

Contact Energy Limited
Stratford Power Station (TCC1 & SP1)
and Ahuroa Gas Storage
Monitoring Programme
Annual Report
2014-2015

Technical Report 2015-110

ISSN: 0114-8184 (Print)
ISSN: 1178-1467 (Online)
Document: 1562544 (Word)
Document: 1658072 (Pdf)

Taranaki Regional Council
Private Bag 713
STRATFORD

May 2016

Executive summary

Contact Energy Limited operates the Stratford Power Station located on State Highway 43 near Stratford in the Patea catchment, and the associated underground Ahuroa Gas Storage facility located 7.5 km away in the Waitara catchment. The Company holds resource consents that provide for the power station, gas storage and connecting pipeline. The consents allow it to abstract water from the Patea River and Kahouri Stream, to discharge to the Patea River and the Kahouri and other streams, and onto and into land, to provide for several structures across streams, and to discharge emissions into the air.

This report describes the monitoring programme implemented by the Council to assess the Company's environmental performance, and the results and environmental effects of the Company's activities.

During the monitoring period, Contact Energy Limited demonstrated an overall high level of environmental performance.

For the power station, the report covers the period July 2014-June 2015, the seventeenth year of its operation. For the gas storage and pipeline, this is the second monitoring report, covering the period July 2014- June 2015.

For Stratford Power Station, the Company holds a total of 28 resource consents, which include a total of 240 conditions setting out the requirements that the Company must satisfy. These consents provide for three gas-fired plants, including a combined-cycle plant, a smaller, open-cycle peaking plant, and a yet-to-be-built plant similar to either of the existing plants.

The Council's annual monitoring programme for the year under review included four site inspections, nine water samples collected for physico-chemical analysis, and three bio-monitoring surveys of receiving waters. Water abstraction, wastewater discharge, and air emission monitoring results were provided by the Company to the Council. There was ongoing consultation between the Council and Contact Energy staff.

The monitoring showed that the power station continued to be well managed and any environmental impacts were negligible.

During the year, the Company demonstrated a high level of environmental performance and high level of administrative performance with the resource consents that provide for Stratford Power Station. The Company has achieved a high level of performance throughout the station's seventeen years of operation.

For Ahuroa Gas Storage, the Company holds a total of 10 resource consents, which include a total of 135 conditions setting out the requirements that the Company must satisfy. For the pipeline, a total of 17 resource consents are held, with a total of 170 conditions.

The Council's annual monitoring programme included three inspections and one stormwater sample collected for physico-chemical analysis at the gas storage site. Data on gas injection and flaring volumes and an annual report were provided by the Company to the Council, some items late. There was ongoing consultation between the Council and Contact Energy staff.

During the 2014-2015 period, the Company demonstrated a high level of environmental performance and good level of administrative performance with the resource consents that provide for construction and operation of Ahuroa Gas Storage and the pipeline connecting it to Stratford Power Station.

For reference, in the 2014-2015 year, 75% 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 22% demonstrated a good level of environmental performance and compliance with their consents.

This report includes recommendations for the 2015-2016 year.

Table of contents

	Page
1. Introduction	1
1.1 Compliance monitoring programme reports and the Resource Management Act 1991	1
1.1.1 Introduction	1
1.1.2 Structure of this report	1
1.1.3 The Resource Management Act 1991 and monitoring	2
1.1.4 Evaluation of environmental performance	3
2. Stratford Power Station	5
2.1 Process description	5
2.2 Resource consents	7
2.2.1 Water abstraction permits	8
2.2.2 Water discharge permits	9
2.2.3 Air discharge permits	12
2.2.3.1 Taranaki Combined Cycle 1 (TCC 1 - operating)	12
2.2.3.2 Taranaki Combined Cycle 2 or Stratford Peaker 2 (TCC2 or SP2 - yet to be constructed)	13
2.2.3.3 Stratford Peaker Plant (SP1)	14
2.2.4 Discharge of waste to land	15
2.2.5 Land use consents	16
2.3 Monitoring programme	19
2.3.1 Introduction	19
2.3.2 Programme liaison and management	19
2.3.3 Site inspections	19
2.3.4 Chemical sampling	20
2.3.5 Biomonitoring surveys	20
2.3.6 Review of data and reports	20
2.4 Results - Water	21
2.4.1 Inspections - Combined Cycle Plant and Peaker Plant	21
2.4.2 Results of abstraction monitoring	22
2.4.3 Results of discharge monitoring	23
2.4.3.1 Results of monitoring by Contact Energy	24
2.4.3.2 Results of Council monitoring	26
2.4.4 Results of receiving environment monitoring	28
2.4.4.1 Biomonitoring	28
2.4.4.2 Physico-chemical monitoring by Council	30
2.4.4.3 Temperature monitoring by Contact Energy	31
2.5 Results - Air	32
2.5.1 Inspections	32
2.5.2 Results of discharge monitoring	32
2.5.3 Emissions testing of Stratford Peaker Plant	33
2.5.4 Reviews and audits	35
2.6 Investigations, interventions, and incidents	36
2.7 Discussion	37
2.7.1 Discussion of plant performance	37

2.7.2	Environmental effects of exercise of water consents	38
2.7.3	Environmental effects of exercise of air discharge permit	38
2.7.3.1	Neighbourhood effects	38
2.7.3.2	Global effects	39
2.8	Evaluation of performance	39
2.9	Recommendations from the 2012-2014 Biennial Report	51
2.10	Alterations to monitoring programmes for 2015-2016	51
2.11	Exercise of optional review of consents	52
2.12	Recommendations	52
3.	Ahuroa Gas Storage	55
3.1	Process description	55
3.1.1	Site overview	55
3.1.2	Geological setting	55
3.1.3	Gas injection/extraction	56
3.1.4	Pressure monitoring	57
3.1.5	Pipeline to Stratford Power Station	57
3.2	Resource consents	59
3.2.1	Water take permit	60
3.2.2	Water discharge permits	60
3.2.3	Air discharge permits	61
3.2.4	Discharges to land	62
3.2.5	Land use consents	63
3.3	Monitoring programme	64
3.3.1	Introduction	64
3.3.2	Programme liaison and management	64
3.3.3	Site inspections	64
3.3.4	Chemical sampling	64
3.3.5	Data review	65
3.4	Results - Water	65
3.4.1	Inspections	65
3.4.2	Results of discharge monitoring	65
3.5	Results - Air	66
3.5.1	Review of flaring data	66
3.6	Results - Land	67
3.6.1	Reservoir pressure and injection pressure data review	67
3.7	Results - Pipeline	68
3.8	Annual report by Contact Energy	68
3.9	Investigations, interventions, and incidents	69
3.10	Discussion	69
3.10.1	Discussion of performance	69
3.10.2	Environmental effects of exercise of consents	69
3.11	Evaluation of performance	70
3.12	Alterations to monitoring programmes for 2015-2016	75
3.13	Exercise of optional review of consents	76
3.14	Recommendations	77

Glossary of common terms and abbreviations	78
Bibliography and references	80
Appendix I Resource consents for Stratford Power Station (For a copy of the signed resource consent please contact the TRC consent department)	
Appendix II Resource consents for Ahuroa Gas Storage	
Appendix III Resource consents for AGS to SPS pipeline	
Appendix IV Biomonitoring reports	
Appendix V Air monitoring results for TCC1	
Appendix VI Air emissions report by Contact Energy Limited Pursuant to condition 8 of consent 4454-1 and condition 3 of consent 4022-2	
Appendix VII Annual report for 2014-2015 by Contact Energy Limited	

List of tables

Table 1	Summary of resource consents for Stratford Power Station	7
Table 2	Monthly abstraction data July 2014 to June 2015	23
Table 3	Monitoring of TCC1 plant effluent by Contact Energy Limited July 2014 to June 2015	24
Table 4	Monitoring of SP1 effluent by Contact Energy Limited July 2014 to June 2015	25
Table 5	Results of effluent monitoring by Council, compared to Contact Energy results for temperature, pH and chlorine	27
Table 6	Patea River monitoring	31
Table 7	Results from emission testing of Stratford Peaker Plant, March 2011	33
Table 8	Summary of NO _x emission monitoring results for Stratford Peaker Plant, August 2014	35
Table 9	Summary of performance for Consent 3939-2	39
Table 10	Summary of performance for Consent 4022-2	39
Table 11	Summary of performance for Consent 4454-1	40
Table 12	Summary of performance for Consent 4455-1	41
Table 13	Summary of performance for Consent 4456-1	42
Table 14	Summary of performance for Consent 4458-1	42
Table 15	Summary of performance for Consent 4459-1	43
Table 16	Summary of performance for Consent 4460-1	44
Table 17	Summary of performance for Consent 4461-1	44
Table 18	Summary of performance for Consent 4462-1	45
Table 19	Summary of performance for Consent 4804-1	46
Table 20	Summary of performance for Consent 5063-1	46
Table 21	Summary of performance for Consent 5633-1	47
Table 22	Summary of performance for Consent 5848-1	47
Table 23	Summary of performance for Consent 7247-1	48

Table 24	Summary of performance for Consent 7248-1	49
Table 25	Summary of performance for Consent 7250-1	49
Table 26	Summary of performance for Consent 7605-1	50
Table 27	Summary of performance for Consent 7653-1	50
Table 28	Summary of resource consents for Ahuroa Production Station	59
Table 29	Summary of resource consents for the gas pipeline from AGS to SPS	59
Table 30	2014-2015 skimmer pond discharge results	66
Table 31	Summary of performance for Consent 3681-2	70
Table 32	Summary of performance for Consent 7432-1	71
Table 33	Summary of performance data for Consent 7746-1	71
Table 34	Summary of performance for Consent 9307-1	73
Table 35	Summary of performance for Consent 9308-1	73
Table 36	Summary of performance for Consents 9309-1 to 9322-1	74
Table 37	Summary of performance for Consent 9576-1	74

List of figures

Figure 1	Physico-chemical and biological sampling sites, discharge sites and abstraction site	21
Figure 2	Patea River flow at Skinner Road (m ³ /s), July 2014 – June 2015	23
Figure 3	Ahuroa B wellsite and gas storage facilities showing main components and discharge sampling site IND000146	57
Figure 4	Pipeline route from Ahuroa Gas Storage to Stratford Power Station	58
Figure 5	Ahuroa flaring volumes (Sm ³) by month for 2014-2015	66
Figure 6	Monthly maximum downhole pressures for Ahuroa wells 3, 4, and 5ST-1, 2014-2015	67
Figure 7	Monthly maximum injection pressures for Ahuroa wells 3, 4 and 5ST-1, 2014-2015	67

List of photographs

Photo 1	Aerial view of Stratford Power Station, March 2012	6
Photo 2	Stack testing at Stratford Peaker Plant GT21, 27 August 2014	34
Photo 3	Ahuroa-B site layout, facing north-west, May 2014	55
Photo 4	Ahuroa-B site looking towards skimmer pond (left) and final pond discharge point (right)	65

1. Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2014-June 2015 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Contact Energy Limited (Contact Energy) to provide for two gas-fired power plants at Stratford Power Station, situated on East Road (State Highway 43) near Stratford, in the Patea catchment.

This report is also the annual report for July 2014-June 2015 by the Council on the monitoring programme associated with resource consents held by Contact Energy to provide for an associated underground gas storage reservoir, situated on Barleymans Road at Ahuroa, in the Waitara catchment, and the pipeline that connects the storage and power station.

This report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by Contact Energy that relate to abstractions and discharges of water within the Patea and Waitara catchments, and the air discharge permits held by Contact Energy to cover emissions to air from the power station and storage sites.

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

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 RMA and the Council's obligations and general approach to monitoring sites through annual programmes.

Section 2 sets out the resource consents held by Contact Energy to allow operation of Stratford Power Station (SPS) in the Patea catchment, the nature of the monitoring programme in place for the period under review, and a description of the activities and operations conducted at the power station site. It presents the results of monitoring in relation to SPS during the period under review, including scientific and technical data. It also discusses the results, their interpretation and their significance for the environment, and makes recommendations.

Section 3 sets out the resource consents held by Contact Energy to provide for Ahuroa Gas Storage (AGS) facility in the Waitara catchment and the associated gas pipelines for supply of the facility and SPS, the nature of the monitoring programme in place for the period under review, and a description of the activities and

operations conducted at AGS site. It presents the results of monitoring in relation to AGS and the pipeline during the period under review, including scientific and technical data. It also discusses the results, their interpretation and their significance for the environment, and makes recommendations.

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

1.1.3 The Resource Management Act 1991 and monitoring

The *Resource Management Act 1991* (RMA) primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

- (a) the neighbourhood or the wider community around a discharger, 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 (eg, recreational, cultural, or aesthetic);
- (e) risks to the neighbourhood or environment.

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

1.1.4 Evaluation of environmental performance

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

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

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

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

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

Environmental Performance

- **High:** No or inconsequential (short-term duration, less than minor in severity) breaches of consent or regional plan parameters resulting from the activity; no adverse effects of significance noted or likely in the receiving environment. The Council did not record any verified unauthorised incidents involving significant environmental impacts and was not obliged to issue any abatement notices or infringement notices in relation to such impacts.
- **Good:** Likely or actual adverse effects of activities on the receiving environment were negligible or minor at most. There were some such issues noted during monitoring, from self reports, or in response to unauthorised incident reports, but these items were not critical, and follow-up inspections showed they have been dealt with. These minor issues were resolved positively, co-operatively, and quickly. The Council was not obliged to issue any abatement notices or infringement notices in relation to the minor non-compliant effects; however abatement notices may have been issued to mitigate an identified potential for an environmental effect to occur.

For example:

- High suspended solid values recorded in discharge samples, however the discharge was to land or to receiving waters that were in high flow at the time;
- Strong odour beyond boundary but no residential properties or other recipient nearby.
- **Improvement required:** Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self reports, or in response to unauthorised incident reports. Cumulative adverse effects of a persistent minor

non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.

- **Poor:** Likely or actual adverse effects of activities on the receiving environment were significant. There were some items noted during monitoring, from self reports, or in response to unauthorised incident reports. Cumulative adverse effects of a persistent moderate non-compliant activity could elevate an 'improvement required' issue to this level. Typically there were grounds for either a prosecution or an infringement notice in respect of effects.

Administrative performance

- **High:** The administrative requirements of the resource consents were met, or any failure to do this had trivial consequences and were addressed promptly and co-operatively.
- **Good:** Perhaps some administrative requirements of the resource consents were not met at a particular time, however this was addressed without repeated interventions from the Council staff. Alternatively adequate reason was provided for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.
- **Improvement required:** Repeated interventions to meet the administrative requirements of the resource consents were made by Council staff. These matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance.
- **Poor:** Material failings to meet the administrative requirements of the resource consents. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.

For reference, in the 2014-2015 year, 75% 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 22% demonstrated a good level of environmental performance and compliance with their consents.

2. Stratford Power Station

2.1 Process description

Taranaki Combined Cycle Plant

The Taranaki Combined Cycle Power Plant (Photo 1) was the first large-scale combined-cycle power plant to be built in New Zealand. The plant was completed in 1998. It uses a gas turbine and a steam turbine in tandem to generate electricity at an efficiency greater than could be achieved by either system alone. The hot exhaust gases from the gas turbine are directed into a heat recovery boiler where most of the heat is used to produce high pressure steam that drives the steam turbine. The station was designed to produce up to 354 MW of electricity at an efficiency of about 56%, which has since been improved to 383 MW at 56.7%. The combustion system in the gas turbine is especially designed to minimise the production of nitrogen oxides in the gases.

The cooling system for the steam system is based on an evaporative process. The cooling towers have been designed to minimise the formation of a vapour plume, so that a plume is visible only under cool or humid conditions.

The gas supply for the plant comes mainly from the Kupe and Maui fields together with a smaller component from the underground Ahuroa Gas Storage facility. The station uses approximately 1.4 million cubic metres of gas per day in generation at full production.

Water is abstracted from the Patea River to supply the cooling towers and for steam generation. The water discharges are from plant utilities and domestic effluent, boiler blowdown and site stormwater. Septic tank effluent is discharged to land.

Stratford Peaker Plant

The Stratford Peaker Plant (Photo 1) is designed to provide fast start-up (peaking) capacity to support the increasing volumes of weather-dependent renewable electricity sources in New Zealand, such as wind generation. Commercial operation commenced in June 2011. The plant may be required to run for hours during low wind conditions, or for months during dry hydro years or times of major plant outages. The two separate 100 MW high-efficiency open cycle gas fired turbines are capable of going from cold to full power in 10 minutes. To improve efficiency, air from the low pressure compressor passes through an inter-cooler before entering the high pressure compressor, giving an LHV efficiency of about 46% at full load.

The cooling system for the intercooler is similar in type to that of the Taranaki Combined Cycle Plant described above, being a hybrid dry/wet mechanical draft cooling tower.

Water to supply the cooling tower is drawn from the Patea River via the existing abstraction and storage system for the combined cycle plant. Wastewater is discharged to the Patea River. Site stormwater is transferred to the raw water holding pond at the combined cycle plant during operation. Domestic wastes are discharged to a land-based system, and also to the Patea River after treatment on the adjacent switchyard site.

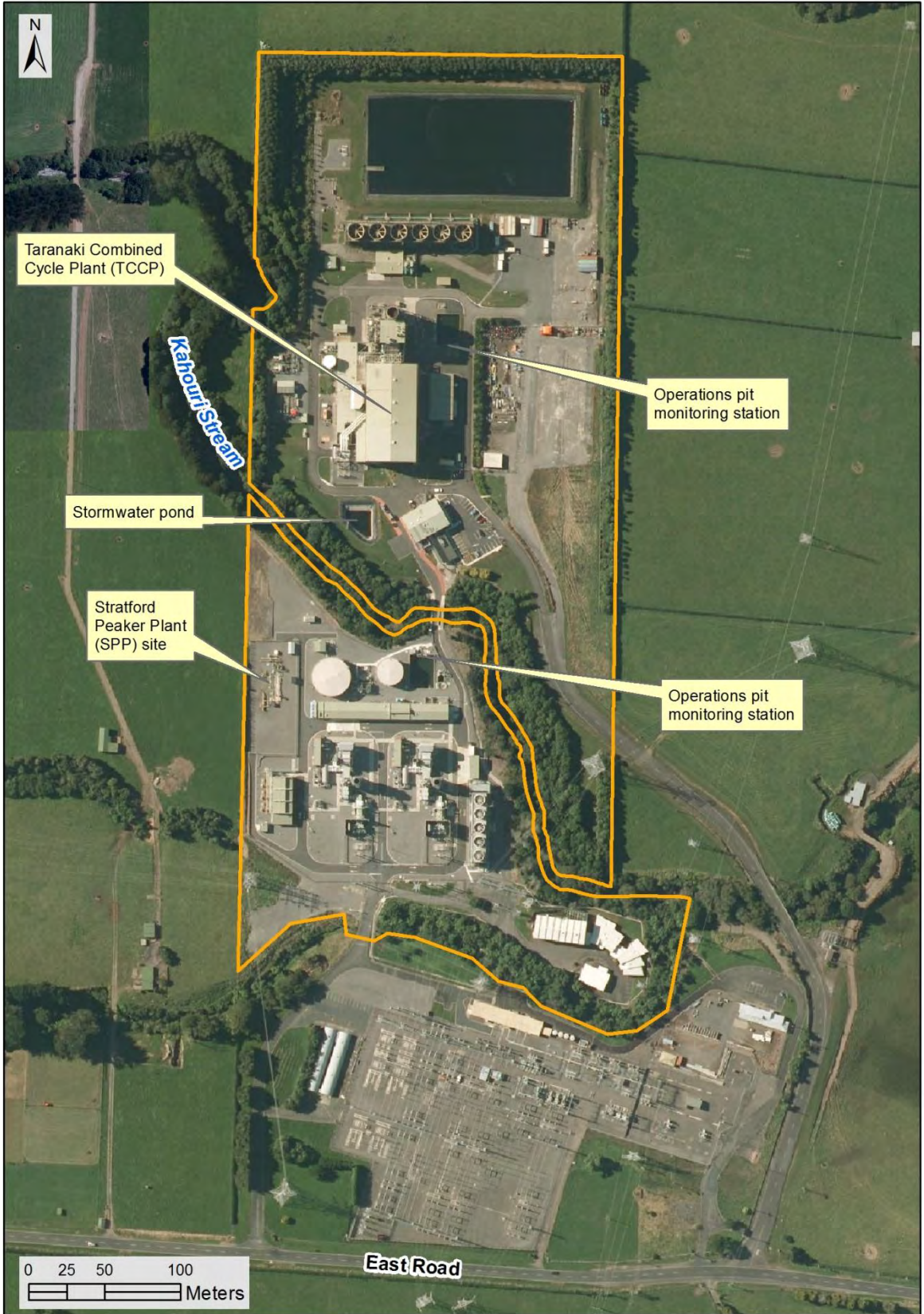


Photo 1 Aerial view of Stratford Power Station, March 2012

2.2 Resource consents

A summary of the consents held by Contact Energy Limited, formerly Stratford Power Limited, in relation to activities at its Stratford power station site is given in Table 1 below. A copy of each of the consents can be found in Appendix I.

Table 1 Summary of resource consents for Stratford Power Station

Consent number	Purpose	Volume	Next review date	Expiry date
3939-2	Discharge stormwater to Kahouri Stream/tributary	464 L/s	-	2016
4022-2	Discharge emissions to air from combustion		-	2022
4454-1	Discharge contaminants to air		2016	2029
4455-1	Take from Patea River below Toko confluence	19,440 m ³ /day (225L/s)	2016	2028
4456-1	Intake structure on Patea River below Toko confluence		2016	2028
4458-1	Diffuser structure on Patea River		2016	2028
4459-1	Discharge stormwater to Kahouri/Piakau Streams	1,360 L/s	2016	2028
4460-1	Stormwater discharge structures		2016	2028
4461-1	Utilities structures on Kahouri Stream		2016	2028
4462-1	Water transmission structures		2016	2028
4804-1	Bridge for electricity transmission over Kahouri Stream		2016	2028
5063-1	Discharge septic tank effluent to land	5 m ³ /day	2016	2028
5633-1	Discharge sediment from water intake to Patea River		2016	2028
5846-1*	Discharge contaminants to air		2016	2034
5847-1*	Take from Patea River at Skinner Road	19,440 m ³ /day (225L/s)	2016	2034
5848-1	Discharge used water to Patea River	6,740 m ³ /day (78L/s)	2016	2034
5849-1*	Gas pipeline structures on Kahouri Stream		2016	2034
5850-1*	Intake structure on Patea River at Skinner Road		2016	2034
5851-1*	Discharge sediment from water intake to Patea River		2016	2034
5852-1*	Utilities structures on Kahouri Stream		2016	2034
7247-1	Discharge emissions to air from cooling tower		2016	2034
7248-1	Bridge for pedestrian access and utilities over Kahouri tributary		2016	2034
7249-1	Bridge for vehicle access over Kahouri Stream		2016	2034
7250-1	Bridge for pedestrian access and utilities over Kahouri Stream		2016	2034
7605-1	Stormwater discharge structure		2016	2028
7653-1	Stormwater discharge structure		2016	2028
7785-1*	Discharge construction contaminants to Piakau/Kahouri Streams		2016	2028
7786-1*	Discharge contaminants to air from construction		2016	2028

* Consents not yet exercised

Consents **4454** to **4462** and **4804** were granted in 1994 and 1995 to provide for the operation of the existing Taranaki Combined Cycle (TCC1) Power Plant, and consents **5063** and **5633** were issued after that plant was commissioned to provide for minor changes in its operation.

Consents **5846** to **5852** were granted in 2001 to provide for the operation of a second, 500 MW combined-cycle power plant (TCC2), in combination with the existing plant (TCC1). The proposed second station has not been constructed. A variation to change the date of the lapse of the consents if the consents are not exercised, to 6 December 2017, was granted in February 2007. Consent **5848** is exercised, in relation to the existing plant.

Consents **7247** to **7250** were granted in March 2008 to provide for the operation of two 100 MW high efficiency open-cycle gas turbine generators, together known as Stratford Peaker Plant (SP1), in combination with the existing plant. Consents **7605** and **7653** were issued in 2010 while the plant was being constructed to provide for minor changes in its design.

Consents **3939** and **4022**, that provided for the disused original Stratford Gas Turbine Plant (SGT), and consents **4455**, **4458**, **4462**, **5847**, **5848** and **5850** were changed in March 2008 to provide for the Peaker Plant. (Construction of the Peaker Plant commenced in December 2008, following demolition of the old plant. It became fully operational in May 2011).

Consents **4459**, **4460**, **4461**, **4804**, **5063**, **5846**, **5849** and **5852** were changed in March 2012 to provide for the development and operation of a second peaker plant (SP2), with up to two 200 MW generators, as an alternative to a second combined cycle plant. Consents **7785** and **7786** were granted to provide for construction activities.

2.2.1 Water abstraction permits

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

Contact Energy Limited holds two consents for the abstraction and use of water in relation to SPS.

Water Permit **4455-1** allows the take and use of up to 19,440 cubic metres/day (225 litres/second averaged over 15 minutes) of water on a continuous basis from the Patea River for use of power stations. This permit was originally issued by the Council on 25 May 1994 under Section 87(d) of the RMA, with change to consent conditions on 7 December 2001 and 6 March 2008. It is due to expire on 1 June 2028.

Condition 1 requires the consent holder to install and operate a recording device for water abstraction rates and to provide the records to the Council.

Conditions 2, 3 and 4 address abstraction during low flow conditions.

Condition 5 sets out review provisions.

Water permit **5847-1** allows the Company to take and use up to 19,440 cubic metres/day (225 litres/second averaged over 15 minutes) of water from a water intake structure in the Patea River for cooling and power station purposes. This permit was issued by the Council on 27 November 2001 as a resource consent under Section 87 (d) of the RMA, with changes to consent conditions on 6 March 2008. The consent expires on 1 June 2034. To date, this consent has not been exercised.

This permit applies to a different abstraction site from that which is covered by Permit **4455**. Contact Energy Limited proposes that when the TCC2 or SP2 station is built, generally water would be drawn from the new site to service the demand of both stations. However, as flows in the Patea decrease, there would be both a reduction in the total draw-off allowed, and a gradual substitution of supply from the existing site over the new site.

Condition 1 requires a measuring device for recording rates of abstraction.

Conditions 2 and 3 set out the abstraction regime under various levels of flow in the Patea River.

Condition 4 sets out an agreed donation towards habitat enhancement within the Patea catchment.

Conditions 5 and 6 deal with lapse and review provisions.

2.2.2 Water discharge permits

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

Used water, mainly cooling water

Stratford Power Limited previously held water discharge permit **4457-1** to cover the discharge of up to 2,770 m³/day (32 litres/second) of used water, mainly blow down water from the cooling system, and up to 5 m³/day (0.12 litres/second) of treated domestic effluent, into the Patea River. This permit was issued by the Council on 25 May 1994 under Section 87(e) of the RMA, and was due to expire on 1 June 2028.

This consent was surrendered on 21 October 2002.

Contact Energy holds water discharge permit **5848-1** to discharge up to 6,740 cubic metres/day (78 litres/second) of used water, mainly blowdown water from the cooling system of power stations, into the Patea River. This permit was issued by the Council on 27 November 2001 under Section 87(e) of the RMA, with changes to the consent granted on 6 March 2008. It is due to expire on 1 June 2034.

Conditions 1 and 2 detail requirements for an effluent disposal management plan, and address subsequent compliance with and revision of the plan.

Conditions 3, 4 and 5 deal with water treatment and cleaning chemicals.

Condition 6 requires a contingency plan in case of accidental discharge or spillage.

Condition 7 establishes a mixing zone beyond which a number of effects are prohibited, and condition 8 addresses fish passage within that zone.

Conditions 9, 10 and 11 relate to control and monitoring of temperature in the mixing zone.

Conditions 12 and 13 impose limits on concentrations of effluent components in the discharge and receiving water.

The last two conditions relate to lapse and review of the consent.

Stormwater

Contact Energy Limited holds two consents in relation to discharge of stormwater at SPS.

Water discharge permit **3939-2** covers the discharge of up to 454 litres/second of stormwater from the Stratford Power Station Peaking Plant into an unnamed tributary of the Kahouri Stream and into the Kahouri Stream in the Patea catchment. This permit was issued by the Council on 10 November 1997 under Section 87(e) of the RMA. It is due to expire on 1 June 2016.

Condition 1 establishes a mixing zone and controls effects of the discharge on the appearance, odour, water quality and biology of the river.

Condition 2 imposes limits on significant potential contaminants in the discharge.

Condition 3 requires the consent to be exercised in accordance with documentation submitted.

Condition 4 is a review provision.

Water discharge permit **4459-1** covers the discharge of stormwater from a nine-hectare power station site into an unnamed tributary of the Piakau Stream and into the Kahouri Stream; both are tributaries of the Patea River. This permit was issued by the Council on 29 May 1994 under Section 87(e) of the RMA with changes to the consent granted on 6 September 2001 and 23 March 2012. It is due to expire on 1 June 2034.

Condition 1 relates to plans of the stormwater system when it is upgraded.

Condition 2, inserted in March 2012, restricts the stormwater catchment area.

Condition 3 imposes limits on significant potential contaminants in the discharge.

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

Condition 5 establishes a mixing zone, and controls effects of the discharge on the appearance, odour, water quality, and biology of the river.

Condition 6 is a review provision.

Sediment at water intakes

Contact Energy holds two consents in relation to the cleaning of water intake structures.

Water discharge permit **5633-1**, to discharge fine sediment and organic matter from water intake structure screens to the Patea River, was issued by the Council on 24 May 2000 under Section 87(e) of the RMA. It is due to expire on 1 June 2028.

Condition 1 requires that the discharge licensed by the consent takes place in accordance with the documentation provided with the application. The second condition sets out environmental performance requirements in terms of unacceptable effects upon the Patea River, while the third condition is a review condition.

Water discharge permit **5851-1**, to discharge fine sediment and organic matter from water intake structure screens to the Patea River, was issued by Council on 7 December 2001 under Section 87(e) of the RMA, with variations to conditions on 22 February 2007. To date this consent has not been exercised. The consent expires on 1 June 2034.

Condition 1 requires that the discharge licensed by the consent take place in accordance with the documentation provided with application.

Condition 2 sets out environmental performance requirements in terms of unacceptable effects upon the Patea River.

Conditions 3 and 4 deal with lapse and review of the consent.

Construction contaminants

Contact Energy holds water discharge permit **7785-1** to discharge stormwater, sediment, dewatering water and washdown water into an unnamed tributary of the Piakau Stream and the Kahouri Stream from earthworks associated with the construction activities of a power station. This permit was issued by the Council on 23 March 2012 under Section 87(e) of the RMA. The consent has not been exercised. It is due to expire on 1 June 2028.

Conditions 1 and 2 require the provision of and adherence to an erosion and sediment control plan. Condition 3 relates to notification of works.

Conditions 4 to 6 deal with sediment control measures and stabilisation of earthworks areas.

Condition 7 requires use of the best practicable option.

Condition 8 and 9 are lapse and review provisions.

2.2.3 Air discharge permits

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

Contact Energy Limited holds five discharge permits in relation to discharges to air at SPS.

2.2.3.1 Taranaki Combined Cycle 1 (TCC 1 - operating)

Air discharge permit **4454-1** covers the discharge of contaminants to air from a combined cycle power station and ancillary plant [‘the station’] located adjacent to East Road approximately three kilometres east of the town of Stratford.

The application relating to discharge to air was called in by the Minister for the Environment under Section 140 of the RMA, and the permit was issued by the Minister on 23 March 1995 (operative on 15 August 1995) as a resource consent under Section 87(e) of the RMA. A variation was granted by Hearing Committee on 12 June 2003 to delete (original) conditions 4 to 10 relating to the mitigation of CO₂ emissions. A change to condition 12 was granted on 9 February 2010 to increase the period when emission standards relating to start-up apply. The consent is due to expire on 14 August 2029.

Conditions 1, 2 and 3 are general, covering supply of information on exercise of consent, monitoring costs and administrative charges.

Conditions 4, 5 and 6 require the adoption of the best practicable option for controlling effects of discharges on the environment, and provide for the supply of relevant information on and for the review of measures representing the best practicable option.

Condition 7 requires consultation with Council before any significant changes on the site.

Condition 8 requires Contact Energy Limited to provide reports within two years of, and then again at 4 years after, commencement of commissioning, and then at six-year intervals. The report(s) are to review technological advances in the reduction or mitigation of emissions, provide an inventory of emission contaminants, detail measures taken to improve energy efficiency, address issues relating to minimisation or mitigation of emissions, and detail carbon dioxide emissions.

Conditions 9 to 13 impose limits on significant potential contaminants in discharges.

Condition 14 sets a minimum height for discharges from turbines.

Condition 15 prohibits any direct significant adverse ecological effect.

Conditions 16 and 17 place controls on visible effects and droplet drift in relation to the evaporative cooling system.

The last two conditions relate to review and lapse of the consent.

2.2.3.2 Taranaki Combined Cycle 2 or Stratford Peaker 2 (TCC2 or SP2 – yet to be constructed)

Contact Energy holds two consents to discharge emissions to air in relation to a proposed new station adjacent to the existing combined cycle plant (TCC1), one for the development and construction phase, the other for the commissioning and operational phase.

Construction

Air discharge permit **7786-1** covers the discharge of contaminants (dust) to air from earthworks associated with the construction activities of a power station. This permit was issued by the Council on 23 March 2012 under Section 87(e) of the RMA. The consent has not been exercised. It is due to expire on 1 June 2028.

Condition 1 limits the earthworks area.

Conditions 2 and 3 require the provision of and adherence to a dust control management plan. Condition 4 relates to notification of works.

Condition 5 requires the adoption of the best practicable option.

Condition 6 controls levels of dust in air from the site beyond the property boundary.

Conditions 7 to 9 address complaints.

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

Operation

Air discharge permit **5846-1** covers the discharge of contaminants to air from power station unit(s) and ancillary plant located adjacent to State Highway 43 (East Road) approximately three kilometres east of Stratford.

This consent relates to a power station to be constructed adjacent to the existing TCC1 plant. The Council granted the permit after a hearing on 14 November 2001. The permit was subsequently appealed by two parties to the Environment Court. The appeal was subsequently dismissed by the Environment Court. The consent was issued on 6 September 2002 to provide for a second combined-cycle station (TCC2). A variation that broadened the purpose and conditions of the consent and allowed minor amendments, to provide for an alternative open-cycle (SP2) power plant, was granted on 23 March 2012. The consent has not been exercised. The consent expires on 1 June 2034.

Condition 1, inserted in March 2012, stipulates the use of gas fuel only. Conditions 2, 3 and 4 require the adoption of the best practicable option for controlling effects of discharges on the environment, and provide for the supply of relevant information on and for the review of measures representing the best practicable option.

Condition 5 requires consultation with Council before any significant changes on the site.

Condition 6 requires Contact Energy to provide reports within two years of, then again at 4 years after, commencement of commissioning, and then at six-year intervals. The report(s) are to review technological advances in the reduction or mitigation of emissions, provide an inventory of emission contaminants, detail measures taken to improve energy efficiency, address issues relating to minimisation or mitigation of emissions, and detail carbon dioxide emissions.

Conditions 7 to 11 impose limits on significant potential contaminants in discharges.

Condition 12 sets a minimum height for discharges from turbines.

Condition 13 prohibits any direct significant adverse ecological effect.

Conditions 14 and 15 place controls on visible effects and droplet drift in relation to the evaporative cooling system.

The last three conditions relate to review and lapse of the consent.

2.2.3.3 Stratford Peaker Plant (SP1)

Air discharge permit **4022-2** covers the discharge of emissions into the air from fuel combustion and other related activities associated with the operation of the Stratford Power Station and ancillary plant. This permit was originally issued by the Council on 14 December 1994 under Section 87(e) of the RMA, with changes to consent conditions on 6 March 2008 and 9 February 2010. It is due to expire on 1 June 2022.

Condition 1 requires the adoption of the best practicable option for controlling effects of discharges on the environment.

Condition 2 requires consultation with Council before any significant changes on the site.

Condition 3 requires Contact Energy to provide reports within two years of granting of the consent, and at six-year intervals thereafter. The report(s) are to review technological advances in the reduction or mitigation of emissions, provide an inventory of emission contaminants, detail measures taken to improve energy efficiency, address issues relating to minimisation or mitigation of emissions, and detail carbon dioxide emissions.

Conditions 4 to 18 impose limits on significant potential contaminants in discharges.

Condition 9 sets a minimum height for discharges from turbines.

Condition 10 prohibits any direct significant adverse ecological effect.

Condition 11 relates to review of the consent.

Air discharge permit **7247-1** covers the discharge of emissions to air from the operation of the cooling tower associated with the Stratford Peaker Power Plant. This permit was issued by the Council on 6 March 2008 under Section 87(e) of the RMA. It is due to expire on 1 June 2034.

Conditions 1 and 4 require the adoption of the best practicable option for controlling effects of discharges on the environment, and that processes be operated to minimise discharges.

Condition 2 requires that the cooling tower described in the consent application be installed.

Condition 3 deals with notification of works.

Conditions 5 and 6 address visible plumes and droplet drift.

Condition 7 requires consultation of significant changes in the plant.

Condition 8 deals with cooling water treatment.

Condition 9 prohibits the causing of offensive odour beyond the site boundary.

Condition 10 prohibits adverse ecological effects.

Conditions 11 and 12 relate to lapse and review of consent.

2.2.4 Discharge of waste to land

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

Contact Energy Limited holds land discharge permit **5063-1** to discharge up to 5 cubic metre/day of domestic septic tank effluent through a soakage field onto and into land in the vicinity of the Kahouri Stream in the Patea Catchment. This permit was issued by the Council on 6 December 1996 as a resource consent under Section 87(e) of the RMA, with changes to conditions on 6 September 2001 and 23 March 2012. The consent expires on 1 June 2028.

Condition 1 requires the septic tank and soakage system to be installed as described in the documentation provided with the application.

Condition 2 prohibits any direct discharge to a waterbody, while Condition 3 is a review condition.

2.2.5 Land use consents

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

Contact Energy Limited holds 14 land use consents for structures on streams in relation to SPS.

Land use consent **4456-1**, to erect, place, use and maintain an intake structure in and on the bed of the Patea River, was issued by the Council on 25 May 1994 as a resource consent under Section 87(a) of the RMA, with a change to consent conditions on 20 January 2000. The consent expires on 1 June 2028.

Conditions 1 and 2 require the provisions of plans and details of the structure and that the consent holder constructs and maintains the structure according to the approved plan.

Condition 3 requires that the structure not obstruct fish passage.

Conditions 4 and 5 relate to notification and timing of maintenance works.

Condition 6 requires that the best practicable option be used to prevent adverse effects on water quality.

Condition 7 requires that the area of river bed disturbance be minimised.

Condition 8 relates to removal of the structure.

Condition 9 is a review condition.

Land use consent **4458-1**, to erect, place, use and maintain a diffuser structure in and above the bed of the Patea River for the purpose of discharging used water from power stations, was issued by the Council on 25 May 1994 as a resource consent under Section 87(a) of the RMA, with a change to consent conditions on 28 November 2001. The consent expires on 1 June 2028.

Consent **4458** has essentially the same nine conditions as those imposed on consent **4456** (above).

Land use permit **4460-1** to erect, place, use and maintain in and above the beds of an unnamed tributary of the Piakau Stream and of the Kahouri Stream, both tributaries of the Patea River, structures for the purpose of discharging stormwater from a power station site, was issued by Council on 25 May 1994 as a resource consent under section 87(a) of the RMA with a change on 23 March 2012. The consent expires on 1 June 2028.

Consent **4460** has essentially the same nine conditions as those imposed on consent **4456** (above).

Land use consent **4461-1** to erect, place, use and maintain in, over and under the bed of the Kahouri Stream (a tributary of the Patea River), within the site and adjacent land immediately to the southeast a bridge, pipelines, cables and associated utilities for a power station site, was issued by the Council on 25 May 1994 as a resource consent under section 87(a) of the RMA. The consent expires on 1 June 2028.

Consent **4461** has essentially the same nine conditions as those imposed on consent **4458** (above).

Land use consent **4462-1** to erect, place, use and maintain water pipelines and associated control cables above, through or below the beds of the Toko Stream and various small unnamed streams, for the purpose of water transmission from the Patea River to power stations, was issued by the Council on 25 May 1994 as a resource consent under section 87(a) of the Resource Management Act. The consent expires on 1 June 2028.

Consent **4462** has essentially the same nine conditions as those imposed on consent **4458** (above).

Land use consent **4804-1** to erect, place use and maintain over the bed of an unnamed tributary of the Kahouri Stream in the Patea catchment a bridge structure to convey high voltage electricity cables and associated communication cables for a power station site, was issued by the Council on 25 May 1994 as a resource consent under section 87(a) of the RMA with a change on 23 March 2012. The consent expires on 1 June 2028.

Consent **4804** has essentially the same nine conditions as those imposed on consent **4458** (above), with the omission of the condition on fish passage.

Land use consent **5849-1** to erect, place use and maintain gas pipelines and associated utilities, under the bed, and including disturbance for installation by trenching of the bed, of the Kahouri Stream in the Patea catchment, for combined cycle power station purposes, was issued by the Council on 27 November 2001 as a resource consent under section 87(a) of the RMA, with changes on 22 February 2007 and 23 March 2012. To date this consent has not been exercised. The consent expires on 1 June 2034.

Conditions 1 and 2 require the provision of plans and details of the structure and that the consent holder constructs and maintains the structure according to the approved plan.

Conditions 3, 4 and 5 control the construction of the structures, addressing effects on the watercourse, and notification and timing.

Condition 6 requires that the structure not obstruct the passage of fish.

Conditions 7 and 8 relate to lapse and review of the consent.

Land use consent **5850-1**, to erect, place use and maintain an intake structure and ancillary pipework and pumps in and on the bed, and including disturbance associated with construction of the bed, of the Patea River, for the purpose of taking water for power stations, was issued by Council on 27 November 2001 as a resource

consent under section 87(a) of the RMA, with a change to conditions on 6 March 2008. To date this consent has not been exercised. The consent expires on 1 June 2034.

Consent **5850** has essentially the same eight conditions as those imposed on consent **5849** (above), with the omission of a condition on fish passage, and the addition of a condition dealing with removal and reinstatement.

Land use consent **5852-1** to erect, place use and maintain a bridge, cables including high voltage electricity cables and associated utilities over the Kahouri Stream in the Patea catchment for combined cycle power station purposes, was issued by the Council on 6 December 2001 as resource consent under section 87(a) of the RMA with change on 23 March 2012. To date this consent has not been exercised. The consent expires on 1 June 2034.

Consent **5852** has essentially the same eight conditions as those imposed on consent **5850** (above).

Land use consent **7248-1**, to erect, place, use and maintain a bridge over an unnamed tributary of the Kahouri Stream for pedestrian access and carriage of water pipes, high voltage cables, control cables and associates utilities, was issued by Council on 6 March 2008 as resource consent under section 87(a) of the RMA. To date this consent has not been exercised. The consent expires on 1 June 2034.

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

Condition 2 requires plans of the bridge.

Condition 3 relates to notification.

Conditions 4, 5 and 6 relate to control and mitigation of sediment, riverbed disturbance, removal of the structure and reinstatement.

Conditions 7 and 8 address lapse and review of consent.

Land use consent **7249-1**, to erect, place use and maintain a bridge over the Kahouri Stream for vehicle access purposes, was issued by Council on 6 March 2008 as a resource consent under section 87(a) of the RMA. To date this consent has not been exercised. The consent expires on 1 June 2034.

Consent **7249** has essentially the same eight conditions as those imposed on consent **7248** (above).

Land use consent **7250-1**, to erect, place use and maintain a bridge over the Kahouri Stream for pedestrian access and carriage of water pipes, high voltage cables, control cables and associates utilities, was issued by Council on 6 March 2008 as a resource consent under section 87(a) of the RMA. The consent expires on 1 June 2034.

Consent **7250** has essentially the same eight conditions as those imposed on consent **7248** (above).

Land use consent **7605-1**, to construct, place and maintain a stormwater outlet structure in the Kahouri Stream was issued by Council on 23 February 2010 as a resource consent under section 87(a) of the RMA. The consent expires on 1 June 2028.

Consent **7605** has seven conditions which are essentially the same as those imposed on consent **7248** (above), with the omission of a condition on provision of plans.

Land use consent **7653-1**, to construct, place and maintain a stormwater outlet structure in the Kahouri Stream was issued by Council on 21 June 2010 as a resource consent under section 87(a) of the RMA. The consent expires on 1 June 2028.

Consent **7653** has eight conditions which are essentially the same as those imposed on consent **7605** with the addition of a condition dealing with timing of works.

2.3 Monitoring programme

2.3.1 Introduction

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

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

The monitoring programme for the Stratford Power Station site consisted of five primary components.

2.3.2 Programme liaison and management

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

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

2.3.3 Site inspections

The Contact Energy site was visited four 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.

2.3.4 Chemical sampling

The Council undertook sampling both of the discharges from the site and of the water quality upstream and downstream of the discharge point and mixing zone (Figure 1).

The used water discharge was sampled on three occasions, and the samples analysed for temperature, pH, suspended solids, oil and grease, free and total chlorine, ammonia, dissolved reactive phosphorus, turbidity and conductivity.

Two sites on the Patea River were sampled on three occasions, and the samples analysed for temperature, pH, suspended solids, ammonia, dissolved reactive phosphorus, turbidity and conductivity.

2.3.5 Biomonitoring surveys

A biological survey was performed on two occasions in the Patea River to determine whether or not the discharge of used water, mainly cooling water, from the site has had a detrimental effect upon the communities of the streams. The Kahouri Stream was surveyed once to assess the effect of stormwater discharges.

2.3.6 Review of data and reports

The consent holder submitted water discharge and emission data on a monthly basis to the Council for review.

2.4 Results - Water

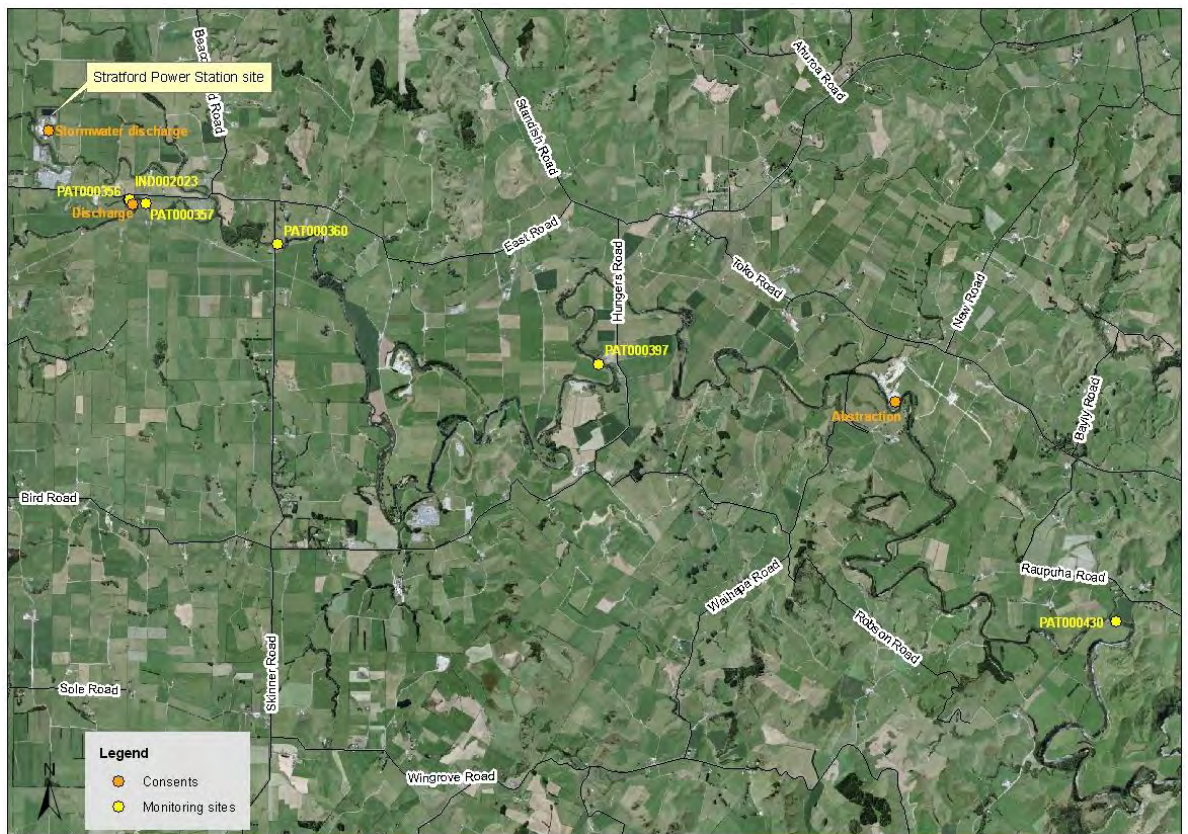


Figure 1 Physico-chemical and biological sampling sites, discharge sites and abstraction site

2.4.1 Inspections – Combined Cycle Plant and Peaker Plant

At the combined-cycle plant and peaker plant site, inspection is made of areas where wastewater is generated, treated and monitored, and where chemicals and fuel/oil are stored, transferred and dispensed. The stormwater system is also included. The laboratory and the control room are visited to view and discuss recent monitoring results.

At the Patea River, the abstraction works at Vickers Quarry and the discharge structure beside East Road are inspected.

Inspections specifically address the operation of the water abstraction system, the raw water treatment plants, the cooling water systems, and the wastewater treatment systems (pH neutralisation, oil separation, holding ponds and monitoring stations). The maintenance of areas that are bunded to contain spillage (e.g. around chemical and oil storage/use, transformers, electrical batteries), and the stormwater drainage system, are given particular attention.

Four site visits were carried out during the 2014-2015 monitoring period. Routine inspections took place on 27 August and 25 November 2014, and 16 February and 29 June 2015.

In general, the site was found to be in tidy condition. Staff of Contact Energy were found to have a good knowledge of the environmental aspects of running the plant,

and to have proper training in dealing with contingency events that have potential for causing adverse environmental effects.

In addition, a liaison meeting was held on 1 July 2014 at the SPS between Council staff and new Contact Energy staff involved in consent compliance monitoring.

2.4.2 Results of abstraction monitoring

Abstractions are regulated by consent **4455**. Contact Energy also holds consent **5847** relating to water abstraction for the proposed power station. Contact Energy operates a continuous monitoring system to measure the abstraction rate at two points, at the river intake and at the inlet to the raw water pond that provides for both power plants. The record is based on 5-minute average flows, rather than instantaneous values, to avoid short-term 'spikes' that are caused when the pumps are reversed into backwash mode or are restarted, giving rise to transient water surges in the pipelines which may represent breaches of the abstraction consent. Data are forwarded to the Council on a monthly basis for audit.

The consent limit is 225 litres/second when river flows at Skinner Road are above 765 litres/second, ramping down to 150 litres/second when river flows at Skinner Road are at or below 690 litres/second.

The abstraction pumps are governed so that they cannot exceed a rate of 225 litres/second. During 2014-2015, the maximum intake flow recorded was 188 litres/second, with an average flow rate of 28 litres/second. The total volume abstracted was 887,750 m³. This was a further decrease of around 5%, or 120 m³/day, from the previous year's abstraction volume (which decreased by 46%), which can be attributed to a combination of further reduction in operation of the combined-cycle plant.

The abstraction consent requires the plant to reduce its abstraction to less than 150 litres/second when river flows drop below 690 litres/second at Skinner Road. Abstraction rate exceeded 150 litres/second on one day, 31 December 2014. During the monitoring period, the Patea River flow dropped below 690 litres/second on a total of 16 days, 18 to 24 February and 24 February to 6 March 2015. The lowest instantaneous flow occurred on 6 March at 1000 NZST, with a value of 400 litres/second. This was the lowest instantaneous flow recorded since the hydrometric site was established on 27 February 1978. The previous lowest recorded flow was 406 litres/second, for 16 February 1982.

Patea River flows measured at Skinner Road are shown in Figure 2.

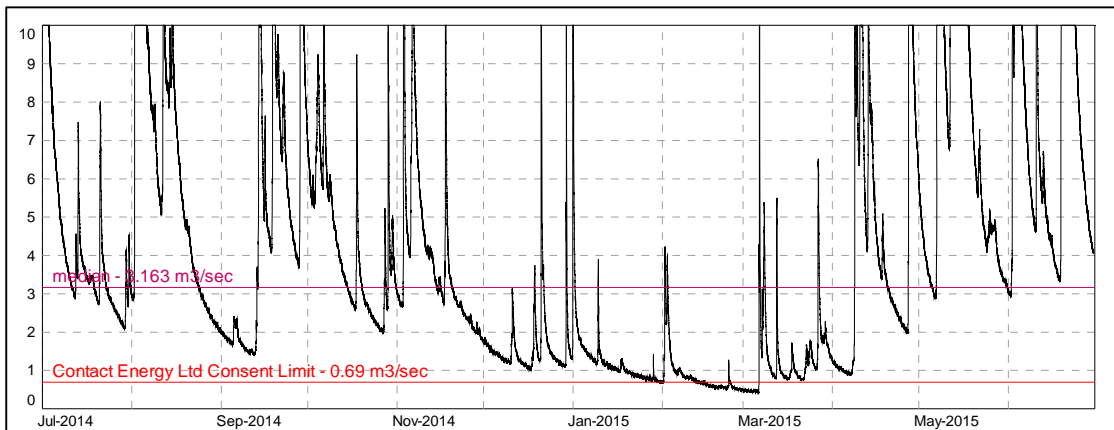


Figure 2 Patea River flow at Skinner Road (m^3/s), July 2014 – June 2015

The data in Table 2 below on abstraction rates are as presented by Contact Energy to the Council.

Table 2 Monthly abstraction data July 2014 to June 2015

Month	Ave L/s	Max L/s
July	13	111
August	4	87
September	24	108
October	46	116
November	62	130
December	31	188
January	45	95
February	43	128
March	30	125
April	27	97
May	11	92
June	4	107

2.4.3 Results of discharge monitoring

Consent 5848 covers the discharge of used waters (mainly blowdown water from the cooling system of TCC1 and water treatment plant of SP1) to the Patea River. The Company continuously monitors pH, chlorine, temperature (effluent and receiving water), and flow of effluent from both plants. It also conducts twice-daily checking of the on-line monitoring devices, and daily sampling and analysis of 'grab' samples. The Council samples the discharge from both plants into the Patea River quarterly, splitting the samples with Contact Energy for inter-laboratory comparison. Sampling times are chosen by Council staff to cover the 'worst case' circumstances, relating to the daily dosing of cooling water with chlorine for biological control, and to flow of the receiving water. The Council analyses the samples to determine compliance with consent conditions on effluent composition (pH and chlorine) and nutrient minimisation (phosphorus), to assess the amount of ammonia discharged (in relation

to the receiving water limit), and to monitor for any change in general effluent quality parameters (conductivity, turbidity and suspended solids).

Consent 4459 covers the discharge of stormwater to the Kahouri Stream from a holding pond that serves both plants. Before 2011, there were few discharges from the pond, as nearly all stormwater was transferred to the raw water pond. With enlargement of the catchment created by construction of the peaker plant, discharge frequency increased. Also, changes in the Company's generation strategy, whereby TCC1 is shut down for longer periods, has led to a need to refresh the raw water pond at times, through overflow back to the Patea River via the stormwater pond and Kahouri Stream. The stormwater is monitored by the Company for compliance with the limits on pH range, suspended solids and oil and grease.

2.4.3.1 Results of monitoring by Contact Energy

The data in Table 3 and Table 4 are from the monthly summaries forwarded to the Council by Contact Energy relating to its monitoring of the Patea River discharge by continuous analysers and by testing of grab samples.

Table 3 Monitoring of TCC1 plant effluent by Contact Energy Limited July 2014 to June 2015

Month	Flow L/s		pH		Total Cl ₂ g/m ³		Temp °C	
	Max	Avg	Min	Max	Max	Avg	Max	Avg
Jul-14	42.7	10.8	6.9	7.8	0.04	<0.01	19.2	16.6
Aug-14	44.1	13.5	7.3	8.5	0.07	<0.01	13.0	12.0
Sep-14	45.7	23.0	7.3	8.9	0.07	0.01	15.8	14.0
Oct-14	45.2	18.5	6.9	8.2	0.75	0.01	23.2	18.8
Nov-14	46.8	17.3	6.3	8.0	0.91	0.01	24.8	21.3
Dec-14	50.7	23.6	7.1	8.9	0.83	<0.01	24.7	20.0
Jan-15	54.4	33.0	7.3	9.0	0.83	<0.01	26.1	22.2
Feb-15	47.1	31.6	7.1	8.9	0.01	<0.01	23.7	20.6
Mar-15	45.8	25.0	7.2	8.3	0.45	<0.01	23.9	18.8
Apr-15	47.7	26.6	6.7	8.8	0.25	0.01	18.1	16.4
May-15	50.4	15.9	6.1	8.9	0.05	<0.01	16.7	14.1
Jun-15	36.1	13.0	7.4	8.6	0.03	<0.01	14.2	12.7
Limit	78		6.0	9.0	0.05			

Table 4 Monitoring of SP1 effluent by Contact Energy Limited July 2014 to June 2015

Month	Flow L/s		pH		Total Cl ₂ g/m ³		Temp °C	
	Max	Avg	Min	Max	Max	Avg	Max	Avg
Jul-14	42.7	10.8	6.9	7.7	0.67	<0.01	15.9	11.0
Aug-14	44.1	13.5	6.5	7.7	0.07	0.02	16.4	12.1
Sep-14	45.7	23.0	6.2	7.6	0.06	0.01	18.0	14.0
Oct-14	45.2	18.5	6.7	7.7	0.27	0.01	20.2	16.8
Nov-14	46.8	17.3	6.7	7.8	1.18	0.01	23.0	17.5
Dec-14	50.7	23.6	6.7	8.5	1.18	0.01	25.7	22.5
Jan-15	54.4	33.0	6.7	7.9	0.50	0.01	27.7	24.9
Feb-15	47.1	31.6	6.5	7.6	0.49	0.01	26.5	23.4
Mar-15	45.8	25.0	6.5	7.9	1.18	0.01	26.6	21.4
Apr-15	47.7	26.6	6.5	7.7	0.71	0.01	21.9	19.0
May-15	50.4	15.9	6.6	8.1	0.18	0.01	19.6	15.8
Jun-15	36.1	13.0	6.7	7.6	0.87	0.01	17.3	12.2
Limit	78		6.0	9.0	0.05			

Flow

The discharge flow remained within the consent limit of 78 litres/second throughout the 2014-2015 period.

In 2014-2015, the combined average discharge flow for TCC1 and SP1 was 21 litres/second, and the maximum recorded discharge flow was 54.4 litres/second. The total volume of wastewater discharged for the year was 543,611 m³, an increase of about 30% from the previous year which related to less evaporative cooling from operation of TCC1.

pH

The discharge pH remained within the consent range limit of 6.0 to 9.0 throughout the monitoring period.

For TCC1, the minimum pH was 6.1, and the maximum 9.0. While for SP1, the minimum recorded pH was 6.2, and the maximum 8.5.

Each time the continuous pH monitor reading exceeds the consent range limit, the wastewater discharge valve at the relevant operations pit on the site automatically closes immediately (within one minute), ensuring discharge of off-specification wastewater to the river does not occur. The limits on when the discharge valve closes are set so that the valve activates outside the pH range 6.1 to 8.9.

Chlorine

The average value for chlorine at the combined-cycle plant was <0.01 mg/kg, and the maximum value was 0.91 mg/kg. The wastewater discharge valve was shut whenever the limit was exceeded; therefore compliance with consent conditions was achieved.

For the peaker plant, the average value for chlorine was 0.01 mg/kg, with a maximum of 1.18 mg/kg.

High chlorine values were recorded on several occasions while the waste water discharge valves were closing. These high values occur due to low sample volume,

which occurs when the circulation pump has been stopped as a result of a low water level in the waste water pit. When the high chlorine values are recorded, the control system is in the process of closing the outlet valve to prohibit discharge, thus keeping the discharge within consent limits.

Temperature

The river temperature during the monitoring period remained below 25°C, allowing for continuous discharge. River temperature differentials remained within consent limits throughout the monitoring period. The maximum temperature differential recorded was 1.68°C.

Stormwater

Contact Energy reported that discharges of stormwater to Kahouri Stream due to high rainfall occurred on 33 occasions. Full compliance with the limits on pH range (6-9), suspended solids (100 g/m³) and oil and grease (15 g/m³) was reported.

2.4.3.2 Results of Council monitoring

The results of Council monitoring of effluent from the combined-cycle and peaker plants in 2014-2015 are presented in Table 5. Also presented are the corresponding results from continuous effluent monitoring by Contact Energy, and of grab samples taken by Contact Energy for inter-laboratory comparison.

Compliance monitoring

Consent 5848 places limits on the pH range and the total residual chlorine concentration in the effluent. On the basis of laboratory test results, compliance with consent conditions on pH and total residual chlorine in the effluent was achieved.

Comparison exercises

Comparisons are carried out between the Council and the Contact Energy laboratories on pH and free residual and total chlorine. The continuous temperature meter was checked with a field meter. Overall there was a good agreement on monitoring results.

Table 5 Results of effluent monitoring by Council, compared to Contact Energy results for temperature, pH and chlorine

	Time NZST	Flow L/s	Temp C		pH		Free Cl ₂ g/m ³	Total Cl ₂ g/m ³		Condy @ 20°C mS/m	Turbidity NTU	SS g/m ³	Oil g/m ³	Amm g/m ³	DRP g/m ³
			TRC	CE meter	TRC	CE meter	TRC	TRC	CE meter						
TCC1*															
25-Nov-14	1230	20.2	-	23.2	7.1	7.2	<0.01	<0.01	0.01	94.3	2.2	6	<0.5	0.054	0.070
SP1															
25-Nov-14	1220	9.3	-	20.8	7.1	7.2	<0.01	0.02	0.02	29.1	1.6	14	<0.5	0.058	0.156
16-Feb-15	1100	15.9	21.6	21.0	7.2	7.3	<0.01	0.01	<0.01	37.0	2.3	30	<0.5	0.038	0.36
18-Jun-15	1040	23.0	12.8	-	7.3	7.1	<0.01	<0.01	<0.01	34.7	3.1	27	<0.5	0.069	0.66
Limit		78			6.0 - 9.0			0.05							

* TCC1 was shut down between 24 December 2014 – 30 June 2015 and therefore discharge was not able to be sampled

CE meter = Contact Energy on-line meter

Free Cl₂ = free chlorine

Total Cl₂ = total chlorine

Cond = conductivity at 20C

DRP = dissolved reactive phosphorus

Amm = ammonia

Oil = oil and grease

SS = suspended solids

Temp = temperature

Turb = turbidity

2.4.4 Results of receiving environment monitoring

2.4.4.1 Biomonitoring

Biomonitoring was conducted in the Patea River on 25 November 2014, and 10 February 2015, and in the Kahouri Stream on 7 April 2015. The full reports are given in Appendix IV. These surveys relate to the exercise of two consents.

Consent **5848-1** allows the discharge of cooling water into the Patea River approximately 1 km upstream of its confluence with the Kahouri Stream. The discharge may be elevated in temperature and may contain nutrients and other contaminants. Consent **4459-1** allows the discharge of stormwater into the Kahouri Stream, approximately 3 km upstream of its confluence with the Patea River. Condition 7 (v) and (vi) of consent **5848-1** and condition 4 (e) and (f) on consent **4459-1** specify that, beyond the mixing zone, the discharge shall not cause any significant adverse effects on aquatic life, habitats, or ecology nor any undesirable biological growths.

The Council's standard 'kick-sampling' technique was used at five established sites to collect streambed macroinvertebrates from the Patea River. Three of the sites are in the immediate vicinity of the discharge point, the other two further downstream below the abstraction point. Samples were processed to provide number of taxa (richness), MCI and SQMCI_s scores, and EPT taxa for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI_s takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities. It may be the more appropriate index if non-organic impacts are occurring.

Significant differences in either MCI or the SQMCI_s between sites indicate the degree of adverse effects (if any) of the discharge being monitored.

The conclusions of the three surveys in the two catchments are presented below.

2.4.4.1.1 Patea River

25 November 2014

This late spring macroinvertebrate survey undertaken following periods of power station peaker plant discharges, indicated that recent discharges of treated cooling water from the Contact Energy site had not had any significant detrimental effect on the macroinvertebrate communities of the river. No significant changes in the macroinvertebrate communities structures were recorded between the upstream 'control' site and site immediately downstream of the discharge

The macroinvertebrate communities in the reach of the Patea River adjacent to the discharge contained moderately high proportions of 'sensitive' taxa at both sites (typical of spring flow conditions) whereas the communities further downstream (below the Kahouri Stream confluence) atypically were dominated by only slightly higher numbers of 'tolerant' taxa. Taxonomic richnesses (numbers of taxa) tended to

be insignificantly different at the time of this spring survey and MCI scores slightly higher compared to those of the previous summer 2014 survey.

Biomonitoring at three sites further downstream in the Patea River, for the establishment of baseline conditions in relation to consented power station expansion, found relatively similar community compositions to those monitored in the vicinity of the cooling water discharges with minimal significant changes in individual taxon abundances recorded. Downstream increases in the SQMCI_s values through the reach below the Skinner Road site were atypical of past results. With the exception of the Skinner Road site (3), MCI scores were similar or higher than historical median values at all sites and typical of communities at these distances from the National Park, despite the survey coinciding with moderate periphyton substrate cover following a wet period in early spring. The MCI score at site 4 (Hungers Rd) was higher than the maximum value recorded over the previous twelve-year period of monitoring.

MCI and SQMCI_s scores indicate that the stream communities throughout the entire river reach were of 'fair' to 'good' generic health and generally in the condition predicted for similar sites in other Taranaki ringplain rivers, following a period of moderate flow conditions following a wet early spring.

10 February 2015

This late summer macroinvertebrate survey undertaken following periods of power station peaker plant discharges, indicated that recent discharges of treated cooling water from the Contact Energy site had not had any significant detrimental effect on the macroinvertebrate communities of the river. No significant changes in the macroinvertebrate communities structures were recorded between the upstream 'control' site and site immediately downstream of the discharge

The macroinvertebrate communities in the reach of the Patea River adjacent to the discharge contained equal proportions of 'sensitive' and 'tolerant' taxa at both sites (more typical of summer flow conditions) whereas the communities further downstream (below the Kahouri Stream confluence) typically were dominated by only slightly higher numbers of 'tolerant' taxa. Taxonomic richnesses (numbers of taxa) tended to be insignificantly different at the time of this summer survey and MCI scores slightly lower compared to those of the previous spring 2014 survey.

Biomonitoring at three sites further downstream in the Patea River, for the establishment of baseline conditions in relation to consented power station expansion, found relatively similar community compositions to those monitored in the vicinity of the cooling water discharges with few significant changes in individual taxon abundances recorded. Downstream increases in the SQMCI_s values through the reach below the Skinner Road site were atypical of past results. With the exception of the Skinner Road site (3), MCI scores were slightly lower than historical median values at all sites but typical of communities at these distances from the National Park, despite the survey coinciding with relatively extensive periphyton substrate cover following a dry period in mid to late summer.

MCI and SQMCI_s scores indicated that the stream communities throughout the entire river reach were mainly of 'fair' generic health and generally in the condition

predicted for similar sites in other Taranaki ringplain rivers, following a period of very low flow conditions during a dry mid to late summer period.

2.4.4.1.2 Kahouri Stream

7 April 2015

This late summer macroinvertebrate survey indicated that the discharge of stormwater from the Contact Energy site had not had any significant detrimental effects on the macroinvertebrate communities of the stream, in comparison between sites, with historical results, and also with predicted MCI scores (for similar sites in ringplain, National Park-sourced streams).

The macroinvertebrate communities of the stream contained a moderately high proportion of 'sensitive' taxa, with some 'highly sensitive' taxa also recorded, one in extreme abundance at both sites. At both sites taxonomic richness (number of taxa) and MCI scores did not differ significantly from the medians of previous surveys although at site 2 the MCI score was the second highest recorded to date. There was also an improvement in the SQMCI₅ score at both sites, as both recorded scores were significantly higher than respective median scores, principally due to the abundance of the 'highly sensitive' mayfly (*Deleatidium*).

MCI and SQMCI₅ scores indicated that the stream communities were of 'good' generic biological health and typical of communities at sites in ring plain streams that are sourced within the National Park. Overall, the results did not indicate any discernible impact from the Contact Energy site discharges of stormwater.

2.4.4.2 Physico-chemical monitoring by Council

Council Officers collected water quality samples from the Patea River on three occasions during 2014-2015 at sites above the discharge point for the cooling and process wastewaters and at the boundary of the mixing zone 75 metres downstream. The results are presented in Table 6. Flow in the river at the recording station downstream at Skinner Road is included for assessment of relative effects of the power station effluent. The Kahouri Stream, a major tributary, joins the river between the discharge point and the recorder station.

Sampling upstream and downstream of the discharge was undertaken in conjunction with inspections on 25 November 2014, 16 February and 18 June 2015. The monitoring on 16 February 2015 coincided with the annual low-flow survey of the discharge from Stratford municipal oxidation ponds.

Table 6 Patea River monitoring

Parameter			25-Nov-14	16-Feb-15	18-Jun-15
Discharge	Units	Site	TCC+SP	SP	SP
Time	NZST	U	1310	1005	1100
		D	1330	1020	1115
Flow	L/s	Skinner Rd	2,231	775	3,121
		Discharge	20.2 + 9.3	15.9	23.0
Temperature	°C	U	15.7	14.6	8.8
		D	16.0	15.0	8.7
Conductivity at 20°C	mS/m	U	9.4	10.9	9.6
		D	11.5	12.0	10.1
pH	pH	U	8.2	8.1	7.8
		D	8.2	8.1	7.8
Ammonia	g/m ³ N	U	0.070	0.026	0.161
		D	0.060	0.013	0.155
Unionised ammonia	g/m ³ NH ₃	U	0.004	0.001	0.002
		D	0.003	0.000	0.002
Dissolved reactive phosphorus	g/m ³ P	U	0.061	0.151	0.044
		D	0.062	0.174	0.051
Suspended solids	g/m ³	U	3	3	<2
		D	4	3	<2
Turbidity	NTU	U	2.0	1.2	0.98
		D	2.0	1.2	1.2

U = upstream of discharge point (Site Code PAT000356)
D = downstream of discharge point (Site Code PAT000357)

The discharge of power plant effluent had negligible effect on the river in terms of physical appearance, nutrient concentration, pH and temperature.

Turbidity and suspended solids levels remained relatively constant.

The concentration of nutrients, in terms of ammonia and dissolved reactive phosphorus (DRP), was governed largely by the discharge from Stratford oxidation ponds upstream. There was a measureable increase in DRP on two of the three monitoring occasions, each when the peaker plant effluent contained a significant amount of DRP – there was no statistical increase in (flow-adjusted) level of DRP recorded for the Patea River at Skinner Road, 2.0 km downstream at the regional state of the environment monitoring site that is monitored monthly. Ammonia concentration differed little between the two monitoring sites and was below levels allowed by consent conditions.

The temperature difference measured in the river was between - 0.1 and + 0.4°C.

2.4.4.3 Temperature monitoring by Contact Energy

The river temperature remained below 25°C throughout the monitoring period, allowing for continuous discharge.

During 2014-2015, the maximum river temperature recorded for the downstream monitoring site was 22.4°C at 1849 NZDT on 29 January 2015. The maximum temperature recorded for the upstream monitoring site was 22.0°C at 1640 NZDT on 29 January 2015.

The average temperature increase caused by the plant discharge was 0.11°C. The highest temperature differential was 1.68°C, recorded on 12 March 2015 at 1543 NZDT. At this time the average plant discharge rate was 42.54 litres/second and the flow rate of the Patea River at Skinner Road was 830 litres/second.

2.5 Results - Air

2.5.1 Inspections

Inspections in relation to emissions to air comprise assessment of the visual effect of discharges from the power station site, particularly the cooling towers, and a visit to the control room to view and discuss air monitoring results. The equipment in the TCC1 air monitoring shed is also included.

Routine inspections took place on 25 November 2014, 16 February and 29 June 2015. An additional visit was undertaken on 27 August 2014 while stack testing was carried out at SP1 (Photo 1).

Compliance with condition 16 of consent **4454** and condition 5 on consent **7247**, in respect of non-production of a visible plume from the evaporative cooling systems except under certain meteorological conditions was achieved at the time of each inspection.

Staff of Contact Energy were found to have a good knowledge of the environmental aspects of running the plant, and to have proper training in dealing with contingency events that have potential for causing adverse environmental effects.

2.5.2 Results of discharge monitoring

The station has provided to Council a monthly summary of its emissions monitoring data. The report covers the average, minimum and maximum concentrations of nitrogen oxides (NO_x), oxygen (O₂), carbon monoxide (CO) and carbon dioxide (CO₂). The results are summarised in Appendix V.

Total emissions of CO₂ for the 2014-2015 year were 372,465 tonnes, comprising 132,074 tonnes from TCC1 and 240,391 tonnes (estimated) from SP1. This represented a reduction of 60,326 tonnes, or 14%, compared to 2013-2014, reflecting the reduction in operational time in 2014-2015. For TCC1, this represented a decrease of 155,775 tonnes or 54% from the previous year. For SP1, this represented an increase of 95,449 tonnes or 66% from the previous year.

The relative contribution from TCC1 decreased, from 67% to 35%, with a corresponding increase for SP1, from 33 to 65%.

The limit imposed by consent **4454-1** on NO_x mass discharge rate (430 kg/h) from TCC1 was complied with. Stack testing of the SP1 units under full load during

commissioning in March 2011 had demonstrated compliance with NO_x emission concentration and mass discharge limits on consent 4022-2. This was confirmed by testing the SP1 units under baseload in August 2014. (See section 2.5.3).

2.5.3 Emissions testing of Stratford Peaker Plant

Consent 4022-2 places limits on the concentration and mass emission rate of nitrogen oxides (NO_x) discharged to air from the two gas turbines at SP1. Limits are also imposed on maximum ground level concentration of carbon monoxide, nitrogen oxides and other contaminants derived from emissions to atmosphere from the site at or beyond the site boundary under ambient conditions, that is, accounting for emissions from all plants at the site.

The Council did not require Contact Energy to install continuous metering to monitor compliance with the NO_x emission limits for SP1, as was done for TCC1, because of the NO_x control technology employed and the relatively regular cycle of emissions for peaker plants of that design. Instead, Council required Contact Energy to demonstrate by stack testing during commissioning of SP1 that the discharge of contaminants would comply with the emission limits under worst case operating conditions, and that, on the basis of air dispersion modelling using the hard data from testing of SP1 and TCC1, compliance with ground level concentration limits would be achieved.

Stack testing of emissions from the two SP1 machines was undertaken on 25 and 26 March 2011. Officers of the Council attended the testing. The results are presented in Table 7. Both machines were run at full load of 108MW. The duration of combustion gas sampling was 110 minutes for each machine. Volumetric flow rate, dry at STP, was 207 – 211 Nm³/s at 15%O₂.

Table 7 Results from emission testing of Stratford Peaker Plant, March 2011

Constituent		Concentration			Mass rate, g/s		
		Unit 21	Unit 22	Limit	Unit 21	Unit 22	Limit
Oxides of Nitrogen(NO _x) as NO ₂	ppm	30	31	125	9.4	9.8	175
Oxides of Nitrogen(NO _x) as NO ₂	ppm @ 15% O ₂	22	23				
Oxides of Nitrogen(NO _x) as NO ₂	mg/Nm ³	61	63				
Carbon monoxide	ppm	17	18		3.2	3.4	NA
Carbon monoxide	ppm @ 15% O ₂	13	13				
Carbon monoxide	mg/Nm ³	21	22				
Carbon Dioxide	% v/v dry	5.2	5.3				
Oxygen	% v/v dry	13.0	12.9				
Moisture content	% v/v	12.3	11.4				

The results demonstrate compliance with the NO_x consent limits at full load, emission concentration being about 25% of the limit, and mass emission rate about 5% of the limit.

The data from emission testing of SP1, used together with existing test data for TCC1, confirmed air dispersion modelling results that limits on NO_x and carbon monoxide at ground level at and beyond the site boundary would be achieved.

Other emission testing, carried out during combustion tuning at commissioning, demonstrated that compliance with the consent limits on NO_x was achieved during “dry” operation, that is, without the water control system, throughout the range of generation conditions, albeit at higher values than under “wet” operation.

In August 2012, Contact Energy reported the first of a series of problems with the NO_x water control system in both peaker plants, which resulted in the cessation of all use of water for NO_x control (deNO_x water) in June 2013.

Additional emission testing, for NO_x and other combustion products, to improve tuning of the plants for optimal power output versus efficiency without deNO_x water, was undertaken on 26 and 27 August 2014 (Photo 2). During the testing, monitoring was performed for a period of 30 minutes on each plant under normal baseload conditions (natural gas consumption of 21,000 Nm³/h, or 5.1 kg/s) to demonstrate that the conditions on consent 4022-2 are being met while the plants are operated without deNO_x water. An officer of Council attended the testing.



Photo 2 Stack testing at Stratford Peaker Plant GT21, 27 August 2014

The results are presented in Table 8.

Table 8 Summary of NO_x emission monitoring results for Stratford Peaker Plant, August 2014

Parameter	Units	Emission Limit	Average Emission
Unit 21 Emissions at Baseload			
Oxides of Nitrogen (NO _x)	ppm	125	103.7
	mg/Nm ³	265*	216 ⁺
Mass emission rate for NO _x	g/s (expressed as NO ₂)	175	33.1
Unit 22 Emissions at Baseload			
Oxides of Nitrogen (NO _x)	ppm	125	103.2
	mg/Nm ³	265*	217 ⁺
Mass emission rate for NO _x	g/s (expressed as NO ₂)	175	33.4
Total mass emission rate Units 21 and 22 at Baseload			
Mass emission rate for NO _x [#]	kg/h (expressed as NO ₂)	830	239.3

* Emission limit of 265 mg/Nm³ (where Nm³ refers to 0°C, 1-atmosphere, dry gas basis) converted from limit of 100 mg m⁻³ at 450°C on consent **4022-2** condition 7c

⁺ Expressed as mg/Nm³ as NO₂, (where Nm³ refers to 0°C, 1-atmosphere, dry gas basis)

[#] Mass emission rate for the entire site

The results demonstrate that, when run without deNO_x water under normal baseload of 100 MW, the SP1 plants comply with the limits on concentration and mass emission rate of nitrogen oxides set on consent **4022-2**. Nitrogen oxides concentration in the emissions was consistently about 83% of the limit of 125 ppm (v/v). This compares with concentrations of about 24% of the limit that were measured in March 2011 when the plants were tested while using deNO_x water.

The mass emission rate of nitrogen oxides without use of deNO_x water was about 19% of the consent limit, compared to about 5.5% of the limit when deNO_x water was used.

Contact has undertaken to carry out annual emission testing on SP1.

2.5.4 Reviews and audits

All three air discharge consents that cover emissions from fuel combustion at Stratford Power Station include a condition that requires Contact Energy to provide the Council with reports:

- reviewing technological advances in reducing or mitigating plant emissions
- providing a site emissions inventory
- describing the energy efficiency of the plant
- covering other matters relating to mitigation or emission reduction, and
- detailing carbon dioxide emissions from the site.

A summary of the most recent report(s) is provided in the annual monitoring report by Council.

In relation to TCC1, under condition 8 of consent **4454-1**, Contact Energy was required to provide the Council with such a report within two years and four years of commissioning the plant and then at six-yearly intervals. The plant was commissioned on 1 February 1998. The first report was received by Council in the

1999-2000 monitoring year and the second in the 2001-2002 year. The third report was received in the 2009-2010 year. The fourth report, due on 1 February 2014, was delayed, so that it could be presented together with the report for SP1 that was due 10 months later. This was received in December 2014.

In relation to SP1, under condition 3 of consent **4022-2**, Contact Energy was required to provide the Council with such a report for the (old) Stratford Gas Turbine Plant within two years from the granting of the (replacement) consent in December 1994 and every six years thereafter. The last such report was considered to be the Assessment of Effects report that was produced in February 2008 in support of the application to change the purpose of consent **4022-2** to provide for operation of SP1. The next report was received in December 2014.

In relation to the as yet unbuilt third plant of either open or closed-cycle design, under condition 6 of consent **5846-1**, Contact Energy was required to provide the Council with such a report within two years and four years of commissioning the plant and then at six-yearly intervals. The cooling tower plume was to be addressed specifically.

The most recent six-yearly report, which relates to both TCC1 and SP1, and was received in December 2014, is attached as Appendix VI. The main points of the report are summarised below.

Technological advances and energy efficiency improvements

For TCC1, there have been no technological advances or efficiency improvements in the last six years. The plant already incorporates many of the features of the latest technology, such as EV burners and sequential combustion. Minor adjustments have been made, resulting in small improvements. (The most notable advances relate to alternative electricity generating plant).

For SP1, the two new open cycle gas turbines commissioned in 2010 were the latest technology, only 51 units having been installed worldwide (as of June 2014). Technology advances implemented since then have related to increased component and hardware life and ability of the gas turbines to meet performance expectations. Annual emission testing was instituted in 2015.

Changes in the electricity market

Following the significant investment that has been made in New Zealand's transmission and renewable generation capacity in the last three years, until such time as electricity demand increases, it is unlikely that the TCC1 will operate in a base loaded role outside of winter months. It is likely that there will be periods where the plant may be operated Monday to Friday only and shutdown in weekends when national electricity demand is lower. This type of operation results in reduced emissions and consumption of natural gas only when needed.

2.6 Investigations, interventions, and incidents

The monitoring programme for the period under review was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with the consent holder. During the year matters may arise which require additional

activity by the Council, for example provision of advice and information, or investigation of potential or actual courses of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The Incident Register (IR) 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 2014-2015 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with Contact Energy's conditions in resource consents or provisions in Regional Plans.

2.7 Discussion

2.7.1 Discussion of plant performance

Contact Energy provided regular documentation on plant performance. All documentation was reviewed by the Council and found to be satisfactory, meeting consent requirements.

Continuous emission monitoring of TCC1 by Contact Energy has demonstrated compliance with the air discharge permits. Emissions from SP1 were tested when the plant was commissioned, and again in August 2014 after use of deNO_x water ceased. The monitoring showed a high level of performance in terms of concentrations of various contaminants in the plant emissions, though higher amounts of NO_x discharged from SP1 after the water treatment was removed.

Continuous monitoring by Contact Energy of water abstraction from the Patea River showed compliance with consent conditions throughout the year. The volume abstracted, which had increased in June 2011 upon commissioning of SP1, reduced markedly (by 46%) between 2012-2013 and 2013-2014, and there was a further reduction of around 5% during 2014-2015. This was a result of less operation of TCC1. The proportion of the volume abstracted that was discharged back to the Patea River increased compared with the 2013-2014 period, from 45 to 61%, as the result of less evaporative cooling from operation of TCC1.

Monitoring of plant effluent, comprising mainly TCC1 cooling water and SP1 water treatment wastewater, was carried out largely by Contact Energy, with checks undertaken by the Council. There was high compliance with conditions on the discharge permit.

Contact Energy Limited produced an annual report to the Council on the 17th year of operation of the power station (Appendix VII). The report was satisfactory.

Reports reviewing technological advances and energy efficiency improvements were received as required by consents 4022-2 and 4454-1.

The effluent management plan was revised in December 2009 to cover the SP1 effluent. The plan was satisfactory. A new site emergency response plan, which covers fire, criminal actions, chemical/oil spill, earthquake, volcanic eruption and gas leak/explosion, among other things, was released in November 2013.

2.7.2 Environmental effects of exercise of water consents

The environmental effects in the Patea River system of discharges from the combined cycle power station were monitored through chemical analysis and biological survey of the Patea River above and below the plant effluent discharge point on East Road, and by biological survey of the Kahouri Stream above and below the stormwater discharge point beside the plant. Permanent temperature monitors are established in the Patea River immediately upstream of the effluent diffuser and at the mixing zone boundary 75 metres downstream.

Chemical testing conducted on samples taken from the Patea River above and below the discharge point under relatively low flow conditions indicated that the discharge had little effect on receiving water quality. There was negligible change in pH, suspended solids, or turbidity. A slight increase in dissolved phosphorus concentration was noted on two out of three monitoring occasions. It is noted that the concentration of nutrients upstream is somewhat elevated as the result of the discharge from Stratford municipal oxidation ponds.

Temperature increase is usually the most important environmental effect associated with thermal power stations. The maximum temperature increase recorded by Contact Energy in 2014-2015 was 1.68°C, at a flow of 830 litres/second at Skinner Road.

Biological surveys carried out in the Patea River in November 2014 and February 2015, and in the Kahouri Stream in April 2015, showed no impacts of any recent discharges from SPS upon the biological communities of in the vicinity of the discharges.

2.7.3 Environmental effects of exercise of air discharge permit

2.7.3.1 Neighbourhood effects

Monitoring in previous years around the station of dust, plume, and nitrogen oxide levels has confirmed there are no local issues arising from aerial emissions. The monitoring programme in the period under review reflected this, with the main emphasis being on ongoing inspections to confirm the status quo, and on auditing the Company's own emissions monitoring data.

All emissions complied with the resource consent conditions.

2.7.3.2 Global effects

Total emissions of carbon dioxide for the year were 372,465 tonnes in 2014-2015, a decrease of 14% compared with 2013-2014. This reflected a further reduction in power generation during the 2014-2015 period. (There was a large decrease of 53% from 2012-2013 to 2013-2014). As described earlier, under alterations to consent **4454**, Contact Energy is no longer required to provide a yearly carbon dioxide emissions report.

2.8 Evaluation of performance

A tabular summary of the Company's compliance record for consents that were exercised during the year under review is set out in Table 9 to Table 27 below.

Table 9 Summary of performance for Consent **3939-2**

Purpose: To discharge 464 litres/second of stormwater from the Stratford Power Station into an unnamed tributary of the Kahouri Stream and into the Kahouri Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Effects not to be present below mixing zone	Site inspections	Yes
2. Limits on contaminant levels in discharge	Samples collected by Contact Energy	Yes
3. Discharge to be undertaken in accordance with application	Site inspections	Yes
4. Optional review of consent	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 10 Summary of performance for Consent **4022-2**

Purpose: To discharge emissions to the air from fuel combustion and other related activities associated with the operation of the Stratford Power Station and ancillary plant		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option (BPO)	Site inspections - checking that standard operating procedures to achieve compliance with conditions are followed	Yes
2. Consulting over significant proposed changes	Liaison during visits..	Yes
3. Provision of reports on specific monitoring/investigations	Received December 2014 (next one due December 2020)	Yes

Purpose: To discharge emissions to the air from fuel combustion and other related activities associated with the operation of the Stratford Power Station and ancillary plant		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Limit on ambient carbon monoxide	Not monitored beyond boundary, as source monitoring at commissioning and modelling gave low results	N/A
5. Limit on ambient nitrogen oxides	Not monitored beyond boundary, as source monitoring at commissioning and modelling gave low results	N/A
6. Limit on other emissions at boundary	Not monitored beyond boundary, as source monitoring at commissioning and modelling gave low results	N/A
7. Limits on nitrogen oxides outside start-up or shut-down periods	Stack testing during commissioning of plants on 25 and 26 March 2011	Yes
8. Limit on nitrogen oxides mass discharge rate	Stack testing during commissioning of plants on 25 and 26 March 2011	Yes
9. Stack height	Inspection by Council	Yes
10. Ecological effects	Inspection by Council and observation of vegetation	Yes
11. Optional review of consent	Review was available within 6 months of report being submitted in December 2014, but not considered necessary	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 11 Summary of performance for Consent **4454-1**

Purpose: To discharge emissions to air from a combined cycle power station and ancillary plant		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Adopt best practicable option (BPO)	Site inspections - checking that standard operating procedures to achieve compliance with conditions are followed	Yes
5. Outline BPO measures at time of commissioning	Report provided in 1998, as required	N/A
6. Option to review BPO measures	No review sought by Council	N/A
7. Consulting over significant proposed changes	Liaison during visits. No significant changes undertaken during year	N/A
8. Provision of reports on specific monitoring/investigations	Received December 2014 (next one due December 2020).	Yes

Purpose: To discharge emissions to air from a combined cycle power station and ancillary plant		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
9. Limit on ambient carbon monoxide	Not monitored beyond boundary, as continuous CO emission monitoring by Contact Energy gave low results	N/A
10. Limit on ambient nitrogen oxides	Not monitored, as emissions monitored continuously by Contact Energy, and previous ambient monitoring by Council, gave low results	N/A
11. Limit on other emissions at boundary	Not monitored, as emissions monitoring by Contact Energy and dispersion modelling demonstrated no need	N/A
12. Limits on nitrogen oxides outside start-up or shut-down periods	Continuous monitoring by Contact Energy and monthly report to Council.	Yes
13. Limit on nitrogen oxides mass discharge rate	Continuous monitoring by Contact Energy and monthly report to Council	Yes
14. Stack height	Inspection by Council	Yes
15. Ecological effects	Inspection by Council and observation of vegetation	Yes
16. Visibility of cooling system plume	Inspection and observation by Council and Contact Energy	Yes
17. Cooling system drift	Inspection and observation by Council	Yes
18. Optional review of consent	Next option for review in June 2016, recommendation attached	N/A
19. Lapse of consent	Consent was exercised	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Note: condition numbering intentionally begins at 4 as conditions 1 – 3 were deleted

Table 12 Summary of performance for Consent **4455-1**

Purpose: To take water up to 19,440 cubic metres/day [225 litres/second averaged over 10 minutes] of water on a continuous bases from the Patea River for use on Power Stations on East Road, Stratford		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Measurement of abstraction rate	Continuous flow metering by Contact Energy and monthly report	Yes
2. Limit on maximum abstraction rate	Continuous flow metering by Contact Energy and monthly report to Council	Yes
3. Limit on abstraction rate during low river flows	Continuous flow metering by Contact Energy and monthly report to Council	Yes
4. Limit on abstraction rate during	Continuous flow metering by Contact Energy and monthly report	Yes

Purpose: To take water up to 19,440 cubic metres/day [225 litres/second averaged over 10 minutes] of water on a continuous bases from the Patea River for use on Power Stations on East Road, Stratford		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
very low river flows	to Council	
5. Optional review of consent	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 13 Summary of performance for Consent **4456-1**

Purpose: To erect, place, use and maintain an intake structure in and on the bed of the Patea River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notification of works	No maintenance undertaken	N/A
2. Construction and maintenance in accordance with documentation		N/A
3. Adopt BPO to prevent or minimise adverse effects		N/A
4. Riverbed disturbance and reinstatement		N/A
5. Removal of structure when no longer required		N/A
6. Timing of works		N/A
7. Optional review provision	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 14 Summary of performance for Consent **4458-1**

Purpose: To erect, place, use and maintain a diffuser structure in and above the bed of the Patea River for the purpose of discharging used water from Power Stations at East Road, Stratford		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Provision of design plans	Plans received by Council and approved in 1996	Yes
2. Construction and maintenance in accordance with documentation		N/A

Purpose: To erect, place, use and maintain a diffuser structure in and above the bed of the Patea River for the purpose of discharging used water from Power Stations at East Road, Stratford		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Passage of fish not to be obstructed	No monitoring during review period. Trout monitoring survey in January 2004 did not show any effect	N/A
4. Notification prior to and after maintenance	No maintenance during period under review	N/A
5. Timing of works	No maintenance during period under review	N/A
6. Adopt best practicable option to prevent or minimise adverse effects	Liaison with Contact Energy and inspection of diffuser	Yes
7. Riverbed disturbance and reinstatement		N/A
8. Removal of structure when no longer required		N/A
9. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 15 Summary of performance for Consent 4459-1

Purpose: To discharge stormwater from the operation of a power station site into an unnamed tributary of the Piakau Stream and into the Kahouri Stream, both tributaries of the Patea River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Provision of plans prior to completion of construction	Plans received by Council	Yes
2. Concentration limits upon potential contaminants in discharge	Monitored by Contact Energy.	Yes
3. Provision of contingency plan	Plan received by Council and approved 1996. Most recent update produced April 2014. No revision required	Yes
4. Controls on effect of discharge in receiving water	Inspection and biological monitoring by Council	Yes
5. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 16 Summary of performance for Consent **4460-1**

Purpose: To erect, place, use and maintain, in and above the beds of an unnamed tributary of the Piakau Stream and of the Kahouri Stream, both tributaries of the Patea River, structures for the purpose of discharging stormwater from a power station site		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Provision of plans	Plans received by Council and approved	Yes
2. Construction and maintenance in accordance with documentation	No maintenance during period under review	N/A
3. Passage of fish not to be obstructed	No monitoring during review period, as design of structure satisfactory	N/A
4. Notification prior to and after maintenance	No maintenance during period under review	N/A
5. Timing of works	No maintenance during period under review	N/A
6. Adopt best practicable option to prevent or minimise adverse effects	No maintenance during period under review	N/A
7. Riverbed disturbance and reinstatement	No maintenance during period under review	N/A
8. Removal of structure when no longer required		N/A
9. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 17 Summary of performance for Consent **4461-1**

Purpose: To erect, place, use and maintain in, over and under the bed of the Kahouri Stream, a tributary of the Patea River, within the site and adjacent land immediately to the southeast, a bridge, pipelines, cables and associated utilities for a power station site		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Provision of plans	Plans received by Council and approved	Yes
2. Construction and maintenance in accordance with documentation	No maintenance during period under review	N/A
3. Passage of fish not to be obstructed	No monitoring during review period, as design of structure satisfactory	N/A
4. Notification prior to and after maintenance	No maintenance during period under review	N/A
5. Timing of works	No maintenance during period under review	N/A

Purpose: To erect, place, use and maintain in, over and under the bed of the Kahouri Stream, a tributary of the Patea River, within the site and adjacent land immediately to the southeast, a bridge, pipelines, cables and associated utilities for a power station site		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
6. Adopt best practicable option to prevent or minimise adverse effects	No maintenance during period under review	N/A
7. Riverbed disturbance and reinstatement	No maintenance during period under review	N/A
8. Removal of structure when no longer required		N/A
9. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 18 Summary of performance for Consent **4462-1**

Purpose: To erect, place, use and maintain water pipelines and associated control cables above, through or below the beds of the Toko Stream and various small unnamed streams, for the purpose of water transmission from the Patea River to Power Stations at East Road, Stratford		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Provision of design plans	Plans received by Council and approved in 1996	N/A
2. Construction and maintenance in accordance with documentation	No maintenance during period under review	N/A
3. Passage of fish not to be obstructed	No monitoring during review period, as design of structure satisfactory	N/A
4. Notification prior to and after maintenance	No maintenance during period under review	N/A
5. Timing of works	No maintenance during period under review	N/A
6. Adopt best practicable option to prevent or minimise adverse effects	No maintenance during period under review	N/A
7. Riverbed disturbance and reinstatement	No maintenance during period under review	N/A
8. Removal of structure when no longer required		N/A
9. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 19 Summary of performance for Consent **4804-1**

Purpose: To erect, place, use and maintain over the bed of an unnamed tributary of the Kahouri Stream in the Patea catchment, within the site and adjacent land immediately to the southeast a bridge structure to convey high voltage electricity cables and associated communication cables for a power station site		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Provision of design plans	Plans received by Council and approved in 1996	Yes
2. Construction and maintenance in accordance with documentation	No maintenance during period under review	N/A
3. Notification prior to and after maintenance	No monitoring during review period, as design of structure satisfactory	N/A
4. Timing of works	No maintenance during period under review	N/A
5. Adopt best practicable option to prevent or minimise adverse effects	No maintenance during period under review	N/A
6. Riverbed disturbance and reinstatement	No maintenance during period under review	N/A
7. Removal of structure when no longer required		N/A
8. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 20 Summary of performance for Consent **5063-1**

Purpose: To discharge up to 5 cubic metres/day of domestic septic tank effluent through a soakage field onto and into land in the vicinity of the Kahouri Stream in the Patea catchment in association with the Stratford Power Station Site		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Installation according to plan submitted	Installation inspected by Council	Yes
2. Prohibition on surface run-off	Inspection by Council	Yes
3. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 21 Summary of performance for Consent **5633-1**

Purpose: To discharge fine sediment and organic matter from water intake structure tee screens to the Patea River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Discharge according to documentation submitted	Inspection by Council	Yes
2. Controls on effect of discharge in receiving water	Inspection and biological monitoring by Council	Yes
3. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 22 Summary of performance for Consent **5848-1**

Purpose: To discharge up to 6,740 cubic metres [78 litres/second averaged over 15 minutes] of used water, mainly blowdown water from the cooling system from Power Stations at east Road, Stratford into the Patea River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Discharge in accordance with effluent disposal management plan	Inspection by Council, and provision of annual report by Contact Energy	Yes
2. Provision and revision of effluent disposal management plan	Plan received by Council and approved 1996. Most recent update received February 2010 approved by Council.	Yes
3. Provision of details on proposed new water treatment chemicals	No changes during monitoring period	N/A
4. Provision of details on proposed new cleaning chemicals	No changes during monitoring period	N/A
5. Optional review of consent on notification of new chemicals	No review required	N/A
6. Provision and maintenance of contingency plan	Plan received by Council and approved. Most recent update released November 2013.	Yes
7. Controls on effect of discharge in receiving water	Inspection and biological monitoring by Council	Yes
8. Passage of fish not to be obstructed	No monitoring during review period. Trout monitoring survey in January 2004 did not show any effect	Yes
9. Limit on river temperature increase	Continuous monitoring and monthly reporting by Contact Energy, and measurement checks by Council	Yes
10. Limit on maximum river temperature	Continuous monitoring and monthly reporting by Contact Energy, and measurement checks by Council	Yes
11. Consent holder to continuously monitor temperature and provide records	Monthly reporting by Contact Energy	Yes
12. Concentration limits upon potential contaminants in discharge	Continuous monitoring and monthly reporting by Contact Energy, and measurement checks by Council	Yes
13. Limit on ammonia in river	Monitoring by Council	Yes

Purpose: To discharge up to 6,740 cubic metres [78 litres/second averaged over 15 minutes] of used water, mainly blowdown water from the cooling system from Power Stations at east Road, Stratford into the Patea River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
14. Lapse of consent	Consent was exercised	N/A
15. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 23 Summary of performance for Consent **7247-1**

Purpose: To discharge emissions into air from the operation of the cooling tower associated with the Stratford Peaker Power Plant		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option (BPO)	Site inspections - checking that standard operating procedures to achieve compliance with conditions are followed	Yes
2. Cooling tower design as described in application	Inspection by Council	Yes
3. Prior notification of exercise of consent	Notification received 10 November 2010	N/A
4. Minimisation of emissions	Inspection by Council	Yes
5. Visibility of cooling system plume	Inspection and observation by Council and Contact Energy	Yes
6. Cooling system drift	Inspection and observation by Council	Yes
7. Description of water treatment regime to be provided	Description provided 10 November 2010	Yes
8. Consulting over significant proposed changes	Liaison during visits. No significant changes undertaken during year	Yes
9. Offensive odour prohibited	Inspection by Council	Yes
10. Ecological effects	Inspection by Council and observation of vegetation	Yes
11. Lapse of consent	Consent was exercised	N/A
12. Optional review of consent	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 24 Summary of performance for Consent **7248-1**

Purpose: To erect, place, use and maintain a bridge over an unnamed tributary of the Kahouri Stream for pedestrian access and carriage of water pipes, high voltage cables, control cables and associated utilities		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application	Site inspections	Yes
2. Provision of bridge plans prior to construction	Not received	N/A
3. Notification prior to exercise of consent	Notification received 15 February 2010	N/A
4. Minimisation of sediment in stream	No maintenance during period under review	N/A
5. Area and volume of disturbance to be minimised	No maintenance during period under review	N/A
6. Structure removed and area reinstated if no longer required		N/A
7. Lapse of consent		N/A
8. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 25 Summary of performance for Consent **7250-1**

Purpose: To erect, place, use and maintain a bridge over the Kahouri Stream for pedestrian access and carriage of water pipes, high voltage cables, control cables and associated utilities		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application	Site inspections	Yes
2. Provision of bridge plans prior to construction	Not received.	N/A
3. Notification prior to exercise of consent	Notification received 15 February 2010	N/A
4. Minimisation of sediment in stream	No maintenance during period under review	N/A
5. Area and volume of disturbance to be minimised	No maintenance during period under review	N/A
6. Structure removed and area reinstated if no longer required		N/A
7. Lapse of consent		N/A
8. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A

Purpose: To erect, place, use and maintain a bridge over the Kahouri Stream for pedestrian access and carriage of water pipes, high voltage cables, control cables and associated utilities		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 26 Summary of performance for Consent **7605-1**

Purpose: To ;construct, place and maintain a stormwater outlet structure in the Kahouri Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application	Site inspections	Yes
2. Notification prior to exercise of consent	Notification received 16 March 2010	N/A
3. Area and volume of disturbance to be minimised	No maintenance during period under review	N/A
4. Minimisation of sediment in stream	No maintenance during period under review	N/A
5. Structure removed and area reinstated if no longer required		N/A
6. Lapse of consent		N/A
7. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 27 Summary of performance for Consent **7653-1**

Purpose: To construct, place and maintain a stormwater outlet structure in the Kahouri Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent in accordance with application	Site inspections by Council	Yes
2. Timing of works	No maintenance during period under review	N/A
3. Notification prior to exercise of consent	Notification received 9 July 2010	N/A
4. Area and volume of disturbance to be minimised	No maintenance during period under review	N/A

Purpose: To construct, place and maintain a stormwater outlet structure in the Kahouri Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
5. Minimisation of sediment in stream	No maintenance during period under review	N/A
6. Structure removed and area reinstated if no longer required	Site inspections	N/A
7. Lapse of consent		N/A
8. Optional review provision re environmental effects	Next option for review in June 2016, recommendation attached	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

During the year, the Company demonstrated a high level of environmental and high level of administrative performance with the resource consents as defined in Section 1.1.4.

2.9 Recommendations from the 2012-2014 Biennial Report

In the 2012-2014 Biennial Report, it was recommended:

1. THAT monitoring of water abstraction and discharges in relation to the Stratford Power Station of Contact Energy Limited in the 2014-2015 year continue at the same level as in 2013-2014.
2. THAT monitoring of air emissions from the Stratford Power Station of Contact Energy Limited in the 2014-2015 year continue at the same level as in 2013-2014.

These recommendations were implemented.

2.10 Alterations to monitoring programmes for 2015-2016

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council had taken into account the extent of information made available by previous authorities, its relevance under the RMA, the obligations of the Act in terms of monitoring emissions/discharges and effects, and subsequently reporting to the regional community, the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within the Taranaki emitting to the atmosphere/discharging to the environment.

In the case of Contact Energy, the programme for 2014-2015 was unchanged from that for 2013-2014. It is proposed that for 2015-2016, the monitoring programme for the Stratford Power Station essentially continues at the same level as in 2014-2015.

A recommendation to this effect is attached to this report.

2.11 Exercise of optional review of consents

Condition 11 of resource consent **4022-2** allows Council to serve notice of an intention to review the conditions of the consent within six months of receiving a report prepared by the consent holder under condition 3 of the consent. A report was received in December 2014, however the conditions on the consent are considered appropriate at this time and no review was undertaken.

Resource consents **4454-1, 4455-1, 4456-1, 4458-1, 4459-1, 4460-1, 4461-1, 4462-1, 4804-1, 5063-1, 5633-1, 5846-1, 5847-1, 5848-1, 5849-1, 5850-1, 5851-1, 5852-1, 7247-1, 7248-1, 7250-1, 7605-1, 7653-1, 7785-1, and 7786-1** all provide for an optional review of the consent in June 2016. Conditions on these consents allow the Council to review the consent, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of the consents.

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

2.12 Recommendations

1. THAT monitoring of water abstraction and discharges in relation to the Stratford Power Station of Contact Energy Limited in the 2015-2016 year continue at the same level as in 2014-2015.
2. THAT monitoring of air emissions from the Stratford Power Station of Contact Energy Limited in the 2015-2016 year continue at the same level as in 2014-2015.
3. THAT the Council notes that the option for review of consent **4022-2** (discharge emissions to air from SP1) within six months of receipt of a report prepared by the consent holder under condition 3 of the consent, as set out in condition 11, was not exercised on the grounds that current conditions are adequate to deal with any adverse effect on the environment caused by the discharge.,
4. THAT the option for a review of resource consent **4454-1** (discharge contaminants to air) in June 2016, as set out in condition 18 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
5. THAT the option for a review of resource consent **4455-1** (water abstraction) in June 2016, as set out in condition 5 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
6. THAT the option for a review of resource consent **4456-1** (intake structure) in June 2016, as set out in condition 7 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.

7. THAT the option for a review of resource consent **4458-1** (discharge structure) in June 2016, as set out in condition 9 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
8. THAT the option for a review of resource consent **4459-1** (discharge stormwater) in June 2016, as set out in condition 5 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
9. THAT the option for a review of resource consent **4460-1** (stormwater structure) in June 2016, as set out in condition 9 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
10. THAT the option for a review of resource consent **4461-1** (utility structures) in June 2016, as set out in condition 9 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
11. THAT the option for a review of resource consent **4462-1** (water transmission structures) in June 2016, as set out in condition 9 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
12. THAT the option for a review of resource consent **4804-1** (electricity transmission structures) in June 2016, as set out in condition 8 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
13. THAT the option for a review of resource consent **5063-1** (discharge septic tank effluent to land) in June 2016, as set out in condition 3 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
14. THAT the option for a review of resource consent **5633-1** (discharge sediment) in June 2016, as set out in condition 3 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
15. THAT the option for a review of resource consent **5846-1** (discharge emissions to air) in June 2016, as set out in condition 17 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
16. THAT the option for a review of resource consent **5847-1** (water take) in June 2016, as set out in condition 6 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
17. THAT the option for a review of resource consent **5848-1** (discharge used water) in June 2016, as set out in condition 15 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.

18. THAT the option for a review of resource consent **5849-1** (gas pipeline structures) in June 2016, as set out in condition 8 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
19. THAT the option for a review of resource consent **5850-1** (intake structure) in June 2016, as set out in condition 8 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
20. THAT the option for a review of resource consent **5851-1** (discharge sediment) in June 2016, as set out in condition 4 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
21. THAT the option for a review of resource consent **5852-1** (erect bridge) in June 2016, as set out in condition 8 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
22. THAT the option for a review of resource consent **7247-1** (discharge emissions to air) in June 2016, as set out in condition 12 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
23. THAT the option for a review of resource consent **7248-1** (erect bridge) in June 2016, as set out in condition 8 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
24. THAT the option for a review of resource consent **7250-1** (erect bridge) in June 2016, as set out in condition 8 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
25. THAT the option for a review of resource consent **7605-1** (stormwater structure) in June 2016, as set out in condition 7 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
26. THAT the option for a review of resource consent **7653-1** (stormwater structure) in June 2016, as set out in condition 8 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
27. THAT the option for a review of resource consent **7785-1** (discharge stormwater) in June 2016, as set out in condition 9 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.
28. THAT the option for a review of resource consent **7786-1** (discharge emissions to air) in June 2016, as set out in condition 11 of the consent not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.

3. Ahuroa Gas Storage

3.1 Process description

3.1.1 Site overview

Contact Energy Ltd (Contact Energy) holds resource consents to store natural gas in a depleted hydrocarbon reservoir in the Tariki formation, using injection and extraction facilities located at the Ahuroa-B wellsite east of Midhirst (shown in Photo 3 and Figure 3). Ahuroa-B wellsite was established by Petroleum Corporation of New Zealand Ltd (Petrocorp) in 1986, following which four production wells were drilled by Petrocorp, Fletcher Challenge Energy New Zealand Ltd and Swift Energy New Zealand Ltd. From 2008, Contact Energy (under operatorship of Origin Energy Ltd) began to develop the Ahuroa underground gas storage (AGS) project.

Storage involves the injection of gas into a depleted sub-surface reservoir. Natural gas is typically injected during periods when the demand for gas supply is relatively low (e.g. in the summer months). As the demand for gas supply increases, the injected gas is withdrawn from the storage reservoir.



Photo 3 Ahuroa-B site layout, facing north-west, May 2014

3.1.2 Geological setting

At Ahuroa, gas is injected, using cased wells at a depth of approximately 2,300 metres, into the reservoir sandstone, known as the Tariki Sandstone Member. This member consists of interbedded sandstone, siltstone and mudstone deposited as submarine fans during the Oligocene (~30 million years ago) as part of the Otaraoa Formation. Periods of tectonic activity during the Oligocene and Early Miocene (~20 million years ago) subsequently modified the structural geology of the region, particularly in relation to tectonic stresses acting upon the Taranaki Fault and Tarata Thrust Fault.

The Tarata Thrust Fault is adjacent to the Ahuroa complex/system and aids in the effective trapping and storage of gas, in addition to the amalgamated sandstone deposits in the Tariki Sandstone Member which provide good reservoir quality and are overlain by alternating intervals of thin and thick siltstones predominantly the Otaraoa formation, which form a continuous top-seal.

The potential environmental risk associated with this gas storage activity relates to the possible unintentional release of natural gas into the receiving environment, particularly into groundwater aquifers. Appropriate reservoir selection and continual pressure monitoring are integral safeguards implemented to mitigate against this risk.

The nearest potable water aquifer to the reservoir is in the Matemateaonga Formation, the base of which is located approximately 950 metres below ground level, some 1,300 metres above the storage reservoir. There are also at least three known hydrocarbon reservoirs in the overlying formations, meaning that, in the highly unlikely event of any gas losses, any potential upward migration of gas would likely be intercepted by these reservoirs on the way toward the surface.

3.1.3 Gas injection/extraction

At the Ahuroa-B site, the gas storage project has been developed in two stages. The initial storage utilised the existing Ahuroa 2A production well (identified in Figure 1) to inject gas. The secondary stage involved the drilling of an additional three injection wells (Ahuroa 3, 4 and 5ST-1, Figure 1), and the installation of additional compressors and surface processing equipment.

The site is configured so that the gas can run either through New Zealand Energy Corporation Ltd's (NZEC's) Waihapa production station (WPS) and then to Ahuroa through the original 8-inch gas line, or through the new 18-inch gas line from the New Zealand gas transmission system via Contact Energy's Stratford power station. The system can be configured to either inject or extract through one or more injection wells at any time using the same surface equipment, but cannot extract through one well and inject through another simultaneously.

During injection, gas comes in through either the Waihapa or Contact Energy line and into the compressor. The compressor raises the pressure of the gas so it can overcome both friction losses in the pipe and well and the reservoir pressure to make injection into the reservoir possible.

Extraction is a similar process to general gas production. During extraction, relatively small quantities of produced water and gas condensate are brought to surface with the gas. These are separated out in the facilities on site. The produced water is piped to a 60 cubic metre storage tank on site, before being transported by road tanker to Waihapa production station to be deep-well injected. The condensate is separated and piped directly to Waihapa. No condensate is stored on site.

Continual pressure monitoring is conducted using Rosemount pressure sensors at surface and down-hole locations on the Ahuroa 3, 4 and 5ST-1 wells.



Figure 3 Ahuroa B wellsite and gas storage facilities showing main components and discharge sampling site IND000146

3.1.4 Pressure monitoring

Pressure data are essential in understanding reservoir behaviour and response to injection and extraction, and in ensuring reservoir and pipeline integrity. Temperature and pressure data are monitored by operators at the Waihapa production station control room. High and low alarms are set on all the recorded pressure data to ensure any potential irregularities are quickly detected by site operators.

Both the pipeline and the reservoir pressure alarms are significantly lower than the design pressure (of the pipeline) or the known safe pressure (for the reservoir).

Hydraulic control valves are installed which can be used to shut the wells in, either remotely, through manual valves, or automatically, or if required should there be a pressure anomaly during injection or extraction. In an extreme emergency, if none of the control valves is working, there is a valve set a few hundred metres sub-surface which will automatically close if the well is exposed to atmospheric pressures.

3.1.5 Pipeline to Stratford Power Station

An 18-inch pipeline, 8.5 km in length, was installed between AGS and SPS in 2013 for the bidirectional conveyance of gas associated with the AGS project. A fibre optic cable was installed in the same trench. The pipeline route crosses 14 waterways, comprising the Kahouri and Piakau Streams and unnamed tributaries of the Kahouri (2) and Piakau (4) Streams in the Patea catchment, and unnamed tributaries of the

Makara (5) and Ahuroa (1) Streams in the Waitara catchment. The pipeline route is shown in Figure 4.

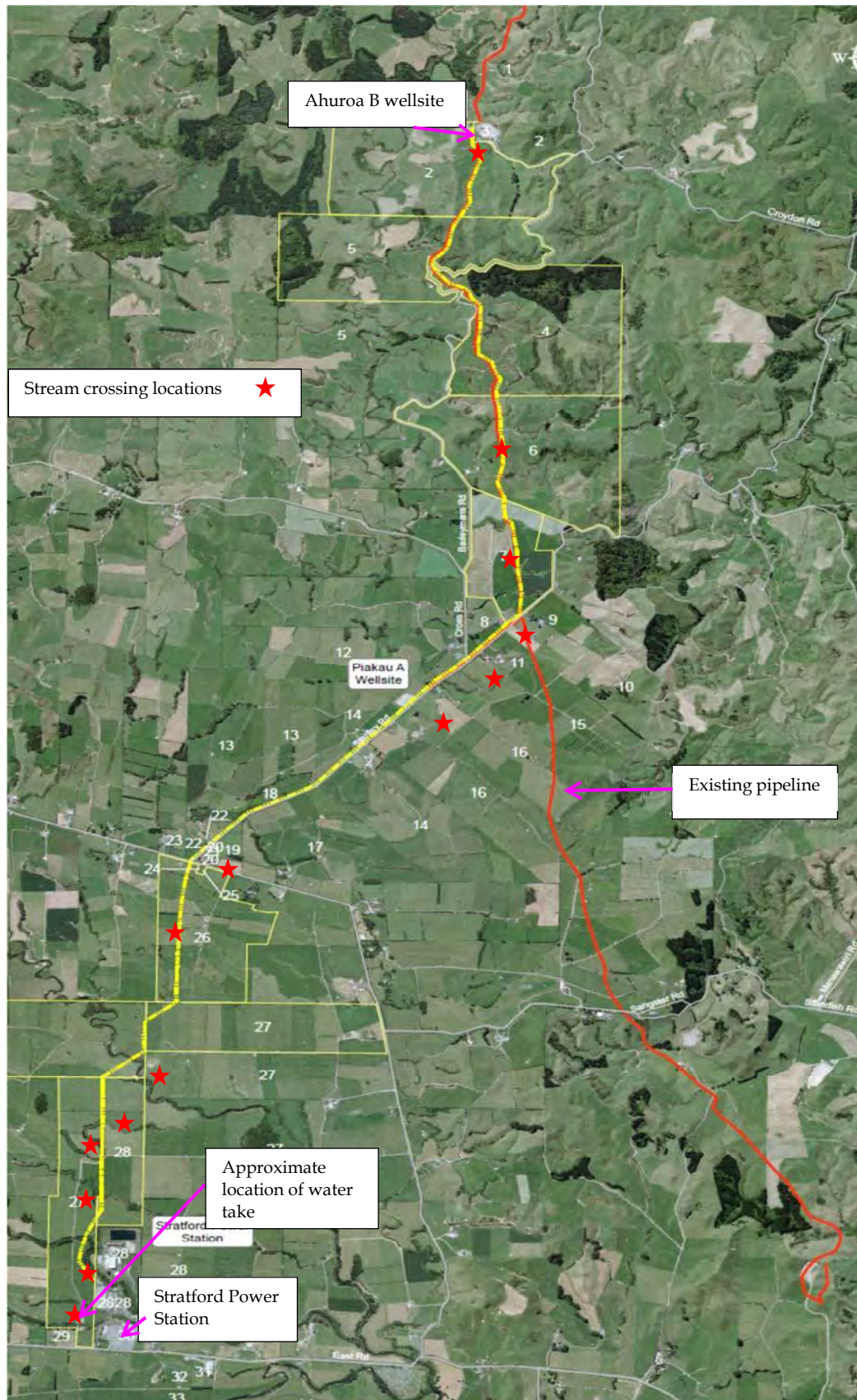


Figure 4 Pipeline route from Ahuroa Gas Storage to Stratford Power Station

3.2 Resource consents

A summary of the consents held by Contact Energy Limited in relation to Ahuroa Gas Storage facility and the gas pipeline connecting it to Stratford Power Station is given in Table 28 and Table 29. A copy of each of the consents for the storage and pipeline can be found in Appendix II and Appendix III, respectively.

Table 28 Summary of resource consents for Ahuroa Production Station

Consent number	Purpose	Next review date	Expiry date
3681-2	Discharge stormwater, site water and uncontaminated production water to land and Makuri Stream tributary	2021	2033
5173-2*	Discharge solid drilling waste from hydrocarbon exploration operations at Ahuroa-B wellsite by mix-bury-covers	-	2021
7432-1	Discharge natural gas into land for purpose of gas storage	2021	2027
7621-1*	Discharge stormwater and sediment from Ahuroa-B site development earthworks to two Makara Stream tributaries	2021	2027
7622-1*	Culvert in Makara Stream tributary	2021	2027
7745-1*	Discharge emissions to air from flaring of hydrocarbons associated with well clean-up and well testing associated with exploration activities at Ahuroa-B wellsite	2016	2028
7746-1	Discharge emission to air during flaring from well workovers and in emergency situations associated with production activities at Ahuroa-B wellsite, together with miscellaneous emissions.	2016	2028
7748-1*	Discharge stormwater and sediment to land from earthworks during extension of Ahuroa-B wellsite	2021	2027
7749-1*	Install pipe in bed of Makara Stream tributary	2021	2027
7750-1*	Access culvert in Makara Stream tributary	2021	2027

Table 29 Summary of resource consents for the gas pipeline from AGS to SPS

Consent number	Purpose	Next review date	Expiry date
9307-1*	Discharge stormwater and sediment from pipeline construction between Ahuroa-B wellsite and SPS to land where may enter surface water	-	2017
9308-1*	Take from Kahouri Stream for pipeline testing	-	2017
9309-1 to 9322-1*	Install and use pipeline for conveying gaseous hydrocarbons under various streams between Ahuroa-B wellsite and SPS	2016	2028
9576-1*	Culvert to realign Makara Stream tributary	2021	2027

* Consents not actively exercised during 2014-2015 monitoring period

Consents **3681** and **5173** were granted in 2003 to replace consents that provided for hydrocarbon exploration and production operations at Ahuroa-B wellsite. Consent **7432** was granted in December 2008 to provide for conversion of the depleted Ahuroa reservoir to a gas storage facility, and consents **7621** and **7622** enabled development of the site. Consents **7745** and **7746** were issued as a partial transfer to Contact Energy of consents that had allowed discharges to air at a number of sites. Consents **7748** to **7750** were granted in January 2011 to provide for expansion of the site.

Consents **9307** to **9322** were granted in March 2012 to provide for the construction and operation of a gas pipeline between AGS and SPS. Consent **9576** was granted in June 2013 to allow access for pipeline testing and maintenance.

Of these 27 consents, as listed in Table 28 and Table 29, three of the 10 held in relation to AGS were actively exercised in the 2014-2015 review period. The pipeline was constructed during 2013, so although the pipeline consents have been exercised they were not actively used during the period under review. Those consents are described below.

3.2.1 Water take permit

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

Water Permit **9308-1** allows the take and use of water from Kahouri Stream for hydrostatic testing of pipelines. This permit was issued by the Council on 30 August 2012 under Section 87(d) of the RMA. It is due to expire on 1 June 2017.

Condition 1 limits the volume of water taken.

Condition 2 requires that a record of the take be maintained.

Condition 3 requires adoption of the best practicable option to minimise adverse effect on the environment.

Condition 4 addresses the protection of fish.

Condition 5 is a lapse provision.

3.2.2 Water discharge permits

Section 15(1)(a) of the *Resource Management Act 1991* (RMA) stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations.

Ahuroa Production Station

Water discharge permit **3681-2** covers the discharge of treated stormwater, uncontaminated treated site water, and uncontaminated treated production water from hydrocarbon exploration and production operations at the Ahuroa-B wellsite onto and into land and into an unnamed tributary of the Makara Stream in the Waitara catchment. This permit was issued to Swift Energy Ltd by the Regional Council on 22 April 2003 under Section 87(e) of the RMA. It was transferred from Swift Energy to Origin Energy on 11 April 2008 and then partially transferred to Contact Energy Ltd on 23 November 2010 under Section 137(2). It is due to expire on 1 June 2033.

Condition 1 requires use of the best practicable option.

Condition 2 restricts the stormwater catchment area.

Condition 3 relates to notification of works.

Condition 4 relates to contingency planning.

Conditions 5 to 7 deal with stormwater treatment system design.

Condition 8 imposes limits on significant potential contaminants in the discharge.

Conditions 9 and 10 establish a mixing zone and set out allowable and unacceptable effects upon the receiving water.

Condition 11 addresses reinstatement of the site.

Condition 12 is a review provision.

Pipeline

Water discharge permit **9307-1** covers the discharge of stormwater and sediment from earthworks associated with the construction and installation of a pipeline between the Ahuroa-B wellsite and Stratford Power Station onto and into land in circumstances where it may enter surface water. This permit was issued to Contact Energy Limited by the Council on 30 August 2012 under Section 87(e) of the RMA. It is due to expire on 1 June 2017.

Condition 1 requires that the discharge licensed by the consent take place in accordance with the documentation provided with application.

Condition 2 relates to notification of works.

Conditions 3 and 4 address sediment control measures.

Condition 5 requires stabilisation of disturbed areas upon completion of earthworks.

Condition 6 requires that the best practicable option be used to minimise adverse effects.

Condition 7 is a lapse provision.

3.2.3 Air discharge permits

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

Contact Energy Ltd holds air discharge permit **7746-1** to cover the discharge of emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Ahuroa-B well site, together with miscellaneous emissions. This activity was formerly provided for by air discharge permit **7518-1**, that was issued to Origin Energy Ltd by the Council to cover emissions at 11 well sites, including Ahuroa-B, on 6 October 2009 under Section 87(e) of the RMA. On 23 November 2010, the part of the consent that relates to Ahuroa-B well site was

transferred to Contact Energy under section 137(2) of the Act. Discharge permit **7746-1** was issued to cover the separated activity. It is due to expire on 1 June 2028.

Conditions 1 and 2 deal with notification of flaring.

Condition 3 requires consultation on changes in equipment or process.

Condition 4 relates to monitoring of wind conditions.

Conditions 5 to 7 address the separation of liquid and solids before gas flaring.

Condition 8 requires adoption of the best practicable option to minimise effects from emissions.

Condition 9 defines which substances can be combusted.

Conditions 10 and 12 control smoke and odour. Condition 11 requires vapour recovery systems on hydrocarbon storage vessels.

Conditions 13 to 15 set limits on ambient ground level concentrations of contaminants arising from flaring.

Conditions 16 to 19 relate to analysis of gas composition, recording of visible smoke emissions, flare event logs, and provision of an annual report.

Condition 20 is a review provision.

3.2.4 Discharges to land

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

Contact Energy Ltd holds discharge permit **7432-1** to cover the discharge of contaminants (natural gas) to land (sub-surface using deep well injection) for the purposes of storage. This permit was issued by the Council on 2 December 2008 under Section 87(e) of the RMA. It was varied on 7 April 2011 to allow a reservoir pressure increase from 3,000 psia to 3,400 psia. It is due to expire on 1 June 2027.

Condition 1 requires adoption of the best practicable option to minimise effects on the environment.

Condition 2 requires discharged gas to meet a certain specification.

Condition 3 limits the maximum gas reservoir pressure, and condition 4 addresses monitoring of injection and reservoir pressures.

Conditions 5 and 6 are lapse and review provisions.

3.2.5 Land use consents

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

Contact Energy Limited holds 15 land use consents for structures on streams in relation to the pipeline from AGS to SPS.

Land use consents **9309-1** to **9322-1**, to install and use a pipeline for conveying gaseous hydrocarbons under the bed of the Kahouri and Piakau Stream, and 12 unnamed tributaries of the Makara, Ahuroa, Kahouri and Piakau Streams were issued by the Council on the same certificate on 30 August 2012 as resource consents under Section 87(a) of the RMA. The consents expire on 1 June 2028.

Condition 1 defines the locations of the installation and use of the pipeline.

Condition 2 requires the provision of a programme and schedule of works, details of the contractor, and notification.

Condition 3 requires that the best practicable option be used to prevent discharge of sediment and adverse effect on surface water.

Condition 4 sets a minimum depth for burial below the stream bed, and condition 5 restricts work to between 1 November and 31 May. Condition 6 requires that the area of stream bed disturbance be minimised and addresses reinstatement.

Condition 7 deals with sediment discharge and suspension, and mitigation of effects.

Condition 8 addresses the discovery of archeological remains.

Conditions 9 and 10 are lapse and review provisions.

Land use consent **9576-1**, to install and use a culvert in an unnamed tributary of the Makara Stream, including associated realignment, streambed disturbance and reclamation was issued by the Council on 6 June 2013 as a resource consent under Section 87(a) of the RMA. The consent expires on 1 June 2027.

Condition 1 requires that the discharge licensed by the consent take place in accordance with the documentation provided with application.

Conditions 2 and 3 limit the length and depth of the culvert.

Condition 4 requires prior notification of works.

Conditions 5 to 11 specify the physical design of the works.

Conditions 12 and 13 are about minimisation of streambed disturbance and sedimentation.

Conditions 14 and 15 deal with stabilisation of earthwork areas and maintenance of the structure.

Condition 16 addresses the discovery of archaeological remains.

Conditions 17 and 18 are lapse and review conditions.

3.3 Monitoring programme

3.3.1 Introduction

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

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

The monitoring programme for the Ahuroa-B site and pipeline consisted of four primary components.

3.3.2 Programme liaison and management

There is generally a significant investment of time and resources by the Council in ongoing liaison with resource consent holders over consent conditions and their interpretation and application:

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

3.3.3 Site inspections

The Ahuroa-B site was visited three times during the 2014-2015 review period. Inspections focussed on flaring activities and potential water discharge points including surface drainage networks and skimmer ponds. General site housekeeping was also assessed, and the neighbourhood was surveyed for environmental effects.

3.3.4 Chemical sampling

The Council undertook sampling of skimmer pit discharges leaving the site once during the review period. The sample was analysed for hydrocarbons, chloride, pH, conductivity, and suspended solids.

3.3.5 Data review

The consent holder is required to provide reservoir pressure and gas injection data routinely for Council review. Special conditions 3 and 4 of Consent 7432-1 stipulate the maximum allowable reservoir pressure, and require the Company to record injection pressures and relate this to maximum reservoir pressure. A summary of flaring data is required annually by condition 18 of consent 7746-1.

3.4 Results – Water

3.4.1 Inspections

22 August 2014

The site was inspected after rainfall, when stormwater discharge had ceased. The bunded areas were secure, and the ring drains and skimmer pits appeared clean. There was no evidence of any effect from stormwater discharges on the receiving water. No flaring was occurring.

22 October 2014

The site was inspected in dry weather and found tidy.

26 June 2015

The site was inspected following a weekend of extreme rainfall, resulting in a "State of Emergency" declaration for Taranaki. The Ahuroa B stormwater system coped well with the conditions - ring drains diverted water through skimmer pits as required, and where sediment settled. A sample of skimmer pit discharge was collected as part of routine monitoring procedure for this site. No flaring was being undertaken during the inspection and the site was found to be neat and tidy.

3.4.2 Results of discharge monitoring

A sample of skimmer pit discharge was collected from sampling site IND001046, identified in Figure 3, and shown in Photo 4 below.



Photo 4 Ahuroa-B site looking towards skimmer pond (left) and final pond discharge point (right)

Discharge results are presented in Table 30.

Table 30 2014-2015 skimmer pond discharge results

Date	Chloride (g/m ³)	Conductivity (mS/m@20C)	Hydrocarbons (g/m ³)	pH	Suspended solids (g/m ³)
26-Jun-15	7.5	8.3	<0.5	6.6	2
Consent limit	50		15	6.5-8.5	100

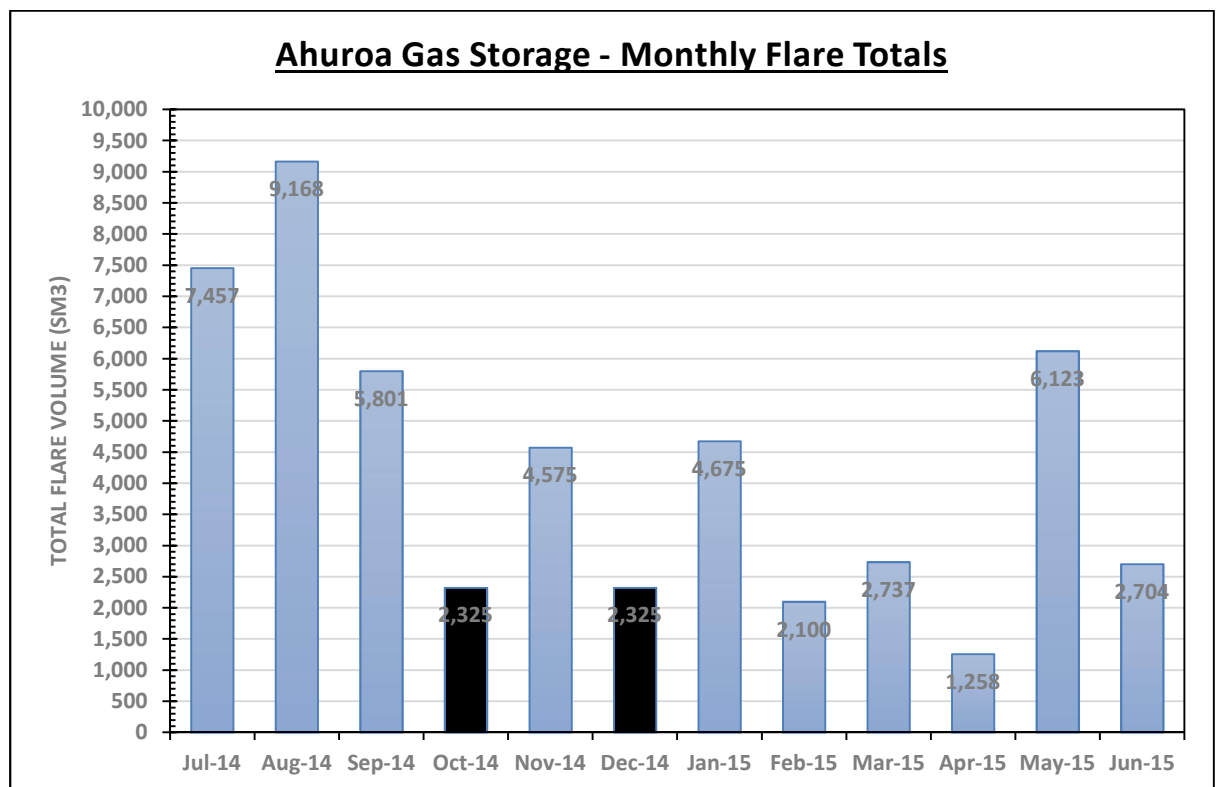
The results were well within consent limits, and discharge component concentrations would have been reduced further through dilution once the discharge eventually reached receiving waters. No hydrocarbons were detected, and the other water quality parameters were within typical surface water ranges.

3.5 Results - Air

3.5.1 Review of flaring data

During the 2014-2015 review period, short periods of flaring occurred at the Ahuroa-B wellsite. Flaring records were supplied to Council as required under condition 18 on consent **7746-1**. The entire dataset of daily flaring volumes was received on 24 September 2015. There were three periods, totalling several months between 24 September 2014 and 26 March 2015, during which flare flow metering faults occurred, resulting in no or erroneous record. Flared volumes were estimated for these periods on the basis of flare constant flow, of about 10 m³/h, and process flaring events. The estimated total annual flared gas volume was 51,248 Sm³. Figure 5 presents the recorded monthly flaring volumes from 1 July 2014 to 30 June 2015.

The Council and neighbours are notified when flaring at high rate was expected. No complaints were received.

**Figure 5** Ahuroa flaring volumes (Sm³) by month for 2014-2015

3.6 Results - Land

3.6.1 Reservoir pressure and injection pressure data review

Consent 7432-1 stipulates a maximum reservoir pressure of 3400 psia. There is also a requirement for the consent holder to record injection pressures and relate these data to the maximum reservoir pressures.

The data supplied to the Council are hourly reservoir pressure values from down-hole pressure gauges in the Ahuroa 3, 4, and 5ST-1 wells, and hourly injection pressure values from surface gauges on the Ahuroa 2a, 3, 4 and 5ST-1 wells. Figure 6 and Figure 7 show monthly maximum readings for the down-hole and injection pressure gauges, respectively.

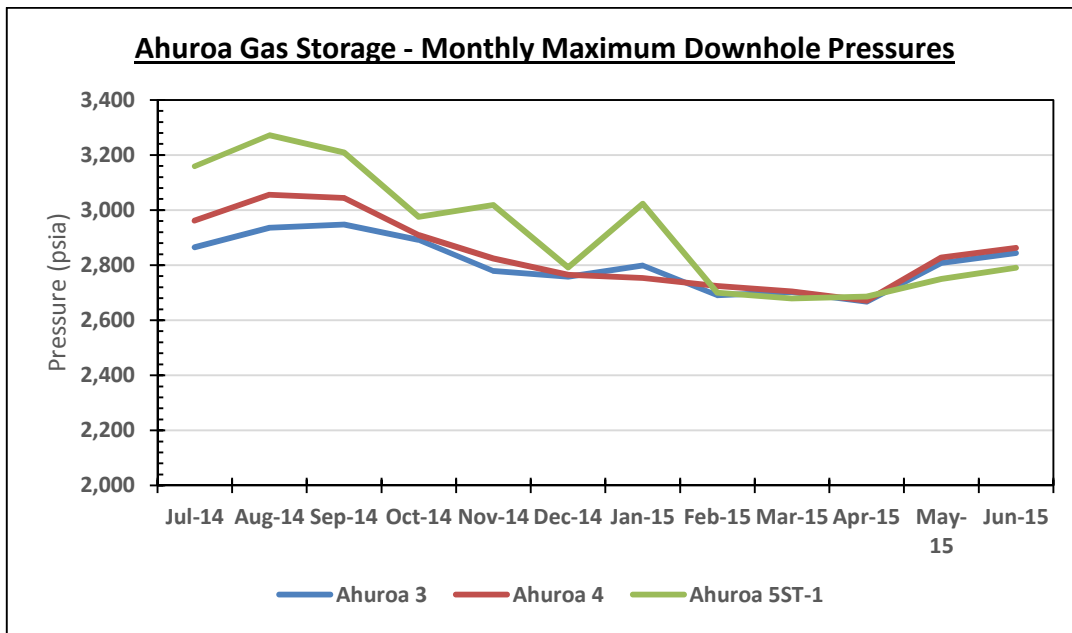


Figure 6 Monthly maximum downhole pressures for Ahuroa wells 3, 4, and 5ST-1, 2014-2015

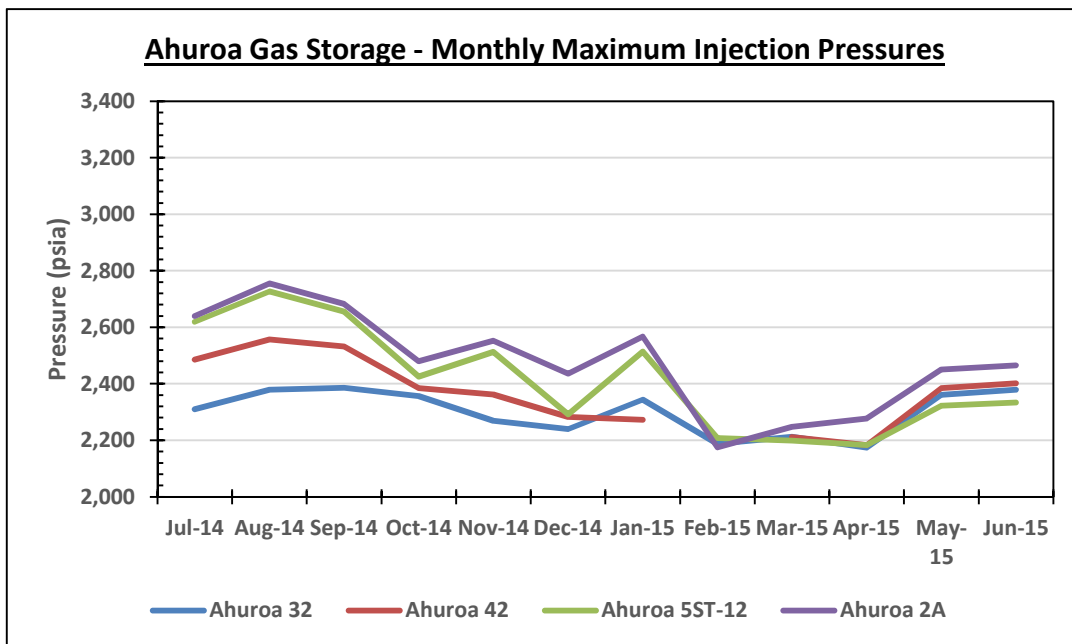


Figure 7 Monthly maximum injection pressures for Ahuroa wells 3, 4 and 5ST-1, 2014-2015

Reservoir pressure and injection pressure monitoring data show compliance with the pressure limit of 3400 psi in condition 3 of consent **7432-1**.

There was a gap in the injection pressure record for Ahuroa 4 injection between 20 January and 6 March 2015 while the meter flowline was removed for maintenance.

3.7 Results – Pipeline

The gas pipeline between AGS and SPS was constructed and commissioned between January and October 2013. Various silt retention measures, including hay bales, silt cloth, fluming, bunds and rip-rap, were used along the pipeline, and revegetation with grass and by riparian planting took place when soil moisture levels became suitable.

No significant effect on waterways was found during the construction, or since.

3.8 Annual report by Contact Energy

Under condition 19 on consent **7746-1** to discharge emissions to air, Contact Energy is required to provide to Council during May each year a report:

- Detailing any energy efficiency measures implemented on the site;
- Detailing smoke emissions as required under conditions 17;
- Detailing any measures undertaken or proposed to reduced smoke emissions;
- Detailing any measures undertaken or proposed to reduce flaring
- Addressing any other issue relevant to the minimisation or mitigation of emissions from the flare;
- Reviewing all options and technological advances relevant to the reduction or mitigation of any discharge to air from the site, how these might be applicable and/or implemented at the site, and the benefits and costs of these advances.

This condition was imposed in relation to flaring from well workovers and emergency situations, and miscellaneous emissions, associated with a hydrocarbon production wellsite. Since 2010, the consent has provided for the operation of an underground gas storage facility with relatively small amounts of emissions.

The required report for the AGS site was received several months late, on 7 December 2015. Previously, the report for AGS had been incorporated within a larger annual report on several gas production sites that was prepared by the former consent holder, Origin Energy. The report is attached as Appendix VII.

No significant change occurred at the site during the review period. The potential for technological advances to reduce discharges to air is stated to be limited, given the intermittent nature of flaring events. No visible emissions or complaints were recorded.

The report is satisfactory.

3.9 Investigations, interventions, and incidents

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

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The Incident Register (IR) 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 2014-2015 period, for the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with Contact's conditions in resource consents or provisions in Regional Plans in relation to Ahuroa Gas Storage facility and the connecting pipeline to Stratford Power Station.

3.10 Discussion

3.10.1 Discussion of performance

The Company performed well in respect to its consent conditions during the monitoring period. No incidents were recorded. Monitoring data were supplied, though delayed at times, and there were some gaps in the record as the result of equipment failure. The data showed compliance with the resource consent conditions. Contact Energy staff were cooperative at all times and no other issues were identified during the monitoring period.

3.10.2 Environmental effects of exercise of consents

No adverse environmental effects have been identified in the monitoring conducted during the 2014-2015 monitoring period in respect to any of the resource consents held by the Company for activities at the Ahuroa Gas Storage facility.

Inspections and discharge monitoring have indicated that Ahuroa-B site surface drainage and stormwater treatment systems are well designed and working effectively, and that site management is generally good.

There are no indications that the injection/withdrawal processes have had any adverse environmental effects.

3.11 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Table 31 to Table 37.

Table 31 Summary of performance for Consent **3681-2**

Purpose: To discharge treated stormwater and uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Ahuroa-B wellsite onto and into land and into and unnamed tributary of the Makara Stream in the Waitara catchment		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adopt best practicable option to prevent or minimise adverse effects	Inspections	Yes
2. Catchment area limited	Inspections and records	Yes
3. Notification provided prior to commencement of site works or drilling	Not undertaken during period under review	N/A
4. Consent holder to provide site contingency plans for the site.	Plan received by Council and approved in 2003. Most recent update July 2011 approved by Council	Yes
5. All stormwater and uncontaminated production water to be directed through a stormwater treatment system prior to discharge	Inspections, review of site plans	Yes
6. Stormwater system management and maintenance in accordance with consent application documentation	Inspection and liaison	Yes
7. Hazardous substance storage areas to be bunded and directed to sumps	Inspections	Yes
8. Limits on constituents in the discharge	Sampling	Yes
9. Discharge shall not result in increase in temp or BOD downstream of the mixing zone	Not sampled during monitoring period	N/A
10. Controls on effect of discharge in receiving water	Inspections	Yes
11. Consent holder to notify prior to site reinstatement	Site still in use	N/A
12. Optional review provision re environmental effects	Next option for review in June 2021	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 32 Summary of performance for Consent **7432-1**

Purpose: To discharge contaminants (natural gas) into land for the purpose of gas storage		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent holder to adopt best practicable option at all times	Inspections, consent holder liaison and data review	Yes
2. Gas discharged must meet into the ground must meet defined specifications	Not assessed	N/A
3. The pressure in the reservoir must not exceed 3400 psia	Data review	Yes
4. Consent holder to record injection pressure and reservoir pressure and supply to Council upon request	Data review, data supplied annually	Yes
5. Lapse condition	Consent exercised	N/A
6. Review provision	Next option for review in June 2021	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 33 Summary of performance data for Consent **7746-1**

Purpose: To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Ahuroa-B wellsite, together with miscellaneous emissions		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent holder to notify of flaring events longer than 5 minutes in duration	Notifications received as required	Yes
2. Consent holder to notify nearby residents of flaring events longer than 5 minutes in duration	No complaints received from neighbours	Yes
3. No alteration of plant equipment or processes leading to changes in the quality of emissions	Company records and inspections	Yes
4. Consent holder to monitor wind conditions prior to flaring	Company records	Yes
5. Liquids and solids to be separated prior to flaring	Company records and inspections	Yes
6. Consent holder to notify if unable to comply with SC5, and to immediately work to re-establish separation process	No instances of non compliance with SC5	N/A

Purpose: To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Ahuroa-B wellsite, together with miscellaneous emissions		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
7. No liquids/solids to be combusted through the flare system unless during emergency	No instances of non compliance with SC5 or 6	N/A
8. Consent holder to adopt BPO to minimise effects from emissions	Company records, inspections	Yes
9. Only treated substances from well stream to be combusted in flare pit	Company records, inspections	Yes
10. No objectionable odours or smoke beyond site boundary	Inspections, no complaints received	Yes
11. All hydrocarbon storage vessels shall be fitted with vapour recovery systems	Only produced hydrocarbon storage vessels on site so does not apply	N/A
12. Opacity of emissions to not exceed level 1 on Ringlemann scale for more than 4 minutes	Not assessed	N/A
13. The consent holder shall control carbon monoxide emissions to not exceed 10 mg/m ³ under ambient conditions	Not assessed	N/A
14. Consent holder to control nitrogen oxide emissions to not exceed 100 ug/m ³ under ambient conditions	Not assessed	N/A
15. Consent holder to ensure other contaminants from flaring do not exceed workplace exposure standards (DOL, 2002)	Not assessed	N/A
16. Consent holder to make an analysis of the gas/condensate stream available on request	Not requested during monitoring period	N/A
17. Visible smoke instances to be recorded and supplied to Council upon request	Not requested	N/A
18. Consent holder to record flaring events in a log and supply records to Council in an annual report	Inspections, records received	Yes
19. The consent holder to supply an annual report during May	Report received on 6 December 2015	No, 6 months late
20. Optional review provision re environmental effects	Optional review scheduled in June 2016, recommendation attached in section 3.11	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		Improvement required

N/A = not applicable

Table 34 Summary of performance for Consent **9307-1**

Purpose: To discharge stormwater and sediment from earthworks associated with the construction and installation of a pipeline between the Ahuroa-B wellsite and Stratford Power Station onto and into land in circumstances where it may enter surface water		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Discharge according to documentation submitted	Inspection by Council	N/A
2. Notification prior to works	Notification received, 7 January 2013	N/A
3. Sediment control measures to be installed to specific design	Inspection by Council	N/A
4. Retention of erosion and sediment control measures until site stabilised	Inspection by Council	N/A
5. Site stabilisation as soon as practicable	Inspection by Council	N/A
6. Adopt best practicable option	Inspection by Council	N/A
7. Lapse of consent	Consent was exercised	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		N/A
Overall assessment of administrative performance in respect of this consent		N/A

N/A = not applicable

Table 35 Summary of performance for Consent **9308-1**

Purpose: To take and use water from the Kahouri Stream for hydrostatic testing of pipelines		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on total abstraction volume	Measurement and recording by consent holder	N/A
2. Record of take	Supply of data to Council upon request	N/A
3. Adopt best practicable option	Inspection by Council	N/A
4. Screening of intake to protect fish	Inspection by Council	N/A
5. Lapse of consent	Consent was exercised	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		N/A
Overall assessment of administrative performance in respect of this consent		N/A

N/A = not applicable

Table 36 Summary of performance for Consents **9309-1** to **9322-1**

Purpose: To install and use a pipeline for conveying gaseous hydrocarbons under the bed of the Kahouri and Piakau Streams, and 12 unnamed tributaries of the Makara, Ahuroa, Kahouri and Piakau Streams		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Conduct activity in accordance with the application	Inspections, consent holder liaison	N/A
2. Notice to Council	Receipt of notice	N/A
3. Adoption of best practicable option	Inspection by Council	N/A
4. Pipeline depth	Inspection by Council	N/A
5. Timing of works	Inspection by Council	N/A
6. Minimise disturbed riverbed	Inspection by Council	N/A
7. Sediment control	Inspection by Council	N/A
8. Discovery of archaeological remains	Liaison with Council	N/A
9. Lapse of consent	Consent exercised	N/A
10. Review of consent	Next option for review in June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 37 Summary of performance for Consent **9576-1**

Purpose: To install and use a culvert in an unnamed tributary of Makara Stream, including associated realignment, streambed disturbance and reclamation		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Construction according to documentation submitted	Inspection by Council	N/A
2. Limit on maximum length of culvert	Inspection by Council	N/A
3. Limit on maximum depth of culvert	Inspection by Council	N/A
4. Notification of works	Notification received, 1 July 2013	N/A
5. Maximum gradient of culvert	Inspection by Council	N/A
6. Installation of headwalls and rip-rap	Inspection by Council	N/A

Purpose: To install and use a culvert in an unnamed tributary of Makara Stream, including associated realignment, streambed disturbance and reclamation		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
7. Rip-rap grading of certain size	Inspection by Council	N/A
8. Rip-rap placement as specified	Inspection by Council	N/A
9. Post-reconstruction of banks and bed	Inspection by Council	N/A
10. Maximum bank slope above culvert	Inspection by Council	N/A
11. Invert depth as specified	Inspection by Council	N/A
12. Minimisation of bed disturbance	Inspection by Council	N/A
13. Minimisation of sedimentation	Inspection by Council	N/A
14. Earthwork area stabilisation upon completion of activity	Inspection by Council	N/A
15. Maintenance of structure and channel	Inspection by Council	Yes
16. Actions upon discovery of archaeological remains	Liaison with Council and other parties	N/A
17. Lapse of consent	Consent was exercised	N/A
18. Optional review of consent	Next review available June 2015	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

During the year, the Company demonstrated a high level of environmental and an overall good level of administrative performance with the resource consents as defined in Section 1.1.4.

3.12 Alterations to monitoring programmes for 2015-2016

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account the extent of information made available by previous authorities, its relevance under the RMA, the obligations of the Act in terms of monitoring emissions/discharges and effects, and subsequently reporting to the regional community. The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki emitting to the atmosphere/discharging to the environment.

It is proposed that for 2015-2016 the monitoring programme remains unchanged from that implemented in the 2014-2015. A recommendation to this effect is attached to this report.

3.13 Exercise of optional review of consents

Resource consents **7745-1** (discharge emissions to air), **7746-1** (discharge emissions to air), and **9309-1 to 9322-1** (install pipeline under various streams) each provide for an optional review of consent in June 2016.

Condition 20 on consent **7745-1**, condition 20 on consent **7746-1**, and condition 10 on consents **9309-1 to 9322-1** allow the Council to review the consents, for the purpose of ensuring that the respective conditions are adequate to deal with any adverse effect of the respective activities on the environment.

Based on the results of monitoring in the period under review, it is considered that there are no grounds that require a review of any of the consents to be pursued or grounds to exercise the review option.

Recommendations to this effect are presented in Section 3.14 of this report.

3.14 Recommendations

1. THAT monitoring of consented activities at Ahuroa gas storage (AGS) facilities and for the connecting pipeline to Stratford Power Station (SPS) in the 2015-2016 year continue at the same level as in 2014-2015.
2. THAT the option for a review of resource consent **7745-1** (discharge emissions to air) in June 2016, as set out in condition 20 of the consent not be exercised, on the ground that current conditions are adequate to deal with any potential adverse effects.
3. THAT the option for a review of resource consent **7746-1** (discharge emissions to air) in June 2016, as set out in condition 20 of the consent not be exercised, on the ground that current conditions are adequate to deal with any potential adverse effects.
4. THAT the option for a review of resource consents **9309-1 to 9322-1** (install pipeline under various streams) in June 2016, as set out in condition 10 of the consents not be exercised, on the ground that current conditions are adequate to deal with any potential adverse effects.

Glossary of common terms and abbreviations

The following abbreviations and terms are used within the report:

AGS	Ahuroa underground gas storage facility
Biomonitoring	Assessing the health of the environment using aquatic organisms
BPO	Best practicable option
Condy	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m
DRP	Dissolved reactive phosphorus
fresh	Elevated flow in a stream, such as after heavy rainfall
HHV	Higher heating value, the gross heat of combustion, expressed as kilojoules (of gas) per kilowatt-hour (of electricity)
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
LHV	Lower heating value, the net heat of combustion, expressed as kilojoules (of gas) per kilowatt-hour (of electricity)
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 ₃	Un-ionised ammonia, normally expressed in terms of the mass of nitrogen (N)
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons)
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than 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
psia	Pounds per square inch absolute. The pressure measured is relative to a vacuum rather than the ambient atmospheric pressure
resource consent	Refer Section 98 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
SGT	Stratford gas turbine plant, commissioned in 1976 and decommissioned in
Sm ³	Standard cubic meter
SP1	Stratford peaker 1 plant, commissioned May 2011
SP2	Stratford peaker 2 plant, not constructed
SS	Suspended solids
TCC1	Taranaki combined cycle 1 power plant, commissioned in 1998
TCC2	Taranaki combined cycle 2 power plant, not constructed
Temp	Temperature, measure in °C (degrees Celsius)
Turb	turbidity, expressed in NTU
UI	Unauthorised Incident
UIR	Unauthorised Incident Register – contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan
v/v	Volume for volume, as the ratio between gases in a mixture

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

Bibliography and references

Origin Energy New Zealand (2012): *Annual Flaring Report to Taranaki Regional Council, 1 April 2011 – 31 March 2012*. 16 May 2012, 20 pp.

Origin Energy New Zealand (2013): *Annual Flaring Report to Taranaki Regional Council, 1 April 2012 – 31 March 2013*. 27 May 2013, 20 pp.

Origin Energy New Zealand (2014): *Annual Flaring Report to Taranaki Regional Council, 1 April 2013 – 31 March 2014*. 21 May 2014, 19 pp.

Taranaki Regional Council (1998): *Stratford Power Ltd Combined Cycle Power Station Monitoring Programme Annual Report 1996-1998*. Technical Report 98-75

Taranaki Regional Council (1999): *Stratford Power Ltd Combined Cycle Power Station Monitoring Programme Annual Report 1998-1999*. Technical Report 99-45

Taranaki Regional Council (2000): *Stratford Power Ltd Combined Cycle Power Station Monitoring Programme Annual Report 1999-2000*. Technical Report 00-66

Taranaki Regional Council (2001): *Stratford Power Ltd Combined Cycle Power Station Monitoring Programme Annual Report 2000-2001*. Technical Report 01-16

Taranaki Regional Council (2002): *Stratford Power Ltd Combined Cycle Power Station Monitoring Programme Annual Report 2001-2002*. Technical Report 02-38

Taranaki Regional Council (2003): *Stratford Power Ltd Combined Cycle Power Station Monitoring Programme Annual Report 2002-2003*. Technical Report 03-59

Taranaki Regional Council (2004): *Stratford Power Ltd Combined Cycle Power Station Monitoring Programme Annual Report 2003-2004*. Technical Report 04-11

Taranaki Regional Council (2005): *Stratford Power Ltd Combined Cycle Power Station Monitoring Programme Annual Report 2004-2005*. Technical Report 05-99

Taranaki Regional Council (2006): *Stratford Power Ltd Combined Cycle Power Station Monitoring Programme Annual Report 2005-2006*. Technical Report 06-97

Taranaki Regional Council (2007): *Stratford Power Ltd Combined Cycle Power Station Monitoring Programme Annual Report 2006-2007*. Technical Report 07-87

Taranaki Regional Council (2008): *Contact Energy Limited Stratford Power Station Monitoring Programme Annual Report 2007-2008*. Technical Report 08-97

Taranaki Regional Council (2009): *Contact Energy Limited Stratford Power Station Monitoring Programme Annual Report 2008-2009*. Technical Report 09-98

Taranaki Regional Council (2010): *Contact Energy Limited Stratford Power Station Monitoring Programme Annual Report 2009-2010*. Technical Report 10-93

Taranaki Regional Council (2010): *Kahouri Catchment Monitoring Programme Annual Report 2009-2010*. Technical Report 10-99

Taranaki Regional Council (2012): *Contact Energy Limited Stratford Power Station Monitoring Programme Biennial Report 2010-2012*. Technical Report 2012-95

Taranaki Regional Council (2014): *Contact Energy Limited Stratford Power Station Monitoring Programme Biennial Report 2012-2014*. Technical Report 2014-71

Appendix I

Resource consents for Stratford Power Station

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

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON

Change To
Conditions Date: 6 March 2008 [Granted: 10 December 1997]

Conditions of Consent

Consent Granted: To discharge up to 464 litres/second of stormwater from the Stratford Power Station Peaking Plant site into an unnamed tributary of the Kahouri Stream and into the Kahouri Stream in the Patea catchment at or about 2623900E-6207100N

Expiry Date: 1 June 2016

Review Date(s): June 2010

Site Location: Stratford Power Station site, State Highway 43 [East Road], Stratford

Legal Description: Lot 1 DP 19365 Blk II Ngaere SD

Catchment: Patea

Tributary: Kahouri

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

Conditions 1 - 2 [unchanged]

1. That after allowing for a mixing zone of 50 metres, the discharge shall not give rise to any of the following effects in the receiving waters of the Kahouri Stream:
 - i) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - ii) any conspicuous change in the colour or visual clarity;
 - iii) any emission of objectionable odour;
 - iv) the rendering of fresh water unsuitable for consumption by farm animals; and
 - v) any significant adverse effects on aquatic life.
2. That the components of the discharge shall not exceed the following concentrations:

pH (range)	6-9
Oil and grease (infrared spectroscopy technique)	15 gm ⁻³
Suspended solids	100 gm ⁻³

Condition 3 - changed

3. That the discharge of stormwater as licensed by this consent shall be undertaken in accordance with the documentation submitted in support of applications 202 & 4899.

Consent 3939-2

Condition 4 – unchanged

4. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2010, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at that time.

Signed at Stratford on 6 March 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Change To
Conditions Date: 9 February 2010 [Granted: 14 December 1994]

Conditions of Consent

Consent Granted: To discharge emissions into the air from fuel combustion and other related activities associated with the operation of the Stratford Power Station and ancillary plant at or about (NZTM) 1713825E-5645366N

Expiry Date: 1 June 2022

Review Date(s): As per special condition 11

Site Location: Stratford Peaker Power Station,
State Highway 43 [East Road], Stratford

Legal Description: Lot 1 DP 19365 & Lot 1 DP 17776 Blk II Ngaere SD

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 consent holder shall adopt the best practicable option 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. That prior to undertaking any alterations to the plant, processes or operations, as specified in the application which may significantly change the nature or quantity of contaminants emitted from the site, the consent holder shall consult with the Chief Executive and shall obtain any necessary approvals under the Resource Management Act.
3. That the consent holder shall provide to the Council within two years from the granting of this consent and every six years thereafter a written report:
 - a) reviewing any technological advances in the reduction or mitigation of emissions, how these might be applicable and/or implemented at the power station, and the costs and benefits of these advances; and
 - b) detailing an inventory of emissions from the site of such contaminants as the Chief Executive, Taranaki Regional Council, may from time to time specify following consultation with the consent holder; and
 - c) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the power station; and
 - d) addressing any other issue relevant to the minimisation or mitigation of emissions from the site that the Chief Executive, Taranaki Regional Council, considers should be included; and
 - e) detailing carbon dioxide emissions from the site.

Consent 4022-2

4. That the consent holder shall control all emissions of carbon monoxide to the atmosphere from the site, 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.
5. That the consent holder shall control all emissions of nitrogen oxides to the atmosphere from the site, 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 20 ug m^{-3} [twenty-four-hour average exposure], or 60 ug m^{-3} [four-hour average exposure] at or beyond the boundary of the site.
6. That the consent holder shall control all emissions to the atmosphere from the site of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, 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].
7. That except in any period of 30 minutes following the initiation of start-up of a turbine or in any period of 30 minutes prior to the cessation of the generation of electricity from a turbine, in the event that the discharge of nitrogen oxides exceeds:
 - a) a mass emission rate for the site of 175 g s^{-1} , or
 - b) *[cancelled]*
 - c) a concentration in any gas turbine stack equivalent to 100 mg m^{-3} at 450 degrees Celsius, or to 125 ppm [volumetric basis].

then the operator shall immediately initiate all reasonable steps to reduce the emissions to below these levels as soon as practicable.
8. That the sum of all discharges of nitrogen oxides from the site of the power station is not to exceed 830 kg in any period of one hour.
9. That the minimum height of discharge of the products of combustion from the turbines shall be 15 metres above ground level.
10. That the discharges authorised by this consent shall not give rise to any direct significant adverse ecological effect on any ecosystems in the Taranaki region, including but not limited to habitats, plants, animals, microflora and microfauna.

Consent 4022-2

11. That subject to the provisions of this condition, the Taranaki Regional Council may within six months of receiving a report prepared by the consent holder pursuant to condition 3 of this consent, serve notice that it intends to review the conditions of this resource consent in accordance with Section 128(1)(a) of the Act 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 and which it is appropriate to deal with at the time of the review or
 - b) requiring the holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; or
 - c) taking into account any Act of Parliament, regulation, national policy statement, regional policy statement or regional rule which relates to limiting, recording, or mitigating carbon dioxide and which is relevant to emissions from the Stratford gas turbine power station.

Signed at Stratford on 9 February 2010

For and on behalf of
Taranaki Regional Council

Chief Executive

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

Name of
Consent Holder: Contact Energy Limited
 P O Box 10742
 WELLINGTON 6143

Change To 9 February 2010 [Granted: 15 August 1995]
Conditions Date:

Conditions of Consent

Consent Granted: To discharge contaminants to air, subject to the following
 specified conditions, from a combined cycle power station
 and ancillary plant ['the station'] located adjacent to East
 Road approximately three kilometres East of the town of
 Stratford at or about (NZTM) 1713732E-5645766N

Expiry Date: 14 August 2029

Site Location: East Road, Stratford

Legal Description: Lot 2 of Subdiv of Lot 2 Lt 18343 Blk II Ngaere SD

Consent 4454-1

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

(note condition numbering intentionally begins at 4)

- 4) That 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 discharge of contaminants into the environment from the site.
- 5) That a general outline of the methods, specifications, operating guidelines or other measures which represent the best practicable option at the time of commissioning will be supplied by the consent holder and thereafter attached to this consent as Schedule A.
- 6) That the measures representing the best practicable option may be reviewed in accordance with the procedure provided for in condition 18.
- 7) That prior to undertaking any alterations to the plant, processes or operations specified in the application, which alterations may significantly change the nature or quantity of contaminants emitted from the site, the consent holder shall consult with the Chief Executive and shall obtain any necessary approvals under the Resource Management Act.
- 8) That the consent holder shall provide to the Council within two years from the commencement of commissioning of the Station and again at four years from commencement of commissioning of the Station and every six years thereafter, a written report:
 - a) reviewing any technological advances in the reduction or mitigation of emissions, especially, but not exclusively in respect of the cooling tower plume and of carbon dioxide, how these might be applicable and/or implemented at the power station, and the costs and benefits of these advances; and
 - b) detailing an inventory of emissions from the site of such contaminants as the Chief Executive may from time to time specify following consultation with the consent holder; and

Consent 4454-1

- c) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the Station; and
 - d) addressing any other issue relevant to the minimisation or mitigation of emissions from the site that the Chief Executive considers should be included; and
 - e) detailing carbon dioxide emissions from the site.
- 9) That the consent holder shall control all emissions of carbon monoxide to the atmosphere from the site, 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/m³ [eight-hour average exposure], or 30 mg/m³ [one-hour average exposure] at or beyond the boundary of the site.
- 10) That the consent holder shall control all emissions of nitrogen oxides to the atmosphere from the site, 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 µ/m³ [twenty-four hour average exposure], or 95 µg/m³ [four-hour average exposure] at or beyond the boundary of the site.
- 11) That the consent holder shall control all emissions to the atmosphere from the site of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, 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].
- 12) That except in any period of 240 minutes following the initiation of start-up of a turbine or in any period of 30 minutes prior to the cessation of the generation of electricity from a turbine, in the event that the discharge of nitrogen oxides exceeds:-
- a) a mass emission rate for the site of 70 g/s, or
 - b) a mass emission rate per gas turbine stack of [70 divided by n] g/s [where n = number of gas turbine stacks], or
 - c) a concentration in any gas turbine stack equivalent to 75 mg/m³ at 84° Celsius, or to 50 ppm [volumetric basis] then the operator shall immediately initiate all reasonable steps to reduce the emissions to below these levels as soon as practicable.

Consent 4454-1

- 13) That the sum of all discharges of nitrogen oxides from the site of the power station is not to exceed 430 kg in any period of one hour.
- 14) That the minimum height of discharge of the products of combustion from the turbines shall be 35 metres above ground level.
- 15) That the discharges authorised by this consent shall not give rise to any direct significant adverse ecological effect on any ecosystems in the Taranaki region, including but not limited to habitats, plants, animals, microflora, and microfauna.
- 16) That the evaporative cooling system to be used shall not produce a visible plume at any ambient condition further from saturation than 6° Celsius and 85% relative humidity.
- 17) That the evaporative cooling system shall be operated in order that the loss of cooling water as droplet drift to atmosphere does not exceed in aggregate 0.02% of the cooling water circulation rate at the time.
- 18) That 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 8 of this consent, 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 for the purpose 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 and which it is appropriate to deal with at the time of the review; or
 - b) requiring the holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; or
 - c) taking into account any Act of Parliament, regulation, national policy statement, regional policy statement or regional rule which relates to limiting, recording, or mitigating carbon dioxide and which is relevant to emissions from the Station.
- 19) That this consent shall lapse on the expiry of six years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to Section 125(b) of the Resource Management Act 1991.

Signed at Stratford on 9 February 2010

For and on behalf of
Taranaki Regional Council

Chief Executive

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON

Change To
Conditions Date: 6 March 2008 [Granted: 25 May 1994]

Conditions of Consent

Consent Granted: To take up to 19,440 cubic metres/day [225 litres/second averaged over 15 minutes] of water on a continuous basis from the Patea River for use on Power Stations at East Road, Stratford at or about 2631900E-6204900N

Expiry Date: 1 June 2028

Review Date(s): June 2010, June 2016, June 2022

Site Location: Toko Road, Stratford

Legal Description: Patea Riverbed adjoining Pt Lot 2 DP 739 & Lot 1 DP 20723 Blk IV Ngaere SD

Catchment: Patea

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 resource consent holder shall install and operate a measuring device capable of recording instantaneous and daily rates of abstraction and shall make such records available to the Chief Executive, Taranaki Regional Council, upon request.
- 2. When the flow in the Patea River at the Taranaki Regional Council Skinner Road recorder [Q20:260-064] is more than 765 litres per second, up to 225 litres per second may be abstracted.
- 3. When the flow in the Patea River at the Taranaki Regional Council Skinner Road recorder [Q20:260-064] is between 765 litres per second and 690 litres per second abstraction may be up to a rate of the flow at the Skinner Road recorder less 540 litres per second.
- 4. When the flow in the Patea River at the Taranaki Regional Council Skinner Road recorder [Q20:260-064] is less than 690 litres per second, up to 150 litres per second may be abstracted.
- 5. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2010, and/or June 2016, and/or June 2022, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which were either not foreseen at the time the application was considered and which it is appropriate to deal with at the time of review.

Signed at Stratford on 6 March 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited (WELLINGTON)
P O Box 10742
WELLINGTON

Change To
Conditions Date: 20 January 2000 [Granted: 25 May 1994]

Conditions of Consent

Consent Granted: To erect, place, use and maintain an intake structure in
and on the bed of the Patea River at or about GR:
Q20:319-049

Expiry Date: 1 June 2028

Review Date(s): June 1998, June 2004, June 2010, June 2016, June 2022

Site Location: Patea River, approximately 1 km downstream from the
Toko Stream confluence, Toko Road, Toko, Stratford

Legal Description: Pt Sec 2 DP 1041 Blk IV Ngaere SD

Catchment: Patea

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 consent holder shall notify the Taranaki Regional Council, at least 48 hours prior to the commencement and upon completion of the initial construction and again prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water.
2. That the structure[s] authorised by this consent shall be constructed generally in accordance with the documentation submitted in support of the application and shall be maintained to ensure the conditions of this consent are met.
3. That the consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
4. That the consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
5. That the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.
6. That any disturbance of parts of the riverbed covered by water and/or any works which may result in downstream discolouration of water shall be undertaken only between 1 November and 30 April, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.

Consent 4456-1

7. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2004 and/or June 2010 and/or June 2016 and/or June 2022, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 4 July 2005

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON

Change To
Conditions Date: 6 March 2008 [Granted: 25 May 1994]

Conditions of Consent

Consent Granted: To erect, place, use and maintain a diffuser structure in and above the bed of the Patea River for the purpose of discharging used water from Power Stations at East Road, Stratford at or about 2624600E-6206700N

Expiry Date: 1 June 2028

Review Date(s): June 2010, June 2016, June 2022

Site Location: Patea River, Approximately 1 km east of the site above the confluence with the Kahouri Stream, State Highway 43 [East Road], Stratford

Legal Description: Patea Riverbed adjoining Pt Sec 121 Blk II Ngaere SD

Catchment: Patea

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. Prior to commencing construction the consent holder shall provide plans and details of any modifications to the diffuser structure, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council. These plans and details shall be in accordance with 'option C', as outlined in the report 'Comments on Diffuser Design' [J C Rutherford, NIWA Ecosystems] provided with the application for this consent. Any modifications to the diffuser structure shall be in accordance with Section 3 of the report 'Stratford Power Station Expansion Project: Water Resources Engineering Summary Report [G Boyd, Meritec Limited, June 2001].
2. The diffuser structure shall be constructed and maintained in accordance with the plans and details provided under condition 1, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.
3. The structure[s] that are the subject of this consent shall not result in the obstruction of fish passage.
4. The consent holder shall notify the Taranaki Regional Council prior to the commencement and upon completion of any subsequent maintenance works that would involve disturbance of or deposition to the riverbed or discharges to water.
5. Modification and any instream maintenance works [that would involve disturbance of or deposition to the riverbed or discharges to water] shall only take place between 1 November and 30 April inclusive, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.
6. The consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
7. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.

Consent 4458-1

8. The structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.
9. The Taranaki Regional Council may review any or all of the conditions of this consent, by giving notice of review during the month of June 2010 and/or 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 consent which were not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review.

Signed at Stratford on 6 March 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date
[change]: 23 March 2012

Commencement
Date [change]: 23 March 2012 [Granted: 25 May 1994]

Conditions of Consent

Consent Granted: To discharge stormwater from the operation of a power station site at or about (NZTM) 1713810E-5645800N into an unnamed tributary of the Piakau Stream at or about (NZTM) 1713959E-5646039N and into the Kahouri Stream at or about (NZTM) 1713635E-5645679N, both tributaries of the Patea River

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Stratford Power Station Site, State Highway 43 [East Road], Stratford

Legal Description: [Part of Stratford Power Station Site – TCC1, TCC2/SP2]
Lot 2 DP 19365, Lot 3 DP 19365 and Sec 134 Blk II
Ngaere SD
[Discharge Points] Lot 2 DP 7012 – Kahouri Stream,
Lot 3 DP 19365 – unnamed tributary of Piakau Stream

Catchment: Patea

Tributary: Kahouri
Piakau

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 forward plans of the upgraded stormwater catchment and treatment system within three months of completion of construction activities.
2. The stormwater discharged shall be from a catchment area not exceeding nine (9) hectares.
3. The following concentrations shall not be exceeded in the discharge:

Component	Concentration
pH [range]	6 - 9
Oil and grease	15 gm ⁻³
Suspended solids	100 gm ⁻³

This condition shall apply prior to the entry of the stormwater into the receiving waters, at designated sampling points approved by the Chief Executive, Taranaki Regional Council.

4. The consent holder shall prepare and maintain a contingency plan, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council, for action to be taken in the event of accidental discharge or spillage of contaminants; the initial plan to be provided at least three months prior to the exercise of this consent.
5. After allowing for reasonable mixing in a 5-metre zone from any discharge point, the discharge must not give rise to any or all of the following effects in the receiving waters:
 - a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;

Consent 4459-1

- b) any conspicuous change in the colour or visual clarity;
 - c) any emission of an objectionable odour;
 - d) the rendering of freshwater unsuitable for consumption by farm animals;
 - e) any significant adverse effects on aquatic life, habitats, or ecology;
 - f) any undesirable biological growths.
6. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during June 2004, and/or June 2010, and/or June 2016 and/or June 2022, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review.

Signed at Stratford on 23 March 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date [change]: 23 March 2012

Commencement Date [change]: 23 March 2012 [Granted: 25 May 1994]

Conditions of Consent

Consent Granted: To erect, place, use and maintain, in and above the beds of an unnamed tributary of the Piakau Stream at or about (NZTM) 1713959E-5646039N and of the Kahouri Stream at or about (NZTM) 1713635E-5645679N, both tributaries of the Patea River, structures for the purpose of discharging stormwater from a power station site at or about (NZTM) 1713810E-5645800N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Stratford Power Station Site, State Highway 43 [East Road], Stratford

Legal Description: [Part of Stratford Power Station Site – TCC1, TCC2/SP2]
Lot 2 DP 19365, Lot 3 DP 19365 and Sec 134 Blk II Ngaere SD
[Discharge Points] Lot 2 DP 7012 – Kahouri Stream,
Lot 3 DP 19365 – unnamed tributary of Piakau Stream

Catchment: Patea

Tributary: Kahouri
Piakau

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

General condition

- 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. Prior to commencing construction the consent holder shall provide plans and details of the stormwater discharge structure[s], to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.
2. The stormwater discharge structure[s] shall be constructed and maintained in accordance with the plans and details provided under condition 1, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.
3. The structure[s] that are the subject of this consent shall not result in the obstruction of fish passage.
4. The consent holder shall notify the Taranaki Regional Council prior to the commencement and upon completion of any subsequent maintenance works that would involve disturbance of or deposition to the riverbed or discharges to water.
5. Any instream maintenance works [that would involve disturbance of or deposition to the riverbed or discharges to water] shall only take place between 1 November and 30 April inclusive, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.
6. The consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
7. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
8. The structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.

Consent 4460-1

9. The Taranaki Regional Council may review any or all of the conditions of this consent, by giving notice of review during the month of June 2004 and/or June 2010 and/or 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 consent which were not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review.

Signed at Stratford on 23 March 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date
[change]: 23 March 2012

Commencement
Date [change]: 23 March 2012 [Granted: 25 May 1994]

Conditions of Consent

Consent Granted: To erect, place, use and maintain in, over and under the bed of the Kahouri Stream a tributary of the Patea River, within the site and adjacent land immediately to the southeast a bridge at or about (NZTM) 1713932E-5645443N, pipelines, cables and associated utilities for a power station site at or about (NZTM) 1713810E-5645800N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Stratford Power Station Site, State Highway 43 [East Road], Stratford

Legal Description: [Part of Stratford Power Station Site – TCC, TCC2/SP2] Lot 2 DP 19365, Lot 3 DP 19365 and Sec 134 Blk II Ngaere SD, [Bridge structure] Pt Sec 108 Blk II Ngaere SD

Catchment: Patea

Tributary: Kahouri

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

General condition

- 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. Prior to commencing construction the consent holder shall provide plans and details of the structure, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.
- 2. The structure shall be constructed and maintained in accordance with the plans and details provided under condition 1, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.
- 3. The structure that is the subject of this consent shall not result in the obstruction of fish passage.
- 4. The consent holder shall notify the Taranaki Regional Council prior to the commencement and upon completion of any subsequent maintenance works that would involve disturbance of or deposition to the riverbed or discharges to water.
- 5. Any instream maintenance works [that would involve disturbance of or deposition to the riverbed or discharges to water] shall only take place between 1 November and 30 April inclusive, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.
- 6. The consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
- 7. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
- 8. The structure authorised by this consent shall be removed and the area reinstated, if and when the structure are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure removal and reinstatement.

Consent 4461-1

9. The Taranaki Regional Council may review any or all of the conditions of this consent, by giving notice of review during the month of June 2004 and/or June 2010 and/or 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 consent which were not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review.

Signed at Stratford on 23 March 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON

Change To
Conditions Date: 6 March 2008 [Granted: 25 May 1994]

Conditions of Consent

Consent Granted: To erect, place, use and maintain water pipelines and associated control cables above, through or below the beds of the Toko Stream and various small unnamed streams, for the purpose of water transmission from the Patea River to Power Stations at East Road, Stratford at or about 2631900E-6204900N

Expiry Date: 1 June 2028

Review Date(s): June 2010, June 2016, June 2022

Site Location: State Highway 43 [East Road], Stratford

Legal Description: Pt Secs 134 & 132, Secs 110, 111 & 130 Blk II Ngaere SD, Subdivision 2 of Sec 112 Ngaere SD, Lots 1 & 2 DP 363968, Lot 1 DP 16285, Lot 1 DP 141, Lot 1 DP 17136, Pt Lots 8 to 13 DP 141, Pt Secs 39 & 40 Blk III Ngaere SD, Lot 2 DP 1115, Pt Lots 1 & 2 DP 739, Lot 1 DP 20723

Catchment: Patea

Tributary: Toko

*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. Prior to commencing construction the consent holder shall provide plans and details of the pipeline and associated structure[s], to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.
2. The pipelines and associated structure[s] shall be constructed and maintained in accordance with the plans and details provided under condition 1, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.
3. The exercise of this consent shall not restrict the passage of fish.
4. The consent holder shall notify the Taranaki Regional Council prior to the commencement and upon completion of any subsequent maintenance works that would involve disturbance of or deposition to the riverbed or discharges to water.
5. Any instream maintenance works [that would involve disturbance of or deposition to the riverbed or discharges to water] shall only take place between 1 November and 30 April, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.
6. The consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
7. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
8. The structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.

Consent 4462-1

9. The Taranaki Regional Council may review any or all of the conditions of this consent, by giving notice of review during the month of June 2010 and/or 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 consent which were not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review.

Signed at Stratford on 6 March 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date [change]: 23 March 2012

Commencement Date [change]: 23 March 2012 [Granted: 24 July 1995]

Conditions of Consent

Consent Granted: To erect, place, use and maintain in, over and under the bed of an unnamed tributary of the Kahouri Stream in the Patea catchment at or about (NZTM) 1713735E-5645420N, within the site and adjacent land immediately to the southeast a bridge structure to convey high voltage electricity cables, pipelines, cables and associated utilities for a power station site at or about (NZTM) 1713810E-5645800N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Stratford Power Station Site, State Highway 43 [East Road], Stratford

Legal Description: [Stratford Power Station Site] Lot 1 DP 19365, Lot 2 DP 19365, Lot 3 DP 19365 and Sec 134 Blk II Ngaere SD, [Bridge structure] Lot 1 DP 19365

Catchment: Patea

Tributary: Kahouri

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

General condition

- 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. Prior to commencing construction the consent holder shall provide plans and details of the structure, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.
- 2. The structure shall be constructed and maintained in accordance with the plans and details provided under condition 1, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.
- 3. The consent holder shall notify the Taranaki Regional Council prior to the commencement and upon completion of any subsequent maintenance works that would involve disturbance of or deposition to the riverbed or discharges to water.
- 4. Any instream maintenance works [that would involve disturbance of or deposition to the riverbed or discharges to water] shall only take place between 1 November and 30 April inclusive, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.
- 5. The consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
- 6. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
- 7. The structure authorised by this consent shall be removed and the area reinstated, if and when the structure are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure removal and reinstatement.

Consent 4804-1

8. The Taranaki Regional Council may review any or all of the conditions of this consent, by giving notice of review during the month of June 2004 and/or June 2010 and/or 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 consent which were not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review.

Signed at Stratford on 23 March 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date
[change]: 23 March 2012

Commencement
Date [change]: 23 March 2012 [Granted: 6 December 1996]

Conditions of Consent

Consent Granted: To discharge up to 5 cubic metres/day of domestic septic tank effluent through a soakage field onto and into land in the vicinity of the Kahouri Stream in the Patea catchment in association with the Stratford Power Station Site at or about (NZTM) 1713753E-5645668N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Stratford Power Station Site, State Highway 43 [East Road], Stratford

Legal Description: Lot 2 DP 19365 [soakage field]

Catchment: Patea

Tributary: Kahouri

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

General condition

- 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 septic tank and field soakage effluent treatment system shall be installed according to the plan submitted in support of application 96/264.
- 2. At no time shall the discharge directly enter a surface waterbody.
- 3. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2004 and/or June 2010 and/or June 2016 and/or June 2022, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent, which were not foreseen at the time the application was considered and which it was not appropriate to deal with at the time.

Signed at Stratford on 23 March 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited (WELLINGTON)
P O Box 10742
WELLINGTON

Consent Granted
Date: 24 May 2000

Conditions of Consent

Consent Granted: To discharge fine sediment and organic matter from water intake structure tee screens to the Patea River at or about GR: Q20:319-049

Expiry Date: 1 June 2028

Review Date(s): June 2004, June 2010, June 2016, June 2022

Site Location: Patea River, approximately 500 m downstream from the Toko Stream confluence, Toko Road, Toko, Stratford

Legal Description: Pt Sec 2 DP 1041 Blk IV Ngaere SD

Catchment: Patea

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 discharge licensed by this consent shall be undertaken in accordance with the documentation submitted in support of the application to ensure the conditions of this consent are met.
2. After allowing for mixing within a mixing zone extending 25 metres downstream of the intake structure, the discharge shall not give rise to any of the following effects in the receiving waters of the Patea 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.
3. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2004 and/or June 2010 and/or June 2016 and/or June 2022, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects of the discharge on the environment arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 4 July 2005

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date
[change]: 23 March 2012

Commencement
Date [change]: 23 March 2012 [Granted: 6 September 2002]

Conditions of Consent

Consent Granted: To discharge contaminants to air from power station unit[s]
and ancillary plant located adjacent to State Highway 43
[East Road] approximately three kilometres east of
Stratford at or about (NZTM) 1713810E-5645800N

Expiry Date: 1 June 2034

Review Date(s): June 2016, June 2022, June 2028

Site Location: Stratford Power Station Site, State Highway 43 [East
Road], Stratford

Legal Description: [Part of Stratford Power Station Site – TCC2/SP2] Lot 2 DP
19365 and Sec 134 Blk II Ngaere SD

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

General condition

- 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 power station shall only operate using gas fuel.
2. 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 discharge of contaminants into the environment from the power station site.
3. A general outline of the methods, specifications, operating guidelines or other measures which represent the best practicable option at the time of commissioning will be supplied by the consent holder and thereafter attached to this consent as Schedule A.
4. The measures representing the best practicable option may be reviewed in accordance with the procedure provided for in conditions 17 and 18.
5. Prior to undertaking any alterations to the plant, processes or operations, as specified in the application and any variation, which may significantly change the nature or quantity of contaminants emitted from the site, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991 and any amendments.
6. The consent holder shall provide to the Council within two years from the first exercise of this consent and again at four years from the exercise of this consent and every six years thereafter a written report:
 - a) reviewing any technological advances in the reduction or mitigation of emissions, especially but not exclusively in respect of any cooling tower plume and of carbon dioxide, how these might be applicable and/or implemented at the power station site, and the costs and benefits of these advances; and

- b) detailing an inventory of emissions from the power station site of such contaminants as the Chief Executive may from time to time specify following consultation with the consent holder; and
- c) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the power station; and
- d) addressing any other issue relevant to the minimisation or mitigation of emissions from the site that the Chief Executive considers should be included; and
- e) detailing carbon dioxide emissions from the site;

and should this consent not have been exercised within 4 years of it being granted, then in any case the consent holder shall provide a written report covering matters (a), (c), and (d) above.

7. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the site, in order that the maximum ground level concentration of carbon monoxide arising from the exercise of this consent in conjunction with the exercise of any other consent for the site measured under ambient conditions does not exceed 10 mg/m³ [eight-hour average exposure], or 30 mg/m³ [one-hour average exposure] at or beyond the boundary of the site.
8. The consent holder shall control all emissions of nitrogen oxides to the atmosphere from the site, in order that the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent in conjunction with the exercise of any other consent for the site measured under ambient conditions does not exceed 30 ug/m³ [annual average exposure] or 200 ug/m³ [one hour average] at or beyond the boundary of the site.
9. The consent holder shall control all emissions to the atmosphere from the site of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, in order that the maximum ground level concentration for any particular contaminant arising from the exercise of this consent in conjunction with the exercise of any other consent for the site measured at or beyond the boundary of the site is not increased above background levels:
 - a) by more than 1/30th of the relevant Workplace Exposure Standard-Time Weighted Average, or by more than the Workplace Exposure Standard-Short Term Exposure Limit at any time, [all terms as defined in Workplace Exposure Standards, 1994, 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, 1994, Department of Labour].
10. Except in any period of 240 minutes following the initiation of start-up of a generating unit or in any period of 30 minutes prior to the cessation of the generation of electricity, the discharge of nitrogen oxides arising from the exercise of this consent shall not exceed:
 - a) a mass emission rate for the plant of 63 g/s, or
 - b) a mass emission rate per generating unit exhaust stack of [63 divided by n] g/s [where n = number of stacks], or

- c) a concentration in any generating unit exhaust stack equivalent to 50 mg/m³ at 100°Celsius, or to 50 ppm [volumetric basis].
11. For a maximum of 240 minutes from initiation of combustion of a generating unit until low NO_x operation is achieved or in any period of 30 minutes prior to the cessation of the generation of electricity, the discharge of nitrogen oxides arising from the exercise of this consent shall not exceed 230 g/s.
12. The minimum height of discharge of products of combustion from a combined cycle plant shall be 35 metres above ground level.
13. The discharges authorised by this consent shall not give rise to any direct significant adverse ecological effect on any ecosystems in the Taranaki region, including but not limited to habitats, plants, animals, microflora and microfauna.
14. The evaporative cooling system to be used shall not produce a visible plume at any ambient condition further from saturation than 6° Celsius and 85% relative humidity.
15. The evaporative cooling system shall be operated in order that the loss of cooling water as droplet drift to atmosphere does not exceed in aggregate 0.02% of the cooling water circulation rate at the time.
16. This consent shall lapse on 6 December 2017 unless the consent is given effect to before the end of that period, or the Taranaki Regional Council fixes a longer period pursuant to section 125 (b) of the Resource Management Act 1991.
17. Subject to the provisions of this condition, within six months of receiving a report prepared by the consent holder pursuant to condition 5 of this consent, or during June 2004, and/or June 2010, and/or June 2016, and/or June 2022, and/or June 2028, the Taranaki Regional Council may review any or all of the conditions of this consent, by giving notice that it intends to review the conditions of this resource consent in accordance with section 128(1)(a) of the Act 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 and which it is appropriate to deal with at the time of the review; or
 - b) requiring the holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge.
 - c) altering, adding, or deleting limits on discharge, receiving environment or ambient concentrations of any contaminant or contaminants, for the purpose of dealing with any significant adverse ecological effect on any ecosystem; or
 - d) taking into account any Act of Parliament, regulation, national policy statement or national environmental standard which relates to limiting, recording, or mitigating emissions of carbon dioxide and/or nitrogen dioxide, and which is relevant to the air discharge from the power station.

Consent 5846-1

18. Prior to serving notice of its intention to review any condition, the Council shall allow at least 28 days for consultation with the holder as to whether the purposes in condition 17 would be achieved by a review and whether alternative means could be used to achieve those purposes.

Signed at Stratford on 23 March 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON

Change To
Conditions Date: 6 March 2008 [Granted: 27 November 2001]

Conditions of Consent

Consent Granted: To take and use up to 19,440 cubic metres/day [225 litres/second averaged over 15 minutes] of water from a water intake structure in the Patea River for cooling and power station purposes at or about 2626000E-6206400N

Expiry Date: 1 June 2034

Review Date(s): June 2010, June 2016, June 2022, June 2028

Site Location: Skinner Road, Stratford

Legal Description: Patea Riverbed adjoining Pt Lot 8 DP 141 Blk III
Ngaere SD

Catchment: Patea

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 resource consent holder shall install and operate a measuring device capable of recording instantaneous and daily rates of abstraction and shall make such records available to the Chief Executive, Taranaki Regional Council, upon request.
2. The maximum rate of abstraction authorised by the exercise of this consent shall be managed so that:-
 - a) when the flow in the Patea River at the point of abstraction is more than 1040 litres per second, up to 225 litres per second may be abstracted;
 - b) when the flow in the Patea River at the point of abstraction is between 1040 litres per second and 887 litres per second, a residual flow of at least 812 litres per second shall be maintained at all times in the Patea River downstream of the abstraction point;
 - c) when the flow in the Patea River at the point of abstraction is between 887 litres per second and 695 litres per second, up to 75 litres per second may be abstracted;
 - d) when the flow in the Patea River at the point of abstraction is between 695 litres per second and 620 litres per second, a residual flow of at least 620 litres per second shall be maintained at all times in the Patea River downstream of the abstraction point; and
 - e) when the flow in the Patea River at the point of abstraction is less than 620 litres per second, no abstraction is permitted.

For (c) and (d) abstraction is permitted only if the maximum abstraction permitted under consent 4455 is already being extracted.

The residual flow below the abstraction point and at the point of abstraction will be as measured, or as implied from measurements, at the Taranaki Regional Council Skinner Road recorder [Q20:260-064].

3. The maximum rate of abstraction authorised by the exercise of this consent in combination with Water Permit 4455 shall not exceed 225 litres per second.

Consent 5847-1

4. By the agreement of the consent holder the consent holder shall provide a one off donation to the Taranaki Regional Council of \$100,000 [plus Goods and Services Tax], for the purposes of enhancing the habitat values of the Patea River and/or its tributaries, benefiting the ecological and/or recreational uses of the Patea catchment, or as otherwise agreed between the Manager, Stratford Power Station, and the Chief Executive, Taranaki Regional Council. The donation is payable at the start of the construction of the power station in respect of which this consent has been sought.
5. This consent shall lapse on 6 December 2017 unless the consent is given effect to before the end of that period, or the Taranaki Regional Council fixes a longer period pursuant to section 125 (b) of the Resource Management Act 1991.
6. The Taranaki Regional Council may review any or all of the conditions of this consent, by giving notice of review during June 2010, and/or June 2016 and/or June 2022 and/or June 2028 for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent which were not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review.

Signed at Stratford on 6 March 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON

Change To
Conditions Date: 6 March 2008 [Granted: 27 November 2001]

Conditions of Consent

Consent Granted: To discharge up to 6,740 cubic metres/day [78 litres/second averaged over 15 minutes] of used water, mainly blowdown water from the cooling system from Power Stations at East Road, Stratford into the Patea River at or about 2624600E-6206800N

Expiry Date: 1 June 2034

Review Date(s): June 2010, June 2016, June 2022, June 2028

Site Location: State Highway 43 [East Road], Stratford

Legal Description: Patea Riverbed adjacent to Pt Sec 121 Blk II Ngaere SD

Catchment: Patea

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

Conditions 1 - 2 [unchanged]

1. The consent shall be exercised in accordance with the procedures set out in an effluent disposal management plan [the effluent disposal management plan], which shall demonstrate ability to comply with consent conditions and shall address the following matters:
 - i) monitoring of discharge effluent;
 - ii) chemical, physicochemical, ecological and biological [including trout] monitoring of the Patea River;
 - iii) minimisation of ammonia and dissolved reactive phosphorus in the discharge effluent;
 - iv) mitigation of the effects of the discharge [including but not limited to, the options of riparian planting and other off-site mitigation measures]; and
 - v) reporting on the exercise of consent.
2. The effluent disposal management plan shall be submitted to the Chief Executive, Taranaki Regional Council, for approval not later than three months prior to the exercise of the consent, and such approval shall not be unreasonably withheld if the effluent disposal management plan demonstrates ability to comply with the conditions of this consent and addresses the matters set out in special condition 1 above. Thereafter the effluent disposal management plan shall be subject to revision upon three months' notice by either the consent holder or the Taranaki Regional Council.

Conditions 3 - 4 [changed]

3. No later than three months prior to exercise of the consent, the consent holder shall provide to the Chief Executive, Taranaki Regional Council, details of water treatment chemicals for use at Power Stations, East Road, Stratford, including raw water, boiler water and cooling water. Further, the consent holder shall provide to the Chief Executive, Taranaki Regional Council, details of any change in water treatment chemical, or increase in maximum concentration of any water treatment chemical used, no later than one month prior to the change.
4. No later than three months prior to exercise of the consent, the consent holder shall provide to the Chief Executive, Taranaki Regional Council, details of cleaning chemicals for use at Power Stations, East Road, Stratford. Further, the consent holder shall provide to the Chief Executive, Taranaki Regional Council, details of any change in cleaning chemical, or increase in maximum concentration of any cleaning chemical used, no later than one month prior to the change.

Conditions 5 - 15 [unchanged]

5. Pursuant to section 128(1)(a) of the Resource Management Act 1991, the Taranaki Regional Council may review special condition 12 of this consent, by giving notice of review within three months of the provision of information under special condition 3 or 4 involving the use of treatment or cleaning chemicals not already advised to the Council or at concentrations not already advised to the Council, for the purpose of including standards addressing water treatment chemicals, cleaning chemicals and their products.
6. The consent holder shall prepare and maintain a contingency plan, to the satisfaction of the Chief Executive, Taranaki Regional Council, for action to be taken in the event of accidental spillage or discharge of contaminants, the initial plan to be provided no later than three months prior to exercise of this consent.
7. That after allowing for reasonable mixing in a zone of 75 metres extending downstream of the discharge point ['the mixing zone'], the discharge shall not give rise to all or any of the following effects in the receiving water:
 - i) the production of any conspicuous oil or grease films, scums or foams or floatable or suspended materials;
 - ii) any conspicuous change in the colour or visual clarity;
 - iii) any emission of an objectionable odour;
 - iv) the rendering of freshwater unsuitable for consumption by farm animals;
 - v) any significant adverse effects on aquatic life, habitats, or ecology;
 - vi) any undesirable biological growths.

Consent 5848-1

8. Within the mixing zone the discharge shall not give rise to a barrier preventing the movement of fish species.
9. The discharge shall not :
 - (i) alter the ambient temperature of the receiving waters of the Patea River by more than 1.5 degrees Celsius for 95% of the time that the discharge is occurring on an annual basis; and
 - (ii) alter the ambient temperature of the receiving waters of the Patea River by more than 2.0 degrees Celsius at any time

when measured simultaneously immediately upstream and 75 metres downstream of the discharge site.

10. The discharge shall not raise the temperature of the receiving water above 25 degrees Celsius when measured 75 metres downstream of the discharge site.
11. The consent holder shall continuously monitor the temperature of the receiving waters so as to assess compliance with special conditions 9 and 10, and forward the results of this monitoring to the Chief Executive, Taranaki Regional Council, at monthly intervals.
12. The following concentrations shall not be exceeded in the discharge effluent:

Component	Concentration
pH [range]	6.0 – 9.0
Total Residual Chlorine	0.05 gm ⁻³

This condition shall apply immediately prior to the entry of the effluent into the receiving water.

13. The discharge shall not cause the concentration of un-ionised ammonia in the Patea River to exceed 0.025 grams per cubic metre when measured at a point 75 metres downstream of the discharge.
14. This consent shall lapse on the expiry of six years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(b) of the Resource Management Act 1991.

Consent 5848-1

15. The Taranaki Regional Council may review any or all of the conditions of this consent, by giving notice of review during June 2010, and/or June 2016 and/or June 2022 and/or June 2028 for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent which were not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review.

Signed at Stratford on 6 March 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date
[change]: 23 March 2012

Commencement
Date [change]: 23 March 2012 [Granted: 27 November 2001]

Conditions of Consent

Consent Granted: To erect, place, use and maintain at or about (NZTM) 1713596E-5645713N gas pipelines and associated utilities, under the bed, and including disturbance for installation by trenching of the bed, of the Kahouri Stream in the Patea catchment, for power station purposes at or about (NZTM) 1713810E-5645800N

Expiry Date: 1 June 2034

Review Date(s): June 2016, June 2022, June 2028

Site Location: Stratford Power Station Site, State Highway 43 [East Road], Stratford

Legal Description: [Part of Stratford Power Station Site – TCC, TCC2/SP2]
Lot 2 DP 19365, Lot 3 DP 19365 and Sec 134 Blk II
Ngaere SD
[Pipeline] Pt Lot 2 DP 7012

Catchment: Patea

Tributary: Kahouri

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

General condition

- 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. Prior to commencing construction the consent holder shall provide plans and details of the structures, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.
- 2. The structures shall be constructed and maintained in accordance with the plans and details provided under condition 1, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.
- 3. During and subsequent to construction works the consent holder must observe every practicable measure to minimise the discharge or placement of silt and/or organics and/or debris into the watercourse, and to avoid or remedy erosion and scour attributable to the works.
- 4. The consent holder must notify the Taranaki Regional Council at least seven days before commencing construction.
- 5. Construction of the structures must be undertaken only between 1 November and 30 April inclusive. These dates may be altered only by the written approval of the Chief Executive, Taranaki Regional Council.
- 6. The exercise of this consent must not result in any barrier to the passage of fish species.
- 7. This consent shall lapse on 6 December 2017 unless the consent is given effect to before the end of that period, or the Taranaki Regional Council fixes a longer period pursuant to section 125 (b) of the Resource Management Act 1991.

Consent 5849-1

8. The Taranaki Regional Council may review any or all of the conditions of this consent, by giving notice of review during June 2004, and/or June 2010, and/or June 2016 and/or June 2022 and/or June 2028 for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent which were not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review.

Signed at Stratford on 23 March 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON

Change To
Conditions Date: 6 March 2008 [Granted: 27 November 2001]

Conditions of Consent

Consent Granted: To erect, place, use and maintain an intake structure and ancillary pipework and pumps in and on the bed, and including disturbance associated with construction of the bed of the Patea River, for the purpose of taking water for Power Stations at East Road, Stratford at or about 2626000E-6206400N

Expiry Date: 1 June 2034

Review Date(s): June 2010, June 2016, June 2022, June 2028

Site Location: Skinner Road, Stratford

Legal Description: Patea Riverbed adjoining Pt Lot 8 DP 141 Blk III
Ngaere SD

Catchment: Patea

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 notify the Taranaki Regional Council, at least 48 hours prior to the commencement and upon completion of the initial construction and again prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water.
2. The structure[s] authorised by this consent shall be constructed generally in accordance with the documentation submitted in support of the application and shall be maintained to ensure the conditions of this consent are met.
3. The consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
4. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
5. The structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.
6. Any disturbance of parts of the riverbed covered by water and/or any works which may result in downstream discolouration of water shall be undertaken only between 1 November and 30 April, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.
7. This consent shall lapse on 6 December 2017 unless the consent is given effect to before the end of that period, or the Taranaki Regional Council fixes a longer period pursuant to section 125 (b) of the Resource Management Act 1991.

Consent 5850-1

8. The Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2010 and/or June 2016 and/or June 2022 and/or June 2028, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent which were not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review.

Signed at Stratford on 6 March 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON

Change To
Conditions Date: 22 February 2007 [Granted: 7 December 2001]

Conditions of Consent

Consent Granted: To discharge fine sediment and organic matter from water intake structure screens to the Patea River at or about GR: Q20:260-064

Expiry Date: 1 June 2034

Review Date(s): June 2004, June 2010, June 2016, June 2022, June 2028

Site Location: Skinner Road, Stratford

Legal Description: Patea Riverbed adjoining Pt Lot 8 DP 141 Blk III
Ngaere SD

Catchment: Patea

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

Conditions 1 – 2 [unchanged]

1. The discharge licensed by this consent shall be undertaken in accordance with the documentation submitted in support of the application to ensure the conditions of this consent are met.
2. After allowing for mixing within a mixing zone extending 25 metres downstream of the intake structure, the discharge shall not give rise to any of the following effects in the receiving waters of the Patea 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.

Condition 3 [changed]

3. This consent shall lapse on 6 December 2017 unless the consent is given effect to before the end of that period, or the Taranaki Regional Council fixes a longer period pursuant to section 125 (b) of the Resource Management Act 1991.

Condition 4 [unchanged]

4. The Taranaki Regional Council may review any or all of the conditions of this consent, by giving notice of review during the month of June 2004 and/or June 2010 and/or June 2016 and/or June 2022 and/or June 2028, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent which were not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review.

Signed at Stratford on 22 February 2007

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON

Change To
Conditions Date: 22 February 2007 [Granted: 6 December 2001]

Conditions of Consent

Consent Granted: To erect, place, use and maintain a bridge, cables and associated utilities over the Kahouri Stream in the Patea catchment for combined cycle power station purposes at or about GR: Q20:239-071

Expiry Date: 1 June 2034

Review Date(s): June 2004, June 2010, June 2016, June 2022, June 2028

Site Location: Kahouri Stream, Straford Combined Cycle Power Station Site, State Highway 43 [East Road], Stratford

Legal Description: Pt Sec 108 Blk II Ngaere SD

Catchment: Patea

Tributary: Kahouri

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

Conditions 1 – 6 [unchanged]

1. Prior to commencing construction the consent holder shall provide final plans and details of the bridge, cables and associated utilities, to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.
2. The bridge, cables and associated utilities shall be constructed generally in accordance with the plans and details provided under condition 1, and shall be maintained to ensure the conditions of this consent are met.
3. The consent holder shall notify the Taranaki Regional Council in writing at least 48 hours prior to the commencement and upon completion of the initial construction and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water.
4. The consent holder shall adopt the best practicable option to avoid or minimise the discharge of silt or other contaminants into water or onto the riverbed and to avoid or minimise the disturbance of the riverbed and any adverse effects on water quality.
5. The consent holder shall ensure that the area and volume of riverbed and bank disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
6. The structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to the structure[s] removal and reinstatement.

Consent 5852-1

Condition 7 [changed]

7. This consent shall lapse on 6 December 2017 unless the consent is given effect to before the end of that period, or the Taranaki Regional Council fixes a longer period pursuant to section 125 (b) of the Resource Management Act 1991.

Condition 8 [unchanged]

8. The Taranaki Regional Council may review any or all of the conditions of this consent, by giving notice of review during the month of June 2004 and/or June 2010 and/or June 2016 and/or June 2022 and/or June 2028, for the purpose of ensuring that the conditions are adequate to deal with any significant adverse effects on the environment arising from the exercise of this consent which were not foreseen at the time the application was considered and which it is appropriate to deal with at the time of the review.

Signed at Stratford on 22 February 2007

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON

Consent Granted
Date: 6 March 2008

Conditions of Consent

Consent Granted: To discharge emissions into the air from the operation of the cooling tower associated with the Stratford Peaker Power Plant at or about 2623861E-6207168N

Expiry Date: 1 June 2034

Review Date(s): June 2010, June 2016, June 2022, June 2028

Site Location: State Highway 43 [East Road], Stratford

Legal Description: Lot 1 DP 17776 & Lot 1 DP 19365 Blk II Ngaere SD

General conditions

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

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. A hybrid dry/wet mechanical draft cooling tower, as described in section 3.3.4 of the assessment of environmental effects provided with the application, shall be installed.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable only if the consent holder does not have access to email.
4. The consent holder shall at all times operate, maintain, supervise, monitor and control all processes so that emissions authorised by this consent are maintained at the minimum practicable level.
5. The evaporative cooling system to be used shall not produce a visible plume at any ambient condition further from saturation than 6° Celsius and 85% relative humidity.
6. That the evaporative cooling system shall be operated in order that the loss of cooling water as droplet drift to atmosphere does not exceed in aggregate 0.02% of the cooling water circulation rate at the time.
7. Prior to undertaking any alterations to the plant, processes or operations which may significantly change the nature or quantity of contaminants emitted from the site and authorised by this consent, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act.

Consent 7247-1

8. The consent holder shall provide the Chief Executive, Taranaki Regional Council a description of the water treatment regime to be used in the cooling tower systems no later than 7 days prior to the first exercise of this consent. The consent holder shall thereafter advise the Chief Executive of the current water treatment regime.
9. The discharges authorised by this consent shall not give rise to an odour at or beyond the boundary of the site that is offensive or objectionable.
10. The discharges authorised by this consent shall not give rise to any significant adverse ecological effect on any ecosystems, including but not limited to habitats, plants, animals, microflora and microfauna.
11. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
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 2010 and/or June 2016 and/or June 2022 and/or June 2028, 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 6 March 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
 P O Box 10742
 WELLINGTON

Consent Granted 6 March 2008
Date:

Conditions of Consent

Consent Granted: To erect, place, use and maintain a bridge over an unnamed tributary of the Kahouri Stream for pedestrian access and carriage of water pipes, high voltage cables, control cables and associated utilities at or about 2623738E-6207157N

Expiry Date: 1 June 2034

Review Date(s): June 2010, June 2016, June 2022, June 2028

Site Location: State Highway 43 [East Road], Stratford

Legal Description: Lot 1 DP 19365 & Lot 1 DP 18343 Blk II Ngaere SD

Catchment: Patea

Tributary: Kahouri

General conditions

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

Special conditions

1. The exercise of this consent shall be undertaken substantially in accordance with the documentation submitted in support of application 4907. In the case of any contradiction between the documentation submitted in support of application 4907 and the conditions of this consent, the conditions of this consent shall prevail.
2. Before beginning construction of the bridge the consent holder shall provide plans of the bridge to the Chief Executive, Taranaki Regional Council.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable only if the consent holder does not have access to email.
4. The consent holder shall take all reasonable steps to:
 - a) minimise the amount of sediment discharged to the stream;
 - b) minimise the amount of sediment that becomes suspended in the stream; and
 - c) mitigate the effects of any sediment in the stream.

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

5. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
6. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.

Consent 7248-1

7. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
8. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2010 and/or June 2016 and/or June 2022 and/or June 2028, 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 6 March 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON

Consent Granted
Date: 6 March 2008

Conditions of Consent

Consent Granted: To erect, place, use and maintain a bridge over the
Kahouri Stream for vehicle access purposes at or about
2624076E-6207480N

Expiry Date: 1 June 2034

Review Date(s): June 2010, June 2016, June 2022, June 2028

Site Location: State Highway 43 [East Road], Stratford

Legal Description: Lots 1 & 2 DP 19365 Blk II Ngaere SD

Catchment: Patea

Tributary: Kahouri

General conditions

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

Special conditions

1. The exercise of this consent shall be undertaken substantially in accordance with the documentation submitted in support of application 4908. In the case of any contradiction between the documentation submitted in support of application 4908 and the conditions of this consent, the conditions of this consent shall prevail.
2. Before beginning construction of the bridge the consent holder shall provide plans of the bridge to the Chief Executive, Taranaki Regional Council.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable only if the consent holder does not have access to email.
4. The consent holder shall take all reasonable steps to:
 - a) minimise the amount of sediment discharged to the stream;
 - b) minimise the amount of sediment that becomes suspended in the stream; and
 - c) mitigate the effects of any sediment in the stream.

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

5. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
6. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.

Consent 7249-1

7. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
8. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2010 and/or June 2016 and/or June 2022 and/or June 2028, 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 6 March 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON

Consent Granted
Date: 6 March 2008

Conditions of Consent

Consent Granted: To erect, place, use and maintain a bridge over the Kahouri Stream for pedestrian access and carriage of water pipes, high voltage cables, control cables and associated utilities at or about 2623777E-6207372N

Expiry Date: 1 June 2034

Review Date(s): June 2010, June 2016, June 2022, June 2028

Site Location: State Highway 43 [East Road], Stratford

Legal Description: Lot 1 DP 17776 & Lots 1 & 2 DP 19365 Blk II Ngaere SD

Catchment: Patea

Tributary: Kahouri

General conditions

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

Special conditions

1. The exercise of this consent shall be undertaken substantially in accordance with the documentation submitted in support of application 4909. In the case of any contradiction between the documentation submitted in support of application 4909 and the conditions of this consent, the conditions of this consent shall prevail.
2. Before beginning construction of the bridge the consent holder shall provide plans of the bridge to the Chief Executive, Taranaki Regional Council.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable only if the consent holder does not have access to email.
4. The consent holder shall take all reasonable steps to:
 - a) minimise the amount of sediment discharged to the stream;
 - b) minimise the amount of sediment that becomes suspended in the stream; and
 - c) mitigate the effects of any sediment in the stream.

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

5. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.
6. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.

Consent 7250-1

7. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
8. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2010 and/or June 2016 and/or June 2022 and/or June 2028, 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 6 March 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
 P O Box 10742
 WELLINGTON 6143

Consent Granted 23 February 2010
Date:

Conditions of Consent

Consent Granted: To construct, place and maintain a stormwater outlet
 structure in the Kahouri Stream at or about (NZTM)
 1713710E-5645626N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: 189 East Road, Stratford

Legal Description: Lot 1 DP 19365

Catchment: Patea

Tributary: Kahouri

General condition

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

Special conditions

1. The exercise of this consent shall be undertaken in accordance with the documentation submitted in support of application 6435, in particular, UGL drawing number 3200-0030-S-3538. In the event of a conflict between that material and this consent; the conditions of this consent shall take precedence.
2. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of the initial installation and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable only if the consent holder does not have access to email.
3. The consent holder shall ensure that the area and volume of streambed disturbance is, as far as practicable, minimised and any areas that are disturbed are, as far as practicable, reinstated.
4. The consent holder shall take all reasonable steps to:
 - a. minimise the amount of sediment discharged to the stream;
 - b. minimise the amount of sediment that becomes suspended in the stream; and
 - c. mitigate the effects of any sediment in the stream.

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

5. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure is no longer required. A further resource consent may be required to authorise the removal of the structure, and the consent holder is advised to seek advice from the Council on this matter.
6. This consent shall lapse on 31 March 2015, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

Consent 7605-1

7. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 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 23 February 2010

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
 P O Box 10742
 WELLINGTON 6143

Consent Granted 21 June 2010
Date:

Conditions of Consent

Consent Granted: To construct, place and maintain a stormwater outlet
 structure in the Kahouri Stream at or about (NZTM)
 1713740E-5645575N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: 189 East Road, Stratford

Legal Description: Lot 1 DP 19365

Catchment: Patea

Tributary: Kahouri

General condition

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

Special conditions

1. The exercise of this consent shall be undertaken in accordance with the documentation submitted in support of application 6498. Specifically this includes United Group Infrastructure Plan 3200-0030-S-3608. If there is any conflict between the documentation submitted in support of application 6498 and the conditions of this consent, the conditions of this consent shall prevail.
2. Any disturbance of parts of the riverbed covered by water and/or any works which may result in downstream discolouration of water shall be undertaken only between 1 November and 30 April, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of the initial installation and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
4. The consent holder shall ensure that the area and volume of streambed disturbance is, as far as practicable, minimised and any areas that are disturbed are, as far as practicable, reinstated.
5. The consent holder shall take all reasonable steps to:
 - a. minimise the amount of sediment discharged to the stream;
 - b. minimise the amount of sediment that becomes suspended in the stream; and
 - c. mitigate the effects of any sediment in the stream.

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

6. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure is no longer required. A further resource consent may be required to authorise the removal of the structure, and the consent holder is advised to seek advice from the Council on this matter.
7. This consent shall lapse on 30 June 2015, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

Consent 7653-1

8. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 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 21 June 2010

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date: 23 March 2012

Commencement
Date: 23 March 2012

Conditions of Consent

Consent Granted: To discharge stormwater, sediment, dewatering water and washdown water into an unnamed tributary of the Piakau Stream at or about 1713959E-5646039N and into the Kahouri Stream at or about 1713635E-5645679N, from earthworks associated with the construction activities of a power station

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Stratford Power Station Site, State Highway 43 [East Road], Stratford

Legal Description: [Part of Stratford Power Station Site – TCC, TCC2/SP2]
Lot 2 DP 19365, Lot 3 DP 19365 and Sec 134 Blk II
Ngaere SD
[Discharge Points] Pt Lot 2 DP 7012 – Kahouri Stream,
Lot 3 DP 19365 – unnamed tributary of Piakau Stream

Catchment: Patea

Tributary: Kahouri
Piakau

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

General condition

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

Special conditions

1. At least 30 working days prior to the commencement of any earthworks, the consent holder shall prepare and submit to the Chief Executive, Taranaki Regional Council, an erosion and sediment control plan. The erosion and sediment control plan shall detail the methodology that will be used to ensure that erosion and sediment control works comply with the conditions of this consent.
2. The consent holder shall at all times adhere to the erosion and sediment control plan approved under condition 1 of this consent. Any changes to the plan approved shall be submitted for certification to the Chief Executive, Taranaki Regional Council prior to being implemented.
3. At least 7 working days prior to the commencement of works the consent holder shall notify the Taranaki Regional Council of the proposed start date for the work. Notification shall include the consent number and a brief description of the activity consented and shall be emailed to worknotification@trc.govt.nz.
4. All runoff from any un-vegetated area shall pass through settlement ponds or sediment traps with a minimum total capacity of:
 - a) 100 cubic metres for every hectare of exposed soil between 1 November to 30 April; and
 - b) 200 cubic metres for every hectare of exposed soil between 1 May to 31 October; unless other sediment control measures that achieve an equivalent standard are agreed to by the Chief Executive of the Taranaki Regional Council.
5. The obligation described in condition 3 above shall cease to apply, and accordingly the erosion and sediment control measures can be removed, in respect of any particular site or area of any site, only when the site is stabilised.

Note: For the purpose of conditions 4 and 5 "stabilised" in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using rock or by the application of basecourse, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council and as specified in the Taranaki Regional Council's Guidelines for Earthworks in the Taranaki Region, 2006. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by an officer of the Taranaki Regional Council, an 80% vegetative cover has been established.

Consent 7785-1

6. All earthworked areas shall be stabilised vegetatively or otherwise as soon as is practicable immediately following completion of soil disturbance activities.

Note: For the purposes of this condition "stabilised" has the same definition as that set out in condition 4.

7. 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 power station site.
8. This consent shall lapse on 6 December 2017, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
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 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 23 March 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date: 23 March 2012

Commencement
Date: 23 March 2012

Conditions of Consent

Consent Granted: To discharge contaminants [dust] to air from earthworks associated with the construction activities of a power station at or about (NZTM) 1713810E-5645800N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Stratford Power Station Site, State Highway 43 [East Road], Stratford

Legal Description: [Part of Stratford Power Station Site – TCC, TCC2/SP2]
Lot 2 DP 19365, Lot 3 DP 19365 and Sec 134 Blk II
Ngaere SD

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

General condition

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

Special conditions

1. The dust discharge shall result from earthworks not exceeding 13 hectares.
2. At least 30 working days prior to the commencement of any earthworks, the consent holder shall prepare and submit to the Chief Executive, Taranaki Regional Council, a dust control management plan. The dust management plan shall detail the methodology that will be used to ensure that discharges to air comply with the conditions of this consent, in particular, special conditions 5 and 6.
3. The consent holder shall at all times adhere to the dust control management plan approved under condition 2 of this consent. Any changes to the plan approved shall be submitted for certification to the Chief Executive, Taranaki Regional Council prior to being implemented.
4. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement of earthworks associated with this consent . Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
5. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
6. Any discharge to air from the site shall not give rise to any offensive, objectionable, noxious or toxic levels of dust at or beyond the boundary of the property, and in any case, suspended particulate matter shall not exceed 3 mg/m³ [measured under ambient conditions] beyond the boundary of the project site.
7. The consent holder shall maintain a permanent record of any complaints received alleging adverse effects from or related to the exercise of this consent. This record shall include the following, where practicable:
 - a. the name and address of the complainant, if supplied;
 - b. date, time and details of the alleged event;
 - c. weather conditions at the time of the alleged event (as far as practicable);
 - d. investigations undertaken by the consent holder in regards to the complaint and any measures adopted to remedy the effects of the incident/complaint; and
 - e. measures put in place to prevent occurrence of a similar incident.

Consent 7786-1

8. The consent holder shall make the complaints record available to officers of Taranaki Regional Council, on request.
9. The consent holder shall notify the Chief Executive, Taranaki Regional Council of any complaints received, which relate to the exercise of this consent, within 24 hours of being received.
10. This consent shall lapse on 6 December 2017, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
11. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 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 23 March 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Appendix II

Resource consents for Ahuroa Gas Storage

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date
[Change]: 12 January 2011

Commencement
Date [Change]: 12 January 2011 [Granted: 22 April 2003]

Conditions of Consent

Consent Granted: To discharge treated stormwater, uncontaminated treated site water, and uncontaminated treated production water from hydrocarbon exploration and production operations at the Ahuroa-B wellsite onto and into land and into an unnamed tributary of the Makara Stream in the Waitara catchment at or about (NZTM) 1715625E-5652966N

Expiry Date: 1 June 2033

Review Date(s): June 2015, June 2021, June 2027

Site Location: Ahuroa-B wellsite, 1278 Croydon Rd, Stratford
[Property owner: G & K Bishop]

Legal Description: Lot 1 DP 16297 Blk X Huiroa SD [Discharge source & site]

Catchment: Waitara

Tributary: Makino
Makara

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

General conditions

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

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects of the discharge on any water body.
2. The stormwater catchment area shall be no more than 40,000 m².
3. The Chief Executive shall be advised in writing at least 7 days prior to any site works commencing, and again in writing at least 7 days prior to any well drilling operation commencing.
4. The consent holder shall provide and maintain for the written approval of the Chief Executive site specific details relating to contingency planning for the wellsite.
5. All site water and uncontaminated production water to be discharged under this permit shall be directed for treatment through the stormwater treatment system for discharge in accordance with the special conditions of this permit.
6. The design, management and maintenance of the stormwater system shall be generally undertaken in accordance with the information submitted in support of application 6634.
7. Any above ground hazardous substances storage areas shall be bunded with drainage to sumps, or other appropriate recovery systems, and not to the stormwater catchment.
8. 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
chloride	50 gm ⁻³

This condition shall apply prior to the entry of the treated stormwater, site water and production water either onto and into land, or into surface water, at a designated sampling point approved by the Chief Executive.

9. After allowing for reasonable mixing, within a mixing zone extending downstream of the discharge point[s] to the confluence of the two unnamed tributaries at [NZTM] 1715531E-5653067N the discharge shall not give rise to any of the following effects in the receiving waters of the unnamed tributary:
 - a) an increase in temperature of more than 2 degrees Celsius;
 - b) an increase in biochemical oxygen demand of more than 2.00 gm⁻³.
10. After allowing for reasonable mixing, within a mixing zone extending downstream of the discharge point[s] to the confluence of the two unnamed tributaries at [NZTM] 1715531E-5653067N the discharge shall not give rise to any of the following effects in the receiving waters of the unnamed tributary:
 - 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.
11. The Chief Executive, Taranaki Regional Council, shall be advised in writing at least 48 hours prior to the reinstatement of the site and the reinstatement shall be carried out so as to minimise effects on stormwater quality.
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 2009 and/or June 2015 and/or June 2021 and/or June 2027, 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 12 January 2011

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date: 16 July 2003

Commencement Date: 16 July 2003

Conditions of Consent

Consent Granted: To discharge solid drilling wastes from hydrocarbon exploration operations at the Ahuroa-B wellsite by mix-bury-cover at or about (NZTM) 1715527E-5652866N

Expiry Date: 1 June 2021

Review Date(s): June 2009, June 2015

Site Location: Ahuroa-B Wellsite, Croydon Road, Te Popo
[Property owner: G & K Bishop]

Legal Description: Lot 1 DP 16297 Blk X Huiroa SD

Catchment: Waitara

Tributary: Makara

*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. This resource consent allows for the discharge of up to 1500 m³ per well of solid drilling wastes [drill cuttings and residual fluids] by way of mix-bury-cover [MBC] into land on the Ahuroa-B Wellsite and surrounding land. MBC discharge areas for wastes from individual wells shall be kept separate and distinct.
2. Prior to the exercise of this consent for each separate mix-bury-cover [MBC] discharge the consent holder shall provide to the written satisfaction of the Chief Executive a report describing proposed MBC, including area, location, nature of material, means of compliance with conditions, etc, and the results of any relevant monitoring of existing MBC discharge sites under this consent. In any case additional MBC discharges shall not take place under this consent within 12 months of any previous MBC discharge, unless this requirement is waived in writing by the Chief Executive.
3. The resource consent holder shall notify the Taranaki Regional Council at least 48 hours prior to commencement, and upon completion of any discharge.
4. The resource consent holder shall ensure that the discharge, licensed by this resource consent, takes place in general accordance with the information submitted in support of application 2198. In particular but without limitation, any amendment to location of mix-bury-cover [MBC], pre-treatment of solids, changes to fluids/additives, method of MBC, or post burial site management, shall be advised to the Chief Executive, and shall not provide or result in any less environmental protection than that set out or provided for in the information submitted in support of application 2198.
5. The consent holder shall keep records of composition and volumes of the material to be discharged, including records of quantities and types of drilling fluids and additives used [materials and their composition], and shall forward the records to the Taranaki Regional Council prior to the discharge.
6. The edge of the mix-bury-cover zone shall be at least 30 metres from any surface water body, or any water supply bore.

Consent 5173-2

7. All ponded water shall be removed from the sump prior to the recovery/mixing operation.
8. The impermeable liner shall be perforated, and where possible removed, so that it no longer encloses the solid drilling wastes.
9. The solid drilling wastes [drill cuttings and residual fluids] shall be incorporated with uncontaminated soils with a mixing ratio of 1 part solid drilling wastes [drill cuttings, additives and residual fluids] to a minimum of 1 part uncontaminated soil.
10. The placement of the solid drilling wastes [drill cuttings and residual fluids] shall as far as practicable be above the watertable.
11. The loading in the disposed solid drilling wastes for each distinct mix-bury-cover disposal area for wastes from an individual well must not exceed those listed in Table 3-1 of the Alberta Energy and Utilities Board, 1996, G-50 guidelines.
12. Post disposal chloride levels in the cover soil layer shall not exceed 2,000 mg kg⁻¹.
13. The loading of chloride must not exceed 1,600 kg for each distinct mix-bury-cover disposal area for wastes from an individual well.
14. The loading of nitrogen must not exceed 400 kg for each distinct mix-bury-cover disposal area for wastes from an individual well.
15. The hydrocarbon content of the soil waste mix shall not exceed 0.1% [1000 mg/kg] on a dry weight basis.
16. The exercise of this consent shall not result in a level of total dissolved salts within any surface or groundwater of more than 2500 gm⁻³.
17. The disposal of solid drilling wastes shall comply with the heavy metal receiving environment concentration limits specified in Table C, Section 9, Public Guidelines for the Safe Use of Sewage Effluent and Sewage Sludge on Land, Ministry of Health, 1992.
18. The solid drilling wastes [drill cuttings and residual fluids] shall be covered by at least 0.5 m of uncontaminated soil, and shall be revegetated and thereafter maintained with pasture cover within 6 months of the completion of any mix-bury-cover operation.
19. The consent holder shall compact, contour, and maintain the cover layer of soil so as to ensure its integrity at all times to the satisfaction of the Chief Executive.
20. The consent holder shall adopt the best practicable option [as defined in the Resource Management Act 1991] to prevent or minimise any actual or potential effects on the environment arising from the discharge, including but not limited to any water body or soil.
21. The exercise of this resource consent, including the design, management and implementation of the mix-bury-cover discharge, shall not lead, or be liable to lead, to contaminants directly entering a surface water body from overland surface flows.

Consent 5173-2

22. The exercise of the resource consent shall not result in any adverse impacts on groundwater as a result of leaching, or surface water including aquatic ecosystems, and/or result in a change to the suitability of use of the receiving water as determined by the Chief Executive.
23. At any time, the levels of hydrocarbons in the soil shall comply with the guideline values for the designated soil type in the surface layer [less than 0.5 metre depth] set out in Tables 4.12 and 4.15 of the Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand [Ministry for the Environment, 1999].
24. At any time, the upper [less than 0.5 metre depth] soil levels shall not exceed the following limits: conductivity, 290 mSm⁻¹; total dissolved salts, 2500 gm⁻³; sodium 460 gm⁻³; and chloride 700 gm⁻³.
25. This resource consent shall lapse on the expiry of six years after the date of issue of this resource consent, unless the resource consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
26. The consent holder may apply to the Taranaki Regional Council for a change or cancellation of any of the conditions of this resource consent in accordance with section 127(1)(a) of the Resource Management Act 1991 to take account of operational requirements or the results of monitoring.
27. The Taranaki Regional Council may review any or all of the conditions of this resource consent within two months of receiving data on the volume and composition of the material under condition 5, for the purpose of assessing the adequacy of monitoring and mitigation measures.
28. 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 2009 and/or June 2015, 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 15 November 2013

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date
[Change]: 7 April 2011

Commencement
Date [Change]: 7 April 2011 [Granted: 2 December 2008]

Conditions of Consent

Consent Granted: To discharge contaminants [natural gas] into land for the
purpose of gas storage at or about (NZTM)
1715630E-5652960N

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: Ahuroa-B wellsite, Barleymans Road, Tariki
[Property owners: GN & KA Bishop]

Legal Description: Lot 1 DP 16297 Blk X Huiroa SD

Catchment: Waitara

Tributary: Makino
Makara

*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 adverse effects on the environment from the exercise of this consent.
2. Any gas discharged into the ground pursuant to this consent shall meet NZ5442 specifications.
3. The pressure within the gas reservoir shall not exceed 3400psia.
4. The consent holder shall continuously record the injection pressure, and establish and maintain a correlation between the injection pressure and pressure within the gas reservoir, so that the reservoir pressure can be monitored at all time to determine compliance with condition 3. The pressure records shall be made available to the Council on request.
5. This consent shall lapse on 31 December 2013, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

Consent 7432-1

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 2015 and/or June 2021, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 7 April 2011

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date: 6 April 2010

Commencement Date: 6 April 2010

Conditions of Consent

Consent Granted: To discharge stormwater and sediment from earthworks into two unnamed tributaries of the Makara Stream, associated with site development at the Ahuroa-B wellsite at or about (NZTM) 1715699E-5652829N

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: Ahuroa-B wellsite, 1278 Croydon Road, Stratford
[Property owner: GS & KA Bishop]

Legal Description: Pt Lot 1 DP 2699 Blk X Huiroa SD

Catchment: Waitara

Tributary: Makino
Makara

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

General condition

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

Special conditions

1. The exercise of this consent shall be undertaken in accordance with the documentation submitted in support of application 6461. Specifically this includes Appendix B and plans NZ-2784-20-SK-0001/2 and NZ-2784-20-SK-0001/1. If there is any conflict between the documentation submitted in support of application 6461 and the conditions of this consent, the conditions of this consent shall prevail.
2. If any area of soil is exposed, all run off from that area shall pass through settlement ponds or sediment traps with a minimum total capacity of;
 - a) 100 cubic metres for every hectare of exposed soil between 1 November to 30 April; and
 - b) 200 cubic metres for every hectare of exposed soil between 1 May to 31 October;

unless other sediment control measures that achieve an equivalent standard are agreed to by the Chief Executive of the Taranaki Regional Council.

3. At least 7 working days prior to the commencement of works the consent holder shall notify the Taranaki Regional Council of the proposed start date for the work. Notification shall include the consent number and a brief description of the activity consented and shall be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable only if the consent holder does not have access to email.
4. All earthwork areas shall be stabilised vegetatively or otherwise as soon as is practicable immediately following completion of soil disturbance activities.
5. This consent shall lapse on 30 June 2015, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

Consent 7621-1

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 2015 and/or June 2021, 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 15 November 2013

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date: 6 April 2010

Commencement Date: 6 April 2010

Conditions of Consent

Consent Granted: To install, use and maintain a culvert in an unnamed tributary of the Makara Stream in the Waitara catchment at or about (NZTM) 1715738E-5652776N

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: Ahuroa-B wellsite, 1278 Croydon Road, Stratford
[Property owner: GS & KA Bishop]

Legal Description: Lot 1 DP 16297 Blk X Huiroa SD

Catchment: Waitara

Tributary: Makino
Makara

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

General condition

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

Special conditions

1. The culvert pipe shall have a diameter no less than 600 and be no longer than 22 metres.
2. The fill over the top of the culvert pipe shall be no deeper than 2.5 metres.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 2 working days prior to the commencement and upon completion of the initial installation and again at least 2 working days to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the river bed or discharges to water. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable only if the consent holder does not have access to email.
4. The consent holder shall ensure that the area and volume of stream bed disturbance is, as far as practicable, minimised and any areas that are disturbed are, as far as practicable, reinstated.
5. The culvert shall not obstruct fish passage.
6. The invert of the culvert shall at all times be slightly lower than the level of the surrounding riverbed so that it fills with bed material and simulates the natural bed.
7. The gradient of the culvert shall be no steeper than the natural gradient of the stream bed at the site.
8. The consent holder shall take all reasonable steps to:
 - a. minimise the amount of sediment discharged to the stream;
 - b. minimise the amount of sediment that becomes suspended in the stream; and
 - c. mitigate the effects of any sediment in the stream.

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

9. The works shall remain the responsibility of the consent holder and be maintained so that:
 - a) it does not become blocked and at all times allows the free flow of water through it;
 - b) any erosion, scour or instability of the stream bed or banks that is attributable to the works carried out as part of this consent is remedied by the consent holder.

Consent 7622-1

10. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the culvert shall be removed and the area reinstated, if and when it is no longer required. A further resource consent may be required to authorise the removal of the structure, and the consent holder is advised to seek advice from the Council on this matter.
11. This consent shall lapse on 30 June 2015, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 and/or June 2021, 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 15 November 2013

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date: 06 October 2009

Commencement
Date: 06 October 2009

Conditions of Consent

Consent Granted: To discharge emissions to air from flaring of hydrocarbons associated with well clean-up and well testing associated with exploration activities at the Ahuroa-B wellsite at or about (NZTM) 1715699E-5652954N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Ahuroa-B wellsite, Barleymans Road, Stratford
[Property owner: G & K Bishop]

Legal Description: Lot 1 DP 16297 Blk X Huiroa SD

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

General condition

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

Special conditions

Exercise of consent

1. Flaring shall not occur for more than 45 days, cumulatively, per zone for each well.

Information and notification

2. The consent holder shall notify the Chief Executive, Taranaki Regional Council, at least 24 hours before the initial flaring of any new zone being commenced. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
3. At least 24 hours before any flaring, other than in emergencies, the consent holder shall provide notification to all residents within 1000 metres of the wellsite[s] of the commencement of flaring. The consent holder shall include in the notification a 24-hour contact telephone number for a representative of the consent holder, and shall keep and make available to the Chief Executive, Taranaki Regional Council, a record of all queries and complaints received in respect of any flaring activity.
4. No alteration shall be made to plant equipment or processes which may substantially alter the nature or quantity of flare emissions or other wellsite emissions, including but not limited to the recovery of produced gas, other than as authorised by this consent, without prior consultation with the Chief Executive, Taranaki Regional Council.

Flaring

5. Other than for the maintenance of a pilot flare flames, the consent holder shall have regard to the prevailing and predicted wind speed and direction at the time of initiation of, and throughout, any episode of flaring so as to minimise offsite effects.
6. All gas that is flared during well clean-up, drill stem testing, initial testing, well workovers, or production testing, or at any other time, must first be treated by effective liquid and solid separation and recovery, to ensure that smoke emission during flaring is minimised.
7. If separation required by condition 6 cannot be implemented or maintained at any time while there is a flow from the well, whether natural or induced, then the consent holder shall immediately advise the Compliance Manager, Taranaki Regional Council, and shall in any case re-establish liquid separation and recovery within three hours.

Consent 7745-1

8. Subject to special condition 7, no liquid or solid hydrocarbons shall be combusted through the gas flare system.
9. The gas shall be combusted so that emissions of smoke are minimised.
10. 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 potential effect on the environment arising from any emission to air from the flare or any other emissions to air from the wellsites authorised under this consent [including use of a separator during well clean-up].
11. Only substances originating from the well stream and treated as outlined by conditions 6, 7, 8, 9, and 10 shall be combusted within the flare pits.
12. There shall not be any objectionable or offensive odour or smoke at or beyond the boundaries of the properties where the wellsites are located.
13. The opacity of any smoke emissions shall not exceed a level of 1, as measured on the Ringelmann Scale, for more than 4 minutes cumulative duration in any 60 minute period.
14. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the flares so that, whether alone or in conjunction with any other emissions from the wellsites, 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 [mg/m^3] [eight-hour average exposure], or 30 mg/m^3 one-hour average exposure] at or beyond the boundaries of the property where the wellsites are located.
15. The consent holder shall control all emissions of nitrogen oxides to the atmosphere from the flares, so that whether alone or in conjunction with any other emissions from the wellsites, the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 100 micrograms per cubic metre [$\mu\text{g}/\text{m}^3$] [24-hour average exposure], or 200 $\mu\text{g}/\text{m}^3$ [1-hour average exposure] at or beyond the boundaries of the properties where the wellsites are located.
16. The consent holder shall control emissions to the atmosphere from the wellsites and flares of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, so that whether alone or in conjunction with any emissions from the flare, the maximum ground level concentration for any particular contaminant arising from the exercise of this consent measured at or beyond the boundaries of the property where the wellsites are located, is not increased above background levels:
 - a) by more than $1/30^{\text{th}}$ 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, 2002, 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, 2002, Department of Labour].

Recording and reporting information

17. The consent holder shall make available to the Chief Executive, Taranaki Regional Council, upon request, an analysis of a typical gas and condensate stream from the field, covering sulphur compound content and the content of carbon compounds of structure C₆ or higher number of compounds.
18. Each time there is visible smoke as a result of the exercise of this consent, the consent holder shall record the time, duration and cause. The consent holder shall make the record available to the Chief Executive, Taranaki Regional Council, upon request.
19. The consent holder shall record and make available to the Chief Executive, Taranaki Regional Council, logs of all flaring, including time, duration, zone, and volumes of substances flared.

Review

20. 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 any of the following purposes:
 - 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.

Transferred at Stratford on 12 January 2011

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date: 06 October 2009

Commencement
Date: 06 October 2009

Conditions of Consent

Consent Granted: To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Ahuroa-B wellsite, together with miscellaneous emissions at or about (NZTM) 1715699E-5652954N

Expiry Date: 1 June 2028

Review Date(s): June 2016, June 2022

Site Location: Ahuroa-B wellsite, Barleymans Road, Stratford
[Property owner: G & K Bishop]

Legal Description: Lot 1 DP 16297 Blk X Huiroa SD

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

General condition

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

Special conditions

Information and notification

1. Other than in emergencies, the consent holder shall notify the Chief Executive, Taranaki Regional Council, whenever the continuous flaring of hydrocarbons [other than purge gas] is expected to occur for more than five minutes in duration. Notification shall be no less than 24 hours before the flaring commences. Notification shall include the consent number and be emailed to worknotification@trc.govt.nz.
2. At least 24 hours before any flaring, other than in emergencies, the consent holder shall provide notification to all residents within 1000 metres of the site[s] of the commencement of flaring. The consent holder shall include in the notification a 24-hour contact telephone number for a representative of the consent holder, and shall keep and make available to the Chief Executive, Taranaki Regional Council, a record of all queries and complaints received in respect of any flaring activity.
3. No alteration shall be made to plant equipment or processes which may substantially alter the nature or quantity of flare emissions or other site emissions, including but not limited to the recovery of produced gas, other than as authorised by this consent , without prior consultation with the Chief Executive, Taranaki Regional Council.

Emissions from the site

4. Other than for the maintenance of a pilot flare flame, the consent holder shall have regard to the prevailing and predicted wind speed and direction at the time of initiation of, and throughout, any episode of flaring so as to minimise offsite effects.
5. All gas that is flared must first be treated by effective liquid and solid separation and recovery to ensure that smoke emission during flaring is minimised.
6. If separation required by special condition 5 cannot be implemented or maintained at any time while there is a flow from the well, whether natural or induced, then the consent holder shall immediately advise the Compliance Manager, Taranaki Regional Council, and shall in any case re-establish liquid and solid separation and recovery within three hours.

Consent 7746-1

7. Subject to special condition 6, no liquid or solid hydrocarbons shall be combusted through the gas flare system, other than in an emergency.
8. Notwithstanding any other condition of this consent 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 potential effect on the environment arising from any emission to air from the flare or any other emissions to air from the wellsites authorised under this consent [including use of a separator during well clean-up].
9. Only substances originating from the well stream and treated as outlined by conditions 5, 6, 7, and 8 shall be combusted within the flare pit.
10. There shall not be any objectionable or offensive odour or smoke at or beyond the boundaries of the properties where the wellsites are located.
11. All hydrocarbon storage vessels shall be fitted with vapour recovery systems.
12. The opacity of any smoke emissions shall not exceed a level of 1, as measured on the Ringelmann Scale, for more than 4 minutes cumulative duration in any 60 minute period.
13. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the flare so that, whether alone or in conjunction with any other emissions from the wellsite, 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 [mg/m^3] [eight-hour average exposure], or 30 mg/m^3 one-hour average exposure] at or beyond the boundaries of the properties where the wellsites are located.
14. The consent holder shall control all emissions of nitrogen oxides to the atmosphere from the flares so that, whether alone or in conjunction with any other emissions from the wellsites, the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 100 micrograms per cubic metre [$\mu\text{g}/\text{m}^3$] [24-hour average exposure], or 200 $\mu\text{g}/\text{m}^3$ [1-hour average exposure] at or beyond the boundaries of the of the properties where the wellsites are located.
15. The consent holder shall control emissions to the atmosphere from the wellsites and flare of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides so that, whether alone or in conjunction with any emissions from the flares, the maximum ground level concentration for any particular contaminant arising from the exercise of this consent measured at or beyond the boundaries of the properties where the wellsites are located, 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, 2002, 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, 2002, Department of Labour].

Recording and reporting information

- 16. The consent holder shall make available to the Chief Executive, Taranaki Regional Council, upon request, an analysis of a typical gas and condensate stream from the field, covering sulphur compound content and the content of carbon compounds of structure C₆ or higher number of compounds.
- 17. Each time there is visible smoke as a result of the exercise of this consent, the consent holder shall record the time, duration and cause. The consent holder shall make the record available to the Chief Executive, Taranaki Regional Council, upon request.
- 18. The consent holder shall record and maintain a log of all continuous flaring events longer than five minutes duration, and any intermittent flaring lasting for an aggregate of ten minutes or longer in any 120-minute period. The log shall contain the date, the start and finish times of the flaring event, 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 19.
- 19. 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 any energy efficiency measures implemented on the site;
 - ii) detailing smoke emissions as required under condition 17;
 - iii) detailing any measures undertaken or proposed to reduce smoke emissions;
 - iv) detailing any measures undertaken or proposed to reduce flaring;
 - v) addressing any other issue relevant to the minimisation or mitigation of emissions from the flare;
 - vi) detailing any complaints received and any measures undertaken to address complaints; and
 - vii) reviewing all options and technological advances relevant to the reduction or mitigation of any discharge to air from the site, how these might be applicable and/or implemented at the site, and the benefits and costs of these advances.

Review

- 20. 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 any of the following purposes:
 - 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

Consent 7746-1

- 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.

Transferred at Stratford on 12 January 2011

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date: 18 January 2011

Commencement
Date: 18 January 2011

Conditions of Consent

Consent Granted: To discharge stormwater and sediment from earthworks during the construction of the extension of the Ahuroa-B wellsite onto and into land at or about (NZTM) 1715527E-5652866N

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: Ahuroa-B wellsite, 1278 Croydon Rd, Stratford
[Property owner: G & K Bishop]

Legal Description: Pt Lot 1 DP 2699 Blk X Huiroa SD
[Discharge source & site]

Catchment: Waitara

Tributary: Makino
Makara

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

General condition

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

Special conditions

1. The 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. If any area of soil is exposed, all run off from that area shall pass through settlement ponds or sediment traps with a minimum total capacity of;
 - a) 100 cubic metres for every hectare of exposed soil between 1 November to 30 April; and
 - b) 200 cubic metres for every hectare of exposed soil between 1 May to 31 October;unless other sediment control measures that achieve an equivalent standard are agreed to by the Chief Executive of the Taranaki Regional Council.
3. The obligation described in condition 2 above shall cease to apply, and accordingly the erosion and sediment control measures can be removed, in respect of any particular site or area of any site, only when the site is stabilised.

Note: For the purpose of conditions 3 and 4 "stabilised" in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using rock or by the application of basecourse, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council and as specified in the Taranaki Regional Council's Guidelines for Earthworks in the Taranaki Region, 2006. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by an officer of the Taranaki Regional Council, an 80% vegetative cover has been established.

4. All earthworked areas shall be stabilised vegetatively or otherwise as soon as is practicable immediately following completion of soil disturbance activities.

Note: For the purposes of this condition "stabilised" has the same definition as that set out in condition 3.

5. At least 7 working days prior to the commencement of works the consent holder shall notify the Taranaki Regional Council of the proposed start date for the work. Notification shall include the consent number and a brief description of the activity consented and shall be emailed to worknotification@trc.govt.nz.
6. This consent shall lapse on 31 March 2016, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

Consent 7748-1

7. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 and/or June 2021 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 18 January 2011

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date: 18 January 2011

Commencement
Date: 18 January 2011

Conditions of Consent

Consent Granted: To install and use a pipe in the bed of an unnamed tributary of the Makara Stream, including the associated reclamation, disturbance and deposition of material between (NZTM) 1715533E-5652692N and 1715550E-5652821N

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: Ahuroa-B wellsite, 1278 Croydon Road, Stratford
[Property owner: G & K Bishop]

Legal Description: Pt Lot 1 DP 2699 Blk X Huiroa SD [Site of structure]

Catchment: Waitara

Tributary: Makino
Makara

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

General condition

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

Special conditions

1. This consent authorises the laying pipe in 140 metres of stream bed and subsequently filling the piped reach between grid references [NZTM] 1715533E-5652692N and 1715550E-5652821N.
2. The pipe shall have a diameter of not less than 600 mm.
3. The piping shall be maintained to ensure it does not become blocked and at all times allows the free flow of water through it.
4. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 2 working days prior to the commencement and upon completion of the initial installation and again at least 2 working days to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the river bed or discharges to water. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
5. Any instream works shall take place only between 1 November and 30 April inclusive.
6. The consent holder shall take all reasonable steps to:
 - a) minimise the amount of sediment discharged to the stream;
 - b) minimise the amount of sediment that becomes suspended in the stream; and
 - c) mitigate the effects of any sediment in the stream.

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

7. No vegetation shall be buried within 20 metres of the stream.
8. In the event that any archaeological remains are discovered as a result of works authorised by this consent, the works shall cease immediately at the affected site and tangata whenua and the Chief Executive, Taranaki Regional Council, shall be notified within one working day. Works may recommence at the affected area when advised to do so by the Chief Executive, Taranaki Regional Council. Such advice shall be given after the Chief Executive has considered: tangata whenua interest and values, the consent holder's interests, the interests of the public generally, and any archaeological or scientific evidence. The New Zealand Police, Coroner, and Historic Places Trust shall also be contacted as appropriate, and the work shall not recommence in the affected area until any necessary statutory authorisations or consents have been obtained.

Consent 7749-1

9. This consent shall lapse on 31 March 2016, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
10. 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 2015 and/or June 2021, 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 18 January 2011

For and on behalf of
Taranaki Regional Council

Director-Resource Management

General condition

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

Special conditions

1. The culvert shall be constructed in accordance with the plan prepared by Transfield Worley Hawkins titled "Ahuroa Gas Storage Project Stage 2B/2C Sediment & Drainage Management" reference NZ-W820-15-EA-0001/2, provided to the Council with application 6637. In the case of any contradiction between the drawing[s] and the conditions of this consent, the conditions of this consent shall prevail.
2. The culvert pipe shall have a diameter no less than 600 mm and be no longer than 20 metres.
3. The fill over the top of the culvert pipe shall be no deeper than 4 metres.
4. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 2 working days prior to the commencement and upon completion of the initial installation. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
5. Any instream works shall take place only between 1 November and 30 April inclusive.
6. The consent holder shall ensure that the area and volume of stream bed disturbance is, as far as practicable, minimised and any areas that are disturbed are, as far as practicable, reinstated.
7. The culvert shall not obstruct fish passage.
8. The invert of the culvert shall at all times be slightly lower than the level of the surrounding riverbed so that it fills with bed material and simulates the natural bed.
9. The gradient of the culvert shall be no steeper than the natural gradient of the stream bed at the site.
10. The consent holder shall take all reasonable steps to:
 - a. minimise the amount of sediment discharged to the stream;
 - b. minimise the amount of sediment that becomes suspended in the stream; and
 - c. mitigate the effects of any sediment in the stream.

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

Consent 7750-1.1

11. The works shall remain the responsibility of the consent holder and be maintained so that:
 - a. it does not become blocked and at all times allows the free flow of water through it;
 - b. any erosion, scour or instability of the stream bed or banks that is attributable to the works carried out as part of this consent is remedied by the consent holder.
12. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the culvert shall be removed and the area reinstated, if and when it is no longer required. A further resource consent may be required to authorise the removal of the structure, and the consent holder is advised to seek advice from the Council on this matter.
13. This consent shall lapse on 1 June 2027, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
14. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 and/or June 2021, 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 16 March 2016

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Appendix III

Resource consents for AGS to SPS pipeline

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date: 30 August 2012

Commencement
Date: 30 August 2012

Conditions of Consent

Consent Granted: To discharge stormwater and sediment from earthworks associated with the construction and installation of a pipeline between the Ahuroa-B wellsite and Stratford Power Station onto and into land in circumstances where it may enter surface water between (NZTM) 1715545E-5652969N and 1713576E-5645663N

Expiry Date: 1 June 2017

Site Location: Pipeline route between Ahuroa-B wellsite and the Stratford Power Station

Legal Description: Various

Catchment: Patea
Waitara

Tributary: Kahouri
Makara
Ahuroa
Pikau

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

General condition

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

Special conditions

1. The discharge of stormwater and sediment authorised by this consent, shall only originate from works associated with the installation and construction of the pipeline in accordance with details submitted with application 7151.
2. At least 7 working days prior to the commencement of works the consent holder shall notify the Taranaki Regional Council of the proposed start date for the work. Notification shall include the consent number and a brief description of the activity consented and shall be emailed to worknotification@trc.govt.nz.
3. All discharge which may enter surface water from any unvegetated area shall pass through settlement ponds or sediment traps with a minimum total capacity of:
 - a) 100 cubic metres for every hectare of exposed soil between 1 November to 30 April; and
 - b) 200 cubic metres for every hectare of exposed soil between 1 May to 31 October; unless other sediment control measures that achieve an equivalent standard are agreed to by the Chief Executive of the Taranaki Regional Council.
4. The obligation described in condition 3 above shall cease to apply, and accordingly the erosion and sediment control measures can be removed, in respect of any particular site or area of any site, only when the site is stabilised.
5. All earthworked areas shall be stabilised vegetatively or otherwise as soon as is practicable immediately following completion of soil disturbance activities.

Note: For the purpose of conditions 4 and 5 "stabilised" in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using rock or by the application of basecourse, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council and as specified in the Taranaki Regional Council's Guidelines for Earthworks in the Taranaki Region, 2006. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by an officer of the Taranaki Regional Council, an 80% vegetative cover has been established.
6. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.

Consent 9307-1

7. This consent shall lapse on 30 September 2017, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

Signed at Stratford on 30 August 2012

For and on behalf of
Taranaki Regional Council

Chief Executive

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date: 30 August 2012

Commencement
Date: 30 August 2012

Conditions of Consent

Consent Granted: To take and use water from the Kahouri Stream for hydrostatic testing of pipelines at or about (NZTM) 1713550E-5645800N

Expiry Date: 1 June 2017

Site Location: East Road, Stratford [Property owner: Hwitan Tune Farm Trusts Partnership]

Legal Description: Lot 2 DP 20934 Blk II Ngaere SD [site of take]

Catchment: Patea

Tributary: Kahouri

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

General condition

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

Special conditions

1. The total volume of water taken shall not exceed 1500 cubic metres.
2. The consent holder shall maintain a record of the take including date, rate, pumping hours and volume abstracted and supply these records to the Chief Executive, Taranaki Regional Council, upon request.
3. 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, including, but not limited to, the efficient and conservative use of water.
4. The consent holder shall ensure that the intake is screened and designed to avoid fish entering the intake or being trapped against the screen.
5. This consent shall lapse on 30 September 2017, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

Signed at Stratford on 30 August 2012

For and on behalf of
Taranaki Regional Council

Chief Executive

Consents 9309-1, 9310-1, 9311-1, 9312-1, 9313-1, 9314-1, 9315-1
9316-1, 9317-1, 9318-1, 9319-1, 9320-1, 9321-1, 9322-1

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

Name of
Consent Holder: Contact Energy Limited
P O Box 10742
WELLINGTON 6143

Decision Date: 30 August 2012

Commencement
Date: 30 August 2012

Conditions of Consent

Consent Granted: To install and use a pipeline for conveying gaseous hydrocarbons under the bed of the Kahouri and Piakau Streams, and 12 unnamed tributaries of the Makara, Ahuroa, Kahouri and Piakau Streams

Expiry Date: 1 June 2028

Review Date(s): June 2016 and June 2022

Site Location: Pipeline route between Ahuroa-B wellsite and the Stratford Power Station

Legal Description: Various

Catchment: Patea
Waitara

Tributary: Kahouri
Makara
Ahuroa
Pikau

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

Consents 9309-1, 9310-1, 9311-1, 9312-1, 9313-1, 9314-1, 9315-1
9316-1, 9317-1, 9318-1, 9319-1, 9320-1, 9321-1, 9322-1

General condition

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

Special conditions

1. These consents authorise the installation and use of a pipeline at or about the locations specified below:

Crossing No.	Consent No.	Location [Map Reference]	Stream
1	9309-1	1715550E-5652867N	Unnamed tributary – Makara Stream
2	9310-1	1715691E-5651133N	Unnamed tributary – Ahuroa Stream
3	9311-1	1715731E-5650473N	Unnamed tributary – Makara Stream
4	9312-1	1715781E-5650005N	Unnamed tributary – Makara Stream
5	9313-1	1715617E-5649687N	Unnamed tributary – Makara Stream
6	9314-1	1715374E-5649461N	Unnamed tributary – Makara Stream
7	9315-1	1714309E-5648554N	Unnamed tributary – Kahouri Stream
8	9316-1	1714065E-5648223N	Unnamed tributary – Kahouri Stream
9	9317-1	1713960E-5647439N	Unnamed tributary – Piakau Stream
10	9318-1	1713745E-5647083N	Piakau Stream
11	9319-1	1713646E-5646976N	Unnamed tributary – Piakau Stream
12	9320-1	1713627E-5646659N	Unnamed tributary – Piakau Stream
13	9321-1	1713619E-5646155N	Unnamed tributary – Piakau Stream
14	9322-1	1713547E-5645926N	Kahouri Stream

2. At least 48 hours prior to the commencement of works the consent holder shall provide the Taranaki Regional Council with a programme for the installation of the pipelines including: a schedule of proposed start dates and an estimation of the duration of the works, and details of the contractor including contact information for the project manager. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
3. 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 the discharge of sediment to any surface water body and to prevent or minimise any adverse effects of the disturbance activities on any surface water body.
4. All pipelines shall be buried to an initial burial depth not less than 2 metres below the bed of the streams.
5. Any work undertaken in the bed of the streams shall be undertaken only between 1 November and 31 May.
6. The consent holder shall ensure that the area and volume of river bed disturbance is restricted to a practicable minimum and that areas disturbed from the exercise of this consent are reinstated as near as practicable to pre-work condition.

Consents 9309-1, 9310-1, 9311-1, 9312-1, 9313-1, 9314-1, 9315-1
9316-1, 9317-1, 9318-1, 9319-1, 9320-1, 9321-1, 9322-1

7. The consent holder shall take all reasonable steps to:
- a. minimise the amount of sediment discharged to the stream;
 - b. minimise the amount of sediment that becomes suspended in the stream; and
 - c. mitigate the effects of any sediment in the stream.

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

8. In the event that any archaeological remains are discovered as a result of works authorised by this consent, the works shall cease immediately at the affected site and tangata whenua and the Chief Executive, Taranaki Regional Council, shall be notified within one working day. Works may recommence at the affected area when advised to do so by the Chief Executive, Taranaki Regional Council. Such advice shall be given after the Chief Executive has considered: tangata whenua interest and values, the consent holder's interests, the interests of the public generally, and any archaeological or scientific evidence. The New Zealand Police, Coroner, and Historic Places Trust shall also be contacted as appropriate, and the work shall not recommence in the affected area until any necessary statutory authorisations or consents have been obtained.
9. This consent shall lapse on 30 September 2017, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
10. 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 30 August 2012

For and on behalf of
Taranaki Regional Council

Chief Executive

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

Name of
Consent Holder: Contact Energy Limited
 P O Box 10742
 WELLINGTON 6143

Decision Date: 6 June 2013

Commencement Date: 6 June 2013

Conditions of Consent

Consent Granted: To install and use a culvert in an unnamed tributary of the
 Makara Stream, including associated realignment,
 streambed disturbance and reclamation

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: Ahuroa-B wellsite, 1278 Croydon Road, Stratford

Legal Description: Pt Lot 1 DP 2699 (Site of structure)

Grid Reference (NZTM) 1715566E-5652807N

Catchment: Waitara

Tributary: Makino
 Makara

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

General condition

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

Special conditions

1. The culvert and stream realignment shall be constructed in accordance with the information provided in the application, including drawing NZ-W828-20-DD-31001-01, Revision A0 and dated March 2013. In the case of any contradiction between the information and the conditions of this consent, the conditions of this consent shall prevail.
2. The culvert shall be no longer than 22 metres.
3. The fill over the top of the culvert shall be no deeper than 3 metres.
4. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 2 working days prior to the commencement of the outstanding works. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
5. The gradient of the culvert shall be no steeper than the natural gradient of the stream bed at the site.
6. The consent holder shall install headwalls and rock rip rap at the outlet and inlet of the culvert.
7. The grading of the rock rip rap is of the following specification:
 - a. 100% less than 450 mm diameter;
 - b. 50% greater than 350 mm diameter; and
 - c. 90% greater than 150 mm diameter.
8. That consent holder shall ensure that rock rip rap armouring is placed a minimum:
 - a. height and distance of 0.5 metres and 3 metres along the banks of the new channel and at the location where the new alignment deviates from the old alignment; and
 - b. distance of 3 metres across the full width of the bed of the new stream channel.
9. On completion of the realignment work:
 - a. the banks of the reconstructed channel shall have a slope no steeper than 1 horizontal to 1 vertical. Where the bank consists of fill, the slope will be no steeper than 2 horizontal to 1 vertical; and
 - b. the bed of the reconstructed channel shall be at an appropriate grade so as to provide for fish passage; and
10. The final slope of the channel banks above the culvert shall be no steeper than 1.5 horizontal to 1 vertical.

Consent 9576-1

11. The invert of the culvert shall be set below the existing streambed by at least 20% of the culvert diameter so that it fills with bed material and simulates the natural bed.
12. The consent holder shall ensure that the area and volume of stream bed disturbance is, as far as practicable, minimised and any areas that are disturbed are, as far as practicable, reinstated.
13. The consent holder shall take all reasonable steps to:
 - a. minimise the amount of sediment discharged to the stream;
 - b. minimise the amount of sediment that becomes suspended in the stream; and
 - c. mitigate the effects of any sediment in the stream.

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

14. All earthwork areas shall be stabilised as soon as is practicable immediately following the completion of soil disturbance activity.

Note: For the purpose of this condition "stabilised" in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using indurated rock or by the application of basecourse, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council and as specified in Taranaki Regional Council's Guidelines for Earthworks in the Taranaki Region, 2006. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by an Investigating Officer, Taranaki Regional Council, an 80% vegetative cover has been established.

15. The culvert structure and new stream channel shall remain the responsibility of the consent holder and be maintained so that:
 - a. the culvert does not become blocked and at all times allows the free flow of water through them; and
 - b. any erosion, scour or instability of the stream bed or banks that is attributable to the works carried out as part of this consent is remedied by the consent holder.
16. In the event that any archaeological remains are discovered as a result of works authorised by this consent, the works shall cease immediately at the affected site and tangata whenua and the Chief Executive, Taranaki Regional Council, shall be notified within one working day. Works may recommence at the affected area when advised to do so by the Chief Executive, Taranaki Regional Council. Such advice shall be given after the Chief Executive has considered: tangata whenua interest and values, the consent holder's interests, the interests of the public generally, and any archaeological or scientific evidence. The New Zealand Police, Coroner, and Historic Places Trust shall also be contacted as appropriate, and the work shall not recommence in the affected area until any necessary statutory authorisation, or consent, have been obtained.
17. This consent shall lapse on 30 June 2018, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

Consent 9576-1

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 2015 and/or June 2021, 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 6 June 2013

For and on behalf of
Taranaki Regional Council

Director-Resource Management

Appendix IV
Biomonitoring reports

To Job Manager, J Kitto
From Scientific Officer, C R Fowles
Document 1458652
Report No CF632
Date January 2015

Spring biomonitoring of the Patea River in relation to the discharge of cooling water and abstraction of water for Contact Energy Ltd's combined cycle and peaker power stations, November 2014

Introduction

Biomonitoring forms a component of the consents compliance monitoring programme implemented by the TRC following the construction of the Taranaki Combined Cycle [TCC1] power station in 1998, and the addition of Stratford Peaker Plant [SPP] in 2011. This particular biological monitoring survey (the first of two biannual surveys for the 2014-2015 monitoring period) related primarily to consent 5848 which permits the discharge of cooling water into the Patea River approximately 1 km upstream of the river's confluence with the Kahouri Stream, east of Stratford.

Five sites in total were surveyed in the Patea River (see Section 2), two in the immediate vicinity of the outfall, as required by Special Condition 7 of the consent (relating to the 'mixing zone'), and one (for reference purposes), at the Council's State of the Environment (SEM) long-term trend detection site at Skinner Road, approximately 1.5 km further downstream. Consents granted in 2001 (5847 and 5850) for the future expansion of the power station [TCC2] required the establishment and monitoring of two additional sites in the mid-reaches of the Patea River between the site of the proposed additional water abstraction (Skinner Road) and the confluence with the Mangaehu River. These sites (Figure 1) at Hungers Road (9 km downstream of Skinner Road) and a further 13 km downstream (adjacent to Raupuha Road, below the Makuri Stream confluence) which initially were sampled as a component of the environmental effects assessment for the power station expansion (Stark and Young, 2001 and CF251), continue to provide baseline information in anticipation of this expansion.

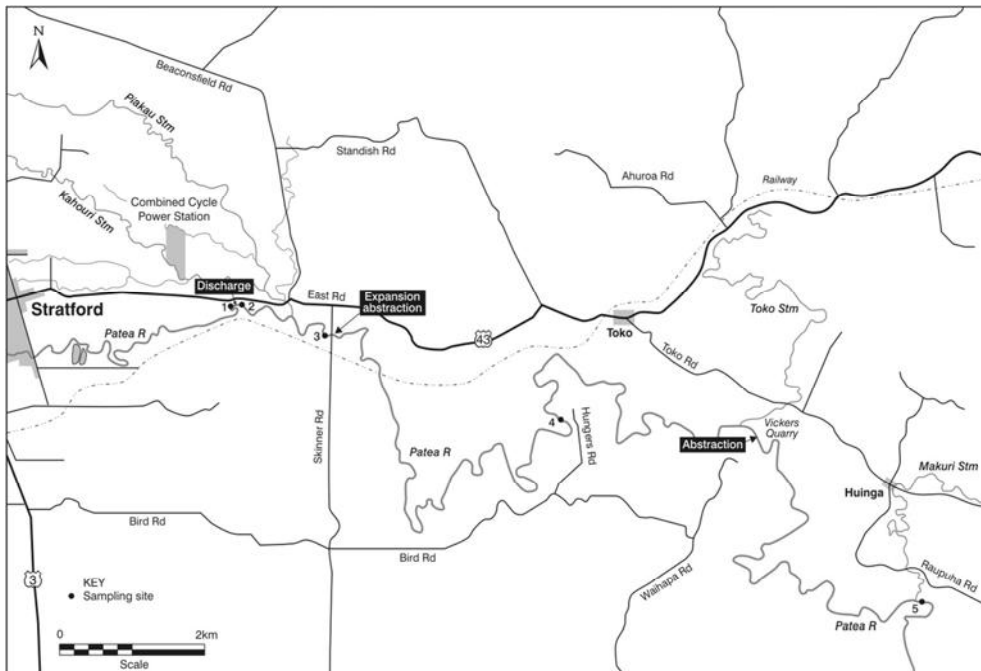
Biomonitoring of the TCC1 station stormwater discharges to the Kahouri Stream is also performed as a separate monitoring programme and this is reported separately. The present biomonitoring survey was performed on 25 November 2014 in conjunction with the spring component of the Regional Council's SEM programme.

Method

The standard '400 ml kick sampling' technique was used to collect streambed (benthic) macroinvertebrates and algae from five riffle sites in the Patea River. These sites were located as listed in Table 1 and illustrated in Figure 1.

Table 1 Location of sampling sites in the Patea River

Site No	Code	GPS reference	Location	Altitude (m asl)	Distance from coast (km)	Distance from National Park (km)
1	PAT000356	E1714497 N5645112	U/s of TCC1 cooling wastes discharge	250	131.8	17.2
2	PAT000357	E1714662 N5645076	100 m d/s of TCC1 cooling wastes discharge	250	131.6	17.4
3	PAT000360	E1715919 N5644681	Skinner Road	240	129.8	19.2
4	PAT000397	E1718991 N5643531	Hungers Road	200	120.5	28.5
5	PAT000430	E1723952 N5641068	Raupuha Road	160	106.9	42.1

**Figure 1** Location of biomonitoring sites in the Patea River in relation to the combined cycle power station, Stratford**Figure 2** Biomonitoring sites location in the Patea River

This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001).

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)	= 20-99 individuals
VA (very abundant)	= 100-499 individuals
XA (extremely abundant)	= 500 or more individuals

Macroinvertebrate Community Index (MCI) values were calculated for taxa present at each site (Stark 1985) with certain taxa scores modified in accordance with Taranaki experience.

A semi-quantitative MCI value, SQMCI_s (Stark 1999) 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 scores, and dividing by the sum of the loading factors. 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).

Results and discussion

This survey was performed on 25 November 2014 during a period of late spring moderate to low, recession flow, eight days after a fresh in excess of 3x median flow and 22 days after a fresh in excess of 7x median flow. It followed a relatively wet early spring period when eight freshes were recorded over the preceding eight week period. River flow at Skinner Road was 2.22 m³/sec representing a flow well below the average monthly mean November flow (4.38 m³/sec) but above the minimum mean monthly flow for November (1.13 m³/sec) recorded for the period 1978-2014.

Periphyton mats were patchy at sites 1 and 2 but thin at all other (downstream) sites. Patchy filamentous algae were present at all sites except site 3 where they were widespread and moss was patchy at all sites except site 4 from observations of the stony riffle substrates. River flow was relatively clear and low at the two sites (1 and 2) adjacent to the discharge site where water temperatures recorded (at the time of this mid morning survey) were 14.4 °C (site 1) and 14.3 °C (site 2) during a period when the power station combined cycle and peaker plant cooling water discharges to the river were occurring.

The (main) combined cycle plant had been discharging continuously since restarting on 15 October 2014, before when it had not operated for three months. One or both peaker plants had been operated almost daily since 15 September, except for a six-day period, ending 19 November.

River flow was moderate, uncoloured, and slightly turbid at the three sites (3, 4, & 5) downstream from the Kahouri Stream confluence, where water temperatures ranged from 14.3 °C to 16.3 °C at these three sites at the time of this mid to late morning survey.

Macroinvertebrate communities

Prior to the establishment of the Contact Energy Ltd's programme, biomonitoring surveys had been performed at site 1 (in association with other consents' monitoring programmes) and site 3 (SEM and investigation programmes). Site 2 was established specifically for the purpose of the Contact Energy Ltd consent monitoring programme and sampled initially in spring 1998. The two lower sites (sites 4 and 5) had been surveyed on fewer previous occasions, principally for environmental assessment purposes. A summary of the results of these previous surveys and the existing programme's results are presented in Table 2 (Note: The results of surveys at sites 4 and 5 performed by Cawthron are not included in this summary but are presented and discussed in TRC report CF251).

Table 2 Summary of macroinvertebrate taxa numbers and MCI values for previous surveys performed between January 1992 and February 2014

Site	No of surveys	Taxa no		MCI values		Survey of November 2014	
		Range	Median	Range	Median	Taxa No.	MCI
1	39	17-31	24	82-116	98	22	106
2	32	14-33	22	86-111	98	20	97
3	40	15-33	24	86-105	98	28	101
4	25	16-30	22	82-102	95	24	106
5	25	15-26	22	82-102	94	21	95

The macroinvertebrate fauna results from the present survey are presented in Table 3, with various survey results since 1992 illustrated in Figure 2.

Sites in the vicinity of the power station outfall (sites 1 and 2)

A narrow range of taxa richnesses (20 to 22 taxa) was recorded at sites 1 and 2 immediately upstream and downstream of the discharge. These taxa numbers were only two taxa fewer than median richnesses previously surveyed at each site (Table 1 and Figure 2). These numbers were from 1 to 3 taxa fewer than the median (25) taxa richness previously recorded from 206 surveys of 'control' sites at similar altitudes (250 to 300 m asl) in Taranaki ring plain rivers and streams sourced within the National Park (TRC, 1999 (updated, 2014)).

The characteristic taxa in this short reach of the river included one 'highly sensitive' taxon [very abundant mayfly (*Deleatidium*)]; five 'moderately sensitive' taxa [mayfly (*Coloburiscus*) elmids, dobsonfly (*Archichauliodes*), free-living caddisfly (*Costachorema*), and crane fly (*Aphrophila*)]; and three 'tolerant' taxa [oligochaete worms and midges (*Maoridiamesa* and orthoclads)]. This dominance represented several changes from the community dominance at the time of the previous summer survey when two additional 'tolerant' taxa were dominant numerically following a lower flow period. No significant differences in individual taxa abundances were recorded between sites 1 and 2, which together with some decrease in the numerical abundance of one very 'tolerant' taxon at site 2, accounted for the relatively similar SQMCI_s values which increased by 0.5 unit at site 2 (Table 3).

Table 3 Macroinvertebrate fauna of the Patea River in relation to Stratford Power Ltd sampled on 25 November 2014

Taxa List	Site Number	MCI score	1	2	3	4	5
	Site Code		PAT000356	PAT000357	PAT000360	PAT000397	PAT000430
	Sample Number		FWB14357	FWB14358	FWB14359	FWB14360	FWB14361
NEMATODA	Nematoda	3	-	-	R	-	-
ANNELIDA (WORMS)	Oligochaeta	1	VA	A	A	A	A
MOLLUSCA	<i>Latia</i>	5	-	-	-	R	R
	<i>Potamopyrgus</i>	4	-	-	-	VA	C
	Sphaeriidae	3	-	-	R	-	-
CRUSTACEA	Ostracoda	1	-	R	-	-	-
	<i>Paracalliope</i>	5	-	R	-	-	-
EPHEMEROPTERA (MAYFLIES)	<i>Austroclima</i>	7	R	-	R	C	A
	<i>Coloburiscus</i>	7	VA	VA	VA	C	C
	<i>Deleatidium</i>	8	VA	VA	XA	XA	VA
	<i>Nesameletus</i>	9	R	-	-	R	-
	<i>Zephlebia group</i>	7	-	-	R	-	-
PLECOPTERA (STONEFLIES)	<i>Acroperla</i>	5	-	-	R	-	-
	<i>Zelandobius</i>	5	-	-	R	C	C
COLEOPTERA (BEETLES)	Elmidae	6	A	A	VA	VA	C
	Hydraenidae	8	C	C	R	-	R
	Ptilodactylidae	8	-	-	-	R	-
MEGALOPTERA (DOBSONFLIES)	<i>Archichauliodes</i>	7	A	A	A	A	C
TRICHOPTERA (CADDISFLIES)	<i>Aoteapsyche</i>	4	C	C	VA	VA	A
	<i>Costachorema</i>	7	A	A	A	C	A
	<i>Hydrobiosis</i>	5	C	C	C	A	C
	<i>Neurochorema</i>	6	-	-	R	R	-
	<i>Orthopsyche</i>	9	-	R	R	-	-
	<i>Olinga</i>	9	R	-	R	R	-
	<i>Oxyethira</i>	2	-	-	R	-	R
	<i>Pycnocentroides</i>	5	R	R	C	VA	A
	<i>Tripletides</i>	5	R	-	-	-	-
DIPTERA (TRUE FLIES)	<i>Aphrophila</i>	5	A	A	VA	A	C
	Eriopterini	5	R	-	-	-	-
	<i>Maoridiamesa</i>	3	VA	VA	VA	A	A
	Orthocladiinae	2	VA	VA	VA	C	C
	Tanypodinae	5	R	-	R	R	-
	Tanytarsini	3	C	C	A	A	C
	Empididae	3	C	R	C	R	-
	Muscidae	3	-	-	R	-	R
	<i>Austrosimulium</i>	3	R	R	C	R	C
ACARINA (MITES)	Acarina	5	-	R	-	-	-
No of taxa			22	20	28	24	21
MCI			106	97	101	106	95
SQMCIs			4.5	5.0	5.9	6.2	5.8
EPT (taxa)			10	7	13	11	8
%EPT (taxa)			45	35	46	46	38
'Tolerant' taxa		'Moderately sensitive' taxa		'Highly sensitive' taxa			

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

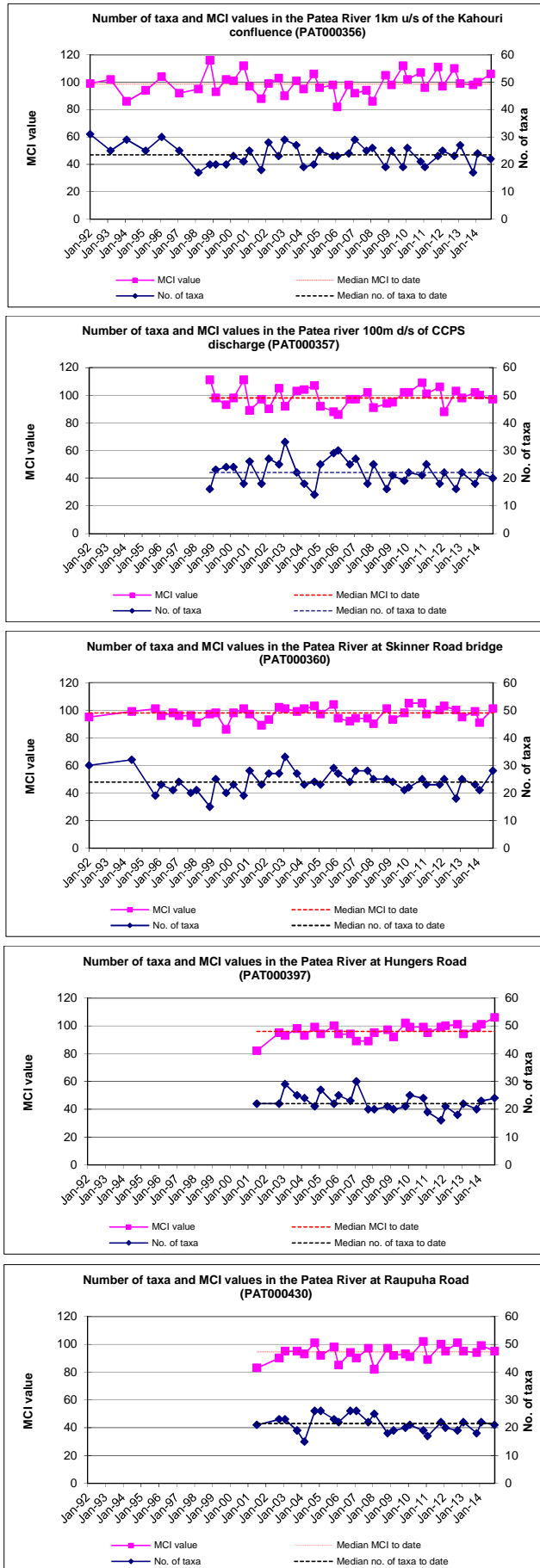


Figure 3 Taxa richness and MCI scores recorded to date at each of the five Patea River sites

The presence of four 'highly sensitive' taxa, one of which was very abundant, in this reach of the Patea River, was an indication of generally good physicochemical water quality conditions preceding the survey under relatively low flow conditions following a wet early spring period and in the presence of limited periphyton substrate cover which could be expected to have had some impact on physical habitat. However, improved treated wastewater quality (and moderate dilution) of the upgraded Stratford municipal WWTP discharge, may have contributed to these conditions on occasions (see reports CF526, CF545, CF575, and CF604).

MCI scores (Table 3) reflected the moderate proportion (60 to 68% of taxa richness) of 'sensitive' taxa in the communities at both sites, with the scores recorded (106 and 97 units) eight units higher and one unit lower than the medians of scores previously recorded at the two sites (Table 1). The scores also reflected the relative similarity in community composition between sites as reflected by the 16 shared taxa (of a total 26 taxa) between sites. These scores categorised these sites as having 'good' (site 1) and 'fair' (site 2) river health (TRC, 2014) at the time of this spring survey. However, they were 4 and 13 units lower than the predicted MCI score for National Park-sourced ringplain sites at an altitude of 250m asl but 6 units higher to 3 units lower than the predicted MCI scores for these sites, at distances of 17.2 km and 17.4 km respectively downstream of the National Park boundary (Stark and Fowles, 2009).

The MCI scores at these two sites showed an insignificant nine unit downstream decrease in scores which was indicative of minimal recent impacts of any cooling water discharge on the macroinvertebrate fauna of the Patea River at the periphery of the permitted mixing zone. These MCI scores between adjacent sites reflected the relatively similar community composition between sites.

Sites in the reach between Skinner Road and Raupuha Road (sites 3, 4 and 5)

Taxa numbers at these three sites had a moderate range of richnesses (21 to 28 taxa), which were within four taxa of historical medians at these sites (Table 2). They were also very similar to median richnesses (20 and 23 taxa) previously recorded by more than 720 surveys of 'control' sites at similar altitudes (155 to 199 m asl and 200 to 249 m asl) in Taranaki ringplain rivers and streams sourced within the National Park (TRC, 1999 (updated 2014)).

The characteristic taxa within this 23 km reach of the Patea River included one 'highly sensitive' taxon [very to extremely abundant mayfly (*Deleatidium*)]; up to seven 'moderately sensitive' taxa [mayfly (*Coloburiscus*), elmid beetles, dobsonfly (*Archichauliodes*), free-living caddisflies (*Hydrobiosis* and *Costachorema*), stony-cased caddisfly (*Pycnocentroides*), and cranefly (*Aphrophila*)]; and up to six 'tolerant' taxa [oligochaete worms, snail (*Potamopyrgus*), net-building caddisfly (*Aoteapsyche*), and midges (orthoclads, tanytarsids, and *Maoridiamesa*)]. Subtle changes in periphyton cover on the riverbed to that recorded upstream (at sites 1 & 2) coincided with increased abundances within a few of the more 'sensitive' taxa and, in particular, increases in abundances of 'tolerant' snails and net-spinning caddisfly in a downstream direction. This resulted in decreases of up to 1.7 SQMCI_s units between site 1 and the furthest three downstream sites. However, only a few significant differences in individual taxon abundances between adjacent sites were recorded further downstream along this river reach which accounted for the variation in SQMCI_s scores of 0.9 unit between sites 2 and 3, 0.3 unit between sites 3 and 4, and 0.4 unit between

sites 4 and 5. The improvement in SQMCI_s score between sites 2 and 3 was due in particular to increased abundances of 'sensitive' mayflies.

The similar proportion of lower scoring 'tolerant' taxa (39% of total taxa) in the community at site 3, small decrease (33% of total taxa) at site 4, and increase (43% of total taxa) at site 5 were reflected in the MCI scores (101, 106, and 95 units) recorded through this reach of the mid Patea River. These scores were an insignificant one to three units higher (sites 3 and 5) to a significant 11 units higher (site 4) than the medians of scores previously recorded at each of the three sites (Table 1) and from four units lower to 10 units higher than those recorded by the previous summer survey which was undertaken under lower flow conditions. The score of site 4 was also four units higher than the maximum previously recorded at this site. The scores recorded at these three sites by this survey varied by 11 units through the reach of the river surveyed with an 11 unit decrease through the 14 km reach between sites 4 and 5. These scores categorised the sites as having 'fair' to 'good' river health (TRC, 2014) at the time of this spring survey. They were an insignificant 8 and 6 units lower (sites 3 and 5) and one unit higher (site 4) than the predicted MCI scores for National Park-sourced ringplain sites at altitudes of 160 to 240m asl but an insignificant 2 units higher (site 3), 5 units (site 5), and a significant 12 units higher (site 4) than the predicted MCI scores for these sites, 19.2 km to 42.1 km downstream of the National Park boundary (Stark and Fowles, 2009).

The atypical increase in MCI scores between sites 3 and 4 and more typical decrease between sites 4 and 5 (0.8 unit/km) were dissimilar to the predicted downstream MCI decrease (an average rate of 0.3 to 0.4 units per km) predicted for this reach of a Taranaki ringplain stream (Stark and Fowles, 2009). Observations in this reach of the river, and particularly below the Skinner Road site (site 3), have indicated that riffles tended to be shorter and/or deeper than those typical of the upper reaches of the river (particularly upstream of the Kahouri Stream confluence), where the 'more sensitive' (particularly mayfly and stonefly) taxa often are a more common component of the macroinvertebrate communities (TRC, 2001). An improvement in MCI scores was found between sites 3 and 4 but the decrease between sites 4 and 5 resulted in an overall typical decrease of six units over this reach (23km) and 11 unit decrease over the total reach (25km) of the river surveyed, which was due to the higher score at the 'control' site upstream of the discharge (site 1). This overall rate of decrease equated to 0.44 MCI unit/km, similar to that predicted for this reach of the river.

Conclusions

This thirtieth biomonitoring survey performed in relation to the discharge of cooling water from the power station indicated no significant impacts of recent discharges upon the biological communities of the Patea River in the vicinity of the discharge outfall east of Stratford during a period of moderate recession flow conditions following a wet early spring period. Macroinvertebrate community richness and MCI scores typical of habitats with moderate periphyton substrate cover were within ranges of results previously recorded, slightly lower than median richnesses, and close to or above median MCI scores coincident with moderately low flow conditions. There were few subtle differences in community compositions between sites (mainly related to presence/absence of taxa rarities) resulting in an insignificant decrease in the MCI score recorded at the periphery of the permitted discharge mixing zone in comparison with the upstream 'control' site.

Biomonitoring performed at sites further downstream in the river has continued for the purpose of establishing baseline information in relation to the proposed expansion of the power station. Moderate community richnesses were found at the three sites in the 23 km reach between Skinner Road and Raupuha Road (where the principal effects of future water abstraction would be expected to occur), and community composition showed few changes from communities found at sites 1 and 2, upstream of the Kahouri Stream confluence. Of the total of 37 taxa found over the entire reach of the river surveyed (compared with 30 taxa in the previous spring and 32 taxa in summer 2014), 20 taxa were present at one or more sites in both of the two reaches above and below the Kahouri Stream confluence. A relatively high proportion of these (14 taxa) was present at all five sites along the reach surveyed, of which one 'highly sensitive', five 'moderately sensitive', and four 'tolerant' taxa were abundant at a minimum of three of the sites. One 'highly sensitive' taxon (mayfly) and two 'tolerant' taxa (worms and midge) were abundant at all five sites; less typical of the number of taxa which have been uniformly characteristic of these sites' communities from time to time in past surveys and coincident with moderate substrate periphyton cover conditions following a wet early spring period.

A relationship between MCI score and distance from the National Park established for National Park-sourced ringplain rivers and streams from Taranaki Regional Council data (Stark and Fowles, 2009) indicates that MCI values for the three sites (3, 4 and 5) in this reach of the mid-Patea River survey are expected to range between 90 and 99 units. Therefore, the results of this survey found a significantly higher than expected score at site 5 and slightly higher than the typical range of scores for those expected in the mid-Patea River reaches below Skinner Road, during a period of moderate spring flow conditions and moderate periphyton substrate cover following a wet early spring period.

The general trend in MCI scores found throughout the reach of the river at the time of this late spring survey, which were not significantly different in comparison with similar reaches of rivers elsewhere in Taranaki, also reflected a limited influence of the major point source municipal oxidation ponds system discharge to the river some 3 km upstream (see report CF604) following the relatively recent upgrading of the Stratford municipal WWTP system

Biannual biomonitoring surveys will form a component of future monitoring programmes associated with consents granted to the Contact Energy Ltd's combined cycle power station and will be integrated into other existing consents and state of the environment monitoring programmes. They will also continue to provide baseline information for the assessment of future effects of increased abstraction and cooling water discharge in the mid reaches of the Patea River with the consented expansion of the Stratford power station.

Summary

The Council's standard 'kick-sampling' technique was used at five established sites to collect streambed macroinvertebrates from the Patea River. Samples were sorted and identified to provide number of taxa (richness) and MCI and SQMCI₅ scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI₅ takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities, particularly if non-organic impacts are occurring.

Significant differences in either the MCI or the SQMCI_s between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

This late spring macroinvertebrate survey undertaken following periods of power station peaker plant discharges, indicated that recent discharges of treated cooling water from the Contact Energy Ltd's site had not had any significant detrimental effect on the macroinvertebrate communities of the river. No significant changes in the macroinvertebrate communities structures were recorded between the upstream 'control' site and site immediately downstream of the discharge

The macroinvertebrate communities in the reach of the Patea River adjacent to the discharge contained moderately high proportions of 'sensitive' taxa at both sites (typical of spring flow conditions) whereas the communities further downstream (below the Kahouri Stream confluence) atypically were dominated by only slightly higher numbers of 'tolerant' taxa. Taxonomic richnesses (numbers of taxa) tended to be insignificantly different at the time of this spring survey and MCI scores slightly higher compared to those of the previous summer 2014 survey.

Biomonitoring at three sites further downstream in the Patea River, for the establishment of baseline conditions in relation to consented power station expansion, found relatively similar community compositions to those monitored in the vicinity of the cooling water discharges with minimal significant changes in individual taxon abundances recorded. Downstream increases in the SQMCI_s values through the reach below the Skinner Road site were atypical of past results. With the exception of the Skinner Road site (3), MCI scores were similar or higher than historical median values at all sites and typical of communities at these distances from the National Park, despite the survey coinciding with moderate periphyton substrate cover following a wet period in early spring. The MCI score at site 4 (Hungers Rd) was higher than the maximum value recorded over the previous twelve-year period of monitoring.

MCI and SQMCI_s scores indicate that the stream communities throughout the entire river reach were of 'fair' to 'good' generic health and generally in the condition predicted for similar sites in other Taranaki ringplain rivers, following a period of moderate flow conditions following a wet early spring.

References

Internal Taranaki Regional Council reports

Fowles C R, 2000: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2000. Report CF223.

Fowles C R, 2001: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2001. Report CF234.

Fowles C R, 2001: A baseline biological macroinvertebrate faunal survey of three sites in the mid reaches of the Patea River, July 2001. Report CF238.

Fowles C R, 2001: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2001. Report CF242.

Fowles C R, 2002: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, March 2002. Report CF251.

Fowles C R, 2002: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2002. Report CF257.

Fowles C R, 2003: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2003. Report CF274.

Fowles C R, 2003: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2003. Report CF288.

Fowles C R, 2004: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, March 2004. Report CF307.

Fowles C R, 2004: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2004. Report CF343.

Fowles C R, 2005: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2005. Report CF360.

Fowles C R, 2005: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2005, Report CF390.

- Fowles C R, 2006: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2006. Report CF400.
- Fowles C R, 2006: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2006, Report CF411.
- Fowles C R, 2007: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2007. Report CF421.
- Fowles C R, 2007: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2007. Report CF433.
- Fowles CR, 2008: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2008. Report CF441.
- Fowles CR, 2008: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2008. Report CF472.
- Fowles C R, 2009: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, March 2009. Report CF487.
- Fowles C R, 2009: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2009. Report CF492.
- Fowles C R, 2009: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2010. Report CF 502.
- Fowles C R, 2010: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2010. Report CF 517.
- Fowles C R, 2011: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2011. Report CF 527.
- Fowles C R, 2011: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2011. Report CF 537.

- Fowles C R, 2012: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2012. Report CF546.
- Fowles C R, 2012: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2012. Report CF558.
- Fowles C R, 2013: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2013. Report CF576.
- Fowles C R, 2013: Biomonitoring of the Patea River in relation to the Stratford District Council's landfill and oxidation pond's system, February 2013. Report CF575.
- Fowles C R, 2013: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2013. Report CF593.
- Fowles C R, 2014: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2014. Report CF605.
- Fowles C R, 2014: Biomonitoring of the Patea River in relation to the Stratford District Council's closed landfill and oxidation ponds' system, February 2014. Report CF604.
- TRC, 1999: Some statistics from the Taranaki Regional Council database (FWB) of freshwater macroinvertebrate surveys performed during the period from January 1980 to 31 December 1998. (State of the Environment Report) TRC Technical Report 99-17.
- TRC, 2014: Freshwater macroinvertebrate fauna biological monitoring programme. Annual state of the environment monitoring report 2012-2013, Technical Report 2013-48.

External Publications

- Stark, J D, 1985: A macroinvertebrate community index of water quality for stony streams. Water and Soil Miscellaneous Publication No 87.
- Stark, J D, 1998: SQMCI: a biotic index for freshwater macroinvertebrate coded-abundance data. NZJE Mar FW Res 32: 55-66.
- Stark, J D, 1999: An evaluation of Taranaki Regional Council's SQMCI biomonitoring index. Cawthron Report No 472. 32pp.
- Stark, JD, Boothroyd IKH, Harding J, Maxted JR, Scarsbrook MR, 2001; Protocols for sampling macroinvertebrates in wadeable streams. New Zealand Macroinvertebrate Working Group Report No 1. Prepared for the Ministry for the Environment. Sustainable Management Fund Project No 5103. 57p.

Stark, JD and Fowles CR, 2009: Relationships between MCI, site altitude, and distance from the source for Taranaki ring plain stream. Stark Environmental Report No 2009-01.47p.

Stark, J D and Young RG, 2001: Stratford Power Station expansion: assessment of ecological effects. Cawthron Report No 623. 37pp.

To Job Manager, J Kitto
From Scientific Officer, C R Fowles
Document 1492256
Report No CF639
Date March 2015

Summer biomonitoring of the Patea River in relation to the discharge of cooling water and abstraction of water for Contact Energy Ltd's combined cycle and peaker power stations, February 2015

Introduction

Biomonitoring forms a component of the consents compliance monitoring programme implemented by the TRC following the construction of the Taranaki Combined Cycle [TCC1] power station in 1998, and the addition of Stratford Peaker Plant [SPP] in 2011. This particular biological monitoring survey (the second of two biannual surveys for the 2014-2015 monitoring period) related primarily to consent 5848 which permits the discharge of cooling water into the Patea River approximately 1 km upstream of the river's confluence with the Kahouri Stream, east of Stratford.

Five sites in total were surveyed in the Patea River (see Section 2), two in the immediate vicinity of the outfall, as required by Special Condition 7 of the consent (relating to the 'mixing zone'), and one (for reference purposes), at the Council's State of the Environment (SEM) long-term trend detection site at Skinner Road, approximately 1.5 km further downstream. Consents granted in 2001 (5847 and 5850) for the future expansion of the power station [TCC2] required the establishment and monitoring of two additional sites in the mid-reaches of the Patea River between the site of the proposed additional water abstraction (Skinner Road) and the confluence with the Mangaehu River. These sites (Figure 1) at Hungers Road (9 km downstream of Skinner Road) and a further 13 km downstream (adjacent to Raupuha Road, below the Makuri Stream confluence) which initially were sampled as a component of the environmental effects assessment for the power station expansion (Stark and Young, 2001 and CF251), continue to provide baseline information in anticipation of this expansion.

Biomonitoring of the TCC1 station stormwater discharges to the Kahouri Stream is also performed as a separate monitoring programme and this is reported separately. The present biomonitoring survey in the Patea River was performed on 10 February 2015 in conjunction with the summer component of the Regional Council's SEM programme and the consent monitoring programme for the Stratford Wastewater Treatment Plant.

Method

The standard '400 ml kick sampling' technique was used to collect streambed (benthic) macroinvertebrates and algae from five riffle sites in the Patea River. These sites were located as listed in Table 1 and illustrated in Figure 1.

Table 1 Location of sampling sites in the Patea River

Site No	Code	GPS reference	Location	Altitude (m asl)	Distance from coast (km)	Distance from National Park (km)
1	PAT000356	E1714497 N5645112	U/s of TCC1 cooling wastes discharge	250	131.8	17.2
2	PAT000357	E1714662 N5645076	100 m d/s of TCC1 cooling wastes discharge	250	131.6	17.4
3	PAT000360	E1715919 N5644681	Skinner Road	240	129.8	19.2
4	PAT000397	E1718991 N5643531	Hungers Road	200	120.5	28.5
5	PAT000430	E1723952 N5641068	Raupuha Road	160	106.9	42.1

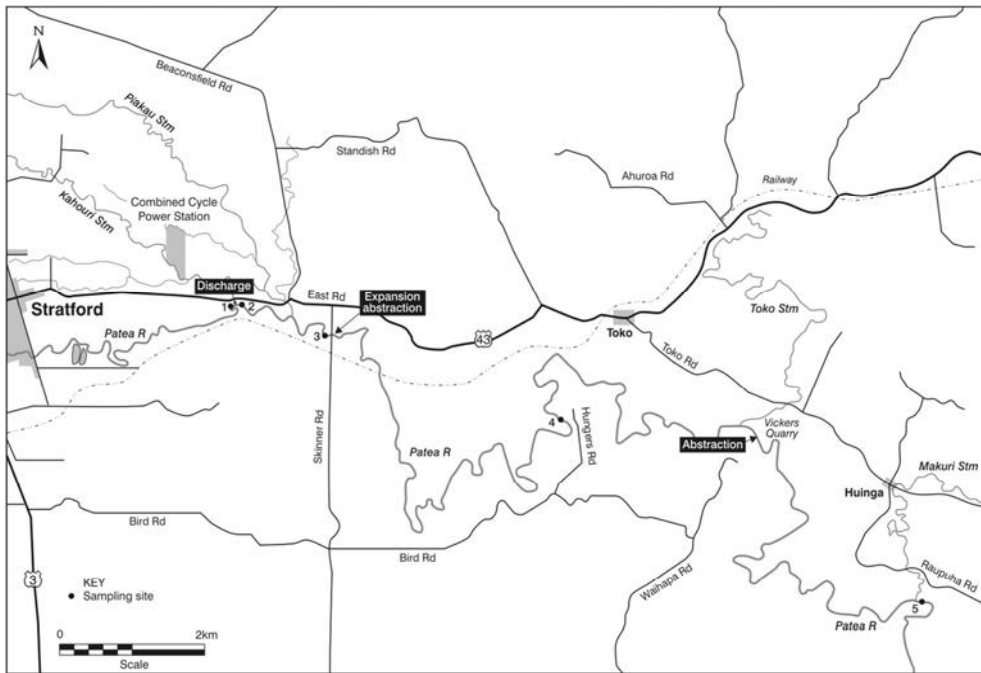


Figure 1 Location of biomonitoring sites in the Patea River in relation to the combined cycle power station, Stratford



Figure 2 Biomonitoring sites location in the Patea River

This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001).

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)	= 20-99 individuals
VA (very abundant)	= 100-499 individuals
XA (extremely abundant)	= 500 or more individuals

Macroinvertebrate Community Index (MCI) values were calculated for taxa present at each site (Stark 1985) with certain taxa scores modified in accordance with Taranaki experience.

A semi-quantitative MCI value, SQMCI_s (Stark 1999) 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 scores, and dividing by the sum of the loading factors. 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).

Results and discussion

This survey was performed on 10 February 2015 during a period of late summer very low, recession flow, 40 days after a fresh in excess of 3x median flow and 41 days after a fresh in excess of 7x median flow. It followed a dry mid to late summer period when only two minor freshes were recorded over the preceding six week period. River flow at Skinner Road was 0.90 m³/sec representing a flow well below the average monthly mean February flow (2.73 m³/sec) but above the minimum mean monthly flow for February (0.64 m³/sec) recorded for the period 1978-2014.

Periphyton mats were patchy at site 4 but widespread at all other sites. Patchy filamentous algae and moss were present at all sites as determined from observations of the stony riffle substrates. River flow was clear, uncoloured, and low at the two sites (1 and 2) adjacent to the discharge site where water temperatures recorded (at the time of this mid morning survey) were 16.3 °C at both sites during a period when the peaker plant cooling water discharges to the river were occurring.

The (main) combined cycle plant had not been operating since 25 November 2014, except for two days in mid-December. One or both peaker plants had been operated daily since 4 January 2015, before when they had operated for several months with occasional breaks of three to seven days.

River flow was very low, uncoloured, and clear at the three sites (3, 4, & 5) downstream from the Kahouri Stream confluence, and water temperatures ranged from 15.9 °C to 19.6°C at these three sites at the time of this mid to late morning survey.

Macroinvertebrate communities

Prior to the establishment of the Contact Energy Ltd's programme, biomonitoring surveys had been performed at site 1 (in association with other consents' monitoring programmes) and site 3 (SEM and investigation programmes). Site 2 was established specifically for the purpose of the Contact Energy Ltd consent monitoring programme and sampled initially in spring 1998. The two lower sites (sites 4 and 5) had been surveyed on fewer previous occasions, principally for environmental assessment purposes. A summary of the results of these previous surveys and the existing programme's results are presented in Table 2 (Note: The results of surveys at sites 4 and 5 performed by Cawthron are not included in this summary but are presented and discussed in TRC report CF251).

Table 2 Summary of macroinvertebrate taxa numbers and MCI values for previous surveys performed between January 1992 and November 2014

Site	No of surveys	Taxa no		MCI values		Survey of February 2015	
		Range	Median	Range	Median	Taxa No.	MCI
1	40	17-31	24	82-116	99	24	93
2	33	14-33	22	86-111	98	26	92
3	41	15-33	24	86-105	98	23	101
4	26	16-30	22	82-106	96	20	90
5	26	15-26	22	82-102	95	21	94

The macroinvertebrate fauna results from the present survey are presented in Table 3, with various survey results since 1992 illustrated in Figure 2.

Sites in the immediate vicinity of the power station outfall (sites 1 and 2)

A narrow range of taxa richnesses (24 to 26 taxa) was recorded at sites 1 and 2 immediately upstream and downstream of the discharge. These taxa numbers were equal with, to four taxa more than, median richnesses previously surveyed at each site (Table 1 and Figure 2). These numbers were within one taxon of the median (25) taxa richness previously recorded from 206 surveys of 'control' sites at similar altitudes (250 to 300 m asl) in Taranaki ring plain rivers and streams sourced within the National Park (TRC, 2015).

The characteristic taxa in this short reach of the river included up to one 'highly sensitive' taxon [mayfly (*Deleatidium*)]; up to five 'moderately sensitive' taxa [mayfly (*Coloburiscus*) elmids, dobsonfly (*Archichauliodes*), free-living caddisfly (*Hydrobiosis*), and cranefly (*Aphrophila*)]; and five 'tolerant' taxa [oligochaete worms, net-building caddisfly (*Aoteapsyche*), and midges (*Maoridiamesa*, tanytarsids, and orthoclads)]. This dominance represented a few changes from the community dominance at the time of the previous spring survey when two fewer 'tolerant' taxa were dominant numerically following a higher, cooler flow period. No significant differences in individual taxon abundances were recorded between sites 1 and 2, which together with some increases in the numerical abundances within three 'sensitive' taxa at site 2, accounted for the relatively similar SQMCI_s values which increased by 0.4 unit at site 2 (Table 3).

Table 3 Macroinvertebrate fauna of the Patea River in relation to Stratford Power Ltd sampled on 10 February 2015

Taxa List	Site Number	MCI score	1	2	3	4	5
	Site Code		PAT000356	PAT000357	PAT000360	PAT000397	PAT000430
	Sample Number		FWB15065	FWB15066	FWB15067	FWB15068	FWB15069
PLATYHELMINTHES (FLATWORMS)	<i>Cura</i>	3	-	R	-	-	-
NEMERTEA	Nemertea	3	R	R	-	R	C
NEMATODA	Nematoda	3	R	R	-	R	-
ANNELIDA (WORMS)	Oligochaeta	1	A	A	VA	A	C
MOLLUSCA	<i>Potamopyrgus</i>	4	R	R	C	A	C
EPHEMEROPTERA (MAYFLIES)	<i>Austroclima</i>	7	-	-	C	A	A
	<i>Coloburiscus</i>	7	C	A	A	R	-
	<i>Deleatidium</i>	8	C	A	A	A	A
	<i>Nesameletus</i>	9	R	-	-	-	-
	<i>Zephlebia group</i>	7	-	-	C	-	C
COLEOPTERA (BEETLES)	Elmidae	6	A	VA	A	A	C
	Hydraenidae	8	R	C	R	-	-
	Ptilodactylidae	8	-	R	-	-	-
MEGALOPTERA (DOBSONFLIES)	<i>Archichauliodes</i>	7	A	A	C	C	C
TRICHOPTERA (CADDISFLIES)	<i>Hydropsyche (Aoteapsyche)</i>	4	XA	XA	VA	XA	XA
	<i>Costachorema</i>	7	C	C	R	R	R
	<i>Hydrobiosis</i>	5	A	A	A	A	A
	<i>Neurochorema</i>	6	C	R	C	-	R
	<i>Confluens</i>	5	-	-	R	-	-
	<i>Oxyethira</i>	2	R	R	-	-	-
	<i>Pycnocentria</i>	7	-	-	-	-	R
	<i>Pycnocentroides</i>	5	R	R	C	VA	VA
	<i>Aphrophila</i>	5	VA	VA	A	A	A
DIPTERA (TRUE FLIES)	Eriopterini	5	-	R	-	-	-
	<i>Maori diamesa</i>	3	VA	A	VA	A	A
	Orthoclaadiinae	2	A	A	VA	VA	VA
	Tanypodinae	5	R	C	R	-	-
	Tanytarsini	3	A	A	VA	VA	VA
	Empididae	3	R	R	R	R	C
	Muscidae	3	C	C	C	-	C
	<i>Austrosimulium</i>	3	C	C	-	R	C
	Tanyderidae	4	-	-	-	R	-
	<i>Acarina</i>	5	-	-	R	-	-
		No of taxa	24	26	23	20	21
		MCI	93	92	101	90	94
		SQMCI	4.1	4.5	3.4	4.0	4.0
		EPT (taxa)	8	7	10	7	9
		%EPT (taxa)	33	27	43	35	43
'Tolerant' taxa		'Moderately sensitive' taxa	'Highly sensitive' taxa				

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

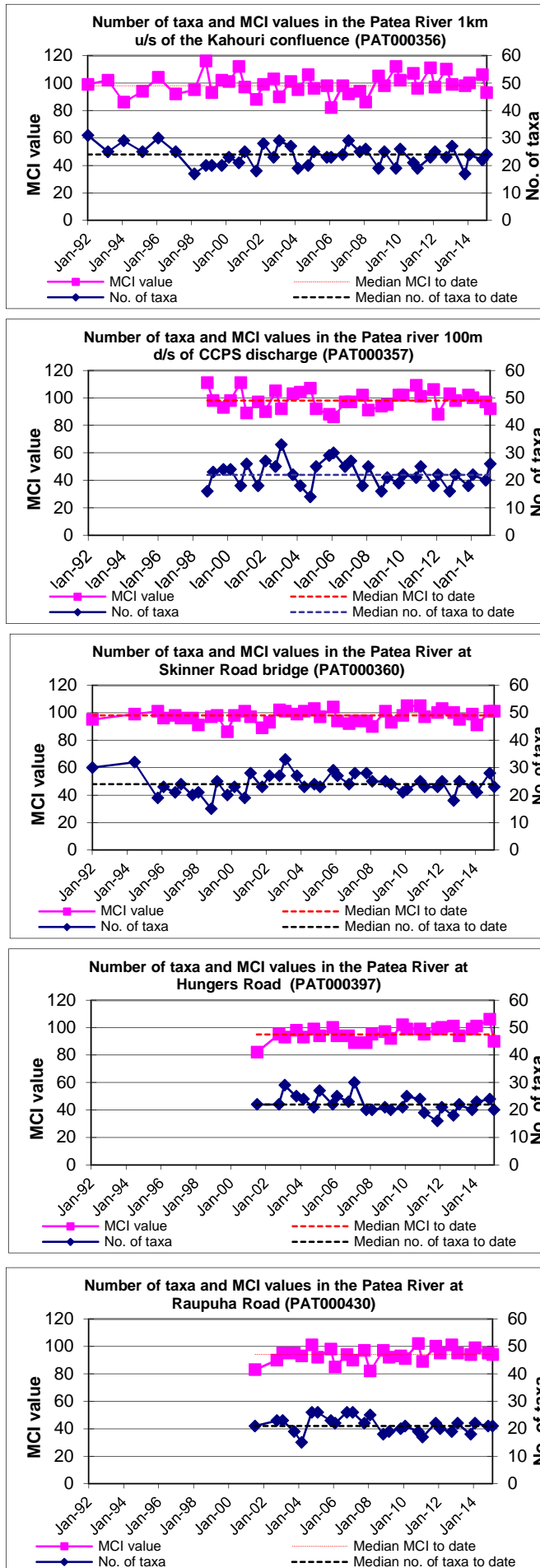


Figure 3 Taxa richness and MCI scores recorded to date at each of the five Patea River sites

The presence of four 'highly sensitive' taxa, one of which was very abundant, in this short reach of the Patea River, was an indication of generally good physicochemical water quality conditions preceding the survey under very low flow conditions following a dry mid to late summer period coincident with relatively widespread periphyton substrate cover which could be expected to have had some impact on physical habitat. However, improved treated wastewater quality (and moderate dilution) of the upgraded Stratford municipal WWTP discharge, may have contributed to these conditions on occasions (see reports CF526, CF545, CF575, and CF604), although some impacts of this wastewater discharge were apparent on the biological health of the river upstream at the time of the current late summer survey (CF638).

MCI scores (Table 3) reflected the equal proportions of 'sensitive' (50% of taxa richness) and 'tolerant' taxa in the communities at both sites, with the scores recorded (93 and 92 units) six units lower than the medians of scores previously recorded at each of these two sites (Table 1). The scores also reflected the relative similarity in community composition between sites as reflected by the very high proportion (23 shared taxa) of a total of 27 taxa between sites. These scores categorised these sites as having 'fair' river health (TRC, 2015a) at the time of this summer survey. However, they were a significant (Stark, 1998) 17 and 18 units lower than the predicted MCI score for National Park-sourced ringplain sites at an altitude of 250m asl and seven to eight units lower than the predicted MCI scores for these sites, at distances of 17.2 km and 17.4 km respectively downstream of the National Park boundary (Stark and Fowles, 2009).

The MCI scores at these two sites showed an insignificant one unit downstream decrease in scores which was indicative of no recent impacts of any cooling water discharge on the macroinvertebrate fauna of the Patea River at the periphery of the permitted mixing zone. These MCI scores between adjacent sites reflected the very similar community compositions between sites.

Sites in the reach between Skinner Road and Raupuha Road (sites 3, 4 and 5)

Taxa numbers at these three sites had a narrow range of richnesses (20 to 23 taxa), which were within one to two taxa of historical medians at these sites (Table 2). They were also very similar to median richnesses (20 and 23 taxa) previously recorded by more than 720 surveys of 'control' sites at similar altitudes (155 to 199 m asl and 200 to 249 m asl) in Taranaki ringplain rivers and streams sourced within the National Park (TRC, 2015).

The characteristic taxa within this 23 km mid-catchment reach of the Patea River included one 'highly sensitive' taxon [mayfly (*Deleatidium*)]; up to six 'moderately sensitive' taxa [mayflies (*Coloburiscus* and *Austroclima*), elmids beetles, free-living caddisfly (*Hydrobiosis*), stony-cased caddisfly (*Pycnocentroides*), and crane fly (*Aphrophila*)]; and up to six 'tolerant' taxa [oligochaete worms, snail (*Potamopyrgus*), net-building caddisfly (*Aoteapsyche*), and midges (orthoclads, tanytarsids, and *Maoridiamesa*)]. Similar relatively widespread periphyton riverbed cover to that recorded upstream (at sites 1 & 2) coincided with some decrease in abundances within a few of the more 'sensitive' taxa and, in particular, increases in abundances of 'tolerant' snails and some midges in a downstream direction. This resulted in a decrease of 1.1 SQMCI_s units between sites 2 and 3. However, only a few significant differences within individual taxon abundances between adjacent sites were recorded further downstream along this river reach which accounted for the variation in SQMCI_s

scores of 0.6 unit between sites 3 and 4, and no change between sites 4 and 5. The improvement in SQMCI_s score between sites 3 and 4 was due in particular to an increased abundance of 'sensitive' stony-cased caddisfly and decreased abundance of very 'tolerant' oligochaete worms.

In comparison with the upstream sites (1 and 2), a decrease in the proportion of lower scoring 'tolerant' taxa (35% of total taxa) in the community at site 3, increase (55% of total taxa) at site 4, and small decrease (48% of total taxa) at site 5 were reflected in the MCI scores (101, 90, and 94 units) recorded through this reach of the mid Patea River. These scores were an insignificant three units higher (site 3), six units lower (site 4), and one unit lower (site 5) than the medians of scores previously recorded at each of the three sites (Table 1) and from equal with to 16 units lower than those recorded by the previous spring survey which was undertaken under higher, cooler flow conditions. The scores recorded at these three sites by this survey varied by 11 units through the reach of the river surveyed with an insignificant 11 unit decrease through the 9 km reach between sites 3 and 4. These scores categorised the sites as having 'good' to 'fair' river health (TRC, 2015a) at the time of this summer survey. They were an insignificant eight and seven units lower (sites 3 and 5) and a significant 15 units lower (site 4) than the predicted MCI scores for National Park-sourced ringplain sites at altitudes of 160 to 240m asl, but an insignificant 2 units higher (site 3), 4 units higher (site 5), and 4 units lower (site 5) than the predicted MCI scores for these sites, 19.2 km to 42.1 km downstream of the National Park boundary (Stark and Fowles, 2009).

The decrease in MCI scores between sites 3 and 5 (1.2 units/km) and atypical increase between sites 4 and 5 were dissimilar to the predicted downstream MCI decrease (an average rate of 0.3 to 0.4 units per km) predicted for this reach of a Taranaki ringplain stream (Stark and Fowles, 2009). Observations in this reach of the river, and particularly below the Skinner Road site (site 3), have indicated that riffles tended to be shorter and/or deeper than those typical of the upper reaches of the river (particularly upstream of the Kahouri Stream confluence), where the 'more sensitive' (particularly mayfly and stonefly) taxa often are a more common component of the macroinvertebrate communities (TRC, 2001). A deterioration in MCI scores was found between sites 3 and 4 but an increase between sites 4 and 5 resulted in an overall typical decrease of seven units over this reach (23km) but no decrease over the total reach (25km) of the river surveyed, which was due to the relatively low score at the 'control' site upstream of the discharge (site 1). This overall absence of any decrease resulted in a lower than predicted average rate of change for this reach of the river.

Conclusions

This thirty-first biomonitoring survey performed in relation to the discharge of cooling water from the power station indicated no significant impacts of recent discharges upon the biological communities of the Patea River in the vicinity of the discharge outfall east of Stratford during a period of very low recession flow conditions following a dry mid to late summer period. Macroinvertebrate community richness and MCI scores typical of habitats with moderately widespread periphyton substrate cover were within ranges of results previously recorded, similar to median richnesses, but below median MCI scores coincident with very low flow conditions. There were very few subtle differences in community compositions between sites resulting in an insignificant (one unit) decrease in the MCI score recorded at the periphery of the permitted discharge mixing zone in comparison with the upstream 'control' site.

Biomonitoring performed at sites further downstream in the river has continued for the purpose of establishing baseline information in relation to the proposed expansion of the power station. Moderate community richnesses were found at the three sites in the 23 km reach between Skinner Road and Raupuha Road (where the principal effects of future water abstraction would be expected to occur), and community composition showed few changes from communities found at sites 1 and 2, upstream of the Kahouri Stream confluence. Of the total of 33 taxa found over the entire reach of the river surveyed (compared with 32 taxa in the previous summer and 37 taxa in spring 2014), 22 taxa were present at one or more sites in both of the two reaches above and below the Kahouri Stream confluence. A relatively high proportion of these (14 taxa) was present at all five sites along the reach surveyed, of which one 'highly sensitive', three 'moderately sensitive', and five 'tolerant' taxa were abundant at a minimum of three of the sites. Two 'moderately sensitive' taxa (caddisfly and crane fly) and four 'tolerant' taxa (caddisfly and midges) were abundant at all five sites; more typical of the number of taxa which have been uniformly characteristic of these sites' communities from time to time in past surveys and coincident with more extensive substrate periphyton cover conditions following a dry mid to late summer period.

A relationship between MCI score and distance from the National Park established for National Park-sourced ringplain rivers and streams from Taranaki Regional Council data (Stark and Fowles, 2009) indicates that MCI values for the three sites (3, 4 and 5) in this reach of the mid-Patea River survey are expected to range between 90 and 99 units. Therefore, the results of this survey found a higher than expected score at site 3 but more typical scores for those expected in the mid-Patea River reaches below Skinner Road, during a period of very low summer flow conditions and relatively extensive periphyton substrate cover following a dry mid to late summer period.

The general trend in MCI scores found throughout the reach of the river at the time of this late summer survey, which were not significantly different in comparison with similar reaches of rivers elsewhere in Taranaki however, also reflected some influence of the major point source municipal oxidation ponds system discharge to the river some 3 km upstream (see report CF638) following the more recent upgrading of the Stratford municipal WWTP system

Biannual biomonitoring surveys will form a component of future monitoring programmes associated with consents granted to the Contact Energy Ltd's combined cycle power station and will be integrated into other existing consents and state of the environment monitoring programmes. They will also continue to provide baseline information for the assessment of future effects of increased abstraction and cooling water discharge in the mid reaches of the Patea River with the consented expansion of the Stratford power station.

Summary

The Council's standard 'kick-sampling' technique was used at five established sites to collect streambed macroinvertebrates from the Patea River. Samples were sorted and identified to provide number of taxa (richness) and MCI and SQMCI₅ scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI₅ takes into account

taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities, particularly if non-organic impacts are occurring.

Significant differences in either the MCI or the SQMCI_s between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

This late summer macroinvertebrate survey undertaken following periods of power station peaker plant discharges, indicated that recent discharges of treated cooling water from the Contact Energy Ltd's site had not had any significant detrimental effect on the macroinvertebrate communities of the river. No significant changes in the macroinvertebrate communities structures were recorded between the upstream 'control' site and site immediately downstream of the discharge

The macroinvertebrate communities in the reach of the Patea River adjacent to the discharge contained equal proportions of 'sensitive' and 'tolerant' taxa at both sites (more typical of summer flow conditions) whereas the communities further downstream (below the Kahouri Stream confluence) typically were dominated by only slightly higher numbers of 'tolerant' taxa. Taxonomic richnesses (numbers of taxa) tended to be insignificantly different at the time of this summer survey and MCI scores slightly lower compared to those of the previous spring 2014 survey.

Biomonitoring at three sites further downstream in the Patea River, for the establishment of baseline conditions in relation to consented power station expansion, found relatively similar community compositions to those monitored in the vicinity of the cooling water discharges with few significant changes in individual taxon abundances recorded. Downstream increases in the SQMCI_s values through the reach below the Skinner Road site were atypical of past results. With the exception of the Skinner Road site (3), MCI scores were slightly lower than historical median values at all sites but typical of communities at these distances from the National Park, despite the survey coinciding with relatively extensive periphyton substrate cover following a dry period in mid to late summer.

MCI and SQMCI_s scores indicated that the stream communities throughout the entire river reach were mainly of 'fair' generic health and generally in the condition predicted for similar sites in other Taranaki ringplain rivers, following a period of very low flow conditions during a dry mid to late summer period.

References

Internal Taranaki Regional Council reports

- Fowles C R, 2000: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2000. Report CF223.
- Fowles C R, 2001: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2001. Report CF234.
- Fowles C R, 2001: A baseline biological macroinvertebrate faunal survey of three sites in the mid reaches of the Patea River, July 2001. Report CF238.
- Fowles C R, 2001: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2001. Report CF242.
- Fowles C R, 2002: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, March 2002. Report CF251.
- Fowles C R, 2002: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2002. Report CF257.
- Fowles C R, 2003: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2003. Report CF274.
- Fowles C R, 2003: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2003. Report CF288.
- Fowles C R, 2004: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, March 2004. Report CF307.
- Fowles C R, 2004: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2004. Report CF343.
- Fowles C R, 2005: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2005. Report CF360.
- Fowles C R, 2005: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2005, Report CF390.

- Fowles C R, 2006: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2006. Report CF400.
- Fowles C R, 2006: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2006, Report CF411.
- Fowles C R, 2007: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2007. Report CF421.
- Fowles C R, 2007: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2007. Report CF433.
- Fowles CR, 2008: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2008. Report CF441.
- Fowles CR, 2008: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2008. Report CF472.
- Fowles C R, 2009: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, March 2009. Report CF487.
- Fowles C R, 2009: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2009. Report CF492.
- Fowles C R, 2009: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2010. Report CF 502.
- Fowles C R, 2010: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2010. Report CF 517.
- Fowles C R, 2011: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2011. Report CF 527.
- Fowles C R, 2011: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2011. Report CF 537.

- Fowles C R, 2012: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2012. Report CF546.
- Fowles C R, 2012: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, October 2012. Report CF558.
- Fowles C R, 2013: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2013. Report CF576.
- Fowles C R, 2013: Biomonitoring of the Patea River in relation to the Stratford District Council's landfill and oxidation pond's system, February 2013. Report CF575.
- Fowles C R, 2013: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2013. Report CF593.
- Fowles C R, 2014: Summer biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, February 2014. Report CF605.
- Fowles C R, 2014: Spring biomonitoring of the Patea River in relation to the discharge of cooling water from Stratford Power Ltd's combined cycle power station, November 2014. Report CF632.
- Fowles C R, 2015: Biomonitoring of the Patea River in relation to the Stratford District Council's closed landfill and oxidation ponds' system, February 2015. Report CF638.
- TRC, 2015: Some statistics from the Taranaki Regional Council database (Esam) of freshwater macroinvertebrate surveys performed during the period from January 1980 to 30 September 2014. (State of the Environment Report) TRC Technical Report 2015-105.
- TRC, 2015a: Freshwater macroinvertebrate fauna biological monitoring programme. Annual state of the environment monitoring report 2013-2014, Technical Report 2014-20.

External Publications

- Stark, J D, 1985: A macroinvertebrate community index of water quality for stony streams. Water and Soil Miscellaneous Publication No 87.
- Stark, J D, 1998: SQMCI: a biotic index for freshwater macroinvertebrate coded-abundance data. NZJE Mar FW Res 32: 55-66.
- Stark, J D, 1999: An evaluation of Taranaki Regional Council's SQMCI biomonitoring index. Cawthron Report No 472. 32pp.

Stark, JD, Boothroyd IKH, Harding J, Maxted JR, Scarsbrook MR, 2001; Protocols for sampling macroinvertebrates in wadeable streams. New Zealand Macroinvertebrate Working Group Report No 1. Prepared for the Ministry for the Environment. Sustainable Management Fund Project No 5103. 57p.

Stark, JD and Fowles CR, 2009: Relationships between MCI, site altitude, and distance from the source for Taranaki ring plain stream. Stark Environmental Report No 2009-01.47p.

Stark, J D and Young RG, 2001: Stratford Power Station expansion: assessment of ecological effects. Cawthron Report No 623. 37pp.

To Job Manager, J Kitto
From Scientific Officer, B Jansma
Doc No 1559582
Report No BJ270
Date 24 August 2015

Biomonitoring of the Kahouri Stream in relation to the Contact Energy sites, East Road, April 2015

Introduction

This survey fulfilled one of two biological components of the 2014-2015 monitoring programme for the Contact Energy site located on East Road, Stratford. It was performed to determine whether or not consented stormwater discharges from the site had had any recent detrimental effect upon the macroinvertebrate communities of the Kahouri Stream. The monitoring related to the consents (3939 and 4459) held by Contact Energy Limited to discharge stormwater to the Kahouri Stream.

The results of biological surveys performed in the Kahouri Stream since 1996 are discussed in various reports referenced at the end of this report.

The other biological component of the monitoring programme, in relation to the abstraction of water from and the discharge of effluent to the Patea River, is reported on separately (see CF639).

Methods

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from two established sites in the Kahouri Stream, (Table 1, Figure 1) on 7 April 2015. This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001).

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.

Table 1 Biomonitoring sites in the Kahouri Stream sampled in relation to the Contact Energy site.

Site No.	Site code	Location	GPS location
1	KHI000457	Kahouri Stream, upstream of the Contact Energy site	E 1713512 N 5645931
2	KHI000480	Kahouri Stream, 20 m upstream of the Piakau Stream confluence	E 1714880 N 5645282

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. Averaging the scores assigned to the taxa found at a site, and multiplying the average by a scaling factor of 20 produces a Macroinvertebrate Community Index (MCI) value.

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 (good quality muddy/weedy sites tend to produce lower MCI values than good quality stony sites).

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, while MCI values range from 20 to 200.



Figure 1 Kahouri Stream Sites sampled for macroinvertebrates, in relation to the Contact Energy site.

Results and discussion

At the time of this mid-morning survey the Kahouri Stream had a low flow with the last flood event of three times the median flow or greater occurring 32 days prior to the sampling date. A swift, cloudy but uncoloured flow was sampled at each site.

The stream bed material at site 1 comprised predominantly gravels and cobbles, and a minor component of silt, sand and boulder. Site 2 was very similar, with only slightly more gravel, and less cobble than that sampled at site 1. Despite the lack of recent floods, periphyton growth was patchy at both sites, with both mats and filamentous algae present. An important change observed at the time of the June 2013 survey was that site 1 had experienced significant disturbance since the May 2012 survey, with the installation of a pipeline used for the conveyance of hydrocarbons. This had resulted in a marked change in the stream bed and a total loss of shading from a site which was previously stable and completely shaded.

Water temperatures recorded in the Kahouri Stream during the present survey ranged from 14.9°C at site 1 to 15.7 °C at site 2.

Macroinvertebrate communities

Previous surveys performed in the Kahouri Stream have indicated that the macroinvertebrate communities have generally been in good condition with relatively high numbers of taxa and MCI values. Results of previous surveys performed at sites 1 and 2 are summarised in Table 2, together with current results, and the full results are reported in Table 3.

Table 2 Summary of the numbers of taxa and MCI values recorded previously in the Kahouri Stream in relation to the Contact Energy site since 1 January 1995, together with the results of the current survey

Site	Number of previous surveys	Numbers of taxa			MCI values			SQMCI _s values (16 previous surveys)		
		Median	Range	Current Survey	Median	Range	Current Survey	Median	Range	Current Survey
1	21	23	18-31	27	103	87-112	109	5.4	2.3-7.6	6.6
2	22	24	17-34	20	67	82-104	104	4.9	3.8-7.5	5.9

Site 1: Kahouri Stream (KHI000457)

This site, immediately upstream of the Stratford Power Station (elevation: 270 m asl), had a moderately high community richness of 27 taxa, four taxa more than the historical median richness (Table 3 and Figure 2). Six 'highly sensitive' taxa were present (indicative of good water quality conditions), while the community was characterised by two 'highly sensitive' taxa [extremely abundant mayfly (*Deleatidium*) and abundant *Beraeoptera* caddisfly]; four 'moderately sensitive' taxa [mayfly (*Coloburiscus*), elmid beetles, dobsonfly (*Archichauliodes*), and crane fly (*Aphrophila*)]; and two 'tolerant' taxa (oligochaete worms and net-building caddisfly (*Hydropsyche-Aoteapsyche*)). This number of 'highly sensitive' taxa and good number of abundant taxa were a reflection of good preceding water quality, and that the site now appears to be stable since the disturbance observed in 2013. The SQMCI_s score (6.6) reflected the dominance of 'sensitive' taxa, particularly the 'highly sensitive' mayfly taxon. The SQMCI_s score was 1.2 units above the long term median of 5.3 units (Table 2) and was the seventh consecutive survey to record a high SQMCI_s score.

Table 3 Macroinvertebrate fauna of the Kahouri Stream (sites 1 & 2) in relation to Contact Energy, East Road during the survey of 7 April 2015

Taxa List	Site Number	MCI score	1	2
	Site Code		KHI000457	KHI000480
	Sample Number		FWB15222	FWB15223
ANNELIDA (WORMS)	Oligochaeta	1	A	A
	Lumbricidae	5	-	R
MOLLUSCA	<i>Potamopyrgus</i>	4	R	R
EPHEMEROPTERA (MAYFLIES)	<i>Austroclima</i>	7	C	C
	<i>Coloburiscus</i>	7	VA	VA
	<i>Deleatidium</i>	8	XA	VA
	<i>Nesameletus</i>	9	R	-
PLECOPTERA (STONEFLIES)	<i>Zelandobius</i>	5	R	-
	<i>Zelandoperla</i>	8	R	-
COLEOPTERA (BEETLES)	Elmidae	6	XA	VA
	Hydraenidae	8	R	R
	Ptilodactylidae	8	R	-
MEGALOPTERA (DOBSONFLIES)	<i>Archichauliodes</i>	7	VA	A
TRICHOPTERA (CADDISFLIES)	<i>Hydropsyche (Aoteapsyche)</i>	4	VA	VA
	<i>Costachorema</i>	7	C	R
	<i>Hydrobiosis</i>	5	C	C
	<i>Beraeoptera</i>	8	A	C
	<i>Confluens</i>	5	-	C
	<i>Oxyethira</i>	2	R	-
	<i>Pycnocentria</i>	7	C	-
	<i>Pycnocentroides</i>	5	C	A
	DIPTERA (TRUE FLIES)	<i>Aphrophila</i>	5	VA
Eriopterini		5	R	-
<i>Maoridiamesa</i>		3	-	R
Orthocladiinae		2	-	R
<i>Polypedilum</i>		3	R	R
Tanypodinae		5	R	-
Tanytarsini		3	R	-
Empididae		3	R	-
<i>Austrosimulium</i>		3	R	-
Tanyderidae		4	C	R
No of taxa			27	20
MCI			109	104
SQMCI			6.6	5.9
EPT (taxa)			12	9
%EPT (taxa)			44	45
'Tolerant' taxa		'Moderately sensitive' taxa	'Highly sensitive' taxa	

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

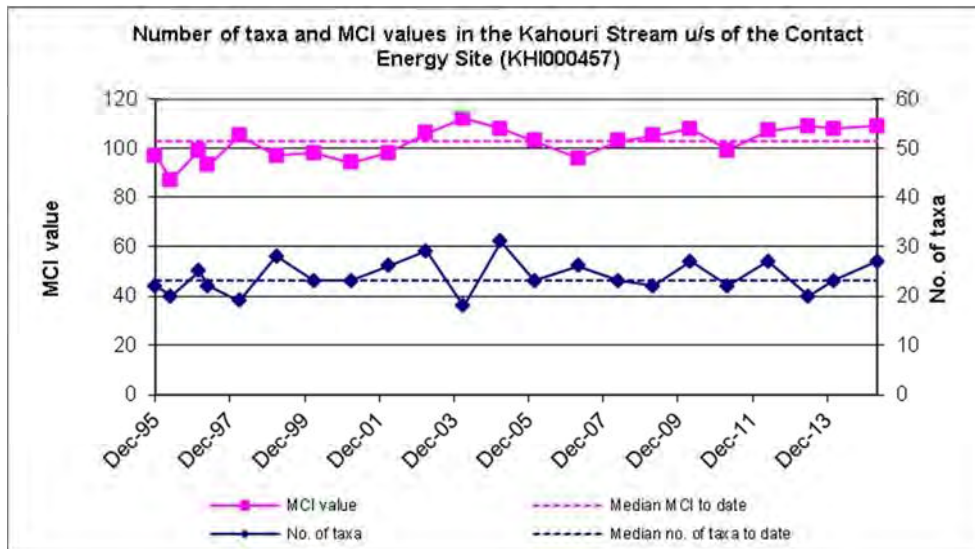


Figure 2 Number of taxa and MCI values in the Kahouri Stream at site 1 (KHI000457)

The community at site 1 had a relatively high proportion of 'sensitive' taxa (66% of total richness) which was reflected in the MCI score of 109 units, six units higher than the long term median score (Table 3). This MCI score was an insignificant three units lower than the predicted MCI score for streams sourced within the National Park at an altitude of 270m asl and eight units above the predicted score for a site 14.9 km downstream from the Park boundary (Stark and Fowles, 2009). Overall, the 'good' generic biological health (TRC, 2014) of the community indicated that 'good' physicochemical water quality conditions preceded the survey at this site, located upstream of the Contact Energy site.

Site 2: Kahouri Stream (KHI000480)

This lower catchment site, located immediately upstream of the confluence with the Piakau Stream, had a lower community richness of 20 taxa. This was four taxa fewer than the median richness recorded by previous surveys (Table 2 and Figure 3) and within the range of previous records, but seven taxa less than the richness recorded upstream.

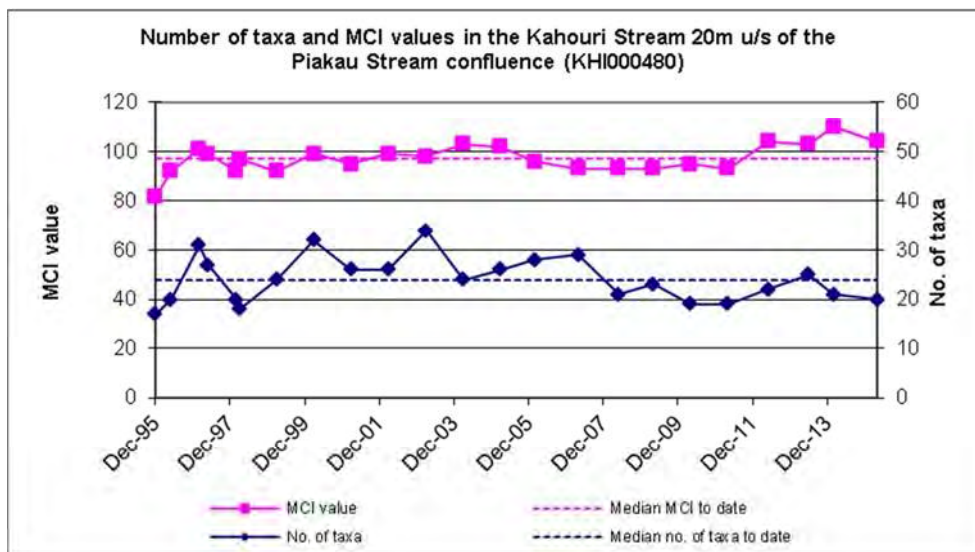


Figure 3 Number of taxa and MCI values in the Kahouri Stream at site 2 (KHI000480)

Three 'highly sensitive' taxa (indicative of good habitat quality conditions) were present at this site and one was very abundant. The taxa characteristic of this site's community (Table 3) included one 'highly sensitive' taxon [very abundant mayfly (*Deleatidium*)]; five 'moderately sensitive' taxa [mayfly (*Coloburiscus*), elmid beetles, dobsonfly (*Archichauliodes*), *Pycnocentroides* caddisfly and crane fly (*Aphrophila*)]; and two 'tolerant' taxa [oligochaete worms and net-building caddisfly (*Hydropsyche-Aoteapsyche*)]: a very similar characteristic community to that at the upstream site.

Only two significant differences in individual taxon abundances were found between sites 1 and 2, both of 'moderately sensitive' taxa, one an increase, the other a decrease. As a result there was minimal change in SQMCI_s score, which decreased by 0.7 unit between sites 1 and 2. However, this SQMCI_s score (5.9 units) was significantly higher than the median for this site (Table 2). The MCI score was only five units lower than that recorded at site 1 upstream, reflective of the similar composition of the two communities. This score was an insignificant (Stark, 1998) seven units higher than the median for this site, and the second highest recorded to date at this site (**Error! Reference source not found.**). In addition, this MCI score was only six units less than the predicted MCI score for streams sourced within the National Park at an altitude of 250masl and six units above the predicted score for a site 17.4 km downstream of the Park boundary (Stark and Fowles, 2009). Overall, the MCI and SQMCI_s scores did not indicate any deterioration in the 'good' generic biological health of the community at this site.

Conclusions

This late summer 2015 biomonitoring survey of the Kahouri Stream that receives stormwater from the Contact Energy site on East Road was undertaken during a low flow period, thirty-two days following a minor flood. Results indicated that the stormwater discharges had not had an impact on the macroinvertebrate communities of the stream. The MCI score did not change significantly from site 1 to site 2. A small but insignificant downstream decrease in SQMCI_s score was indicative of the similarity in characteristic community composition at both sites. In addition, the MCI scores at both sites were higher than their respective median MCI scores and were insignificantly different from predicted MCI scores for streams sourced within the National Park at sites with an altitude of 250 to 270 metres and located 15 to 17 km from the National Park boundary. Overall, the scores at both sites were reflective of good preceding physicochemical water quality, with no discernible impact from the Contact Energy site stormwater discharges.

Summary

The Council's standard 'kick-sampling' technique was used at two sites to collect streambed macroinvertebrates from the Kahouri Stream on 7 April 2015 to determine whether or not consented stormwater discharges from the Contact Energy site had had any recent detrimental effect upon the macroinvertebrate communities of the Kahouri stream. Samples were sorted and identified to provide the number of taxa (richness), MCI, and SQMCI_s scores for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. It may be used in soft-bottomed streams to detect trends over time. 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 MCI or SQMCI_s between sites indicate the degree of adverse effects (if any) of discharges being monitored.

This late summer macroinvertebrate survey indicated that the discharge of stormwater from the Contact Energy site had not had any significant detrimental effects on the macroinvertebrate communities of the stream, in comparison between sites, with historical results, and also with predicted MCI scores (for similar sites in ringplain, National Park-sourced streams).

The macroinvertebrate communities of the stream contained a moderately high proportion of 'sensitive' taxa, with some 'highly sensitive' taxa also recorded, one in extreme abundance at both sites. At both sites taxonomic richness (number of taxa) and MCI scores did not differ significantly from the medians of previous surveys although at site 2 the MCI score was the second highest recorded to date. There was also an improvement in the SQMCI_s score at both sites, as both recorded scores were significantly higher than respective median scores, principally due to the abundance of the 'highly sensitive' mayfly (*Deleatidium*).

MCI and SQMCI_s scores indicated that the stream communities were of 'good' generic biological health and typical of communities at sites in ring plain streams that are sourced within the National Park. Overall, the results did not indicate any discernible impact from the Contact Energy site discharges of stormwater.

References

- Dunning K, 2002: Biomonitoring of the Kahouri Stream and an unnamed tributary, March 2002. TRC report KD124
- Fowles C, 1996: Biomonitoring of the Kahouri Stream in relation to the construction phase of the Stratford Combined Cycle Power Station, May 1996. TRC report CF117.
- Fowles CR, 2014: Summer biomonitoring of the Patea River in relation to the discharge of cooling water and abstraction of water for Contact Energy Ltd's combined cycle and peaker power stations, February 2014. TRC report CF605.
- Fowles C & Moore S, 2004: Biomonitoring of the Kahouri Stream and an unnamed tributary, March 2004. TRC report CF332.
- Fowles C & Hope K, 2006: Biomonitoring of the Kahouri Stream and an unnamed tributary, February 2006. TRC report CF405.
- Fowles C & Jansma B, 2014: Biomonitoring of the Kahouri Stream in relation to the Contact Energy sites, East Road, February 2014. TRC Report CF616.
- Hope K, 2005: Biomonitoring of the Kahouri Stream and an unnamed tributary, March 2005. TRC report KH035.
- Jansma, B, 2009a: Biomonitoring of the Kahouri Stream and an unnamed tributary, April 2007. TRC report BJ052.

- Jansma, B, 2009b: Biomonitoring of the Kahouri Stream and an unnamed tributary, May 2008. TRC report BJ053.
- Jansma, B, 2010: Biomonitoring of the Kahouri Stream and an unnamed tributary, April 2009. TRC report BJ088.
- Jansma, B, 2011: Biomonitoring of the Kahouri Stream and an unnamed tributary, April 2010. TRC report BJ142.
- Jansma, B, 2012: Biomonitoring of the Kahouri Stream in relation to the Contact Energy sites, East Road, April 2011. TRC report BJ167.
- Jansma, B, 2013: Biomonitoring of the Kahouri Stream in relation to the Contact Energy sites, East Road, May 2012. TRC report BJ196.
- Jansma, B, 2013: Biomonitoring of the Kahouri Stream in relation to the Contact Energy sites, East Road, June 2013. TRC report BJ219.
- McWilliam H, 1997: Biomonitoring of the Kahouri Stream in relation to the construction of the Stratford Combined Cycle Power Station, May 1997. TRC report HM71
- McWilliam H, 1998: Biomonitoring of the Kahouri Stream and an unnamed tributary, March 1998. TRC report HM126
- McWilliam H, 1999: Biomonitoring of the Kahouri Stream and an unnamed tributary, March 1999. TRC report HM172
- McWilliam H, 2000: Biomonitoring of the Kahouri Stream and an unnamed tributary, March 2000. TRC report HM225
- McWilliam H, 2001: Biomonitoring of the Kahouri Stream and an unnamed tributary, March 2001. TRC report HM242
- Moore S, 2003: Biomonitoring of the Kahouri Stream and an unnamed tributary, 24 March 2003. TRC report SM583
- Stark JD, 1985: A macroinvertebrate community index of water quality for stony streams. Water and Soil Miscellaneous Publication No. 87.
- Stark JD, 1998: SQMCI: a biotic index for freshwater macroinvertebrate coded abundance data. New Zealand Journal of Marine and Freshwater Research 32(1): 55-66.
- Stark JD, 1999: An evaluation of Taranaki Regional Council's SQMCI biomonitoring index. Cawthron Institute, Nelson. Cawthron Report No. 472.
- Stark JD, Boothroyd IKG, Harding JS, Maxted JR, Scarsbrook MR, 2001: Protocols for sampling macroinvertebrates in wadeable streams. New Zealand Macroinvertebrate Working Group Report No. 1. Prepared for the Ministry for the Environment. Sustainable Management Fund Project No. 5103. 57p.

Stark, JD and Fowles CR, 2009: Relationships between MCI, site altitude, and distance from the source for Taranaki ring plain stream. Stark Environmental Report No 2009-01. 47p.

TRC, 1999: Some statistics from the Taranaki Regional Council database (FWB) of freshwater macroinvertebrate surveys performed during the period from January 1980 to 31 December 1998. Technical Report 99-17.

TRC, 2014: Freshwater macroinvertebrate fauna biological monitoring programme Annual State of the Environment Monitoring Report 2012-2013. Technical Report 2013-48.

Appendix V

Air monitoring results for TCC1

Appendix VI

**Air emissions report
by Contact Energy Limited**

**Pursuant to condition 8 of consent 4454-1 and condition 3
of consent 4022-2**



Ahuroa Gas Storage Facility

Consent 7746-1

**Compliance Report Pursuant to Condition 19 of
Consent 7746-1 – To discharge emissions to air from
the Ahuroa Gas Storage Facility**

November 2015

Introduction

Condition 19 of Consent 7746-1 requires:-

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 any energy efficiency measures implemented on the site;
- ii. Detailing smoke emissions as required under condition 17;
- iii. Detailing any measures undertaken or proposed to reduce smoke emissions;
- iv. Detailing any measures undertaken or proposed to reduce flaring;
- v. Addressing any other issue relevant to the minimisation or mitigation of emissions from the flare;
- vi. Detailing any complaints received and any measures undertaken to address complaints; and
- vii. Reviewing all options and technological advances relevant to the reduction or mitigation of any discharge to air from the site, how these might be applicable and/or implemented at the site, and the benefits and costs of these advances.

Energy Efficiency Measures Implemented at Ahuroa Gas Storage

No efficiency measures have been implemented at Ahuroa Gas Storage during the current reporting period.

However Contact has been working to minimise process upsets that lead to plant trips and flaring events as ongoing improvement to the plant operations. We have been making small improvements in the plant operations to reduce the number of plant trips and hence flaring events.

Flaring & Flare Emissions

Flaring at the Ahuroa Gas Storage facility is a primary safety mechanism to dispose of gas from process upsets, plant shutdowns and start-ups, well testing and pipeline depressurisation by converting to products of combustion rather than flaring unburnt hydrocarbon gas. Flaring is only undertaken as absolutely necessary due to the economic cost of flaring stored gas.

A pilot flare is maintained at all times to ensure that there is a source of ignition for flared gas to ensure safe ignition, meaning there is a small continual amount of gas continually being flared.

The flare installed at Ahuroa was designed by the original equipment manufacturer John Zink to have a high combustion efficiency, smokeless operation and reduced air

emissions. Contact conduct regular maintenance on the flare system to ensure the flare continues to operate as per design.

Smoke Emissions

There have been no visible smoke emissions at Ahuroa as a result of exercising consent 7746-1 during the current reporting period.

Complaints Received relating to Ahuroa Gas Storage

No complaints have been received as a result of any flaring events or smoke emissions at Ahuroa during the current reporting period

Technological Advances Relevant to any Discharge to Air

Technological advances to plant such as Ahuroa Gas Storage to reduce current discharges to air are limited given the intermittent nature of the facility and the flaring events.

Potential exists to recover gas sent to flare and re-use within the plant with the addition of Flare Gas Recovery Units. However given the intermittent nature of operation of Ahuroa the flaring events are as a result of plant trips or process upsets which does not allow for the collection and re-use of the flare gases in part of the plant using gas. Therefore these measures have not been pursued further

Appendix VII

**Annual report for 2014-2015
by Contact Energy Limited**

Pursuant to condition 19 of consent 7746-1



8 August 2015
The Chief Executive
Taranaki Regional Council
Private Bag 713
Stratford

Attn: James Kitto

Subject: Stratford Power Station Annual Report for the period 1 July 2014 to 30 June 2015.

Dear Mr. Kitto

We are pleased to report that the 17th year of Stratford Power Station (SPS) operation, we believe, has continued to maintain a high level of compliance. This summary relates to compliance with Resource Consents held for the operation of Stratford Power Station and the Resource Management (Measurement and Reporting of Water Takes) Regulations for the period 1 July 2014 to 30 June 2015.

Please find included a summary of plant operation with regard to consent monitoring and relevant operational changes for the year in review. Summary reports reflecting the last years inter laboratory testing are also included for wastewater discharge, raw water abstraction and stack emissions.

We look forward to any feedback from the TRC on improvements or further reporting definitions with regard to the reporting period.

Yours faithfully

Paul Fougere
Head of Generation - Taranaki

Consent Monitoring Highlights for the period 1 July 2014 – 30 June 2015

Consent 4455-1 Water Take from the Patea River:

Abstraction from the Patea River was within the consent requirements throughout the year with the river flow results being supplied by TRC.

The total volume of water taken from the Patea River during the year was 887,750m³ with an average abstraction rate of 28 l/s. The maximum abstraction rate for the year was 188 l/s on 31 December 2014 when the minimum river flow was 1322l/s.

Consent 5848-1 Waste Water Discharge into the Patea River:

Constituents monitored for wastewater discharged during the year remained within consent requirements.

River Temperature:

- During the year the river temperature remained below 25°C allowing for continuous site discharge.
- Temperature differentials remained within the consent limit of 1.5°C & 2.0°C (5% of time) for the entire year.
- River temperature probes were calibrated periodically during the year in accordance with the maintenance plan.

The maximum difference between upstream and downstream temperatures occurred on 12 March 2015 at 15:43hrs, with difference of 1.68°C. At this time the waste water flow from site was 42.54l/s, river flow at 0.83m³/s and upstream and downstream temperatures of 15°C and 16.58°C respectively.

The Maximum River Differential Temp value of 1.68°C applies to the whole day, not the time stamp reference listed on the attached datasheet.

Discharge Flow:

The maximum recorded combined discharge flow for the year was 54.43 l/s, this being within the discharge consent limit of 78 l/s.

The average combined discharge flow from the site was 20.99 l/s for the year.

The total volume of wastewater discharged for the year from site was 543,611m³. This equates to approximately 61% of the water abstracted for plant use during the year.

Monitoring of both the TCC and SPP waste water discharges is by online analysers. Routine inter-comparison is also performed to verify accuracy of testing in the laboratory. Calibration and servicing of the wastewater pH meters and chlorine meters was carried out as required throughout the year.

High chlorine values were recorded on several occasions while the waste water discharge valves were closing. These high values occur due to low sample volume, which occurs when the circulation pump has been stopped as a result of a low water level in the waste water pit. When the high chlorine values are recorded, the control system is in the process of closing the outlet valve to prohibit discharge, thus keeping SPS within its consent limits.

Consent 4459-1 & 3939-2 Discharge storm water to Piakau and Kahouri Streams:

Stratford Power Station: -

Storm water discharge remained within consent conditions for the entire year.

The storm water pond overflowed into the neighbouring river on 33 occasions during the year due to high rainfall occurrences. These occurred in August, September, November and December 2014, and March, April, May and June 2015.

Consent 4454-1 Discharge to air (TCC):

The maximum hourly Nitrogen Oxides discharge rate from the plant for the reporting year was 135.4 kg/hr, which is below the consent limit of 430 kg/hr.

Under normal operation, the maximum concentration of Nitrogen Oxide emissions for the year was 32.13 ppm on 10 November 2014. This is below the consent limit of 50 ppm. During start up and shut down, the plant is permitted to exceed the 50 ppm limit for set periods as per the consent. The maximum emissions during these periods of start up and shutdown were 80ppm on the 15 October 2014.

Total Carbon Dioxide stack emissions were calculated to be 132073 tonnes for the year and the total Nitrogen Oxides emissions from the plant were recorded at 498 tonnes for the year.

The cooling tower plume was visible at certain times throughout the year, generally in the morning and at night during the winter months.

Consent 4454-1 Discharge to air (SPP):

The cooling tower plume was visible at certain times during the year, generally in the morning and at night during winter months; the plume coincides with plant operation at low ambient temperatures.

Inter Laboratory Comparisons and site inspections:

During the year, SPS was inspected on three occasions with inter laboratory comparisons samples taken. Results reported between the site Laboratory, on line analysers and the TRC Laboratory were acceptable for all parameters being measured.

Inter-comparison sampling occurred on the 25 November 2014, 16 February & 18 June 2015, see attached Tables 1 & 2.

General Remarks:

Plant Operation:

The TCC plant was shut down during the following periods for maintenance and commercial reasons:

From	To
1 July 2014	5 July
12 July	14 October
26 November	21 December
24 December 2014	30 June 2015

The Stratford Peaker Plant was shut down for maintenance during the following periods: -

GT21

From	To
28 June 2014	2 July
8 September	15 September
13 October	30 October 2014
6 January 2015	9 January
15 March	25 March
6 June	19 June 2015

GT22

From	To
3 September 2014	15 September
11 October	12 October
6 January 2015	8 January
28 January	29 January
20 March	18 April
6 June	7 June 2015

Please note that outside of the dates listed above, TCC & Stratford Peaker Plant generating units were available for operation.

ISO Programs:

Stratford Power Station continued to maintain ISO14001 and ISO9001 Certification. An external audit was carried out by Telarc on 8 April 2015 with no non conformances or findings; positive feedback was received in respect of the site Environmental Aspects & Impacts Register.

Environmental Management:

The SPS Environmental Focus Group met twice (July 2014 and February 2015) during the year to discuss and progress environmental opportunities for monitoring and management improvement.

In August 2014 exhaust stack emission monitoring took place for both GT21 & GT22. Monitoring was carried out by BECA with favourable results which demonstrated that both gas turbines were operating within their consent limits. A copy of the results was provided to TRC.

In October 2014 delegates from Stratford Power Station & Ahuroa Gas Storage facility attended a Consent Monitoring Workshop hosted by TRC.

Table 1: Results of Laboratory testing completed by TRC Lab, SPS Lab and site monitors on Waste Water Discharge.

Date	Time	Sample	Test	Units	TRC Lab	SPS Lab	Difference TRC-SPS Lab	Plant Monitor	Difference TRC-Plant Monitor
			Free Chlorine	mg/m3	<0.01	-	-	-	-
			Total Chlorine	mg/m3	0.02	0.02	0	0.018	0.01
			Conductivity	mS/m	29.1	32.3	3.2	-	-
			pH		7.1	7.15	0.05	7.14	0.04
			Temperature	°C	-	-	-	20.8	-
			Turbidity	NTU	1.6	0.84	0.76	-	-
			Ammoniacal Nitrogen	mg/m3	0.058	-	-	-	-
			Suspended Solids	mg/m3	14	-	-	-	-
			Oil & Grease	mg/m3	<0.5	-	-	-	-
			Dissolved Phosphate	mg/m3	0.166	0.60	0.444	-	-
			Flow	l/s	-	-	-	9.3	-
			Free Chlorine	mg/m3	<0.01	-	-	-	-
			Total Chlorine	mg/m3	<0.01	0.01	0	0.000	<0.01
			Conductivity	mS/m	94.3	10.41	80.31	-	-
			pH		7.1	7.15	0.05	6.99	0.11
			Temperature	°C	-	-	-	23.2	-
			Turbidity	NTU	2.2	1.66	0.54	-	-
			Ammoniacal Nitrogen	mg/m3	0.054	-	-	-	-
			Suspended Solids	mg/m3	6	-	-	-	-
			Oil & Grease	mg/m3	<0.5	-	-	-	-
			Dissolved Phosphate	mg/m3	0.0202	-	-	-	-
			Flow	l/s	-	-	-	20.2	-
			Free Chlorine	mg/m3	<0.01	-	-	-	-
			Total Chlorine	mg/m3	0.01	0.00	0.01	0.005	0.005
			Conductivity	mS/m	37	40.9	3.9	-	-
			pH		7.2	7.30	0.1	7.35	0.05
			Temperature	°C	21.6	-	-	21.0	-
			Turbidity	NTU	2.3	2.42	0.12	-	-
			Ammoniacal Nitrogen	mg/m3	0.038	-	-	-	-
			Suspended Solids	mg/m3	30	-	-	-	-
			Oil & Grease	mg/m3	<0.5	-	-	-	-
			Dissolved Phosphate	mg/m3	0.363	1.23	0.867	-	-
			Flow	l/s	-	-	-	15.9	-
			Free Chlorine	mg/m3	<0.01	-	-	-	-
			Total Chlorine	mg/m3	<0.01	0.00	-	0.00	<0.01
			Conductivity	mS/m	45.4	38.4	7	-	-
			pH		7.3	7.09	0.21	7.27	0.03
			Temperature	°C	12.8	-	-	14	-
			Turbidity	NTU	3.1	2.67	0.43	-	-
			Ammoniacal Nitrogen	mg/m3	0.069	-	-	-	-
			Suspended Solids	mg/m3	27	-	-	-	-
			Oil & Grease	mg/m3	<0.5	-	-	-	-
			Dissolved Phosphate	mg/m3	0.659	2.32	1.661	-	-
			Flow	l/s	-	-	-	23	-

Table 2: Results of Laboratory testing completed by TRC Lab on Upstream & Downstream Patea River samples.

Date	Time	Test	Units	Upstream Patea River	Downstream Patea River	Difference Downstream - Up stream	% Change
		Conductivity	mS/m	9.4	11.5	2.1	18
		Dissolved Phosphate	µg/m3	0.061	0.062	0.001	43
		Un-ionised Ammonia	µg/m3	0.00369	0.00323	-0.00046	-14
		Ammonical Nitrogen	µg/m3	0.070	0.060	-0.01	-16
		pH		8.2	8.2	0	0
		Suspended Solids	µg/m3	3	4	1	25
		Temperature	C	15.7	16	0.3	19
		Turbidity	NTU	2.0	2.0	0	0
		Conductivity	mS/m	10.9	12	1.1	9
		Dissolved Phosphate	µg/m3	0.151	0.174	0.023	13
		Un-ionised Ammonia	µg/m3	0.00102	0.00052	-0.0005	-9
		Ammonical Nitrogen	µg/m3	0.026	0.013	-0.013	-100
		pH		8.1	8.1	0	0
		Suspended Solids	µg/m3	3	3	0	0
		Temperature	C	14.6	15.0	0.4	3
		Turbidity	NTU	1.2	1.2	0	0
		Conductivity	mS/m	9.6	10.1	0.5	5
		Dissolved Phosphate	µg/m3	0.044	0.051	0.007	6
		Un-ionised Ammonia	µg/m3	0.00209	0.0020	-0.00009	-17
		Ammonical Nitrogen	µg/m3	0.161	0.155	-0.006	-4
		pH		7.8	7.8	0	0
		Suspended Solids	µg/m3	<2	<2	0	0
		Temperature	C	8.8	8.7	-0.1	-1
		Turbidity	NTU	0.98	1.2	0.22	18

Notes:

1. Wastewater discharge from TCC had a negligible effect on the Patea River. The water quality was improved for some parameters.
2. Conductivity had the most impact on the River.