

Stratford Power Station  
(TCC1 & SP1  
Ahuroa Gas Storage  
Contact Energy Ltd  
Monitoring Programme  
Annual Report  
2017-2018

Technical Report 2018-50

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## Executive summary

Contact Energy Ltd operates the Stratford Power Station (SPS) located on State Highway 43 near Stratford in the Patea catchment. Contact Energy also operate the associated Ahuroa B Gas Storage facility (AGS). This facility is located 7.5 km away in the Waitara catchment. Contact Energy hold resource consents that provide for the power station, gas storage, and connecting pipeline. The consents allow Contact Energy to abstract water from the Patea River and Kahouri Stream, to discharge to the Patea River and the Kahouri Stream, and onto and into land, to provide for several structures across streams, and to discharge emissions into the air.

This report for the period July 2017 to June 2018 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Contact Energy's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of the Contact Energy's activities.

Contact Energy in relation to SPS hold 27 resource consents, which include a total of 232 conditions setting out the requirements that they must satisfy. The consents provide for three gas-fired plants, these are a combined cycle plant (TTC1), a smaller open cycle peaking plant (SP1), and a yet to be built facility which will comprise of a copy of either of the two existing facilities.

### **During the monitoring period Contact Energy demonstrated an overall high level of environmental performance.**

The Council's monitoring programme for the year under review included five inspections, 10 water samples collected for physicochemical analysis and three biomonitoring surveys of receiving waters. In addition, monthly emission results and abstraction records are provided to the Council and are reviewed.

The monitoring showed that the Stratford Power Station continued to be well managed with negligible environmental effects. Of note was the cessation of a particular cooling tower product which was found to have resulted in sporadic odour complaints over time.

During the year, the Company demonstrated a high level of environmental and administrative performance with respect to their resource consents.

For the Ahuroa B Gas Storage facility, Contact holds 10 resource consents, this includes 135 conditions setting out the requirements that Contact must satisfy. For the associated pipeline which connects to two establishments of SPS and AG, a total of 17 consents are held, with a total of 170 conditions.

The Council's annual monitoring programme included two inspections and one stormwater sample collected for physio-chemical analysis. Data on gas injection, well pressure data and flaring volumes were provided by Contact to the Council monthly and an annual report was also provided.

Monitoring of the stormwater indicated compliance with consent derived conditions, inspections remarked that the site appeared well managed, secure, with housekeeping prevalent across the site. Review of the monthly reports indicated that during April 2018, an irregular pressure reading of injection wells Ahuroa 3 and 4 was reported. This was the result of a failure in the monitoring equipment which was soon rectified by the consent holder.

During the year, Contact demonstrated a high level of environmental and administrative performance with respect to their resource consents held for Ahuroa B Gas storage facility.

In similarity to SPS, there was also ongoing consultation between the Council and Contact throughout the monitoring period to liaise around matters of interest.

For reference, in the 2017-2018 year, consent holders were found to achieve a high level of environmental performance and compliance for 76% of the consents monitored through the Taranaki tailored monitoring

programmes, while for another 20% of the consents, a good level of environmental performance and compliance was achieved.

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

This report includes recommendations for the 2018-2019 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 and administrative performance	2
2	Stratford Power Station	4
2.1	Process description	4
2.2	Resource Consents	6
2.2.1	Water abstraction permits	7
2.2.2	Water discharge permit	8
2.2.3	Air discharge permit	9
2.2.3.1	Taranaki Combined Cycle 1 (TCC1-operating)	10
2.2.3.2	Taranaki Combined Cycle 2 or Stratford Peaker 2 (TCC2 or SP2 – yet to be constructed)	10
2.2.3.3	Stratford Peaker Plant (SP1)	11
2.2.4	Discharges of wastes to land	12
2.2.5	Land use permits	12
2.3	Monitoring programme	15
2.3.1	Introduction	15
2.3.2	Programme liaison and management	15
2.3.3	Site inspections	15
2.3.4	Chemical sampling	16
2.3.5	Biomonitoring surveys	16
2.3.6	Provision of consent holder data	16
2.4	Results – Water	17
2.4.1	Inspections	18
2.4.2	Results of the abstraction monitoring	18
2.4.3	Results of discharge monitoring	20
2.4.3.1	Results of monitoring by Contact Energy	21
2.4.3.2	Results of Council monitoring	24
2.5	Results of the receiving environment monitoring	26
2.5.1	Biomonitoring	26

	2.5.1.1	Patea River	27
	2.5.1.2	Kahouri Stream	28
	2.5.2	Physico-chemical monitoring by the Council	30
	2.5.3	Temperature monitoring by Contact Energy	31
2.6		Results – Air	31
	2.6.1	Inspections	31
	2.6.2	Results of discharging monitoring	31
	2.6.2.1	Taranaki Combined Cycle	31
	2.6.2.2	Emissions testing of the Stratford Peaker plants	32
	2.6.3	Reviews and audits	34
2.7		Investigations, interventions, and incidents	35
3		Discussion	37
	3.1	Discussion of site performance	37
	3.2	Environmental effects of exercise of consents	38
	3.3	Evaluation of performance	38
	3.4	Recommendations from the 2016-2017 Annual Report	53
	3.5	Alterations to monitoring programmes for 2018-2019	53
	3.6	Recommendations	54
4		Ahuroa B Gas Storage	55
	4.1	Process description	55
	4.1.1	Site overview	55
	4.1.2	Geological setting	55
	4.1.3	Gas injection/extraction	56
	4.1.4	Pressure monitoring	57
	4.1.5	Pipeline to Stratford Power Station	57
	4.2	Resource consents	59
	4.2.1	Water discharge permit	60
	4.2.2	Air discharge permit	60
	4.2.3	Discharge to land	61
	4.3	Monitoring programme	61
	4.3.1	Introduction	61
	4.3.2	Programme liaison and management	61
	4.3.3	Site inspections	62
	4.3.4	Chemical sampling	62
	4.3.5	Data review	62

5	Results – Water	63
	5.1.1    Inspections	63
	5.1.2    Results of discharge monitoring	63
5.2	Results – Air	64
	5.2.1    Review of flaring data	64
	5.2.2    Reservoir pressure and injection pressure data review	64
5.3	Results – Pipeline	66
5.4	Annual report by Contact Energy for Ahuroa B Gas storage	67
5.5	Investigations, interventions, and incidents	68
6	Discussion	69
	6.1    Discussion of site performance	69
	6.2    Environmental effects of exercise of consents	69
	6.3    Evaluation of performance	69
	6.4    Recommendations from the 2016-2017 Annual Report	73
	6.5    Alterations to monitoring programmes for 2018-2019	73
7	Recommendations	74
	Glossary of common terms and abbreviations	75
	Bibliography and references	77
	Appendix I  Resource consents held by Contact Energy Ltd	
	Appendix II  Resource consents held by Contact Energy Ltd for Ahuroa Gas Storage	
	Appendix III  Resource consents held by Contact Energy Ltd for AGS to SPS pipeline	
	Appendix IV  Biomonitoring Reports	
	Appendix V  Air monitoring results for SP1	
	Appendix VI  Annual Report for 2017-2018 by Contact Energy Ltd	

## List of tables

Table 1	Consents held by Contact Energy for SPS	6
Table 2	SPS chemical sampling analytes	16
Table 3	Monthly abstraction data Contact Energy 2017-2018	20
Table 4	Monitoring of SP1 effluent by Contact Energy July 2017-June 2018	21
Table 5	Monitoring of TCC1 plant effluent by Contact Energy July 2017-June 2018	22
Table 6	Results of effluent monitoring by Council with Contact Energy results for chlorine and pH	25

Table 7	Location of biomonitoring sampling sites in relation to the Patea River	26
Table 8	Biomonitoring sites in the Kahouri Stream in relation to Contact Energy SPS	28
Table 9	Patea River monitoring in relation to discharges from Contact Energy 2017-2018	30
Table 10	Results of emission testing baseload of Stratford Peaker Plant September 2016	33
Table 11	Emission measurement for Unit 22 plant at lower GTG load conditions	34
Table 12	Summary of performance for consent 3939-2 2017-2018 monitoring period	38
Table 13	Summary of performance for consent 4022-2 2017-2018 monitoring period	39
Table 14	Summary of performance for consent 4454-1 2017-2018 monitoring period	40
Table 15	Summary of performance for consent 4455-1 2017-2018 monitoring period	41
Table 16	Summary of performance for consent 4456-1 2017-2018 monitoring period	41
Table 17	Summary of performance for consent 4458-1 2017-2018 monitoring period	42
Table 18	Summary of performance for consent 4459-1.3 2017-2018 monitoring period	43
Table 19	Summary of performance for consent 4460-1 2017-2018 monitoring period	43
Table 20	Summary of performance for consent 4461-1 2017-2018 monitoring period	44
Table 21	Summary of performance for consent 4462-1 2017-2018 monitoring period	45
Table 22	Summary of performance for consent 4804-1 2017-2018 monitoring period	46
Table 23	Summary of performance for consent 5063-1 2017-2018 monitoring period	47
Table 24	Summary of performance for consent 5633-1 2017-2018 monitoring period	47
Table 25	Summary of performance for consent 5848-1 2017-2018 monitoring period	48
Table 26	Summary of performance for consent 7247-1 2017-2018 monitoring period	49
Table 27	Summary of performance for consent 7248-1 2017-2018 monitoring period	50
Table 28	Summary of performance for consent 7250-1 2017-2018 monitoring period	51
Table 29	Summary of performance for 7605-1 2017-2018 monitoring period	52
Table 30	Summary of performance for consent 7653-1 2017-2018 monitoring period	52
Table 31	Summary of resource consents for Ahuroa B gas storage	59
Table 32	Summary of resource consents for the pipeline from AGS to SPS	59
Table 33	Ahuroa B skimmer pit sampling 2017-2018	63
Table 34	Summary of performance for consent 3681-2	69
Table 35	Summary of performance for consent 7432-1	70
Table 36	Summary of performance for consent 7746-1	71
Table 37	Evaluation of environmental performance over time	72



## List of figures

Figure 1	Patea River flow at Skinner Road m <sup>3</sup> /second 1 July 2017-1 July 2018	19
Figure 2	Patea River temperature 2017-2018 downstream of SPS discharge	23
Figure 3	Patea River upstream minus downstream of discharge temperature variation 2017-2018	24
Figure 4	Location of biomonitoring sites in the Patea River in relation to Stratford Power Station	27
Figure 5	Biomonitoring locations on the Kahouri Stream in relation to Contact SPS	29
Figure 6	Ahuroa B site layout facing North West, May 2014	55
Figure 7	Ahuroa B wellsite and gas storage facilities	57
Figure 8	Pipeline route from Ahuroa B Gas storage to Stratford Power Station	58
Figure 9	Ahuroa B Gas storage facility flaring volumes by month (Sm <sup>3</sup> ) 2017-2018	64
Figure 10	Monthly downhole pressure for Ahuroa B gas wells 3, 4 and 5ST-1, 2017-2018	66
Figure 11	Monthly injection pressures for Ahuroa B gas wells 2A, 3, 4, and 5ST-1, 2017-2018	66
Figure 12	Annual flaring volumes for AGS over time since 2014-2015	68

## List of photos

Photo 1	Aerial view of Stratford Power Station March 2012	5
Photo 2	Physicochemical, biological sampling, discharge sites and abstraction site locations	17
Photo 3	Ahuroa B site looking towards the skimmer pit (left) and the final discharge point	63



# 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 2017 to June 2018 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Contact Energy Ltd (Contact Energy). Contact Energy operates two gas-fired power plants at Stratford Power Station (Taranaki Combine Cycle TCC1 and Stratford Peaker Plants SP1), situated on East Road (State Highway 43) near Stratford, in the Patea catchment.

This report is also the annual report for July 2017 to June 2018 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.

The 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 permit held by Contact Energy to cover emissions to air from the 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 20th combined annual report by the Council for Contact Energy.

### 1.1.2 Structure of this report

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

- consent compliance monitoring under the RMA and the Council's obligations;
- the Council's approach to monitoring sites through annual programmes;
- the resource consents held by Contact Energy 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 in Contact Energy's sites.

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

**Section 3** discusses the results, their interpretations, and their significance for the environment including recommendations to be implemented in the 2018-2019 monitoring year for SPS.

**Section 4** of this report is a background section for Ahuroa B Gas Storage.

It sets out general information about:

- consent compliance monitoring under the RMA and the Council's obligations;
- the Council's approach to monitoring sites through annual programmes;
- the resource consents held by Contact Energy in the Waitara catchment;

- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted in Contact Energy's sites.

**Section 5** presents the results of monitoring of Ahuroa B Gas Storage during the period under review, including scientific and technical data.

**Section 6** discusses the results, their interpretations, and their significance for the environment.

**Section 7** presents recommendations to be implemented in the 2017-2018 monitoring year for AGS.

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

### 1.1.3 The Resource Management Act 1991 and monitoring

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

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

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

### 1.1.4 Evaluation of environmental and administrative performance

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

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year. Administrative performance is concerned with 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 2017-2018 year, consent holders were found to achieve a high level of environmental performance and compliance for 76% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 20% of the consents, a good level of environmental performance and compliance was achieved.

## 2 Stratford Power Station

### 2.1 Process description

#### Taranaki Combined Cycle Plant (TCC)

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 B 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 Plants (SP1)

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.



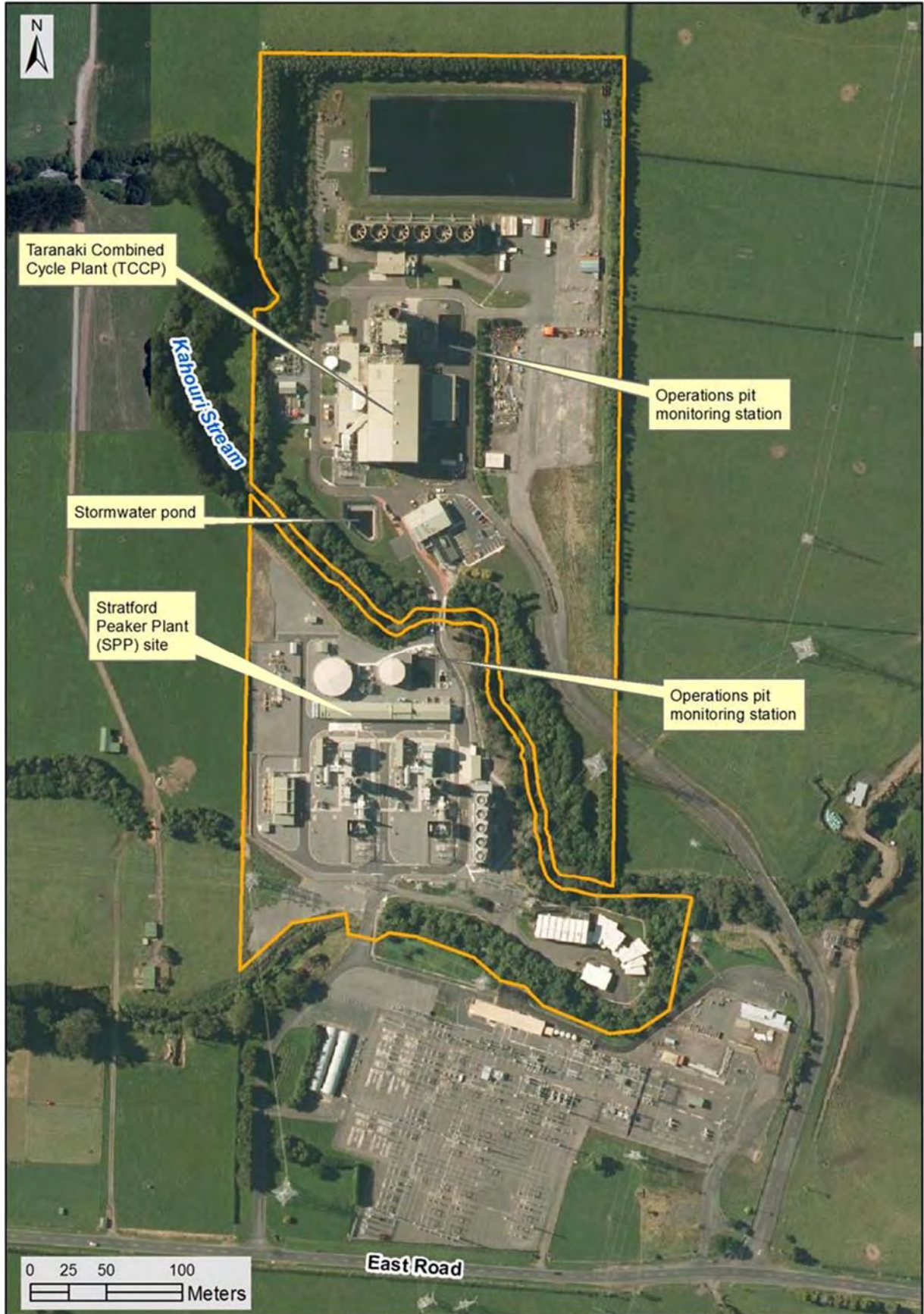


Photo 1 Aerial view of Stratford Power Station March 2012

## 2.2 Resource Consents

A summary of consents held by Contact Energy in relation to activities at its Stratford Power Station site are provided in Table 1 below. A copy of each of the consents can be found in Appendix I.

Table 1 Consents held by Contact Energy for SPS

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



Consent number	Purpose	Volume	Next review date	Expiry date
7786-1*	Discharge contaminants to air from construction		2022	2028

\*indicates consents not yet exercised

^ This consent expired on 1 June 2016 and was not renewed. 4459-1.3 has been changed to cover this activity.

# Optional review date is within 6 months of receipt of report required by consent conditions.

For consent 4022-2 the report was provided in December 2014 (next one due December 2020).

For consent 4454-1 the report was provided in 1998.

- 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 the 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 (now expired) and 4022 had 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 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 m<sup>3</sup>/day (225 L/s 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 Contact Energy to take and use up to 19,440 cubic m<sup>3</sup>/day (225 L/s 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 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.

The permit is attached to this report in Appendix I.

## 2.2.2 Water discharge permit

### Used water, mainly cooling water.

Contact Energy holds water discharge permit **5848-1** to discharge up to 6,740 m<sup>3</sup>/day (78 L/s) 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 holds one consent in relation to discharge of stormwater at Stratford Power Station.

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. This consent includes conditions covered in the recently expired consent 3939-2.

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 the 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.

The permit is attached to this report in Appendix I.

## 2.2.3 Air discharge permit

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

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

### 2.2.3.1 Taranaki Combined Cycle 1 (TCC1-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 CO<sub>2</sub> 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 to provide reports within two years of, and then again at four 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 four 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 8 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.

The permit is attached to this report in Appendix I.

## 2.2.4 Discharges of wastes to land

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

Contact Energy holds land discharge permit **5063-1** to discharge up to 5 m<sup>3</sup>/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.

The permit is attached to this report in Appendix I.

## 2.2.5 Land use permits

Section 13(1)(a) of the RMA stipulates that no person may in relation to the bed of any lake or river use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on,

under, or over the bed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

Contact Energy 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 4456 (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 RMA. The consent expires on 1 June 2028.

Consent 4462 has essentially the same nine conditions as those imposed on consent 4456 (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 4456 (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 associated utilities, was issued by Council on 6 March 2008 as resource consent under Section 87(a) of the RMA. 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. The consent was due to expire on 1 June 2034, but it was not exercised within five years and as per condition 7 it has lapsed.

Consent 7249 had 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.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consent(s) which is/are appended to this report.

## 2.3 Monitoring programme

### 2.3.1 Introduction

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

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

The monitoring programme for the 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:
- on-going liaison with resource consent holders over consent conditions and their interpretation and application;
- in discussion over monitoring requirements;
- preparation for any consent reviews, renewals or new consent applications;
- 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 three 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 Company 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 of both the discharges from the site and the water quality upstream and downstream of the discharge point and mixing zone (Photo 2).

The used water discharge from both the TCCP and SP1 were sampled on three occasions, and were analysed for the analytes provided in the Table 2.

Two sites on the Patea River were also sampled on three occasions for the parameters provided in Table 2.

Table 2 SPS chemical sampling analytes

Location	Analytes	
Discharges IND002023 IND002038	Chlorine (Total)* Conductivity Dissolved reactive phosphorous (DRP) Un-ionised Ammonia NH <sub>3</sub> Ammoniacal Nitrogen NH <sub>4</sub>	Oil and Grease pH Suspended solids Temperature Turbidity
Patea River PAT000356 PAT000357	Conductivity Dissolved reactive phosphorous (DRP) Flow Un-ionised Ammonia NH <sub>3</sub> Ammoniacal Nitrogen NH <sub>4</sub>	pH Suspended solids Temperature Turbidity

\*Total chlorine monitoring was not possible in the final monitoring round due to the closure of the Regional Council on site laboratory. It will be continued in the 2018-2018 monitoring period

### 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 Provision of consent holder data

Contact Energy submitted monitoring data to the Council on a monthly basis for review pertaining to the operations of the plant, including water abstraction, wastewater discharges and air emissions discharges. They also provided the Council with an annual report. The annual report is appended to this report.

## 2.4 Results – Water



Photo 2 Physicochemical, biological sampling, discharge sites and abstraction site locations



### 2.4.1 Inspections

At the SPS 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 control room are also visited to view and discuss recent monitoring results. On 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 plant, 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 (around chemical and oil storage/use, transformers, electrical batteries), and the stormwater drainage system, are given particular attention.

Three inspections were undertaken by the Council at Contact Energy's facility, Stratford Power Station (SPS), in the 2017-2018 monitoring period. These were undertaken on the following dates:

Inspection 1: 7<sup>th</sup> November 2017,

Inspection 2: 5<sup>th</sup> March 2018, and

Inspection 3: 19<sup>th</sup> July 2018.

In general, the site was found to be well kept with good housekeeping evident across the facility. Staff of Contact Energy were found to hold good knowledge of the environmental aspects of running the plant, and to have proper training in dealing with contingency events that have the potential for causing adverse environmental effects.

There is good communication between Contact Energy and the Council. This includes the supply of monthly monitoring reports from Contact Energy to the Council as to the processes undertaken by the facility, which provides good transparency between both parties.

### 2.4.2 Results of the abstraction monitoring

Water abstractions are regulated under consent 4455. Monitoring of the abstraction system is undertaken at two locations. One is located at the Patea River intake, while the other is located at the inlet to the raw water pond. The raw water pond provides for both power plants (the combined cycle and the two smaller peaker plants). Contact Energy also hold consent 5847 which is also related to water abstraction, however this is for a future proposed facility.

During July 2017 the site experienced issues with its river water transfer system from the Patea River. This resulted in a short fall in the plants ability to supply its self with raw water, which could have impacted the operations of the Taranaki combined cycle (TCC). It was remedied through close communication with the Council, and as a result 60 water trucks and a temporary river water system were installed. This allowed the Company to resolve the issue with its normal river water transfer system.

The record for water abstraction (Figure 1) is based on 5 minute average flows, rather than instantaneous values. This is undertaken to prevent short term spikes within the data set as a process of when the pumps are reversed into backwash mode or restarted, as this may give rise to transient water surges in the pipelines which may represent breaches of the abstraction consent.

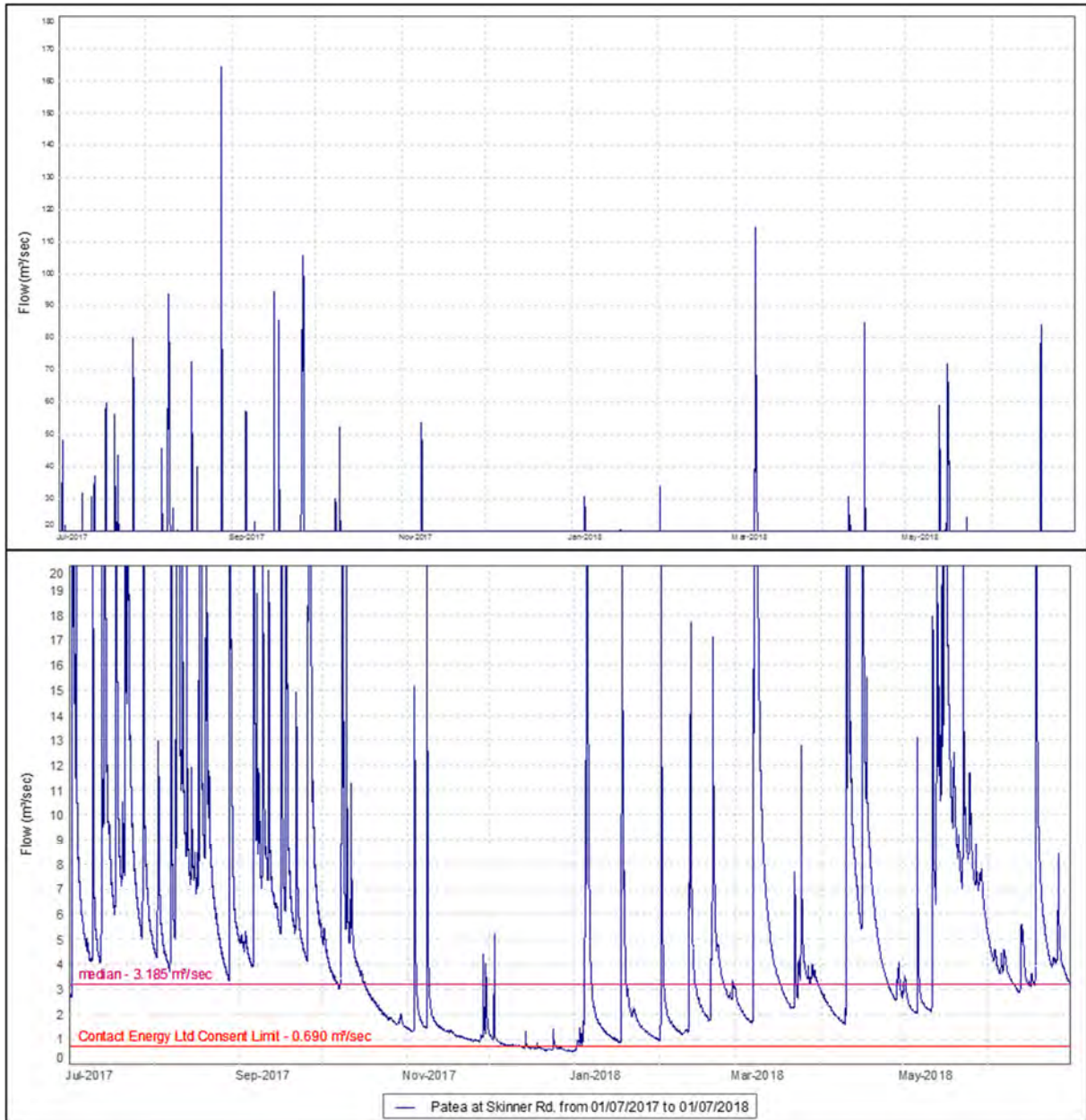


Figure 1 Patea River flow at Skinner Road m<sup>3</sup>/second 1 July 2017-1 July 2018

### Flow Monitoring

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

The abstraction is setup so it is not possible to exceed a pump rate of 225 L/s. Throughout the 2017-2018 monitoring period the maximum abstraction average intake flow was recorded was 140 L/s (June 2018) with an average flow rate of 52 L/s (Table 3). The total volume abstracted throughout the monitoring period was 1,310,125 m<sup>3</sup>.

This abstraction volume was an increase of 3.4 % compared to the previous monitoring period (2016-2017), where the total abstraction volume was 1,266,571 m<sup>3</sup>. The increase in volume abstracted was attributed to the TCC1 which was in operation for a total 176 days this monitoring period. For comparison, in the previous monitoring period the TCC1 was in operation for 155 days.

Table 3 Monthly abstraction data Contact Energy 2017-2018

Month	Max. Abstraction L/s average	Ave. Abstraction L/s average
July	132	79
August	126	48
September	95	6
October	90	9
November	103	34
December	129	67
January	136	86
February	114	42
March	86	20
April	105	8
May	107	46
June	140	52

### 2.4.3 Results of discharge monitoring

Consent 5848 is held by Contact Energy. This covers the discharge of used waters (mainly blowdown water) from the cooling system of combined cycle (TCC1) and water treatment plant of the Peaker facilities (SP1) to the Patea River (Photo 2).

Contact Energy continuously monitors the following parameters:

- pH,
- chlorine,
- temperature (including the effluent of receiving waters), and
- flow of the effluents from both plants (TCC1 and SP1).

The online monitoring sensors are checked twice daily. Contact Energy also undertake sampling and analysis of grab samples from both operation pits (Photo 1) to assess the online sensor accuracy.

The Council samples the discharge from both plants, this is undertaken as close to quarterly as possible. Though variations in the flow rate in the Patea River may lead to a slight augmentation in timing. Inter-laboratory comparison exercises are also undertaken between both parties of the same discharges through split samples.

The analysis undertaken by the Council in respect of the discharges includes the following:

- pH;
- Chlorine (free and total);
- Conductivity;
- Dissolved reactive phosphorus (DRP);
- Ammonia (NH<sub>4</sub>)
- Oil and grease
- Suspended solids;

- Turbidity;
- Flow rate;
- Temperature; and
- Un-ionised ammonia (NH<sub>3</sub>).

The Council analyses the samples to determine compliance with the specific consent conditions on effluent composition (pH and chlorine), it is also assessed for nutrients and nutrient minimisation (phosphorus). Ammonia is also assessed (in relation to the receiving water limit). General effluent parameters are also monitored for any significant change (conductivity, turbidity and suspended solids).

Consent 4459 covers the discharge of stormwater to the Kahorui Stream from the holding pond that serves both plants. Prior to 2011 there were minimal discharges from this pond as the majority of stormwater was recycled through the raw water pond. When the stormwater catchment area was increased as a process of redeveloping the site, the discharge from this source increased. This was also a reflection of the augmentation of the facilities power generation capabilities, whereby the combined cycle (TCC1) may be shut down for periods. This would result in a need to refresh the raw water pond at times through flow back into the Patea River, via the stormwater pond and Kahourui Stream. The stormwater prior to discharge is monitored by Contact Energy and its compliance limits as defined by consent 4459 are as follows:

- pH (6-9),
- Suspended solids (100 g/m<sup>3</sup>), and
- Oil and grease (15 g/m<sup>3</sup>)

#### 2.4.3.1 Results of monitoring by Contact Energy

The following two tables (Table 4 & 5) detail the monthly summaries provided to the Council from Contact Energy. They relate to monitoring of the Patea River discharge by continuous analyser. The analyser record is also further checked for precision through the analysis of a grab sample from the associated operations pit.

Table 4 Monitoring of SP1 effluent by Contact Energy July 2017-June 2018

Month	SP1 & TCC Max flowrate discharge	SP1 & TCC Ave flowrate discharge	SP1 Max Cl <sub>2</sub>	SP1 Ave Cl <sub>2</sub>	SP1 Max pH	SP1 min pH	SP1 Temp Max	SP1 Temp Ave
	L/s avg 15mins	L /s	ppm	ppm	pH	pH	°C	°C
July	40.9	17.7	0.73	0.02	7.94	6.24	18.18	13.46
August	39.1	15.5	0.79	0.01	7.78	6.15	17.2	13.9
September	35.9	12.2	0.69	0.02	7.68	6.20	17.26	13.52
October	38.2	10.6	1.18	0.02	7.76	6.11	19.5	15.5
November	50.6	18.8	0.76	0.02	7.90	6.08	25.0	19.88
December	49.9	23.5	0.77	0.02	7.64	6.42	27.36	23.02
January	40.9	20.6	0.74	0.02	7.64	6.2	30.8	24.3
February	49.8	19.4	0.77	0.02	8.73	6.64	27.4	22.2
March	49.6	16.7	0.45	0.02	8.2	6.9	23.7	19.8
April	41.9	4.62	0.07	0.02	7.64	7.04	20.77	16.97

Month	SP1 & TCC Max flowrate discharge	SP1 & TCC Ave flowrate discharge	SP1 Max Cl <sub>2</sub>	SP1 Ave Cl <sub>2</sub>	SP1 Max pH	SP1 min pH	SP1 Temp Max	SP1 Temp Ave
	L/s avg 15mins	L /s	ppm	ppm	pH	pH	°C	°C
May	41.9	4.6	0.33	0.01	7.6	6.95	16.02	13.2
June	45.4	12.04	0.7	0.01	8.69	6.84	12.0	10.16

Table 5 Monitoring of TCC1 plant effluent by Contact Energy July 2017-June 2018

Month	SP1 & TCC Max flowrate discharge	SP1 & TCC Ave flowrate discharge	TCC Max Cl <sub>2</sub>	TCC Ave Cl <sub>2</sub>	TCC Max pH	TCC min pH	TCC Temp Max	TCC Temp Ave
	L /s avg 15 mins	L /s	ppm	ppm	pH	pH	°C	°C
July	40.9	17.7	0.06	0.01	8.58	6.04	21.2	19.35
August	39.1	15.5	0.08	0.02	8.34	6.52	21.89	17.95
September	35.9	12.2	0.10	0.01	8.69	6.73	15.7	13.17
October	38.2	10.6	0.14	0.02	8.96	6.86	19.31	15.71
November	50.6	18.8	0.66	0.07	8.95	7.04	20.59	17.54
December	49.9	23.5	0.4	0.02	8.86	6.13	27.98	22.55
January	40.9	20.6	1.03	0.02	7.92	6.22	30.31	27.1
February	49.8	19.4	0.06	0.01	8.63	6.25	32.42	23.28
March	49.6	16.7	1.03	0.03	8.91	6.39	22.66	19.34
April	41.9	4.62	1.03	0.01	7.71	6.8	23.2	16.5
May	41.9	4.6	1.03	0.01	7.71	6.8	23.2	16.5
June	45.4	12.04	1.03	0.01	8.91	6.25	21.09	18.79

## Flow

The discharges from Contact Energy in the 2017-2018 monitoring period were compliant with the associated consent limit which stipulates a rate of <78 L/s.

In 2017-2018, the combined average discharge flow from both plants (TCC1 and SP1) was 14.68 L/s, the maximum recorded discharge flow was 50.6 L/s. The total volume of wastewater discharged for the year was 448,709 m<sup>3</sup>. This was a 5.04 % reduction when compared to the previous monitoring periods discharge.

## pH

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

For the TCC1 (Table 5), the minimum pH observed was pH 6.04, recorded in July 2017. The maximum observed was pH 8.96, recorded in October 2017. For the SP1 (Table 4), the minimum recorded pH was pH 6.08, recorded in November 2017. The highest recorded pH was pH 8.73, recorded in February 2018.



When the continuous pH monitor indicates an exceedance with respect to the pH range limit, the wastewater discharge valve at relevant operations pit on the site automatically closes immediately (within one minute). This does not allow the non-compliant discharge to enter the river.

The limits on the discharge monitor with respect to pH range, activate when the corresponding pH range reaches either, pH 6.1 or 8.9.

### Chlorine

The average value for chlorine within the discharge from the TCC1 was recorded as 0.02 ppm, the corresponding max value for chlorine was 1.03 ppm, recorded on five occasions during the monitoring period. When chlorine levels reach or exceed 0.05 ppm, as with the pH, the discharge ceases.

For SP1, the average value was recorded as 0.0175 ppm chlorine, while the maximum recorded chlorine was found to be 1.18 ppm. The control system engages and ceases the discharge prior to elevated chlorine process water discharging.

### Temperature

The river temperature during the monitoring period remained below 25 °C consented limit (Figure 2), allowing for continuous discharge if required. River temperature differentials remained within consent limits. However, for less than 1% of the time in the 2017-2018 monitoring period, it was temporarily exceeded with a value of 1.64°C, Figure 3. Note, consent 5348-1, condition 9, states that the discharge shall not alter the ambient temperature of the receiving waters of the Patea River by more than 1.5 °C for 95% of the time that the discharge is occurring on an annual basis. Of note: on two occasions during the monitoring period, the upstream temperature monitor was swept away during high flow events, thus the record is incomplete for this period.

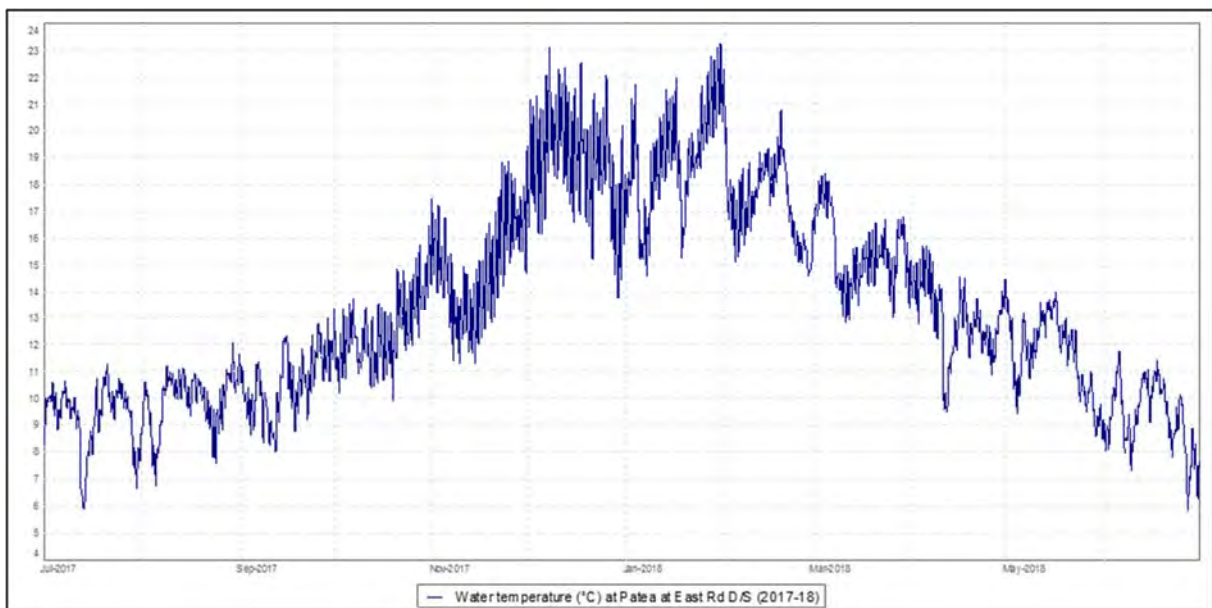


Figure 2 Patea River temperature 2017-2018 downstream of SPS discharge

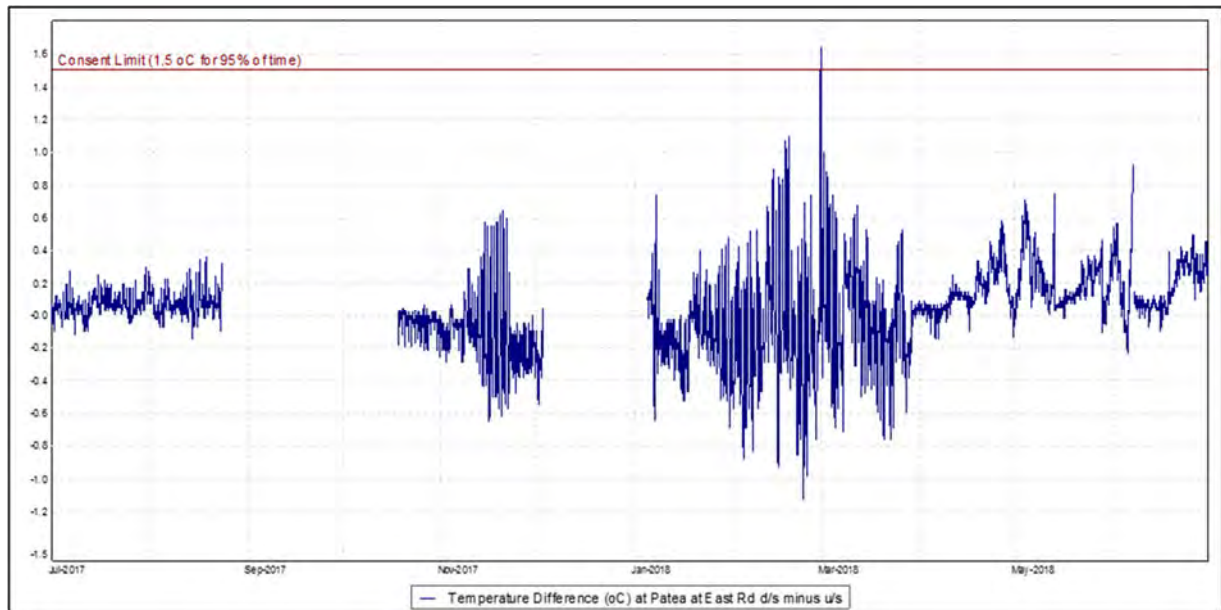


Figure 3 Patea River upstream minus downstream of discharge temperature variation 2017-2018

#### Stormwater

Contact Energy recorded 45 occasions where stormwater was discharged to the Kahouri Stream during the 2017-2018 monitoring period. This occurred during high rainfall events. Stormwater monitoring undertaken by Contact Energy indicated compliance with consent conditions for the entire year.

#### 2.4.3.2 Results of Council monitoring

The results of the Council monitoring of the effluent from the TCC1 and SP1 in the 2017-2018 monitoring period are provided in the following Table 6. Included in this table are the corresponding concentrations of the continuous effluent monitoring provide by Contact Energy for pH and chlorine and the associated grab samples, undertaken for validation of the continuous analysis.

#### Compliance monitoring

Specifically consent 5848 places limits on the pH range and the total residual chlorine concentrations within the effluent, as previously discussed, these limits are as follows:

The following concentration shall not be exceeded in the discharge effluent:

- pH range of discharge: pH 6.0 - 9.0
- Total residual chlorine: 0.05 g/m<sup>3</sup>

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

#### Comparison exercises

Inter-laboratory comparisons were undertaken between Contact Energy and the Council on two occasions this period. The comparisons were undertaken across the following parameters:

- Total residual chlorine;
- Conductivity;
- Oil and grease;
- pH;
- Dissolved reactive phosphorus; and
- Turbidity.

Overall, there was good agreement on the inter-laboratory results.

Table 6 Results of effluent monitoring by Council with Contact Energy results for chlorine and pH

Description	Discharge	Date	Time	Flow	Temperature °C	pH			Free CL <sub>2</sub> g/m <sup>3</sup>	Total CL <sub>2</sub> g/m <sup>3</sup>			Conductivity at 20°C mS/m	Turbidity g/m <sup>3</sup>	Suspended solids g/m <sup>3</sup>	Oil and grease g/m <sup>3</sup>	Ammonia g/m <sup>3</sup>	DRP g/m <sup>3</sup>
						TRC	CE meter	SPS Lab		TRC	CE meter	SPS lab						
Combined cycle	IND002023	07-Nov-17	08:20	16.7	17.4	6.9	7.0	NR	0.02	0.05	0.012	NR	41.2	1.9	21	<0.5	0.00008	0.874
Peaker plant	IND002038	07-Nov-17	08:45	7.9	17.4	7.7	7.58	NR	0.02	0.05	0.008	NR	18.1	0.85	0.5	<0.5	0.00055	0.013
Combined cycle	IND002023	05-Mar-18	11:35	20.15	22.2	7.9	8.03	7.99	<0.01	<0.01	0.009	<0.01	13.7	1.3	4	<0.5	0.00051	0.013
Peaker plant	IND002038	05-Mar-18	11:25	23.6	21.9	7.3	7.28	7.28	<0.01	<0.01	0.038	0.01	34.8	1.7	18	<0.5	0.00121	0.4
Combined cycle	IND002023	19-Jul-18	14:00	3.81	21.6	7.2	7.08	7.22	NR	NR	0.001	0.00	94.5	2.5	<3	<4	<0.010	0.065
Peaker plant	IND002038	19-Jul-18	13:40	9.8	11.1	7.4	7.48	7.47	NR	NR	-0.002	0.002	25.8	0.82	3	<4	0.021	0.199

\*CE meter: Contact Energy on-line meter

\*Free Cl<sub>2</sub> : Free chlorine

\*Total Cl<sub>2</sub> : Total chlorine

\*Cond : Conductivity at 20°C

\*DRP : Dissolved reactive phosphorus

\*SPS lab : Stratford Power Station laboratory

\*L/s : litres per second

## 2.5 Results of the receiving environment monitoring

### 2.5.1 Biomonitoring

Biomonitoring of the Patea River and Kahouri Stream was undertaken this monitoring period. The Patea River was monitored on two occasions, 30 October 2017 and 3 April 2018, while the Kahouri Stream was monitored on one occasion, April 2018. A summary of the surveys are provided below, the full reports are appended to this report in appendix IV.

Biomonitoring forms a component of the consents compliance monitoring programme implemented by the Council following the construction of the Taranaki Combined Cycle [TCC1] power station in 1998, and the addition of Stratford Peaker Plant [SP1] in 2011. This particular biological monitoring survey (the first of two biannual surveys for the 2017-2018 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, 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 1.9 km downstream of the discharge. 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 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 18 December 2016 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 7 and illustrated in Figure 4.

Table 7 Location of biomonitoring sampling sites in relation to the Patea River

Site No	Site code	Grid reference	Location	Altitude (m asl)
1	PAT000356	E1714497 N5645112	U/s of TCC1 cooling wastes discharge	250
2	PAT000357	E1714662 N5645076	100 m d/s of TCC1 cooling wastes discharge	250
3	PAT000360	E1715919 N5644681	Skinner Road	240
4	PAT000397	E1718991 N5643531	Hungers Road	200
5	PAT000430	E1723952 N5641068	Raupuha Road	160

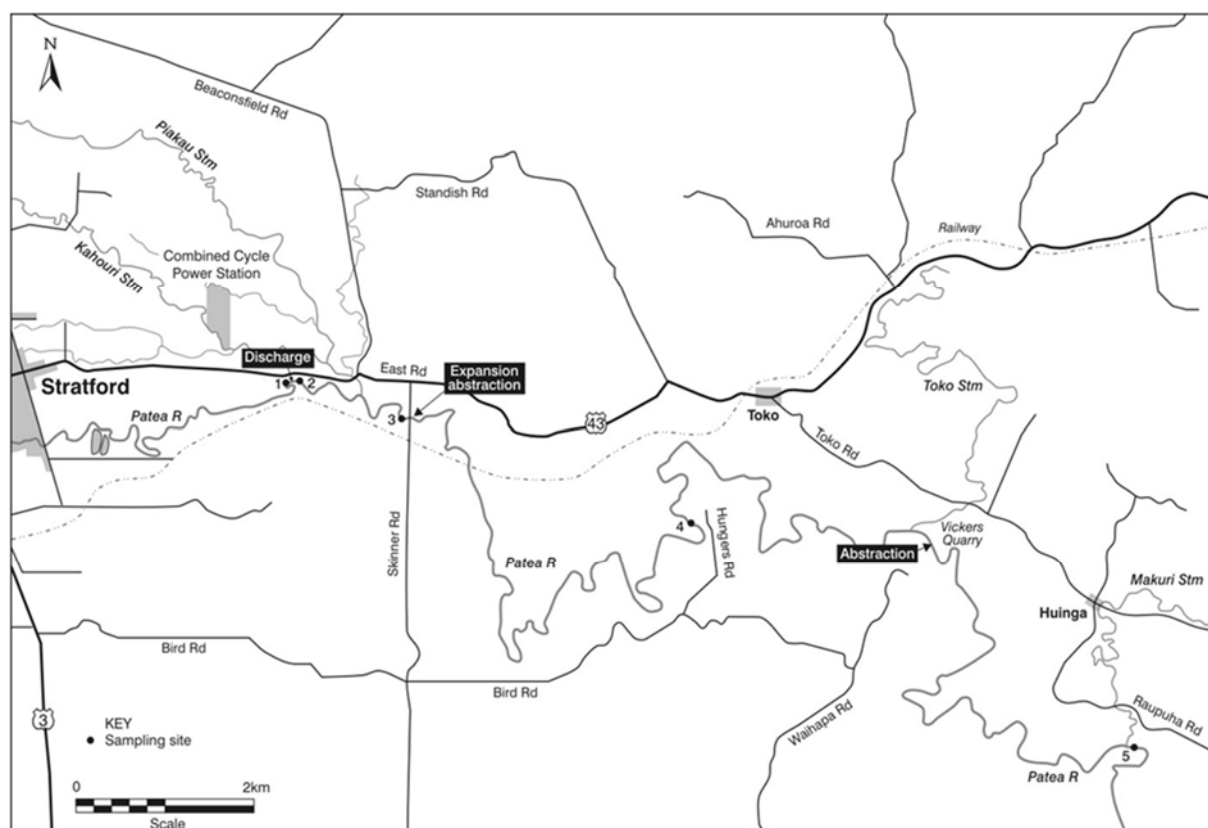


Figure 4 Location of biomonitoring sites in the Patea River in relation to Stratford Power Station

### 2.5.1.1 Patea River

30 October 2017

The Council's standard 'kick-sampling' technique was used at five established sites to collect streambed macroinvertebrates from the Patea River on the 30 October 2017. Samples were sorted and identified to provide number of taxa (richness) and MCI and SQMCI 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 SQMCI 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<sub>5</sub> between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

Taxa richnesses were slightly lower than historic medians but there was no meaningful difference among sites. MCI scores indicated that the stream communities for the four upstream sites were in 'good' health with only the bottom site in 'fair' generic health with no significant differences among the four upstream sites. SQMCI<sub>5</sub> scores indicated healthier than normal macroinvertebrate communities at the majority of sites.

Overall, this spring macroinvertebrate survey indicated that 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.

3 April 2018

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 SQMCI<sub>5</sub> 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 SQMCI<sub>5</sub> 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<sub>5</sub> between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

Taxa richnesses were similar to historic medians. MCI scores indicated that the macroinvertebrate communities were in 'fair' health with no significant differences between sites 1 and 2, and sites 3 and 4 were significantly higher than the control site. SQMCI<sub>5</sub> scores were slightly lower than normal but there was no significant differences between sites 1 and 2.

Overall, this summer macroinvertebrate survey indicated that 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.

### 2.5.1.2 Kahouri Stream

This survey fulfilled the biological components of the 2017-2018 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 3939-2 to discharge up to 464 L/s of stormwater from the Stratford Power Station Peaking Plant site into an unnamed tributary of the Kahouri Stream and into the Kahouri Stream and 4459-1 to discharge stormwater from the operation of a power station site into an unnamed tributary of the Piakau Stream and into the Kahouri Stream, all tributaries of the Patea River. Both consents are currently held by Contact Energy. The monitoring sites on the Kahouri Stream are defined in Table 8 and presented in Figure 5.

The results of biological surveys performed in the Kahouri Stream since 1996 are discussed in various reports referenced at the end of this report.

**Table 8** Biomonitoring sites in the Kahouri Stream in relation to Contact Energy SPS

Site No	Site code	Location	GPS co-ordinates
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





Figure 5 Biomonitoring locations on the Kahouri Stream in relation to Contact SPS

4 April 2018

The Council's standard 'kick-sampling' technique was used at two sites to collect streambed macroinvertebrates from the Kahouri Stream on 4 April 2018 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<sub>S</sub> 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<sub>S</sub> takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities, particularly if non-organic impacts such as elevated silt levels from stormwater discharges are occurring.

Significant differences in either MCI or SQMCI<sub>S</sub> between sites indicate the degree of adverse effects (if any) of discharges being monitored.

Taxa richness at both sites were similar to each other and indicated moderate richness. The macroinvertebrate communities of both sites were in 'good' generic biological health with no significant difference between sites. The more sensitive SQMCI<sub>S</sub> score indicated that the 'impact' site macroinvertebrate community was in better health than the 'control' site and in better than normal health overall.

Overall, this 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 Kahouri Stream.

## 2.5.2 Physico-chemical monitoring by the Council

On three occasions in the 2017-2018 monitoring period, water quality samples were collected from the Patea River. There are two sample sites in respect of the discharge of monitored plant effluent from Contact Energy. One site is located upstream (PAT000356), above the discharge, aimed at assessing the preceding water quality. The second site is located at the boundary of the 75 metres mixing zone (PAT000357), post the discharge, downstream of the discharge, aimed at assessing the likely effect of the discharge.

The results of the three monitoring rounds on the Patea River are presented in Table 9 below.

Table 9 Patea River monitoring in relation to discharges from Contact Energy 2017-2018

Discharge origin		SP1	SP1	TCC and SP1	TCC and SP1	TCC and SP1	TCC and SP1
Site		PAT000356	PAT000357	PAT000356	PAT000357	PAT000356	PAT000357
Location		Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
Date		07 Nov 2017	07 Nov 2017	05 Mar 2018	05 Mar 2018	19 Jul 2018	19 Jul 2018
Time	Parameter	09:00	09:10	11:00	11:30	14:45	15:05
Conductivity	mS/m@20C	9.3	10.2	10.1	10.8	10.7	11.5
Dissolved reactive phosphorus	g/m <sup>3</sup> P	0.078	0.094	0.075	0.08	0.037	0.039
Ammonia	g/m <sup>3</sup> N	0.239	0.217	0.033	0.032	0.139	0.146
pH	pH	7.7	7.7	8.3	8.5	7.7	7.4
Suspended solids	g/m <sup>3</sup>	1	1.6	2	3	<3	<3
Turbidity	NTU	0.88	0.82	1.0	1.2	1.03	1.16
Flow	m <sup>3</sup> /s	1.493	1.493	2.132	2.132	4.492	4.492
Temperature	°C	12.8*	12.8*	18.0*	18.4*	10.7*	10.6*
Un-ionised ammonia	g/m <sup>3</sup>	0.00332	0.00301	0.00255	0.00387	<0.010	<0.010

SP1 = Stratford peaker plant. TCC = Taranaki combined cycle. Upstream = Sample prior to discharge.  
Downstream = Sample 75m from discharge \* Temperature field thermometers have an accuracy of +/-0.2°C

The monitoring undertaken on three occasions indicated that the discharge was having a minimal effect on the receiving waters of the Patea River. The analysis provided in Table 9 indicated the following:

- Conductivity ranged from 9.3 to 11.5 mS/m@20 °C across the six samples collected. The largest variation, though minimal, was observed in the November 2017 sample, with a range of 0.9 mS/m@20 °C.
- Dissolved reactive phosphorus (DRP) ranged from 0.037 to 0.094 g/m<sup>3</sup>P across the six samples collected. The largest variation between upstream and downstream sample locations was observed in the November 2017 monitoring round. The variation was observed to be an increase of 0.016 g/m<sup>3</sup>P dissolved reactive phosphorus, which is negligible.
- Ammonia concentrations ranged from 0.032 to 0.239 g/m<sup>3</sup> N. In the November 2017 and March 2018 sampling round, the downstream ammonia concentration was found to be less than the upstream ammonia. Overall the impacts of the discharge were minimal in terms of ammonia concentration.



- pH analysis indicated a stable pH across the five samples collected. Of note was the corresponding pH value observed in the March 2018 sample round, with a value of pH 8.5. This elevated pH value is the likely effect of increased algal activity in the summer months. Minimal variation was observed between sites throughout the monitoring period.
- Suspended solids were observed at low concentrations in all six samples collected this period.
- Turbidity analysis indicated negligible impacts of the discharge in similarity to the suspended solids result.
- Temperature monitoring indicated negligible impacts in terms of temperature changes between the upstream and downstream monitoring locations. The largest variation between sites was observed to be 0.4 °C in the March 2018 sample round, note that the field thermometers have an accuracy of +/- 0.2 °C.
- Un-ionised ammonia concentrations were found to remain quite consistent across the six samples collected. On one occasion, November 2017, the corresponding downstream concentration of NH<sup>3</sup> was found to be lower than the upstream value. The July 2018 sampling round results were found to be below detection limit.

### 2.5.3 Temperature monitoring by Contact Energy

During the 2017-2018 monitoring period the largest variation in temperature was observed on the 1 January 2018, with an increase of 0.81 °C. The max observed temperature downstream of the discharge point was 23.25 °C on 30 of January 2018.

## 2.6 Results – Air

### 2.6.1 Inspections

Inspections in relation to emissions to the air comprised assessment of the visual effect of discharges from the power station site, including odour surveys. The TCC is monitored continuously through the use of continuous emissions monitoring sensors, monthly reports are provided to Council. While for the SP1, the emissions are checked regularly with stack testing, with the most recent testing undertaken in September 2016.

### 2.6.2 Results of discharging monitoring

Contact Energy provides monthly reports to the Council which summarise its emissions monitoring data with respect to the TCC. The report includes the average, maximum and minimum concentrations of the following target gases:

- Nitrogen oxides (NO<sub>x</sub>);
- Oxygen (O<sub>2</sub>);
- Carbon monoxide (CO); and
- Carbon dioxide (CO<sub>2</sub>).

#### 2.6.2.1 Taranaki Combined Cycle

In terms of the Taranaki Combined Cycle (TCC1), under normal operational circumstances, the maximum concentration of NO<sub>x</sub> emissions for the year was 59.79 ppm, recorded on the 22 January 2018. This exceeded the consent limit, as defined by consent 4454, which for normal operation is set at 50 ppm NO<sub>x</sub>. This concentration was a result of the TCC Emission Monitoring Equipment developing a fault in the sample heating system. The fault was rectified by Contact Energy and the following month indicated a normal

operational value of 36.57 ppm, the highest normal operational value for NO<sub>x</sub> (not including the fault derived value) was 38.4 ppm recorded in December 2017.

During start-up and shutdown of the TCC1, the limit of 50 ppm NO<sub>x</sub> limit may be exceeded for a set period of time as defined by the consent. The maximum recorded emission during these periods of start-up and shutdown was 80.9 ppm, recorded on the 29 April 2018.

Total carbon dioxide (CO<sub>2</sub>) emissions were calculated by Contact Energy to comprise 482,441 tonnes CO<sub>2</sub> in the 2017-2018 monitoring period. This was an increase of 72,606 tonnes CO<sub>2</sub> when compared to the previous monitoring period. This reflects the TCC1 plant operation which was in use for a total of 171 days in the 2017-2018 monitoring period, whereas in the previous monitoring period it was in operation for 155 days.

Total Nitrogen Oxide (NO<sub>x</sub>) emissions from the plant were recorded at 152 tonnes NO<sub>x</sub> in the 2017-2018 monitoring period.

The limit imposed by consent 4454 on the NO<sub>x</sub> mass discharge rate is set at 430 kg/hr NO<sub>x</sub>. In this period the limit was not exceeded and the maximum hourly NO<sub>x</sub> concentration was reported as 89.63 kg/Hr.

Please note that the Taranaki combined cycle is fitted with a continuous emissions monitoring system (CEMS). The CEMS continually monitor oxides of nitrogen (NO<sub>x</sub>), carbon monoxide (CO) and carbon dioxide (CO<sub>2</sub>) emitted from the facility.

#### 2.6.2.2 Emissions testing of the Stratford Peaker plants

Consent 4022 defines the limits on the concentration and mass emission rate for nitrogen oxides (NO<sub>x</sub>) discharged to air from the operation of the two peaker plant gas turbines (SP1). Limits are also imposed on maximum ground level concentration of carbon dioxide, carbon monoxide and nitrogen oxides, derived from emissions to the atmosphere from the site as or beyond the site boundary under ambient conditions.

No CEMS are fitted to the peaker plants in SP1. The peaker plants employ NO<sub>x</sub> control technology, coupled with a relatively regular cycle of emissions for peaker plants of that design. Contact Energy undertakes regular stack testing of their peaker plants. The most recent assessment of the emissions from both plants was undertaken on the 12 and 13 September 2016 by the suitably qualified consultants Beca Ltd (Beca). Contact Energy has undertaken biennial emission testing on SP1. The previous round of monitoring was undertaken in August 2014. Included in this testing was the requirement to undertake the testing in worst case operating conditions.

The results of the (September 2016) stack testing of the two SP1 plants, including the assessment under varying load conditions is provided in the following Tables 10 and 11 respectively. The full report is attached in appendix V.

In May 2018, Gas turbine 22 was submitted for exhaust emission testing and engine tuning. This was undertaken by the peaker plant suppliers, General Electric. Gas turbine 21 will undergo similar testing in the upcoming monitoring period.

Table 10 Results of emission testing baseload of Stratford Peaker Plant September 2016

Parameter	Units	Emission Limit	Average Emission	Percent of in relation to consent limit
<b>Unit 21 Emissions at Baseload</b>				
Oxides of Nitrogen (NO <sub>x</sub> )	ppm	125	<b>27.0</b>	21.6%
	mg/Nm <sup>3</sup>	265¥	<b>55.5*</b>	20.9%
Mass emission rate for total oxides of nitrogen	g/s (expressed as NO <sub>2</sub> )	175	<b>6.5</b>	3.71%
<b>Unit 22 Emissions at Baseload</b>				
Oxides of Nitrogen (NO <sub>x</sub> )	ppm	125	<b>25.1</b>	20.08%
	mg/Nm <sup>3</sup>	265¥	<b>51.5*</b>	19.4%
Mass emission rate for total oxides of nitrogen	g/s (expressed as NO <sub>2</sub> )	175	<b>7.6</b>	4.34%
<b>Total mass emission rate Units 21 and 22 at Baseload</b>				
Mass emission rate for total oxides of nitrogen#	kg/hour (expressed as NO <sub>2</sub> )	830	<b>14.1</b>	1.69%
<p>¥ Emission limit of 265 mg/Nm<sup>3</sup> (where Nm<sup>3</sup> refers to 0°C, 1-atmosphere, dry gas basis) converted from 100 mg.m-3 at 450°C, as given in TRC air discharge permit 4022-2 compliance limit 7(c); equivalent to 100 mg.m-3 at 450°C, or 125 ppm. (NB: 125ppm NO<sub>x</sub> is equivalent to 96.7mg/m<sup>3</sup> expressed as NO<sub>2</sub> at 450°C which equals 257 mg/Nm<sup>3</sup> expressed as NO<sub>2</sub>).</p> <p>* Expressed as mg/Nm<sup>3</sup> as NO<sub>2</sub> (where Nm<sup>3</sup> refers to 0°C, 1-atmosphere, dry gas basis).</p> <p># Mass emission rate of 830kg.hr-1 is for the entire site, total emissions presented for the purposes of this report are for the two Stratford peaker plants only.</p> <p>Extracted from Stratford Peaker Power Plant Air Emissions Measurements – Beca // 30 November 2016 3291669 // NZ1-13358368-4 0.4</p>				

The results of the instrument monitoring exercise (Tables 10 and 11) undertaken on behalf of Contact Energy by Beca Consultancy indicated that at the time of sampling, both peaker plant gas turbine units were running within compliance limits set by the Council under consent 4022.

Table 11 Emission measurement for Unit 22 plant at lower GTG load conditions

Time inclusive	Active Power	Oxygen	Carbon dioxide	Carbon monoxide corrected to 15% O <sub>2</sub>	Nitrogen oxides corrected to 15% O <sub>2</sub>
(Hrs)	(MW)	(%)	(%)	(ppm)	(ppm)
11:35 – 11:47	6	16.2	2.9	51.7	37.8
12:02 – 12:20	30	14.9	3.7	30.8	22.8
12:31 – 12:52	50	14.4	4.1	24.7	21.9
13:02 – 13:25	70	14.0	4.3	23.9	20.5
13:34 – 13:58	95	13.6	4.5	20.7	19.6
14:05 – 14:16	Baseload	13.4	4.6	16.4	19.8
14:19 – 14:30	107	13.4	4.7	14.8	19.9

### 2.6.3 Reviews and audits

Contact Energy hold three air discharge consents, two of these (4454 & 4022) are currently in use for the TCC1 and SP1. The third (5846) relates to the currently un-built, though proposed future facility. Included in each of these three consents is a condition that requires Contact Energy to provide the Council with reports which will include the following:

- Reviewing technological advances in reducing or mitigating plant emissions
- Providing a site emissions inventory
- Describing the energy efficiency of the plant
- Covering other matter relating to mitigation or emissions reduction, and
- Detailing carbon dioxide emissions from the site.

The most recent six yearly reports which relates to both the TCC1 and SP1 was received in December 2014, with the next set due in 2020. This report is provided in an earlier edition of the Council's annual report on Contact Energy in the 2014-2015 monitoring period and may be referenced from the bibliography and reference section of this report. The main points of the report are summarised below.

#### Technological advances and energy efficiency improvements

For TCC1, there had been no technological advances or efficiency improvements in the last six years. The plant already incorporated 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 had 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 and undertaken in the 2016 monitoring period.

#### 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.

#### Officer's note

Please note that the changes to the electricity market synopsis were undertaken in 2014. The following monitoring period (2015-2016) observed the TCC1 in operation for a total of 52 days. In the 2016-2017 monitoring period the TCC1 was in operation for a total of 155 days. In the monitoring period covered by this report, the TCC1 was in operation for a total of 176 days. This reflects the requirement for baseline power in New Zealand, which can vary annually.

#### Other information

July 2017- Raw water supply to the TCC1 experienced issues with its river water transfer system, as a result 60 road tankers were utilised and a temporary river water transfer system was employed while the system issue was resolved.

October 2017- Internal biennial environmental awareness training was undertaken.

January 2018- Cease of copper corrosion inhibitor dosing for SPP cooling towers.

January 2018- Project Stoat 2017 accounted for 14 Stoats and 34 rats caught around the site.

#### Plant improvements

This reporting period was proposed by Contact Energy to have observed the largest efficiency improvement in the TCC plant since 2008. This involved the evolution of the GT26 gas turbine firing control which now allows the unit to operate as variable fuel inlet pressures. This was an improvement as it removed the requirement for the fuel gas compressors and their associated electrical loading (2000 kilowatts). Enabling this power to be utilised/ exported.

#### Odour

Sporadic odour complaints had been received by the Council over the past couple of monitoring periods. This was in respect to an odour emanating from the cooling towers associated with the SP1 units (peaker plants).

Contact Energy undertook an internal investigation into the odour and as result the use of a certain copper corrosion inhibitor was ceased, as it was determined that the odour was the result of such a products utilisation. This was ceased during January 2018, and since this cessation of copper corrosion inhibition the associated odour has not been observed.

However, noted by Contact Energy is the ongoing concern with respect to copper corrosion within the cooling water system. To appease this concern with respect to copper corrosion, an alternative product will be proposed in the upcoming monitoring period.

## 2.7 Investigations, interventions, and incidents

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

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The incident register includes events where Contact Energy 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 2017-2018 period, the Council was 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.

#### 8 September 2017

A complaint was received concerning an offensive odour attributed to activities at the Contact Energy facilities.

An odour survey of the surrounding area was undertaken where a noticeable peppery odour was identified. Upon entry to the complainant's property the odour was intermittently noticeable. Noting that an odour must be found to be consistent and objectionable to be deemed offensive, no further action was taken.

#### Officers note

Periodic complaints had been received concerning an offensive odour emanating from the Contact Energy facility under certain metrological conditions, prior to the aforementioned complaint, the previous one received was 23 May 2017 and prior to that, May 2016. Following the complaint in May 2016 Contact Energy independently began their own investigation.

The odour was confirmed to be a product of the cooling water system attributed to the peaker plants (SP1). At the time Council officers were yet to identify an odour which was deemed more than noticeable, as the requirement is to identify objectionable odour for a breach in consent conditions to be found.

The finding of noticeable odour in May 2016 prompted the Council to open discussions with Contact Energy to identify the source of the odour and to mitigate it. Contact Energy subsequently engaged their chemical supplier NALCO. Discussion with NALCO resulted in some minor adjustments proposed to the method of chemical corrosion inhibition which were undertaken in October 2016. Since that date there appeared to be an improvement.

Post the finding of noticeable odour on the 8 September 2017, the Council discussed the issue with Contact Energy. Contact Energy in turn opened lines of communication with their peaker plant designer, General Electric. This resulted in a modification to their peaker plant cooling water system, whereby the use of a certain copper corrosion inhibitor was discontinued, this occurred on the 9 January 2018.

## 3 Discussion

### 3.1 Discussion of site performance

The Council was notified of an issue with water abstraction for usage within the power station when it occurred (July 2017). The issue related to a malfunction in one of the two raw water supply pumps. These pumps are associated with providing the TCC1 with raw water from the abstraction point on the Patea River.

At the time the demand for base power was high, as it had been a relatively drier winter for the hydroelectric production facilities. The month prior had seen Contact Energy operate all three power generation facilities on site, SP1 (June 2017, 28 days of operation) and TCC1 (June 2017, 30 days of operation per unit). For this to occur the supply of raw water was paramount. Contact Energy mitigated the issue with the use of an emergency pump and the use of a significant number of water trucks to bring water to site while the malfunction with the raw water supply pump was remedied. This also allowed the TCC1 to run unhindered, as such it remained in service for the whole of July 2017.

In terms of total surface water abstraction throughout the 2017-2018 monitoring period. The total volume of water abstracted was 1,310,125 m<sup>3</sup>. This abstraction volume was an increase of 3.4 % compared to the previous monitoring period (2016-2017), where the total abstraction volume was 1,266,571 m<sup>3</sup>. The increase in volume abstracted was attributed to the TCC1 which was in operation for a total 176 days this monitoring period. For comparison, in the previous monitoring period the TCC1 was in operation for 155 days.

Inter-laboratory comparison exercises were undertaken, with reasonably good agreement found between the Council and Contact Energy. The results of the discharge monitoring undertaken by the Council did not indicate anything adverse in the three sampling exercises undertaken this monitoring period.

In terms of discharges of process waters, the discharge flow was found to be compliant with no exceedance of the discharge flow value of >78 L/s. pH limits were compliant with requisite 6 – 9 pH. The monitoring of residual chlorine was also found compliant.

Temperature monitoring of the Patea River indicated that for 1 % of the time, the limit for the thermal increase on the receiving waters of 1.5 °C was briefly exceeded with value of 1.64 °C. However this is within consent limits as the condition allows it to be above the 1.5 °C limit for 5% of the time.

In terms of emissions to air, continuous emissions monitoring sensors are fitted to the TCC1 and for the majority of this monitoring period these sensors were in operation, though on one occasion (22 January 2018) a fault developed which resulted in an elevated NO<sub>x</sub> reading. This was remedied and the fault was communicated to the Council when it occurred and also when it was fixed.

One of the two peaker plant units (GT22) was submitted for emission testing and engine tuning during May 2018 and the results were proposed to be within compliance standards, however these results will need to be related to the consent conditions by Contact Energy as they were supplied as raw data. The second unit is programmed to undergo similar testing in the 2018-2019 period. The results of the proposed testing of GT21 and the testing of GT22 will be supplied to exhibit compliance with the consent conditions in the 2018-2019 monitoring period. Noting that the stack emissions testing undertaken in the 2016-2017 period indicated compliance with the consent derived values for emissions to the air from SP1.

Odours related to the SP1 cooling towers have been previously discussed. On the 9 January 2018 chemical dosing of a certain copper corrosion inhibitor was ceased. Since this date no detectable odour had since been observed. Though noted by Contact Energy is the requirement for a replacement chemical to be used for copper corrosion inhibition and a new chemical will be proposed in the upcoming monitoring period.



## 3.2 Environmental effects of exercise of consents

The main environmental effect associated with the exercise of consent at Contact Energy's Stratford Power Station was centred on sporadic odour complaints. The odour as previously discussed was from the cooling towers associated with SP1. As a result, a review discussion was undertaken by Contact Energy with respect to the odour generated, whereby they discussed the issue with their chemical supplier NALCO and then the supplier of the SP1 units, General Electric.

The result of such an engagements identified a certain copper corrosion inhibitor and its reaction with other constituents within the cooling tower system. This led to the cessation of the use of the inhibitor. This was communicated to Council and the date of its cessation (8 January 2018). No further odour complaints were received for the remainder of the monitoring period. Proposed for the upcoming monitoring period will be a replacement chemical to provide copper corrosion inhibition within the cooling towers. A review of the proposed chemical will be undertaken and the result of the review will be discussed with the Council.

Biological monitoring was undertaken on both the receiving waters of the Patea River and the Kahouri Stream. The Kahouri Stream receives stormwater from the site, while the Patea River receives process waters. The finding of the surveys indicated that there was no significant detrimental effect to these water bodies.

Monitoring of process waters did not indicate anything of an adverse nature.

## 3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Tables 12-30.

Table 12 Summary of performance for consent 3939-2 2017-2018 monitoring period

<b>Purpose: To discharge 464 L/s of stormwater from the Stratford Power Station into an unnamed tributary of the Kahouri Stream and into the Kahouri Stream</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
1. Effects not to be present below mixing zone	Site inspections and biological monitoring of the Kahouri Stream	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	Consent expired 1 June 2016	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 13 Summary of performance for consent 4022-2 2017-2018 monitoring period

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
1. Adopt best practicable option (BPO)	Site inspections - checking that standard operating procedures to achieve compliance with conditions are followed Proactive in dealing with sporadic odour complaints	Yes
2. Consulting over significant proposed changes	Liaison during visits and also consistent communication with Council via monthly reports, chemical changes and plant operations	Yes
3. Provision of reports on specific monitoring/investigations	Received December 2014 (next one due December 2020)	Yes
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 and also undertaken 12/13 September 2016	Yes
8. Limit on nitrogen oxides mass discharge rate	Stack testing during commissioning of plants and also undertaken 12/13 September 2016	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 available within six months of report being submitted in December 2020	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 14 Summary of performance for consent 4454-1 2017-2018 monitoring period

<b>Purpose: To discharge emissions to air from a combined cycle power station and ancillary plant</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
1. Adopt best practicable option (BPO)	Site inspections - checking that standard operating procedures to achieve compliance with conditions are followed Outlined when equipment malfunctioned and also when equipment was brought back online	Yes
2. Outline BPO measures at time of commissioning	Report provided in 1998, as required	N/A
3. Option to review BPO measures	No review sought by Council	N/A
4. Consulting over significant proposed changes	Liaison during visits. No significant changes undertaken during year	N/A
5. Provision of reports on specific monitoring/investigations	Received December 2014 (next one due December 2020)	Yes
6. Limit on ambient carbon monoxide	Not monitored beyond boundary, as continuous CO emission monitoring by Contact Energy gave low results	N/A
7. Limit on ambient nitrogen oxides	Not monitored, as emissions monitored continuously by Contact Energy, and previous ambient monitoring by Council, gave low results. Some technical issues this period with CEMS functionality. Communicated to Council when they occurred, and when resolved.	N/A
8. Limit on other emissions at boundary	Not monitored, as emissions monitoring by Contact Energy and dispersion modelling demonstrated no need	N/A
9. Limits on nitrogen oxides outside start-up or shut-down periods	Continuous monitoring by Contact Energy and monthly report to Council	Yes
10. Limit on nitrogen oxides mass discharge rate	Continuous monitoring by Contact Energy and monthly report to Council. Some technical issues with CEMS this period, however communicated to the Council at the time.	Yes
11. Stack height	Inspection by Council	Yes
12. Ecological effects	Inspection by Council and observation of vegetation	Yes
13. Visibility of cooling system plume	Inspection and observation by Council and Contact Energy	Yes
14. Cooling system drift	Inspection and observation by Council	Yes
15. Optional review of consent	Review available within 6 months of report being submitted as per condition 8. Report submitted 12 December 2014. No review required	N/A
16. Lapse of consent	Consent was exercised	N/A

<b>Purpose: To discharge emissions to air from a combined cycle power station and ancillary plant</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 15 Summary of performance for consent 4455-1 2017-2018 monitoring period

<b>Purpose: To take water up to 19,440 cubic metres/day [225L/s averaged over 10 minutes] of water on a continuous basis from the Patea River for use on power stations on East Road, Stratford</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 very low river flows	Continuous flow metering by Contact Energy and monthly report to Council	Yes
5. Optional review of consent	Next option for review in June 2022	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 16 Summary of performance for consent 4456-1 2017-2018 monitoring period

<b>Purpose: To erect, place, use and maintain an intake structure in and on the bed of the Patea River</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
1. Notification of works	Maintenance communicated when required	Yes
2. Construction and maintenance in accordance with documentation	Maintenance communicated when required, sand trap removed from wet well August 2017	Yes
3. Adopt BPO to prevent or minimise adverse effects	Communicated when removal of sand trap waste from the pump	Yes
4. Riverbed disturbance and reinstatement	Inspections	Yes

<b>Purpose: To erect, place, use and maintain an intake structure in and on the bed of the Patea River</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
5. Removal of structure when no longer required		N/A
6. Timing of works	Communicated to the Council about the proposed works. Assessed and found to be actionable outside of time period	Yes
7. Optional review provision	Next option for review in June 2022	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 17 Summary of performance for consent 4458-1 2017-2018 monitoring period

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
1. Provision of design plans	Plans received by Council and approved in 1996	Yes
2. Construction and maintenance in accordance with documentation		N/A
3. Passage of fish not to be obstructed	Not observed to be obstructing fish during period under review, assessed during surface water sample collection	Yes
4. Notification prior to and after maintenance	A fallen tree was removed during the period under review. The notification about the intended works was supplied by telephone	Yes
5. Timing of works	Works undertaken during low flows	Yes
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 2022	N/A

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 18 Summary of performance for consent 4459-1.3 2017-2018 monitoring period

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 May 2016	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 2022	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 19 Summary of performance for consent 4460-1 2017-2018 monitoring period

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 2020	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 20 Summary of performance for consent 4461-1 2017-2018 monitoring period

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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



<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 2022	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 21 Summary of performance for consent 4462-1 2017-2018 monitoring period

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 2022	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 22 Summary of performance for consent 4804-1 2017-2018 monitoring period

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 2022	N/A

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 23 Summary of performance for consent 5063-1 2017-2018 monitoring period

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
1. Installation according to plan submitted	Installation inspected by Council, new plans recently submitted August 2018	Yes
2. Prohibition on surface run-off	Inspection by Council	Yes
3. Optional review provision re environmental effects	Next option for review in June 2022	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 24 Summary of performance for consent 5633-1 2017-2018 monitoring period

<b>Purpose: To discharge fine sediment and organic matter from water intake structure tee screens to the Patea River</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 2022	N/A

<b>Purpose: To discharge fine sediment and organic matter from water intake structure tee screens to the Patea River</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 25 Summary of performance for consent 5848-1 2017-2018 monitoring period

<b>Purpose: To discharge up to 6,740 cubic metres (78 L/s 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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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	One change during monitoring period, cessation of copper corrosion inhibitor. New chemical to be reviewed and proposed in upcoming monitoring period	N/A
4. Provision of details on proposed new cleaning chemicals	No changes during monitoring period, though proposed in upcoming 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 May 2016.	Yes
7. Controls on effect of discharge in receiving water	Inspection, sampling and biological monitoring by Council	Yes
8. Passage of fish not to be obstructed	Inspection of diffuser during compliance inspections did not indicate any fish barriers. 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. On one occasion the value of 1.5°C was exceeded, though this is within consent conditions.	Yes

<b>Purpose: To discharge up to 6,740 cubic metres (78 L/s 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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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
14. Lapse of consent	Consent was exercised	N/A
15. Optional review provision re environmental effects	Next option for review in June 2022	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 26 Summary of performance for consent 7247-1 2017-2018 monitoring period

<b>Purpose: To discharge emissions into air from the operation of the cooling tower associated with the Stratford Peaker Power Plant</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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

<b>Purpose: To discharge emissions into air from the operation of the cooling tower associated with the Stratford Peaker Power Plant</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
6. Cooling system drift	Inspection and observation by Council	Yes
7. Description of water treatment regime to be provided	Description provided 10 November 2010, likely to be amended in the upcoming monitoring period	Yes
8. Consulting over significant proposed changes	Liaison during visits. No significant changes undertaken during year	Yes
9. Offensive odour prohibited	Periodic odour complaints identified non consistent odour from the cooling tower. Odour surveys also identified non consistent odour.	No Cooling tower odour mitigated in this period through cessation of copper corrosion inhibitor 9 January 2018
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 2022	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>Good</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 27 Summary of performance for consent 7248-1 2017-2018 monitoring period

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 2022	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 28 Summary of performance for consent 7250-1 2017-2018 monitoring period

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 2022	N/A

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 29 Summary of performance for 7605-1 2017-2018 monitoring period

<b>Purpose: To construct, place and maintain a stormwater outlet structure in the Kahouri Stream</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 2022	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 30 Summary of performance for consent 7653-1 2017-2018 monitoring period

<b>Purpose: To construct, place and maintain a stormwater outlet structure in the Kahouri Stream</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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



<b>Purpose: To construct, place and maintain a stormwater outlet structure in the Kahouri Stream</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
4. Area and volume of disturbance to be minimised	No maintenance during period under review	N/A
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 2022	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

### 3.4 Recommendations from the 2016-2017 Annual Report

In the 2016-2017 Annual Report, it was recommended:

1. That in the first instance, monitoring of consented activities at the Contact Energy Stratford Power Station (SPS) in the 2017-2018 year continue at the same level as in 2016-2017.
2. That should there be issues with environmental or administrative performance in the 2018-2019 monitoring period, the monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

These recommendations were implemented.

### 3.5 Alterations to monitoring programmes for 2018-2019

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

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- 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 exercising resource consents.

It is proposed that for the 2018-2019 monitoring period in relation to the Contact Energy Stratford Power Station (SPS), that the monitoring programme remain unchanged from that undertaken in the 2017-2018 monitoring period.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme

from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2018-2019.

### 3.6 Recommendations

1. That in the first instance, monitoring of consented activities at the Contact Energy Stratford Power Station (SPS) in the 2018-2019 year continue at the same level as in 2017-2018.
2. That should there be issues with environmental or administrative performance in the 2018-2019 monitoring period, the monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

## 4 Ahuroa B Gas Storage

### 4.1 Process description

#### 4.1.1 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 Figures 6-8). Ahuroa-B wellsite was established by the 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 B 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.



Figure 6 Ahuroa B site layout facing North West, May 2014

#### 4.1.2 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.

### 4.1.3 Gas injection/extraction

At the Ahuroa-B site, the gas storage project had been developed in two stages. The initial storage utilised the existing Ahuroa 2A production well (identified in Figure 7) 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 First 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 pipeline and into the compressor. The compressor raises the pressure to well and the reservoir pressure to make injection into the reservoir possible.

Extraction is a similar process to natural 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 63 cubic metre storage tank on site, before being transported by road tanker to Waihapa production station for disposal by deep-well injected. The condensate is separated and piped directly to Waihapa. No condensate is stored on site.

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



Figure 7 Ahuroa B wellsite and gas storage facilities

#### 4.1.4 Pressure monitoring

Pressure data is 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 pressure transmitters 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, or automatically, as required should there be a pressure anomaly during injection or extraction. In an extreme emergency, if none of the control valves are working, there is a subsurface safety valve on each well which will automatically close if the well is exposed to atmospheric pressures.

#### 4.1.5 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 8 below.



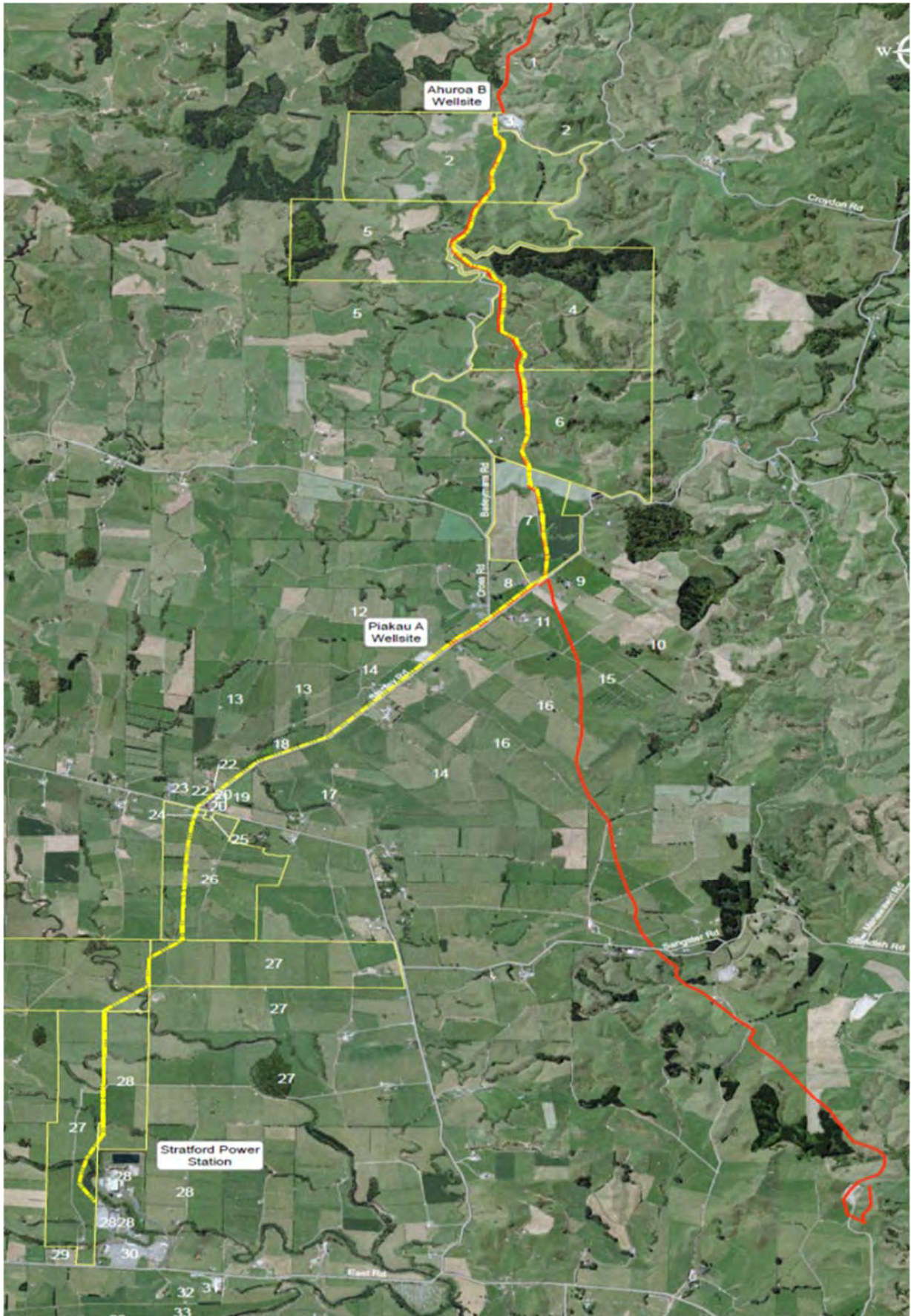


Figure 8 Pipeline route from Ahuroa B Gas storage to Stratford Power Station

## 4.2 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 the following Tables 31 and 32 respectively. A copy of each of the consents for the storage and pipeline can be found in Appendix II and Appendix III, respectively.

**Table 31 Summary of resource consents for Ahuroa B gas storage**

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	2022	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	2022	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 32 Summary of resource consents for the pipeline from AGS to SPS**

Consent number	Purpose	Next review date	Expiry date
9309-1 to 9322-1*	Install and use pipeline for conveying gaseous hydrocarbons under various streams between Ahuroa-B wellsite and SPS	2022	2028
9576-1*	Culvert to realign Makara Stream tributary	2021	2027

\*Consents not actively exercised during the 2017-2018 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. An extension to the lapse period of 7750 was granted on 16 March 2016. This enables Contact Energy to exercise the consent (i.e build the proposed culvert) at any time up until 1 June 2027.

Consents 9309 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 18 and Table 19, three of the ten held in relation to AGS were actively exercised in the 2017-2018 review period and these consents are described below. The pipeline was constructed during 2013, so although the pipeline consents have been exercised they were not actively used during the period under review.

#### 4.2.1 Water discharge permit

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.

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 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.

#### 4.2.2 Air discharge permit

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

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 wellsite, together with miscellaneous emissions. This activity was formerly provided for by air discharge permit **7518-1**, which was issued to Origin Energy Ltd by the Council to cover emissions at 11 wellsites, 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 wellsite was transferred to Contact Energy under Section 137(2) of the RMA. 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.

### 4.2.3 Discharge 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.

## 4.3 Monitoring programme

### 4.3.1 Introduction

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

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

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

### 4.3.2 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.

### 4.3.3 Site inspections

The Ahuroa-B site was visited twice during the 2017-2018 review period. Inspections focused 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.

### 4.3.4 Chemical sampling

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

Contact Energy also undertakes regular sampling of this discharge to ascertain if it is within the consented concentrations to discharge.

### 4.3.5 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 Contact Energy 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.

## 5 Results – Water

### 5.1.1 Inspections

6 November 2017

At the time of inspection the site was unmanned, so only a perimeter inspection was carried out. The water quality of the pond was visually assessed and found to be very good, with numerous aquatic species present. The state of the water quality indicated that the silt control measures were working efficiently. No flaring was occurring during the inspection. The area of the access track that had had earlier subsidence had been stabilised and there were no silt issues as a result of the works undertaken to fix the track.

2 July 2018

At the time of inspection routine monitoring and stormwater discharge sampling of the site was undertaken as per the monitoring programme. The skimmer pit discharge was very clear and did not give rise to any immediate concern. All stormwater from the site was being directed through the north-west skimmer pit for treatment prior to discharging into the adjacent unnamed tributary of the Makara Stream. The ring drains and bunds were all secure, and there was no flaring onsite during the inspection. There were a maintenance crew onsite. While no silt or other visual contaminants were noticed in and about the site.

### 5.1.2 Results of discharge monitoring

A sample of the skimmer pit discharge was collected on one occasion this monitoring period. The sample was collected from monitoring location IND0001046 (Photo 3). The results of the monitoring are provided in the following Table 20.



Photo 3 Ahuroa B site looking towards the skimmer pit (left) and the final discharge point

Table 33 Ahuroa B skimmer pit sampling 2017-2018

IND001046	Parameter	Chloride	Conductivity	Hydrocarbons	pH	Suspended solids
Site	Collected	g/m <sup>3</sup>	mS/m@20 °C	g/m <sup>3</sup>	pH	g/m <sup>3</sup>
IND001046	02 July 2018	3.5	4.4	<4	6.8	<3
	Min	3.4	3.1	<0.5	6.6	<2
	Max	15	30.9	<0.5	7.2	43
	Median	6.75	8.2	0.2	6.9	3

IND001046	Parameter	Chloride	Conductivity	Hydrocarbons	pH	Suspended solids
Site	Collected	g/m <sup>3</sup>	mS/m@20 °C	g/m <sup>3</sup>	pH	g/m <sup>3</sup>
	Mean	7.91	10.7	0.5	6.9	8
Consent limit 3681-2		50	-	15	6.5-8.5	100

The results of the skimmer pit sampling is provided in the above Table 20, note the statistics for this monitoring location since 2011 are also provided.

The sample results indicate compliance with consent 3681-2, condition 8, as defined in Table 20 for the target analytes of chloride, total petroleum hydrocarbons, pH and suspended solids.

## 5.2 Results – Air

### 5.2.1 Review of flaring data

Contact Energy monitor and record monthly flaring totals. They record this data and provide the Council with monthly updates pertaining to flaring. In the 2017-2018 monitoring period the estimated gas flared was 44,447 Sm<sup>3</sup>. The following Figure 9 details the monthly flaring totals for this monitoring period 1 July 2017-30 June 2018.

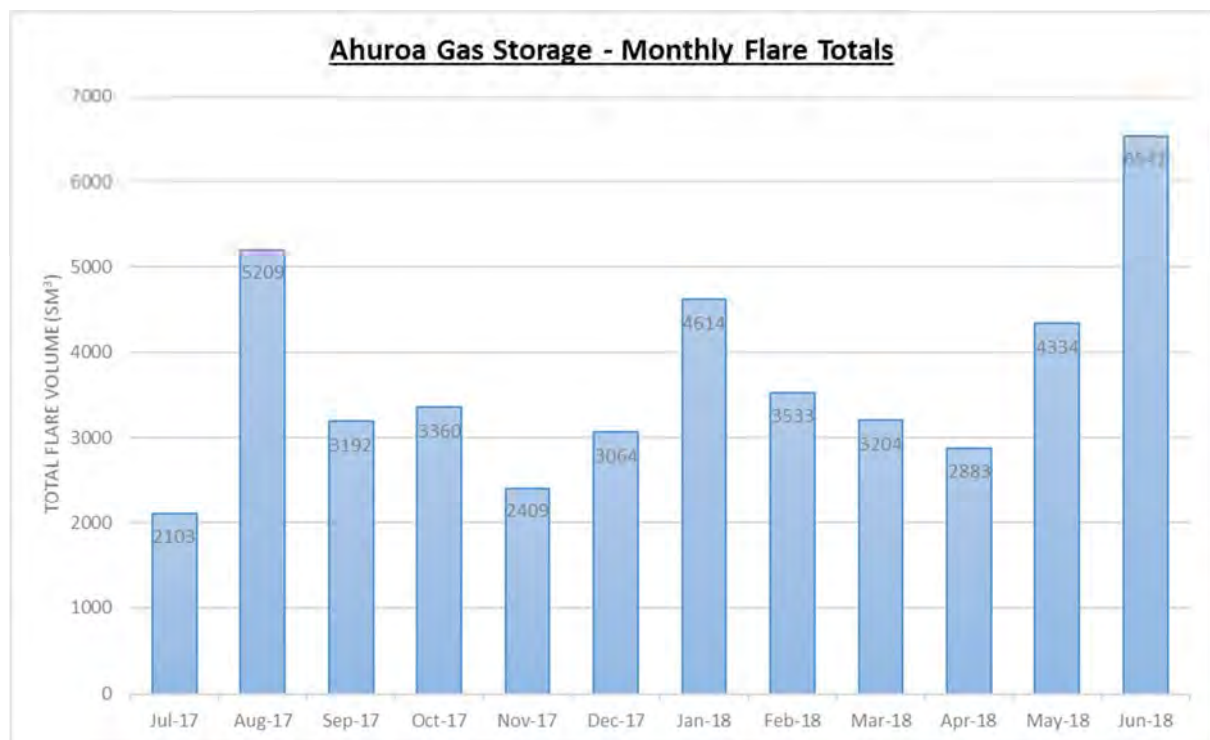


Figure 9 Ahuroa B Gas storage facility flaring volumes by month (Sm<sup>3</sup>) 2017-2018

### 5.2.2 Reservoir pressure and injection pressure data review

Consent 7432-1 stipulates a maximum reservoir pressure of 3,400 psi. 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. Figures 9 and Figure 10 show monthly maximum readings for the down-hole and injection pressure gauges, respectively.

Reservoir pressure and injection pressure monitoring data (Figure 10) show compliance with the pressure limit of 3,400 psi in condition 3 of consent 7432-1 for the majority of the monitoring period. Noted though was the increase observed in Ahuroa 3 and Ahuroa 4 which breached the value of 3,400 psi, though it returned to below consented value the following month. This was the result of an instrumentation failure which was rectified later in the monitoring period.

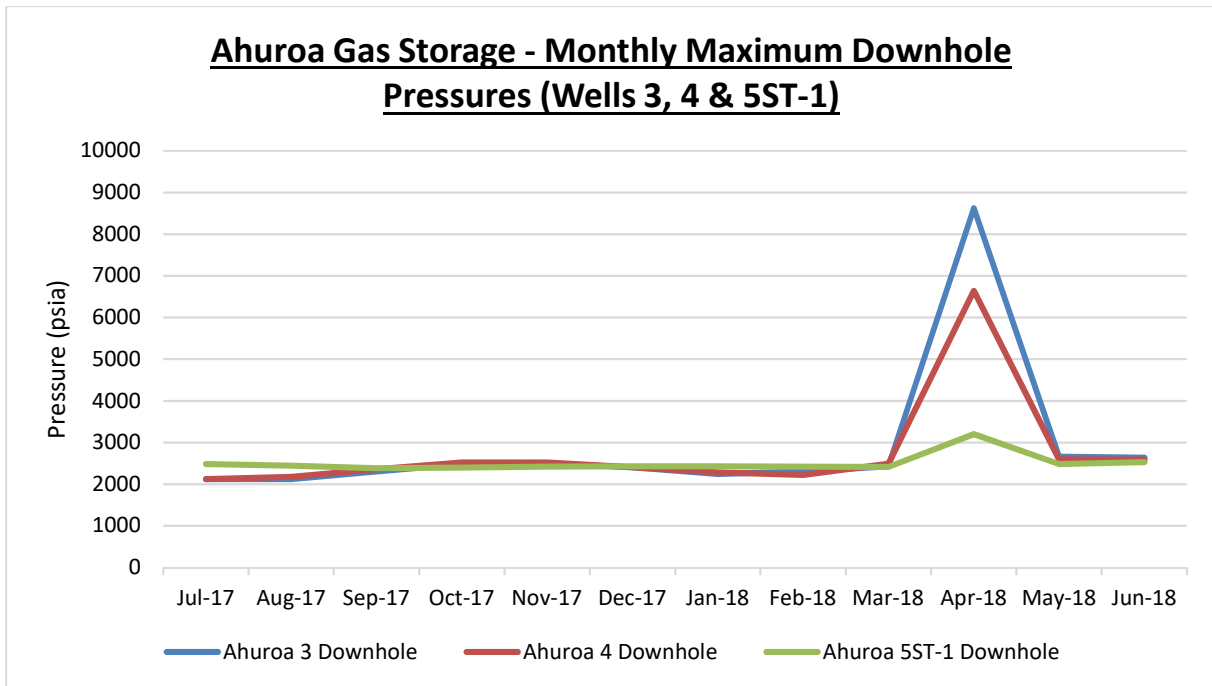


Figure 10 Monthly downhole pressure for Ahuroa B gas wells 3, 4 and 5ST-1, 2017-2018

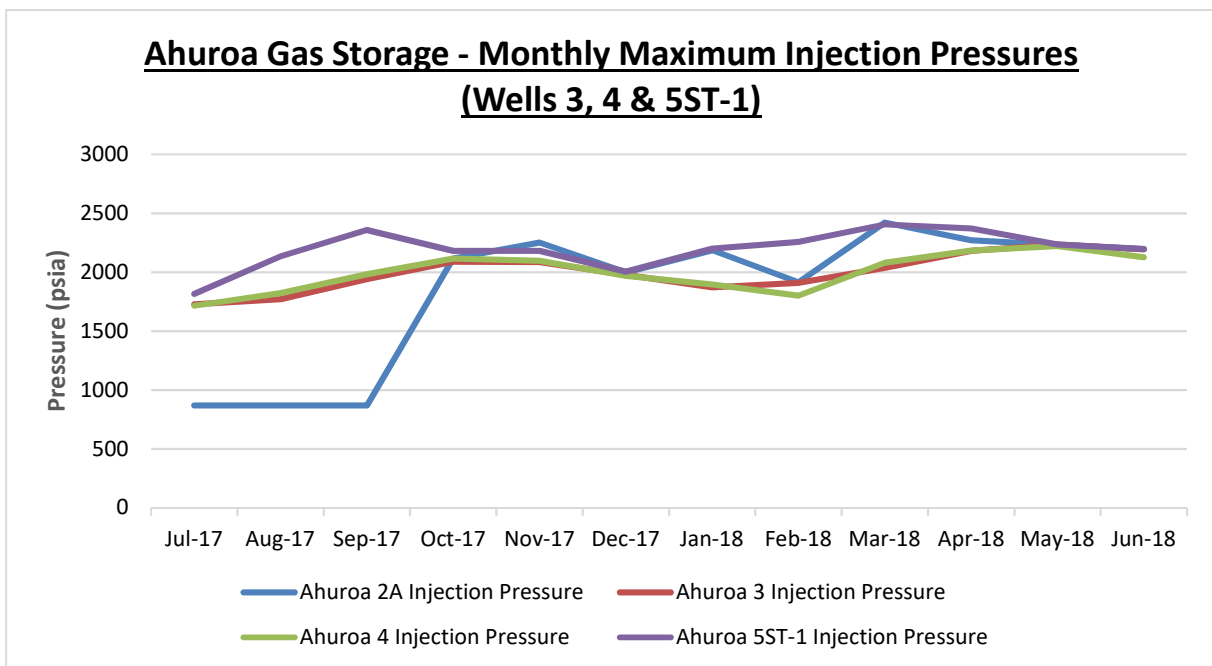


Figure 11 Monthly injection pressures for Ahuroa B gas wells 2A, 3, 4, and 5ST-1, 2017-2018

### 5.3 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.

## 5.4 Annual report by Contact Energy for Ahuroa B Gas storage

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 on 20 July 2018 as required. A summation by Contact Energy is provided below in relation to the points defined by condition 19 of consent 7746-1. The report is attached as Appendix VII.

### Energy efficiency measures:

No efficiency measures have been implemented at Ahuroa Gas Storage during the current reporting period. However Contact Energy is continuing 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 and 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 when it's 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 Energy carries out regular maintenance and checks on the equipment, including:

- Two yearly checks of the pressure equipment. The last round of maintenance inspections was undertaken in 2018.
- Annual visual inspections of vegetation to minimise fire risks
- Regular ad-hoc maintenance to ensure the flare continues to operate as per design

Annual flaring volumes since the 2014-2015, provided by Contact Energy for the AGS, is presented in the following Figure 12.

### Smoke emissions

No emissions of visible smoke were reported by the consent holder throughout the monitoring period as a result of exercising consent 7746-1.

### Technological advances relevant to discharges 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.

As mentioned in previous reports, potential exists to recover gas sent to flare and reuse 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.

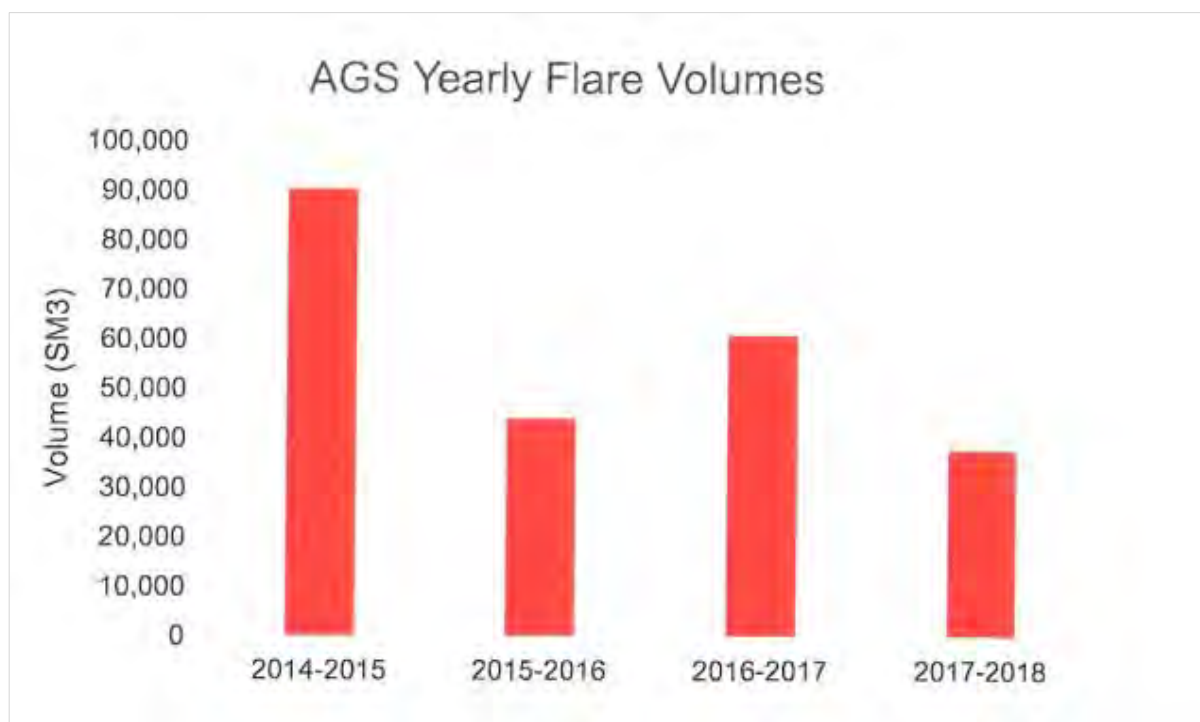


Figure 12 Annual flaring volumes for AGS over time since 2014-2015

## 5.5 Investigations, interventions, and incidents

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

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

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

In the 2017-2018 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 in relation to Ahuroa B Gas storage facility and the connecting pipeline to Stratford Power Station.



## 6 Discussion

### 6.1 Discussion of site performance

Contact Energy performed well in respect of consent compliance for the Ahuroa B Gas Storage facility in the 2017-2018 monitoring period. Inspections indicated that silt control was undertaken to a high standard with the visual check of the discharge indicating minimal suspended solids or turbidity. This was further assessed during the sampling exercise. The associated skimmer pits, ring drains and bunding were all assessed by the Council's investigating Officer and found to be secure.

Downhole pressure readings for Ahuroa 3 and Ahuroa 4 indicated a brief elevation in pressure. This was noted during a review of consent holder provided downhole pressure readings from April 2018. The rationale for a breach in the consent defined maximum downhole pressure value of 3,400 psia was due to an instrumentation failure which was later rectified by the consent holder.

In this period, the investigating officer noted that the slipped earthen material near the site entrance, which was discussed in the previous monitoring period, had been stabilised. Contact Energy staff were found to be co-operative in all interactions with the Council during this period. Noted that this is the final monitoring report with respect to Contact Energy in charge of this asset.

### 6.2 Environmental effects of exercise of consents

Minimal environmental effects were noted for the Ahuroa B Gas Storage facility in the 2017-2018 monitoring period. The singular sample of the skimmer pit indicated compliance with the consent derived values of chloride, suspended solids, pH and total petroleum hydrocarbons. The site was also observed to be well kept with secure bunding and associated ring draining. Visual inspections of the discharge location indicated the skimmer pits were functioning as planned.

### 6.3 Evaluation of performance

A tabular summary of the consent holders compliance record for the year under review is set out in the following Tables 34-37.

Table 34 Summary of performance for consent 3681-2

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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.	Most recent update May 2016	Yes

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 indicated compliance with consent condition	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		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 35 Summary of performance for consent 7432-1

<b>Purpose: To discharge contaminants (natural gas) into land for the purpose of gas storage</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
1. Consent holder to adopt best practicable option at all times	Inspections, consent holder liaison and data review	Yes
2. Gas discharged must meet defined specifications	Not assessed	N/A
3. The pressure in the reservoir must not exceed 3,400 psia	Data review indicated an increase in pressure in two wells, Ahuroa 3 and Ahuroa 4, above the requisite 3,400 psia as a result of monitoring instrumentation failure which was rectified	Yes
4. Consent holder to record injection pressure and reservoir pressure and supply to Council upon request	Data supplied and reviewed	Yes

<b>Purpose: To discharge contaminants (natural gas) into land for the purpose of gas storage</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 36 Summary of performance for consent 7746-1

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 not requested in current period	N/A
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 special condition 5 and to immediately work to re-establish separation process	No instances of non-compliance with special condition 5	N/A
7. No liquids/solids to be combusted through the flare system unless during emergency		N/A
8. Consent holder to adopt BPO to minimise effects from emissions	Company records, inspections and annual report	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

<b>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</b>		
<b>Condition requirement</b>	<b>Means of monitoring during period under review</b>	<b>Compliance achieved?</b>
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 <sup>3</sup> under ambient conditions	Not assessed	N/A
14. Consent holder to control nitrogen oxide emissions to not exceed 100 ug/m <sup>3</sup> 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 in annual report	Yes
19. The consent holder to supply an annual report during May	Report received May 2018	Yes
20. Optional review provision re environmental effects	Next option for review in June 2022	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		<b>High</b>
Overall assessment of administrative performance in respect of this consent		<b>High</b>

Table 37 Evaluation of environmental performance over time

<b>Year</b>	<b>Consent no</b>	<b>High</b>	<b>Good</b>	<b>Improvement req</b>	<b>Poor</b>
2014-2015	3681-2	1			
	7432-1	1			
	7746-1	1			
2015-2016	3681-2	1			
	7432-1	1			
	7746-1	1			
2016-2017	3681-2	1			
	7432-1	1			
	7746-1	1			

Year	Consent no	High	Good	Improvement req	Poor
Totals		9			

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

## 6.4 Recommendations from the 2016-2017 Annual Report

In the 2016-2017 Annual Report, it was recommended:

1. That in the first instance, monitoring of consented activities at Ahuroa B gas storage (AGS) facilities and for the connecting pipeline to Stratford Power Station (SPS) in the 2017-2018 year continue at the same level as in 2016-2017.
2. That should there be issues with environmental or administrative performance in the 2018-2019 monitoring period, the monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

These recommendations were implemented.

## 6.5 Alterations to monitoring programmes for 2018-2019

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

- the extent of information already made available through monitoring or other means to date;
- its relevance under the RMA;
- the Council's obligations to monitor consented activities and their effects under the RMA;
- the record of administrative and environmental performances of the consent holder; and
- 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 exercising resource consents.

It is proposed that for the 2018-2019 monitoring period in relation to AGS and the associated pipeline, that the monitoring programme remained unchanged from that undertaken in the 2017-2018 monitoring period.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2018-2019.

## 7 Recommendations

1. That in the first instance, monitoring of consented activities at Ahuroa B gas storage (AGS) facilities and for the connecting pipeline to Stratford Power Station (SPS) in the 2018-2019 year continue at the same level as in 2017-2018.
2. That should there be issues with environmental or administrative performance in the 2018-2019 monitoring period, the monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

## Glossary of common terms and abbreviations

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

Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
Bund	A wall around a tank to contain its contents in the case of a leak.
CBOD	Carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m.
Cu*	Copper.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m <sup>3</sup> s <sup>-1</sup> ).
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
Fresh	Elevated flow in a stream, such as after heavy rainfall.
g/m <sup>2</sup> /day	grams/metre <sup>2</sup> /day.
g/m <sup>3</sup>	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident register	The 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.
L/s	Litres per second.
m <sup>2</sup>	Square Metres.
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 <sub>4</sub>	Ammonium, normally expressed in terms of the mass of nitrogen (N).

NH <sub>3</sub>	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
NO <sub>3</sub>	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
Pb*	Lead.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
PM <sub>10</sub> , PM <sub>2.5</sub> , PM <sub>1.0</sub>	Relatively fine airborne particles (less than 10 or 2.5 or 1.0 micrometre diameter, respectively).
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	<i>Resource Management Act 1991</i> and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
UI	Unauthorised Incident.
Zn*	Zinc.

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

For further information on analytical methods, contact a Science Services Manager.



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# Appendix I

## Resource consents held by Contact Energy Ltd

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

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

**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

## Consent 4022-2

### 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  $10 \text{ mg m}^{-3}$  [eight-hour average exposure], or  $30 \text{ mg m}^{-3}$  [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  $20 \text{ ug m}^{-3}$  [twenty-four-hour average exposure], or  $60 \text{ ug m}^{-3}$  [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  $175 \text{ g s}^{-1}$ , or
  - b) *[cancelled]*
  - c) a concentration in any gas turbine stack equivalent to  $100 \text{ mg m}^{-3}$  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

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**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/m<sup>3</sup> [eight-hour average exposure], or 30 mg/m<sup>3</sup> [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/m<sup>3</sup> [twenty-four hour average exposure], or 95 µg/m<sup>3</sup> [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/m<sup>3</sup> 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

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**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

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**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



## Consent 4456-1

### 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

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.
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

Consent 4456-1

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

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**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

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**Director-Resource Management**



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

Name of  
Consent Holder: Contact Energy Limited  
PO Box 10742  
Wellington 6143

Decision Date  
(Change): 8 July 2016

Commencement Date  
(Change): 8 July 2016 (Granted Date: 25 May 1994)

**Conditions of Consent**

Consent Granted: To discharge stormwater from the operation of a power station site into the Kahouri Stream

Expiry Date: 1 June 2028

Review Date(s): June 2022 and in accordance with special condition 10

Site Location: Stratford Power Station, 167 East Road, Stratford

Grid Reference (NZTM) 1713640E-5645680N & 1713757E-5645561N

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 with section 36 of the Resource Management Act 1991.

### Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The stormwater discharged shall be from an area not exceeding 7.5 ha outlined in Appendix 1 (attached).
3. All stormwater shall be directed for treatment through the stormwater treatment system for discharge in accordance with the special conditions of this permit.
4. Constituents of the discharge shall meet the standards shown in the following table.

<u>Constituent</u>	<u>Standard</u>
pH	Within the range 6.0 to 9.0
suspended solids	Concentration not greater than 100 gm <sup>-3</sup>
oil and grease	Concentration not greater than 15 gm <sup>-3</sup>

This condition shall apply before entry of the treated stormwater into the receiving waters at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

5. The consent holder will notify the Taranaki Regional Council as soon as practicable if a direct discharge of stormwater from the SP1 pond to the Kahouri Stream is required or has been undertaken. The volume and duration of the discharge will be recorded and this information made available to the Council upon request.
6. After allowing for reasonable mixing, within a mixing zone extending 5 metres downstream of the discharge point, the discharge shall not, either by itself or in combination with other discharges, give rise to any or all of the following effects in the receiving water:
  - a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - b) any conspicuous change in the colour or visual clarity;
  - c) any emission of objectionable odour;
  - d) the rendering of fresh water unsuitable for consumption by farm animals;
  - e) any significant adverse effects on aquatic life.
7. The consent holder shall maintain and regularly update a 'Contingency Plan' that details measures and procedures that will be undertaken to prevent, and to avoid environmental effects from, a spillage or any discharge of contaminants not authorised by this consent. The plan shall be approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity.

## Consent 4459-1.3

8. The site shall be operated in accordance with a 'Management Plan' prepared by the consent holder and approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The plan shall detail how the site is to be managed to minimise the contaminants that become entrained in the stormwater and shall include as minimum:
- a) the loading and unloading of materials;
  - b) maintenance of conveyance systems;
  - c) general housekeeping; and
  - d) management of the treatment system.

*Note: A Stormwater Management Plan template is available in the Environment section of the Taranaki Regional Council's web site [www.trc.govt.nz](http://www.trc.govt.nz).*

9. The consent holder shall notify the Chief Executive, Taranaki Regional Council, prior to making any changes to the processes or operations undertaken at the site, or the chemicals used or stored on site that could alter the nature of the discharge. Any such change shall then only occur following receipt of any necessary approval under the Resource Management Act 1991. Notification shall include the consent number, a brief description of the activity consented and an assessment of the environmental effects of any changes, and be emailed to [consents@trc.govt.nz](mailto:consents@trc.govt.nz).
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:
- a) during the month of June 2022 and/or
  - b) within 3 months of receiving a notification under special condition 9 above;

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 8 July 2016

For and on behalf of  
Taranaki Regional Council

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A D McLay  
**Director - Resource Management**

Appendix 1



Stormwater catchment

**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

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**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

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**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

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**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

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**Director-Resource Management**



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

Name of  
Consent Holder: 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

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**Director-Resource Management**

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

Name of  
Consent Holder: 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

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**Director-Resource Management**

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

Name of  
Consent Holder: Contact Energy Limited  
PO Box 10742  
Wellington 6143

Decision Date  
(Change): 19 January 2017

Commencement Date  
(Change): 19 January 2017 (Granted Date: 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

Expiry Date: 1 June 2034

Review Date(s): June 2022, June 2028

Site Location: Stratford Power Station Site, SH 43, East Road, Stratford

Grid Reference (NZTM) 1713810E-5645800N

*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 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.

## Consent 5846-1.3

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/m<sup>3</sup> (eight-hour average exposure), or 30 mg/m<sup>3</sup> (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/m<sup>3</sup> (annual average exposure) or 200 ug/m<sup>3</sup> (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).

### Consent 5846-1.3

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/m<sup>3</sup> 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<sub>x</sub> 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 2024 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 5846-1.3

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 19 January 2017

For and on behalf of  
Taranaki Regional Council

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A D McLay  
**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  
PO Box 10742  
Wellington 6143

Decision Date  
(Change): 19 January 2017

Commencement Date  
(Change): 19 January 2017 (Granted Date: 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

Expiry Date: 1 June 2034

Review Date(s): June 2022, June 2028

Site Location: Skinner Road, Stratford

Grid Reference (NZTM) 1715933E-5644667N

Catchment: Patea

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

## Consent 5847-1.3

### 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 (1715933E-5644667N).

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 5847-1.3

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 2024 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 19 January 2017

For and on behalf of  
Taranaki Regional Council

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A D McLay  
**Director - Resource Management**





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

Name of  
Consent Holder: 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:

<b>Component</b>	<b>Concentration</b>
pH [range]	6.0 – 9.0
Total Residual Chlorine	0.05 gm <sup>-3</sup>

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

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**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  
PO Box 10742  
Wellington 6143

Decision Date  
(Change): 19 January 2017

Commencement Date  
(Change): 19 January 2017 (Granted Date: 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

Expiry Date: 1 June 2034

Review Date(s): June 2022, June 2028

Site Location: Stratford Power Station Site, SH 43, East Road, Stratford

Grid Reference (NZTM) 1713596E-5645713N  
1713810E-5645800N

Catchment: Patea

Tributary: Kahouri

*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 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 2024 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 5849-1.3

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 19 January 2017

For and on behalf of  
Taranaki Regional Council

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A D McLay  
**Director - Resource Management**



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

Name of  
Consent Holder: 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

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**Director-Resource Management**



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

Name of  
Consent Holder: Contact Energy Limited  
PO Box 10742  
Wellington 6143

Decision Date  
(Change): 19 January 2017

Commencement Date  
(Change): 19 January 2017 (Granted Date: 7 December 2001)

**Conditions of Consent**

Consent Granted: To discharge fine sediment and organic matter from water intake structure screens to the Patea River

Expiry Date: 1 June 2034

Review Date(s): June 2022, June 2028

Site Location: Skinner Road, Stratford

Grid Reference (NZTM) 1715933E-5644667N

Catchment: Patea

*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 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. This consent shall lapse on 6 December 2024 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 5851-1.3

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 19 January 2017

For and on behalf of  
Taranaki Regional Council

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A D McLay  
**Director - Resource Management**



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

Name of  
Consent Holder: Contact Energy Limited  
PO Box 10742  
Wellington 6143

Decision Date  
(Change): 19 January 2017

Commencement Date  
(Change): 19 January 2017 (Granted Date: 6 December 2001)

**Conditions of Consent**

Consent Granted: To erect, place, use and maintain a bridge, cables including high voltage electricity cables and associated utilities at or about (NZTM)1713770E-5645532N over 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 2022, June 2028

Site Location: Stratford Power Station Site, SH 43, East Road, Stratford

Grid Reference (NZTM) 1713770E-5645532N  
1713810E-5645800N

Catchment: Patea

Tributary: Kahouri

*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 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.
- 7. This consent shall lapse on 6 December 2024 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 5852-1.4

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 19 January 2017

For and on behalf of  
Taranaki Regional Council

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A D McLay  
**Director - Resource Management**



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

Name of  
Consent Holder: 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](mailto: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

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**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 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](mailto: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

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**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



## Consent 7250-1

### 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

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](mailto: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

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**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

Change To                    15 June 2010    [Granted: 23 February 2010]  
Conditions Date:

**Conditions of Consent**

Consent Granted:        To construct, place and maintain a stormwater outlet  
  structure in the Kahouri Stream at or about (NZTM)  
  1713704E-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-3609. 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](mailto: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 15 June 2010

For and on behalf of  
Taranaki Regional Council

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**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](mailto: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

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**Director-Resource Management**



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

Name of  
Consent Holder: Contact Energy Limited  
PO Box 10742  
Wellington 6143

Decision Date  
(Change): 19 January 2017

Commencement Date  
(Change): 19 January 2017 (Granted 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 2022

Site Location: Stratford Power Station Site, SH 43, East Road, Stratford

Grid Reference (NZTM) 1713959E-5646039N  
1713635E-5645679N

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 with section 36 of the Resource Management Act 1991.

### 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](mailto: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 7785-1.1

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 2024, 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 19 January 2017

For and on behalf of  
Taranaki Regional Council

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A D McLay  
**Director - Resource Management**



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

Name of  
Consent Holder: Contact Energy Limited  
PO Box 10742  
Wellington 6143

Decision Date  
(Change): 19 January 2017

Commencement Date  
(Change): 19 January 2017 (Granted 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

Expiry Date: 1 June 2028

Review Date(s): June 2022

Site Location: Stratford Power Station Site, SH 43, East Road, Stratford

Grid Reference (NZTM) 1713810E-5645800N

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



### General condition

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

### Special conditions

1. The 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](mailto: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/ m<sup>3</sup> [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 7786-1.1

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 2024, 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 19 January 2017

For and on behalf of  
Taranaki Regional Council

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A D McLay  
**Director - Resource Management**



## Appendix II

Resource consents held by Contact Energy Ltd for  
Ahuroa Gas Storage

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	2022	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	2022	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

**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 m<sup>2</sup>.
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:

<b>Component</b>	<b>Concentration</b>
pH (range)	6.5 - 8.5
suspended solids	100 gm <sup>-3</sup>
total recoverable hydrocarbons [infrared spectroscopic technique]	15 gm <sup>-3</sup>
chloride	50 gm <sup>-3</sup>

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<sup>-3</sup>.
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

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**Director-Resource Management**





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

Name of  
Consent Holder: 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 m<sup>3</sup> 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<sup>-1</sup>.
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<sup>-3</sup>.
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<sup>-1</sup>; total dissolved salts, 2500 gm<sup>-3</sup>; sodium 460 gm<sup>-3</sup>; and chloride 700 gm<sup>-3</sup>.
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

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**Director-Resource Management**

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

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

Decision Date               7 April 2011  
[Change]:

Commencement              7 April 2011     [Granted: 2 December 2008]  
Date [Change]:

**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

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**Director-Resource Management**





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

Name of  
Consent Holder: 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](mailto: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

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**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](mailto: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

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**Director-Resource Management**





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

Name of  
Consent Holder: 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](mailto: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 [ $\text{mg}/\text{m}^3$ ] [eight-hour average exposure], or 30  $\text{mg}/\text{m}^3$  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<sup>th</sup> 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 C<sub>6</sub> 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

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**Director-Resource Management**

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

Name of  
Consent Holder: 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](mailto: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 [ $\text{mg}/\text{m}^3$ ] [eight-hour average exposure], or 30  $\text{mg}/\text{m}^3$  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 1/30<sup>th</sup> 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 C<sub>6</sub> 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

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**Director-Resource Management**



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

Name of  
Consent Holder: 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](mailto: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

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**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](mailto: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

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**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  
PO Box 78  
Stratford 4352

Decision Date 16 March 2016  
(Change):

Commencement Date 16 March 2016 (Granted Date: 18 January 2011)  
(Change):

**Conditions of Consent**

Consent Granted: To place and use a culvert in an unnamed tributary of the Makara Stream for access purposes

Expiry Date: 1 June 2027

Review Date(s): June 2021

Site Location: Ahuroa-B wellsite, 1278 Croydon Road, Stratford

Grid Reference (NZTM) 1715558E-5652753N

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 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](mailto: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

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A D McLay  
**Director - Resource Management**



## Appendix III

Resource consents held by Contact Energy Ltd for  
AGS to SPS pipeline



Consent number	Purpose	Next review date	Expiry date
9309-1 to 9322-1*	Install and use pipeline for conveying gaseous hydrocarbons under various streams between Ahuroa-B wellsite and SPS	2022	2028
9576-1*	Culvert to realign Makara Stream tributary	2021	2027

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](mailto: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

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**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](mailto: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

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**Director-Resource Management**

## Appendix IV

### Biomonitoring Reports



**To** Nathan Crook, Job Manager  
**From** Darin Sutherland, Environmental Scientist  
**Document** 2040799  
**Report No** DS086  
**Date** 23 April 2018

## 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, October 2017

### Introduction

Biomonitoring forms a component of the consents compliance monitoring programme implemented by the Taranaki Regional Council 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 2017-2018 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, 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 1.9 km downstream of the discharge. 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), 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 30 October 2017 in conjunction with 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 from five riffle sites in the Patea River. These sites were located as listed in Table 1 and illustrated in Figure 1 and Figure 2.

Table 1 Location of sampling sites in the Patea River

Site No	Site code	Grid reference	Location	Altitude (m asl)
1	PAT000356	E1714497 N5645112	U/s of TCC1 cooling wastes discharge	250
2	PAT000357	E1714662 N5645076	100 m d/s of TCC1 cooling wastes discharge	250
3	PAT000360	E1715919 N5644681	Skinner Road	240
4	PAT000397	E1718991 N5643531	Hungers Road	200
5	PAT000430	E1723952 N5641068	Raupuha Road	160

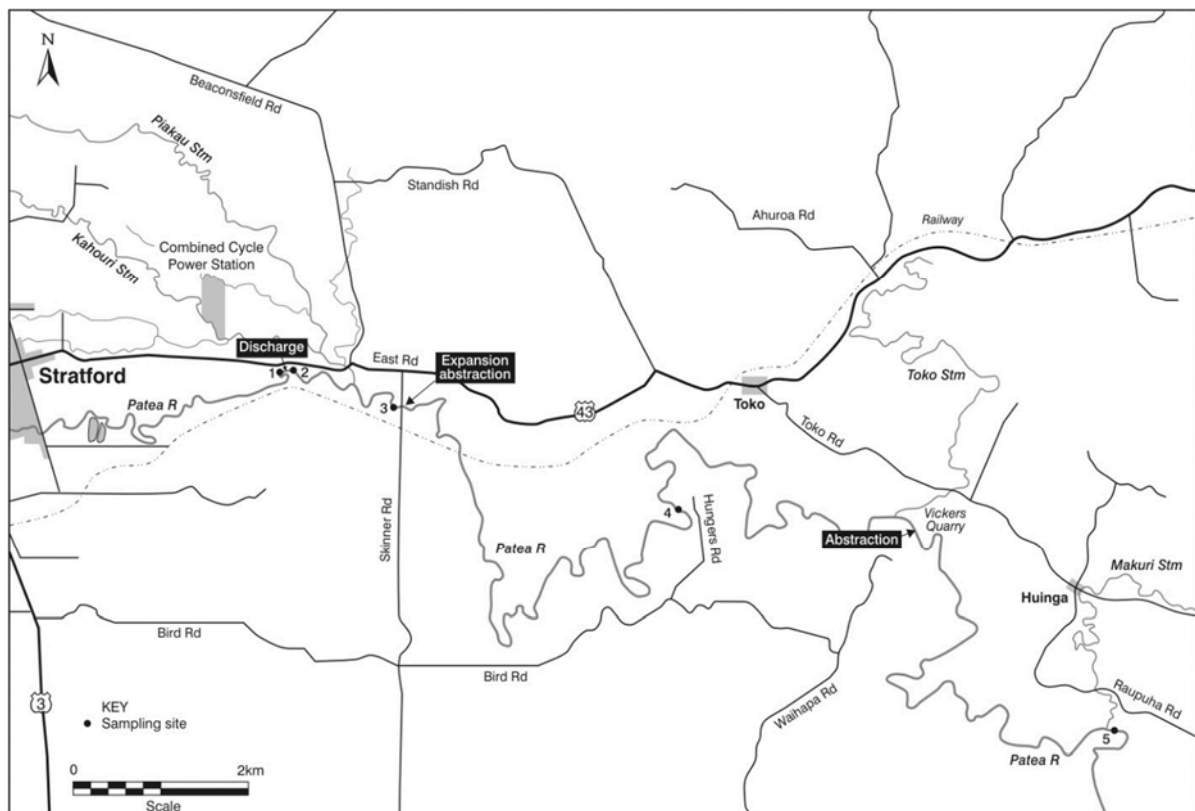


Figure 1 Location of biomonitoring sites in the Patea River in relation to the combined cycle power station, Stratford

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 stereomicroscopic sorting and identification according to documented Taranaki Regional Council methodology and macroinvertebrate taxa abundances scored based on the categories in Table 2.

Table 2 Macroinvertebrate abundance categories

Abundance category	Number of individuals
R (rare)	1-4
C (common)	5-19
A (abundant)	20-99
VA (very abundant)	100-499
XA (extremely abundant)	500+

Table 3 Macroinvertebrate health based on MCI ranges which has been adapted for Taranaki streams and rivers (TRC, 2015) from Stark's classification (Stark, 1985, Boothroyd and Stark, 2000, and Stark and Maxted, 2007)

TRC Grading	MCI	SQMCI <sub>s</sub>
Excellent	> 140	>7.00
Very Good	120-140	6.00-7.00
Good	100-119	5.00-5.99
Fair	80-99	4.00-4.99
Poor	60-79	3.00-3.99
Very Poor	<60	<3.00

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams. Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1. Sensitivity scores for certain taxa have been modified in accordance with Taranaki experience. By averaging the scores obtained from a list of taxa collected from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. A gradation of biological water quality conditions based upon MCI ranges which has been adapted for Taranaki streams and rivers (TRC, 2013) from Stark's classification (Stark, 1985 and Boothroyd and Stark, 2000) (Table 3). More 'sensitive' communities inhabit less polluted waterways. A difference of 11 units or more in MCI values is considered significantly different (Stark 1998).

A semi-quantitative MCI value, SQMCI<sub>s</sub> (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

### Site habitat characteristics and hydrology

This spring survey was performed under moderately low flow conditions (approximately three quarters median flow), 19 days after a fresh in excess of 3 times median flow and 21 days after a fresh in excess of 7 times median flow in the Patea River (flow gauging site at the Patea River at Skinner Road). The survey followed a very wet winter and early spring period but during the last month was drier with three significant freshes recorded over the preceding month.

The water temperatures during the survey were in the range 14.4-20.3 °C. The water was uncoloured and clear for sites 1, 2 and 3 and brown and cloudy for sites 4 and 5. The substrate at all five sites comprised gravel/cobble and boulder.

Site 1 had patchy mats and filamentous algae, site 2 had widespread mats and filamentous algae, site 3 had widespread mats and patchy filamentous algae and sites 4 and 5 both had patchy mats and filamentous algae. Sites 3 and 5 had patchy moss and leaves while site 4 had patchy moss.

### 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 the Cawthron Institute are not included in this summary but are presented and discussed in TRC report CF251).

**Table 4** Summary of macroinvertebrate taxa numbers and MCI values for previous surveys performed between January 1992 and March 2017 and the current survey

Site No.	N	No of taxa			MCI value			SQMCI's value		
		Median	Range	Current survey	Median	Range	Current survey	Median	Range	Current survey
1	45	23	17-31	15	99	82-116	113	4.1	2.3-7.2	6.5
2	38	22	14-33	18	99	86-111	111	4.0	2.0-6.8	5.0
3	46	24	15-33	18	98	86-105	112	4.0	1.9-7.3	4.6
4	31	22	16-30	15	95	82-106	108	4.8	3.1-6.4	7.2
5	31	21	15-26	15	94	82-103	96	4.2	3.1-7.1	7.0

The macroinvertebrate fauna results from the present survey are presented in Table 5, and previous survey and current survey results are shown in figure 3.

Table 5 Macroinvertebrate fauna of the Patea River in relation to Stratford Power Ltd sampled on 30 October 2017

Taxa List	Site Number	MCI score	1	2	3	4	5	
	Site Code		PAT000356	PAT000357	PAT000360	PAT000397	PAT000430	
	Sample Number		FWB17363	FWB17364	FWB17365	FWB17366	FWB17367	
ANNELIDA (WORMS)	Oligochaeta	1	-	R	R	-	C	
	Lumbricidae	5	-	-	-	-	C	
MOLLUSCA	<i>Potamopyrgus</i>	4	R	-	-	C	R	
EPHEMEROPTERA (MAYFLIES)	<i>Austroclima</i>	7	-	R	R	R	C	
	<i>Coloburiscus</i>	7	A	A	A	C	R	
	<i>Deleatidium</i>	8	VA	VA	VA	XA	VA	
	<i>Nesameletus</i>	9	C	R	R	-	-	
	<i>Zephlebia group</i>	7	-	R	-	-	-	
PLECOPTERA (STONEFLIES)	<i>Acroperla</i>	5	R	-	-	-	-	
	<i>Zelandobius</i>	5	-	-	R	C	C	
	<i>Zelandoperla</i>	8	R	R	-	-	-	
COLEOPTERA (BEETLES)	Elmidae	6	-	R	C	A	C	
	Hydraenidae	8	R	R	R	R	-	
MEGALOPTERA (DOBSONFLIES)	<i>Archichauliodes</i>	7	R	R	R	C	-	
TRICHOPTERA (CADDISFLIES)	<i>Hydropsyche (Aoteapsyche)</i>	4	R	R	C	A	C	
	<i>Costachorema</i>	7	R	R	R	R	-	
	<i>Hydrobiosis</i>	5	-	-	R	-	R	
	<i>Olinga</i>	9	-	-	R	-	-	
	<i>Pycnocentria</i>	7	-	-	-	-	R	
	<i>Pycnocentroides</i>	5	R	R	C	VA	C	
DIPTERA (TRUE FLIES)	<i>Aphrophila</i>	5	C	C	A	C	-	
	<i>Maoridiamesa</i>	3	A	A	VA	C	R	
	Orthoclaadiinae	2	A	VA	VA	C	R	
	<i>Polypedilum</i>	3	-	R	-	-	-	
	<i>Austrosimulium</i>	3	R	R	R	-	R	
	Tabanidae	3	-	-	-	R	-	
No of taxa			15	18	18	15	15	
MCI			113	111	112	108	96	
SQMCIs			6.5	5.0	4.6	7.2	7.0	
EPT (taxa)			8	9	10	7	8	
%EPT (taxa)			53	50	56	47	53	
'Tolerant' taxa		'Moderately sensitive' taxa		'Highly sensitive' taxa				
R = Rare		C = Common		A = Abundant		VA = Very Abundant		XA = Extremely Abundant



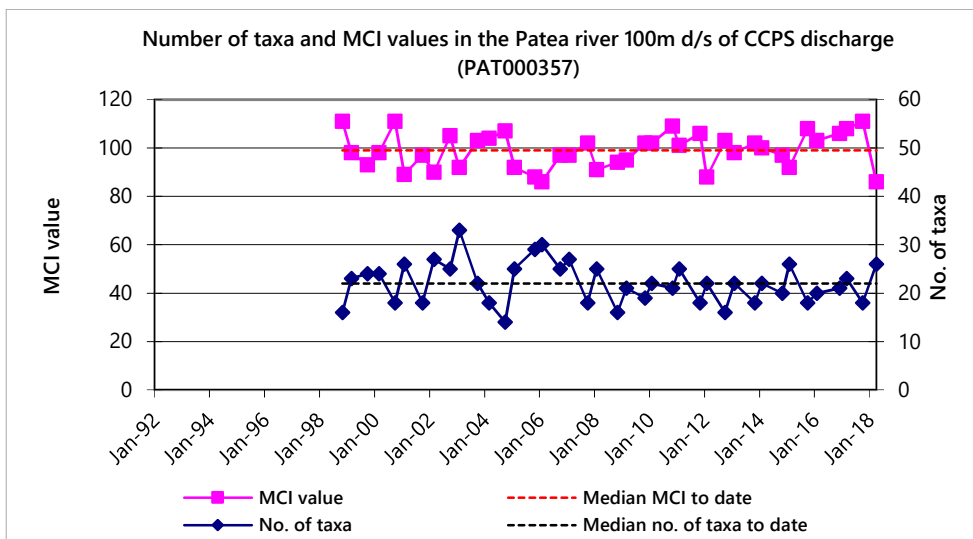
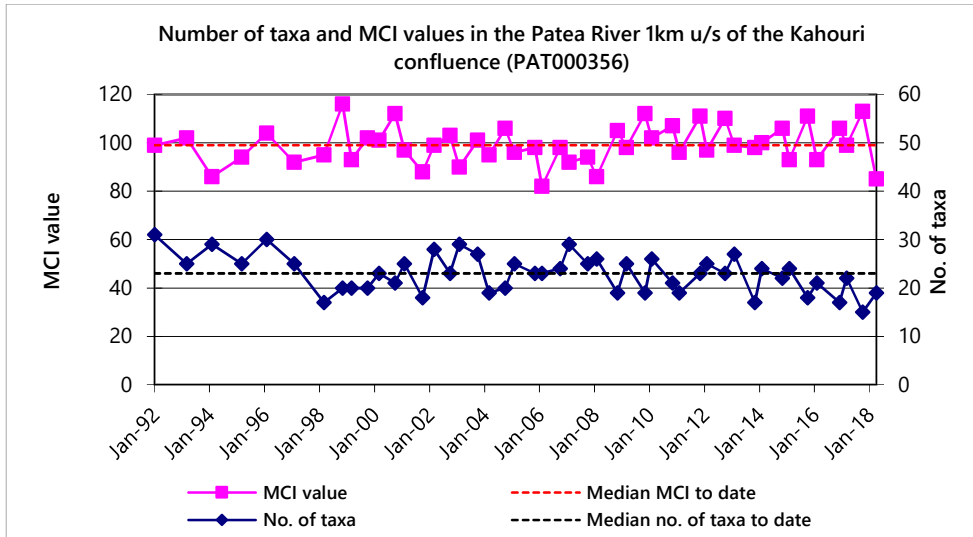
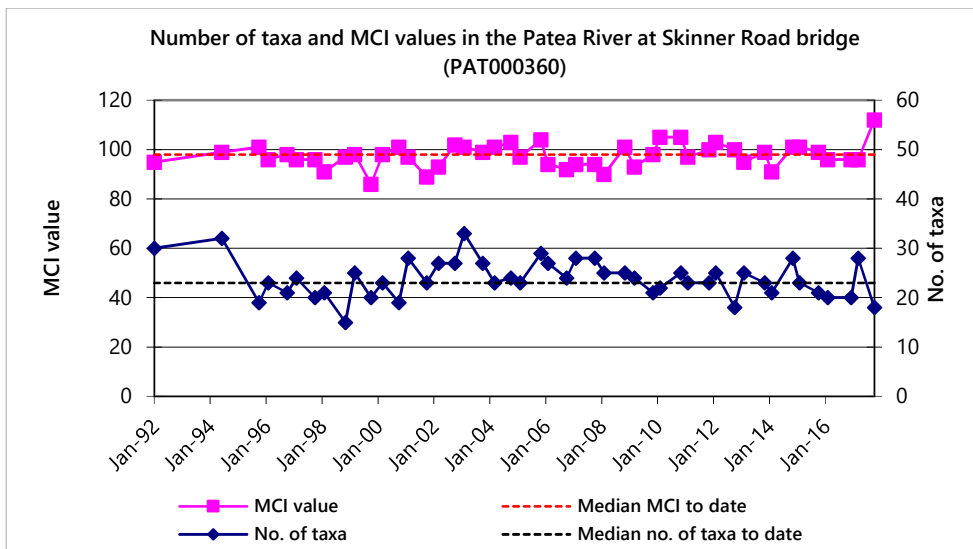


Figure 2 Taxa richness and MCI scores recorded to date at sites in the vicinity of the outfall



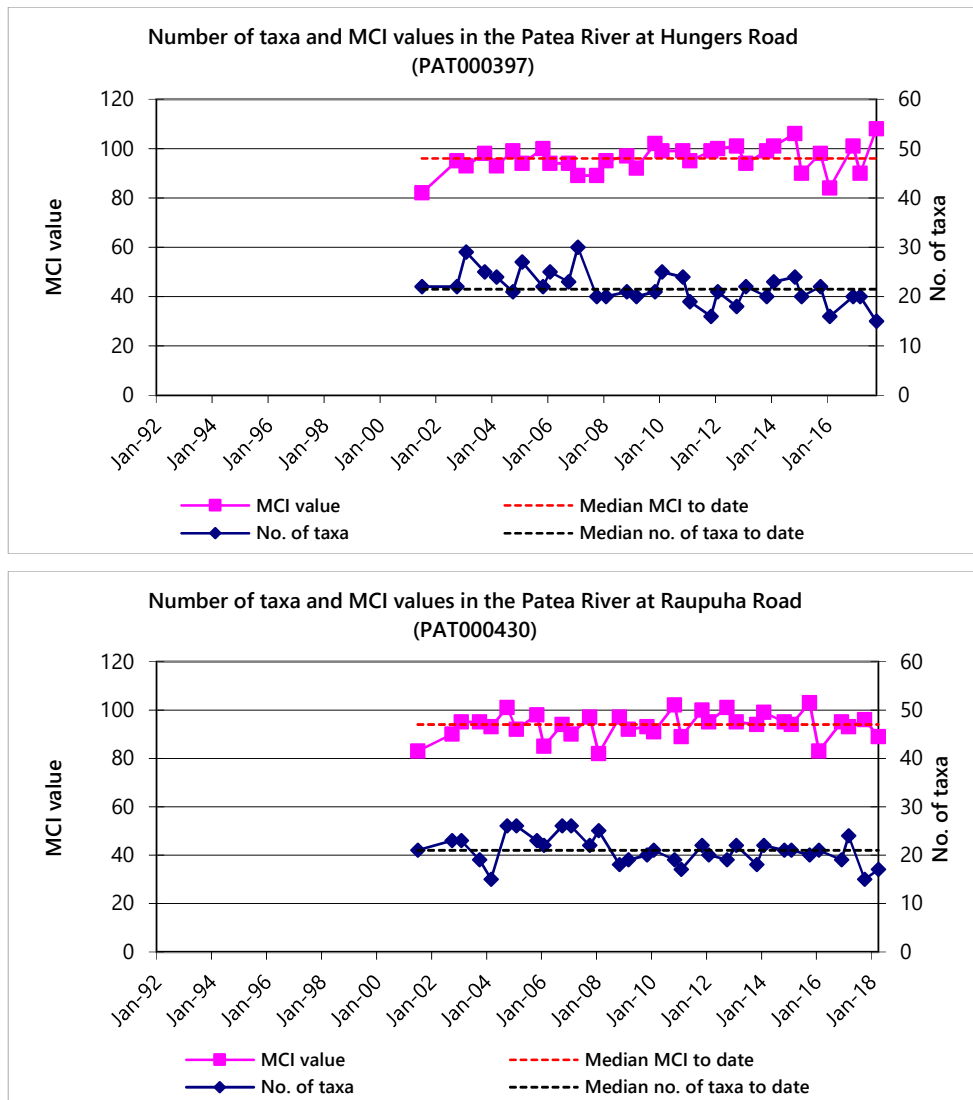


Figure 3 Taxa richness and MCI scores recorded to date at the reach between Skinner Road and Raupuha Road

### Site 1 (upstream of discharge at East Road)

A moderately low macroinvertebrate community richness of 15 taxa was found at site 1 ('control' site) at the time of the survey (Table 4). This was seven taxa less than the previous survey on March 2017 (22 taxa) and eight taxa less than the historic median (23 taxa).

The MCI score of 113 units indicated a community of 'good' biological health which was significantly higher (Stark, 1998) than the historic median MCI score of 99 units and the preceding survey (99 units).

The SQMCI<sub>s</sub> score of 6.5 units was significantly higher than the median SQMCI<sub>s</sub> score of 4.1 units (Table 4) but not significantly different to the preceding survey (6.2 units).

The community was dominated by two 'tolerant' taxa [midges (*Maoridiamesa* and *Orthocladiinae*)], one 'moderately sensitively' taxon [mayfly (*Coloburiscus*)] and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 5).

## Site 2 (100m d/s discharge East Road)

A moderate macroinvertebrate community richness of 18 taxa was found at site 2 ('primary impact' site) (Table 4). This was five taxa less than the previous survey (23 taxa) and four taxa less than the historic median (22 taxa).

The MCI score of 111 units indicated a community of 'good' biological health which was significantly higher (Stark, 1998) than the median MCI score of 99 units. The MCI score was not significantly different to the preceding survey (108 units).

The SQMCI<sub>s</sub> score of 5.0 units was significantly higher than the median SQMCI<sub>s</sub> score of 4.0 units (Table 4) but not significantly different to the preceding survey (4.8 units).

The community was dominated by two 'tolerant' taxa [midges (*Maoridiamesa* and Orthoclaadiinae)], one 'moderately sensitively' taxon [mayfly (*Coloburiscus*)] and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 5).

## Site 3 (Skinner Road)

A moderate macroinvertebrate community richness of 18 taxa was found at site 3 at the time of the survey (Table 4). This was ten taxa less than the previous survey (28 taxa) and six taxa less than the historic median (24 taxa).

The MCI score of 112 units indicated a community of 'good' biological health which was significantly higher (Stark, 1998) than the median MCI score of 98 units and the preceding survey (96 units).

The SQMCI<sub>s</sub> score of 7.2 units was significantly higher than the median SQMCI<sub>s</sub> score of 4.0 units (Table 4) and the preceding survey (4.2 units).

The community was dominated by two 'tolerant' taxa [midges (*Maoridiamesa* and Orthoclaadiinae)], two 'moderately sensitively' taxa [mayfly (*Coloburiscus*) and crane fly (*Aphrophila*)] and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 5).

## Site 4 (Hungers Road)

A moderately low macroinvertebrate community richness of 15 taxa was found at site 4 (Table 4). This was five taxa less than the previous survey (20 taxa) and seven taxa less than the historic median (22 taxa).

The MCI score of 108 units indicated a community of 'good' biological health which was significantly higher (Stark, 1998) than the median MCI score of 95 units and the preceding survey (90 units).

The SQMCI<sub>s</sub> score of 7.2 units was significantly higher than the median SQMCI<sub>s</sub> score of 4.8 units (Table 4) and the preceding survey (5.3 units).

The community was dominated by one 'tolerant' taxon [caddisfly (*Hydropsyche* – *Aoteapsyche*)], two 'moderately sensitive' taxa [caddisfly (*Pycnocentroides*) and beetles (Elmidae)], and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 5).

## Site 5 (Raupuha Road)

A moderately low macroinvertebrate community richness of 15 taxa was found at site 5 at the time of the survey (Table 4). This was nine taxa lower than the previous survey (24 taxa) and six taxa lower than the historic median (21 taxa).

The MCI score of 96 units indicated a community of 'fair' biological health which was not significantly different (Stark, 1998) to the median MCI score of 94 units and to the preceding survey (93 units).

The SQMCI<sub>s</sub> score of 5.3 units was not significantly higher than the median SQMCI<sub>s</sub> score of 4.8 units (Table 4) but was significantly lower than the preceding survey (6.3 units).

The community was dominated by one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 5).

## Discussion and conclusions

The two sites immediately up and downstream of the discharge (sites 1 and 2) are useful in determining the effects of the outfall. The three most downstream sites provide background information in case the anticipated expansion of the power scheme occurs and are unlikely to ever be affected by the discharge considering the considerable distance downstream they are from the outfall. Biannual biomonitoring surveys 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 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.

Macroinvertebrate richnesses were moderate to moderately low and were lower than historical medians (by 4-8 taxa). There was very little difference in taxa richnesses between sites (by 0-3 taxa) and the primary impact site had three taxa more than the control site.

The MCI scores categorised the four most upstream sites as having 'good' generic river health which were all significantly higher than their respective historic medians, while the bottom site had 'fair' generic health that was not significantly higher than its historic median. There were no significant differences among the four most upstream sites while there was a significant decrease between site 4 and site 5. This indicates that the four upstream macroinvertebrate communities were healthier than normal with no evidence of any effect from the power station. Site 5 typically has the lowest MCI score of the five monitored sites but this was more pronounced during the current survey.

The SQMCI<sub>s</sub> scores showed some variation among sites and though there was a statistically significant difference between sites 1 and 2, the taxa composition indicates that there was very little difference between the two sites apart from site 2, had 'very abundant' orthoclad midges as opposed to site 1 which had 'abundant' orthoclad midges. Generally, MCI scores for the current survey would appear to better reflect the macroinvertebrate communities' actual health than the SQMCI<sub>s</sub> scores. The SQMCI<sub>s</sub> scores were congruent with the MCI scores in that all sites had higher scores than their historic medians with all but site 3 SQMCI<sub>s</sub> and site 5 MCI having significantly higher scores.

Overall, this 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.

## Summary

The Council's standard 'kick-sampling' technique was used at five established sites to collect streambed macroinvertebrates from the Patea River on the 30 October 2017. Samples were sorted and identified to provide number of taxa (richness) and MCI and SQMCI 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 SQMCI 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<sub>s</sub> between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

Taxa richnesses were slightly lower than historic medians but there was no meaningful difference among sites. MCI scores indicated that the stream communities for the four upstream sites were in 'good' health with only the bottom site in 'fair' generic health with no significant differences among the four upstream sites. SQMCI<sub>s</sub> scores indicated healthier than normal macroinvertebrate communities at the majority of sites.

Overall, this spring macroinvertebrate survey indicated that 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.

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**To** Nathan Crook, Job Manager  
**From** Darin Sutherland, Environmental Scientist  
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## 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, April 2018

### Introduction

Biomonitoring forms a component of the consents compliance monitoring programme implemented by the Taranaki Regional Council 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 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. 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 and a further 13 km downstream (adjacent to Raupuha Road, below the Makuri Stream confluence) were initially were sampled as a component of the environmental effects assessment for the power station expansion (Stark and Young, 2001 and CF251). They 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 3 April 2018 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 and Figure 2.

Table 1 Location of sampling sites in the Patea River

Site No	Site code	Grid reference	Location	Altitude (m asl)
1	PAT000356	E1714497 N5645112	U/s of TCC1 cooling wastes discharge	250
2	PAT000357	E1714662 N5645076	100 m d/s of TCC1 cooling wastes discharge	250
3	PAT000360	E1715919 N5644681	Skinner Road	240
4	PAT000397	E1718991 N5643531	Hungers Road	200
5	PAT000430	E1723952 N5641068	Raupuha Road	160

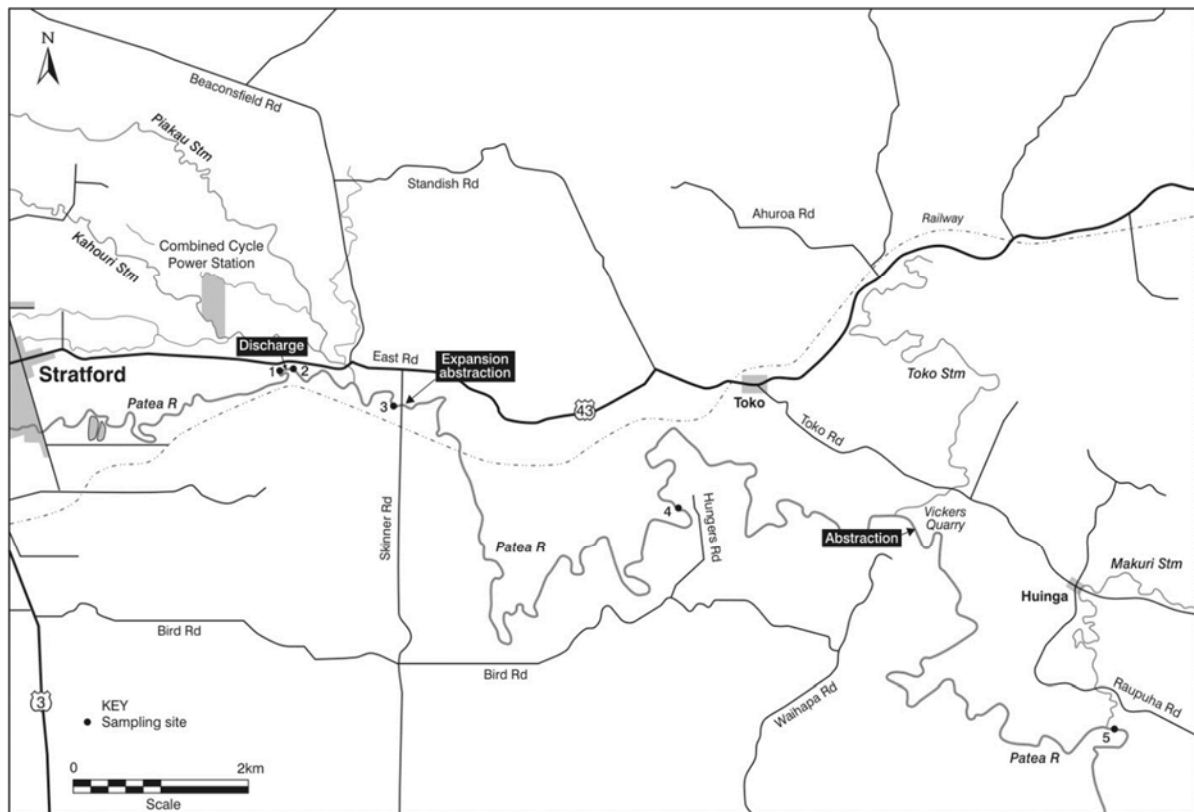


Figure 1 Location of biomonitoring sites in the Patea River in relation to the combined cycle power station, Stratford

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 stereomicroscopic sorting and identification according to documented Taranaki Regional Council methodology and macroinvertebrate taxa abundances scored based on the categories in Table 2.

Table 2 Macroinvertebrate abundance categories

Abundance category	Number of individuals
R (rare)	1-4
C (common)	5-19
A (abundant)	20-99
VA (very abundant)	100-499
XA (extremely abundant)	500+

Table 3 Macroinvertebrate health based on MCI ranges which has been adapted for Taranaki streams and rivers (TRC, 2015) from Stark's classification (Stark, 1985, Boothroyd and Stark, 2000, and Stark and Maxted, 2007)

TRC Grading	MCI	SQMCI <sub>s</sub>
Excellent	>140	>7.00
Very Good	120-140	6.00-7.00
Good	100-119	5.00-5.99
Fair	80-99	4.00-4.99
Poor	60-79	3.00-3.99
Very Poor	<60	<3.00

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams. Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1. Sensitivity scores for certain taxa have been modified in accordance with Taranaki experience. By averaging the scores obtained from a list of taxa collected from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. A gradation of biological water quality conditions based upon MCI ranges which has been adapted for Taranaki streams and rivers (TRC, 2013) from Stark's classification (Stark, 1985 and Boothroyd and Stark, 2000) (Table 3). More 'sensitive' communities inhabit less polluted waterways. A difference of 11 units or more in MCI values is considered significantly different (Stark 1998).

A semi-quantitative MCI value, SQMCI<sub>s</sub> (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

### Site habitat characteristics and hydrology

This summer survey was performed under moderate conditions (approximately 80% of median flow), eight days after a fresh in excess of 3 times median flow and 26 days after a fresh in excess of 7 times median flow in the Patea River (flow gauging site at the Patea River at Skinner Road). The survey followed a relatively dry spring period but during the month prior was wetter with two significant freshes recorded over the preceding month.

The water temperatures during the survey were in the range 14.4 -16.6 °C. Water levels were moderate and water speed was swift. The water was uncoloured and clear for all sites. The substrate at all five sites comprised gravel/cobble/boulder.

Site 1 had patchy algal mats and widespread filamentous algae patchy leaves on the streambed, site 2 had patchy mats and filamentous algae with patchy moss on the streambed, site 3 had patchy mats, filamentous algae, moss and leaves, site 4 had patchy mats and filamentous algae, and site 5 had widespread mats, and patchy filamentous algae, moss and leaves.

### 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 the Cawthron Institute are not included in this summary but are presented and discussed in TRC report CF251).

**Table 4** Summary of macroinvertebrate taxa numbers and MCI values for previous surveys performed between January 1992 and October 2017 and the current survey

Site No.	N	No of taxa			MCI value			SQMCI <sub>s</sub> value		
		Median	Range	Current survey	Median	Range	Current survey	Median	Range	Current survey
1	46	23	15-31	19	99	82-116	85	4.1	2.3-7.2	3.8
2	39	22	14-33	26	100	86-111	86	4.0	2.0-6.8	3.2
3	47	23	15-33	24	98	86-112	99	4.2	1.9-7.3	3.2
4	32	22	15-30	17	96	82-108	94	4.8	3.1-7.2	4.1
5	32	21	15-26	17	95	82-103	89	4.2	3.1-7.1	2.6

The macroinvertebrate fauna results from the present survey are presented in Table 3, and previous survey and current survey results are shown in figure 3.

Table 5 Macroinvertebrate fauna of the Patea River in relation to Stratford Power Ltd sampled on 3 April 2018

Taxa List	Site Number	MCI score	1	2	3	4	5	
	Site Code		PAT000356	PAT000357	PAT000360	PAT000397	PAT000430	
	Sample Number		FWB18193	FWB18194	FWB18195	FWB18196	FWB18197	
NEMERTEA	Nemertea	3	-	-	-	-	R	
NEMATODA	Nematoda	3	R	-	R	-	R	
ANNELIDA (WORMS)	Oligochaeta	1	A	A	VA	A	VA	
	Lumbricidae	5	-	-	-	R	C	
MOLLUSCA	<i>Physa</i>	3	R	R	-	-	-	
	<i>Potamopyrgus</i>	4	R	R	C	VA	A	
CRUSTACEA	Cladocera	5	-	R	-	-	-	
	Ostracoda	1	-	R	-	-	-	
	<i>Paracalliope</i>	5	R	-	-	-	-	
EPHEMEROPTERA (MAYFLIES)	<i>Austroclima</i>	7	-	R	C	R	C	
	<i>Coloburiscus</i>	7	C	C	C	-	-	
	<i>Deleatidium</i>	8	A	A	A	A	-	
	<i>Zephlebia group</i>	7	-	-	-	-	R	
COLEOPTERA (BEETLES)	Elmidae	6	C	R	C	A	C	
	Hydraenidae	8	-	R	R	R	-	
MEGALOPTERA (DOBSONFLIES)	<i>Archichauliodes</i>	7	C	C	C	C	R	
TRICHOPTERA (CADDISFLIES)	<i>Hydropsyche (Aoteapsyche)</i>	4	VA	A	VA	VA	A	
	<i>Costachorema</i>	7	C	R	R	-	-	
	<i>Hydrobiosis</i>	5	R	R	A	C	R	
	<i>Neurochorema</i>	6	-	-	R	-	-	
	<i>Beraeoptera</i>	8	-	-	R	-	-	
	<i>Confluens</i>	5	-	-	R	-	-	
	<i>Oxyethira</i>	2	R	C	R	-	R	
	<i>Pycnocentria</i>	7	-	-	R	-	R	
	<i>Pycnocentroides</i>	5	R	R	A	C	A	
	DIPTERA (TRUE FLIES)	<i>Aphrophila</i>	5	R	R	A	R	A
Eriopterini		5	-	R	-	-	-	
<i>Chironomus</i>		1	A	R	-	-	-	
<i>Maoriidamesa</i>		3	A	C	A	R	-	
Orthoclaadiinae		2	A	VA	VA	A	VA	
<i>Polypedilum</i>		3	-	R	-	-	-	
Tanytarsini		3	C	C	VA	A	A	
Empididae		3	-	-	C	-	-	
Ephydriidae		4	-	C	-	R	-	
Muscidae		3	-	R	C	-	-	
<i>Austrosimulium</i>		3	-	R	-	-	-	
Tabanidae		3	-	-	-	R	-	
No of taxa			19	26	24	17	17	
MCI			85	86	99	94	89	
SQMCIs			3.8	3.2	3.2	4.1	2.6	
EPT (taxa)			6	7	11	5	6	
%EPT (taxa)			32	27	46	29	35	
'Tolerant' taxa		'Moderately sensitive' taxa		'Highly sensitive' taxa				

R = Rare

C = Common

A = Abundant

VA = Very Abundant

XA = Extremely Abundant

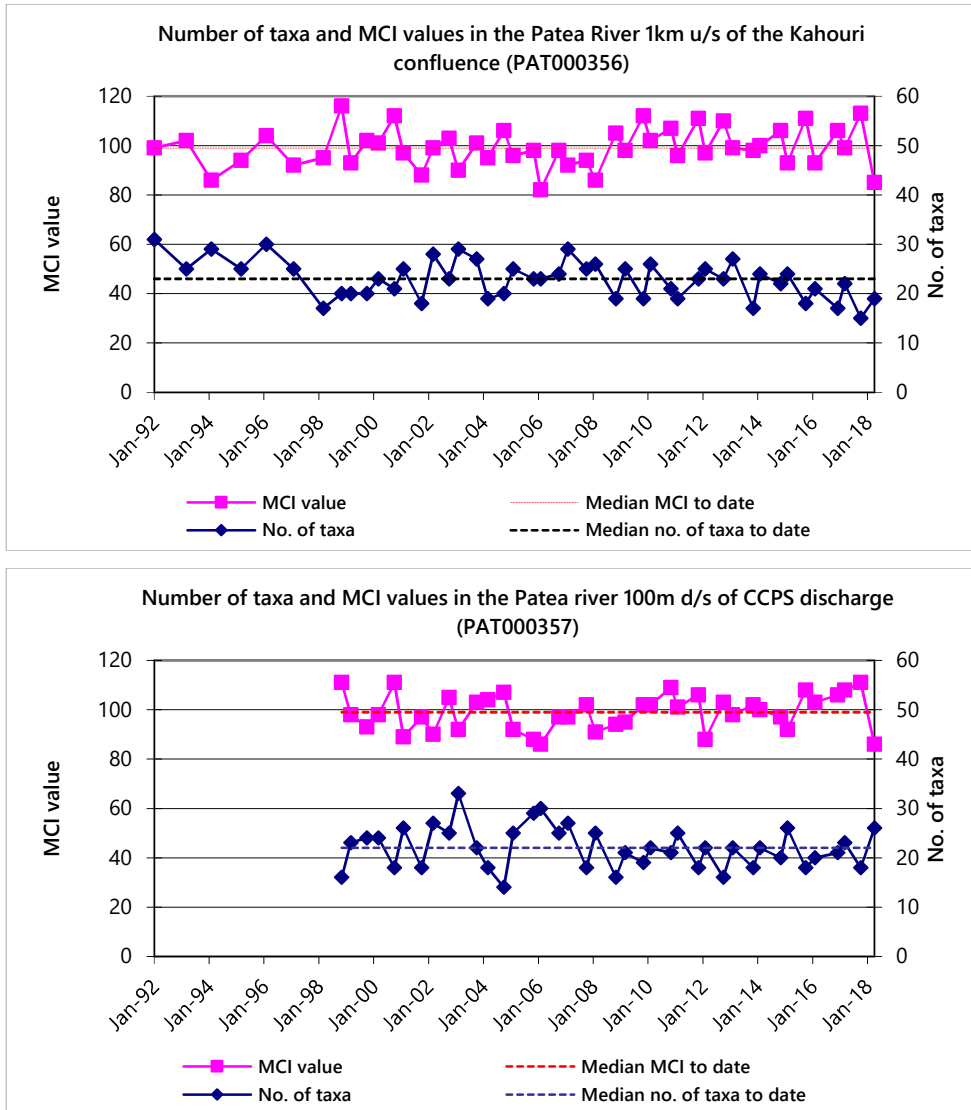


Figure 2 Taxa richness and MCI scores recorded to date at sites in the vicinity of the outfall

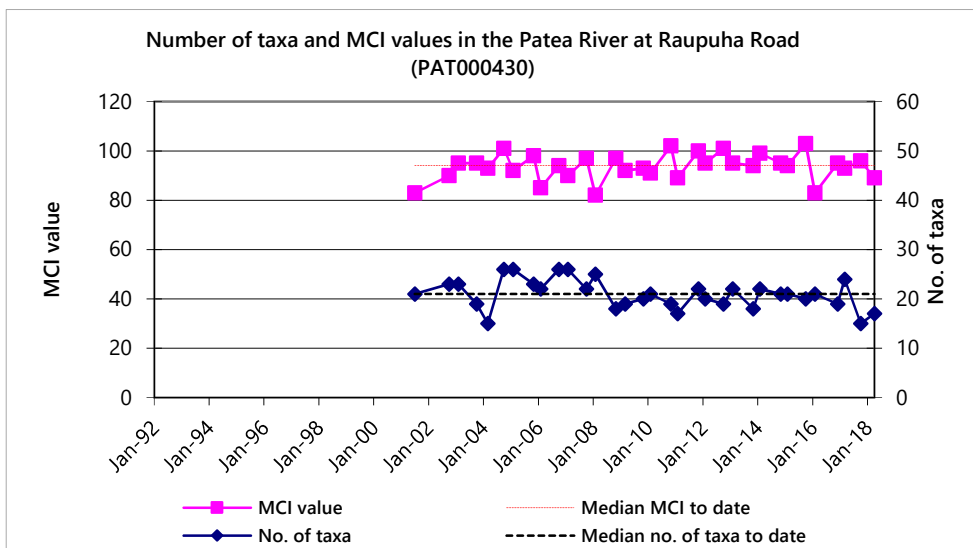
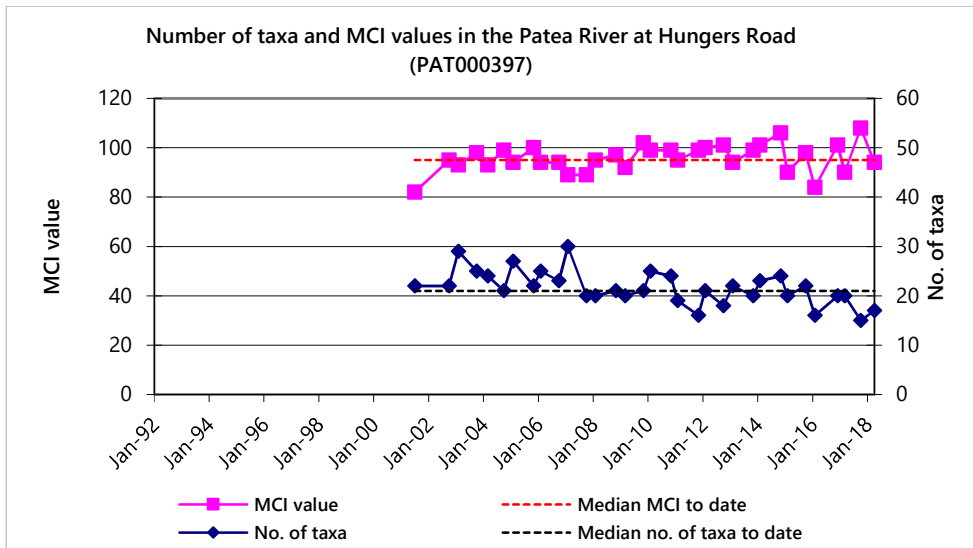
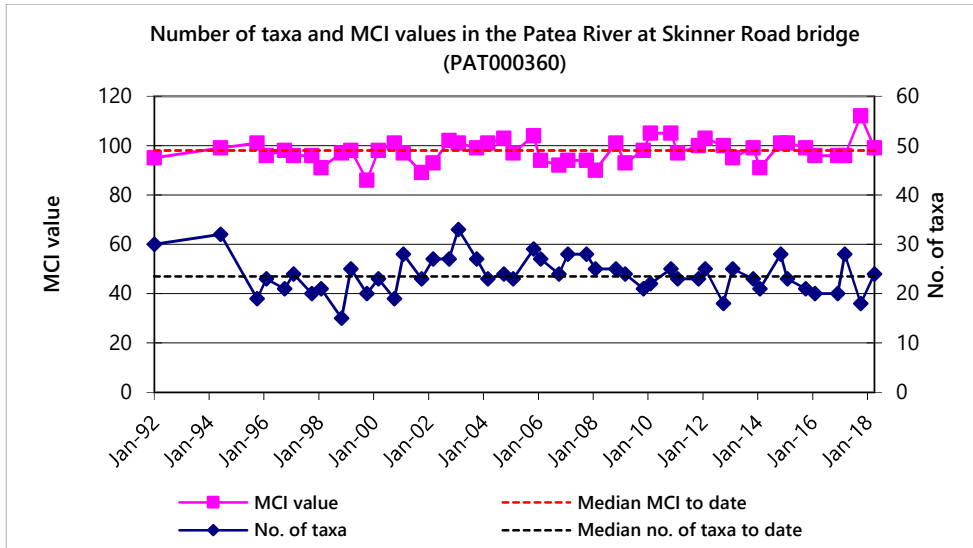


Figure 3 Taxa richness and MCI scores recorded to date at the reach between Skinner Road and Raupuha Road

## Site 1 (upstream of discharge at East Road)

A moderate macroinvertebrate community richness of 19 taxa was found at site 1 ('control' site) at the time of the survey (Table 4). This was four taxa more than the previous survey on October 2017 (15 taxa) but four taxa less than the historic median (23 taxa).

The MCI score of 85 units indicated a community of 'fair' biological health which was significantly lower (Stark, 1998) than the historic median MCI score of 99 units and the preceding survey (113 units).

The SQMCI<sub>5</sub> score of 3.8 units was not significantly different to the median SQMCI<sub>5</sub> score of 4.1 units (Table 4) but was significantly lower than the preceding survey score (6.5 units).

The community was dominated by five 'tolerant' taxa [oligochaete worms, caddisfly (*Hydropsyche* – *Aoteapsyche*), and midges (*Chironomus*, *Maoridiamesa* and Orthoclaadiinae)], and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 5).

## Site 2 (100m d/s discharge East Road)

A moderately high macroinvertebrate community richness of 26 taxa was found at site 2 ('primary impact' site) (Table 4). This was eight taxa more than the previous survey (18 taxa) and four taxa more than the historic median (22 taxa).

The MCI score of 86 units indicated a community of 'fair' biological health which was significantly lower (Stark, 1998) than the median MCI score of 100 units. The MCI score was also significantly lower than the preceding survey (111 units).

The SQMCI<sub>5</sub> score of 3.2 units was not significantly different to the median SQMCI<sub>5</sub> score of 4.0 units (Table 4) but significantly lower than the preceding survey (5.0 units).

The community was dominated by three 'tolerant' taxa [oligochaete worms, caddisfly (*Hydropsyche* – *Aoteapsyche*), and midge (Orthoclaadiinae)], and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 5).

## Site 3 (Skinner Road)

A moderate macroinvertebrate community richness of 24 taxa was found at site 3 at the time of the survey (Table 4). This was six taxa more than the previous survey (18 taxa) and one more than the historic median (23 taxa).

The MCI score of 99 units indicated a community of 'fair' biological health which was not significantly different (Stark, 1998) to the median MCI score of 98 units but was significantly lower than the preceding survey (112 units).

The SQMCI<sub>5</sub> score of 3.2 units was not significantly different to the median SQMCI<sub>5</sub> score of 4.0 units (Table 4) but was significantly lower than the preceding survey (7.2 units).

The community was dominated by five 'tolerant' taxa [oligochaete worms, caddisfly (*Hydropsyche* – *Aoteapsyche*), and midges (Tanytarsini, *Maoridiamesa* and Orthoclaadiinae)], three 'moderately sensitive' taxa [caddisflies (*Hydrobiosis* and *Pycnocentroides*), and crane fly (*Aphrophila*)] and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 5).

## Site 4 (Hungers Road)

A moderate macroinvertebrate community richness of 17 taxa was found at site 4 (Table 4). This was two taxa higher than the previous survey (15 taxa) and five taxa less than the historic median (22 taxa).

The MCI score of 94 units indicated a community of 'fair' biological health which was not significantly different (Stark, 1998) to the median MCI score of 95 units but was significantly lower than the preceding survey (108 units).

The SQMCI<sub>s</sub> score of 4.1 units was not significantly different to the median SQMCI<sub>s</sub> score of 4.8 units (Table 4) but was significantly lower than the preceding survey (7.2 units).

The community was dominated by five 'tolerant' taxa [oligochaete worms, snails (*Potamopyrgus*), caddisfly (*Hydropsyche* – *Aoteapsyche*), and midges (Tanytarsini and Orthoclaadiinae)], one 'moderately sensitive' taxon [beetle (Elmidae)] and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 5).

## Site 5 (Raupuha Road)

A moderate macroinvertebrate community richness of 17 taxa was found at site 5 at the time of the survey (Table 4). This was two taxa lower than the previous survey (15 taxa) and four taxa lower than the historic median (21 taxa).

The MCI score of 89 units indicated a community of 'fair' biological health which was not significantly different (Stark, 1998) to the median MCI score of 95 units and to the preceding survey (96 units).

The SQMCI<sub>s</sub> score of 2.6 units was significantly lower than the median SQMCI<sub>s</sub> score of 4.8 units (Table 4) and to the preceding survey (5.3 units).

The community was dominated by five 'tolerant' taxa [oligochaete worms, snails (*Potamopyrgus*), caddisfly (*Hydropsyche* – *Aoteapsyche*), and midges (Tanytarsini and Orthoclaadiinae)], and two 'moderately sensitive' taxa [caddisfly (*Pycnocentodes*) and crane fly (*Aphrophila*)] (Table 5).

## Discussion and conclusions

The two sites immediately up and downstream of the discharge (sites 1 and 2) are useful in determining the effects of the outfall. The three most downstream sites provide background information in case the anticipated expansion of the power scheme occurs and are unlikely to ever be affected by the discharge considering the considerable distance downstream they are from the outfall. 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.

Macroinvertebrate richnesses were moderate to moderately high and were not substantially different to historical medians (differed by 1-5 taxa). There was a noticeable increase in richness from site 1 to 2, with little difference between sites 2 and 3, with a seven taxa decrease between sites 3 and 4.

The MCI scores categorised all five sites as having 'fair' generic river health. Sites 1 and 2 both had scores significantly lower than historic medians and preceding surveys. However, their respective scores were very similar to each other. This indicates that upstream influences, possibly the Stratford WWTP, were impacting on macroinvertebrate health in the Patea River but that there was no effect from Contact Energy Ltd's discharges. The three lower sites all had scores not significantly different to historic medians but there was a slight decrease by seven units at site 5. Sites 3 and 4 also had scores significantly higher than site 1, the control site, and site 2, an atypical trend in Taranaki ringplain rivers where scores usually decrease in a downstream



direction. Site 5 typically has the lowest MCI score of the five monitored sites but this did not occur during the current survey.

The SQMCI<sub>5</sub> can be more sensitive than the MCI because it also uses taxa abundance. The SQMCI<sub>5</sub> scores were lower than historic medians for all five sites with sites 2 and 5 having scores significantly lower than historic medians. However, there were no significant differences between sites 1 and 2 indicating no effect from discharges from the power station. There was a significant increase between sites 3 and 4 followed by a significant decrease between sites 4 and 5. In reality there appears to be only minor differences between sites 3 and 4 while the decrease at site 5 was larger and probably did reflect a poorer macroinvertebrate health.

Overall, this 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.

## 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 SQMCI<sub>5</sub> 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 SQMCI<sub>5</sub> 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<sub>5</sub> between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

Taxa richnesses were similar to historic medians. MCI scores indicated that the macroinvertebrate communities were in 'fair' health with no significant differences between sites 1 and 2, and sites 3 and 4 were significantly higher than the control site. SQMCI<sub>5</sub> scores were slightly lower than normal but there was no significant differences between sites 1 and 2.

Overall, this summer macroinvertebrate survey indicated that 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.

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**To** Nathan Crook, Job Manager  
**From** Darin Sutherland, Environmental Scientist  
**Doc No** 2090858  
**Report No** DS101  
**Date** 19 July 2018

## Biomonitoring of the Kahouri Stream in relation to the Contact Energy sites, East Road, April 2018

### Introduction

This survey fulfilled the biological components of the 2017-2018 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 3939-2 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 and 4459-1 to discharge stormwater from the operation of a power station site into an unnamed tributary of the Piakau Stream and into the Kahouri Stream, all tributaries of the Patea River. Both consents are currently held by Contact Energy Limited.

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 DS101).

### Methods

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from two established sites in the Kahouri Stream on 4 April 2018 (Figure 1, Table 1).

Table 1 Biomonitoring sites in the Kahouri Stream sampled in relation to the Contact Energy site

Site No	Site code	GPS co-ordinates	Location
1	KHI000457	E 1713512 N 5645931	Kahouri Stream, upstream of the Contact Energy site
2	KHI000480	E 1714880 N 5645282	Kahouri Stream, 20 m upstream of the Piakau Stream confluence



Figure 1 Kahouri Stream Sites sampled for macroinvertebrates, in relation to the Contact Energy site

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 abundances scored based on the categories presented in Table 1.

Table 2 Macroinvertebrate abundance categories

Abundance category	Number of individuals
R (rare)	1-4
C (common)	5-19
A (abundant)	20-99
VA (very abundant)	100-499
XA (extremely abundant)	500+

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams. Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1. Sensitivity scores for certain taxa have been modified in accordance with Taranaki experience. By averaging the scores obtained from a list of taxa collected from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. A gradation of biological water quality conditions based upon MCI ranges which has been adapted for Taranaki streams and rivers (TRC, 2013) from Stark's classification (Stark, 1985 and Boothroyd and Stark, 2000) (Table 2). More 'sensitive' communities inhabit less polluted waterways. A difference of 10.83 units or more in MCI values is considered significantly different (Stark 1998).

Table 3 Macroinvertebrate health based on MCI ranges which has been adapted for Taranaki streams and rivers (TRC, 2013) from Stark's classification (Stark, 1985 and Boothroyd and Stark, 2000)

Grading	MCI	SQMCI <sub>s</sub>
Excellent	> 140	>7.0
Very Good	120-140	6.0-7.0
Good	100-119	5.0-5.9
Fair	80-99	4.0-4.9
Poor	60-79	3.0-3.9
Very Poor	<60	<3.0

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<sub>s</sub>) 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<sub>s</sub> is not multiplied by a scaling factor of 20, so that its corresponding range of values is 20x lower. A difference of 0.83 units or more in SQMCI<sub>s</sub> values is considered significantly different (Stark 1998).

## Results

### Site habitat characteristics and hydrology

This summer survey was performed under moderate flow conditions (approximately three quarters of median flow), 10 days after a fresh in excess of 3 times median flow and 27 days after a fresh in excess of 7 times) median flow in the Patea River (flow gauging site at the Patea River at Skinner Road).

The stream at site 1 had slippery periphyton mats and no filamentous algae. Patchy leaves were on the streambed. Substrate was predominately cobbles and gravels. Site 2 had patchy mats and no filamentous algae. Patchy leaves were on the streambed. Substrate was predominately cobbles and gravels.

### 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 4 together with current results, and the full results are reported in Table 5.



Table 4 Summary of the numbers of taxa, MCI and SQMCI<sub>s</sub> 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 No.	N	No of taxa			MCI value			SQMCI <sub>s</sub> value		
		Median	Range	Current Survey	Median	Range	Current Survey	Median	Range	Current Survey
1	24	23	18-31	19	103	87-112	103	5.8	2.3-7.6	5.9
2	25	24	17-34	24	98	82-110	108	5.0	3.8-7.5	7.3

### Site 1: Kahouri Stream (KHI000457)

A moderate macroinvertebrate community richness of 19 taxa was found at site 1 ('control' site) at the time of the summer survey. This was four taxa less than the historical median for this site (23 taxa) and three taxa less than the previous survey (22 taxa) on March 2017 (Figure 2).

The MCI score of 103 units indicated a community of 'good' biological health which was the same as the historical median MCI score of 103 units. The MCI score was not significantly different (Stark, 1998) to the preceding survey (98 units).

The SQMCI<sub>s</sub> score of 5.9 units was not significantly different (Stark, 1998) to the median SQMCI<sub>s</sub> score of 5.8 units and to the preceding survey score (6.0 units) (Stark, 1998).

The community was characterised by two 'tolerant' taxa [oligochaete worms and caddisfly (*Hydropsyche/Aoteapsyche*)], two 'moderately sensitive' taxa [mayfly (*Coloburiscus*), beetle (*Elmidae*)], and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 5).

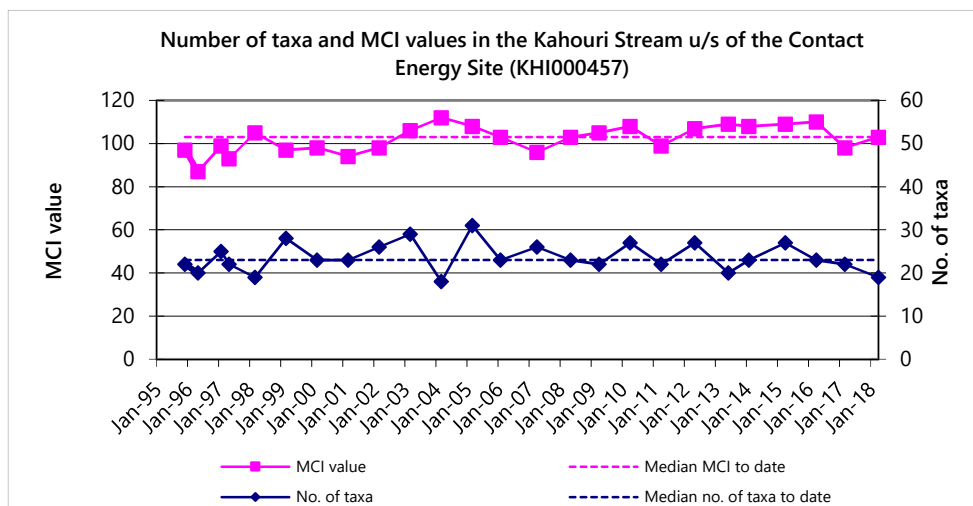


Figure 2 Number of taxa and MCI values in the Kahouri Stream at site 1 (KHI000457)

### Site 2: Kahouri Stream (KHI000480)

A moderate macroinvertebrate community richness of 24 taxa was found at site 2 ('impact' site). This was the same as the historical median for this site (24 taxa) and two taxa higher than the previous survey (22 taxa) (Figure 3).

The MCI score of 108 units indicated a community of 'good' biological health which was not significantly different (Stark, 1998) to the historical median MCI score of 98 units and to the preceding survey (98 units).

However, the score was only two units lower than the highest recorded value for the site and was in the upper range of values that have been previously recorded at the site.

The SQMCI<sub>s</sub> score of 7.3 units was not significantly higher (Stark, 1998) than the median SQMCI<sub>s</sub> score of 5.0 units and the preceding survey score (6.3 units) (Stark, 1998).

The community was characterised by two 'tolerant' taxa [snail (*Potamopyrgus*) and caddisfly (*Hydropsyche/Aoteapsyche*)], three 'moderately sensitive' taxa [mayfly (*Coloburiscus*), beetle (*Elmidae*), cranefly (*Archichauliodes*) caddisfly (*Pycnocentria*) and cranefly (*Aphrophila*)], and one 'highly sensitive' taxon [mayfly (*Deleatidium*)] (Table 5).

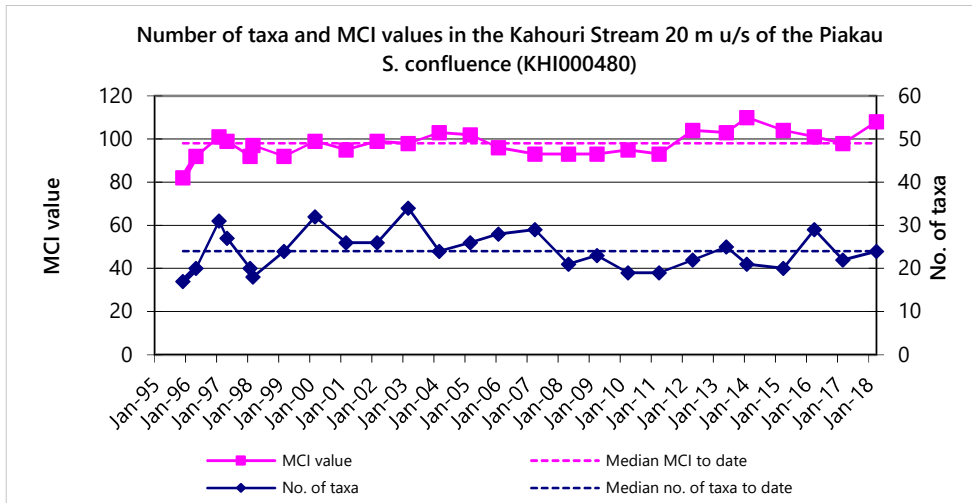


Figure 3 Number of taxa and MCI values in the Kahouri Stream at site 2 (KHI000480)

Table 5 Macroinvertebrate fauna of the Kahouri Stream (sites 1 & 2) in relation to Contact Energy, East Road during the survey of 4 April 2018

Taxa List	Site Number	MCI score	1	2
	Site Code		KHI000457	KHI000480
	Sample Number		FWB18209	FWB18210
NEMERTEA	Nemertea	3	R	-
ANNELIDA (WORMS)	Oligochaeta	1	A	C
MOLLUSCA	<i>Potamopyrgus</i>	4	C	A
EPHEMEROPTERA (MAYFLIES)	<i>Austroclima</i>	7	C	C
	<i>Coloburiscus</i>	7	VA	VA
	<i>Deleatidium</i>	8	A	XA
	<i>Nesameletus</i>	9	R	R
	<i>Zephlebia group</i>	7	C	R
	COLEOPTERA (BEETLES)	Elmidae	6	A
	Hydraenidae	8	-	R
MEGALOPTERA (DOBSONFLIES)	<i>Archichauliodes</i>	7	C	A
TRICHOPTERA (CADDISFLIES)	<i>Hydropsyche (Aoteapsyche)</i>	4	A	A
	<i>Costachorema</i>	7	-	C
	<i>Hydrobiosis</i>	5	R	C
	<i>Beraeoptera</i>	8	-	R
	<i>Confluens</i>	5	-	R
	<i>Pycnocentria</i>	7	C	A
	<i>Pycnocentroides</i>	5	C	C
	<i>Triplectides</i>	5	R	-
	DIPTERA (TRUE FLIES)	<i>Aphrophila</i>	5	C
	Eriopterini	5	-	R
	Orthocladiinae	2	R	R
	<i>Polypedilum</i>	3	C	C
	Tanytarsini	3	R	R
	Tabanidae	3	-	R
	Tanyderidae	4	-	R
No of taxa			19	24
MCI			103	108
SQMCIs			5.9	7.3
EPT (taxa)			10	12
%EPT (taxa)			53	50
'Tolerant' taxa		'Moderately sensitive' taxa	'Highly sensitive' taxa	

R = Rare

C = Common

A = Abundant

VA = Very Abundant

XA =

Extremely Abundant

## Discussion and conclusions

This summer 2018 biomonitoring survey of the Kahouri Stream that receives stormwater from the Contact Energy site on East Road was undertaken during a relatively dry period. Results indicated that the stormwater discharges had not had an impact on the macroinvertebrate communities of the stream.

Macroinvertebrate richnesses were moderate for both sites and similar or the same as historic medians indicating no evidence for any toxic discharges.

Both sites had 'good' macroinvertebrate health with no significant difference in score between the two sites or between their respective historic medians suggesting typical results. This indicated that there were no significant impacts from discharges from the Contact Energy site.

The SQMCI<sub>s</sub> scores were largely congruent with the MCI scores though it showed that the downstream, 'impact' site, was in excellent health which was better than normal for the site. Furthermore, the score indicated that the site was in significantly better health than the upstream 'control' site. The difference in MCI score for the 'impact' site was only one unit off being significant and overall it does appear that the macroinvertebrate community was in better health than the upstream 'control' site.

Overall, there was no evidence that stormwater discharges from the Contact Energy site had any discernible impact on the macroinvertebrate community of the Kahouri Stream.

## Summary

The Council's standard 'kick-sampling' technique was used at two sites to collect streambed macroinvertebrates from the Kahouri Stream on 4 April 2018 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<sub>s</sub> 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<sub>s</sub> takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities, particularly if non-organic impacts such as elevated silt levels from stormwater discharges are occurring.

Significant differences in either MCI or SQMCI<sub>s</sub> between sites indicate the degree of adverse effects (if any) of discharges being monitored.

Taxa richness at both sites were similar to each other and indicated moderate richness. The macroinvertebrate communities of both sites were in 'good' generic biological health with no significant difference between sites. The more sensitive SQMCI<sub>s</sub> score indicated that the 'impact' site macroinvertebrate community was in better health than the 'control' site and in better than normal health overall.

Overall, this 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 Kahouri Stream.

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## Appendix V

### Air monitoring results for SP1





Report

# Stratford Peaker Power Plant Air Emissions Measurements - September 2016

Prepared for Contact Energy Ltd (Client)

By Beca Ltd (Beca)

30 November 2016



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## Revision History

Revision N°	Prepared By	Description	Date
A	Brian Mills	Final version for release	30 November 2016

## Document Acceptance

Action	Name	Signed	Date
Prepared by	Brian Mills <i>Environmental Scientist</i>		30 November 2016
Reviewed by	Mathew Noonan <i>Environmental Engineer</i>		30 November 2016
Approved by	Prue Harwood <i>Technical Director</i>		30 November 2016
on behalf of			

## Table of Contents

<b>1</b>	<b>Introduction</b> .....	<b>2</b>
1.1	Scope.....	2
1.2	Purpose .....	2
1.3	Limitations .....	3
<b>2</b>	<b>Process Description and Sampling Location</b> .....	<b>4</b>
2.1	Process Description.....	4
2.2	Sampling Point Locations .....	4
<b>3</b>	<b>Test Methods</b> .....	<b>5</b>
3.1	Flow and Temperature Measurements .....	5
3.2	Instrumental Continuous Emission Monitoring .....	5
3.3	Instrument Calibration .....	5
<b>4</b>	<b>Unit 21 Results</b> .....	<b>7</b>
4.1	Continuous Instrumental Monitoring Results – Baseload Conditions .....	7
4.2	Stack Flow Rates – Baseload Conditions .....	8
4.3	Continuous Instrumental Monitoring Results – Lower GTG Load Conditions.....	10
<b>5</b>	<b>Unit 22 Results</b> .....	<b>11</b>
5.1	Continuous Instrumental Monitoring Results – Baseload Conditions .....	11
5.2	Stack Flow Rates - Baseload Conditions .....	12
5.3	Continuous Instrumental Monitoring Results – Lower GTG Load Conditions.....	14
<b>6</b>	<b>Results Summary</b> .....	<b>15</b>
<b>7</b>	<b>Discussion</b> .....	<b>16</b>

## Appendices

### Appendix A - Emissions Calculation Data

## Introduction

### 1.1 Scope

This report describes air emissions monitoring performed by Beca Ltd on behalf of Contact Energy Ltd at the Stratford thermal generation site, East Rd, Stratford, Taranaki on 12 September and 13 September 2016. The results of the emission testing exercise are presented following a brief description of the process and the test methods used.

### 1.2 Purpose

This monitoring programme was requested by Contact Energy to assess the air emissions performance of each of the two General Electric (GE) LMS100 PA gas turbine (GT) peaker power plants installed at the Stratford site, (the "Stratford peaker plants"). Contact Energy requested the air emissions testing to demonstrate that the Stratford peaker plants are being operated in compliance with the requirements specified in the Taranaki Regional Council Resource Consent for air discharges for the site; Permit N<sup>o</sup> 4022-2, Conditions 7 and 8. The compliance conditions specified in Conditions 7 and 8 of the resource consent N<sup>o</sup> 4022-2 for emissions from the Stratford site peaker plant(s) are:

*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<sup>-1</sup>;*

*(b) [cancelled]; and*

*(c) a concentration in any gas turbine stack equivalent to 100 mg.m<sup>-3</sup> at 450 degrees Celsius, or to 125 ppm [volumetric basis].*

*then the consent holder 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.*

Monitoring was performed for a period of 30-minutes at baseload on each of the two Stratford peaker plants to demonstrate that these compliance conditions are being met under routine normal operating conditions for the plants. No power plant start-up and/or shut-down emissions measurements were requested as part of the monitoring data set.

### 1.3 Limitations

This report has been prepared by Beca Ltd for Contact Energy Ltd based upon the scope of sampling as set out in the preceding section and subsequent results presented in this report. This is a factual report on air emission monitoring and laboratory analysis only. Opinions and conclusions included are based upon our understanding and interpretation of these results only, and should not be construed as legal opinions. Analysis of the effects of these results on ground level concentrations, and any health impacts that may arise thereof, is beyond the scope of this report. No interpretation of the final results beyond factual comparison of the data presented should be inferred as having been made in this report. Results are presented on the basis that the definition of normal production conditions is reliant upon information supplied by Contact Energy personnel.

## 2 Process Description and Sampling Location

### 2.1 Process Description

Contact Energy's Stratford thermal generation site has two General Electric (GE) open cycle LMS100 PA gas turbines, (the Stratford peaker plants). These two gas turbines are designated by Contact Energy as Unit 21 and Unit 22 and are referred to as such for the purposes of this report. Each LMS100 PA gas turbine provides approximately 100 MW via an aerodynamically coupled generator (i.e. using a free power turbine without the need for a speed reduction gearbox). All gas turbines installed at the Stratford site are fuelled on natural gas.

The LMS100 PA gas turbines are equipped with deNOx water injection (i.e. water injected into the GT combustion zone to reduce NOx emissions). During the emission testing presented herein, monitoring was performed for a period of 30-minutes at baseload on each of the two Stratford peaker plant GT's to demonstrate that the Taranaki Regional Council compliance conditions are being met while the Stratford peaker plant GT's are operating without deNOx water.

### 2.2 Sampling Point Locations

The exhaust gases from each gas turbine are directed through a 90° bend before being discharged to the atmosphere from a vertical exhaust stack. The exhaust stacks rise to a height of approximately 23 m above ground level. Each exhaust stack has a pair of internal noise baffles orientated parallel to the gas turbine's centreline. The emissions from the gas turbine were sampled from the exhaust stack sampling points which are located approximately 1.8 m from the top of the stack at which point the stacks have an internal diameter of approximately 3.66 m.

Due to the diameter to height ratio and internal noise baffles, there are no sampling points available that can be defined as an undisturbed flow as per the definition of the standard methods used. Therefore the flow measurements undertaken from the sample points on the Stratford peaker plant exhaust stacks may not be accurate to within the precision of the method. The nature of the operation of a gas turbine results in the exhaust gases being well mixed prior to reaching the exhaust stack sampling points and hence the concentrations for the exhaust gases presented herein are considered to be fully representative.

### 3 Test Methods

All sample collection was conducted by Beca using the test methods outlined below.

#### 3.1 Flow and Temperature Measurements

- Air velocity measurements were taken with an S-type Pitot tube and micro manometer following:
  - Australian Standard; AS 4323.1: 1995: *Method 1; Stationary Source Emissions – Selection of Sampling Points.*
  - U.S. EPA Method 1; *Sample and velocity traverses for stationary sources for the selection of sampling positions in small stack and ducts.*
- The determination of Gas Flow Data was undertaken following:
  - U.S. EPA Method 2; *Determination of stack gas velocity and volumetric flow rate (type S pitot tube).*
- Temperature measurements were taken with a K-type thermocouple.
- Moisture content of the stack gases was measured using the following:
  - U.S. EPA Method 4; *Determination of Moisture Content in Stack Gases.*

#### 3.2 Instrumental Continuous Emission Monitoring

A Testo 350 Portable Emission Analyser manufactured in Germany by Testo SE & Co. KGaA was used to measure gas composition. The Testo 350 uses electrochemical cells to measure oxygen (O<sub>2</sub>), carbon monoxide (CO) and oxides of nitrogen (NO<sub>x</sub>) via separate measurement of nitrogen oxide (NO) and nitrogen dioxide (NO<sub>2</sub>). The Testo 350 also measures carbon dioxide (CO<sub>2</sub>) using non-dispersive infrared (NDIR). The Testo 350 meets the requirements of the U.S. EPA conditional test method, CTM-034 – *Test Method - Determination of Oxygen, Carbon Monoxide and Oxides of Nitrogen from Stationary Sources for Periodic Monitoring (Portable Electrochemical Analyzer Procedure).*

The Testo 350 Portable Emission Analyser extracts a continuous gas sample from the sampling point via a testing probe supplied as standard with the analyser. The stack gases are automatically conditioned (i.e. filtration, dried and dilution if required) within the Testo 350 prior to measurement. The Testo 350 was inspected and its operation checked prior to sampling being undertaken. At the beginning of the emissions sampling run and at the conclusion of the sampling run, each of the Testo 350's test parameters was checked against both a zero and span gas reading.

#### 3.3 Instrument Calibration

The instrument was given a two point calibration check for each of the gases being measured. A two point calibration involves checking the zero and span settings by introducing calibration gases into the instrument for each of the parameters measured. At the start of a sampling run the instrument readings are adjusted to the correct reading for the calibration gas concentration. At the conclusion of a sampling run the measurement data is corrected against the final checks for any drift in both the zero offset and span (slope) throughout the monitoring period. Unless stated otherwise, corrections are applied based on the assumption that any drift in the zero offset and span values occurs linearly with sampling time between any two calibration checks. Note that two-point (only) calibration checks and mathematical correction of the final data are deviations from the U.S. EPA methods for continuous emissions monitoring.



Calibrations were undertaken immediately prior to the emissions sampling programme and again following completion of the sample programme for each set of results presented in Sections 4 to 6. Details of the calibration gases used and the zero offset and span drift that occurred between the initial calibration and the final calibration undertaken at the time for each set of sample results presented are given in **Table 1** and **Table 2**. All measurements presented herein were corrected in accordance with these checks for both zero offset and span drift.

**Table 1 - Zero Offset and Span Drift Corrections Completed  
Unit 21 Plant 1230 hrs to 1530 hrs 12 September 2016**

Parameter	Span Gas Conc.	Instrument zero correction (max)	Max instrument span correction applied (as a % of span gas conc.)
Zero gas	Nitrogen (N <sub>2</sub> )	Not applicable	
Oxygen	Ambient air 20.96%	0.00%	0.6%
Carbon dioxide*	CO/CO <sub>2</sub> Mix 10.4%	0.10%	0.4%
Carbon monoxide*	CO/CO <sub>2</sub> Mix 500ppm	0.0ppm	1.2%
Nitrogen oxides*	Nitrogen oxide 105ppm	0.0ppm	1.9%

\* Remaining bulk of gas mixture is nitrogen

**Table 2 - Zero Offset and Span Drift Corrections Completed  
Unit 22 Plant 0930 hrs to 1500 hrs 13 September 2016**

Parameter	Span Gas Conc.	Instrument zero correction (max)	Max instrument span correction applied (as a % of span gas conc.)
Zero gas	Nitrogen (N <sub>2</sub> )	Not applicable	
Oxygen	Ambient air 20.96%	0.01%	0.4%
Carbon dioxide*	CO/CO <sub>2</sub> Mix 10.4%	0.11%	0.2%
Carbon monoxide*	CO/CO <sub>2</sub> Mix 500ppm	0.0ppm	0.6%
Nitrogen oxides*	Nitrogen oxide 105ppm	0.0ppm	1.3%

\* Remaining bulk of gas mixture is nitrogen

## 4 Unit 21 Results

### 4.1 Continuous Instrumental Monitoring Results – Baseload Conditions

On 12 September 2016 the Unit 21 gas turbine was operating under normal conditions at approximately 95MW throughout the period from 15:04 hrs to 15:27 hrs. During this time the Unit 21 gas turbine consumed natural gas at 17,162 Nm<sup>3</sup>/hr (4.2 kg/s) throughout the monitoring period.

Presented in the following section are the instrumental exhaust emissions monitoring data for the Unit 21 gas turbine from 15:04 hrs until 15:27 hrs on 12 September 2016. Results of the testing period are given as 1-minute averages and 10-minute averages in **Table 4** and **Table 5**. Rolling averages for 10-minute data have been calculated from the 1-minute averages using a minimum of 90% valid data for each averaging time period (i.e. each rolling 10-minute average is calculated on the basis that they contain a minimum of nine 1-minute data points). The results of the sample run (as 1-minute averages) are depicted in **Figure 1**. Emissions calculation data are attached in **Appendix A**.

**Table 4 – Unit 21 Plant Emission Measurements at 95MW**

**Instrumental Monitoring based on 1-minute averages 1504 – 1527 hrs, 12 September 2016**  
Measurements taken on a dry gas basis.

Range	Oxygen	Carbon dioxide	Carbon monoxide	Nitrogen oxides
	(%)	(%)	(ppm)	(ppm)
Maximum	13.6	4.7	17.8	27.3
Minimum	13.5	4.6	16.8	26.2
<b>Average</b>	<b>13.5</b>	<b>4.7</b>	<b>17.6</b>	<b>27.0</b>
<b>Average (mg/Nm<sup>3</sup>):</b>			<b>22.0</b>	<b>55.5*</b>

\*expressed as mg/Nm<sup>3</sup> as NO<sub>2</sub> where Nm<sup>3</sup> refers to 0°C, 1-atmosphere, dry gas basis

**Table 5 – Unit 21 Plant Emission Measurements at 95MW**

**Instrumental Monitoring based on 10-minute averages 1504 – 1527 hrs, 12 September 2016**  
Measurements taken on a dry gas basis.

Range	Oxygen	Carbon dioxide	Carbon monoxide	Nitrogen oxides
	(%)	(%)	(ppm)	(ppm)
Maximum	13.5	4.7	17.8	27.2
Minimum	13.5	4.7	16.8	26.3
<b>Average</b>	<b>13.5</b>	<b>4.7</b>	<b>17.5</b>	<b>26.9</b>

## 4.2 Stack Flow Rates – Baseload Conditions

Stack flow rates were measured under baseload conditions between 15:25 hrs to 15:30 hrs, 12 September 2016. The plant operating conditions were stable throughout the time the flow measurements were taken. The exhaust gas flow rate from the Unit 21 gas turbine exhaust stack measured 42 m/s. The moisture content was calculated to be 11.4%. *Note that calculating flow rates and moisture levels from gas consumption are variations from standard U.S. EPA measurement methods.*

Due to the position and size of the sound baffles within the stack, it is not possible to accurately measure the stack flow rate based on the velocities measured, as the effective area of the stack is significantly impacted by the sound baffles to an unknown degree. Consequently the flow rates and moisture levels have been calculated based on the concentration of carbon dioxide emitted from the gas turbine measured at the time of sampling as presented herein. In addition, the volume of natural gas consumed, the composition of the natural gas and the mass of water being injected into the G.T. at the time the measurements were taken have also been used to calculate the flow rates and moisture content.

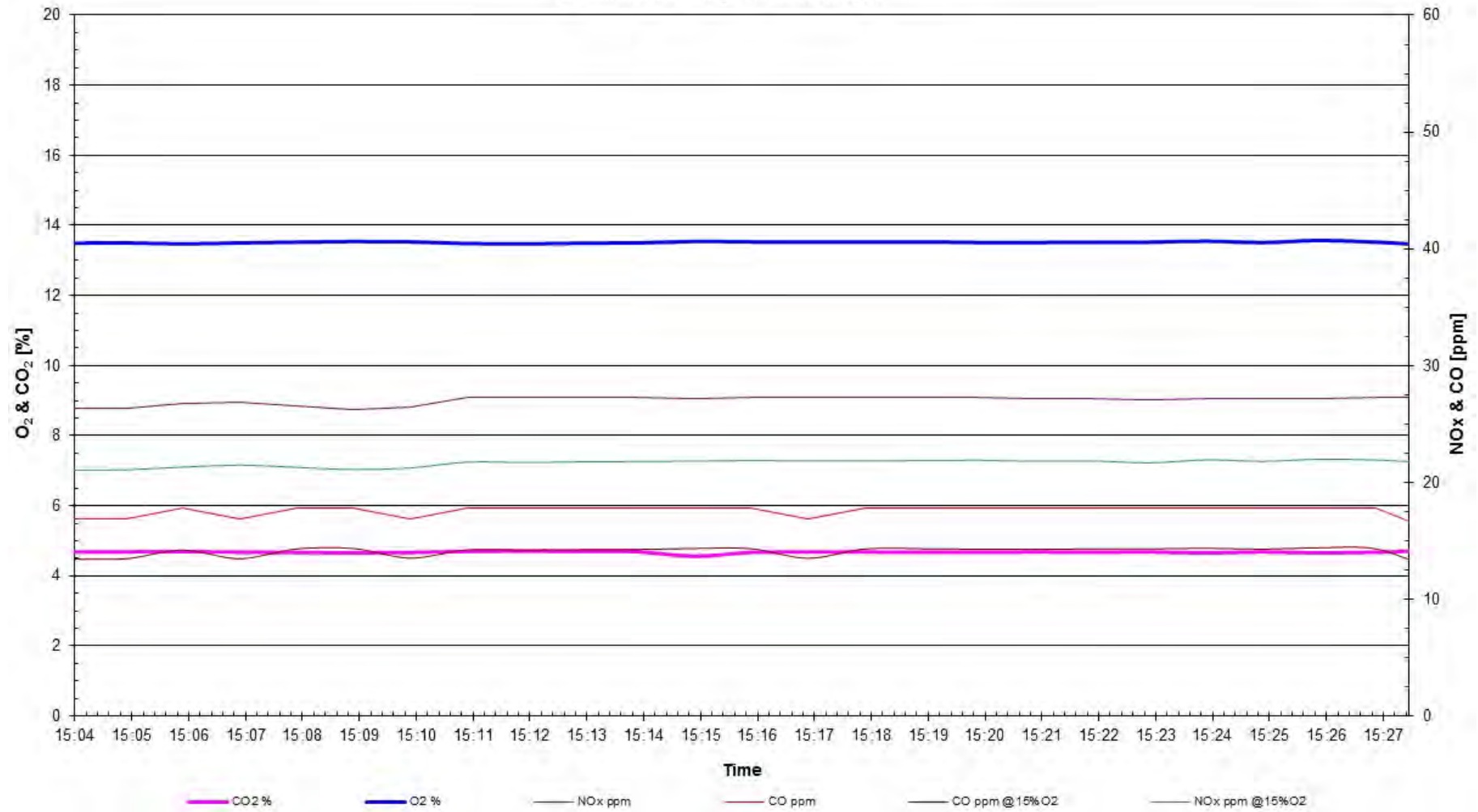
This flow rate has been used to calculate the oxides of nitrogen (NOx) mass emissions presented in **Table 6** for the measurement period from 15:25 hrs to 15:30 hrs, 12 September 2016. Emissions calculation data are attached in **Appendix A**.

**Table 6 - Emission Measurements for Unit 21 plant at Baseload Conditions**  
**Calculated average mass emission rate for NOx 15:25 hrs to 15:30 hrs, 12 September 2016**  
 Measurements taken on a dry gas basis.

Sample Time	Temp*	Velocity*	Moisture Content*	Volumetric Flow*	Rate of emission of total NOx (g/s as NO <sub>2</sub> )
	(°C)	(m/s)	(%)	(m <sup>3</sup> /s) (0°C, 1 atmosphere, on a dry gas basis)	(g/s as NO <sub>2</sub> )
<b>1520 - 1530</b>	----	----	<b>11.4</b>	<b>117</b>	<b>6.5</b>

\* Calculated from flow measurements taken between 1205 – 1210, natural gas consumption and CO2 emissions measured at that time.

**Contact Energy Unit 21 Peaker Plant Stack Emissions**  
**12 September 2016**  
 Instrumental monitoring - 1 minute averages



**Figure 1 - Graph of the Instrumental Monitoring Results for All Four Parameters Monitored Continuously on the Unit 21 Stack at 95MW**

### 4.3 Continuous Instrumental Monitoring Results – Lower GTG Load Conditions

On 12 September 2016 the Unit 21 gas turbine was stepped up and held up at a series of different operating loads throughout the period from 1300 hrs to 1530 hrs. The operating loads were 6, 30, 50, 70, and 95 MW. The emissions of NO<sub>x</sub> and CO were measured at each of the given loads.

Presented in **Table 7** are the results of the instrumental exhaust emissions monitoring data for the Unit 21 gas turbine. Results of the testing period are given as an average of 1-minute averages for each of the stated time periods. Note that the active power loads given in **Table 7** are approximate and that actual loads may have varied by  $\pm 1$  MW.

**Table 7 – Emission Measurements for Unit 21 plant at Lower GTG Load Conditions**  
Instrumental Monitoring based on 1-minute averages 1305 – 1527 hrs, 12 September 2016  
Measurements taken on a dry gas basis.

Time inclusive	Active Power	Oxygen	Carbon dioxide	Carbon monoxide corrected to 15% O <sub>2</sub>	Nitrogen oxides corrected to 15% O <sub>2</sub>
(Hrs)	(MW)	(%)	(%)	(ppm)	(ppm)
13:05 – 13:18	6	16.1	3.1	40.7	40.9
13:33 – 13:51	30	14.6	4.0	22.4	25.8
14:01 – 14:23	50	14.2	4.3	18.4	25.7
14:31 – 14:56	70	13.8	4.5	16.4	22.9
15:04 – 15:27	95	13.5	4.7	14.1	21.7
----	<b>Baseload</b>	----	----	----	----

## 5 Unit 22 Results

### 5.1 Continuous Instrumental Monitoring Results – Baseload Conditions

On 13 September 2016 the Unit 22 gas turbine was operating under normal baseload conditions throughout the period from 14:00 hrs to 14:16 hrs. During this time the Unit 22 gas turbine consumed natural gas at 21,540 Nm<sup>3</sup>/hr (5.3 kg/s) and had an average baseload power output of approximately 104 MW throughout the monitoring period.

Presented in the following section are the instrumental exhaust emissions monitoring data for the Unit 22 gas turbine from 14:05 hrs until 14:16 hrs on 13 September 2016. Results for the testing period are given as rolling 1-minute and 10-minute averages in **Table 8** and **Table 9**. Rolling averages for 10-minute data have been calculated from the 1-minute averages using a minimum of 90% valid data for each averaging time period (i.e. each rolling 10-minute average is calculated on the basis that they contain a minimum of nine 1-minute data points). The results of the sample run (as 1-minute averages) are depicted in **Figure 2**. Emissions calculation data are attached in **Appendix A**.

**Table 8 – Unit 22 Plant Emission Measurements at Baseload Conditions**

**Instrumental Monitoring based on 1-minute averages 1405 – 1416 hrs, 13 September 2016**  
Measurements taken on a dry gas basis.

Range	Oxygen	Carbon dioxide	Carbon monoxide	Nitrogen oxides
	(%)	(%)	(ppm)	(ppm)
Maximum	13.6	4.7	21.0	25.7
Minimum	13.3	4.5	18.0	24.4
<b>Average</b>	<b>13.4</b>	<b>4.6</b>	<b>20.7</b>	<b>25.1</b>
<b>Average (mg/Nm<sup>3</sup>):</b>			<b>25.9</b>	<b>51.5*</b>

\*expressed as mg/Nm<sup>3</sup> as NO<sub>2</sub> where Nm<sup>3</sup> refers to 0°C, 1-atmosphere, dry gas basis

**Table 9 – Unit 22 Plant Emission Measurements at Baseload Conditions**

**Instrumental Monitoring based on 10-minute averages 1405 – 1416 hrs, 13 September 2016**  
Measurements taken on a dry gas basis.

Range	Oxygen	Carbon dioxide	Carbon monoxide	Nitrogen oxides
	(%)	(%)	(ppm)	(ppm)
Maximum	13.4	4.7	21.0	25.1
Minimum	13.4	4.6	20.5	25.0
<b>Average</b>	<b>13.4</b>	<b>4.6</b>	<b>20.8</b>	<b>25.1</b>

## 5.2 Stack Flow Rates - Baseload Conditions

Stack flow rates were measured under baseload conditions between 14:05 hrs to 14:16, 13 September 2016. The plant operating conditions were stable throughout the time the flow measurements were taken. The exhaust gas flow rate from the Unit 22 gas turbine exhaust stack measured 42 m/s. The moisture content was calculated to be 11.0%. *Note that calculating flow rates and moisture levels from gas consumption are variations from standard U.S. EPA measurement methods.*

As with the Unit 21 stack, due to the position and size of the sound baffles within the stack, it is not possible to accurately measure the stack flow rate based on the velocities measured as the effective area of the stack is significantly impacted by the sound baffles to an unknown degree. Consequently the flow rates and moisture levels have been calculated based on the concentration of carbon dioxide emitted from the gas turbine measured at the time of sampling as presented herein. In addition, the volume of natural gas consumed, the composition of the natural gas and the mass of water being injected into the G.T. at the time the measurements were taken have also been used to calculate the flow rates and moisture content.

This flow rate has been used to calculate the oxides of nitrogen (NOx) mass emissions presented in **Table 10** for the measurement period from 14:05 hrs to 14:16, 13 September 2016. Emissions calculation data are attached in **Appendix A**.

**Table 10 - Emission Measurements for Unit 22 plant at Baseload Conditions**  
**Calculated average mass emission rate for NOx 1405 – 1416 hrs, 13 September 2016**  
 Measurements taken on a dry gas basis.

Sample Time	Temp*	Velocity*	Moisture Content*	Volumetric Flow*	Rate of emission of total NOx (g/s as NO <sub>2</sub> )
	(°C)	(m/s)	(%)	(m <sup>3</sup> /s) (0°C, 1 atmosphere, on a dry gas basis)	(g/s as NO <sub>2</sub> )
<b>1405 - 1415</b>	----	----	<b>11.0</b>	<b>148</b>	<b>7.6</b>

\* Calculated from flow measurements taken between 1405 – 1410, natural gas consumption and CO2 emissions measured at that time.

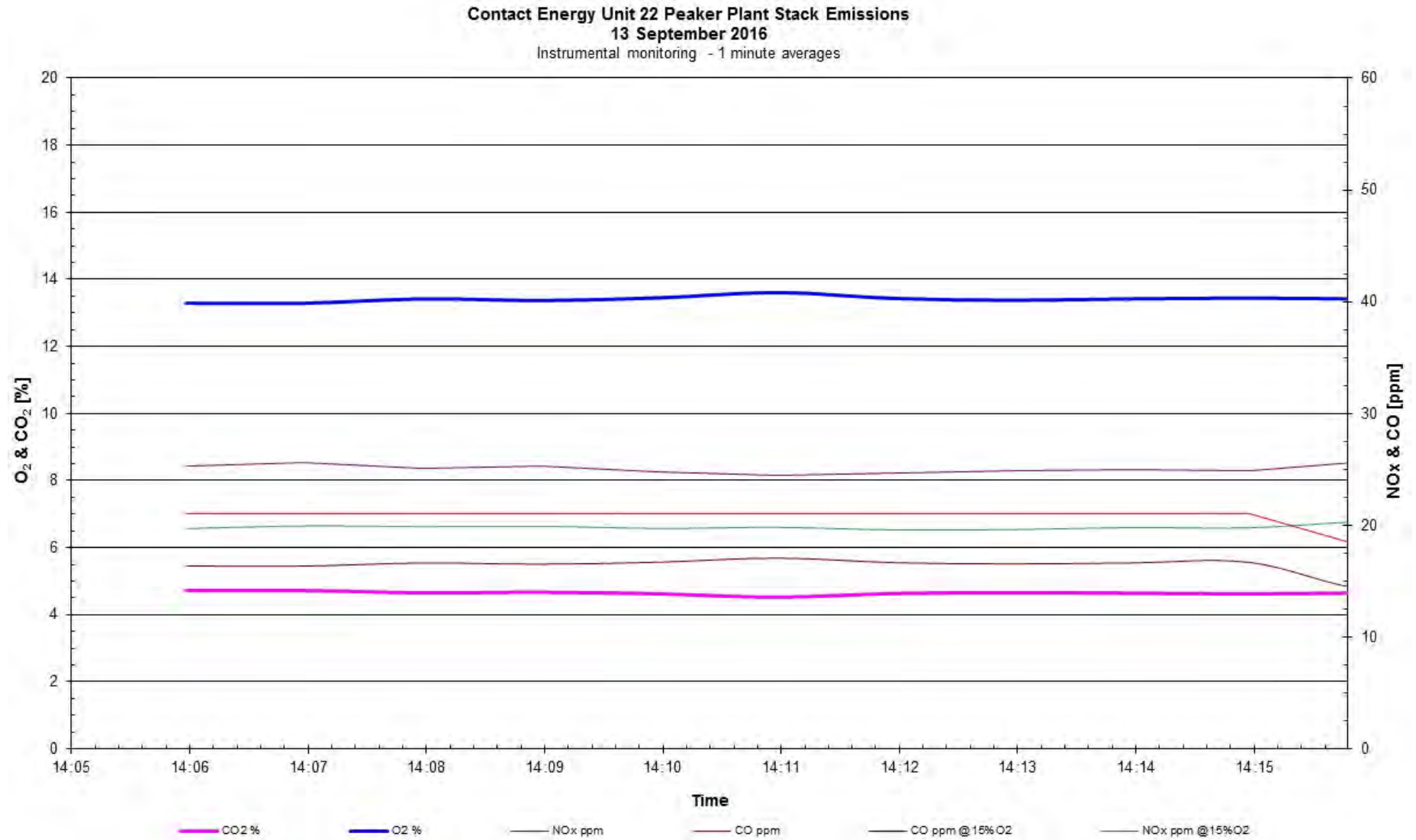


Figure 2 - Graph of the Instrumental Monitoring Results for All Four Parameters Monitored Continuously on the Unit 22 Stack at Baseload



### 5.3 Continuous Instrumental Monitoring Results – Lower GTG Load Conditions

On 13 September 2016 the Unit 22 gas turbine was stepped up and held up at a series of different operating loads throughout the period from 1130 hrs to 1430 hrs. The operating loads were 6, 30, 50, 70, 95, 104(baseload) and 107MW. The emissions of NO<sub>x</sub> and CO were measured at each of the given loads.

Presented in **Table 11** are the results of the instrumental exhaust emissions monitoring data for the Unit 22 gas turbine for each of the loads given. Results of the testing period are given as an average of 1-minute averages for each of the stated time periods. Note that the active power loads given in **Table 11** are approximate and that actual loads may have varied by  $\pm 1$ MW.

**Table 11 – Emission Measurements for Unit 22 plant at Lower GTG Load Conditions**  
Instrumental Monitoring based on 1-minute averages 1130 – 1430 hrs, 13 September 2016  
Measurements taken on a dry gas basis.

Time inclusive	Active Power	Oxygen	Carbon dioxide	Carbon monoxide corrected to 15% O <sub>2</sub>	Nitrogen oxides corrected to 15% O <sub>2</sub>
(Hrs)	(MW)	(%)	(%)	(ppm)	(ppm)
11:35 – 11:47	6	16.2	2.9	51.7	37.8
12:02 – 12:20	30	14.9	3.7	30.8	22.8
12:31 – 12:52	50	14.4	4.1	24.7	21.9
13:02 – 13:25	70	14.0	4.3	23.9	20.5
13:34 – 13:58	95	13.6	4.5	20.7	19.6
<b>14:05 – 14:16</b>	<b>Baseload</b>	<b>13.4</b>	<b>4.6</b>	<b>16.4</b>	<b>19.8</b>
14:19 – 14:30	107	13.4	4.7	14.8	19.9

## 6 Results Summary

**Table 12** summarises the instrumental emissions monitoring results for the two Contact Energy LMS100 PA Stratford peaker power plants at Baseload as sampled on 12 and 13 September 2016 and compares the results with the Taranaki Regional Council (TRC) Resource Consent compliance limits for the installation (refer to Section 1.2).

**Table 12 – Instrumental Monitoring Results Summary  
Contact Energy Stratford Peaker Plants Baseload Emissions**

Data based on 1-minute averages  
Measurements taken on a dry gas basis.

Parameter	Units	Emission Limit	Average Emission
<b>Unit 21 Emissions at Baseload</b>			
Oxides of Nitrogen (NO <sub>x</sub> )	ppm	125	<b>27.0</b>
	mg/Nm <sup>3</sup>	265 <sup>¥</sup>	<b>55.5*</b>
Mass emission rate for total oxides of nitrogen	g/s (expressed as NO <sub>2</sub> )	175	<b>6.5</b>
<b>Unit 22 Emissions at Baseload</b>			
Oxides of Nitrogen (NO <sub>x</sub> )	ppm	125	<b>25.1</b>
	mg/Nm <sup>3</sup>	265 <sup>¥</sup>	<b>51.5*</b>
Mass emission rate for total oxides of nitrogen	g/s (expressed as NO <sub>2</sub> )	175	<b>7.6</b>
<b>Total mass emission rate Units 21 and 22 at Baseload</b>			
Mass emission rate for total oxides of nitrogen <sup>#</sup>	kg/hour (expressed as NO <sub>2</sub> )	830	<b>14.1</b>

¥ Emission limit of 265 mg/Nm<sup>3</sup> (where Nm<sup>3</sup> refers to 0°C, 1-atmosphere, dry gas basis) converted from 100 mg.m<sup>-3</sup> at 450°C, as given in TRC air discharge permit 4022-2 compliance limit 7(c); equivalent to 100 mg.m<sup>-3</sup> at 450°C, or 125 ppm. (NB: 125ppm NO<sub>x</sub> is equivalent to 96.7mg/m<sup>3</sup> expressed as NO<sub>2</sub> at 450°C which equals 257 mg/Nm<sup>3</sup> expressed as NO<sub>2</sub>).

\* Expressed as mg/Nm<sup>3</sup> as NO<sub>2</sub> (where Nm<sup>3</sup> refers to 0°C, 1-atmosphere, dry gas basis).

# Mass emission rate of 830kg.hr<sup>-1</sup> is for the *entire site*, total emissions presented for the purposes of this report are for the two Stratford peaker plants *only*.

## 7 Discussion

The results of the instrumental monitoring exercise conducted on 12 and 13 September 2016 show that at the time of sampling, both the Contact Energy Unit 21 and Unit 22 LMS100 PA gas turbines were running within the compliance limits set by the Taranaki Regional Council resource consent N°4022-2.

*Report ends*

*Appendices follow page 17*

## Appendix A

# Emissions Calculation Data

The following **6** page(s) are the calculation spreadsheets which contain the results and calculations data presented in this report.

**Contact Energy Ltd, Unit 21, Taranaki.**
**Baseload 15:04 - 15:27, 12 September 2016**

95MW

1 MIN (NZST)	O2 %	CO2 %	CO ppm	NOx ppm	CO ppm @15%O2	NOx ppm @15%O2
12/09/16 15:04	13.49	4.69	16.83	26.34	13.45	21.05
12/09/16 15:05	13.50	4.69	16.83	26.34	13.47	21.08
12/09/16 15:06	13.47	4.70	17.82	26.74	14.21	21.32
12/09/16 15:07	13.50	4.68	16.83	26.84	13.47	21.48
12/09/16 15:08	13.52	4.67	17.82	26.54	14.30	21.29
12/09/16 15:09	13.54	4.66	17.82	26.23	14.34	21.11
12/09/16 15:10	13.53	4.67	16.83	26.43	13.53	21.24
12/09/16 15:11	13.48	4.70	17.82	27.24	14.23	21.74
12/09/16 15:12	13.47	4.71	17.82	27.24	14.21	21.71
12/09/16 15:13	13.49	4.70	17.83	27.24	14.25	21.77
12/09/16 15:14	13.50	4.69	17.83	27.23	14.27	21.79
12/09/16 15:15	13.54	4.56	17.83	27.13	14.34	21.83
12/09/16 15:16	13.53	4.67	17.83	27.23	14.32	21.88
12/09/16 15:17	13.52	4.68	16.84	27.23	13.51	21.85
12/09/16 15:18	13.52	4.68	17.83	27.23	14.30	21.85
12/09/16 15:19	13.53	4.67	17.83	27.23	14.32	21.88
12/09/16 15:20	13.51	4.67	17.83	27.32	14.29	21.90
12/09/16 15:21	13.51	4.68	17.83	27.22	14.29	21.81
12/09/16 15:22	13.52	4.67	17.83	27.22	14.30	21.84
12/09/16 15:23	13.52	4.68	17.83	27.02	14.30	21.68
12/09/16 15:24	13.55	4.65	17.83	27.22	14.36	21.93
12/09/16 15:25	13.51	4.68	17.83	27.22	14.29	21.81
12/09/16 15:26	13.57	4.65	17.83	27.21	14.40	21.98
12/09/16 15:27	13.52	4.67	17.83	27.31	14.31	21.92
12/09/16 15:28						
<b>Max</b>	13.57	4.71	17.83	27.32	14.40	21.98
<b>Min</b>	13.47	4.56	16.83	26.23	13.45	21.05
<b>Average</b>	13.52	4.67	17.62	27.01	14.13	21.66

**Contact Energy Ltd, Unit 22, Taranaki.**
**Baseload 14:05 - 14:16, 13 September 2016**

Baseload 104MW

<b>1 MIN (NZST)</b>	<b>O2 %</b>	<b>CO2 %</b>	<b>CO ppm</b>	<b>NOx ppm</b>	<b>CO ppm @15%O2</b>	<b>NOx ppm @15%O2</b>
13/09/16 14:05						
13/09/16 14:06	13.29	4.72	21.02	25.32	16.36	19.71
13/09/16 14:07	13.29	4.72	21.02	25.63	16.36	19.94
13/09/16 14:08	13.42	4.65	21.02	25.12	16.64	19.88
13/09/16 14:09	13.37	4.67	21.02	25.32	16.53	19.91
13/09/16 14:10	13.45	4.62	21.02	24.82	16.70	19.72
13/09/16 14:11	13.61	4.52	21.02	24.41	17.06	19.82
13/09/16 14:12	13.43	4.63	21.02	24.72	16.66	19.59
13/09/16 14:13	13.38	4.66	21.02	24.92	16.55	19.62
13/09/16 14:14	13.42	4.64	21.02	25.02	16.64	19.81
13/09/16 14:15	13.44	4.62	21.02	24.92	16.68	19.78
13/09/16 14:16	13.41	4.65	18.02	25.73	14.24	20.34
13/09/16 14:18						

<b>Max</b>	13.61	4.72	21.02	25.73	17.06	20.34
<b>Min</b>	13.29	4.52	18.02	24.41	14.24	19.59
<b>Average</b>	13.41	4.65	20.75	25.09	16.40	19.83

**Contact Energy Ltd, Unit 21, Taranaki.**  
**95MW 15:20 - 15:30, 12 Sep 2016**  
95MW (deNOx water injection ON)

Unit 21 CEMS Results - 95MW 15:20 - 15:30, 12 Sep 2016

Unit 21 - 12 Sep 2016

<b>1 MIN AVERAGE</b> (NZST)	<b>O2</b> %	<b>CO2</b> %	<b>CO</b> ppm	<b>NOx</b> ppm	<b>CO ppm</b> @ 15%O2	<b>NOx ppm</b> @ 15%O2
<b>Max</b>	13.57	4.71	17.83	27.32	14.40	21.98
<b>Min</b>	13.47	4.56	16.83	26.23	13.45	21.05
<b>Average</b>	13.52	4.67	17.62	27.01	14.13	21.66

Calculations for NOx & CO Mass Emissions

Unit 21 - 12 Sep 2016

Description	Concentration (ppm)	(mg/m3, 0°C, 1-atm, dry) as NO2	O2 correction factor 15	Conc at 15% O2 (mg/m3) NOx as NO2	Volumetric flow (m3/s, 0°C, 1-atm, dry)	Mass emission (O2 uncorrected) (g/s as NO2, 0°C, 1-atm, dry)
NOx	27.0	55.5	0.8007	44.4	116.84	6.48
CO	17.6	22.0	0.8007	17.6		
		O <sub>2</sub> %	13.5			

Sample Gas Molecular Weight

Unit 21 - 12 Sep 2016

Gas	MW	% in gas	
O2	32	13.5	432.54
CO2	44	4.7	207.17
H2O	18	11.4	204.48
CO	28	0.002	0.05
N2	28	70.41	1,971.56
			28.16

Pitot Reading and Flow Calculations

Unit 21 - 27 Aug 2014

Stack temperature (degs C)	418
Stack pressure (ins wg)	-2.56
Pitot constant	0.83
Flue gas molecular weight	28.16
Atmospheric Pres. (ins wg)	401.0

27/08/2014		12:05-12:10
Pitot reading		Velocity
Position	(ins wg)	(m/s)
1	1.51	32.48
2	2.26	39.74
3	2.70	43.43
4	2.74	43.76
5	2.69	43.35
6	2.90	45.01
7	2.88	44.86
8	2.77	43.99
9	2.73	43.68
10	2.70	43.43
11	2.20	39.21
12	1.50	32.37
13		
14		
Average		41.28


Overall Average Velocity for Unit 21 CEMS Results - 95MW 15:20 - 15:30, 12 Sep 2016

41.28 (m/s)

**Contact Energy Ltd, Unit 21, Taranaki.**

**95MW 15:20 - 15:30, 12 Sep 2016**

95MW (deNOx water injection ON)

**Velocity and Flow Rate** Unit 21 - 27 Aug 2014

Stack inner dimension	144 gas path diameter		
Effective diameter	3.66 m diameter		
Stack gas moisture	11.4 %		
Gas temp (°C)	Gas velocity (m/s)	Gas flowrate (m3/s)	Gas flowrate (m3/s @ 0°C, dry, 1 atm)
418	41.28	433.41	148.55

Flowrates at baseload, 0.00kg/s deNOx & sprint water injection, (12,454 SCFM gas consumption).

**Moisture emission & Gas consumption calculations** Unit 21 - 12 Sep 2016

Gas	MW (g/mol)				
CH4	16.0	CH4+2O2-->CO2+2H2O			
CH3CH3	30.1	CH3CH3 + 3.5O2 --> 3H2O + 2CO2			
CH3CH2CH3	44.1	C3H8 + 5O2 --> 3CO2 + 4H2O			
CH3CH2CH2CH3	58.1	C4H10 + 7O2 --> 4CO2 + 5H2O			
CO2	44.0				
H2O	18.0				
O2	32.0				
Actual Gas Consumption*	Nm3/hr	17,162			
Gas Composition*	% in gas	Nm3/hr	kg/hr	mols/hr	
CH4	82.9	14,232.4	10,193.1	635,377.1	
CH3CH3	6.1	1,050.3	1,409.9	46,889.0	
CH3CH2CH3	2.4	410.2	807.5	18,311.2	
CH3CH2CN2CH3	0.6	103.0	267.2	4,597.0	
CO2	7.0	1,204.8	2,367.0	53,784.5	
* Supplied by Contact Energy Ltd.		Total (kg/s):	4.18		
Convert to Products of Combustion		H2O (mol/hr)	CO2 (mol/hr)		
CH4		1,270,754.2	635,377.1		
CH3CH3		140,667.1	93,778.1		
CH3CH2CH3		73,245.0	54,933.7		
CH3CH2CH2CH3		22,984.8	18,387.9		
CO2		-	53,784.5		
<b>TOTAL</b>		1,507,651.1	856,261.2		
Convert to Mass of Products of Combustion		kg/hr	kg/s		
Total H2O		27,160.03	7.54		
Total CO2		37,683.20	10.47		
Approx. Air Intake Volume	Total Nm3/hr	403,475.09 <b>112.08</b>			
Water Content	kg/hr	+water injection	kg/hr	Nm3/hr	Moisture %
H2O	27,160	3.13	38,428	47,782	11.359%
Gas Volumetric Flow Rate	ppm	mg/m3	m3/s (0°C)		
CO2	45,598.1	89,586.0	116.844		



**Contact Energy Ltd, Unit 22, Taranaki.**

Baseload 14:05 - 14:16, 13 Sep 2016

Baseload 100MW (deNOx water injection at 0.00kg/s)

Unit 22 CEMS Results - Baseload 14:05 - 14:16, 13 Sep 2016 Unit 22 - 13 Sep 2016

1 MIN AVERAGE (NZST)	O2 %	CO2 %	CO ppm	NOx ppm	CO ppm @ 15%O2	NOx ppm @ 15%O2
<b>Max</b>	13.61	4.72	21.02	25.73	17.06	20.34
<b>Min</b>	13.29	4.52	18.02	24.41	14.24	19.59
<b>Average</b>	13.41	4.65	20.75	25.09	16.40	19.83

Calculations for NOx & CO Mass Emissions Unit 22 - 13 Sep 2016

Description	Concentration (ppm as NOx)	(mg/m3, 0°C, 1-atm, dry) as NO2	O2 correction factor 15	Conc at 15% O2 (mg/m3) NOx as NO2	Volumetric flow (m3/s, 0°C, 1-atm, dry)	Mass emission (O2 uncorrected) (g/s as NO2, 0°C, 1-atm, dry)
NOx	25.1	<b>51.5</b>	0.7894	40.7	147.86	<b>7.62</b>
CO	20.7	25.9	0.7894	20.5		
O2 %				13.4		

Sample Gas Molecular Weight Unit 22 - 13 Sep 2016

Gas	MW	% in gas	
O2	32	13.6	435.50
CO2	44	4.7	207.80
H2O	18	11.0	198.27
CO	28	0.002	0.06
N2	28	70.65	1,978.22
			28.20

Pitot Reading and Flow Calculations Unit 22 - 26 Aug 2014

Stack temperature (degs C)	411
Stack pressure (ins wg)	-1.95
Pitot constant	0.83
Flue gas molecular weight	28.20
Atmospheric Pres. (ins wg)	401.0

26/08/2014		15:10-15:25
Pitot reading		Velocity
Position	(ins wg)	(m/s)
1	1.90	36.20
2	2.20	38.95
3	2.31	39.91
4	2.37	40.43
5	2.70	43.15
6	2.80	43.94
7	2.99	45.41
8	3.01	45.56
9	2.90	44.72
10	2.30	39.83
11	2.10	38.05
12	1.79	35.13
13		
14		
Average		40.94



Overall Average Velocity for Unit 22 CEMS Results - Baseload 14:05 - 14:16, 13 Sep 2016 40.94 (m/s)

**Contact Energy Ltd, Unit 22, Taranaki.**

**Baseload 14:05 - 14:16, 13 Sep 2016**

Baseload 100MW (deNOx water injection at 0.00kg/s)

**Velocity and Flow Rate** Unit 22 - 26 Aug 2014

Stack inner dimension	144" m gas path diameter		
Effective diameter	3.66 m diameter		
Stack gas moisture	11.0 %		
Gas temp (°C)	Gas velocity (m/s)	Gas flowrate (m3/s)	Gas flowrate (m3/s @ 0°C, dry, 1 atm)
411	40.94	429.88	149.66

Flowrates at baseload, 3.75kg/s deNOx & sprint water injection, (12,398 Nm3/hr gas consumption).

**Moisture emission & Gas consumption calculations** Unit 22 - 13 Sep 2016

Gas	MW (g/mol)			
CH4	16.0	CH4+2O2-->CO2+2H2O		
CH3CH3	30.1	CH3CH3 + 3.5O2 --> 3H2O + 2CO2		
CH3CH2CH3	44.1	C3H8 + 5O2 --> 3CO2 + 4H2O		
CH3CH2CH2CH3	58.1	C4H10 + 7O2 --> 4CO2 + 5H2O		
CO2	44.0			
H2O	18.0			
O2	32.0			
Actual Gas Consumption*	Nm3/hr	21,540		
Gas Composition*	% in Exhaust	Nm3/hr	kg/hr	mols/hr
CH4	82.9	17,863.1	12,793.3	797,460.8
CH3CH3	6.1	1,318.2	1,769.6	58,850.4
CH3CH2CH3	2.4	514.8	1,013.4	22,982.4
CH3CH2CN2CH3	0.6	129.2	335.4	5,769.6
CO2	7.0	1,512.1	2,970.8	67,504.8
* Supplied by Contact Energy Ltd.		Total (kg/s):	5.25	
Convert to Products of Combustion		H2O (mol/hr)	CO2 (mol/hr)	
CH4		1,594,921.6	797,460.8	
CH3CH3		176,551.1	117,700.7	
CH3CH2CH3		91,929.6	68,947.2	
CH3CH2CH2CH3		28,848.2	23,078.6	
CO2		-	67,504.8	
<b>TOTAL</b>		1,892,250.5	1,074,692.1	
Convert to Mass of Products of Combustion		kg/hr	kg/s	
Total H2O		34,088.51	9.47	
Total CO2		47,296.13	13.14	
Approx. Air Intake Volume	Total Nm3/hr	510,764.20 <b>141.88</b>		
Water Content	kg/hr	+water injection	kg/hr	Nm3/hr
H2O	34,089	3.63	47,157	58,635
				<b>11.015%</b>
Gas Volumetric Flow Rate	ppm	mg/m3	m3/s (0°C)	
CO2	45,224.3	88,851.7	<b>147.862</b>	



## Appendix VI

Annual Report for 2017-2018 by Contact Energy  
Ltd



Taranaki Regional Council  
Private Bag 713  
Stratford

Attn: Nathan Crook

29 August 2018

Dear Nathan

**Subject: Stratford Power Station Annual Report for the period 1 July 2017 to 30 June 2018**

We are pleased to report that during the 20<sup>th</sup> year of Stratford Power Station 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 2017 to 30 June 2018.

Please find included an overview of plant operation with regard to consent monitoring and relevant operational changes for the year in review. Summary reports reflecting the last year are 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

A handwritten signature in blue ink that reads "Mark Evans".

Mark Evans  
Operations Supervisor - Taranaki

## Consent Monitoring Highlights for the period 1 July 2017 – 30 June 2018

### 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 1310125 m<sup>3</sup> with an average abstraction rate of 40.1 l/s. The maximum abstraction rate for the year was 140 l/s on 23 June 2018.

### Consent 5848-1 Waste Water Discharge into the Patea River:

#### 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 for the entire year.
- River temperature probes were calibrated periodically during the year in accordance with the maintenance plan.

The maximum River water temperature and difference between upstream and downstream temperatures occurred in January 2018 with a river water temperature of 23.25°C and differential of 0.81°C.

#### Discharge Flow:

The maximum recorded combined discharge flow for the year was 50.61l/s, this being within the discharge consent limit of 78 l/s.

The average combined discharge flow from the site was 15.46l/s for the year.

The total volume of wastewater discharged for the year from site was 448797m<sup>3</sup>. This equates to approximately 34.25% 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 often occur due to low sample volume 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 outflows within consent limits.



### **Consent 4459-1 Discharge storm water to Piakau and Kahouri Streams: Stratford Power Station:**

Storm water discharge remained within consent conditions for the entire year.

The TCC storm water pond overflowed into the neighbouring river on a number of occasions during the year due to high rainfall occurrences. These are included in monthly reporting statistics. The storm water collection pond was cleaned during this reporting period and a quantity of sand removed to improve collection capacity. During normal rainfall all storm water from both sites is collected and used within the process.

Reporting at the Piakau Well site abandonment project proved to be inadequate and this was dealt with internally with support from Regional Council representatives.

Ahuroa Diesel Storage systems were identified by CEL staff as an area for improvement and this was actioned.

### **Consent 4454-1 Discharge to air (TCC):**

The maximum hourly Nitrogen Oxides discharge rate from the plant for the reporting year was 89.6 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 24.9 ppm this is below the consent limit of 50 ppm.

Under start up and shut down operation, the plant is permitted to exceed the 50 ppm limit, the maximum emissions during these periods was 80.9 ppm.

Total Carbon Dioxide stack emissions were calculated to be 482441 tonnes for the year and the total Nitrogen Oxides emissions from the plant were recorded at 152 tonnes for the year.

The cooling tower plume was visible under low ambient conditions as allowed under consents.

### **Consent 4022-1 Discharge to air (SPP):**

On 22 May Gas Turbine 22 exhaust emission testing and engine tuning was undertaken by General Electric. Results indicated the unit to be well within consented limits. Gas Turbine 21 testing and tuning is programmed for the next reporting period.

The cooling tower plume was visible under low ambient conditions as allowed under consents.

Ongoing odour reports attributable to the cooling tower resulted in the suspect treatment being halted while options are considered. Cooling water system corrosion concerns exist and the use of an alternative product is expected to be submitted for approval in the near future.



## Inter Laboratory Comparisons and site inspections:

During the year, inter laboratory comparisons samples were taken on 2 occasions. 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 7<sup>th</sup> November 2017 and 5<sup>th</sup> March 18.

### Site Inspections Notices

Inspection Notice	Inspection Type	Date Issued	Consent	Comments
OBS-2018-44846	Compliance Monitoring	March 2018	All	All Compliant

## Plant Improvements:

This reporting Period has seen the largest efficiency improvement from the TCC plant since 2008.

The GT26 Gas Turbine firing control has evolved and the engine now has the ability to operate at variable fuel inlet pressures. A significant project has been undertaken removing the need for the Fuel Gas Compressors and their subsequent electrical load of 2000 kilowatts. This energy is now available for export and is especially effective in the low to mid load range where TCC often operates. Additionally this removes one of the noisier plant auxiliaries with the alternative pressure control stations being designed by local engineering consultants and CEL approving the additional costs to ensure operations within the TCC gas reception area remain below 85 decibels.

### Plant Operation:

#### TCC Number of Operational Days July 2017 – June 2018

July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June
31	18	0	0	0	15	30	14	0	2	31	30

#### GT21 Number of Operational Days July 2017 – June 2018

July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June
30	25	15	8	16	5	19	13	9	16	0	3

#### GT22 Number of Operational Days July 2016 – June 2017

July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June
31	29	18	13	24	25	22	14	18	22	0	0