaere SD
Catchment:	Patea
Tributary:	Ngaere

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. Notwithstanding any other condition of this consent, 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 effect on the environment associated with the discharge of contaminants from the site.

2. Stormwater discharged shall be collected from a catchment area of no more than 5 hectares.

3. The consent holder shall maintain a contingency plan outlining measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not licensed by this consent and measures to avoid, remedy or mitigate the environmental effects of such a spillage or discharge. No changes shall be made to the contingency plan without the prior approval of the Chief Executive, Taranaki Regional Council.

4. The management and maintenance of the stormwater treatment system shall be undertaken in general accordance with the information submitted in support of consent application 5217.

5. All stormwater and produced water shall be directed for treatment through the stormwater treatment system, identified under condition 4 of this consent, before being discharged.

6. Any above ground hazardous substances storage areas shall be bunded with drainage to an appropriate treatment system.

7. Constituents of the discharge shall meet the standards shown in the following table.

Constituent	Standard
pH	Within the range 6.0 to 9.0
suspended solids	Concentration not greater than 100 gm^{-3}
total recoverable hydrocarbons	Concentration not greater than 15 gm^{-3}
chloride	Concentration not greater than 50 gm^{-3}

This condition shall apply before entry of the treated stormwater into the receiving waters of the Ngaere Stream, or onto/into land, at a designated sampling point(s) approved by the Chief Executive, Taranaki Regional Council.

8. After allowing for a mixing zone of 25 metres, the discharge shall not give rise to an increase in temperature of more than 2 degrees Celsius within the Ngaere Stream.

9. After allowing for a mixing zone of 25 metres, the discharge shall not give rise to any of the following effects in the Ngaere 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. Results of the water samples taken from the firewater pond [undertaken prior to the release of stormwater from the facility] shall be made available to the Chief Executive, Taranaki Regional Council, on request.

11. Any erosion, scour or instability of the bed or banks of the Ngaere Stream that is attributable to the discharges authorised by this consent shall be remedied by the consent holder.

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 2016 and/or June 2022, 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 27 July 2009

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 3767-2

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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 NZ [Tawn] Limited Private Bag 2022 NEW PLYMOUTH 4342
Consent Granted Date:	25 November 1999

Conditions of Consent

Consent Granted:	To take water from the Ngaere Stream in the Patea catchment for utility and firewater purposes at the Waihapa Production Station at or about (NZTM) 1717334E-5642268N
Expiry Date:	1 June 2016
Review Date(s):	June 2004, June 2010
Site Location:	Waihapa Production Station, Bird Road, Ngaere, Stratford
Legal Description:	Sec 10 Blk III Ngaere SD
Catchment:	Patea
Tributary:	Ngaere

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. That the volume abstracted per day shall not exceed 240 cubic metres, at a rate no greater than 2.8 litres/second.

2. That the consent holder shall install and operate a measuring device capable of accurately [to within 5%] recording daily rates of abstraction and shall measure, record and make such records available to the Chief Executive, Taranaki Regional Council, upon request.

3. That the Taranaki Regional Council may, pursuant to section 128 of the Resource Management Act 1991, review any or all of the conditions of this consent by giving notice of review during June 2004 and/or June 2010, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which either were not foreseen at the time the application was considered or which it was not appropriate to deal with at that time.

Transferred at Stratford on 1 December 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Consent 4049-3

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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 NZ [Tawn] Limited Private Bag 2022 NEW PLYMOUTH 4342
Consent Granted Date:	6 October 2009

Conditions of Consent

Consent Granted:	To discharge emissions into the air from the flaring of hydrocarbons at the Waihapa Production Station in association with production, processing and maintenance activities and in emergency situations, together with miscellaneous emissions at or about (NZTM) 1717334E-5642168N
Expiry Date:	1 June 2028
Review Date(s):	June 2011, June 2016, June 2022
Site Location:	Waihapa Production Station, Bird Road, Stratford
Legal Description:	Sec 10 Blk III Ngaere 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

Exercise of consent

1. The consent holder shall at all times adopt the best practicable option [as defined in section 2 of the Resource Management Act 1991] to prevent or minimise any 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.

Recording and submitting information

2. The consent holder shall supply to the Taranaki Regional Council each month a copy of flaring information comprising: the type and amount of material flared [including any gas used to maintain a pilot flame], the date this was flared, the reason why flaring was undertaken, and an indication of whether smoke was produced from such flaring events.

3. 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 flare, including but not restricted to routine operational flaring and flaring logged in accordance with condition 4;
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.

4. The consent holder shall keep and maintain a log of all continuous flaring incidents lasting longer than 5 minutes and any intermittent flaring lasting for an aggregate of 10 minutes or longer in any 60-minute period. The log shall contain the date, the start and finish times, the quantity and type of material flared, and the reason for flaring. The log shall be made available to the Chief Executive, Taranaki Regional Council, upon request, and summarised annually in the report required under condition 3. 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.

5. 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.

Information and notification

6. 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 Waihapa field, covering sulphur compound content and the content of compounds containing six or more carbon atoms in their molecular structure.

7. 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 described in the consent application, 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.

8. Any incident whereby the discharge of emissions to air has potential or actual adverse environmental effects which has caused or is liable to cause a 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.

9. The consent holder shall notify the Chief Executive, Taranaki Regional Council, as soon as practicable, 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.

Preventing and minimising emissions

10. 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.

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

12. 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.

13. 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 property boundary.

14. 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.

15. 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.

16. 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.

17. 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].

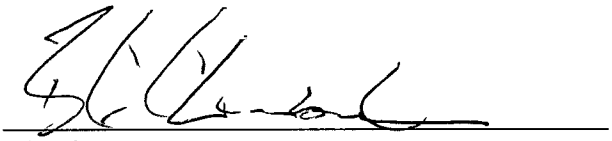
Review

18. 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 2016 and/or June 2022, 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.

Signed at Stratford on 6 October 2009

For and on behalf of
Taranaki Regional Council



Chief Executive

Appendix II

Biomonitoring reports

To Job Manager, David Olsen
From Scientific Officers, K L Smith and C R Fowles
Report No KS015
Doc No 1110909
Date 18 March 2013

Biomonitoring of the Ngaere Stream in relation to the Waihapa Production Station, May 2012

Introduction

This was the only survey completed of the two scheduled biomonitoring surveys relating to the Waihapa Production Station of Origin Energy Resources New Zealand Ltd (previously owned by Swift Energy New Zealand Ltd), for the 2011-2012 monitoring year. The spring survey could not be completed due to inclement weather delays.

The Production Station discharges stormwater, wastewater and firewater to the Ngaere Stream. An API separator of the production station discharges to a small tributary of the Ngaere Stream, a short distance upstream of the Ngaere Stream confluence with the Patea River. The purpose of this survey was to determine whether this discharge from the Production Station has resulted in any detrimental effects on the macroinvertebrate communities in the Ngaere Stream downstream of the discharge.

The results from surveys performed since the 2002-2003 monitoring year are discussed in the reports listed in the references at the end of this report.

Methods

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from three sites in the Ngaere Stream (Table 1, Figure 1) on 4 May 2012. The '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 Ngaere Stream surveyed in association with the Waihapa Production Station

Site No.	Site code	GPS reference	Location
3	NGR 000480	E1717076 N5641732	Ngaere Stream, Bird Road Bridge
4	NGR 000497	E1717385 N5642263	Ngaere Stream, 35 m above confluence with Patea R
5	NGR 000498	E1717431 N5642297	Ngaere Stream, 10 m upstream confluence with Patea R

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 collected 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.

The MCI was designed as a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. MCI results can also reflect the effects of warm temperatures, slow current speeds and low dissolved oxygen levels, because the taxa capable of tolerating these conditions generally have low sensitivity scores. Usually more 'sensitive' communities (with higher MCI values) inhabit less polluted waterways. The use of this index in non-stony streams is possible if results are related to physical habitat (e.g., good quality muddy/weedy sites tend to produce lower MCI values than good quality stony sites). Weedy stream macroinvertebrate communities tend to be dominated by more 'tolerant' taxa than is the case in stony stream communities. It may therefore require more severe organic pollution to cause a significant decline in MCI value in weedy streams.

A semi-quantitative MCI value ($SQMCI_s$) 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 $SQMCI_s$ is not multiplied by a scaling factor of 20, therefore $SQMCI_s$ values range from 1 to 10.

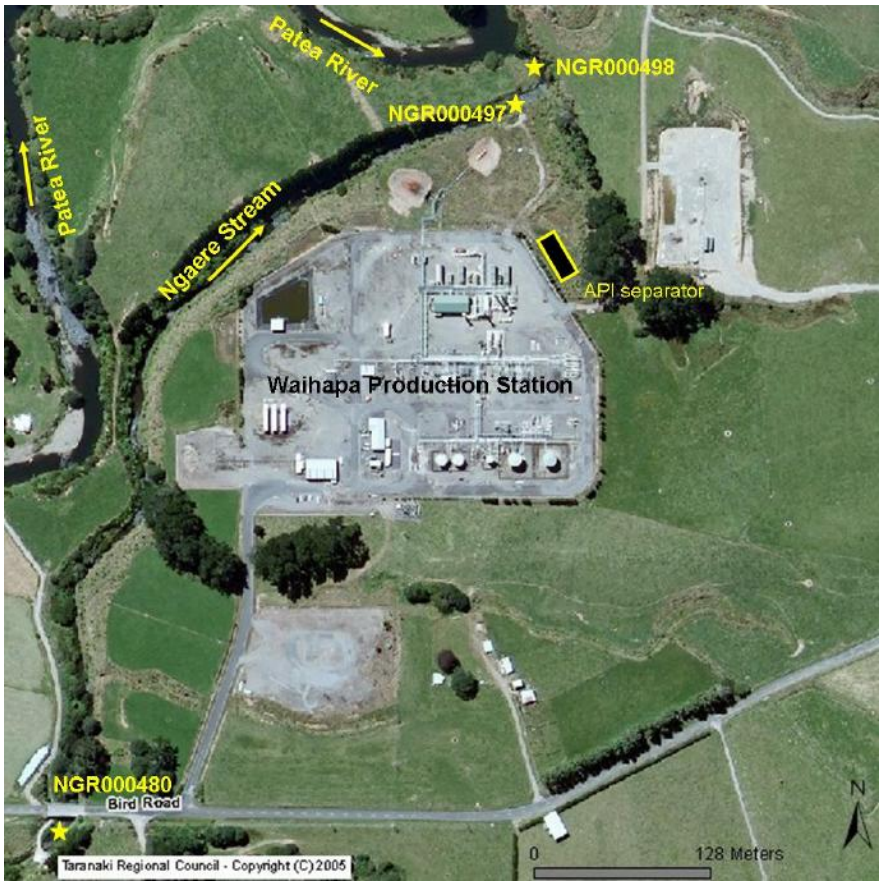


Figure 1 Biological sampling sites in the Ngaere Stream related to the Waihapa Production Station

Results and discussion

At the time of this early afternoon survey there was a low, swift, cloudy, but uncoloured flow in the Ngaere Stream at all three sites. Water temperature ranged from 9.0°C to 9.8°C during this survey. Substrate was similar at the three sites in the Ngaere Stream and comprised mainly cobbles, gravels, and boulders, with some sand and silt substrate also present. Periphyton mats and filaments were patchy at sites 3 and 5, but at site 4 both algal forms were widespread. Moss was patchy at sites 4 and 5. In contrast to the previous survey, which recorded no macrophyte beds on the stream bed at all sites, beds were observed at site 3 in the current survey. This survey was undertaken following a lengthy period of flow recession, during autumn and 44 days after the latest fresh in excess of 3x median flow.

Macroinvertebrate communities

A summary of survey results performed to date at the three sites in the Ngaere Stream are presented in Table 2 and the full results of the current survey in Table 3.

Table 2 Summary of previous numbers of taxa and MCI values, together with results of the May, 2012 survey in the Ngaere Stream

Site	Number of previous surveys	Numbers of taxa			MCI values			SQMCI$_S$			
		Median	Range	Current Survey	Median	Range	Current Survey	N	Median	Range	Current Survey
3	37	19	11-26	22	84	65-107	95	25	4.4	2.3-6.1	4.8
4	25	21	12-27	24	84	67-101	100	16	4.0	2.9-5.8	3.3
5	29	22	12-27	24	84	62-100	97	25	3.4	2.2-4.8	4.6

Site 3: Bird Road, upstream of Production Station

A moderate community richness of 22 taxa was recorded at site 3 in the Ngaere Stream upstream of all Waihapa Production Station discharges. This was above the historical median number of taxa for this site (Table 2, Figure 2). The community was characterised by two 'tolerant' taxa (oligochaete worms and caddisfly (*Aoteapsyche*)) and five 'moderately sensitive' taxa (amphipod (*Paracalliope*), mayfly (*Austroclima*), elmid beetles, and caddisfly larvae (*Pycnocentria* and *Pycnocentrodes*)), but no 'highly sensitive' taxa. Some of these taxa are associated with nutrient-enriched habitats in streams coincident with significant periphyton substrate cover.

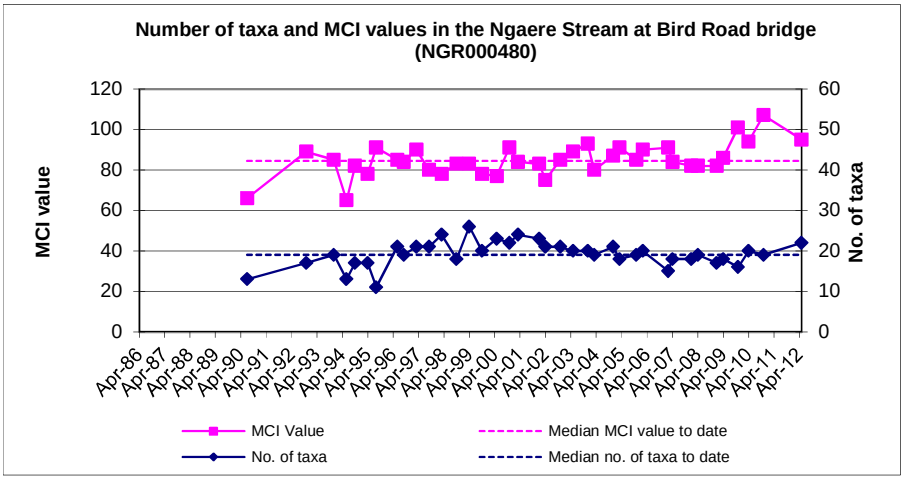


Figure 2 Taxa richness and MCI scores recorded to date at Bird Road Bridge (site 3)

Table 3 Macroinvertebrate fauna of the Ngaere Stream in relation to Waihapa Production Station sampled on 4 May 2012

Taxa List	Site Number	MCI score	3	4	5
	Site Code		NGR000480	NGR000497	NGR000498
	Sample Number		FWB12245	FWB12244	FWB12243
NEMERTEA	Nemertea	3	R	-	R
ANNELIDA (WORMS)	Oligochaeta	1	VA	VA	A
MOLLUSCA	*Ferrissia*	3	-	-	R
	Potamopyrgus	4	C	C	C
CRUSTACEA	*Paracalliope*	5	A	C	A
	Paraleptamphopidae	5	-	R	-
EPHEMEROPTERA (MAYFLIES)	*Austroclima*	7	VA	A	A
	Coloburiscus	7	R	C	C
	Deleatidium	8	C	C	C
	Zephlebia group	7	C	C	C
PLECOPTERA (STONEFLIES)	*Zelandobius*	5	C	R	R
COLEOPTERA (BEETLES)	Elmidae	6	VA	C	A
MEGALOPTERA (DOBSONFLIES)	*Archichauliodes*	7	C	R	C
TRICHOPTERA (CADDISFLIES)	*Aoteapsyche*	4	A	A	VA
	Costachorema	7	-	C	C
	Hydrobiosis	5	C	C	A
	Confluens	5	-	R	R
	Oxyethira	2	R	-	R
	Pycnocentria	7	A	C	A
	Pycnocentrodes	5	A	C	A
	Triplectides	5	-	-	R
DIPTERA (TRUE FLIES)	*Aphrophila*	5	R	A	A
	Hexatomini	5	R	-	-
	Maoridiamesa	3	R	VA	A
	Orthocladiinae	2	C	A	A
	Empididae	3	-	R	R
	Muscidae	3	-	C	-
	Austrosimulium	3	R	-	-
	Tanyderidae	4	R	R	-
ACARINA (MITES)	Acarina	5	-	R	-
		No of taxa	22	24	24
		MCI	95	100	97
		SQMCIs	4.8	3.3	4.6
		EPT (taxa)	9	11	12
		%EPT (taxa)	41	46	50

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

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

The community contained a moderate proportion of 'tolerant' taxa (41% of richness), resulting in the MCI score of 95 units, a significant 11 units (Stark, 1998) higher than the median score recorded by previous surveys at this site (Table 2). A moderate $SQMCI_S$ score was recorded for this site (4.8 units), reflecting the relative balance in numerical dominance between 'tolerant' and 'moderately sensitive' taxa and, in particular, the predominance of one 'tolerant' and two 'moderately sensitive' taxa (Table 3). This score was slightly above the long term median for surveys conducted at this site.

Site 4: 35m u/s of Patea River confluence

A community richness of twenty four taxa was found at site 4, nearly 600m downstream of site 3 (and below various discharges from the Waihapa Production Station to the Ngaere Stream), but above the small unnamed tributary (which receives the API separator discharge). This was identical to that found at site 3 upstream and slightly higher than the median for this site (Table 2, Figure 3). However, there were several differences in dominant taxa composition at this site. Reductions in abundances of the 'moderately sensitive' elmid beetles, amphipod (*Paracalliope*), and two caddisflies (*Pycnocentria* and *Pycnocentrodes*) were recorded at site 4, while the 'moderately sensitive' cranefly *Aphrophila* and 'tolerant' *Maoridiamesa* and orthoclad midge larvae were all abundant at site 4. This is most likely a reflection of the increased algal growth (widespread mats and filamentous) caused by the reduction in shading at this site (Table 3). Again, some of these taxa are associated with nutrient-enriched habitats of mid to lower reaches of streams in agricultural catchments, but the majority of changes related to the different habitat characteristics at site 4.

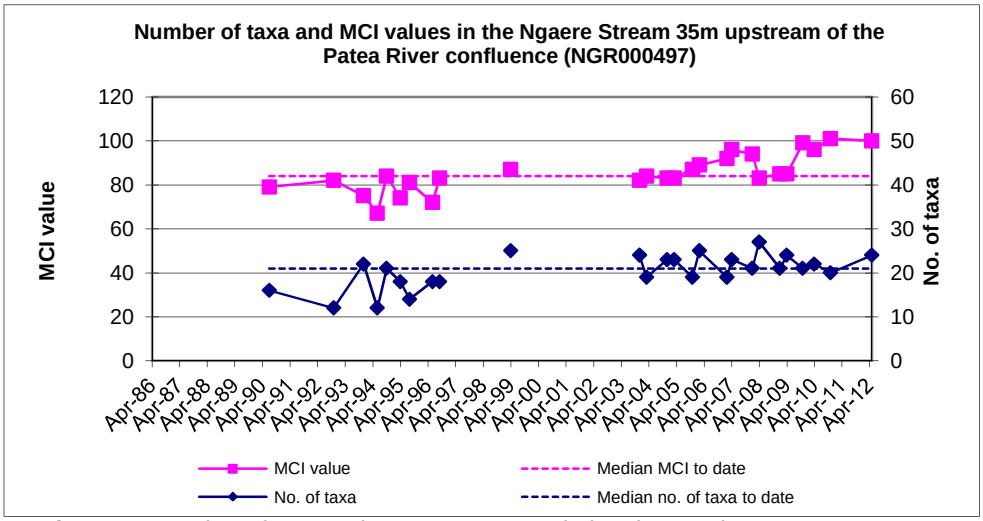


Figure 3 Number of taxa and MCI scores recorded to date at site 4, 35 m upstream of the confluence with the Patea River

However, there were no significant changes in individual taxon abundances between sites 3 and 4 although the predominant taxa altered from one 'tolerant' and two 'moderately sensitive' taxa (at site 3) to two 'tolerant' taxa at site 4 which was primarily responsible for the downstream drop of 1.5 units in $SQMCI_s$ value.

'Tolerant' taxa comprised a slightly lower proportion (33% of total taxa) of the community compared with site 3, which was reflected in the MCI score of 100 units. This was significantly higher than the median of previous surveys' scores, and within one unit of the maximum for this site, which had been recorded by the spring 2010 survey (Figure 3). This is the fifteenth consecutive survey where the MCI score has been equal to or higher than the running median for this site. The MCI score for this survey was similar to that recorded at site 3 upstream of all Waihapa Production Station discharges, while the $SQMCI_S$ value reduced by 1.5 units (Table 2). This reduction (referenced earlier) was also due to the decrease in abundance of five 'moderately sensitive' taxa and significant increase in the abundance of one 'tolerant' taxon and is considered to be related to the increase in periphyton cover on the substrate at this site. The results indicate that it is unlikely that there was a change in physicochemical water quality caused by discharges from the Production Station between sites 3 and 4.

Site 5: 10m u/s of Patea River confluence

A community richness of twenty-four taxa was recorded at site 5, downstream of the various Waihapa Production Station discharges and downstream of the unnamed tributary receiving the API separator discharge. This was slightly above the median richness found by previous surveys at this site and equal with that recorded at the nearest upstream site (Table 2, Figure 4). The characteristic taxa increased in number compared to those at site 4, and comprised the same four 'tolerant' taxa (oligochaete worms, caddisfly larvae (*Aoteapsyche*), and midges (orthoclads and *Maoridiamesa*)), but increased to seven 'moderately sensitive' taxa (amphipods (*Paracalliope)*, mayfly (*Austroclima)*, elmid beetles, caddisflies (*Hydrobiosis*, *Pycnocentria,* and *Pycnocentrodes*) and cranefly (*Aphrophila*)), but no 'highly sensitive' taxa. These changes were coincident with a reduction in substrate periphyton cover at site 5.

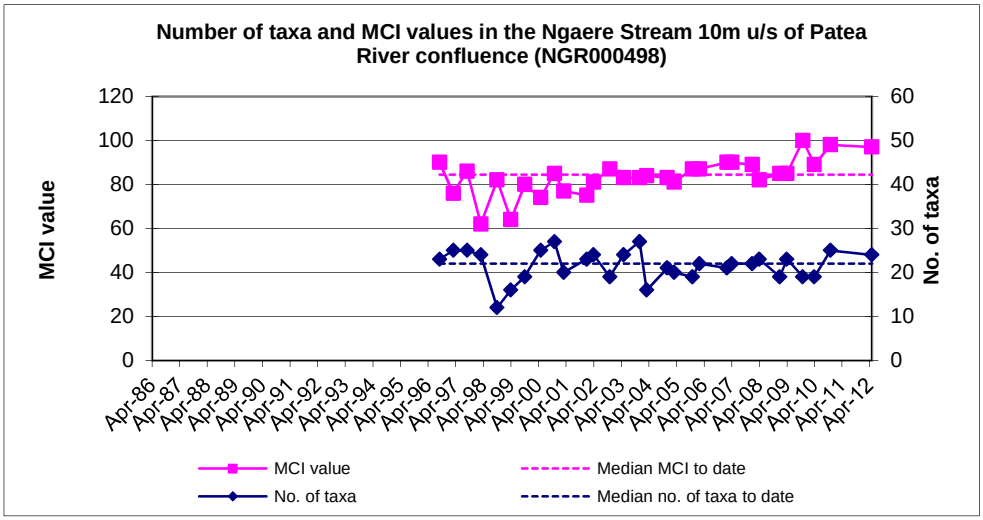


Figure 4 Number of taxa and MCI scores recorded to date at site 5, downstream of all Waihapa Production Station discharges

However, there were minimal significant changes in individual taxon abundances between adjacent sites 4 and 5 but the numerical decrease in 'tolerant' worms and midges produced an increase in the $SQMCI_S$ value of 1.3 units which was 1.2 units above the median value for this site (Stark, 1998), and very similar to that recorded at the reference site 3 (Stark, 1998). The subtle changes recorded from site 4 are more attributable to changes in habitat characteristics at site 5, and are unlikely to be have been due to discharges to the tributary entering the Ngaere Stream between sites 4 and 5.

The community was again comprised of a moderately low proportion (38%) of 'tolerant' taxa which was reflected in the MCI score of 97 units. As with the two upstream sites, this score was significantly higher than the median score from previous surveys at this site, being one of the highest scores recorded at this site (Table 2, Figure 4). This score was not significantly different to the scores recorded at the two sites upstream, indicative of no recent impacts of the API separator discharge on the macroinvertebrate communities of the Ngaere Stream.

Conclusions and summary

The Council's standard 'kick-sampling' technique was used at three established sites to collect streambed macroinvertebrates from the Ngaere Stream, to assess whether the discharges from the Waihapa Production Station had had any detrimental effects on the macroinvertebrate communities of this stream. The spring survey had not been performed due to delays caused by inclement weather. Samples were sorted and identified to provide the number of taxa (richness) and MCI and $SQMCI_S$ scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects or 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 may indicate the degree of adverse effects (if any) of the discharges being monitored.

This late summer macroinvertebrate survey indicated that the discharge of treated stormwater and API separator discharges from the Waihapa Production Station site had not had any recent detrimental effects on the macroinvertebrate communities of the Ngaere Stream. The MCI scores for each site were all significantly higher than their respective historical medians, and were amongst the highest scores recorded for each site. The only significant changes in the macroinvertebrate communities related to abundances of individual taxa, mainly as a result of habitat changes between sites. $SQMCI_S$ scores were not significantly different between sites 3 and 5, but a significant decrease between sites 3 and 4 was coincident with more extensive periphyton substrate downstream at the more open site 4.

The macroinvertebrate communities of the stream contained moderately low proportions of 'tolerant' taxa at all sites. In addition, communities at all sites had a number of common dominant taxa, although there was some variation as a result of variations in periphyton growth between sites. There was no significant change in MCI values between sites, despite some differences in habitat. In addition, taxonomic richness (numbers of taxa) was relatively consistent across all three sites. The MCI scores indicated that the stream communities were of good 'health', and better than typical conditions in comparison with median values recorded from past surveys. The lack of significant differences between the three sites indicated no recent impacts from any of the Waihapa Production Station discharges.

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To Job Manager, David Olsen
From Scientific Officers, C R Fowles and K L Smith
Report No CF577
Doc No 1174414
Date 18 March 2013

Biomonitoring of the Ngaere Stream in relation to the Waihapa Production Station, October 2012

Introduction

This was the first survey completed of the two scheduled biomonitoring surveys relating to the Waihapa Production Station of Origin Energy Resources New Zealand Ltd (previously owned by Swift Energy New Zealand Ltd), for the 2012-2013 monitoring year.

The Production Station discharges stormwater, wastewater and firewater to the Ngaere Stream. An API separator of the production station discharges to a small tributary of the Ngaere Stream, a short distance upstream of the Ngaere Stream confluence with the Patea River.

The purpose of this survey was to determine whether this discharge from the Production Station has resulted in any detrimental effects on the macroinvertebrate communities in the Ngaere Stream downstream of the discharge.

The results from surveys performed since the 2002-2003 monitoring year are discussed in the reports listed in the references at the end of this report.

Methods

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from three sites in the Ngaere Stream (Table 1, Figure 1) on 5 October 2012. The '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 Ngaere Stream surveyed in association with the Waihapa Production Station

Site No.	Site code	GPS reference	Location
3	NGR 000480	E1717076 N5641732	Ngaere Stream, Bird Road Bridge
4	NGR 000497	E1717385 N5642263	Ngaere Stream, 35 m above confluence with Patea R
5	NGR 000498	E1717431 N5642297	Ngaere Stream, 10 m upstream confluence with Patea R

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 collected 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.

The MCI was designed as a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. MCI results can also reflect the effects of warm temperatures, slow current speeds and low dissolved oxygen levels, because the taxa capable of tolerating these conditions generally have low sensitivity scores. Usually more 'sensitive' communities (with higher MCI values) inhabit less polluted waterways. The use of this index in non-stony streams is possible if results are related to physical habitat (e.g., good quality muddy/weedy sites tend to produce lower MCI values than good quality stony sites). Weedy stream macroinvertebrate communities tend to be dominated by more 'tolerant' taxa than is the case in stony stream communities. It may therefore require more severe organic pollution to cause a significant decline in MCI value in weedy streams.

A semi-quantitative MCI value ($SQMCI_s$) 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 $SQMCI_s$ is not multiplied by a scaling factor of 20, therefore $SQMCI_s$ values range from 1 to 10.

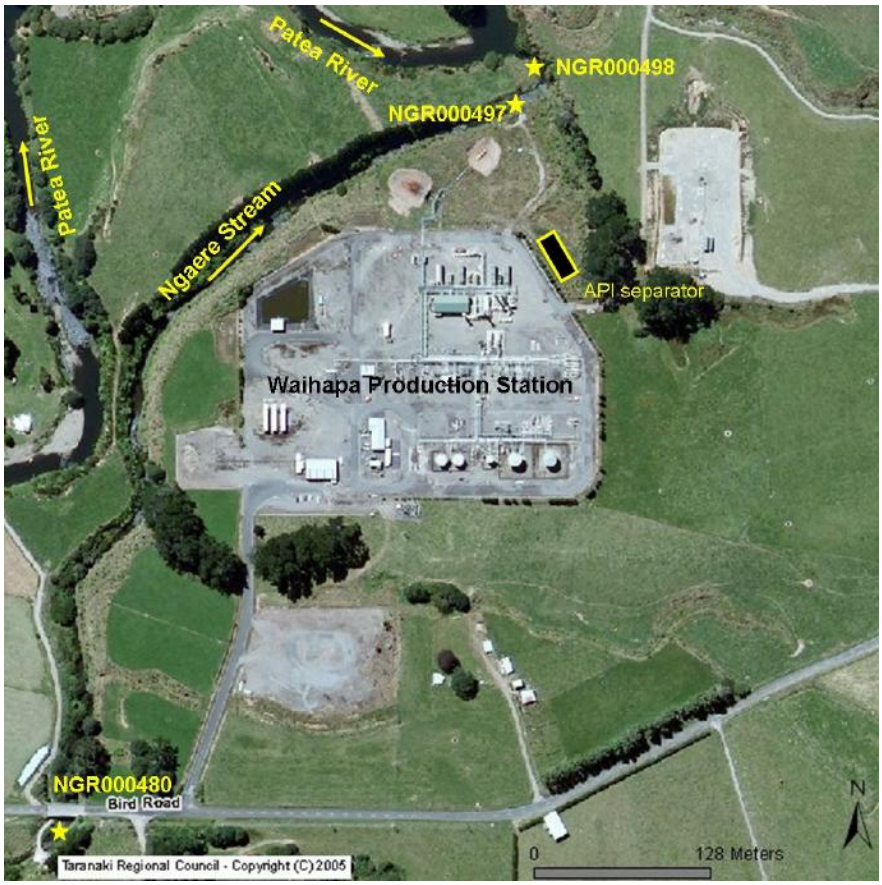

Figure 1 Biological sampling sites in the Ngaere Stream related to the Waihapa Production Station

Results and discussion

At the time of this midday survey there was a moderate, swift, cloudy, greyish flow in the Ngaere Stream at all three sites. Water temperature ranged from 11.6°C to 12.1°C during this survey. Substrate was similar at the three sites in the Ngaere Stream and comprised mainly cobbles, gravels, and boulders, with some sand and silt substrate also present although there were fewer boulders and more gravel at site 3. Periphyton mats and filaments were patchy at all sites. Moss was patchy at sites 4 and 5. No macrophyte beds were recorded on the stream bed at any site. This survey was undertaken following a period of flow recession, during spring 18 days after the latest fresh in excess of 3x median flow.

Macroinvertebrate communities

A summary of survey results performed to date at the three sites in the Ngaere Stream are presented in Table 2 and the full results of the current survey in Table 3.

Table 2 Summary of previous numbers of taxa and MCI values, together with results of the October, 2012 survey in the Ngaere Stream

Site	Number of previous surveys	Numbers of taxa			MCI values			SQMCI$_S$			
		Median	Range	Current Survey	Median	Range	Current Survey	N	Median	Range	Current Survey
3	38	19	11-26	19	85	65-107	98	26	4.4	2.3-6.1	4.9
4	26	21	12-27	21	85	67-101	105	17	4.0	2.9-5.8	4.8
5	30	22	12-27	23	85	62-100	104	26	3.4	2.2-4.8	3.9

Site 3: Bird Road, upstream of Production Station

A moderate community richness of 19 taxa was recorded at site 3 in the Ngaere Stream upstream of all Waihapa Production Station discharges. This was equal with the historical median number of taxa for this site (Table 2, Figure 2). The community was characterised by two 'tolerant' taxa (oligochaete worms and caddisfly (*Aoteapsyche*)) and four 'moderately sensitive' taxa (mayfly (*Austroclima*), elmid beetles, and caddisfly larvae (*Pycnocentria* and *Pycnocentrodes*)), but no 'highly sensitive' taxa. Some of these taxa are associated with nutrient-enriched habitats in streams coincident with periphyton substrate cover which was patchy at this partially shaded site.

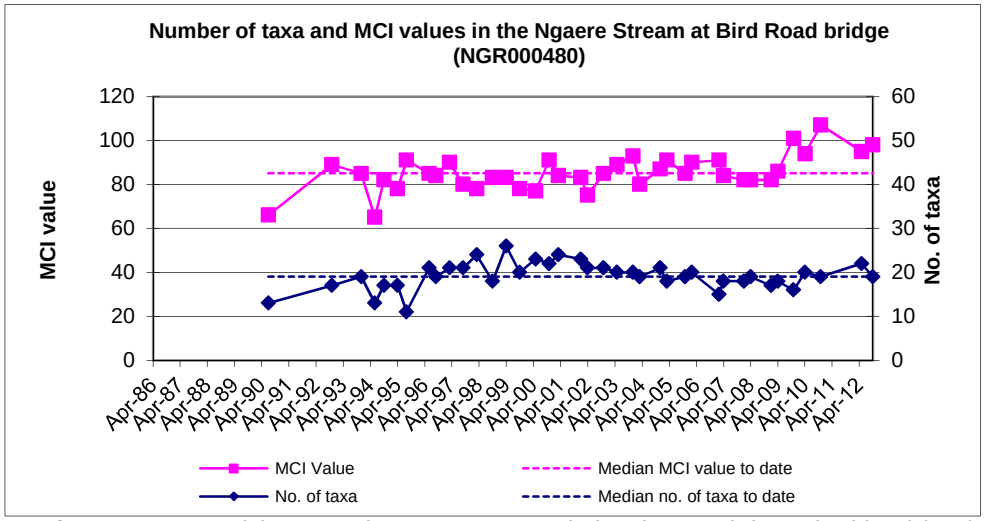

Figure 2 Taxa richness and MCI scores recorded to date at Bird Road Bridge (site 3)

Table 3 Macroinvertebrate fauna of the Ngaere Stream in relation to Waihapa Production Station sampled on 5 October 2012

Taxa List	Site Number	MCI score	3	4	5
	Site Code		NGR000480	NGR000497	NGR000498
	Sample Number		FWB12366	FWB12367	FWB12368
ANNELIDA (WORMS)	Oligochaeta	1	VA	A	VA
	Lumbricidae	5	R	-	-
MOLLUSCA	*Latia*	5	-	-	R
	Potamopyrgus	4	C	C	C
CRUSTACEA	*Paracalliope*	5	C	R	R
	Paranephrops	5	-	-	R
EPHEMEROPTERA (MAYFLIES)	*Austroclima*	7	VA	A	A
	Coloburiscus	7	C	C	C
	Deleatidium	8	-	C	C
	Nesameletus	9	-	-	R
	Zephlebia group	7	A	A	A
PLECOPTERA (STONEFLIES)	*Zelandobius*	5	C	A	A
HEMIPTERA (BUGS)	*Sigara*	3	R	-	-
COLEOPTERA (BEETLES)	Elmidae	6	VA	A	A
	Hydraenidae	8	-	R	-
MEGALOPTERA (DOBSONFLIES)	*Archichauliodes*	7	C	C	C
TRICHOPTERA (CADDISFLIES)	*Aoteapsyche*	4	A	A	A
	Costachorema	7	-	C	R
	Hydrobiosis	5	C	C	C
	Pycnocentria	7	A	C	R
	Pycnocentrodes	5	A	A	A
DIPTERA (TRUE FLIES)	*Aphrophila*	5	C	VA	A
	Eriopterini	5	R	-	-
	Maoridiamesa	3	-	A	R
	Orthocladiinae	2	C	A	C
	Tanytarsini	3	-	R	-
	Empididae	3	R	-	R
	Austrosimulium	3	-	-	R
	Tanyderidae	4	-	R	-
		No of taxa	19	21	23
		MCI	98	105	104
		SQMCIs	4.9	4.8	3.9
		EPT (taxa)	8	10	11
		%EPT (taxa)	42	48	48
'Tolerant' taxa	'Moderately sensitive' taxa	'Highly sensitive' taxa			

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

The community contained a moderately low proportion of 'tolerant' taxa (32% of richness), resulting in the MCI score of 98 units, a significant 13 units (Stark, 1998) higher than the median score recorded by previous surveys at this site (Table 2). This score continued the more recent improvement in MCI scores recorded over the past five surveys. A moderate $SQMCI_S$ score was recorded for this site (4.9 units), reflecting the relative balance in numerical dominance between 'tolerant' and 'moderately sensitive' taxa and, in particular, the predominance of one 'tolerant' and two 'moderately sensitive' taxa. (Table 3). This score was slightly above (0.5 unit) the long term median for surveys conducted at this site.

Site 4: 35m u/s of Patea River confluence

A community richness of twenty-one taxa was found at site 4, nearly 600m downstream of site 3 (and below various discharges from the Waihapa Production Station to the Ngaere Stream), but above the small unnamed tributary (which receives the API separator discharge). This was slightly higher than that found at site 3 upstream but identical with the median for this site (Table 2, Figure 3). However, there were several differences in dominant taxa composition at this site. Reductions in abundance of the 'moderately sensitive' caddisfly (*Pycnocentria*) was recorded at site 4, while the 'moderately sensitive' cranefly (*Aphrophila)* and stonefly *(Zelandobius)* and 'tolerant' *Maoridiamesa* and orthoclad midge larvae were all abundant at site 4. This was probably coincident with increased algal growth caused by the reduction in shading at this site (Table 3). Again, some of these taxa are associated with nutrient-enriched habitats of mid to lower reaches of streams in agricultural catchments, but the majority of changes related to the different habitat characteristics at site 4.

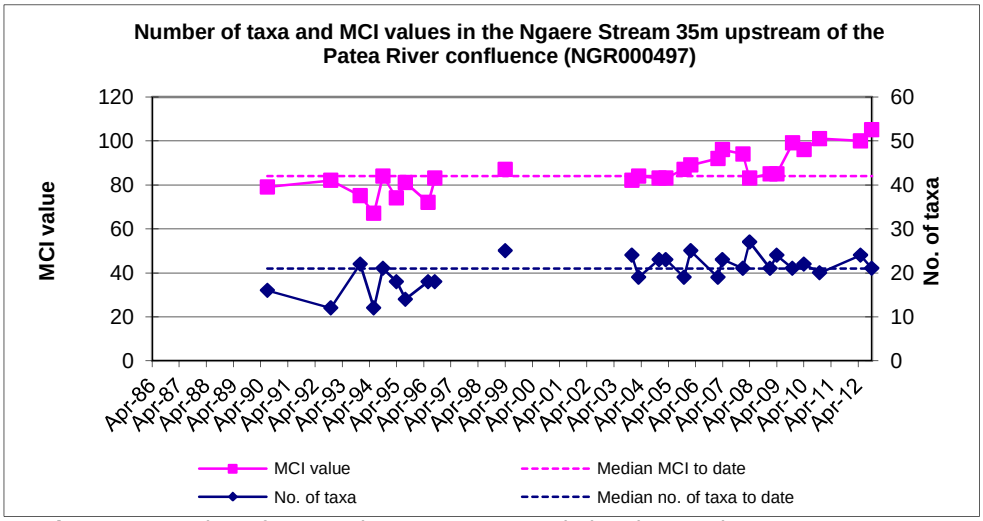

Figure 3 Number of taxa and MCI scores recorded to date at site 4, 35 m upstream of the confluence with the Patea River

However, there were relatively few significant changes in individual taxon abundances between sites 3 and 4, although the predominant taxa altered from one 'tolerant' and two 'moderately sensitive' taxa (at site 3) to one 'moderately sensitive' taxon at site 4, which was illustrated in the similarity for between $SQMCI_s$ values which varied by only 0.1 unit.

'Tolerant' taxa comprised a very similar proportion (33% of total taxa) of the community compared with site 3, which was reflected in the MCI score of 105 units. This was significantly higher than the median of previous surveys' scores, and four units above the maximum for this site (which had been recorded by the spring 2010 survey (Figure 3)). This is the sixteenth consecutive survey where the MCI score has been equal to or higher than the running median for this site. The MCI score for this survey was seven units above that recorded at site 3 upstream of all Waihapa Production Station discharges, while the $SQMCI_S$ values were very similar (see above). The results indicate that it is unlikely that there had been any recent changes in physicochemical water quality caused by discharges from the Production Station between sites 3 and 4.

Site 5: 10m u/s of Patea River confluence

A community richness of twenty-three taxa was recorded at site 5, downstream of the various Waihapa Production Station discharges and downstream of the unnamed tributary receiving the API separator discharge. This was slightly higher than the median richness

found by previous surveys at this site and slightly higher than that recorded at the nearest upstream site (Table 2, Figure 4). The number of characteristic taxa decreased compared to those at site 4, and comprised only two of the four 'tolerant' taxa (oligochaete worms and caddisfly larvae (*Aoteapsyche*)), and the same number of 'moderately sensitive' taxa as found at site 4.

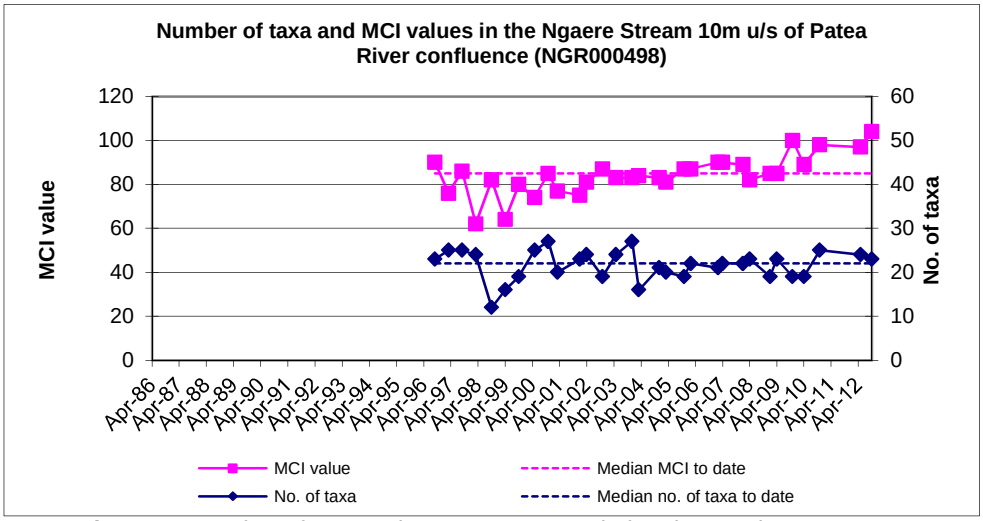

Figure 4 Number of taxa and MCI scores recorded to date at site 5, downstream of all Waihapa Production Station discharges

However, there were no significant changes in individual taxon abundances between adjacent sites 4 and 5 but the numerical increase in 'tolerant' worms and decrease in 'sensitive' craneflies produced a decrease in the $SQMCI_S$ value of 0.9 unit which remained 0.5 unit above the median value for this site (Stark, 1998), but one unit lower than that recorded at the reference site 3 (Stark, 1998). The very subtle changes recorded from site 4 are more attributable to changes in habitat characteristics at site 5, and are unlikely to be have been due to discharges to the tributary entering the Ngaere Stream between sites 4 and 5.

The community was again comprised of a moderately low proportion (30%) of 'tolerant' taxa which was reflected in the MCI score of 104 units. As with the two upstream sites, this score was significantly higher than the median score from previous surveys at this site. It was also the highest score recorded at this site to date and continued the trend of higher MCI scores found at this site by the five most recent surveys (Table 2, Figure 4). This score was not significantly different to the scores recorded at the two sites upstream, indicative of no recent impacts of the API separator discharge on the macroinvertebrate communities of the Ngaere Stream.

Conclusions and summary

The Council's standard 'kick-sampling' technique was used at three established sites to collect streambed macroinvertebrates from the Ngaere Stream, to assess whether the discharges from the Waihapa Production Station had had any detrimental effects on the macroinvertebrate communities of this stream. This spring survey was the first of two surveys programmed for the 2012-2013 monitoring period. Samples were sorted and identified to provide the number of taxa (richness) and MCI and $SQMCI_S$ scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects or 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 may indicate the degree of adverse effects (if any) of the discharges being monitored.

This spring macroinvertebrate survey indicated that the discharge of treated stormwater and API separator discharges from the Waihapa Production Station site had not had any recent detrimental effects on the macroinvertebrate communities of the Ngaere Stream. The MCI scores for each site were all significantly higher than their respective historical medians, and were amongst the highest scores recorded for each site with two sites' scores a few units in excess of historical maxima. The only significant changes in the macroinvertebrate communities related to abundances of individual taxa, mainly as a result of subtle habitat changes between sites. $SQMCI_S$ scores were not significantly different between sites 3 and 4, but a marginally significant decrease between sites 3 and 5 was coincident with less shading at the downstream site.

The macroinvertebrate communities of the stream contained relatively lower proportions of 'tolerant' taxa at all sites. In addition, communities at all sites had a number of common dominant taxa (they shared six of the eleven dominant taxa through the surveyed reach), although there was some variation as a result of subtle variations in habitat between sites. There were no significant changes in MCI values between sites, despite some differences in habitat. In addition, taxonomic richness (numbers of taxa) was relatively consistent across all three sites. The MCI scores indicated that the stream communities were of good 'health', and better than typical conditions in comparison with median values recorded from past surveys. The absence of significant differences between the three sites indicated no recent impacts from any of the Waihapa Production Station discharges.

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Appendix III

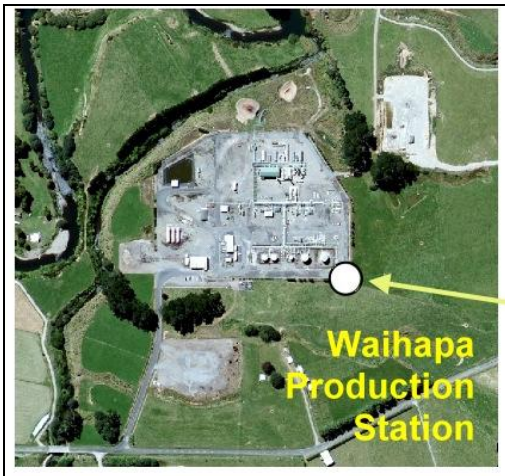
Ambient gas monitoring at the Waihapa Production Stations

Memorandum

To Job Manager, David Olson
From Scientific Officer - Air Quality Officer, Brian Cheyne
File FRODO - #1130183, 4049 (Consent)
Date November 31, 2012

Ambient gas monitoring at Waihapa Production Station

During the monitoring year, a multi-gas meter was deployed on one occasion in the vicinity of the Waihapa Production Station. Deployment lasted approximately twenty-four, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continuous measurements of gas concentrations for the gases of interest (carbon monoxide and combustible gases). The location of the multi-gas meter for the sampling run and summarised details of the sample are shown in Figure 1.



From 22.11.201113:22 to 23.11.2011 13:42		
(CO) Carbon Monoxide		
Max	Mean	Min
4.0 (ppm)	0.20 (ppm)	0.00 (ppm)

(LEL) Lower Explosive Limit		
Max	Mean	Min
0.30 (%)	0.00 (%)	0.00 (%)

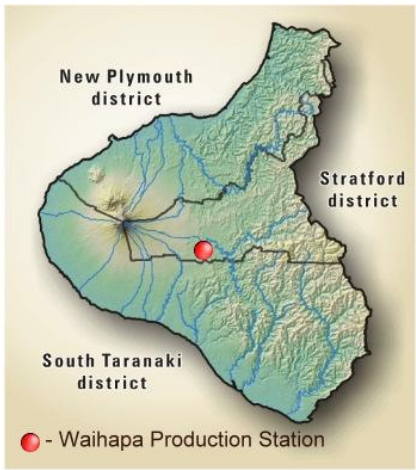


Figure 1 Air monitoring site- Waihapa production station (year 2011-2012)

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.

The details of the sample run are presented graphically in Figure 2**.**
The consent covering air discharges from the Waihapa Production Station has specific limits related to particular gases. Special condition 15 of consent 4049-3 sets a limit on the carbon monoxide concentration at or beyond the production station's boundary. The limit is expressed as 10 mg/m³ (equivalent to 12ppm) for an eight hour average or 30 mg/m³ (equivalent to 35ppm) for a 1 hour average exposure.
The maximum concentration of carbon monoxide found during the monitoring run was 3.4 mg/m³ and average concentration was only 0.17 mg/m³1 which complies with the consent condition. This continues the pattern found in previous years.

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.

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 Waihapa Production Station reach any more than a trivial level.

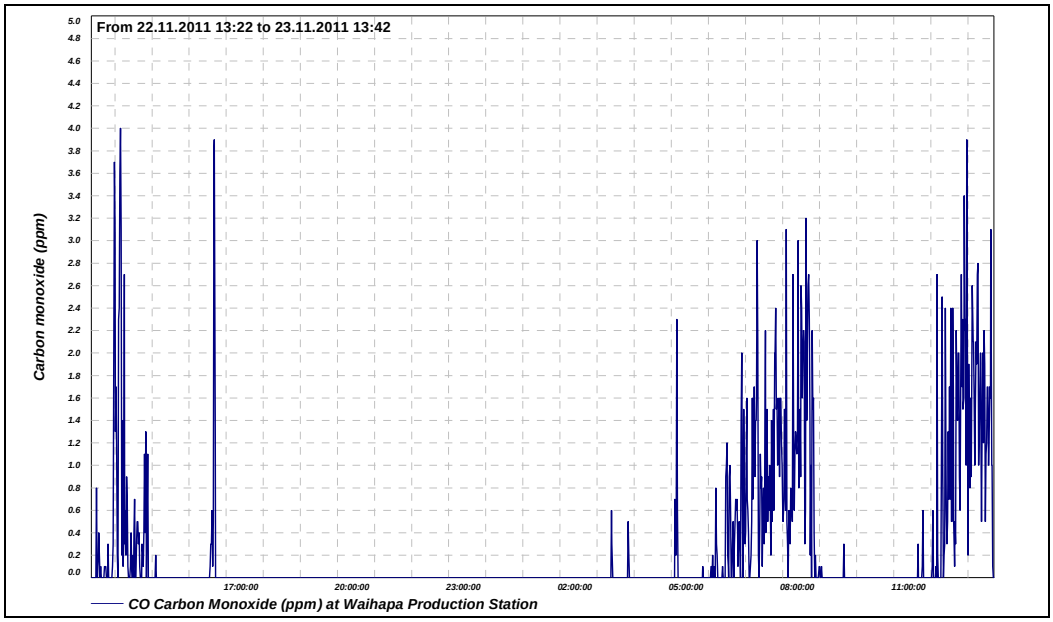


Figure 2 Graph of ambient gas levels in the vicinity of the Waihapa Production station

Appendix IV

Origin Energy's annual flaring summary report

Summary of Origin Energy New Zealand 2012-2013 Annual Flaring Report to Taranaki Regional Council for Waihapa Production Station and Rimu Production Station

This report summarises flaring at Origin Energy New Zealand (OENZ) Waihapa Production Station (WPS) and Rimu Production Station (RPS). A full report was submitted to Taranaki Regional Council to meet the reporting requirements of the air discharge resource consents held for these sites.

Flaring at Waihapa Production Station

Due to the existing pipelines to the WPS from most of the wellsites in the TAWN field, most flaring required is diverted to the WPS and flared under consent 4049-3, or the gas may enter the production stream. This is desirable as the WPS is a permanent facility and is better equipped to control emissions, minimise flaring, and minimise any adverse environmental effects.

Figure 1 below shows the total monthly amounts of gas flared at the WPS from April 2012 till the end of March 2013. This includes flaring of gas from Contact Energy, as they process some gas through the WPS for the Ahuroa Gas Storage Project. Flaring of gas from NZEC's Copper Moki wellsite commenced flow into the WPS on the 31st August 2012 until the 15th March 2013. This resulted in a significant increase of volume flared as shown in Figure 4.2. There is no separate gas metering to distinguish between the WPS created flaring and the Copper Moki gas flaring, therefore we are unable to trend against historical data for the WPS flare volume.

The total volume of gas flared for this period is 4,495,919 Sm^3 (standard cubic metres). This is considerably higher from the last period (April 2011 – March 2012) where the total volume of gas flared was 113,801 Sm^3.

Figure 1: Waihapa Production Station Total Monthly Volumes Flared

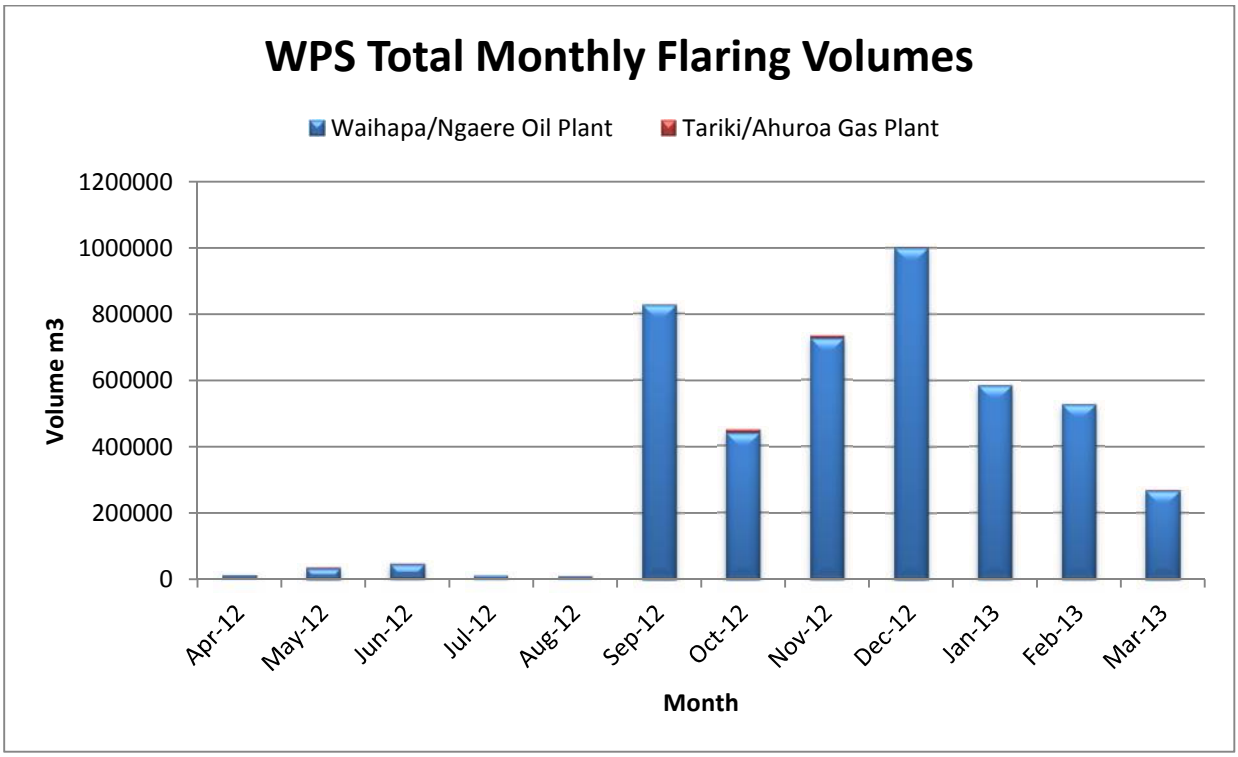
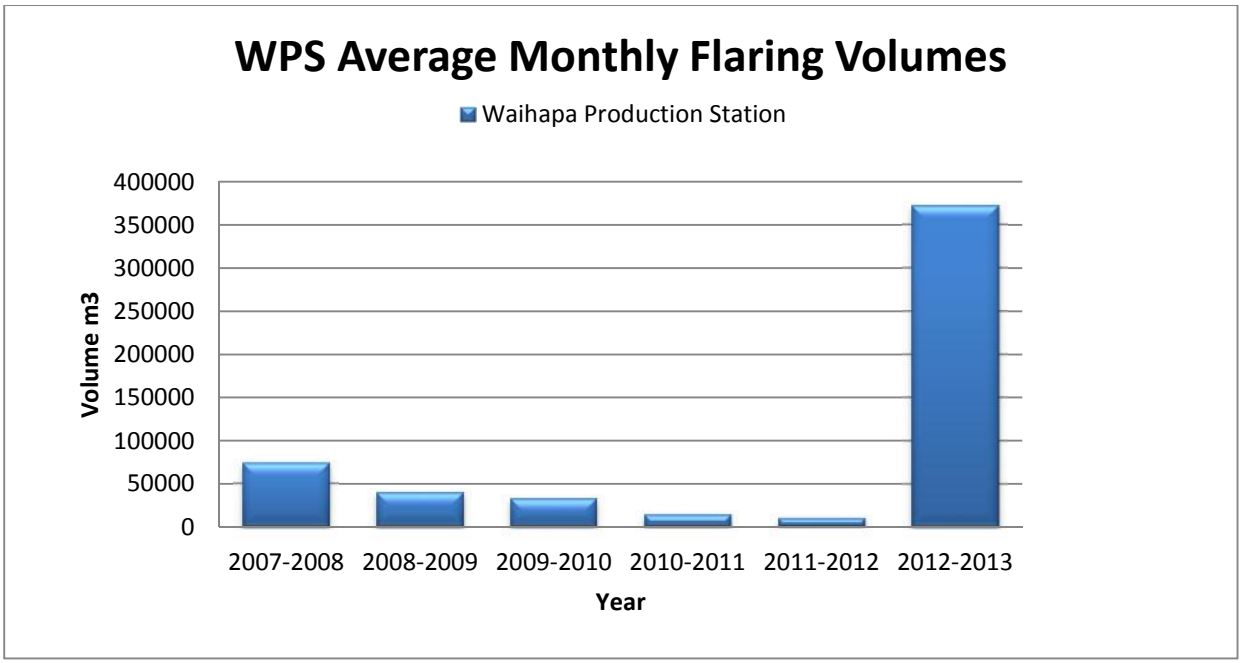


Figure 2 below indicates that the average monthly volumes flared over consecutive reporting periods was trending down until the addition of the Copper Moki gas to the WPS.

Figure 2: Waihapa Production Station Average Monthly Volumes Flared



Flaring at RPS

At the RPS over the last twelve months (April 12 – March 13) flaring has regularly occurred each month. The quantities flared each month vary and relate to incidents at the site; for example, the high volume in April was the result of ongoing intermittent faults with a compressor. Figure 3 below shows the total monthly flaring amounts of gas flared at the RPS from April 2012 until the end of March 2013.

The total volume of gas flared for this reporting year is 186,972 Sm^3, which is less than the 2011-2012 year (315,766 Sm^3).

Figure 3: Rimu Production Station Total Monthly Volumes Flared

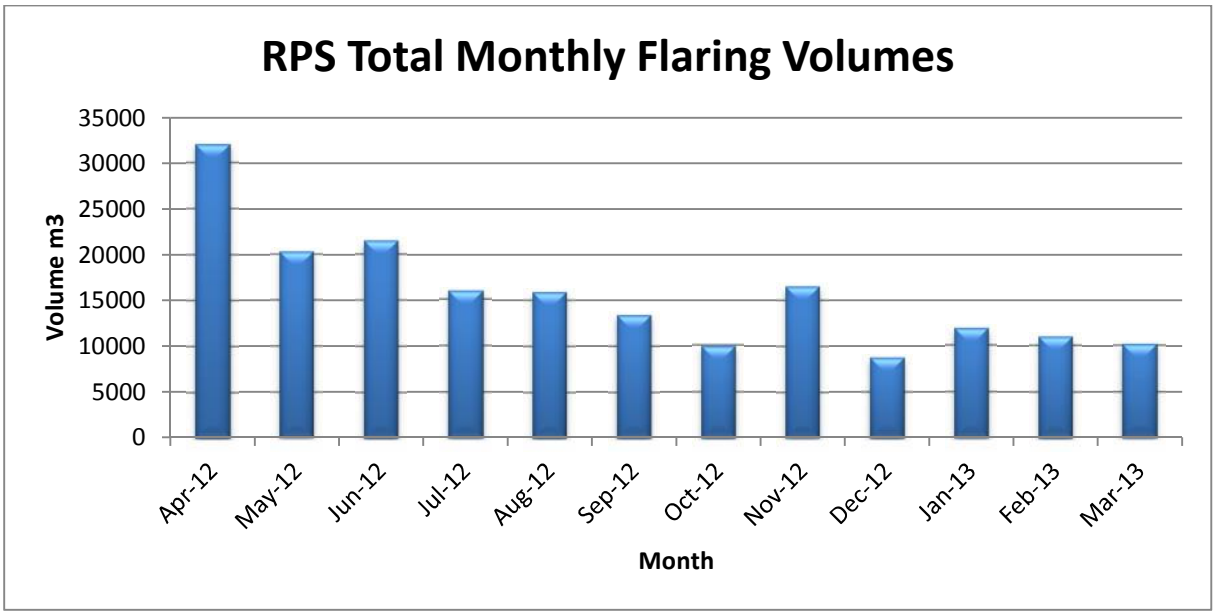


Figure 4 below indicates that the average monthly volumes flared over consecutive reporting periods has shown a good reduction over the last three reporting periods.

Figure 4: Rimu Production Station Average Monthly Volumes Flared