Contact Energy
Stratford Power Station

Monitoring Programme

Annual Report

2022-2023

Technical Report 2023-35

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Taranaki Regional Council

Taranaki Regional Council
Private Bag 713
Stratford

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Executive summary

Contact Energy Ltd (the Company) operates the Stratford Power Station (SPS) located on State Highway 43 near Stratford in the Pātea catchment.

This report for the period July 2022 to June 2023 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company'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 Company activities.

During the monitoring period, the Company demonstrated an overall high level of environmental performance and a high level of administrative performance.

The Company holds 17 resource consents that are being exercised in relation to SPS, and these include a total of 154 conditions setting out the requirements that they must satisfy. The exercised consents provide for two gas-fired plants. These are a combined cycle plant, referred to as the Taranaki Combined Cycle (TCC) and a smaller open cycle peaking plant, referred to as the Stratford Peaker Plant (SPP). In addition, the Company holds seven consents that are yet to be exercised that were granted in connection with a facility that is yet to be built. This plant will be a copy of either of the two existing facilities. Some consents apply to the individual generation units, while others apply to the site as a whole.

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

The monitoring showed that the Stratford Power Station continued to be well managed with negligible environmental effects as a result of the exercise of their consents.

Surface water abstraction was compliant with daily rate and volume. Process water discharges were compliant with consent defined parameters. Surface water monitoring indicated negligible impacts from the discharge of process waters.

The thermal tolerances within the receiving waters were not exceeded for the duration of the monitoring period. This included during the summer low flows, during which time the thermal impacts on the receiving environment was found to be minimal.

Inter-laboratory comparisons indicated good agreement for the majority of parameters assessed this monitoring period.

Emissions monitoring results from the TCC were within consent defined specifications for the full duration of the monitoring period.

The SPP were stack tested with the resulting analysis indicating compliance with consent defined criteria.

The six yearly emissions report, as required by the consents, was previously submitted during December 2020. An update to the progress on the initiatives that were in progress at that time was provided during the year under review. The next six yearly report is due in the 2026-2027 year.

No odours were noted or communicated during the monitoring period.

For reference, in the 2022-2023 year, consent holders were found to achieve a high level of environmental performance and compliance for 878 (87%) of a total of 1007 consents monitored through the Taranaki tailored monitoring programmes, while for another 96 (10%) of the consents a good level of environmental performance and compliance was achieved. A further 27 (3%) of consents monitored required improvement in their performance, while the remaining one (<1%) achieved a rating of poor.

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 high level in the period under review.

Table of contents

List of tables

List of figures

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 2022 to June 2023 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Contact Energy Ltd (the Company). The Company operates two gas-fired power plants at Stratford Power Station, the Taranaki Combined Cycle Plant (TCC) and the Stratford Peaker Plant (SPP), situated on East Road (State Highway 43) near Stratford, in the Pātea catchment.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by the Company that relate to abstractions and discharges of water within the Pātea catchment, and the air discharge permits held by the Company to cover emissions to air from the site.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of the Company's use of water, land and air, and is the 25th combined annual report by the Council for the Company.

1.1.2 Structure of this report

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

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

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

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

Section 4 presents recommendations to be implemented in the 2022-2023 monitoring year.

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

1.1.3 The Resource Management Act 1991 and monitoring

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

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

1.1.4 Evaluation of environmental and administrative performance

Besides discussing the various details of the performance and extent of compliance by the consent holders, this report also assigns a rating as to each Company's environmental and administrative performance during the period under review. The rating categories are high, good, improvement required and poor for both environmental and administrative performance. The interpretations for these ratings are found in Appendix II.

For reference, in the 2022-2023 year, consent holders were found to achieve a high level of environmental performance and compliance for 878 (87%) of a total of 1007 consents monitored through the Taranaki tailored monitoring programmes, while for another 96 (10%) of the consents a good level of environmental performance and compliance was achieved. A further 27 (3%) of consents monitored required improvement in their performance, while the remaining one (<1%) achieved a rating of poor.[1]

1.2 Process description

Taranaki Combined Cycle Plant (TCC)

The Taranaki Combined Cycle Plant (Figure 1) was the first large-scale combined-cycle power plant to be built in New Zealand. The plant was completed in 1998. It utilises 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.

[1] The Council has used these compliance grading criteria for more than 19 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

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.

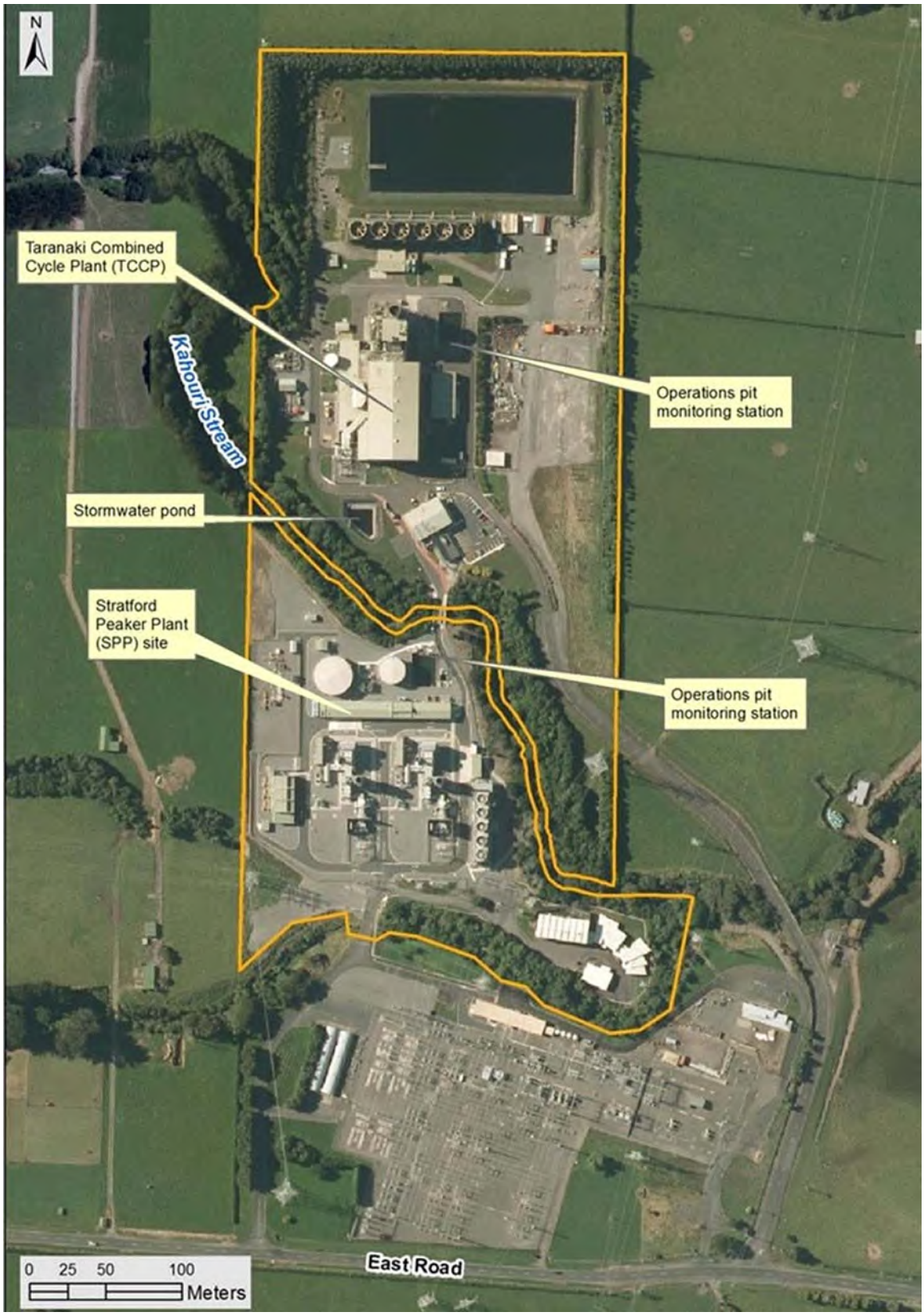

Figure 1 Aerial view of Stratford Power Station 2012

Water is abstracted from the Pātea 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 (SPP)

The Stratford Peaker Plant (Figure 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 Pātea River via the existing abstraction and storage system for the combined cycle plant. Wastewater is discharged to the Pātea 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 which was upgraded in September 2018.

1.3 Resource consents

The Company holds a total of 25 resource consents, the details of which are summarised in Table 1 below. Summaries of the conditions attached to each permit exercised are set out in Section 3 of this report.

A summary of the various consent types issued by the Council is included in Appendix I, as are copies of all permits held by the Company during the period under review.

Table 1 Summary of resource consents held by the Company

Consent Number	Purpose	Consent Granted/ Commencement Date	Change to Conditions Date	Next Review Date	Expiry Date
Discharge to Air Permits					
4022-2	Discharge emissions to air from fuel combustion	Dec 1994	Feb 2010	#	Expired 1 June 2022 -S124 protection
4454-1	Discharge contaminants to air from power station & ancillary plant	Aug 1995	Feb 2010	#	2029
5846-1.3*	Discharge contaminants to air from power station & ancillary plant	Jan 2017	-	2028	2034
7247-1	Discharge emissions to air from cooling tower	Mar 2008	-	2028	2034
7786-1.1*	Discharge contaminants to air from construction	Jan 2017	-	-	2028
Discharge to Water Permits					
5848-1	Discharge up to 78 L/s averaged over 15 minutes of used water to Pātea River	Mar 2008	Mar 2008	2028	2034
4459-1.3	Discharge stormwater to Kahouri/Piakau Streams	Jul 2016	-	-	2028

Consent Number	Purpose	Consent Granted/ Commencement Date	Change to Conditions Date	Next Review Date	Expiry Date
5633-1	Discharge sediment from water intake to Pātea River	May 2000	-	-	2028
5851-1.3*	Discharge sediment from water intake to Pātea River	Jan 2017	-	2028	2034
7785-1.1*	Discharge construction contaminants to Piakau/Kahouri Streams	Jan 2017	-	-	2028
Water Use Permits					
4455-1	Take up to 225 L/s averaged over 15 minutes from Pātea River below Toko confluence	May 1994	Mar 2008	-	2028
5847-1.3*	Take up to 225 L/s averaged over 15 minutes from Pātea River at Skinner Road	Jan 2017	-	2028	2034
Land Use Permits					
5849-1.3*	Gas pipeline structures on Kahouri Stream	Jan 2017	-	2028	2034
5850-1*	Intake structure on Pātea River at Skinner Road	Nov 2001	Mar 2008	2028	2034
4456-1	Intake structure on Pātea River below Toko confluence	May 1994	Jan 2000	-	2028
4458-1	Diffuser structure on Pātea River	May 1994	Mar 2008	-	2028
7248-1	Bridge for pedestrian access and utilities over Kahouri tributary	Mar 2008	-	2028	2034
7250-1	Bridge for pedestrian access and utilities over Kahouri Stream	Mar 2008	-	2028	2034
4804-1	Bridge for electricity transmission over unnamed tributary of Kahouri Stream	Mar 2012	-	-	2028
4460-1	Stormwater discharge structures (above unnamed tributary of Piakau Stream)	May 2012	-	-	2028
7605-1	Stormwater discharge structure in Kahouri Stream	Feb 2010	Jun 2010	-	2028
7653-1	Stormwater discharge structure in Kahouri Stream	Jun 2010	-	-	2028
4461-1	Utilities structures on Kahouri Stream	Mar 2012	-	-	2028
5852-1.4*	Utilities structures on Kahouri Stream	Jan 2017	-	2028	2034
4462-1	Water transmission structures above Toko Stream/unnamed streams	May 1994	Mar 2008	-	2028

*indicates consents not yet exercised – lapse date 6 December 2024.

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

It is noted that consent 4022-2 expired on 1 June 2022. Section 124 of the RMA provides for the consent holder to continue to operate under the conditions of the expired consent until a decision is made on the

renewal in certain circumstances. As the application to renew the consent was received more than six months prior to the expiry, this Section 124 protection applies.

1.4 Monitoring programme

1.4.1 Introduction

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

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

The monitoring programme for the Company consisted of five primary components.

1.4.2 Programme liaison and management

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

- ongoing liaison with resource consent holders over consent conditions and their interpretation and application;
- 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.

1.4.3 Site inspections

The Company site was visited four times during the monitoring period. These were conducted on 28 September 2022, 20 January 2023, 3 May 2023, and 9 June 2023.

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.

1.4.4 Chemical sampling

The Council undertook sampling of both the discharges from the site and the water quality upstream and downstream of the discharge point and mixing zone (Figure 2).

The used water discharges from both the TCCP and SPP were sampled on four occasions. The discharges were analysed for the analytes provided in Table 2.

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

Inter-lab comparisons of sample results were also conducted, with results provided in section 2.2.1.

Table 2 SPS chemical sampling analytes

Location	Analytes	
Discharges IND002023 IND002038	Chlorine (Total) Conductivity Dissolved reactive phosphorus (DRP) Un-ionised Ammonia NH_3 Ammoniacal Nitrogen NH_4	Oil and Grease pH Suspended solids Temperature Turbidity
Pātea River PAT000356 PAT000357	Conductivity Dissolved reactive phosphorus (DRP) Flow Un-ionised Ammonia NH_3 Ammoniacal Nitrogen NH_4	pH Suspended solids Temperature Turbidity

1.4.5 Biomonitoring surveys

Biological surveys were performed on 27 October 2022 and 30 March 2023 in the Pātea River, and a single survey on 1 May 2023 in the Kahouri Stream. These are to determine the effects of cooling water discharge, water abstraction and discharge of stormwater from the Company's combined cycle and peaker power stations.

These surveys include establishing macroinvertebrate abundance, their corresponding 'health' based on MCI and SQMCI ranges, site habitat characteristics and hydrology, and a summary of macroinvertebrate taxa present during the survey.

1.4.6 Provision of consent holder data

The Company 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 (Section 2.3.3). The Company also provided the Council with an annual report that is appended to this report.

Condition 3 of air discharge consent 4022-2 requires that the Company supply a report every six years that addresses specified matters. This report was last provided in December 2020. This consent expired on 1 June 2022, but if the schedule of reporting is continued in the re-issued consent, the next report would be due in December 2026.

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

2 Results

2.1 Water

2.1.1 Inspections

At the SPS combined cycle (TCC) plant and peaker plant (SPP) 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 Pātea 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.

Four inspections were undertaken by the Council at Contact Energy's facility, Stratford Power Station (SPS), in the 2022-2023 monitoring period. These were undertaken on the following dates:

Inspection 1: 28 September 2022

Inspection 2: 20 January 2023

Inspection 3: 3 May 2023

Inspection 4: 9 June 2023

During these inspections the following areas were also inspected;

- Peaker plant Ops pits (IND002038),
- Combined cycle Ops pit (IND002023),
- Stormwater pit (STW002032) and
- Diffuser on the Pātea River with respect to the process water discharge.

2.1.2 Inspection results and notes

The Company site appeared to be compliant across all consent conditions. In general, the site was found to be well kept with good housekeeping evident across the facility. Staff of the Company 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.

Across all consent aspects there appeared to be no visual environmental impacts (either air or water) at any of the discharge locations.

Throughout the 2022-2023 monitoring period temperature data was downloaded monthly from all four monitoring sites (upstream and downstream of the weir, Hungers Road & Vickers quarry) or were inspected

after high river flow conditions if required. No major temperature variances were observed throughout this period[2].

On 20 January 2023 it was noted that one of the pH probes in the chemistry shed for the TCC pond was to be replaced. The raw water pond had been dredged two weeks prior to the inspection on 3 May 2023 and the TCC pond was cleaned to remove duck weed shortly before the inspection on 9 June 2023. At this inspection it was noted that the TCC pond was slightly turbid with a brown colouration, however there were no visible effects in the receiving water as a result of the discharge.

Nil to minimal odour was noted during inspections, including downwind of the SPP cooling towers. Any issues found during inspections, as previously noted were minor and were quickly resolved, or planned to be resolved by the Company during the monitoring period.

Overall, there is good communication between the Company and the Council. This includes the supply of monthly monitoring reports from the Company to the Council as to the processes undertaken by the facility, highlights any abnormal operating conditions and consults with Council when matters that may affect environmental monitoring or performance are identified. This provides good transparency between both parties.

During the year under review, the communications focus on air related matters and are outlined in Section 2.3

2.1.3 Results of abstraction and discharge monitoring

Water abstractions are regulated under consent 4455. Monitoring of the abstraction system is undertaken at two locations. One is located at the Pātea 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). The Company also holds consent 5847 which is also related to water abstraction, however this is for a future proposed facility.

The record for water abstraction (Figure 3) is based on 15 minute average flows, rather than instantaneous values. This is undertaken to prevent short term spikes within the data set as a consequence 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 otherwise represent apparent but not actual breaches of the abstraction consent.

The analysis provided in Figure 3 indicated compliance with the consent defined maximum abstraction volume which is limited to 19,440 m^3/day. In addition, the analysis provided by Figure 4 indicated compliance with the maximum abstraction rate (<225 L/s), which was not exceeded for the duration of the monitoring period.

[2] The temperature change In the Pātea River between upstream of East Rd and downstream of East Rd and/or at Vickers Quarry was not able to be determined between 4 August 2022 and 19 October 2022 and from 25 January to 3 March 2023 due to loss of monitoring capacity during these periods.

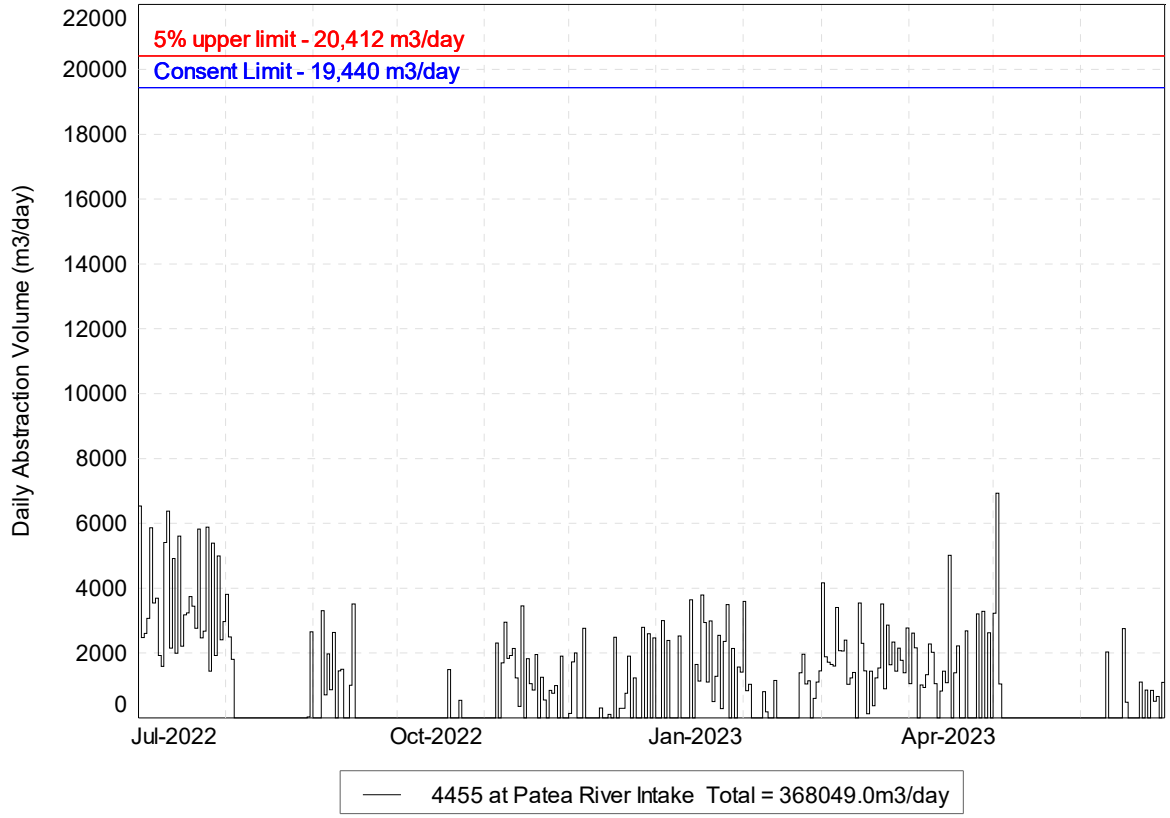

Figure 3 Consent 4455-1 daily abstraction from the Pātea River SPP

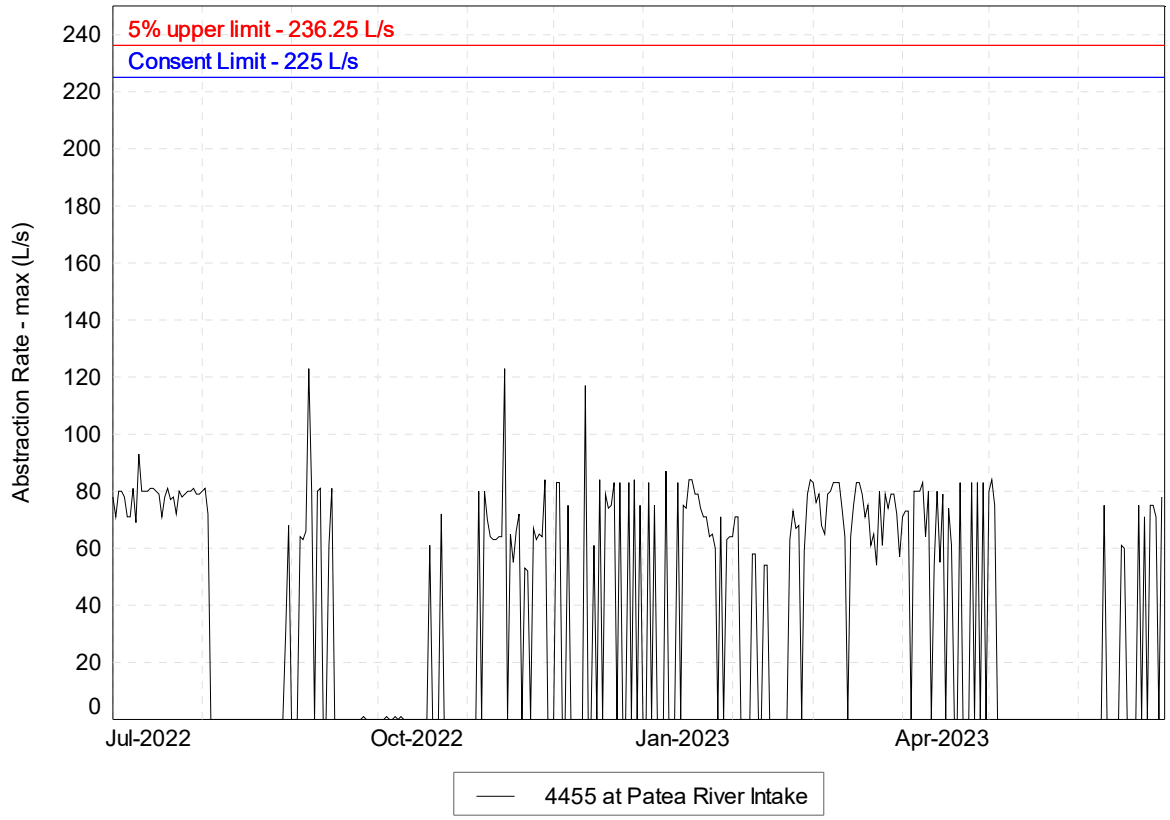

Figure 4 Abstraction rate maximum (L/s) Pātea River intake SPP 2022-2023

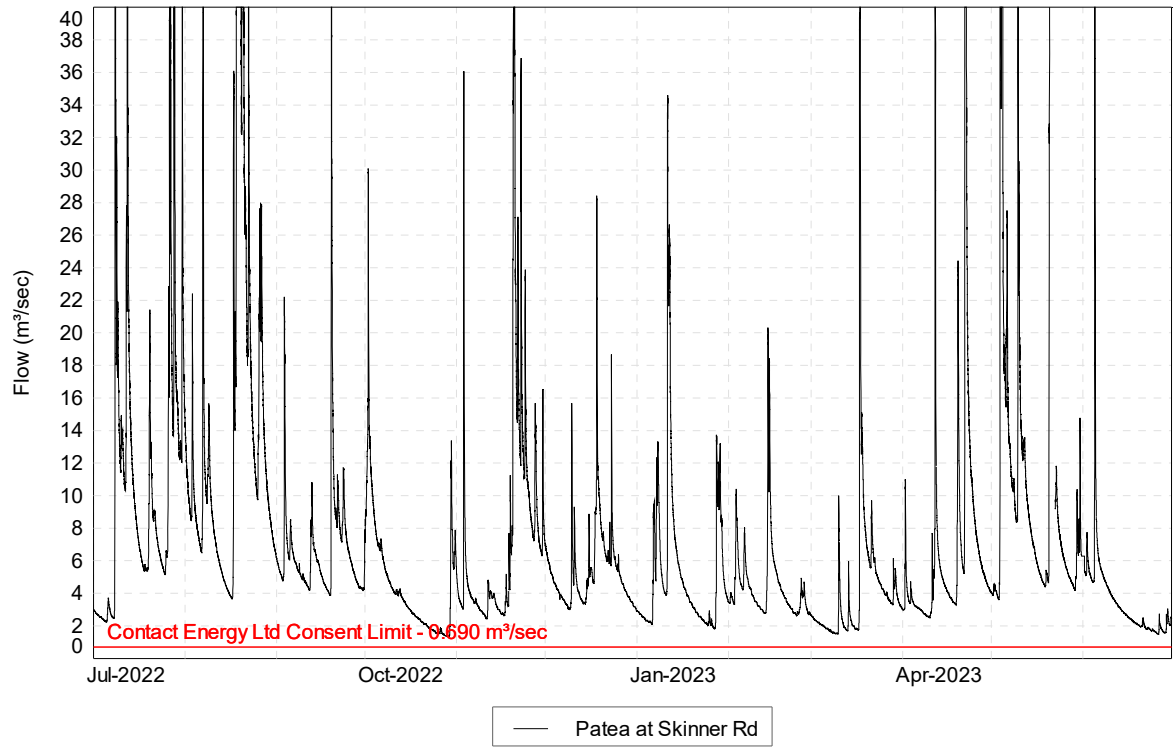

Figure 5 Pātea River flow (m^3/sec) at Skinner Road 2022-2023

2.1.3.1 Flow monitoring

The consent limit (4455-1) abstraction rate 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 permitted take rate varies when the river flows at Skinner Road are between 690 L/s and 765 L/s. At these times, the permitted take rate limit is up to the flow rate of the Pātea River at Skinner Road less 540 L/s. The record of the abstraction rate, as provided in Figure 4, can be compared against the river flow of Pātea River at Skinner Road (Figure 5).

The flow in the Pātea River did not drop below 765 L/s during the year under review, and therefore the abstraction rate limit of 225 L/s applied throughout this period.

The abstraction is setup so it is not possible to exceed a pump rate of 225 L/s. Throughout the 2022-2023 monitoring period the maximum 15 minute average abstraction flow rate recorded was 123 L/s (September and November 2022) with an overall average abstraction of 11 L/s (Table 3). The total volume abstracted throughout the monitoring period was 337,061 m^3. This was a decrease of 521,165 m^3 when compared to the previous monitoring period.

This abstraction volume was a decrease of 61% when compared to the previous monitoring period (2021-2022), across which the total abstraction volume was 858,226 m^3. The TCC was in operation for a total 37 days during the year under review. For comparison, in the previous monitoring period the TCC was in operation for 120 days, which is likely to account for the reduction in the volume of water abstracted this monitoring period.

Table 3 Monthly abstraction data from the Company 2022-2023

Month	Max. Abstraction L/s average	Ave. Abstraction L/s average	Total monthly volume (m^3)
July	93	39	105682
August	81	3	9016
September	123	6	15520
October	72	<1	496
November	123	11	27591
December	117	7	19313
January	87	14	37960
February	84	6	14158
March	83	20	54869
April	83	13	34967
May	84	3	9153
June	78	3	8335

2.1.4 Results of discharge monitoring

Consent 5848 covers the discharge of used waters (mainly blowdown water) from the cooling system of the combined cycle (TCC) and the water treatment plant that serves both of the peaker facilities (SPP) to the Pātea River (Figure 2).

The Company continuously monitors pH, chlorine, temperature (including the effluent of receiving waters) and flow of the effluents from both plants (TCC and SPP).

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

The Council samples the discharge from both plants. This is undertaken as close to quarterly as possible, although variations in the flow rate in the Pātea 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 temperature, pH, chlorine, conductivity, dissolved reactive phosphorus, ammonia (NH_4), oil and grease, total suspended solids, turbidity, flow rate and un-ionised ammonia (NH_3).

The Council analyses the discharge samples to determine compliance with the specific consent conditions on effluent composition (pH and chlorine), minimisation of phosphorus and ammonia and general effluent parameters for any significant change (conductivity, turbidity and suspended solids).

Consent 4459 covers the discharge of stormwater to the Kahouri 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 result 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 TCC 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 Pātea River, via the stormwater pond and Kahouri Stream.

The stormwater prior to discharge is monitored by the Company and its compliance limits as defined by consent 4459 are as follows:

- pH (6-9);
- Suspended solids (100 g/m^3); and
- Oil and grease (15 g/m^3).

2.1.4.1 Results of monitoring by the Company

Tables 4 and 5 detail the monthly summaries provided to the Council from the Company. They relate to monitoring of the Pātea 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 SPP effluent by the Company July 2022-June 2023

Month	SPP & TCC Max flowrate discharge	SPP & TCC Avg flowrate discharge	SPP Max Cl_2	SPP Avg Cl_2	SPP Max pH	SPP min pH	SPP Temp Max	SPP Temp Avg
	L/s avg 15mins	L/s	ppm	ppm	pH	pH	°C	°C
July	35.924	7.060	0.110	0.014	7.87	6.85	12.04	11.11
August	32.595	5.197	0.122	0.025	7.52	6.40	14.20	12.05
September	45.482	10.487	0.047	0.014	8.89	6.95	14.09	12.52
October	39.423	2.457	0.046	0.022	8.80	7.20	16.16	14.73
November	41.539	14.756	0.326	0.012	8.80	6.99	20.08	17.76
December	38.893	10.305	0.041	0.010	8.02	7.08	21.50	19.66
January	40.038	10.620	0.310	0.005	8.01	6.94	25.79	23.00
February	36.030	5.447	0.057	0.005	7.83	7.19	25.28	21.99
March	45.891	16.655	0.030	0.000	7.90	7.15	23.20	20.17
April	47.785	15.848	0.039	0.008	9.26	7.10	16.94	15.75
May	48.098	4.751	0.522	0.014	7.86	6.61	19.58	15.94
June	33.546	3.327	0.081	0.004	8.02	6.74	14.57	11.90

Table 5 Monitoring of TCC plant effluent by the Company July 2022-June 2023

Month	SPP & TCC Max flowrate discharge	SPP & TCC Avg flowrate discharge	TCC Max Cl_2	TCC Avg Cl_2	TCC Max pH	TCC min pH	TCC Temp Max	TCC Temp Avg
	L/s avg 15mins	L/s	ppm	ppm	pH	pH	°C	°C
July	35.924	7.060	0.732	0.007	7.90	6.78	22.17	19.58
August	32.595	5.197	1.030	0.016	8.88	6.12	17.69	13.39
September	45.482	10.487	0.300	0.023	8.93	6.97	15.48	12.26
October	39.423	2.457	0.049	0.036	8.71	7.87	17.89	14.74

Month	SPP & TCC Max flowrate discharge	SPP & TCC Avg flowrate discharge	TCC Max Cl_2	TCC Avg Cl_2	TCC Max pH	TCC min pH	TCC Temp Max	TCC Temp Avg
	L/s avg 15mins	L/s	ppm	ppm	pH	pH	°C	°C
November	41.539	14.756	0.289	0.003	8.41	7.29	21.19	19.18
December	38.893	10.305	0.202	0.003	8.62	6.61	24.61	20.36
January	40.038	10.620	0.600	0.002	8.91	7.52	24.19	22.10
February	36.030	5.447	0.283	0.019	8.22	6.89	22.19	19.35
March	45.891	16.655	0.173	0.001	8.84	7.29	20.70	19.19
April	47.785	15.848	0.713	0.018	8.48	7.01	17.78	16.25
May	48.098	4.751	0.932	0.014	8.13	6.94	22.11	16.11
June	33.546	3.327	0.046	0.036	8.49	7.03	12.66	11.86

2.1.4.1.1 Flow

The discharges from the Company in the 2022-2023 monitoring period were compliant with the associated consent limit which stipulates a rate of <78 L/s.

In 2022-2023, the average combined discharge flow from both plants (TCC and SPP) was 8.91 L/s, and the maximum recorded discharge flow rate was 48.1 L/s, recorded in May 2023. The total volume of wastewater discharged for the year was 274,818 m^3. This was a 37.5% decrease when compared to the previous monitoring period, when 439,593 m^3 was discharged. This decrease is most likely due to the reduction in operational hours as discussed in the previous section. The total volume of water discharged from the site during the year under review equated to approximately 81.5% of the total volume of the water abstracted. This demonstrates that most of the water abstracted was returned to the river upstream of the abstraction point.

2.1.4.1.2 Chlorine

The consent limit for total residual chlorine is 0.05 g/m^3 (0.05 ppm). The yearly average value for chlorine within the discharge from the TCC was recorded as 0.01 ppm. High chlorine values were recorded on several occasions, with a maximum value of 1.03 ppm recorded during August 2022. The Company has advised that the high values can occur due to low sample volume when the circulation pump has been stopped due to low water level in the wastewater pit. When the chlorine values at or above 0.05 ppm are recorded, the control system involves the process of closing the outlet valve to prohibit discharge, thus keeping outflows within consent limits.

For the SPP, the yearly average value was recorded as 0.01 ppm chlorine, while the maximum recorded chlorine was found to be 0.52 ppm. This was recorded during May 2023. Again, the control system engages and ceases the discharge prior to elevated chlorine process water discharging.

2.1.4.1.3 pH

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

For the TCC the minimum pH observed was pH 6.12, recorded in August 2022. The maximum observed was pH 8.93, recorded in September 2022. For SPP the minimum pH recorded was pH 6.40, recorded in August 2022. The yearly maximum was recorded as pH 8.89, recorded during September 2022.

When the continuous pH monitors indicate an exceedance with respect to the pH range limit, the wastewater discharge valve, at the relevant operations pit, on site automatically closes immediately (within one minute). This prevents the non-compliant discharge entering 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.

2.1.4.1.4 Temperature

Condition 10 of consent 5848-1 specifies that the discharge shall not raise the temperature of the Pātea River above 25°C. In addition to the self-monitoring undertaken by the Company, the Council also monitors the temperature of the Pātea River at East Road, upstream and downstream of this discharge.

During the period from 16 August 2022 to 10 October 2022 both of the Council's loggers were removed for a service/replacement. There is also no data for the monitoring site downstream of East Road from 25 January to 3 March 2023 because the logger was washed away by high flows.

The Company's downstream temperature logger was replaced on 4 April 2023, resulting in an erroneous maximum daily temperature of 28.68°C being recorded and reported to the Council, along with an explanation of events. The actual temperature maximum downstream of the site on this day was 15.96°C and the maximum temperature differential on this day was 0.21°C.

The ambient river temperature upstream of the site remained below the 25°C consented limit for the full duration of the monitoring period (Figure 6), thereby allowing for continuous discharge if required. Although some of the data from the Council's upstream and downstream site was lost, the maximum upstream temperature recorded was 20.14°C on 4 February 2023, and downstream maximum was 20.18°C on 29 December 2022. Self-monitoring data provided by the Company confirmed that the maximum temperature recorded by their downstream logger was also 20.18°C on 29 December 2022. The Company complied with the 25°C temperature limit at the downstream monitoring location throughout the monitoring period (Figure 7).

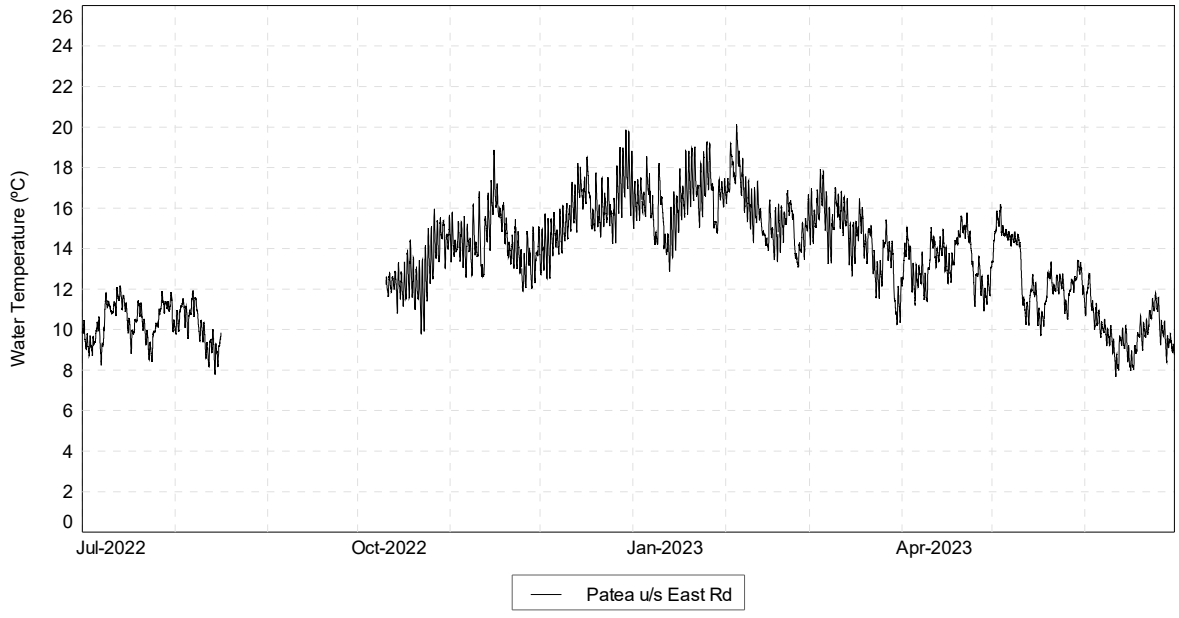

Figure 6 Pātea River temperature at East Road upstream of the plant during the year under review

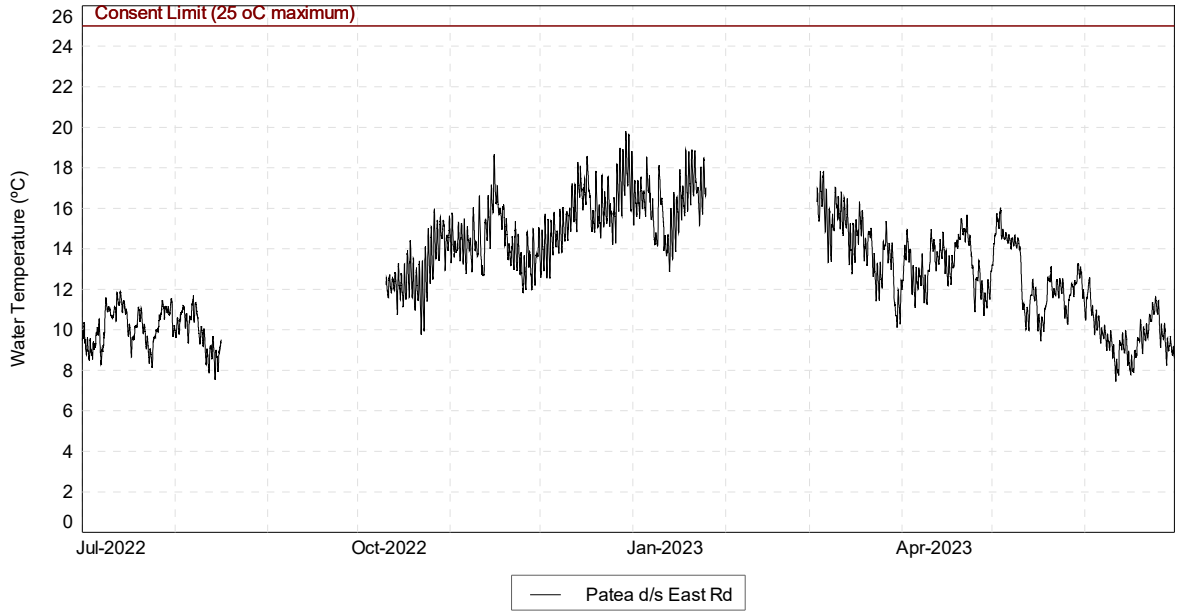

Figure 7 Pātea River temperature at East Road downstream of the plant during the year under review

Consent 5848-1 (condition 9) also specifies that the discharge shall not alter the ambient water temperature of the receiving waters of the Pātea River by more than 2°C at any time, and by no more than 1.5°C for 95% of the time, on an annual basis.

Monitoring showed that the river temperature differentials also remained within consent limits (Figure 8). A maximum differential of 0.46°C was recorded on 31 July and 11 November 2022. This is in comparison with the temperature differential of 0.45°C reported by Company, which was recorded as the annual maximum differential during the month of November 2022.

The National Environmental Standard covering measurement and collection of the instream temperatures gives maximum permitted off-sets of ± 0.8˚C deviation at each monitoring location (± 0.5˚C, with an additional off-set of ± 0.3˚C allowed for due to errors on the thermometer used to perform the calibration), and a consequent potential error of up to ± 1.6˚C on any calculated temperature differentials overall. Therefore the difference between the Company's temperature differential and that recorded by the Council minimal and well within the potential error provided for in the Standard.

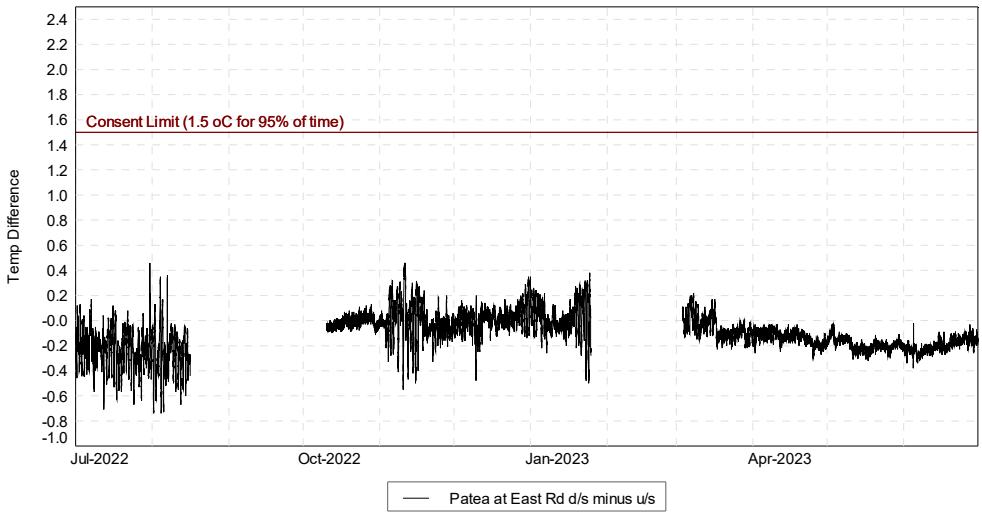

Figure 8 Temperature differential in the Pātea River at East Road during the year under review, upstream minus downstream of the plant

2.1.4.2 Discharges to the Kahouri Stream

The Company recorded 28 occasions where stormwater was discharged to the Kahouri Stream during the 2022-2023 monitoring period. These discharges occurred during high rainfall events. Stormwater monitoring is undertaken by the Company.

2.2 Results of receiving environment monitoring

2.2.1 Inter-lab Comparisons

The results of the Council monitoring of the effluent from the TCC and SPP in the 2022-2023 monitoring period are provided in Tables 6 and 7. Included in these tables are the corresponding concentrations of the continuous effluent monitoring provide by the Company for pH and chlorine and the associated grab samples, undertaken for validation of the continuous analysis.

Compliance monitoring

Specifically consent 5848-1 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^3.

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

Comparison exercises

Inter-laboratory comparisons were undertaken between the Company and the Council on four occasions during this monitoring period.

The analysis provided in Tables 6 and 7 indicated that the facility was operating within its consent conditions in terms of pH and total residual chlorine. Although there were some exceptions, for the most part, the inter-laboratory comparison exercises indicated good agreement across all parameters.

Table 6 Inter-laboratory comparisons September 2022 and January 2023

28 Sep 2022	Site	IND002038 (Stratford Peaker Plant SPP)		IND002023 (Taranaki Combined Cycle TCC)	
	Units	Contact	TRC	Contact	TRC
Time	**NZST**	12:40	12:40	13:03	13:03
pH (lab)	**pH**	8.35	7.3	8.23	8.0
Total Cl_2 (Company lab and Council lab)	**mg/L**	0.03	0.19	0.02	<0.07
Turbidity	**NTU**	4.48	6.1	1.57	1.19
Oil and grease	**g/m^3**	A	<4	A	<4
Conductivity (lab)	**µS/cm @ 25°C**	219	225	275	274
Conductivity	**mS/m**	21.9	22.5	27.5	27.4
Phosphate (DRP)	**g/m^3**	2.51	0.78	N/P	0.008
Discharge flow (meter)	**L/s**	14.6	N/P	31.4	N/P
pH (meter)	**pH**	8.55	N/P	8.29	N/P
Total Cl_2 (continuous meter)	**mg/L**	0	N/P	0.04	N/P

28 Sep 2022	Site	IND002038 (Stratford Peaker Plant SPP)		IND002023 (Taranaki Combined Cycle TCC)	
	Units	Contact	TRC	Contact	TRC
Temperature (continuous meter and TRC probe)	°C	11.0	15.1	15.1	15.6
TSS	g/m³	N/P	15	N/P	<3
Ammoniacal nitrogen	g/m³	N/P	<0.010	N/P	0.016
Un-ionised Ammonia	g/m³	N/P	<0.00006	N/P	0.0005
20 Jan 2023	Site	IND002038 (Stratford Peaker Plant SPP)		IND002023 (Taranaki Combined Cycle TCC)	
	Units	Contact	TRC	Contact	TRC
Time	NZST	9:25	9:25	9:35	9:35
pH (lab)	pH	7.19	7.2	8.37	8.3
Total Cl_2 (Company lab and Council lab)	mg/L	0	<0.07	0	<0.07
Turbidity	NTU	2.26	2.0	0.86	0.74
Oil and grease	g/m³	A	<4	A	<4
Conductivity (lab)	µS/cm @ 25°C	426	395	128.1	129
Conductivity	mS/m	42.6	39.5	12.81	12.9
Phosphate (DRP)	g/m³	1.64	0.46	N/P	0.006
Discharge flow (meter)	L/s	15.5	N/P	13.4	N/P
pH (meter)	pH	7.01	N/P	8.51	N/P
Total Cl_2 (continuous meter)	mg/L	0	N/P	0	N/P
Temperature (continuous meter and TRC probe)	°C	20.6	22.4	22.6	22.2
TSS	g/m³	N/P	14	N/P	<3
Ammoniacal nitrogen	g/m³	N/P	0.017	N/P	0.026
Un-ionised Ammonia	g/m³	N/P	0.00011	N/P	0.0021

N/P = Not provided

A = Absent

Table 7 Inter-laboratory comparisons May 2023 and June 2023

3 May 2023	Site	IND002038 (Stratford Peaker Plant SPP)		IND002023 (Taranaki Combined Cycle TCC)	
	Units	Contact	TRC	Contact	TRC
Time	NZST	9:30	9:30	9:45	9:45
pH (lab)	pH	7.08	7.3	7.16	7.3
Total Cl2 (Company lab and Council lab)	mg/L	0.02	<0.07	0	<0.07
Turbidity	NTU	4.79	2.6	3.05	2.3
Oil and grease	g/m³	A	<4	A	<4
Conductivity (lab)	µS/cm @ 25°C	373	376	793	808
Conductivity	mS/m	37.3	37.6	79.3	80.8
Phosphate (DRP)	g/m³-P	1.02	1.09	N/P	0.059

3 May 2023	Site	IND002038 (Stratford Peaker Plant SPP)		IND002023 (Taranaki Combined Cycle TCC)	
	Units	Contact	TRC	Contact	TRC
Discharge flow (meter)	L/s	15.8	N/P	20.6	N/P
pH (meter)	pH	7.11	N/P	7.39	N/P
Total Cl2 (continuous meter)	mg/L	0	N/P	0.01	N/P
Temperature (meter)	°C	15.4	20.0	20.6	17.4
TSS	g/m^3	N/P	26	N/P	7
Ammoniacal nitrogen	g/m^3	N/P	0.16	N/P	0.081
Un-ionised Ammonia	g/m^3	N/P	0.0012	N/P	0.00056
9 June 2023	Site	IND002038 (Stratford Peaker Plant SPP)		IND002023 (Taranaki Combined Cycle TCC)	
	Units	Contact	TRC	Contact	TRC
Time	NZST	9:35	9:35	9:40	9:40
pH (lab)	pH	7.32	7.4	7.31	7.5
Total Cl2 (Company lab and Council lab)	mg/L	0	<0.07	0.04	<0.07
Turbidity	NTU	1.7	1.29	3.6	3.6
Oil and grease	g/m^3	A	<4	A	<0.4
Conductivity (lab)	µS/cm @25°C	237	239	242	244
Conductivity	mS/m	23.7	23.9	24.2	24.4
Phosphate (DRP)	g/m^3-P	0.31	0.29	N/P	0.005
Discharge flow (meter)	L/s	15.1	15.1	15.2	15.2
pH (meter)	pH	7.24	N/P	7.04	N/P
Total Cl2 (continuous meter)	mg/L	0	N/P	0.02	N/P
Temperature (meter)	°C	11.0	11.0	11.7	11.8
TSS	g/m^3	N/P	7	N/P	9
Ammoniacal nitrogen	g/m^3	N/P	0.03	N/P	<0.010
Un-ionised Ammonia	g/m^3	N/P	0.00014	N/P	<0.00007

N/P = Not provided
A = Absent

The results of the four inter-laboratory comparisons undertaken in this monitoring period were provided in the above Tables 6 and 7. The results indicated the following:

- All results were within consent limits.
- In seven of the eight Inter-laboratory comparison samples, pH variations were found to be relatively minor, with the variation being up to 0.2 pH units. An exception to this was in the sample collected from the SPP discharge on 28 September 2022. At this time there was a discrepancy of approximately 1 pH unit. The probe was subsequently replaced by the Company. In terms of consents; 5848-1 requires the pH of the discharge to remain within set standards (6-9 pH), the values recorded indicated compliance with this consent limit on the four occasions it was assessed.
- Total chlorine levels are assessed in the Council laboratory, and in the Company laboratory, levels are also continuously monitored at the discharge point through a meter. The highest concentration of total Cl_2 found was 0.19 mg/L in the SPP sample collected during September 2022 and analysed by the Council. This result was significantly different from the results achieved by the Company from both the continuous meter (0.03 mg/L) and their laboratory test (0 mg/L). This is the first time a

discrepancy of this magnitude has been found for this analyte. It is not known why there was this discrepancy, but is most likely due to the inaccuracy at the time of the chlorine meter (it has since been calibrated and appears to be functioning correctly since). As both the continuous meter and the Company's laboratory result correlated with each other, and the levels were well within the consent limit, this result is more than likely to be an anomaly.

- The temperature comparisons indicated good agreement for the TCC on all but one occasion and for the SPP on one of the four occasions. Notable discrepancies were recorded for the SPP discharge on 28 September 2022, 20 January 2023, and 3 May 2023 and for the TCC discharge on 3 May 2023. On each occasion the Company corrected the off-sets promptly.
- Throughout this monitoring period both ammonia and un-ionised ammonia levels were monitored by the Council. The results indicated that levels of ammonia and un-ionised ammonia were all relatively low. The highest recording of ammonia was 0.16 g/m^3 recorded in May 2023 in the SPP discharge, while the highest recording for un-ionised ammonia was 0.0012 g/m^3 recorded again in May 2023 in the SPP discharge.
- Turbidity comparisons demonstrated reasonable agreement across both plants and all four inter-laboratory exercises. The largest discrepancy was recorded at 2.19 NTU in May 2023 in the SPP discharge. Across the monitoring period the Company were generally recording higher values in comparison to the Council.
- Oil levels were measured in g/m^3 by the Council, and visual checks by the Company. All results obtained by the Council were below the detection limit of 0.4 g/m^3.
- Conductivity comparisons indicated good agreement between the two laboratories. The largest variation between the two laboratories was 31 µS/cm points recorded in January 2023 in the SPP discharge. This a minor variation.
- Phosphate comparisons indicated some slight variation in results. The largest variation between the two laboratories was 1.73 g/m^3, recorded in September 2022 in the SPP site. The Council has previously made the Company aware of the tendency for variation in this parameter and the Company has been working towards gaining better agreement in this analyte. Following further investigation, the Company advised the Council that the discrepancy was due to reporting differences. The Company had been reporting the results as g/m^3 of phosphate (PO_4), whereas the Council reports results as g/m^3 phosphorous (P). The conversion factor was applied to historical results and it was found that there was generally good agreement achievement between results. It is further noted that good agreement was also achieved in the May and June monitoring rounds.
- Total Suspended Solids (TSS) observations were monitored only by Council during this monitoring period. The highest reading of TSS was 26 g/m^3 recorded in May 2023 in the SPP discharge.

2.2.2 Physicochemical monitoring by the Council

On four occasions in the 2022-2023 monitoring period water quality samples were collected from the Pātea River. There are two sample sites (Figure 2) in respect to the discharge of monitored plant effluent from the Company. 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 m mixing zone (PAT000357), aimed at assessing any actual or likely effect of the discharge.

The results of the four monitoring rounds on the Pātea River are presented in Table 8.

Table 8 Surface water monitoring Pātea River July 2022 - June 2023

Parameter	Discharge origin	TCC and SPP		TCC and SPP		TCC and SPP		TCC and SPP	
	Site	PAT000356	PAT000357	PAT000356	PAT000357	PAT000356	PAT000357	PAT000356	PAT000357
	Collected	28 Sep 22	28 Sep 22	20 Jan 23	20 Jan 23	03 May 23	03 May 23	09 Jun 23	09 Jun 23
	Time (NZST)	13:15	13:10	10:25	10:10	10:20	10:15	10:15	10:10
	Unit/Location	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
Dissolved Reactive Phosphorus	g/m^3	0.041	0.045	0.054	0.059	0.050	0.055	0.048	0.045
Electrical Conductivity	mS/m	10.2	10.8	10.9	11.5	10.0	11.6	10.4	10.6
Free Ammonia as N	g/m^3	0.0008	0.0019	0.00099	0.00076	0.00125	0.00104	0.00098	0.00091
pH	pH Units	7.2	7.7	7.7	7.6	7.6	7.6	7.4	7.4
Sample Temperature	°C	13.5	12.5	16.7	16.7	15.0	15.2	9.0	9.1
Total Ammoniacal-N	g/m^3	0.194	0.170	0.071	0.058	0.110	0.094	0.240	0.195
Total Suspended Solids	g/m^3	< 3	< 3	3	< 3	< 3	9	< 3	3
Turbidity	FNU[3]	0.71	0.86	1.16	1.15	1.35	1.85	1.16	1.02

The analysis provided in Table 8 indicate that the plant effluents from the two operation areas of SPP and TCC were having a minimal effect on Pātea River at the time of sampling.

The monitoring indicated the following:

- Dissolved reactive phosphorus (DRP) results recorded minimal increases between both sites. The largest increase between the two sites was found during the January and May 2023 monitoring rounds with an increase of 0.005 g/m^3.
- Electrical conductivity (EC) values indicated slight increases between the two monitoring sites across the four monitoring rounds. The largest increase was found in the May 2023 monitoring round with an increase of 1.6 mS/m.
- Free ammonia (NH_3) was recorded at very low concentrations throughout the monitoring period. The largest increase of free ammonia was recorded during the September 2022 monitoring round with an increase of 0.0011 g/m^3, which is minimal, and well below the consent limit of 0.025 g/m^3.
- pH results indicated values that were approximately neutral pH (approximately pH 7). The range recorded was 7.2-7.7 pH units, with the highest reading recorded downstream of the site during the September 2022 survey. The largest increase in pH was also observed in the receiving water at the time of this survey, with an increase of 0.5 pH units between the upstream and downstream sites. There is no specific limit on the pH conditions in the receiving water, however the consent does

[3] FNU – Formazin Nephelometric Unit, a measure of scattered light at 90 degrees from the incident light beam.

prohibit the discharge from giving rise to a barrier preventing the movement of fish. The change does not exceed the ±0.5 pH above which the change in pH may result in a barrier to fish passage.

- Surface water temperatures ranged from 9.0-16.7°C this monitoring period. The lower temperatures were observed in June 2023, whilst the higher temperatures were recorded in the January 2023 monitoring round. The greatest increase was noted at 0.2°C. It is noted that there was a decrease of 1°C between the upstream and downstream sites at the time of the September 2022 survey. This may be as a result of cooler temperatures in the Kahouri Stream, which joins the Pātea River between the two sampling sites.
- Total ammoniacal nitrogen (NH_4) was recorded throughout this monitoring period. The range recorded 0.058 g/m^3 through to 0.240 g/m^3 indicated low concentrations for this analyte. It should be noted that the higher concentrations were recorded at the upstream water quality sites at the time of all four surveys.
- Total suspended solids (TSS) was at or below the level of detection (<3 g/m^3) during the majority of the monitoring period. The highest value of 9 was recorded at the downstream site in May 2023 and the greatest increase was observed during the same period.
- Turbidity ranged from 0.71-1.85 FNU, with the highest instream turbidity recorded during the May 2023 survey. The largest increase in this analyte was 0.5 FNU during the same monitoring survey.

2.2.3 Biological monitoring

Three macroinvertebrate surveys were conducted during the year under review. Summaries of the findings are given in the following sections and a full copy of the reports can obtained from the Council upon request.

Biomonitoring forms a key component of the consent compliance monitoring programme implemented by the Council following the construction of the TCC power station in 1998, and the addition of SPP in 2011. These particular biological monitoring surveys relate primarily to consent 5848, which permits the discharge of cooling water into the Pātea River approximately 1 km upstream of the river's confluence with the Kahouri Stream, east of Stratford, and consent 4459-1 to discharge stormwater into tributaries of the Pātea River.

2.2.3.1 Macroinvertebrate surveys, Pātea River

Five sites in total were surveyed in the Pātea 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 Pātea River, between the site of the proposed additional water abstraction (Skinner Road) and the confluence with the Mangaehu River. These sites (Figure 9 and Figure 10) at Hungers Road and a further 13 km downstream (adjacent to Raupuha Road, below the Makuri Stream confluence) were initially sampled as a component of the environmental effects assessment for the power station expansion (Stark and Young, 2001 and CF251).

At each of these sites the Council collected streambed macroinvertebrates to investigate the effects of the cooling water discharge and abstraction of water for the Company's combined cycle and peaker power stations. Macroinvertebrates were identified, the number of different types of taxa counted (taxa richness), and MCI and SQMCI scores were calculated for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of nutrient pollution in streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to pollution. The SQMCI takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities. Significant differences in either the MCI or the SQMCI between sites indicate the degree of adverse effects (if any) of the discharges being monitored and enable the overall health of the macroinvertebrate communities to be determined.

Biomonitoring of the TCC station stormwater discharges to the Kahouri Stream is also performed as a separate monitoring programme and this is reported separately (Section 2.2.3.2).

The standard '400 ml kick sampling' technique was used to collect streambed (benthic) macroinvertebrates from five riffle sites in the Pātea River. Table 9 and Figure 9 detail the location of the monitoring sites.

Table 9 Location of biomonitoring sampling sites in relation to the Pātea River

Site No	Site code	Grid reference	Location	Altitude (m asl)
1	PAT000356	E1714497 N5645112	U/s of TCC cooling wastes discharge	250
2	PAT000357	E1714662 N5645076	100 m d/s of TCC 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

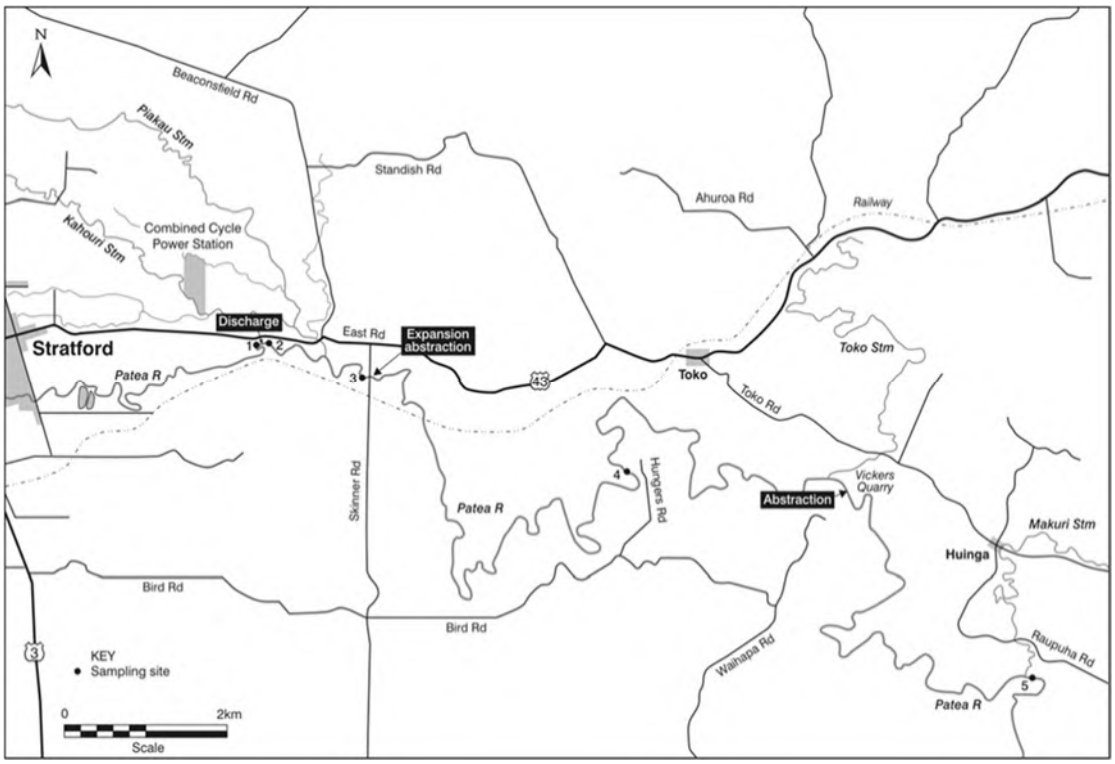

Figure 9 Location of biomonitoring sites in the Pātea River in relation to Stratford Power Station

Overall, the biomonitoring surveys performed in relation to the discharge of cooling water from the power station and water abstraction indicated no significant impacts upon the biological communities of the Pātea River.

27 October 2022

The results of this survey are summarised in Figure 10.

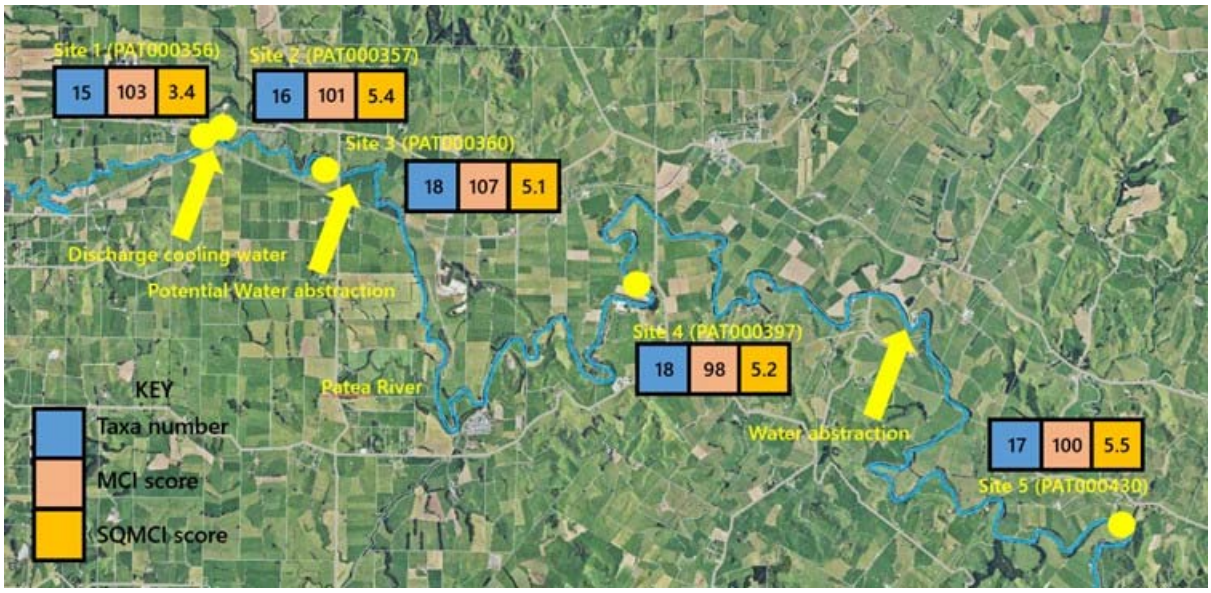

Figure 10 Location of biomonitoring sites in the Pātea River in relation to the power station discharge of cooling water and water abstraction with taxa number, MCI scores and SQMCI scores for each site

Macroinvertebrate taxa richness was moderately low and ranged from 15-18 taxa. Taxa richness was lowest at the 'control' site 1, where it then showed a small increase in a downstream direction. All sites recorded a richness less than their respective site medians. One taxa, the 'tolerant' Orthoclad midge, was dominant throughout all five sites in the survey, being recorded as either 'abundant' or 'very abundant'.

The MCI scores recorded were reflective of 'good' health at sites 1, 2, 3, and 5, while the score at site 4 was reflective of 'fair' health. There were no significant differences in MCI scores between sites in the current survey, and all sites scored higher than their site medians, although not significantly.

The SQMCI scores were reflective of 'poor' health at site 1, and 'good' health at sites 2, 3, 4, and 5. There was a significant improvement of health in a downstream direction, with sites 2, 3, 4, and 5 all recording significantly higher than site 1. The four downstream sites scored similar to each other. All sites recorded similar SQMCI scores to that recorded previously, with the exception of site 1, which scored a significant 2.9 units lower than that recorded previously. Sites 2, 3, and 5 recorded significantly higher than their respective medians, while sites 1 and 4 recorded similar to their site medians.

30 March 2022

The results of this survey are summarised in Figure 11.

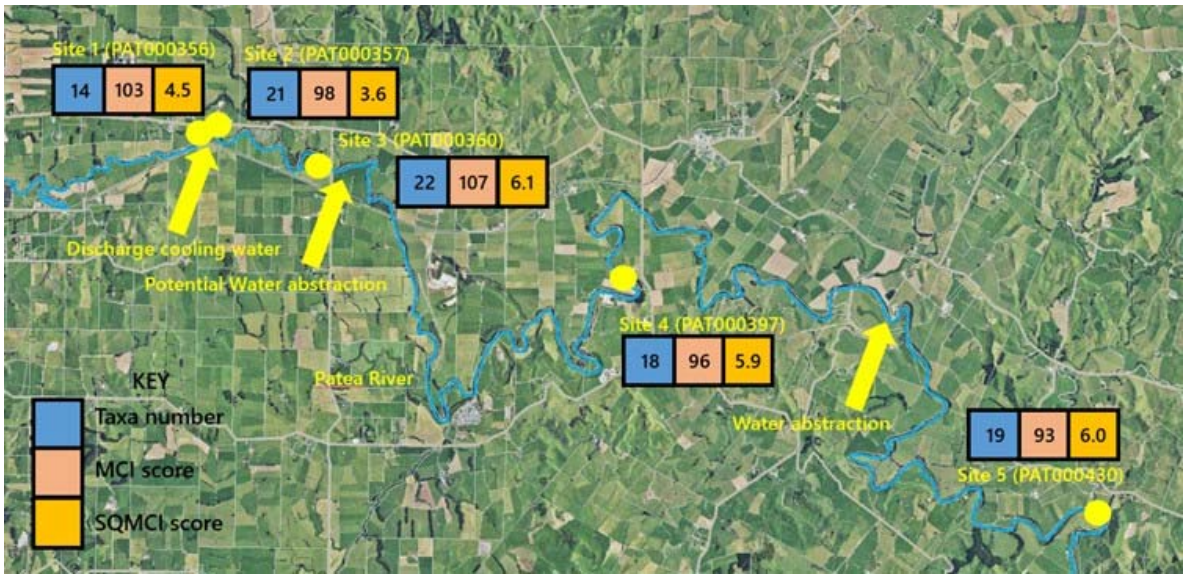

Figure 11 Location of biomonitoring sites in the Pātea River in relation to the power station discharge of cooling water and water abstraction with taxa number, MCI scores and SQMCI scores for each site

Macroinvertebrate taxa richness was low to moderate, ranging from 14-22 taxa. Taxa richness was lowest at the 'control' site 1. All sites recorded either equal to or lower than their respective medians, with site 1 recording much lower than its site median. Two 'tolerant' taxa were dominant throughout all five sites: the *Hydropsyche* caddisfly, and the Orthoclad midge, both scoring either 'abundant' or 'very abundant' at all sites.

MCI scores were reflective of 'fair' to 'good' health. Sites 4 and 5 recorded a significantly lower MCI score to site 3, however were similar to sites 1 and 2. All sites recorded similar results to those recorded in the previous survey, as well as their respective site medians.

SQMCI scores were reflective of 'poor' to 'good' health. Site 2 recorded significantly lower than the 'control' site 1, although this decrease was principally due to the change in abundance of one taxon. Sites 3, 4, and 5 recorded a SQMCI score significantly higher than both sites 1 and 2, and significantly higher than their respective site medians, while site 2 recorded significantly lower than its median. The SQMCI score at site 1 was similar to its median.

2.2.3.2 Macroinvertebrate survey, Kahouri Stream

This survey fulfilled the biological components of the 2022-2023 monitoring programme for the Company's site located on East Road, Stratford. It was performed to determine whether consented stormwater discharges from the site had any recent detrimental effect upon the macroinvertebrate communities of the Kahouri Stream. The monitoring is related to consent 4459-1 to discharge stormwater into the tributary of the Pātea River (the Kahouri Stream).

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from two established sites in the Kahouri Stream on 1 May 2023 (Table 10). The location of the sites and a summary of the results from this survey are presented in Figure 12.

Table 10 Biomonitoring sites in the Kahouri Stream

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

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

Figure 12 Map showing sampled sites with current taxa richness, MCI, and SQMCI values in relation to the Company's site on 1 May 2023

Macroinvertebrate taxa richness was moderate, with 16 and 19 taxa recorded at sites 1 and 2 respectively. Compared to the previous survey, an equal taxa richness was recorded at site 2, while site 1 had lower taxa richness (by two taxa). Additionally, taxa richness was lower compared with the historic medians.

MCI scores indicated that site 1 had 'very good', and site 2 had 'good' macroinvertebrate health, differing 10 units in MCI scores between the two sites. For both sites, these results were higher compared with the previous survey and site median.

The SQMCI scores were reflective of 'very good' macroinvertebrate community at both sites. Additionally, there was no significant difference in SQMCI scores between the control site and the impacted site. The current SQMCI scores were higher than their respective historic medians, by 0.9 units and 1.3 units at sites 1 and 2 respectively.

EPT taxa comprise the pollution sensitive mayfly, stonefly and caddisfly groups. Both macroinvertebrate samples comprised more than 60% of EPT species, with a 5% increase in the percentage of total EPT species between sites 1 and 2, along with an actual increase of three EPT species.

2.3 Air

Communications between the Company and the Council during the year under review included the following:

- notification that there had been a failure of the water pump controller on the NOx (emission reduction) water system for the GT21 Peaker Plant in March 2023. The estimated timeframe on a replacement controller from the supplier was 26 weeks. The Company advised that until the repairs had been undertaken, GT21 would remain in "duty 2 start mode" so that the operation can be minimised while national grid demands allow;
- notification that the manufacturer of the continuous NOx monitoring equipment on the TCC plant is no longer in business. This was part of the Company's description of best practice for the plant in the

Schedule A attached to consent 4454 provided in 1998. Discussions commenced on updating Schedule A, and the assessments and evidence that will be required to enable the update to happen;

- a notable plant improvement was that the Peaker Plant GT22 was fitted with an upgraded gas turbine set referred to as PA+, providing an ongoing heat rate improvement ranging from 0.78 to 1.5%. Tuning of all combustion parts will continue to ensure these units provide the most efficient service possible;
- the TCC plant will be decommissioned. Therefore the gas turbine will not receive any further major overhauls. It is expected to be decommissioned in September 2024 as part of the Company's decarbonisation strategy. However, the operating hours may last until 2025. The steam turbine was serviced during 2022-2023 then test run. The boiler and steam system will be subject to full inspection early 2024; and
- the Peaker LMS100 spare engine had been shipped to Houston for a major overhaul and was not expected to be available until late 2024.

2.3.1 Inspections

Inspections in relation to emissions to the air comprised assessment of the visual effect of discharges from the power station site and including odour surveys. The TCC emissions are monitored through the use of continuous emissions monitoring sensors (CEMS), with monthly reports provided to Council. While for the SPP, the emissions are checked regularly with stack testing, with the most recent testing commissioned in June 2023.

2.3.2 Results of discharge monitoring

The Company 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 (NOx);
- Oxygen (O_2);
- Carbon monoxide (CO); and
- Carbon dioxide (CO_2)

2.3.2.1 Taranaki Combined Cycle

In terms of the TCC, under normal operation, the maximum concentration of total nitrogen oxides (NOx) emissions for the year was reported as 25.38 ppm. This is well below the consent limit of 50 ppm above which all reasonable steps must be initiated to reduce emissions (consent 4454-1, condition 12). There were six occasions during plant start up where the plant exceeded the 50 ppm limit which applies during steady-state operation. However, during start up and shut down of the plant there are brief specified periods of time that are exempt from this requirement. Across these start-up or cessation operations, the maximum NOx concentration value was reported at 79.97 ppm.

The maximum hourly NOx discharge rate reported to the Council was 91.36 kg/hr, which is in compliance with consent 4454-1, condition 13. This condition allows for a maximum of 430 kg in any one hour period.

Total carbon dioxide (CO_2) emissions in the 2022-2023 monitoring period were calculated by the Company to be 74,034 tonnes CO_2. This was a decrease of 203,360 tonnes CO_2 (73.3%) when compared to the previous monitoring period. The TCC1 plant operation was in use for a total of 37 days this monitoring period, which was 83 days less than the previous monitoring period (120 days).

NOx emissions from the plant were recorded at 18.42 tonnes NOx in the 2022-2023 monitoring period. This is a decrease of 71 tonnes NOx from the previous monitoring period (89.7 tonnes).

2.3.2.2 Emissions testing of the Stratford Peaker plants

Consent 4022 defines the limits on the concentration and mass emission rate for nitrogen oxides (NOx) discharged to air from the operation of the two peaker plant gas turbines (SPP). 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 continuous emissions monitoring sensors (CMES) are fitted to the peaker plants in SPP. The peaker plants employ NOx control technology, coupled with a relatively regular cycle of emissions for peaker plants of that design. The Company undertakes regular assessments of their peaker plants. The most recent biennial air emissions testing from both plants was undertaken on 8 June 2023.

The Company commissioned Air Resource Management Ltd to assess the air emissions performance of the two General Electric (GE) LMS100 PA gas turbine power plants. The Company requested the air emissions testing to demonstrate that the Stratford Peaker plants were being operated in compliance with Consent 4022-2, conditions 7 and 8.

Table 11 details the air emissions testing carried on the 8 June 2023 on both gas turbines located at the Stratford Power Station site.

Table 11 Summary of NOx emissions from SPP including the combined emissions June 2023 (Air Resource Management 2023)

Source (average)	NO_x (ppm)	NO_2 (ppm)	NO (ppm)	Gas Temp (°C)
GT21	82.6	5.6	77.0	418
GT22	41.8	5.5	36.4	423
Average	62.2	5.6	56.7	421
	NO_x (ppm)	NO_x (mg/m^3 @ 450°C)	NO_x (g/s @ 0°C)	NO_x (kg/hr @ 0°C)
GT21	82.6	64.0	19.9	71.6
GT22	41.8	23.4	9.4	33.9
Total	124.4	87.4	29.3	105.5

*Calculation approximated using NO_2 as mass. All figures in table 8 to 1 ATM.

The report noted that the deNOx water was not available for GT21, but was working as normal for GT22. Although this resulted in a higher result for GT21 and the GT21 and GT22 averages and totals, the testing confirmed compliance with the consent conditions.

Table 12 Comparison of the June 2023 emissions monitoring results with the consent limits (Air Resource Management 2023)

GT 21 Results		
Figure	Consent Limit	Average Value
(7a) NO_x Concentration (mg/m^3, 450°C)	**100**	**64.0**
(7c) NO_x Mass Emission (g/s, 0°C)	**175**	**19.9**
GT 22 Results		
Figure	Consent Limit	Average Value
(7a) NO_x Concentration (mg/m^3, 450°C)	**100**	**23.4**
(7c) NO_x Mass Emission (g/s, 0°C)	**175**	**9.4**
Total Results		
Figure	Consent Limit	Average Value
(8) NO_x Total Mass Emission (kg/hr, 0°C)	**830**	**105.5**

*All figures given on a dry gas basis, and to 1 atmospheric pressure.

The next biennial air emissions testing is due in the 2024-2025 year.

2.3.3 Reviews and audits

The Company hold three air discharge consents. Two of these (4454 & 4022) are currently in use for the TCC and SPP. 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 the Company to provide the Council with a six yearly report that is to 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 report, which relates to both the TCC and SPP, was received in December 2020. The main points of the report are summarised below. Updates since the report was provided are also included here.

Technological advances and energy efficiency improvements

Consent 4454-1

A large efficiency improvement was made on the GT26 Gas Turbine firing control in 2017-2018 with the engine now able to operate at variable fuel inlet pressures. A significant project was undertaken to remove 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.

There have been no technological advances to the TCC plant in the last six years, as new technological advancements for these gas turbines have not been developed in recent years. Hence, technological advances to plant such as TCC which reduce or mitigate emissions are limited to minor adjustments as this plant already incorporates the latest available technology, such as EV burners and sequential combustion. The minor adjustments would generally result in small improvements in efficiency and output. Improvements to efficiency directly reduce carbon dioxide emissions whilst improvements to output improve the electricity sector's carbon dioxide emissions by displacing emissions from plants that have higher emission factors.

The technology relating to the mitigation of emissions is continually developing with the most notable advances being related to alternative electricity generating plant.

Consent 4022-2

There is one specific upgrade implemented at the end of 2019 on Peaker Plant GT22 which is worthwhile from an environmental improvement point of view.

The inlet air filters on the gas turbines have a three to five year life cycle and during the last planned outage on GT22 when these filters were scheduled for replacement, the Company chose to install high grade HEPA filtration filters into the air intake housing of the gas turbine. HEPA stands for "high efficiency particulate air". Contact installed an E12 HEPA filter, which has the highest filtration class in the market, replacing the standard F9 synthetic filters which were struggling to keep the turbine hardware in a clean condition. This had meant regular water washes were required throughout the year (six weekly) to reduce the rate of degradation of the compressor hardware between outages (hand cleaning of the compressor occurs annually).

The cost of HEPA filtration had in the past been prohibitive, but the Company has been able to offset this extra cost through savings made as a result of sustained higher unit efficiency and a reduced number of water washes. The use of high efficiency filters has an improved operational and environmental outcome. The low pressure compressor cleanliness and efficiency does not significantly degrade. As a result of the sustained clean condition, the degradation in performance (efficiency) of the engine is minimal. In general terms, fouling, corrosion, and pressure drop cause gas turbines to become less efficient limiting their maximum power output and increasing their heat rate. Engines with higher heat rates burn more fuel to produce the same power. Therefore, burning less fuel for the same output means less emissions are produced and will result in an overall reduction in emissions between annual outages. Annually the reduced number of water washes results in less water use, less chemical use and less off-site discharges and an overall higher availability (due to the reduced number of water wash outages). The same upgrade was planned for Peaker Plant GT21 in 2021. This upgrade has since been carried out.

No other significant environmental improvements are on General Electric's (the manufacturer) horizon. They are currently putting a lot of focus on modifying some of their IP (Intermediate Pressure) turbine hardware, since a number of users, including the Company are suffering reduced equipment life due to early blade and nozzle failure.

Other issues requested by the Council

The Council has not advised the Company of any other issues relevant to the minimisation or mitigation of emissions from the sites to be included in this six-yearly report.

However, as detailed in previous reports, "other aspects" of the Company's operations impact upon its overall efficiency in the production of electricity, at Stratford and across the Company's other sites.

Contact Energy has a policy of continuous assessment of means to improve the thermodynamic performance of all thermal stations it owns and operates. This makes economic sense and is consistent with the RMA precept of sustainable use of resources. These are generally small and can be difficult to quantify but do result in a reduction in Contact's air emissions.

Energy efficiencies across the Company have included reduced usage of the TCC plant for base load generation other than during winter months, especially during wetter periods, improved transmission flexibility elsewhere in the national network; closure of other less efficient natural-gas-fired generation capacity; arrangements for flexible large customer demand during peak demand periods; supply of heat or heat pump to industry in the vicinity of geothermal facilities, replacing the use of electricity for heat raising; and carbon sequestration through forestry.

Patterns of annual operation

Table 13 and Figure 13 show the operational days of the TCC since 2015. In the 2022-2023 year there was a significant reduction in operational days to only 37 days of operation. This reflects the fact that the requirement for baseline power in New Zealand can vary annually.

During the 2022-2023 year there were 139 days of operation for the Peaker Plant GT21, and 119 days for the Peaker Plant GT22.

Table 13 Operational days per monitoring period since 2015

Monitoring period	Days of operation
2015-2016	52
2016-2017	155
2017-2018	176
2018-2019	195
2019-2020	136
2020-2021	179
2021-2022	120
2022-2023	37

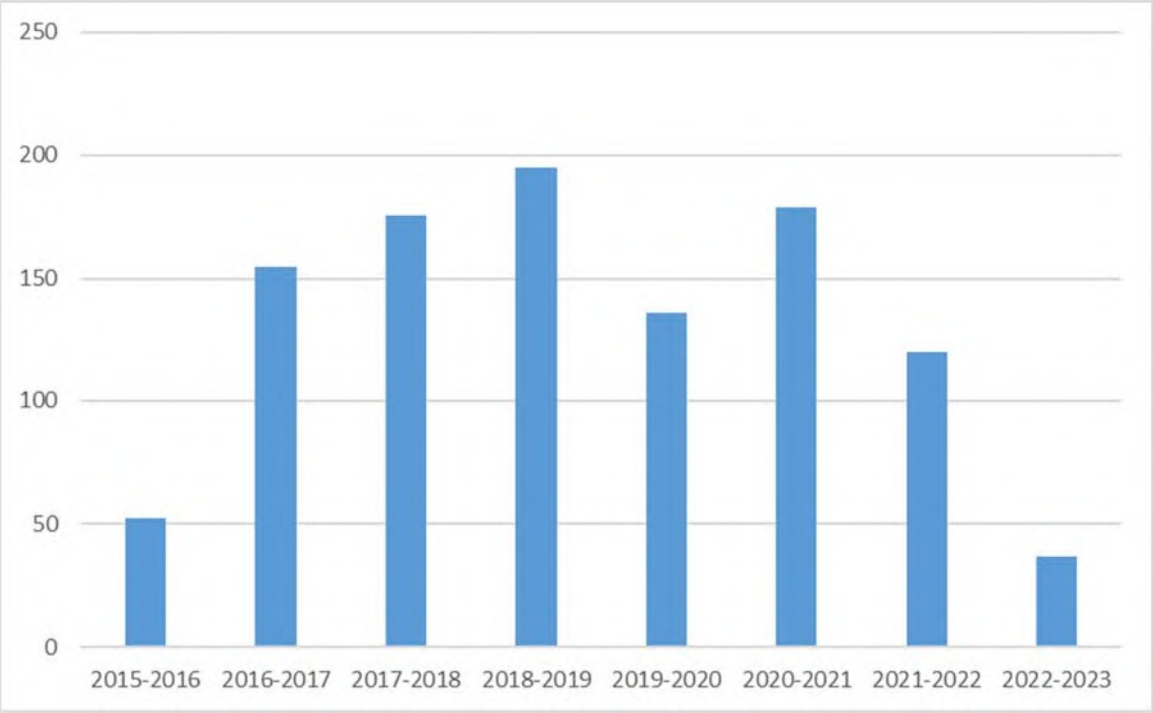

Figure 13 Annual days of operation SPS TCC 2015-2023

2.4 Incidents, investigations, and interventions

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.

For all significant compliance issues, as well as complaints from the public, the Council maintains a database record. The record includes events where the individual/organisation concerned has itself notified the Council. Details of any investigation and corrective action taken are recorded for non-compliant events.

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 individual/organisation is indeed the source of the incident (or that the allegation cannot be proven).

In the 2022-2023 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with the Company's conditions in resource consents or provisions in Regional Plans.

3 Discussion

3.1 Discussion of site performance

Water abstraction

The daily surface water abstraction limit was not exceeded (19,440 m^3/day) throughout the monitoring period. The maximum daily abstraction was recorded as approximately 6,743 m^3/day. The daily surface water abstraction rate was not exceeded (<225 L/s at times when the flow rate in the Pātea River is greater than 765 L/s). The maximum rate recorded was 123 L/s.

The total volume of abstracted surface water during this monitoring period was 337,061 m^3. This is a decrease of 61% when compared to the previous monitoring period where 858,226 m^3 was abstracted.

Discharge of process waters

The maximum discharge flow rate from the operations pits was 48.10 L/s, with the average combined flow recorded as 8.91 L/s. The total volume of wastewater discharged for the year was 274,818 m^3. This was a 37.5% decrease when compared to the previous monitoring period, when 439,593 m^3 was discharged.

Chlorine analysis by the Company indicated compliance with the set requirement for not exceeding 0.05 g/ m^3 in the discharge. When the continuous chlorine monitors indicate an exceedance with respect to the free total chlorine 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. Therefore, although there were occasions on which the reported chlorine concentration was above the consent limit, the operational controls prevented this from being discharged.

The discharge pH remained within the consent range limit of pH 6.0-9.0 throughout the monitoring period. For TCC the minimum pH observed was pH 6.12 recorded in August 2022. The maximum observed was pH 8.93, recorded in September 2022. For SPP the minimum pH recorded was pH 6.40, recorded in August 2022. The yearly maximum was recorded as pH 8.89 during September 2022. When the continuous pH monitors indicate 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 valves activate when the pH reading on the monitor reaches either pH 6.1 or 8.9.

Water usage

During the year under review, approximately 81.5% of the water abstracted was returned to the river. This is in comparison to approximately 42.2% of the water abstracted being returned to the river in the 2021-2022 year.

Temperature monitoring of receiving surface waters

The Pātea River temperature during the monitoring period remained below the 25°C consented limit for the full duration, allowing for continuous discharge if required. River temperature differentials also remained within consent limits.

Kahouri stormwater

The stormwater over flow to the Kahouri Stream occurred on 28 occasions in this monitoring period. These were all noted to have occurred during high rainfall events.

Inter-laboratory comparisons

Inter-laboratory comparisons were undertaken on four occasions this monitoring period. The results provided by the Company generally indicated good agreement between both parties across the majority of parameters assessed.

There was a discrepancy during September 2022 survey when the total chlorine concentration found was 0.19 mg/L in the SPP sample collected and analysed by the Council. This result was significantly different from the results achieved by the Company from both the continuous meter (0.03 mg/L) and their laboratory test (0 mg/L). It is most likely a discrepancy due to the inaccuracy at the time of the chlorine meter (it has since been calibrated and appears to be functioning correctly since). As both the continuous meter and the Company's laboratory result correlated with each other, and the levels were well within the consent limit, this result was determined to be an anomaly.

A discrepancy in pH was also found for the September 2022 SPP sample, following which the Company's pH probe was replaced. Additional work was undertaken by the Company to identify and correct the variation noted on the phosphate levels. The discrepancy was found to relate to the units of reporting between the Company and the Council. Good agreement was achieved following the application of the appropriate conversion factor.

Pātea River physicochemical analysis

Physicochemical analysis of the Pātea River was undertaken on four occasions this monitoring period. The aim was to assess the effects of the discharge from the operations pits when they are discharging to the Pātea River. The results showed that the discharge of process waters were not causing an effect which was more than minor.

Emissions to air

The TCC plant operation was in use for a total of 37 days this monitoring period. Of note, the TCC was in use 83 days less than the previous monitoring period (2021-2022: 120 days).

Total carbon dioxide (CO_2) emissions were calculated by the Company to comprise 74,034 tonnes CO_2 in the 2022-2023 monitoring period. This was a decrease of 203,360 tonnes CO_2 (73.3%) when compared to the previous monitoring period. NOx emissions from the plant were recorded at 18.42 tonnes NOx in the 2022-2023 monitoring period. This is a decrease of 71 tonnes NOx from the previous monitoring period (2021-2022: 89.7 tonnes).

The maximum NOx concentration within the air discharge under normal operational circumstances was recorded at 25.38 ppm. On six occasions emissions of NOx were higher than the consent limit that requires actions to be taken to reduce the NOx concentration (50 ppm), which applies during steady-state operation. These six occasions were during start-up operations and so no action was required as the Company are permitted a brief periods above this concentration during start up or shutdown of this plant.

The maximum hourly NOx discharge rate reported to the Council was 91.36 kg/hr, which is in compliance with consent 4454-1, condition 13. This was recorded in May 2023. This condition allows for a maximum of 430 kg in any hour period.

It is be noted that the TCC is fitted with continuous emissions monitoring sensors (CEMS) which continually analyses for source exhaust gases. The Company has identified that the parts are not available, should there be an issue with this monitoring equipment. The Company is working towards providing sufficient evidence, to demonstrate that a proposed alternative means of monitoring meets the necessary standard to allow for Schedule A (attached to the air discharge consent) to be amended.

Emissions from the SPP, in comparison to the TCC, do not have emission specific monitoring sensors. The SPP employ NOx control technology, coupled with a relatively regular cycle of emissions for peaker plants of that design. The Company undertakes regular assessments of their SPP units.

The most recent assessment was undertaken during June 2023. The results indicated the site was operating within the limits of the air discharge consent 4022-2.

There were no incidents, investigations or interventions required with respect to the Company this monitoring period. Site inspections noted good housekeeping throughout the site with knowledgeable and appropriately trained staff throughout.

Overall, there continues to be good communication between the Company and the Council. This includes the supply of monthly monitoring reports from the Company to the Council as to the processes undertaken by the facility, which provides good transparency between both parties.

3.2 Environmental effects of exercise of consents

Minimal environmental effects were noted during the period under review. In terms of emissions to air, carbon dioxide and nitrogen oxides (CO_2 & NO_x) emissions from the TCC were decreased when compared to the previous monitoring period. This was a direct result of the decreased time in operation for the TCC this monitoring period.

For the SPP, stack testing was undertaken in June 2023, all results were recorded within compliance standards.

No issues related to odour were recorded or communicated by the inspectors during the inspections this monitoring period.

Biological monitoring of the Pātea River (two occasions) and the Kahouri Stream (one occasion) was undertaken this monitoring period.

In terms of the Pātea River, the biologist noted the following:

Overall, these biomonitoring surveys performed in relation to the discharge of cooling water from the power station and water abstraction indicated no significant impacts upon the biological communities of the Pātea River.

In terms of the Kahouri Stream the biologist noted the following:

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.

Inspections and monitoring of process waters did not indicate anything of an adverse nature. Temperature monitoring indicated compliance with consent defined criteria for both maximum thermal increase and total river temperature.

In terms of discharges of process waters to the Pātea River, minimal effects were noted during the surface water and discharge monitoring rounds. It is noted that there was a significant reduction in water usage at the site during the year under review when compared to the previous year. This reduction was reflected in both a reduced volume abstracted for the year and an increase in the proportion of abstracted water that was returned to the river.

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 14-30.

Table 14 Summary of performance for consent 4022-2

Purpose: *To discharge emissions to the air from fuel combustion and other related activities associated with the operation of the Stratford Power Station and ancillary plant*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option (BPO)	Site inspections - checking that standard operating procedures to achieve compliance with conditions are followed Stack testing commissioned this monitoring period, compliant results	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	Review of Council records. Received December 2020. Next due in the 2026-2027 year if the schedule is maintained in the reissued consent	Yes
4. Limit on ambient carbon monoxide	Not monitored beyond boundary in this monitoring period Source monitoring at commissioning and modelling undertaken during the assessment of effects provided adequate results	N/A
5. Limit on ambient nitrogen oxides	Not monitored beyond boundary in this monitoring period Source monitoring at commissioning and modelling undertaken during the assessment of effects provided adequate results	N/A
6. Limit on other emissions at boundary	Not monitored beyond boundary in this monitoring period Source monitoring at commissioning and modelling undertaken during the assessment of effects provided adequate results	N/A
7. Limits on nitrogen oxides outside start-up or shut-down periods	Stack testing commissioned in June 2023 indicated compliance with this condition	Yes
8. Limit on nitrogen oxides mass discharge rate	Stack testing commissioned in June 2023 indicated compliance with this condition	Yes
9. Stack height	Inspection by Council	Yes
10. Ecological effects	Inspection by Council and observation of vegetation	Yes

Purpose: *To discharge emissions to the air from fuel combustion and other related activities associated with the operation of the Stratford Power Station and ancillary plant*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
11. Optional review of consent	Consent expired. Under Section 124 protection. No review opportunities	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 15 Summary of performance for consent 4454-1

Purpose: *To discharge emissions to air from a combined cycle power station and ancillary plant*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. [4]Adopt best practicable option (BPO)	Site inspections-checked that standard operating procedures to achieve compliance with conditions are followed Outlined when equipment malfunctioned and kept Council updated on issues faced sourcing replacement parts	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. Discussions commenced regarding contingent alternative means of monitoring should unsupported NOx continuous monitoring equipment fail.	N/A
5. Provision of reports on specific monitoring/investigations	Review of Council records. Received December 2020. Next due in the 2026-2027 year	Yes
6. Limit on ambient carbon monoxide	Not monitored beyond boundary, as continuous CO emission monitoring by the Company 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	N/A
8. Limit on other emissions at boundary	Not monitored, as emissions monitoring by the Company and dispersion modelling undertaken during AEE stage demonstrated no requirement	N/A

[4] Condition numbers 1 to 3 have previously been deleted from the consent

Purpose: *To discharge emissions to air from a combined cycle power station and ancillary plant*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
9. Limits on nitrogen oxides outside start-up or shut-down periods	Continuous monitoring by the Company and monthly report to Council	Yes
10. Limit on nitrogen oxides mass discharge rate	Continuous monitoring by the Company and monthly report to Council	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 The Company	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. Next report to be submitted in the 2026-2027 year	N/A
16. Lapse of consent	Consent was exercised	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 16 Summary of performance for consent 4455-1

Purpose: *To take water up to 19,440 m^3/day [225 L/s averaged over 15 minutes] of water on a continuous basis from the Pātea River for use on power stations on East Road, Stratford*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Measurement of abstraction rate	Continuous flow metering by the Company and monthly report	Yes
2. Limit on maximum abstraction rate	Continuous flow metering by the Company and monthly report to Council	Yes
3. Limit on abstraction rate during low river flows	Continuous flow metering by the Company and monthly report to Council	Yes
4. Limit on abstraction rate during very low river flows	Continuous flow metering by the Company and monthly report to Council	Yes
5. Optional review of consent	No further review opportunities prior to consent expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

Table 17 Summary of performance for consent 4456-1

Purpose: *To erect, place, use and maintain an intake structure in and on the bed of the Pātea River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Notification of works	Maintenance communicated when required	Yes
2. Construction and maintenance in accordance with documentation	Maintenance communicated when required	Yes
3. Adopt BPO to prevent or minimise adverse effects	Communicated when required	Yes
4. Riverbed disturbance and reinstatement	Inspections	Yes
5. Removal of structure when no longer required		N/A
6. Timing of works	Communicated to the Council when required	Yes
7. Optional review provision	No further review opportunities prior to consent expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 18 Summary of performance for consent 4458-1

Purpose: *To erect, place, use and maintain a diffuser structure in and above the bed of the Pātea River for the purpose of discharging used water from power stations at East Road, Stratford*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Provision of design plans	Plans received by Council and approved in 1996	Yes
2. Construction and maintenance in accordance with documentation		N/A
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		Yes
5. Timing of works	Works undertaken during low flows	Yes
6. Adopt best practicable option to prevent or minimise adverse effects	Liaison with the Company and inspection of diffuser	Yes

Purpose: *To erect, place, use and maintain a diffuser structure in and above the bed of the Pātea River for the purpose of discharging used water from power stations at East Road, Stratford*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
7. Riverbed disturbance and reinstatement		N/A
8. Removal of structure when no longer required		N/A
9. Optional review provision re environmental effects	No further review opportunities prior to consent expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 19 Summary of performance for consent 4459-1.3

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 Pātea River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option to prevent or minimise adverse effects	Site inspections - checking that standard operating procedures to achieve compliance with conditions are followed	Yes
2. Stormwater discharged not to exceed area outlined	Inspections	Yes
3. Stormwater treatment system	Inspections	Yes
4. Meet constituent limits	Inspections and monitoring	Yes
5. Notification of direct discharge of stormwater to Kahouri Stream	Records and notification supplied	Yes
6. Limit effects on receiving water	Inspections and monitoring	Yes
7. Contingency Plan	Received by Council	Yes
8. Management Plan	Received by Council	Yes
9. Notification of any changes	Provide notification	N/A
10. Optional review provision re environmental effects	No further review opportunities prior to consent expiry	N/A

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 Pātea River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 20 Summary of performance for consent 4460-1

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

N/A = not applicable

Table 21 Summary of performance for consent 4461-1

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

N/A = not applicable

Table 22 Summary of performance for consent 4462-1

Purpose: *To erect, place, use and maintain water pipelines and associated control cables above, through or below the beds of the Toko Stream and various small unnamed streams, for the purpose of water transmission from the Pātea River to power stations at East Road, Stratford*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Provision of design plans	Plans received by Council and approved in 1996	Yes
2. Construction and maintenance in accordance with documentation	No maintenance during period under review	N/A

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 Pātea River to power stations at East Road, Stratford*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
3. Passage of fish not to be obstructed	No monitoring during review period, 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	No further review opportunities prior to consent expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 23 Summary of performance for consent 4804-1

Purpose: *To erect, place, use and maintain over the bed of an unnamed tributary of the Kahouri Stream in the Pātea catchment, within the site and adjacent land immediately to the southeast a bridge structure to convey high voltage electricity cables and associated communication cables for a power station site*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Provision of design plans	Plans received by Council and approved in 1996	Yes
2. Construction and maintenance in accordance with documentation	No maintenance during period under review	N/A
3. Notification prior to and after maintenance	No monitoring during review period, as design of structure satisfactory	N/A
4. Timing of works	No maintenance during period under review	N/A
5. Adopt best practicable option to prevent or minimise adverse effects	No maintenance during period under review	N/A

Purpose: *To erect, place, use and maintain over the bed of an unnamed tributary of the Kahouri Stream in the Pātea catchment, within the site and adjacent land immediately to the southeast a bridge structure to convey high voltage electricity cables and associated communication cables for a power station site*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
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	No further review opportunities prior to consent expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 24 Summary of performance for consent 5633-1

Purpose: *To discharge fine sediment and organic matter from water intake structure tee screens to the Pātea River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Discharge according to documentation submitted	Inspection by Council	Yes
2. Controls on effect of discharge in receiving water	Inspection and biological monitoring by Council	Yes
3. Optional review provision re environmental effects	No further review opportunities prior to consent expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 25 Summary of performance for consent 5848-1

Purpose: *To discharge up to 6,740 m^3 (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 Pātea River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Discharge in accordance with effluent disposal management plan	Inspection by Council, and provision of annual report by The Company	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	Liaison with Company. No changes during year under review	N/A
4. Provision of details on proposed new cleaning chemicals	As above	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	Monitoring by the Company and Council indicated that this complaint for the full duration of the monitoring period	Yes
10. Limit on maximum river temperature	Monitoring by the Company and Council indicated that the maximum river temperature was not exceeded for the duration of the monitoring period	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 through inter-laboratory analysis	Yes
13. Limit on ammonia in river	Monitoring by Council	Yes
14. Lapse of consent	Consent was exercised	N/A

Purpose: *To discharge up to 6,740 m^3 (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 Pātea River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
15. Optional review provision re environmental effects	Next option for review in June 2028	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 26 Summary of performance for consent 7247-1

Purpose: *To discharge emissions into air from the operation of the cooling tower associated with the Stratford Peaker Power Plant*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option (BPO)	Site inspections - checking that standard operating procedures to achieve compliance with conditions are followed	Yes
2. Cooling tower design as described in application	Inspection by Council	Yes
3. Prior notification of exercise of consent	Notification received 10 November 2010	N/A
4. Minimisation of emissions	Inspection by Council	Yes
5. Visibility of cooling system plume	Inspection and observation by Council and the Company	Yes
6. Cooling system drift	Inspection and observation by Council	Yes
7. Description of water treatment regime to be provided	Inspection and liaison with Company. No changes during the year under review. Last update to water treatment regime implemented in 2018-2019 year. Documentation provided	Yes
8. Consulting over significant proposed changes	Liaison during visits. No significant changes undertaken during year	Yes
9. Offensive odour prohibited	Inspection and observation by Council	Yes
10. Ecological effects	Inspection by Council and observation of vegetation	Yes

Purpose: *To discharge emissions into air from the operation of the cooling tower associated with the Stratford Peaker Power Plant*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
11. Lapse of consent	Consent was exercised	N/A
12. Optional review of consent	Next option for review in June 2028	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 27 Summary of performance for consent 7248-1

Purpose: *To erect, place, use and maintain a bridge over an unnamed tributary of the Kahouri Stream for pedestrian access and carriage of water pipes, high voltage cables, control cables and associated utilities*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Exercise of consent in accordance with application	Site inspections	Yes
2. Provision of bridge plans prior to construction	Not received	N/A
3. Notification prior to exercise of consent	Notification received 15 February 2010	N/A
4. Minimisation of sediment in stream	No maintenance during period under review	N/A
5. Area and volume of disturbance to be minimised	No maintenance during period under review	N/A
6. Structure removed and area reinstated if no longer required		N/A
7. Lapse of consent		N/A
8. Optional review provision re environmental effects	Next option for review in June 2028	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 28 Summary of performance for consent 7250-1

Purpose: *To erect, place, use and maintain a bridge over the Kahouri Stream for pedestrian access and carriage of water pipes, high voltage cables, control cables and associated utilities*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Exercise of consent in accordance with application	Site inspections	Yes
2. Provision of bridge plans prior to construction	Not received.	N/A
3. Notification prior to exercise of consent	Notification received 15 February 2010	N/A
4. Minimisation of sediment in stream	No maintenance during period under review	N/A
5. Area and volume of disturbance to be minimised	No maintenance during period under review	N/A
6. Structure removed and area reinstated if no longer required		N/A
7. Lapse of consent		N/A
8. Optional review provision re environmental effects	Next option for review in June 2028	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 29 Summary of performance for consent 7605-1

Purpose: *To construct, place and maintain a stormwater outlet structure in the Kahouri Stream*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Exercise of consent in accordance with application	Site inspections	Yes
2. Notification prior to exercise of consent	Notification received 16 March 2010	N/A
3. Area and volume of disturbance to be minimised	No maintenance during period under review	N/A
4. Minimisation of sediment in stream	No maintenance during period under review	N/A
5. Structure removed and area reinstated if no longer required		N/A

Purpose: *To construct, place and maintain a stormwater outlet structure in the Kahouri Stream*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
6. Lapse of consent		N/A
7. Optional review provision re environmental effects	No further review opportunities prior to consent expiry	N/A
Overall assessment of consent compliance and environment performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 30 Summary of performance for consent 7653-1

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

N/A = not applicable

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

3.4 Recommendations from the 2021-2022 Annual Report

In the 2021-2022 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Stratford Power Station in the 2022-2023 year continue at the same level as in 2021-2022.
2. THAT should there be issues with environmental or administrative performance in 2022-2023, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Recommendation 1 was undertaken, recommendation 2 was not required.

3.5 Alterations to monitoring programmes for 2023-2024

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.

There are no planned changes to the current compliance monitoring programme for Stratford Power Station in the 2023-2024 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 2022-2024.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at Stratford Power Station in the 2023-2024 year continue at the same level as in 2022-2023.
2. THAT should there be issues with environmental or administrative performance in 2023-2024, 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:

Al*	Aluminium.
As*	Arsenic.
Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
Bund	A wall around a tank to contain its contents in the case of a leak.
CBOD	Carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
CEMS	Continuous emissions monitoring sensors
cfu	Colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample.
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in µS/cm.
Cu*	Copper.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m^3s^{-1}).
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
E.coli	Escherichia coli, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
Ent	Enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre of sample.
EPT	Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies)
F	Fluoride.
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample.
FNU	Formazin nephelometric units, a measure of the turbidity of water
Fresh	Elevated flow in a stream, such as after heavy rainfall.
$g/m^2/day$	grams/$metre^2$/day.
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a

	consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
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^2	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.
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.
MPN	Most Probable Number. A method used to estimate the concentration of viable microorganisms in a sample.
µS/cm	Microsiemens per centimetre.
NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH_3	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
NO_3	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
Pb*	Lead.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
PM_{10}, $PM_{2.5}$, $PM_{1.0}$	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	*Resource Management Act 1991* and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).

Turb	Turbidity, expressed in NTU or FNU.
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 an Environment Quality Manager.

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Taranaki Regional Council (2023): *Biomonitoring of the Pātea 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 2022*. Internal Memorandum FK023.

Taranaki Regional Council (2023): *Biomonitoring of the Pātea River in relation to the discharge of cooling water and abstraction of water for Contact Energy Ltd's combined cycle and peaker power stations, March 2023*. Internal Memorandum FK024.

Taranaki Regional Council (2023): *Biomonitoring of the Kahouri Stream in relation to the Contact Energy sites, East Road, May 2023*. Internal Memorandum AB015.

Appendix I

Resource consents held by Contact Energy Stratford

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

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. Permits authorising the abstraction of water are issued by the Council under Section 87(d) of the RMA.

Water discharge permits

Section 15(1)(a) of the RMA stipulates that no person may discharge any contaminant into water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or by national regulations. Permits authorising discharges to water are issued by the Council under Section 87(e) of the RMA.

Air discharge permits

Section 15(1)(c) of the RMA stipulates that no person may discharge any contaminant from any industrial or trade premises into air, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising discharges to air are issued by the Council under Section 87(e) of the RMA.

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. Permits authorising the discharge of wastes to land are issued by the Council under Section 87(e) of the RMA.

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. Land use permits are issued by the Council under Section 87(a) of the RMA.

Coastal permits

Section 12(1)(b) of the RMA stipulates that no person may erect, reconstruct, place, alter, extend, remove, or demolish any structure that is fixed in, on, under, or over any foreshore or seabed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Coastal permits are issued by the Council under Section 87(c) of the RMA.

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

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. That the 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.

4. That the consent holder shall control all emissions of carbon monoxide to the atmosphere from the site, in order that the maximum ground level concentration of carbon monoxide arising from the exercise of this consent measured under ambient conditions does not exceed 10 mg m^{-3} [eight-hour average exposure], or 30 mg m^{-3} [one-hour average exposure] at or beyond the boundary of the site.

5. That the consent holder shall control all emissions of nitrogen oxides to the atmosphere from the site, in order that the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 20 ug m^{-3} [twenty-four-hour average exposure], or 60 ug m^{-3} [four-hour average exposure] at or beyond the boundary of the site.

6. That the consent holder shall control all emissions to the atmosphere from the site of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, in order that the maximum ground level concentration for any particular contaminant arising from the exercise of this consent measured at or beyond the boundary of the site is not increased above background levels:

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

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

7. That except in any period of 30 minutes following the initiation of start-up of a turbine or in any period of 30 minutes prior to the cessation of the generation of electricity from a turbine, in the event that the discharge of nitrogen oxides exceeds:

   a) a mass emission rate for the site of 175 g s^{-1}, or
   b) *[cancelled]*
   c) a concentration in any gas turbine stack equivalent to 100 mg m^{-3} at 450 degrees Celsius, or to 125 ppm [volumetric basis].

   then the operator shall immediately initiate all reasonable steps to reduce the emissions to below these levels as soon as practicable.

8. That the sum of all discharges of nitrogen oxides from the site of the power station is not to exceed 830 kg in any period of one hour.

9. That the minimum height of discharge of the products of combustion from the turbines shall be 15 metres above ground level.

10. That the discharges authorised by this consent shall not give rise to any direct significant adverse ecological effect on any ecosystems in the Taranaki region, including but not limited to habitats, plants, animals, microflora and microfauna.

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

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

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
(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

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^3 [eight-hour average exposure], or 30 mg/m^3 [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^3 [twenty-four hour average exposure], or 95 $\mu g/m^3$ [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^3 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.

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^{o} 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

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 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

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. That the 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

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

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 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.

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.

Constituent	Standard
pH	Within the range 6.0 to 9.0
suspended solids	Concentration not greater than 100 gm^{-3}
oil and grease	Concentration not greater than 15 gm^{-3}

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.

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.

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.

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.

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.

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.

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.

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

Consent 5633-1

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

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. 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:	Colin David Boyd P O Box 44 INGLEWOOD 4347
Decision Date (Change):	5 February 2014
Commencement Date (Change):	5 February 2014 (Granted: 14 December 2005)

Conditions of Consent

Consent Granted:	To discharge sludge and other residuals from water treatment plants in the New Plymouth and South Taranaki Districts onto and into land
Expiry Date:	1 June 2026
Review Date(s):	June 2015, June 2021
Site Location:	Surrey Road, Inglewood
Legal Description:	Secs 9, 10 & Pt Sec 13 Blk XII Egmont SD Lot 2 DP 344156 Blk XII Egmont SD Secs 17 & 18 Blk XVI Egmont SD (Discharge sites)
Grid Reference (NZTM)	1701925E-5652253N
Catchment:	Waitara
Tributary:	Mangamawhete Mangatengehu

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of the original application and any subsequent applications to change conditions. In the case of any contradiction between the documentation submitted in support of previous applications and the conditions of this consent, the conditions of this consent shall prevail.

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

4. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to the transportation of the sludge to the disposal site, and again at least 48 hours prior to beginning the actual disposal operation. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.

5. The sludge shall only be spread in the areas specified in application 4067 and 6784.

6. The consent holder shall ensure that sludge stockpiles are adequately bunded to ensure that there is no stormwater or leachate runoff to any surface watercourse, including farm drains.

7. The sludge shall not be deposited within 25 metres of the Mangamawhete Stream, the Mangatengehu Stream or the Waipuku Stream, or within 10 metres of any open drain or other watercourse.

8. The exercise of the consent shall not result in a total aluminium concentration exceeding 55ug/L in the Mangamawhete Stream, the Mangatengehu Stream or the Waipuku Stream or any open drain or watercourse including farm drains.

9. The area of bare land, stripped for receipt of the residuals, exposed at any particular time shall not exceed 40 acres.

10. As soon as practicable following discharge and incorporation, the discharge area shall be contoured and sown into pasture.

11. The exercise of this consent shall not result in any adverse impacts on groundwater as a result of leaching, or on 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, Taranaki Regional Council.

12. The exercise of this consent shall not result in any of the following effects on surface water:

    a) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended material;
    b) Any conspicuous change in the colour or visual clarity
    c) Any emission of objectionable odour;
    d) The rendering of freshwater unsuitable for consumption by farm animals;
    e) Any significant adverse effects on aquatic life.

13. 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.

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 2009 and/or 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 5 February 2014

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: 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.

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^3 (eight-hour average exposure), or 30 mg/m^3 (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^3 (annual average exposure) or 200 ug/m^3 (one hour average) at or beyond the boundary of the site.

9. The consent holder shall control all emissions to the atmosphere from the site of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, in order that the maximum ground level concentration for any particular contaminant arising from the exercise of this consent in conjunction with the exercise of any other consent for the site measured at or beyond the boundary of the site is not increased above background levels:

   a) by more than 1/30th of the relevant Workplace Exposure Standard-Time Weighted Average, or by more than the Workplace Exposure Standard-Short Term Exposure Limit at any time, (all terms as defined in Workplace Exposure Standards, 1994, Department of Labour); or

   b) if no Short Term Exposure Limit is set, by more than three times the Time Weighted Average at any time, (all terms as defined in Workplace Exposure Standards, 1994, Department of Labour).

10. Except in any period of 240 minutes following the initiation of start-up of a generating unit or in any period of 30 minutes prior to the cessation of the generation of electricity, the discharge of nitrogen oxides arising from the exercise of this consent shall not exceed:

    a) a mass emission rate for the plant of 63 g/s, or
    b) a mass emission rate per generating unit exhaust stack of (63 divided by n) g/s (where n = number of stacks), or
    c) a concentration in any generating unit exhaust stack equivalent to 50 mg/m3 at 100°Celsius, or to 50 ppm (volumetric basis).

11. For a maximum of 240 minutes from initiation of combustion of a generating unit until low NO_x operation is achieved or in any period of 30 minutes prior to the cessation of the generation of electricity, the discharge of nitrogen oxides arising from the exercise of this consent shall not exceed 230 g/s.

12. The minimum height of discharge of products of combustion from a combined cycle plant shall be 35 metres above ground level.

13. The discharges authorised by this consent shall not give rise to any direct significant adverse ecological effect on any ecosystems in the Taranaki region, including but not limited to habitats, plants, animals, microflora and microfauna.

14. The evaporative cooling system to be used shall not produce a visible plume at any ambient condition further from saturation than 6° Celsius and 85% relative humidity.

15. The evaporative cooling system shall be operated in order that the loss of cooling water as droplet drift to atmosphere does not exceed in aggregate 0.02% of the cooling water circulation rate at the time.

16. This consent shall lapse on 6 December 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.

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

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.

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

Consent 5848-1

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:	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 combined cycle power stations into the Patea River at or about GR: Q20:246-068
Expiry Date:	1 June 2034
Review Date(s):	June 2004, June 2010, June 2016, June 2022, June 2028
Site Location:	Combined Cycle Power Station, State Highway 43 [East Road], Stratford
Legal Description:	Pt Sec 121 Blk II Ngaere SD
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 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.

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 the Stratford Combined Cycle Power Station, 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 the Stratford Combined Cycle Power Station. 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.

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.

8. Within the mixing zone the discharge shall not give rise to a barrier preventing the movement of fish species.

9. The discharge shall not :

   (i) alter the ambient temperature of the receiving waters of the Patea River by more than 1.5 degrees Celsius for 95% of the time that the discharge is occurring on an annual basis; and
   (ii) alter the ambient temperature of the receiving waters of the Patea River by more than 2.0 degrees Celsius at any time

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

10. The discharge shall not raise the temperature of the receiving water above 25 degrees Celsius when measured 75 metres downstream of the discharge site.

11. The consent holder shall continuously monitor the temperature of the receiving waters so as to assess compliance with special conditions 9 and 10, and forward the results of this monitoring to the Chief Executive, Taranaki Regional Council, at monthly intervals.

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

Component	**Concentration**
pH [range]	6.0 – 9.0
Total Residual Chlorine	0.05 gm^{-3}

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

13. The discharge shall not cause the concentration of un-ionised ammonia in the Patea River to exceed 0.025 grams per cubic metre when measured at a point 75 metres downstream of the discharge.

14. This consent shall lapse on the expiry of six years after the date of commencement of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(b) of the Resource Management Act 1991.

15. 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.

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 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.

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

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 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.

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.

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

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

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.

2. A hybrid dry/wet mechanical draft cooling tower, as described in section 3.3.4 of the assessment of environmental effects provided with the application, shall be installed.

3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable only if the consent holder does not have access to email.

4. The consent holder shall at all times operate, maintain, supervise, monitor and control all processes so that emissions authorised by this consent are maintained at the minimum practicable level.

5. The evaporative cooling system to be used shall not produce a visible plume at any ambient condition further from saturation than 6° Celsius and 85% relative humidity.

6. That the evaporative cooling system shall be operated in order that the loss of cooling water as droplet drift to atmosphere does not exceed in aggregate 0.02% of the cooling water circulation rate at the time.

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

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

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The exercise of this consent shall be undertaken substantially in accordance with the documentation submitted in support of application 4907. In the case of any contradiction between the documentation submitted in support of application 4907 and the conditions of this consent, the conditions of this consent shall prevail.

2. Before beginning construction of the bridge the consent holder shall provide plans of the bridge to the Chief Executive, Taranaki Regional Council.

3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable only if the consent holder does not have access to email.

4. The consent holder shall take all reasonable steps to:

a) minimise the amount of sediment discharged to the stream;
b) minimise the amount of sediment that becomes suspended in the stream; and
c) mitigate the effects of any sediment in the stream.

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

5. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.

6. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.

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

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

General conditions

a) On receipt of a requirement from the Chief Executive, Taranaki Regional Council the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

b) Unless it is otherwise specified in the conditions of this consent, compliance with any monitoring requirement imposed by this consent must be at the consent holder's own expense.

c) The consent holder shall pay to the Council all required administrative charges fixed by the Council pursuant to section 36 in relation to:

i) the administration, monitoring and supervision of this consent; and
ii) charges authorised by regulations.

Special conditions

1. The exercise of this consent shall be undertaken substantially in accordance with the documentation submitted in support of application 4909. In the case of any contradiction between the documentation submitted in support of application 4909 and the conditions of this consent, the conditions of this consent shall prevail.

2. Before beginning construction of the bridge the consent holder shall provide plans of the bridge to the Chief Executive, Taranaki Regional Council.

3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable only if the consent holder does not have access to email.

4. The consent holder shall take all reasonable steps to:

a) minimise the amount of sediment discharged to the stream;
b) minimise the amount of sediment that becomes suspended in the stream; and
c) mitigate the effects of any sediment in the stream.

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

5. The consent holder shall ensure that the area and volume of riverbed disturbance shall, so far as is practicable, be minimised and any areas which are disturbed shall, so far as is practicable, be reinstated.

6. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.

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

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

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 [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. 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.

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

_____

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 Date:	21 June 2010

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

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 6498. Specifically this includes United Group Infrastructure Plan 3200-0030-S-3608. If there is any conflict between the documentation submitted in support of application 6498 and the conditions of this consent, the conditions of this consent shall prevail.

2. Any disturbance of parts of the riverbed covered by water and/or any works which may result in downstream discolouration of water shall be undertaken only between 1 November and 30 April, except where this requirement is waived in writing by the Chief Executive, Taranaki Regional Council.

3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of the initial installation and again at least 48 hours prior to and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.

4. The consent holder shall ensure that the area and volume of streambed disturbance is, as far as practicable, minimised and any areas that are disturbed are, as far as practicable, reinstated.

5. The consent holder shall take all reasonable steps to:

   a. minimise the amount of sediment discharged to the stream;
   b. minimise the amount of sediment that becomes suspended in the stream; and
   c. mitigate the effects of any sediment in the stream.

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

6. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure is no longer required. A further resource consent may be required to authorise the removal of the structure, and the consent holder is advised to seek advice from the Council on this matter.

7. This consent shall lapse on 30 June 2015, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

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.

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.

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

_____

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.

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^3 [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.

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

_____

A D McLay
Director - Resource Management

Appendix II

Categories used to evaluate environmental and administrative performance

Categories used to evaluate environmental and administrative performance

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year. Administrative performance is concerned with the Company's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

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

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

Environmental Performance

High: No or inconsequential (short-term duration, less than minor in severity) breaches of consent or regional plan parameters resulting from the activity; no adverse effects of significance noted or likely in the receiving environment. The Council did not record any verified unauthorised incidents involving 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 during investigations of incidents reported to the Council by a third party 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 during investigations of incidents reported to the Council by a third party. 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 during investigations of incidents reported to the Council by a third party. 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.

Appendix III

Company provided Annual Report

Air Resource Management Limited
P.O. Box 163050 Lynfield
12A Rangitata Place
Auckland
New Zealand
Phone: 09-6273531
www.armnz.kiwi

Contact Energy
Stratford Peaker Power Plant

East Road, Stratford

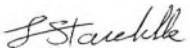
June 2023

Report Version 1.1, Produced on 19th June 2023

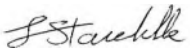
Scope of report:

Report on velocity & gas compositions, from gas turbine 21 & 22 units, conducted on 8th of June 2023.

Field Technician(s):

Jed Stancliffe	Environmental Technician	
Dylan Petherick	Environmental Technician	

Author of Report:

Jed Stancliffe	Environmental Technician	

Peer Reviewer:

Dylan Petherick	Environmental Technician	

Project Management:

Glenn Veart	Managing Director	

Version History:

Version	Date Amended	Author	Changes
v1.0	**16/06/2023**	**JS**	**First version produced**
v1.1	**19/06/2023**	**JS**	**Changed wording slightly at certain areas, at clients request**

Table of contents

1 Introduction

1.1 Preliminary Information

Scope

This report describes air emissions monitoring performed by Air Resource Management Ltd on behalf of Contact Energy Ltd at the Stratford thermal generation site, East Rd, Stratford, Taranaki on 8th June 2023. The results of the emission testing exercise are presented following a brief description of the process and the test methods used.

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 No 4022-2, Conditions 7 and 8. The compliance conditions specified in Conditions 7 and 8 of the resource consent No 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 $g.s^{-1}$

(b) [cancelled]

(c) A concentration in any gas turbine stack equivalent to 100 $mg.m^{-3}$ at 450 degrees Celsius, or to 125 ppm [volumetric basis].

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.

Limitations

This report has been prepared by Air Resource Management 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.

1.2 Process Description and Sampling Location

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 GT21 & GT22, 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 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). At the time of sampling **deNOx was not available for GT21**, while **deNOx was working as normal for GT22.**

Monitoring was performed over a 180-minute period, on each of the two Stratford Peaker plants. The testing was conducted in 25-minute runs, with 5 minutes of pausing at each power level change, to allow for conditions to stabilise. Starting at 7 Megawatts, then increasing to 30, 50, 70, 95, then 101 for GT21 & 106 for GT22. Data gathered will be used to demonstrate that the above 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.

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 metres 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 1.8m from the top of the stack at which point the stacks have an internal diameter of approximately 3.6m.

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.

Due to the size of our type-S pitot, not all positions across the traverse could have their differential reading taken. Positions 1 to 18 could be reached, but 19 to 24 were out of range. Please see velocity traverse graphs. However, due to the good laminar flow within the stack, as seen by velocity results, this issue has little effect on volumetric flow rate results.

2 Methodology

2.1 Sampling Methods

Stack Conditions:

Prior to a sampling run, duct conditions are determined using direct measurements of temperature, pressure, and gas composition. The velocity of flue gas is calculated from a series of differential pressure readings using a S-type pitot traverse across the diameter of the duct. Correcting the velocity to 0˚C and 1 ATM (dry gas basis) and multiplying by the duct area allow for the determination of the volumetric flow at time of testing. Such measurements are repeated between runs to assess potential temporal variations throughout the duration of the sampling.
ARM Method 1-4.

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 (O2), carbon monoxide (CO) and oxides of nitrogen (NOx) via separate measurement of nitrogen oxide (NO) and nitrogen dioxide (NO2). The Testo 350 also measures carbon dioxide (CO2) using non-dispersive infrared (NDIR). The Testo 350 meets the requirements of the U.S. EPA conditional test method CTM-034: 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 checked prior to sampling being undertaken.

Air Resource Management is IANZ accredited for all of the tests performed.

2.2 Quality Assurance

Instrument Calibration:

The Testo 350 instrument has been given a service and calibration check for each of the gases being measured. The calibration involves checking the zero and span settings by introducing calibration gases into the instrument for each of the parameters. At the conclusion of the sampling runs the instrument is again given a calibration check and the results of the testing are corrected for any drift in both the zero offset and span off the before and after calibration.

Detection Limits:

There are different detection limits, for each specific gas. If a sample is below this detection limit value, a less than sign (<) is used to indicate this. Below is a table, showing each limit.

Table 1: Detection Limit Values

Contaminant	Detection Limits
O_2	0.01 vol.%
CO_2	0.01 vol.%
CO	1ppm
NO	1ppm
NO_2	0.1ppm
NO_x	0.1ppm

3 Results

3.1 Gas Turbine 21 results

Table 2: Sampling Plane Provisions

Gas Turbine 21	
Duct Dimensions	3.6m
Distance from nearest upstream disturbance	0.5 duct diameters
Distance from nearest downstream disturbance	0.5 duct diameters
Port fitting	1 x 4 inch port
Discharge	Vertical
Gas Moisture Content (STP)	12.3%

Table 3: Sampling Details

Sample	Start Time	End Time	Average Gas Temperature (°C)	Average Gas Velocity (m/s)	Volumetric gas flow, STP, dry (m^3/s)
7MW	09:05	09:30	436	14.4	49.9
30MW	09:35	10:00	427	25.3	88.6
50MW	10:05	10:30	418	31.1	110.6
70MW	10:35	11:00	415	37.1	132.4
95MW	11:05	11:30	404	43.9	159.4
101MW	11:35	12:00	410	45.3	162.5
Average			**418**	**32.9**	**117.2**

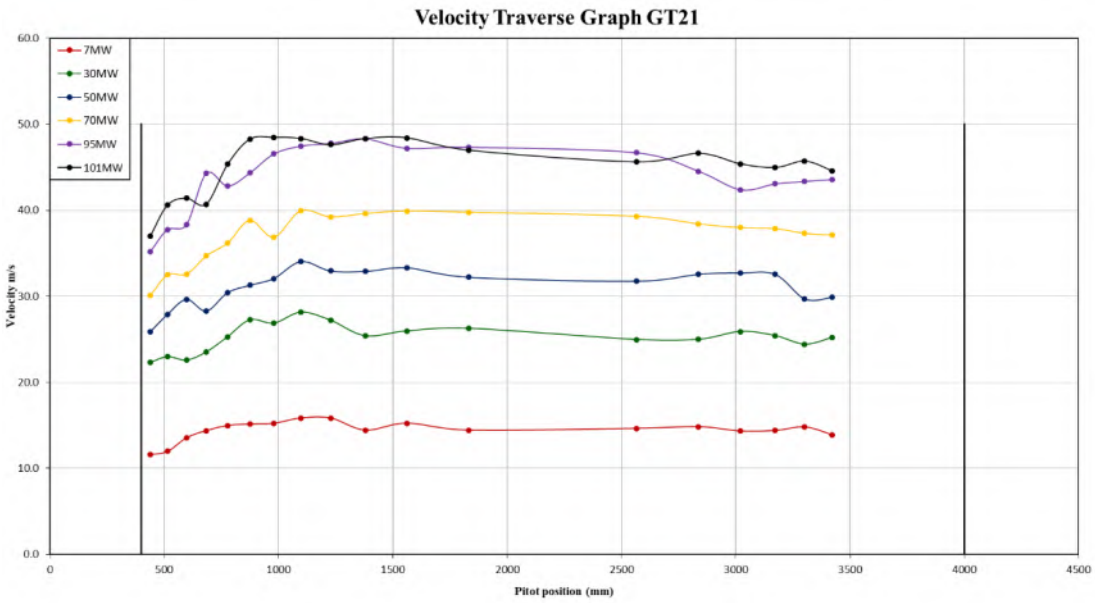


***Figure 1**: Velocity Traverse Graph – GT21*

Table 4: Sampling Details – GT21

Sample	O_2 %	CO_2 %	*CO_2 (kg/hr)	CO (ppm)	**NO_x (ppm)	NO_2 (ppm)	NO (ppm)
7MW	15.12	3.24	11424	7	53.4	3.4	50.0
30MW	14.83	3.40	21286	7	60.4	5.4	55.0
50MW	14.58	3.61	28213	7	74.4	7.4	67.0
70MW	14.15	3.88	36300	5	91.0	8.5	82.5
95MW	13.86	4.05	45618	5	104.7	4.5	100.2
101MW	13.69	4.15	47653	4	111.9	4.5	107.3
Average	**14.4**	**3.7**	**28273**	**5.8**	**82.6**	**5.6**	**77.0**

*Carbon dioxide is converted into a mass emission, given in kilograms per hour on a dry gas basis, at standard pressure and 0 degrees Celsius.

** On GT21, the deNOx was not available, so NO_x levels will be higher.

3.2 Gas Turbine 22 Results

Table 5: Sampling Plane Provisions

Gas Turbine 21	
Duct Dimensions	3.6m
Distance from nearest upstream disturbance	0.5 duct diameters
Distance from nearest downstream disturbance	0.5 duct diameters
Port fitting	1 x 4 inch port
Discharge	Vertical
Gas Moisture Content (STP)	15.0%

Table 6: Sampling Details

Sample	Start Time	End Time	Average Gas Temperature (°C)	Average Gas Velocity (m/s)	Volumetric gas flow, STP, dry (m^3/s)
7MW	13:05	13:30	456	13.5	43.8
30MW	13:35	14:00	432	23.7	79.9
50MW	14:05	14:30	419	29.5	101.8
70MW	14:35	15:00	414	35.9	124.5
95MW	15:05	15:30	405	42.6	149.9
106MW	15:35	16:00	410	45.3	158.2
Average			**423**	**31.8**	**109.7**

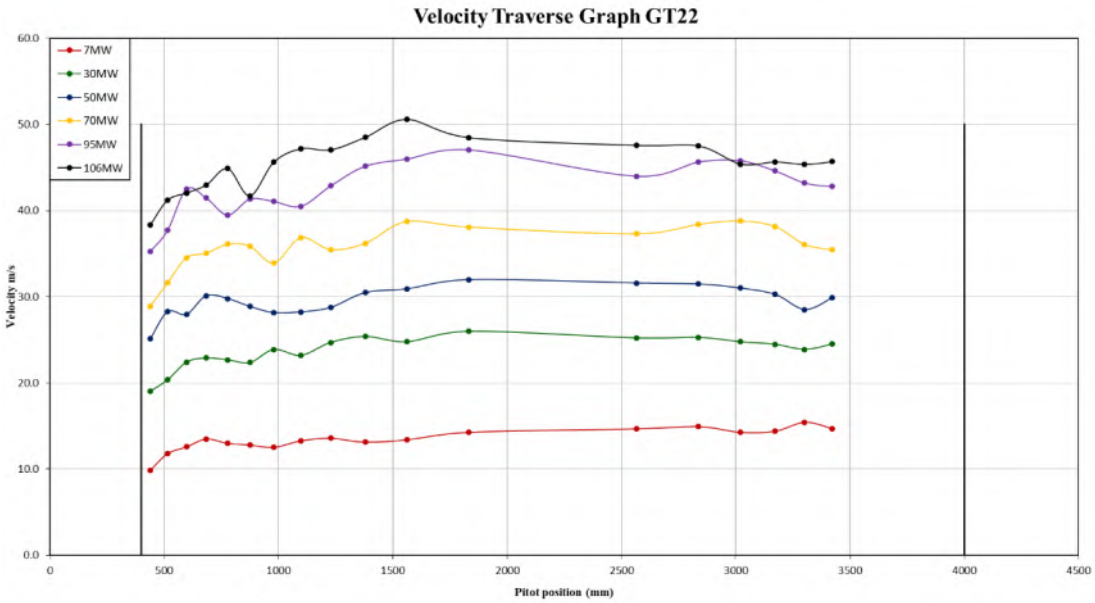


***Figure 2**: Velocity Traverse Graph – GT22*

Table 7: Sampling Details

Sample	O_2 %	CO_2 %	*CO_2 (kg/hr)	CO (ppm)	NO_x (ppm)	NO_2 (ppm)	NO (ppm)
7MW	16.20	2.65	8202	20	32.5	3.7	28.8
30MW	14.93	3.37	19027	10	34.6	4.7	29.9
50MW	14.30	3.72	26760	7	41.1	5.8	35.3
70MW	13.81	4.00	35190	6	45.8	6.2	39.6
95MW	13.45	4.22	44700	5	46.9	6.1	40.8
106MW	13.19	4.37	48851	5	49.9	6.2	43.7
Average	**14.31**	**3.72**	**26452**	**8.8**	**41.8**	**5.5**	**36.4**

*Carbon dioxide is converted into a mass emission, given in kilograms per hour on a dry gas basis, at standard pressure and 0 degrees Celsius.

3.3 Comparison

Below is a comparison of some key figures, between Gas Turbines 21 & 22:

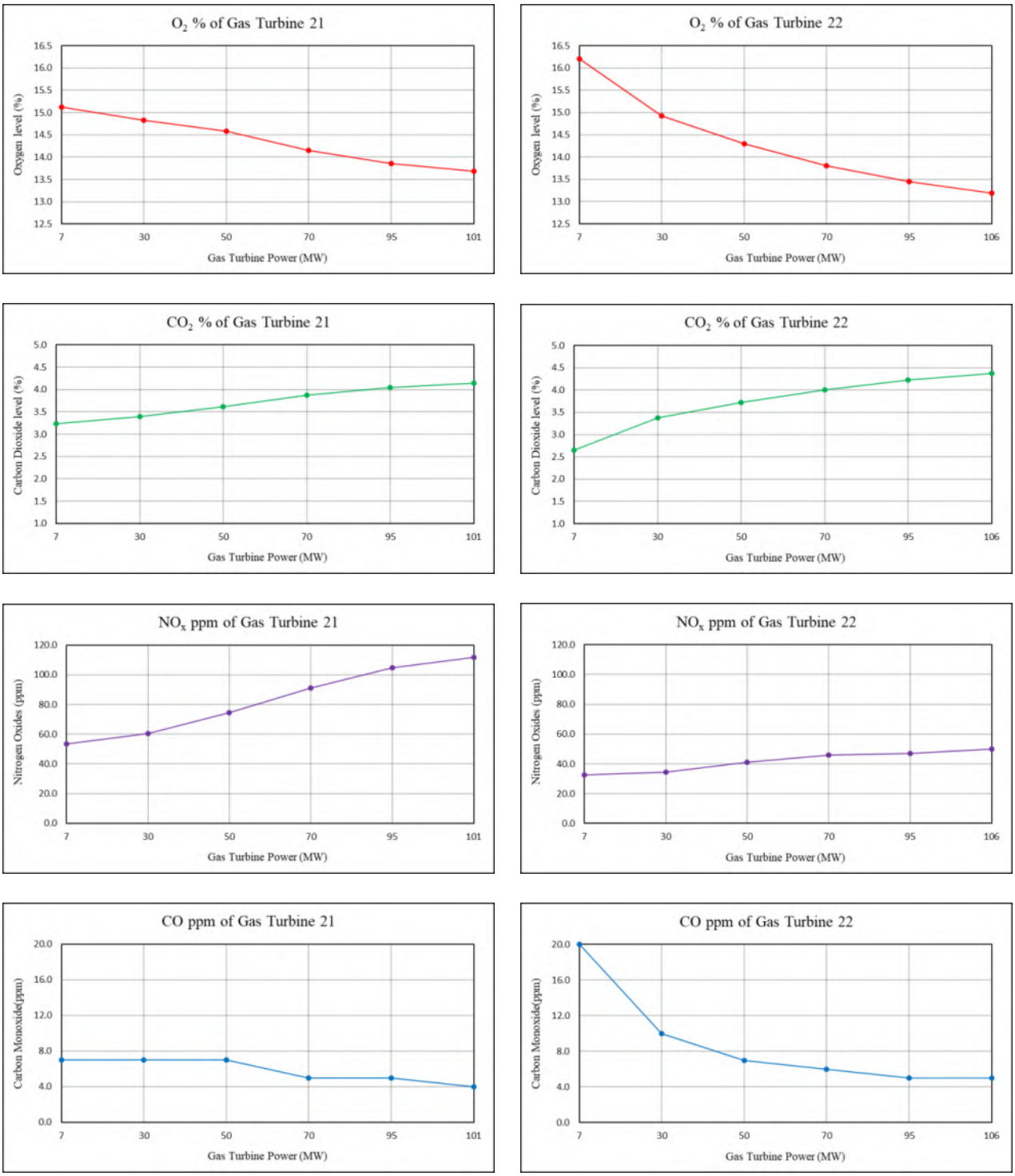


***Figure 3**: Graphs of GT21 & GT22 Comparison*

4 Summary

The final results are given in terms of an average, over all the sampled power levels. The power level on any given day, will fluctuate between these estimated values, so an average of these is appropriate. Due to the deNOx not being available for GT21, the results for NOx will be high, which will affect the GT21 & 22 averages and totals.

Table 8: Summary of NOx

Source (average)	NO_x (ppm)	NO_2 (ppm)	NO (ppm)	Gas Temp (°C)
GT21	82.6	5.6	77.0	418
GT22	41.8	5.5	36.4	423
Average	62.2	5.6	56.7	421
	NO_x (ppm)	NO_x (mg/m^3 @ 450°C)	NO_x (g/s @ 0°C)	NO_x (kg/hr @ 0°C)
GT21	82.6	64.0	19.9	71.6
GT22	41.8	23.4	9.4	33.9
Total	124.4	87.4	29.3	105.5

*Calculation approximated using NO_2 as mass. All figures in table 8 to 1 ATM.

The air emission testing carried out on the 8th of June 2023 on both the Gas Turbines, located at the Contact Energy station at Stratford, show the following interpreted results for consent their conditions 7a, 7c & 8:

Table 9: Comparison with Consent

GT 21 Results		
Figure	Consent Limit	Average Value
(7a) NO_x Concentration (mg/m^3, 450°C)	**100**	**64.0**
(7c) NO_x Mass Emission (g/s, 0°C)	**175**	**19.9**
GT 22 Results		
Figure	Consent Limit	Average Value
(7a) NO_x Concentration (mg/m^3, 450°C)	**100**	**23.4**
(7c) NO_x Mass Emission (g/s, 0°C)	**175**	**9.4**
Total Results		
Figure	Consent Limit	Average Value
(8) NO_x Total Mass Emission (kg/hr, 0°C)	**830**	**105.5**

*All figures given on a dry gas basis, and to 1 atmospheric pressure.

Note: The emission testing was done solely of the Gas turbines and do not consider any NOx emissions that maybe being emitted from other sources located at this site.

5 References

1. ARM Method 1: Sample and Velocity Traverses for Stationary Sources.
   Ref: USEPA Method 1 Sample and Velocity Traverses for Stationary Sources

2. ARM Method 2: Determination of Stack Gas Velocity and Flowrate (Type S Pitot Tube).
   Ref: USEPA Method 2 Determination of Stack Gas Velocity and Flowrate (Type S Pitot Tube)

3. ARM Method 3: Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources.
   Ref: USEPA Method 3 Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources

4. ARM Method 4: Determination of Moisture Content in Stack Gases.
   Ref: USEPA Method 4 Determination of Moisture Content in Stack Gases

5. USEPA CTM-034 Test Method: Determination of Oxygen, Carbon Monoxide and Oxides of Nitrogen from Stationary Sources for Periodic Monitoring.
   (Portable Electrochemical Analyzer Procedure)

6 Appendices

Table A1

Contact Energy, G21 7MW Load

FILE NO.	175	**PROJECT NUMBER**	23020
DATE	08/06/2023	**TESTERS**	DP, JS
SAMPLING SITE	G21	**LEAK CHECK**	

Stack details (Method 1)

Diameter (m)	3.60
Dimensions (Length)	
Dimensions (Width)	
Equivalent Diameter	
Stack area (m^2) (A_s)	10.18
Upstream disturbance (m)	1.8
Upstream disturbance (dia)	NA
Downstream disturbance (m)	1.8
Downstream disturbance (dia)	0.5
Particulates or Velocity	V
Min Number of Total Points	16
Number of Total Points Chosen	24
Number of Ports	1
Number of Points per Port	24

Gas flow data (Method 2)

Stack temp (°C) (T_s)	436.0
Stack temp (°K) (T_s)	709.15
Pitot constant (C_p)	0.86
Stack pressure (Pa)	-71
Stack pressure (mmHg)	-0.533
Stack pressure(mmHg) (P_s)	767.57
Atm. pressure (mbar)	1024
Atm. pressure (mmHg) (P_m)	768.1
Meter Pressure (mmHg)	768.1
Average Velocity (m/s) (v_s)	**14.4**
Vol. flow rate (m^3/s, STP, dry)	**49.9**

Gas Composition (Method 3)

CO_2 (%)	3.2
O_2 (%)	15.1
N_2 (%)	81.64
CO (%)	
H_2O (%)	12.6
M_{WS} (dry)	29.12
M_{WS}(wet)	27.720
B_{ws}	0.13
Saturated Gas Value (%)	100
Fuel Factor (F_o)	1.784
Excess Air (%EA)	235.04
Fuel Type	Gas, Natural
Fuel Factor Within range	Within Range

Stack moisture (Method 4)

Condensate vol. (impingers 1-3) (mL)	10.3
Condensate vol (silica gel impinger). (mL)	
Condensate vol (Total). (mL)	10.3
Volume of water vapour (impinger 1-3)	0.013
Volume of water vapour (silica Gel impinger)	
Initial meter Volume	4.962
Final meter Volume	5.177
Meter vol. @ STP (m^3)	0.0888
Moisture content (%)	**12.6**
Meter temp.(ºC) (T_m)	15
Meter temp.(ºK) (T_m)	288
Gas meter constant (Y)	1.0607
or	
Assumed Moisture (%)	<data>

Sampling Traverse Data

Position	ΔP (Pa)	Stack temperature (°C) (Ts)	Velocity (m/s)
A1	44	436	11.6
A2	47		12.0
A3	60		13.5
A4	67		14.4
A5	73		15.0
A6	75		15.1
A7	75		15.2
A8	82		15.8
A9	82		15.8
A10	68		14.4
A11	76		15.2
A12	68		14.4
A13	70		14.6
A14	72		14.8
A15	67		14.3
A16	67		14.4
A17	71		14.8
A18	63		13.9
A19			
A20			
A21			
A22			
A23			
A24			
Sum or Average	**68**	**436**	**14.4**

Table A2

Contact Energy, G21 30MW Load

FILE NO.	175	**PROJECT NUMBER**	23020
DATE	08/06/2023	**TESTERS**	DP, JS
SAMPLING SITE	G21	**LEAK CHECK**	

Stack details (Method 1)

Diameter (m)	3.60
Dimensions (Length)	
Dimensions (Width)	
Equivalent Diameter	
Stack area (m^2) (A_s)	10.18
Upstream disturbance (m)	1.8
Upstream disturbance (dia)	NA
Downstream disturbance (m)	1.8
Downstream disturbance (dia)	0.5
Particulates or Velocity	V
Min Number of Total Points	16
Number of Total Points Chosen	24
Number of Ports	1
Number of Points per Port	24

Gas flow data (Method 2)

Stack temp (°C) (T_s)	427.0
Stack temp (°K) (T_s)	700.15
Pitot constant (C_p)	0.86
Stack pressure (Pa)	-145
Stack pressure (mmHg)	-1.088
Stack pressure(mmHg) (P_s)	767.01
Atm. pressure (mbar)	1024
Atm. pressure (mmHg) (P_m)	768.1
Meter Pressure (mmHg)	768.1
Average Velocity (m/s) (v_s)	**25.3**
Vol. flow rate (m^3/s, STP, dry)	**88.6**

Gas Composition (Method 3)

CO_2 (%)	3.4
O_2 (%)	14.8
N_2 (%)	81.8
CO (%)	
H_2O (%)	12.5
M_{WS} (dry)	29.14
M_{WS}(wet)	27.747
B_{ws}	0.12
Saturated Gas Value (%)	100
Fuel Factor (F_o)	1.794
Excess Air (%EA)	217.80
Fuel Type	Gas, Natural
Fuel Factor Within range	Within Range

Stack moisture (Method 4)

Condensate vol. (impingers 1-3) (mL)	10.3
Condensate vol (silica gel impinger). (mL)	
Condensate vol (Total). (mL)	10.3
Volume of water vapour (impinger 1-3)	0.013
Volume of water vapour (silica Gel impinger)	
Initial meter Volume	4.962
Final meter Volume	5.177
Meter vol. @ STP (m^3)	0.0899
Moisture content (%)	**12.5**
Meter temp.(ºC) (T_m)	15
Meter temp.(ºK) (T_m)	288
Gas meter constant (Y)	1.0607

or

Assumed Moisture (%)	<data>

Sampling Traverse Data

Position	ΔP (Pa)	Stack temperature (°C) (Ts)	Velocity (m/s)
A1	164	427	22.3
A2	174		23.0
A3	168		22.6
A4	182		23.5
A5	211		25.3
A6	245		27.3
A7	238		26.9
A8	261		28.1
A9	244		27.2
A10	213		25.4
A11	222		26.0
A12	227		26.3
A13	206		25.0
A14	206		25.0
A15	221		25.9
A16	213		25.4
A17	197		24.4
A18	210		25.2
A19			
A20			
A21			
A22			
A23			
A24			
Sum or Average	**211**	**427**	**25.3**

Table A3

Contact Energy, G21 50MW Load

FILE NO.	175	**PROJECT NUMBER**	23020
DATE	08/06/2023	**TESTERS**	DP, JS
SAMPLING SITE	G21	**LEAK CHECK**	

Stack details (Method 1)

Diameter (m)	3.60
Dimensions (Length)	
Dimensions (Width)	
Equivalent Diameter	
Stack area (m^2) (A_s)	10.18
Upstream disturbance (m)	1.8
Upstream disturbance (dia)	NA
Downstream disturbance (m)	1.8
Downstream disturbance (dia)	0.5
Particulates or Velocity	V
Min Number of Total Points	16
Number of Total Points Chosen	24
Number of Ports	1
Number of Points per Port	24

Gas flow data (Method 2)

Stack temp (°C) (T_s)	418.0
Stack temp (°K) (T_s)	691.15
Pitot constant (C_p)	0.86
Stack pressure (Pa)	-261
Stack pressure (mmHg)	-1.958
Stack pressure(mmHg) (P_s)	766.14
Atm. pressure (mbar)	1024
Atm. pressure (mmHg) (P_m)	768.1
Meter Pressure (mmHg)	768.1
Average Velocity (m/s) (v_s)	**31.1**
Vol. flow rate (m^3/s, STP, dry)	**110.6**

Sampling Traverse Data

Position	ΔP (Pa)	Stack temperature (°C) (Ts)	Velocity (m/s)
A1	223	418	25.8
A2	260		27.9
A3	293		29.6
A4	267		28.3
A5	309		30.4
A6	327		31.3
A7	344		32.1
A8	387		34.1
A9	363		32.9
A10	361		32.9
A11	371		33.3
A12	347		32.2
A13	337		31.8
A14	354		32.6
A15	358		32.7
A16	354		32.6
A17	294		29.7
A18	298		29.9
A19			
A20			
A21			
A22			
A23			
A24			
Sum or Average	**325**	**418**	**31.1**

Gas Composition (Method 3)

CO_2 (%)	3.6
O_2 (%)	14.6
N_2 (%)	81.8
CO (%)	
H_2O (%)	12.3
M_{WS} (dry)	29.16
M_{WS}(wet)	27.784
B_{ws}	0.12
Saturated Gas Value (%)	100
Fuel Factor (F_o)	1.750
Excess Air (%EA)	208.71
Fuel Type	Gas, Natural
Fuel Factor Within range	Within Range

Stack moisture (Method 4)

Condensate vol. (impingers 1-3) (mL)	10.3
Condensate vol (silica gel impinger). (mL)	
Condensate vol (Total). (mL)	10.3
Volume of water vapour (impinger 1-3)	0.013
Volume of water vapour (silica Gel impinger)	
Initial meter Volume	4.962
Final meter Volume	5.177
Meter vol. @ STP (m^3)	0.0911
Moisture content (%)	**12.3**
Meter temp.(ºC) (T_m)	15
Meter temp.(ºK) (T_m)	288
Gas meter constant (Y)	1.0607

or

Assumed Moisture (%)	<data>

Table A4

Contact Energy, G21 70MW Load

FILE NO.	175	**PROJECT NUMBER**	23020
DATE	08/06/2023	**TESTERS**	DP, JS
SAMPLING SITE	G21	**LEAK CHECK**	

Stack details (Method 1)

Diameter (m)	3.60
Dimensions (Length)	
Dimensions (Width)	
Equivalent Diameter	
Stack area (m^2) (A_s)	10.18
Upstream disturbance (m)	1.8
Upstream disturbance (dia)	NA
Downstream disturbance (m)	1.8
Downstream disturbance (dia)	0.5
Particulates or Velocity	V
Min Number of Total Points	16
Number of Total Points Chosen	24
Number of Ports	1
Number of Points per Port	24

Gas flow data (Method 2)

Stack temp (°C) (T_s)	415.0
Stack temp (°K) (T_s)	688.15
Pitot constant (C_p)	0.86
Stack pressure (Pa)	-412
Stack pressure (mmHg)	-3.090
Stack pressure(mmHg) (P_s)	765.01
Atm. pressure (mbar)	1024
Atm. pressure (mmHg) (P_m)	768.1
Meter Pressure (mmHg)	768.1
Average Velocity (m/s) (v_s)	**37.1**
Vol. flow rate (m^3/s, STP, dry)	**132.4**

Gas Composition (Method 3)

CO_2 (%)	3.9
O_2 (%)	14.2
N_2 (%)	81.9
CO (%)	
H_2O (%)	12.3
M_{WS} (dry)	29.19
M_{WS}(wet)	27.817
B_{ws}	0.12
Saturated Gas Value (%)	100
Fuel Factor (F_o)	1.718
Excess Air (%EA)	191.33
Fuel Type	Gas, Natural
Fuel Factor Within range	Within Range

Stack moisture (Method 4)

Condensate vol. (impingers 1-3) (mL)	10.3
Condensate vol (silica gel impinger). (mL)	
Condensate vol (Total). (mL)	10.3
Volume of water vapour (impinger 1-3)	0.013
Volume of water vapour (silica Gel impinger)	
Initial meter Volume	4.962
Final meter Volume	5.177
Meter vol. @ STP (m^3)	0.0915
Moisture content (%)	**12.3**
Meter temp.(ºC) (T_m)	15
Meter temp.(ºK) (T_m)	288
Gas meter constant (Y)	1.0607

or

Assumed Moisture (%)	<data>

Sampling Traverse Data

Position	ΔP (Pa)	Stack temperature (°C) (Ts)	Velocity (m/s)
A1	304	415	30.1
A2	354		32.5
A3	357		32.6
A4	404		34.7
A5	440		36.2
A6	505		38.8
A7	456		36.9
A8	535		39.9
A9	516		39.2
A10	526		39.6
A11	534		39.9
A12	530		39.8
A13	518		39.3
A14	495		38.4
A15	483		38.0
A16	481		37.9
A17	467		37.3
A18	462		37.1
A19			
A20			
A21			
A22			
A23			
A24			
Sum or Average	**465**	**415**	**37.1**

Table A5

Contact Energy, G21 95MW Load

FILE NO.	175	**PROJECT NUMBER**	23020
DATE	08/06/2023	**TESTERS**	DP, JS
SAMPLING SITE	G21	**LEAK CHECK**	

Stack details (Method 1)

Diameter (m)	3.60
Dimensions (Length)	
Dimensions (Width)	
Equivalent Diameter	
Stack area (m^2) (A_s)	10.18
Upstream disturbance (m)	1.8
Upstream disturbance (dia)	NA
Downstream disturbance (m)	1.8
Downstream disturbance (dia)	0.5
Particulates or Velocity	V
Min Number of Total Points	16
Number of Total Points Chosen	24
Number of Ports	1
Number of Points per Port	24

Gas flow data (Method 2)

Stack temp (°C) (T_s)	404.0
Stack temp (°K) (T_s)	677.15
Pitot constant (C_p)	0.86
Stack pressure (Pa)	-563
Stack pressure (mmHg)	-4.223
Stack pressure(mmHg) (P_s)	763.88
Atm. pressure (mbar)	1024
Atm. pressure (mmHg) (P_m)	768.1
Meter Pressure (mmHg)	768.1
Average Velocity (m/s) (v_s)	**43.9**
Vol. flow rate (m^3/s, STP, dry)	**159.4**

Gas Composition (Method 3)

CO_2 (%)	4.0
O_2 (%)	13.9
N_2 (%)	82.1
CO (%)	
H_2O (%)	12.1
M_{WS} (dry)	29.20
M_{WS}(wet)	27.840
B_{ws}	0.12
Saturated Gas Value (%)	100
Fuel Factor (F_o)	1.750
Excess Air (%EA)	178.79
Fuel Type	Gas, Natural
Fuel Factor Within range	Within Range

Stack moisture (Method 4)

Condensate vol. (impingers 1-3) (mL)	10.3
Condensate vol (silica gel impinger). (mL)	
Condensate vol (Total). (mL)	10.3
Volume of water vapour (impinger 1-3)	0.013
Volume of water vapour (silica Gel impinger)	
Initial meter Volume	4.962
Final meter Volume	5.177
Meter vol. @ STP (m^3)	0.0930
Moisture content (%)	**12.1**
Meter temp.(ºC) (T_m)	15
Meter temp.(ºK) (T_m)	288
Gas meter constant (Y)	1.0607

or

Assumed Moisture (%)	<data>

Sampling Traverse Data

Position	ΔP (Pa)	Stack temperature (°C) (Ts)	Velocity (m/s)
A1	421	404	35.2
A2	485		37.7
A3	500		38.3
A4	668		44.3
A5	625		42.8
A6	669		44.3
A7	738		46.5
A8	767		47.5
A9	777		47.8
A10	795		48.3
A11	759		47.2
A12	763		47.3
A13	742		46.7
A14	675		44.5
A15	612		42.4
A16	632		43.1
A17	640		43.3
A18	647		43.6
A19			
A20			
A21			
A22			
A23			
A24			
Sum or Average	**662**	**404**	**43.9**

Table A6

Contact Energy, G21 101MW Load

FILE NO.	175	**PROJECT NUMBER**	23020
DATE	08/06/2023	**TESTERS**	DP, JS
SAMPLING SITE	G21	**LEAK CHECK**	

Stack details (Method 1)

Diameter (m)	3.60
Dimensions (Length)	
Dimensions (Width)	
Equivalent Diameter	
Stack area (m^2) (A_s)	10.18
Upstream disturbance (m)	1.8
Upstream disturbance (dia)	NA
Downstream disturbance (m)	1.8
Downstream disturbance (dia)	0.5
Particulates or Velocity	V
Min Number of Total Points	16
Number of Total Points Chosen	24
Number of Ports	1
Number of Points per Port	24

Gas flow data (Method 2)

Stack temp (°C) (T_s)	410.0
Stack temp (°K) (T_s)	683.15
Pitot constant (C_p)	0.86
Stack pressure (Pa)	-575
Stack pressure (mmHg)	-4.313
Stack pressure(mmHg) (P_s)	763.79
Atm. pressure (mbar)	1024
Atm. pressure (mmHg) (P_m)	768.1
Meter Pressure (mmHg)	768.1
Average Velocity (m/s) (v_s)	**45.3**
Vol. flow rate (m^3/s, STP, dry)	**162.5**

Gas Composition (Method 3)

CO_2 (%)	4.2
O_2 (%)	13.7
N_2 (%)	82.1
CO (%)	
H_2O (%)	12.2
M_{WS} (dry)	29.22
M_{WS}(wet)	27.850
B_{ws}	0.12
Saturated Gas Value (%)	100
Fuel Factor (F_o)	1.714
Excess Air (%EA)	171.80
Fuel Type	Gas, Natural
Fuel Factor Within range	Within Range

Stack moisture (Method 4)

Condensate vol. (impingers 1-3) (mL)	10.3
Condensate vol (silica gel impinger). (mL)	
Condensate vol (Total). (mL)	10.3
Volume of water vapour (impinger 1-3)	0.013
Volume of water vapour (silica Gel impinger)	
Initial meter Volume	4.962
Final meter Volume	5.177
Meter vol. @ STP (m^3)	0.0922
Moisture content (%)	**12.2**
Meter temp.(ºC) (T_m)	15
Meter temp.(ºK) (T_m)	288
Gas meter constant (Y)	1.0607

or

Assumed Moisture (%)	<data>

Sampling Traverse Data

Position	ΔP (Pa)	Stack temperature (°C) (Ts)	Velocity (m/s)
A1	462	410	37.0
A2	557		40.6
A3	579		41.4
A4	560		40.7
A5	695		45.4
A6	787		48.3
A7	794		48.5
A8	789		48.4
A9	766		47.6
A10	789		48.3
A11	792		48.4
A12	745		47.0
A13	703		45.6
A14	734		46.6
A15	696		45.4
A16	683		45.0
A17	706		45.7
A18	671		44.6
A19			
A20			
A21			
A22			
A23			
A24			
Sum or Average	**695**	**410**	**45.3**

Table B1

Contact Energy, G22 7MW Load

FILE NO.	175	**PROJECT NUMBER**	23020
DATE	08/06/2023	**TESTERS**	DP, JS
SAMPLING SITE	G22	**LEAK CHECK**	

Stack details (Method 1)

Diameter (m)	3.60
Dimensions (Length)	
Dimensions (Width)	
Equivalent Diameter	
Stack area (m^2) (A_s)	10.18
Upstream disturbance (m)	1.8
Upstream disturbance (dia)	NA
Downstream disturbance (m)	1.8
Downstream disturbance (dia)	0.5
Particulates or Velocity	V
Min Number of Total Points	16
Number of Total Points Chosen	24
Number of Ports	1
Number of Points per Port	24

Gas flow data (Method 2)

Stack temp (°C) (T_s)	456.0
Stack temp (°K) (T_s)	729.15
Pitot constant (C_p)	0.86
Stack pressure (Pa)	-40
Stack pressure (mmHg)	-0.300
Stack pressure(mmHg) (P_s)	767.80
Atm. pressure (mbar)	1024
Atm. pressure (mmHg) (P_m)	768.1
Meter Pressure (mmHg)	768.1
Average Velocity (m/s) (v_s)	**13.5**
Vol. flow rate (m^3/s, STP, dry)	**43.8**

Gas Composition (Method 3)

CO_2 (%)	2.7
O_2 (%)	16.2
N_2 (%)	81.1
CO (%)	
H_2O (%)	15.6
M_{WS} (dry)	29.08
M_{WS}(wet)	27.356
B_{ws}	0.16
Saturated Gas Value (%)	100
Fuel Factor (F_o)	1.741
Excess Air (%EA)	310.92
Fuel Type	Gas, Natural
Fuel Factor Within range	Within Range

Stack moisture (Method 4)

Condensate vol. (impingers 1-3) (mL)	14.1
Condensate vol (silica gel impinger). (mL)	
Condensate vol (Total). (mL)	14.1
Volume of water vapour (impinger 1-3)	0.018
Volume of water vapour (silica Gel impinger)	
Initial meter Volume	5.211
Final meter Volume	5.448
Meter vol. @ STP (m^3)	0.0952
Moisture content (%)	**15.6**
Meter temp.(ºC) (T_m)	15
Meter temp.(ºK) (T_m)	288
Gas meter constant (Y)	1.0607

or

Assumed Moisture (%)	<data>

Sampling Traverse Data

Position	ΔP (Pa)	Stack temperature (°C) (Ts)	Velocity (m/s)
A1	31	456	9.9
A2	44		11.8
A3	50		12.6
A4	57		13.5
A5	53		13.0
A6	51		12.8
A7	49		12.5
A8	55		13.3
A9	58		13.6
A10	54		13.1
A11	56		13.4
A12	64		14.3
A13	67		14.7
A14	70		14.9
A15	64		14.3
A16	65		14.4
A17	75		15.4
A18	68		14.7
A19			
A20			
A21			
A22			
A23			
A24			
Sum or Average	**57**	**456**	**13.5**

Table B2

Contact Energy, G22 30MW Load

FILE NO.	175	**PROJECT NUMBER**	23020
DATE	08/06/2023	**TESTERS**	DP, JS
SAMPLING SITE	G22	**LEAK CHECK**	

Stack details (Method 1)

Diameter (m)	3.60
Dimensions (Length)	
Dimensions (Width)	
Equivalent Diameter	
Stack area (m^2) (A_s)	10.18
Upstream disturbance (m)	1.8
Upstream disturbance (dia)	NA
Downstream disturbance (m)	1.8
Downstream disturbance (dia)	0.5
Particulates or Velocity	V
Min Number of Total Points	16
Number of Total Points Chosen	24
Number of Ports	1
Number of Points per Port	24

Gas flow data (Method 2)

Stack temp (°C) (T_s)	432.0
Stack temp (°K) (T_s)	705.15
Pitot constant (C_p)	0.86
Stack pressure (Pa)	-157
Stack pressure (mmHg)	-1.178
Stack pressure(mmHg) (P_s)	766.92
Atm. pressure (mbar)	1024
Atm. pressure (mmHg) (P_m)	768.1
Meter Pressure (mmHg)	768.1
Average Velocity (m/s) (v_s)	**23.7**
Vol. flow rate (m^3/s, STP, dry)	**79.9**

Gas Composition (Method 3)

CO_2 (%)	3.4
O_2 (%)	14.9
N_2 (%)	81.7
CO (%)	
H_2O (%)	15.1
M_{WS} (dry)	29.14
M_{WS}(wet)	27.455
B_{ws}	0.15
Saturated Gas Value (%)	100
Fuel Factor (F_o)	1.765
Excess Air (%EA)	223.43
Fuel Type	Gas, Natural
Fuel Factor Within range	Within Range

Stack moisture (Method 4)

Condensate vol. (impingers 1-3) (mL)	14.1
Condensate vol (silica gel impinger). (mL)	
Condensate vol (Total). (mL)	14.1
Volume of water vapour (impinger 1-3)	0.018
Volume of water vapour (silica Gel impinger)	
Initial meter Volume	5.211
Final meter Volume	5.448
Meter vol. @ STP (m^3)	0.0984
Moisture content (%)	**15.1**
Meter temp.(ºC) (T_m)	15
Meter temp.(ºK) (T_m)	288
Gas meter constant (Y)	1.0607

or

Assumed Moisture (%)	<data>

Sampling Traverse Data

Position	ΔP (Pa)	Stack temperature (°C) (Ts)	Velocity (m/s)
A1	118	432	19.1
A2	134		20.4
A3	163		22.4
A4	170		22.9
A5	167		22.7
A6	162		22.4
A7	185		23.9
A8	174		23.2
A9	197		24.7
A10	209		25.4
A11	199		24.8
A12	219		26.0
A13	206		25.2
A14	207		25.3
A15	199		24.8
A16	194		24.5
A17	185		23.9
A18	195		24.5
A19			
A20			
A21			
A22			
A23			
A24			
Sum or Average	**182**	**432**	**23.7**

Table B3

Contact Energy, G22 50MW Load

FILE NO.	175	**PROJECT NUMBER**	23020
DATE	08/06/2023	**TESTERS**	DP, JS
SAMPLING SITE	G22	**LEAK CHECK**	

Stack details (Method 1)

Diameter (m)	3.60
Dimensions (Length)	
Dimensions (Width)	
Equivalent Diameter	
Stack area (m^2) (A_s)	10.18
Upstream disturbance (m)	1.8
Upstream disturbance (dia)	NA
Downstream disturbance (m)	1.8
Downstream disturbance (dia)	0.5
Particulates or Velocity	V
Min Number of Total Points	16
Number of Total Points Chosen	24
Number of Ports	1
Number of Points per Port	24

Gas flow data (Method 2)

Stack temp (°C) (T_s)	419.0
Stack temp (°K) (T_s)	692.15
Pitot constant (C_p)	0.86
Stack pressure (Pa)	-256
Stack pressure (mmHg)	-1.920
Stack pressure(mmHg) (P_s)	766.18
Atm. pressure (mbar)	1024
Atm. pressure (mmHg) (P_m)	768.1
Meter Pressure (mmHg)	768.1
Average Velocity (m/s) (v_s)	**29.5**
Vol. flow rate (m^3/s, STP, dry)	**101.8**

Gas Composition (Method 3)

CO_2 (%)	3.7
O_2 (%)	14.3
N_2 (%)	82
CO (%)	
H_2O (%)	14.9
M_{WS} (dry)	29.16
M_{WS}(wet)	27.502
B_{ws}	0.15
Saturated Gas Value (%)	100
Fuel Factor (F_o)	1.784
Excess Air (%EA)	194.61
Fuel Type	Gas, Natural
Fuel Factor Within range	Within Range

Stack moisture (Method 4)

Condensate vol. (impingers 1-3) (mL)	14.1
Condensate vol (silica gel impinger). (mL)	
Condensate vol (Total). (mL)	14.1
Volume of water vapour (impinger 1-3)	0.018
Volume of water vapour (silica Gel impinger)	
Initial meter Volume	5.211
Final meter Volume	5.448
Meter vol. @ STP (m^3)	0.1003
Moisture content (%)	**14.9**
Meter temp.(ºC) (T_m)	15
Meter temp.(ºK) (T_m)	288
Gas meter constant (Y)	1.0607

or

Assumed Moisture (%)	<data>

Sampling Traverse Data

Position	ΔP (Pa)	Stack temperature (°C) (Ts)	Velocity (m/s)
A1	208	419	25.1
A2	264		28.3
A3	258		28.0
A4	300		30.1
A5	293		29.8
A6	275		28.9
A7	262		28.2
A8	263		28.2
A9	273		28.8
A10	307		30.5
A11	316		30.9
A12	338		32.0
A13	330		31.6
A14	327		31.5
A15	317		31.0
A16	302		30.3
A17	268		28.5
A18	295		29.9
A19			
A20			
A21			
A22			
A23			
A24			
Sum or Average	**289**	**419**	**29.5**

Table B4

Contact Energy, G22 70MW Load

FILE NO.	175	**PROJECT NUMBER**	23020
DATE	08/06/2023	**TESTERS**	DP, JS
SAMPLING SITE	G22	**LEAK CHECK**	

Stack details (Method 1)

Diameter (m)	3.60
Dimensions (Length)	
Dimensions (Width)	
Equivalent Diameter	
Stack area (m^2) (A_s)	10.18
Upstream disturbance (m)	1.8
Upstream disturbance (dia)	NA
Downstream disturbance (m)	1.8
Downstream disturbance (dia)	0.5
Particulates or Velocity	V
Min Number of Total Points	16
Number of Total Points Chosen	24
Number of Ports	1
Number of Points per Port	24

Gas flow data (Method 2)

Stack temp (°C) (T_s)	414.0
Stack temp (°K) (T_s)	687.15
Pitot constant (C_p)	0.86
Stack pressure (Pa)	-392
Stack pressure (mmHg)	-2.940
Stack pressure(mmHg) (P_s)	765.16
Atm. pressure (mbar)	1024
Atm. pressure (mmHg) (P_m)	768.1
Meter Pressure (mmHg)	768.1
Average Velocity (m/s) (v_s)	**35.9**
Vol. flow rate (m^3/s, STP, dry)	**124.5**

Gas Composition (Method 3)

CO_2 (%)	4.0
O_2 (%)	13.8
N_2 (%)	82.2
CO (%)	
H_2O (%)	14.8
M_{WS} (dry)	29.19
M_{WS}(wet)	27.536
B_{ws}	0.15
Saturated Gas Value (%)	100
Fuel Factor (F_o)	1.775
Excess Air (%EA)	174.67
Fuel Type	Gas, Natural
Fuel Factor Within range	Within Range

Stack moisture (Method 4)

Condensate vol. (impingers 1-3) (mL)	14.1
Condensate vol (silica gel impinger). (mL)	
Condensate vol (Total). (mL)	14.1
Volume of water vapour (impinger 1-3)	0.018
Volume of water vapour (silica Gel impinger)	
Initial meter Volume	5.211
Final meter Volume	5.448
Meter vol. @ STP (m^3)	0.1010
Moisture content (%)	**14.8**
Meter temp.(ºC) (T_m)	15
Meter temp.(ºK) (T_m)	288
Gas meter constant (Y)	1.0607

or

Assumed Moisture (%)	<data>

Sampling Traverse Data

Position	ΔP (Pa)	Stack temperature (°C) (Ts)	Velocity (m/s)
A1	277	414	28.9
A2	332		31.6
A3	396		34.5
A4	409		35.1
A5	434		36.1
A6	428		35.9
A7	383		33.9
A8	452		36.9
A9	419		35.5
A10	436		36.2
A11	500		38.8
A12	483		38.1
A13	463		37.3
A14	491		38.4
A15	501		38.8
A16	484		38.2
A17	432		36.1
A18	418		35.5
A19			
A20			
A21			
A22			
A23			
A24			
Sum or Average	**430**	**414**	**35.9**

Table B5

Contact Energy, G22 95MW Load

FILE NO.	175	**PROJECT NUMBER**	23020
DATE	08/06/2023	**TESTERS**	DP, JS
SAMPLING SITE	G22	**LEAK CHECK**	

Stack details (Method 1)

Diameter (m)	3.60
Dimensions (Length)	
Dimensions (Width)	
Equivalent Diameter	
Stack area (m^2) (A_s)	10.18
Upstream disturbance (m)	1.8
Upstream disturbance (dia)	NA
Downstream disturbance (m)	1.8
Downstream disturbance (dia)	0.5
Particulates or Velocity	V
Min Number of Total Points	16
Number of Total Points Chosen	24
Number of Ports	1
Number of Points per Port	24

Gas flow data (Method 2)

Stack temp (°C) (T_s)	405.0
Stack temp (°K) (T_s)	678.15
Pitot constant (C_p)	0.86
Stack pressure (Pa)	-543
Stack pressure (mmHg)	-4.073
Stack pressure(mmHg) (P_s)	764.03
Atm. pressure (mbar)	1024
Atm. pressure (mmHg) (P_m)	768.1
Meter Pressure (mmHg)	768.1
Average Velocity (m/s) (v_s)	**42.6**
Vol. flow rate (m^3/s, STP, dry)	**149.9**

Gas Composition (Method 3)

CO_2 (%)	4.2
O_2 (%)	13.4
N_2 (%)	82.4
CO (%)	
H_2O (%)	14.6
M_{WS} (dry)	29.21
M_{WS}(wet)	27.568
B_{ws}	0.15
Saturated Gas Value (%)	100
Fuel Factor (F_o)	1.786
Excess Air (%EA)	160.41
Fuel Type	Gas, Natural
Fuel Factor Within range	Within Range

Stack moisture (Method 4)

Condensate vol. (impingers 1-3) (mL)	14.1
Condensate vol (silica gel impinger). (mL)	
Condensate vol (Total). (mL)	14.1
Volume of water vapour (impinger 1-3)	0.018
Volume of water vapour (silica Gel impinger)	
Initial meter Volume	5.211
Final meter Volume	5.448
Meter vol. @ STP (m^3)	0.1023
Moisture content (%)	**14.6**
Meter temp.(ºC) (T_m)	15
Meter temp.(ºK) (T_m)	288
Gas meter constant (Y)	1.0607

or

Assumed Moisture (%)	<data>

Sampling Traverse Data

Position	ΔP (Pa)	Stack temperature (°C) (Ts)	Velocity (m/s)
A1	419	405	35.3
A2	479		37.7
A3	609		42.5
A4	579		41.5
A5	525		39.5
A6	576		41.3
A7	568		41.1
A8	553		40.5
A9	619		42.9
A10	687		45.2
A11	713		46.0
A12	746		47.1
A13	652		44.0
A14	702		45.7
A15	706		45.8
A16	670		44.6
A17	629		43.2
A18	617		42.8
A19			
A20			
A21			
A22			
A23			
A24			
Sum or Average	**614**	**405**	**42.6**

Table B6

Contact Energy, G22 106MW Load

FILE NO.	175	**PROJECT NUMBER**	23020
DATE	08/06/2023	**TESTERS**	DP, JS
SAMPLING SITE	G22	**LEAK CHECK**	

Stack details (Method 1)

Diameter (m)	3.60
Dimensions (Length)	
Dimensions (Width)	
Equivalent Diameter	
Stack area (m^2) (A_s)	10.18
Upstream disturbance (m)	1.8
Upstream disturbance (dia)	NA
Downstream disturbance (m)	1.8
Downstream disturbance (dia)	0.5
Particulates or Velocity	V
Min Number of Total Points	16
Number of Total Points Chosen	24
Number of Ports	1
Number of Points per Port	24

Gas flow data (Method 2)

Stack temp (°C) (T_s)	410.0
Stack temp (°K) (T_s)	683.15
Pitot constant (C_p)	0.86
Stack pressure (Pa)	-533
Stack pressure (mmHg)	-3.998
Stack pressure(mmHg) (P_s)	764.10
Atm. pressure (mbar)	1024
Atm. pressure (mmHg) (P_m)	768.1
Meter Pressure (mmHg)	768.1
Average Velocity (m/s) (v_s)	**45.3**
Vol. flow rate (m^3/s, STP, dry)	**158.2**

Gas Composition (Method 3)

CO_2 (%)	4.4
O_2 (%)	13.2
N_2 (%)	82.4
CO (%)	
H_2O (%)	14.7
M_{WS} (dry)	29.23
M_{WS}(wet)	27.578
B_{ws}	0.15
Saturated Gas Value (%)	100
Fuel Factor (F_o)	1.750
Excess Air (%EA)	154.32
Fuel Type	Gas, Natural
Fuel Factor Within range	Within Range

Stack moisture (Method 4)

Condensate vol. (impingers 1-3) (mL)	14.1
Condensate vol (silica gel impinger). (mL)	
Condensate vol (Total). (mL)	14.1
Volume of water vapour (impinger 1-3)	0.018
Volume of water vapour (silica Gel impinger)	
Initial meter Volume	5.211
Final meter Volume	5.448
Meter vol. @ STP (m^3)	0.1016
Moisture content (%)	**14.7**
Meter temp.(ºC) (T_m)	15
Meter temp.(ºK) (T_m)	288
Gas meter constant (Y)	1.0607

or

Assumed Moisture (%)	<data>

Sampling Traverse Data

Position	ΔP (Pa)	Stack temperature (°C) (Ts)	Velocity (m/s)
A1	491	410	38.3
A2	568		41.2
A3	591		42.0
A4	618		43.0
A5	674		44.9
A6	582		41.7
A7	696		45.6
A8	745		47.2
A9	741		47.1
A10	787		48.5
A11	857		50.6
A12	786		48.5
A13	757		47.6
A14	755		47.5
A15	690		45.4
A16	697		45.6
A17	688		45.4
A18	698		45.7
A19			
A20			
A21			
A22			
A23			
A24			
Sum or Average	**690**	**410**	**45.3**