

Greymouth Petroleum Ltd
Southern Sites
Monitoring Programme
Annual Report
2018-2019

Technical Report 2019-62

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Taranaki Regional Council
Private Bag 713
STRATFORD
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Executive summary

Greymouth Petroleum Ltd (GPL) operates the Kaimiro Production Station located at Inglewood, in the Waiongana catchment, and the associated Ngatoro-A satellite wellsite also located at Inglewood, in the Waitara catchment. Radnor Production Station is also operated by GPL and this is located at Midhirst in the Patea catchment. This report for the period July 2018 to June 2019 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess GPL'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 GPL's activities.

GPL holds eight resource consents relating to production activities at the southern sites, which include a total of 130 conditions setting out the requirements that GPL must satisfy. GPL holds two consents to allow it to take and use water, three consents to discharge treated stormwater and wastewater into the Mangaoraka and Ngatoro Streams, and three consents to discharge emissions into the air.

During the monitoring period, Greymouth Petroleum Ltd demonstrated an overall high level of environmental performance.

The Council's monitoring programme for the year under review included nine inspections of the Kaimiro Production Station; five inspections at the Ngatoro-A satellite site; six inspections of the Radnor Production Station; and an annual inspection of associated wellsites. Three water samples were collected from the Ngatoro-A site for physicochemical analysis, while two biomonitoring surveys of receiving waters and three ambient air quality surveys were carried out at the Kaimiro Production Station.

The results of biomonitoring carried out in the Mangaoraka Stream, indicated that the discharges were not having a significant adverse effect on the water quality downstream of the Kaimiro Production Station.

There were no adverse effects on the environment resulting from the exercise of the air discharge consents. Ambient air quality monitoring at the Kaimiro Production Station showed that levels of carbon monoxide, combustible gases, PM₁₀ particulates, nitrogen oxides and the volatile organic compounds benzene, toluene, ethylbenzene and xylenes were all below levels of concern at the time of sampling. No offensive or objectionable odours were detected beyond the boundary during inspections.

During the period under review, GPL demonstrated a high level of both environmental performance and administrative compliance with the resource consents.

For reference, in the 2018-2019 year, consent holders were found to achieve a high level of environmental performance and compliance for 83% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 13% of the consents, a good level of environmental performance and compliance was achieved.

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

This report includes recommendations for the 2019-2020 year, including a recommendation relating to an optional review of consents 4048-3 and 5384-2.

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1 Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2018 to June 2019 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Greymouth Petroleum Ltd (GPL). GPL operates the Kaimiro Production Station situated on Upland Road at Inglewood, in the Waiongana catchment. The associated Ngatoro-A satellite site is located on Upper Dudley Road at Inglewood, in the Waitara catchment. A further 20 wellsites are monitored annually in conjunction with the Kaimiro Production Station. Radnor Production Station is also operated by GPL and is located on Radnor Road in Midhirst in the Patea catchment.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by GPL that relate to abstractions and discharges of water within the Waiongana, Waitara and Patea catchments, and the air discharge permits held to cover emissions to air from the sites.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of GPL's use of water, land and air, and is the 15th combined annual report by the Council for the Kaimiro Production Station and associated sites.

1.1.2 Structure of this report

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

- consent compliance monitoring under the RMA and the Council's obligations;
- the Council's approach to monitoring sites through annual programmes;
- the resource consents held by GPL in the Waiongana, Waitara and Patea catchments;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at the Kaimiro and Radnor production stations, and the Ngatoro-A satellite site.

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

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

Section 4 presents recommendations to be implemented in the 2019-2020 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' inasmuch as is appropriate for each activity. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the RMA to assess the effects of the exercise of consents. In accordance with Section 35 of the RMA, the Council undertakes compliance monitoring for consents and rules in regional plans, and maintains an overview of the performance of resource users and consent holders. Compliance monitoring, including both activity and impact monitoring, enables the Council to continually re-evaluate its approach and that of consent holders to resource management and, ultimately, through the refinement of methods and considered responsible resource utilisation, to move closer to achieving sustainable development of the region's resources.

1.1.4 Evaluation of environmental and administrative performance

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

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

For reference, in the 2018-2019 year, consent holders were found to achieve a high level of environmental performance and compliance for 83% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 13% of the consents, a good level of environmental performance and compliance was achieved.¹

1.2 Process description

1.2.1 Kaimiro Production Station

The Kaimiro Production Station (Photo 1) was commissioned in 1985. The production station separates and treats oil and gas from wells in the Kaimiro and Ngatoro fields. Oil is piped to the Omata tank farm and gas is piped into the national grid. Wellsites associated with the Kaimiro Production Station are as follows:

Kaimiro: B, C, D, F, G, H, J, K, O; Ngatoro: A, B, C, D, E, F, G; Salisbury; Goldie; Windsor.

¹ The Council has used these compliance grading criteria for 15 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

The York-A and Ngatoro South wellsites were reinstated during the monitoring period and their consents surrendered.

The production station's BTEX vapour incinerator was replaced in October 2007 with a more efficient unit. A new gas compressor was commissioned in June 2008 and upgrades made to all existing compressor PLC control systems. These measures have resulted in a significant sustained improvement in plant energy efficiency at the Kaimiro site.



Photo 1 Kaimiro Production Station

Stormwater from the Kaimiro Production Station passes through a separator system and a skimmer pit before discharging to an unnamed tributary of the Mangaoraka Stream. All chemical storage is contained within bunds and isolated from the stormwater system.

1.2.2 Radnor Production Station



Photo 2 Radnor Production Station

The Radnor wellsite (Photo 2) was constructed in 2003 with the first well drilled in 2004. A production station to handle oil and gas from the Radnor-B wellsite was constructed in late 2004, with commissioning of the plant in March 2005. A number of drilling campaigns were conducted, but the wells were eventually shut-in or abandoned and production ceased in 2010. Production resumed in late 2014 with the Radnor Production Station processing oil and gas from the Radnor-1B well. The Radnor-2 well was drilled during the monitoring period under review. The site is currently a remote, unmanned facility. Gas is exported to Methanex via a pipeline and oil is loaded out by tanker twice per week and transported to Kaimiro Production Station.

1.2.3 Ngatoro-A satellite site



Photo 3 Ngatoro-A wellsite

Ngatoro-A (Photo 3) was established in July 1992. The site consists of four wells (Ngatoro-1, 6, 7 and 8), storage facilities for recovered oil, and a bunded earth flare pit. In July 1999 the north-east skimmer pit at the site was decommissioned. The south-west skimmer pit now receives all stormwater from the site for treatment prior to discharge to an unnamed tributary of the Ngatoro Stream. Recovered oil and gas is piped off site to the Kaimiro Production Station, consequently flaring has been reduced.

1.3 Resource consents

GPL holds eight resource consents the details of which are summarised in the table below. Summaries of the conditions attached to each permit 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 GPL during the period under review.

Table 1 Resource consents held by GPL

Site	Consent number	Purpose	Granted	Review	Expires
Kaimiro Production Station	1334-3	To discharge treated stormwater from the Kaimiro Production Station into an unnamed tributary of the Mangaoraka Stream in the Waiongana Catchment	Jan 2002	-	June 2020
	4048-3	To discharge emissions into the air from the flaring of hydrocarbons arising from hydrocarbon production and hydrocarbon processing operations together with miscellaneous emissions at the Kaimiro Production Station	Jan 2008	June 2020	June 2026
Kaimiro-O	5384-2	To take groundwater from the Matemateaonga Formation for use in enhanced hydrocarbon recovery activities at the Kaimiro-O wellsite.	Sept 1988	June 2020	June 2032
Radnor Production Station	6394-1	To discharge emissions to air during flaring from well workovers, in emergency situations, from a permanent pilot flame and other miscellaneous emissions associated with production activities at the Radnor-B wellsite	June 2004	-	June 2022
	6399-1	To take water from the Piakau Stream for hydrocarbon exploration purposes associated with the Radnor-B wellsite	June 2004	-	June 2022
	9966-1*	To discharge treated stormwater from hydrocarbon exploration and production operations at the Radnor-B wellsite through a roadside drain into an unnamed tributary of the Piakau Stream	Sep 2014	Nov 2020	June 2028
Ngatoro-A	4073-3	To discharge treated stormwater from hydrocarbon exploration and production operations at the Ngatoro-A wellsite, onto land and into an unnamed tributary of the Ngatoro Stream	June 2016		June 2021
	7295-1	To cover discharge of emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Ngatoro-A site	May 2008	June 2021	June 2027

* minor changes to the consent were made during period under review

1.3.1 Related consents

GPL also holds a number of consents relating to the sites which did not require active (sampling based) monitoring during the period under review. A summary of these consents is provided in Table 2.

Table 2 Consents related to Kaimiro Production Station, Radnor Production Station and Ngatoro-A

Wellsite	Consent number	Purpose	Issue date	Expiry
Kaimiro-B	3678-2	To discharge treated stormwater from hydrocarbon exploration operations at the Kaimiro-B wellsite into an unnamed tributary of the Mangaoraka Stream in the Waiongana catchment	Feb 2002	June 2020
	5481-2	To discharge emissions to air associated with hydrocarbon producing wells at the Kaimiro-B wellsite	June 2014	June 2032

Wellsite	Consent number	Purpose	Issue date	Expiry
Kaimiro-C	4153-2	To discharge treated stormwater, treated produced water, and treated drilling wastewater from hydrocarbon exploration and production activities at the Kaimiro-C wellsite onto land and into an unnamed tributary of the Mangaoraka Stream	Dec 2013	June 2026
	9750-1	To discharge emissions to air associated with hydrocarbon producing wells at the Kaimiro-C wellsite	Dec 2013	June 2032
Kaimiro-D	4165-2	To discharge treated stormwater, treated produced water, and treated drilling wastewater from hydrocarbon exploration and production operations at the Kaimiro-D wellsite into an unnamed tributary of the Mangaoraka Stream in the Waiongana catchment	Dec 2007	June 2026
	7300-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Kaimiro-D wellsite	May 2008	June 2026
Kaimiro-F	4553-2	To discharge treated stormwater, treated produced water, and treated drilling wastewater from hydrocarbon exploration and production operations at the Kaimiro-F wellsite into an unnamed tributary of the Manganaeia Stream in the Waiongana catchment	Jan 2008	June 2026
Kaimiro-F	7299-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Kaimiro-F wellsite	May 2008	June 2026
Kaimiro-G	4610-2	To discharge treated stormwater, treated surplus drilling water, and treated produced water from hydrocarbon exploration and production operations at the Kaimiro-G wellsite, onto land and into an unnamed tributary of the Mangaoraka Stream	May 2014	June 2026
	7296-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Kaimiro-G wellsite	May 2008	June 2026
Kaimiro-H	4555-2	To discharge treated stormwater, treated produced water, and treated drilling wastewater from hydrocarbon exploration and production operations at the Kaimiro-H wellsite into the Manganaeia Stream in the Waiongana catchment	Jan 2008	June 2026
	7298-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Kaimiro-H wellsite	May 2008	June 2026
Kaimiro-J	4612-2	To discharge treated stormwater, treated produced water and treated drilling wastewater from hydrocarbon production and exploration at the Kaimiro-J wellsite onto land and into an unnamed tributary of the Mangaoraka Stream	Dec 2013	June 2026
	7297-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Kaimiro-J wellsite	Dec 2013	June 2026
Kaimiro-K	4820-2	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Kaimiro-K wellsite, into an unnamed tributary of the Manganaeia Stream	Jun 2014	June 2032

Wellsite	Consent number	Purpose	Issue date	Expiry
Kaimiro-O	5192-2	To discharge uncontaminated and treated stormwater [excluding produced water and drilling fluids] from hydrocarbon exploration and production operations at the Kaimiro-O wellsite into the Waiwhakaiho River	Jan 2008	June 2026
Ngatoro-B	3951-3	To discharge treated wastewater and treated stormwater from hydrocarbon exploration and production operations at the Ngatoro-B wellsite into an unnamed tributary of the Ngatoro Stream in the Waitara catchment	April 2009	June 2027
	7220-1	To cover discharge of emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Ngatoro-B site	May 2008	June 2027
Ngatoro-C	4015-3	To discharge treated stormwater from hydrocarbon exploration and production operations at the Ngatoro-C wellsite, into an unnamed tributary of the Kurapete Stream	Jul 2015	June 2033
	7294-2	To discharge emissions to air associated with hydrocarbon producing wells at the Ngatoro-C wellsite	Mar 2014	June 2033
Ngatoro-D	4070-3	To discharge treated stormwater from hydrocarbon exploration and production operations at the Ngatoro-D wellsite, onto land where it may enter an unnamed tributary of the Waionganaiti Stream	Mar 2015	June 2032
	7219-2	To discharge emissions to air associated with hydrocarbon producing wells at the Ngatoro-D wellsite	Apr 2014	June 2026
Ngatoro-E	4067-3	To discharge treated stormwater from hydrocarbon exploration and production operations at the Ngatoro-E wellsite, onto land and into the Ngatoroiti Stream	Jun 2016	June 2033
	4069-4	To discharge emissions to air from flaring during hydrocarbon exploration and production testing associated with up to 4 new wells, flaring from well workover activities and in emergency situations associated with production activities, and miscellaneous emissions at the Ngatoro-E wellsite.	Dec 2013	June 2021
Ngatoro-F	5974-1	To discharge stormwater, uncontaminated treated site water, and uncontaminated treated produced water from hydrocarbon exploration and production operations at the Tabla-1 wellsite onto and into land and into an unnamed tributary of the Ngatoroiti Stream a tributary of the Ngatoro Stream a tributary of the Manganui River in the Waitara catchment... now known as Ngatoro-F wellsite	April 2002	June 2021
	5975-1	To discharge emissions into the air from hydrocarbon exploration and production testing operations and miscellaneous emissions at the Tabla-1 wellsite involving five wells and up to six zones per well ...now known as Ngatoro-F wellsite	June 2002	June 2021
Ngatoro-G	7934-1	To discharge treated stormwater and produced water onto land and into an unnamed tributary of the Ngatoronui Stream from hydrocarbon exploration and production operations at the Ngatoro-G wellsite	Aug 2014	June 2027
	7935-1	To take water from the Ngatoronui Stream and an unnamed tributary of the Ngatoronui Stream for wellsite and well drilling during hydrocarbon exploration and production activities at the Ngatoro-G wellsite	Oct 2011	June 2021

Wellsite	Consent number	Purpose	Issue date	Expiry
	7938-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Ngatoro-G wellsite	Oct 2011	June 2027
Goldie	5285-2	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Goldie wellsite into an unnamed tributary of the Waiongana Stream	Nov 2007	June 2026
	5982-1	To discharge emissions into the air from the flaring of hydrocarbons arising from production operations and miscellaneous emissions at the Goldie Wellsite	May 2002	June 2020
Salisbury	7492-1	To discharge treated stormwater and treated production water from hydrocarbon exploration and production operations at the Salisbury wellsite onto and into land in the vicinity of an unnamed tributary of the Waitepuke Stream in the Waitara catchment	Jun 2009	June 2027
Salisbury	7494-1	To discharge emissions to air from flaring of hydrocarbons and miscellaneous emissions associated with well clean-up, initial well testing and production testing at the Salisbury wellsite	Sep 2009	June 2027
Surrey	6042-2	To discharge emissions to air from hydrocarbon exploration and production testing operations and miscellaneous emissions associated with up to three wells at the Surrey-1 wellsite	Jan 2008	June 2027
	6043-2	To discharge stormwater from hydrocarbon exploration and production operations at the Surrey-1 wellsite	Jan 2008	June 2027
Windsor	5668-2	To discharge treated stormwater from hydrocarbon exploration and production operations at the Windsor wellsite	Nov 2015	June 2032
	5669-2	To discharge contaminants to air from hydrocarbon exploration at the Windsor-1 wellsite, including combustion involving flaring or incineration of petroleum recovered from natural deposits, in association with well development or redevelopment and testing or enhancement of well production flows	Oct 2015	June 2032

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 Kaimiro Production Station, Radnor Production Station and Ngatoro-A satellite site consisted of four 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

Nine inspections of the Kaimiro Production Station; five inspections at the Ngatoro-A satellite site; six inspections of the Radnor Production Station; and an annual inspection of associated wellsites were conducted during the monitoring period. With regard to consents for the abstraction of or discharge to water, the main points of interest were plant processes with potential or actual discharges to receiving watercourses, including contaminated stormwater and process wastewaters. Air inspections focused on plant processes with associated actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. Sources of data being collected by GPL 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 the ambient air quality outside the boundary of the Kaimiro Production Station site. Passive absorption discs were placed at two sites on one occasion to measure nitrogen oxides. A multi-gas meter was also deployed on one occasion in the vicinity of the plant, with monitoring consisting of continuous measurements of gas concentrations for the gases of interest (carbon monoxide and combustible gases). Council also measured the concentrations of the volatile organic compounds benzene, toluene, ethylbenzene and xylenes (BTEX) on one occasion during the year as part of a regionwide monitoring programme.

1.4.5 Biomonitoring surveys

Two biological surveys were performed in two unnamed tributaries of the Mangaoraka Stream to determine whether or not the discharge of treated stormwater from the Kaimiro Production Station had had a detrimental effect upon the communities of the stream.

2 Results

2.1 Water

2.1.1 Inspections

Nine inspections of the Kaimiro Production Station; five inspections at the Ngatoro-A satellite site; six inspections of the Radnor Production Station; and an annual inspection of associated wellsites were undertaken during the 2018-2019 monitoring period. The following was found during inspections:

31 August 2018

Kaimiro Production Station, Ngatoro-A, and Radnor Production Station:

The sites were observed to be neat and tidy. Stormwater was being directed through ring drains, bunds and separators to the skimmer pits on all sites. No visual impact from any discharges was noted in the receiving waters.

No flaring was occurring at any of the sites during the inspections and no smoke or odours were noted.

9 October 2018

Kaimiro Production Station:

Trees had been removed from the site and the site had been enlarged by extending the security fence out to encompass the wellsite area adjacent to the production station. A small section of the liner in the second skimmer pit had come apart and the inspecting officer was advised that plans were in place to repair this. Large sections of the ring drain had been covered with coconut matting and rock weirs (filters) had been placed approximately every 30 m to help settle out sediment that flows from the site. It was anticipated by GPL that the rock weirs would require less maintenance than the silt fences which had previously been installed. Small drop out pits had been created immediately prior to stormwater flowing into the pits. The installation of filter bags in these pits was proposed to help control sediment. Temporary bunding was in place to help sediment settle out from the flare pit earthworks currently taking place. A cover had been placed over the chemical skid to prevent rain from filling the bund and overflowing. The bunded areas of the site discharge to a multi chamber separator before discharging offsite. The shut off valve for this was operated and found to be working. A visual inspection of the stream was undertaken with no issues or concerns were noted.

Gas was not being flared during the inspection and no smoke or odours were noted. Works had commenced onsite to combine the three flare pits into one. It appeared that any liquids captured within the new pit would be drained via a three stage separator before flowing to the ring drain and skimmer pits for further treatment. It was unclear at the time of inspection whether the current pits were lined or whether remediation was to occur to remove contaminated soil if unlined. The systems currently in place to limit the amount of gas flared and treat the gas before being flared appeared to be working as designed.

Ngatoro-A:

This site is unmanned, however operators visit the site daily. The site was found to be dry at the time of inspection with the ring drain free of water and no pooling or ponding observed. The skimmer pits were not discharging at the time of the inspection. The shut off valve was tight to work but operational. Improvements had been made to the chemical skid to reduce discharges to the ground. Further improvements to the wax cutting equipment were being considered. Appropriate bunding was observed around the site.

The flare pit was not in use at the time of the inspection and is generally only used during planned shut downs for maintenance work or in emergency situations, with gas otherwise piped to Kaimiro Production Station for treatment.

Radnor Production Station:

All bunded areas flow to a separator before discharging into an underground piped network that flows to an open drain. Special condition 6 of consent 9966-1 required that all discharges from the site flow to a perimeter drain and skimmer pit. In the opinion of the Inspecting officer the current design could not comply with the requirements of special condition 6. Works to the ring drain have been proposed that include the installation of coconut matting and rock weirs. Water quality in the skimmer pits was good as indicated by numerous resident frogs. It was noted that two 44 gallon drums were sitting un-bunded when an appropriate bund was only metres away. There were also two large storage tanks for produced/process water that were not bunded and the Inspecting Officer noted that these tanks must have primary bunding in line with best practice, and that relying solely on secondary site bunding (i.e. ring drains and skimmer pits) significantly increases the risk and ease by which a hazardous substance (in this case produced water) can discharge off site in the event of a mishap/accident.

Well testing was being carried out at the time of the inspection. A thermal oxidiser was in use to maintain a pilot flare and to flare gas from the low pressure line. Once pressure built up the flare pit at the western end of the site was used. The flare from both the oxidiser and pit appeared clean burning. It was noted that a separator was in use. No emissions of smoke were noted during the inspection.

29 November 2018

Kaimiro Production Station:

Chemicals onsite were appropriately bunded. Process equipment bunds discharge to site before entering a piped network that flows to the oily water separator. Staff advised that visual checks of the water within the bunds are carried out before release. The oily water separator appeared to working normally. Sediment controls onsite had improved since the previous inspection, with a combination of coconut matting, rock weirs, silt cloth, and filter bags being used. A temporary liner had been installed in the second skimmer pit.

A drilling rig and associated equipment had been moved onto site and was being set up. Improvements to the site were noted, these included the use of impermeable liners on the ground to prevent drilling mud etc. from going to ground around the D tank/mud shaker/mud tank areas.

The new flare pit had been completed and the original flare pits removed. The flare line to the pit had been repositioned closer to the boundary fence. Staff advised that the three stage separator treating stormwater from the flare pit was checked daily. The flare pit was operating at the time of the inspection and no smoke or heat haze was noted. The flare log was inspected and it was noted that no smoke events had been recorded.

Ngatoro-A:

The site was neat and tidy. Chemicals onsite were bunded appropriately and the stormwater system appeared to be functioning satisfactorily.

Radnor Production Station:

Significant sediment runoff was noted in the eastern ring drain. The un-bunded 44 gallon drums noted in the previous inspection were still not bunded and the consent holder was advised that action would need to be taken to ensure that these were either placed within a bund or on top of a bund. The other outstanding issue was the stormwater sump that appears to flow offsite and not to the skimmer pit system. This needs to be confirmed and then action taken to comply with the consent (if required).

10 December 2018

Kaimiro Production Station:

The site was neat and tidy and no issues were noted.

4 February 2019

Kaimiro Production Station:

Control measures put in place at the start of rig set up were working well to capture minor spills. Equipment around the rig was well bunded and drip trays were appropriately in place. Discussion was had with staff about minor improvements that could be made to the dry chemical bund and underneath the shakers. It was noted that the sediment traps adjacent to the skimmer pits were unlined and the Inspecting Officer requested that this be fixed. Staff were also asked to keep an eye on the ring drain in one particular location to check that stormwater was not overtopping the drain and bypassing the skimmer pits.

Ngatoro-A:

The site was neat and tidy at the time of the inspection and no issues were noted.

Radnor Production Station:

The site was observed to be tidy in general with no activity occurring. The site was dry with no ground water flowing onto the site. The skimmer pits were well below the level of discharge due to evaporation. Bunding within the production area was appropriate. It was noted that works had been carried out recently to install a culvert, earth bunds, and a raised nib across the entrance track to site in order to comply with the new special condition 6 of resource consent 9966-1. This new condition states that the consent holder shall take all reasonable steps to prevent stormwater from entering the well site from the adjacent land, including undertaking the work shown in Appendix 1. The Inspecting Officer was of the opinion that the works undertaken would not prevented stormwater from entering the site. It was noted that the existing entry point from the above farm land was still in situ and the flow path from this point is onto site and towards the skimmer pits. It was also noted that the nib crossing appeared to have been placed in the wrong position.

20 March 2019

Kaimiro Production Station:

The site was observed to be neat and tidy and consent conditions assessed were compliant. At the time of inspection there was a lot of equipment being removed within and from site. Equipment in temporary storage was bunded appropriately. Ring drains and skimmer pits were observed to be working well following recent rainfall.

29 March 2019

Kaimiro Production Station, Radnor Production Station and Ngatoro-A:

All sites were neat and tidy and those conditions that were assessed during the inspection were found to be compliant.

17 April 2019

Kaimiro Production Station:

The site was neat and tidy with no issues noted. The skimmer pits appeared to be satisfactory, with minimal turbidity and no signs of any sheens on the surface.

30 April 2019

Kaimiro Production Station:

The sites was neat and tidy with above ground substances stored appropriately in bunded areas. The skimmer pits were visually turbid and this was discussed with staff.

1 May 2019

An annual inspection of the well sites associated with the Kaimiro, Ngatoro and Radnor production stations was undertaken. The well sites inspected were: Kaimiro-B, C, D, F, G, H, J, K and O; Ngatoro-A, C, D and E; Goldie; Salisbury; Surrey; and Windsor. In general the sites were tidy and clean with minimal activity occurring. The sites were being maintained with weed spraying evident on the site and in some places within the ring drains. The majority of ring drains were vegetated with grasses that helped with controlling and treating sediment laden stormwater. Other sediment controls in place within the ring drains included rock weirs and silt fences.

Hydrocarbon sheens were not observed within the skimmer pits or in puddles on any of the sites. The skimmer pits were all in good order with goose neck pipes functioning as required. The turbidity of the pits varied from clear to slightly turbid (following heavy rainfall the two days before). The majority of the discharges were onto land before flowing to surface water. Some pits were unlined and empty. No effects were noted in the surrounding vegetation (such as burnt patches or dead grass) or within the streams.

Flaring was not occurring at any of the sites at the time of the inspections and no visual effects were noted as a result of any previous flaring.

The ring drain at the southern end of Kaimiro-K was not well formed and works were required to ensure all stormwater is captured and directed to the skimmer pits. An old skimmer pit was being used to store waste calf bedding. It was noted that this product will break down and potentially leach to surface or groundwater and as such it needed to be removed and disposed of appropriately.

The levels in the drain at Ngatoro-D appeared to fall away to the corner next to the old skimmer pit, and it was discussed onsite that a site visit when it was raining could determine if the drain was functioning properly. Minor ponding was noted at Ngatoro-E.

Red algae was noted in the water storage pond at Kaimiro-F.

Ground water was entering the ring drain from a tomo in the drain at Kaimiro-J and a sewage pipe that crosses the ring drain at Kaimiro J was causing needles and other vegetation to jam up.

A pipe had been installed at Kaimiro-D that links a stream above the site with the ring drain. The gradient of the pipe was unknown at the time of inspection, as was its purpose. This connection between the ring drain and stream needed to cease and any stream flooding issues be addressed.

The northern and eastern ring drains at Salisbury needed redefining.

Radnor Production Station: No issues were noted during the inspection. The recent earthworks to divert stormwater away from the site appear to be effective.

2.1.2 Results of discharge monitoring

The location of water quality sampling sites in relation to Ngatoro-A are shown in Figure 1.

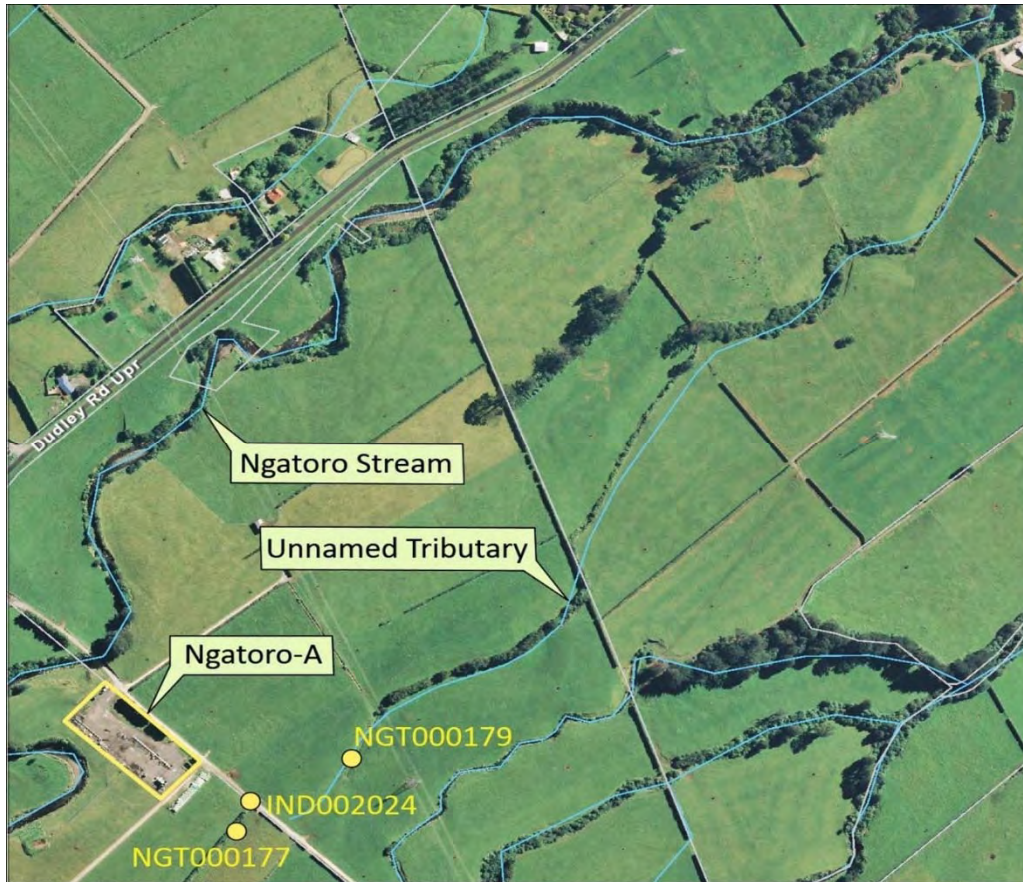


Figure 1 Water quality monitoring sites in relation to Ngatoro-A

Chemical water sampling of the discharge from Ngatoro-A was undertaken once during the 2018-2019 monitoring period. Table 3 presents the results along with the consent limits.

Table 3 Results of discharge monitoring from Ngatoro-A (site IND002024)

Parameter	Units	5 June 2019	Consent limits
Chloride	g/m ³	22	
Conductivity	mS/m@25°C	22.3	
Hydrocarbons	g/m ³	< 0.7	15
pH		7.3	6.0 - 9.0*
Suspended solids	g/m ³	< 3	100
Temperature	Deg. C	10.9	
Turbidity	NTU	3.0	

*pH may exceed 9.0 if due to photosynthetic activity within the skimmer pits

Levels of hydrocarbons, pH and suspended solids in the discharge all complied with resource consent conditions. The chloride concentration in the discharge has remained low since 2016 because GPL no longer discharges treated production water via the stormwater system.

2.1.3 Results of receiving environment monitoring

2.1.3.1 Chemical

Chemical water quality sampling of the receiving environment at Ngatoro-A was undertaken in conjunction with discharge monitoring. The results are presented in Table 4 below. The results indicate that the discharge was having minimal effect on the water quality of the Ngatoro Stream at the times of sampling. Chloride levels and temperature below the mixing zone were within consent limits on both occasions.

Table 4 Results of receiving environment monitoring in relation to Ngatoro-A

Parameter	Units	Consent limits 4073-3	5 June 2019	
			Upstream NGT000177	Downstream NGT000179
Chloride	g/m ³	50	11	12
Conductivity	mS/m@25°C	-	12.9	14.5
Hydrocarbons	g/m ³	-	< 0.7	< 0.7
pH		-	7.0	7.0
Suspended solids	g/m ³	-	3	3
Temperature	Deg. C	<2°C increase	13.7	13.2
Turbidity	NTU	-	3.7	4.5

2.1.3.2 Biomonitoring

Benthic macroinvertebrates were collected from three sites in two unnamed tributaries of the Mangaoraka Stream in relation to discharges from the Kaimiro Production Station on 26 November 2018 and 4 February 2019. This has provided data to assess any potential impacts the consented discharges have had on the macroinvertebrate communities of the stream. Samples were processed to provide number of taxa (taxa richness), MCI and SQMCI₅ scores for each site.

Taxa richness is the most robust index when determining whether a macroinvertebrate community has been exposed to toxic discharges. Macroinvertebrates when exposed to toxic discharges may die and be swept downstream or may deliberately drift downstream as an avoidance mechanism (catastrophic drift). The MCI is a measure of the overall sensitivity of the macroinvertebrate community to organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI₅ takes into account relative abundances of taxa as well as sensitivity to pollution. Significant differences in taxa richness, MCI or SQMCI₅ between sites may indicate the degree of adverse effects (if any) of the discharge being monitored.

Significant differences in either the MCI or the SQMCI₅ between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

During the spring survey in November taxonomic richnesses were similar between the two sites in the major Mangaoraka Stream tributary however were much lower at site 2 in the minor Mangaoraka Stream tributary. MCI scores increased between sites 1 and 3 while the SQMCI₅ scores were equal. Site 3 recorded an MCI score significantly higher than that recorded at site 1, while the MCI score recorded at site 2 was not significantly different to either site 1 or 3. Site 1 recorded 'poor' macroinvertebrate health whilst sites 2 and 3 recorded 'fair' macroinvertebrate health.

During the summer survey in February, taxonomic richness was also similar between the two sites in the major Mangaoraka Stream tributary and much lower at site 2 in the minor Mangaoraka Stream tributary.

MCI scores were not significantly different across the three sites surveyed, while the SQMCI_s score recorded at site 2 in the minor Mangaoraka Stream tributary was significantly higher than those recorded at sites 1 and 3. The MCI scores recorded by sites 1 and 3 were reflective of 'poor' macroinvertebrate health while the MCI score recorded at site 2 was reflective of 'fair' macroinvertebrate health.

During both surveys the minor tributary did not record poorer macroinvertebrate community health than the major tributary. Results show a decline in taxa richness across the past four surveys indicating potential deterioration of macroinvertebrate habitat at the major Mangaoraka Stream tributary sites. Further investigation may be necessary to ensure the validity of using site 1 as a 'control' site, should stream deterioration continue.

Overall there was no evidence that discharges from the Kaimiro Production Station had had any recent detrimental effects on the macroinvertebrate communities of the two unnamed tributaries of the Mangaoraka Stream.

Copies of biomonitoring reports for this site are available from the Council upon request.

2.1.4 Results of abstraction monitoring

Figure 1 provides a summary of the abstraction volumes for the consented water take at the Kaimiro-O wellsite under consent 5384-2. All daily volumes were below the 550 m³ limit stipulated by the consent.

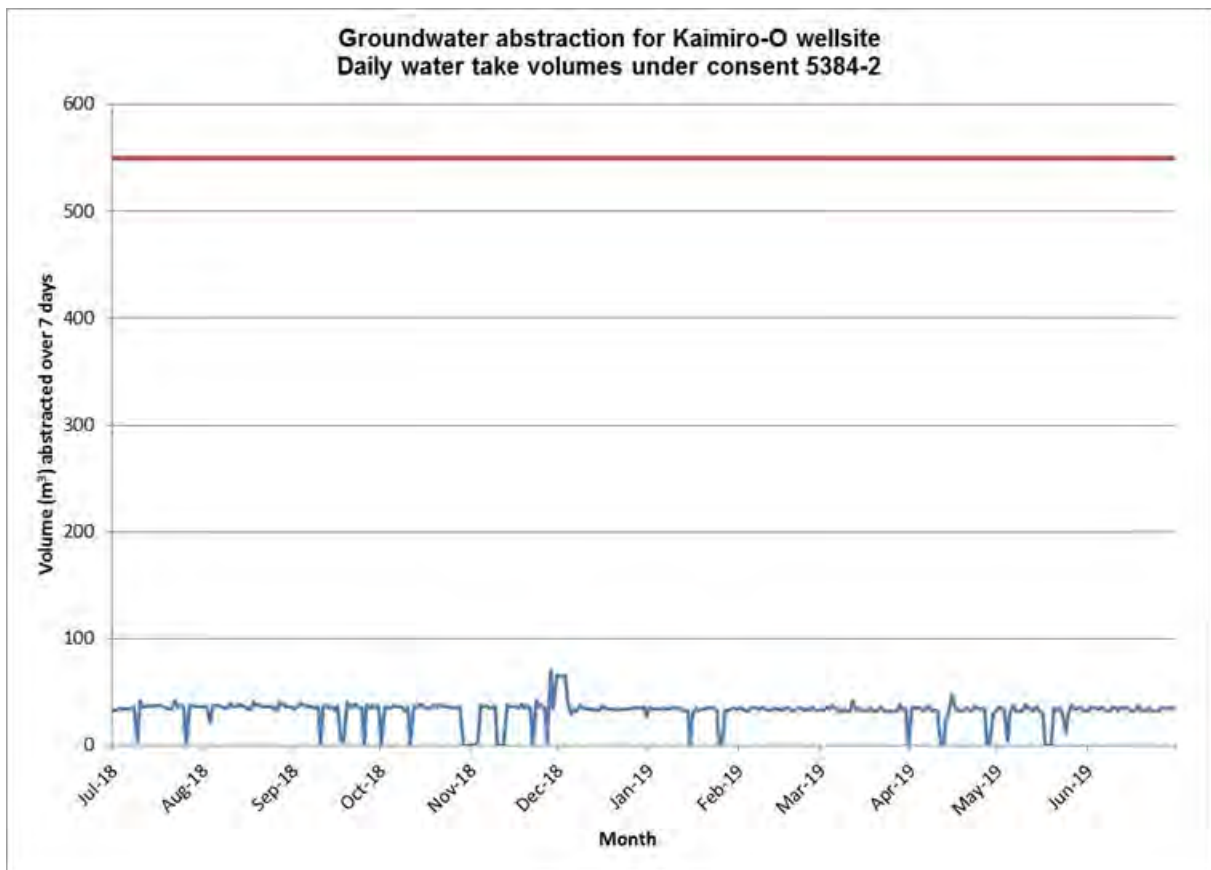


Figure 2 Daily water abstraction volumes for Kaimiro-O under consent 5384-2

2.2 Air

2.2.1 Inspections

Air inspections were carried out in conjunction with site inspections as discussed in section 2.1.1 above. On all occasions air discharges complied with consent conditions.

2.2.2 Results of discharge monitoring

2.2.2.1 Carbon monoxide and combustible gases

During the monitoring year, a multi-gas meter was deployed on one occasion in the vicinity of the Kaimiro Production Station. The deployment lasted approximately 50 hours, with the instrument placed in a downwind position at the start of the deployment. Monitoring consisted of continuous measurements of gas concentrations for the gases of interest (carbon monoxide and combustible gases). The monitoring sites used in the year under review are shown in Figure 3.

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

The details of the sample run are summarised in Table 5 and the data from the sample run are presented graphically in Figure 4.



Figure 3 Air monitoring sites at Kaimiro Production Station

The consents covering air discharges from the Kaimiro Production Station have specific limits related to particular gases. Special condition 13 of consent 4048-3 sets a limit on the carbon monoxide concentration at or beyond the production station's boundary. The limit is expressed as 10 mg/m^3 for an eight hour average or 30 mg/m^3 for a one hour average exposure. The maximum concentration of carbon monoxide found during the monitoring run was 2.4 mg/m^3 while the average concentration for the entire dataset was 0.23 mg/m^3 , which comply with consent conditions. This is consistent with the pattern found in previous years.

Table 5 Results of carbon monoxide and LEL monitoring at Kaimiro Production Station

Component		10 to 12 May 2019
Max	CO (ppm)	2.10
	LEL (%)	0.20
Mean	CO (ppm)	0.20
	LEL (%)	0.00
Min	CO (ppm)	0.00
	LEL (%)	0.00

Notes:

- (1) the instrument records in units of ppm. At 25°C and 1 atm, 1ppm CO = 1.145 mg/m³
- (2) because the LEL of methane is equivalent to a mixture of approximately 5% methane in air, then the actual concentration of methane in air can be obtained by dividing the percentage LEL by 20.

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

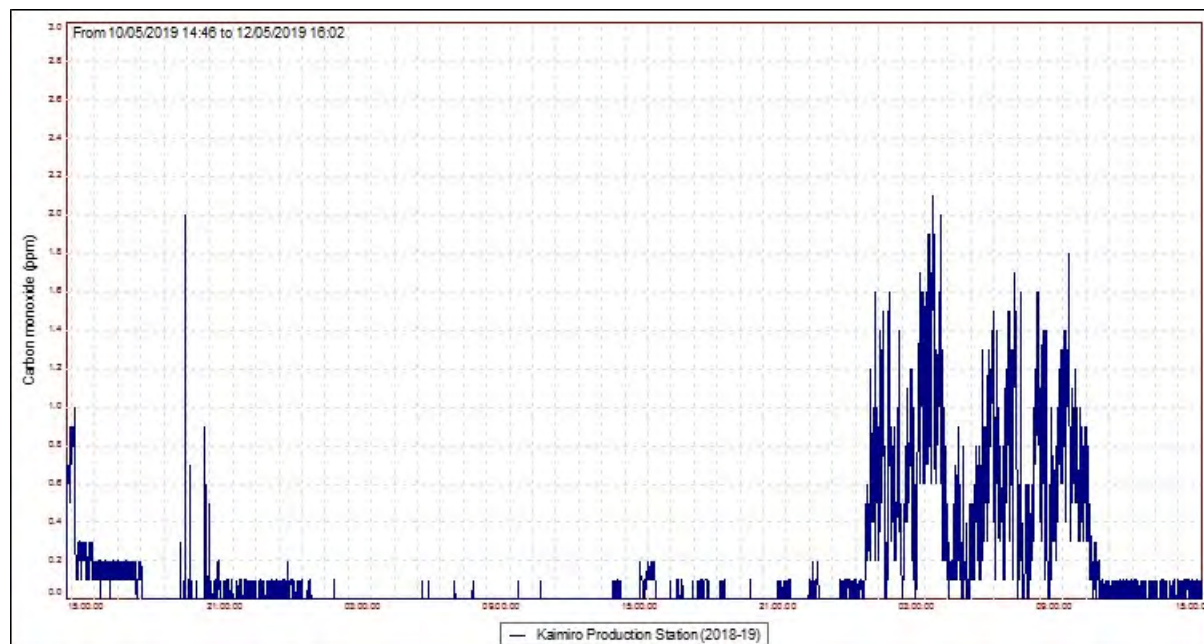


Figure 4 Ambient CO levels in the vicinity of Kaimiro Production Station

2.2.2.2 PM₁₀ particulates

In September 2004 the Ministry for the Environment enacted National Environmental Standards (NESs) relating to certain air pollutants. The NES for PM₁₀ particulates is 50 µg/m³ (24-hour average).

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

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

During the reporting period, a DustTrak PM₁₀ monitor was deployed on one occasion in the vicinity of Kaimiro Production Station. The deployment lasted approximately 65 hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continual measurements of PM₁₀ concentrations. The location of the DustTrak monitor during the sampling run is shown in Figure 3. The results of the sample run are presented in Figure 5 and Table 6.

Table 6 Daily averages of PM₁₀ results from monitoring at Kaimiro Production Station

	10 to 13 May 2019 (65 hours)	
24 hr. set	Day 1 (start to 24 hours)	Day 2 (24 hours to end)
Daily average	14.7 µg/m ³	26.4 µg/m ³
NES	50µg/m ³	

During the 65 hour run, from 10 to 13 May 2019, the average recorded PM₁₀ concentration was 14.7 µg/m³ for the first 24 hour period and 26.4 µg/m³ for the second 24 hour period. These daily averages equate to 29% and 53%, respectively, of the 50 µg/m³ value that is set by the NES. Background levels of PM₁₀ in the region have been found to be typically around 11 µg/m³.

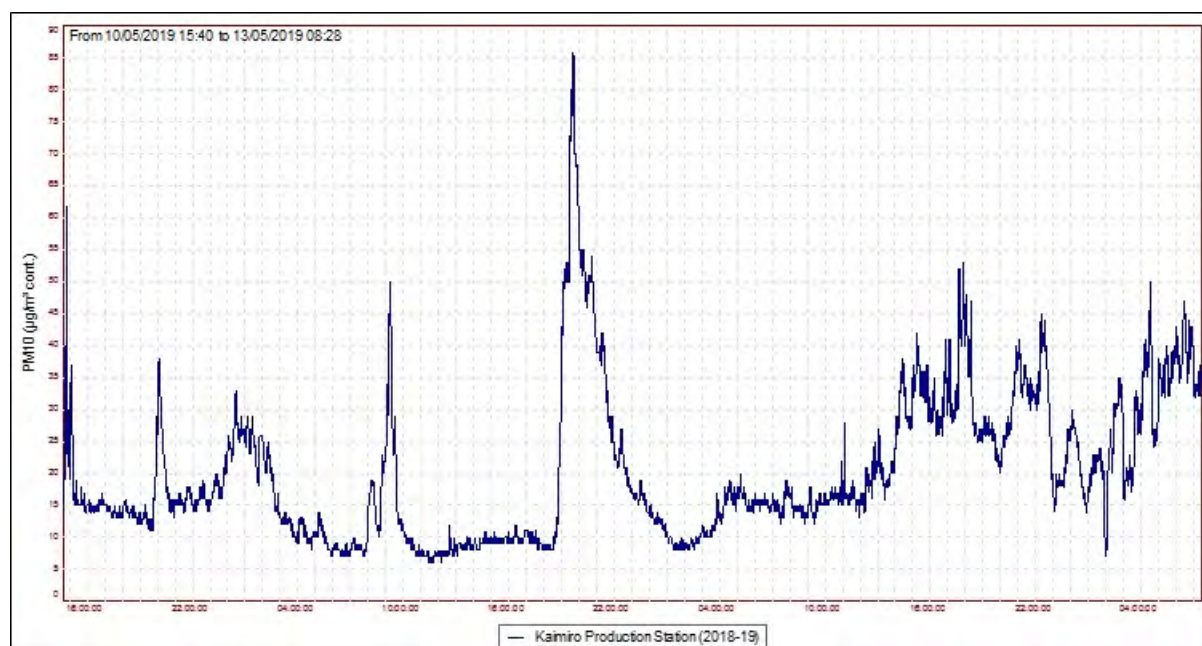


Figure 5 PM₁₀ concentrations (µg/m³) at Kaimiro Production Station

2.2.2.3 Nitrogen oxides

From 2014 onwards, the Council implemented a coordinated region-wide compliance monitoring programme to measure nitrogen oxides (NO_x). The programme involves deploying measuring devices at 24 NO_x monitoring sites (including two sites in the vicinity of Kaimiro Production Station) on the same day, with retrieval three weeks later. This approach assists the Council in further evaluating the effects of local and regional emission sources and ambient air quality in the region.

The consent covering air discharges from the Kaimiro Production Station has specific limits related to particular gases. Special condition 14 of consent 4048-3 sets a limit on the nitrogen dioxide concentration at or beyond the production station's boundary. The limit is expressed as 200 µg/m³ for a one hour average or 100 µg/m³ for a 24 hour average exposure.

NOx passive adsorption discs were placed at two locations in the vicinity of the Kaimiro Production Station on one occasion during the year under review (Figure 2). The discs were left in place for a period of 21 days. The calculated average one hour and 24 hour theoretical maximum NOx concentrations found at Kaimiro Production Station during the year under review equate to 26.2 µg/m³ and 13.9 µg/m³, respectively. The results show that the ambient ground level concentration of NOx is well below the limits set out by consent 4048-3.

2.2.2.4 BTEX

The volatile organic compounds (VOC) benzene, toluene, ethylbenzene and xylenes together are commonly referred to as BTEX. In New Zealand, benzene is the only member of the BTEX group subject to a national guideline value. The Ministry for the Environment (MfE) guideline for long-term exposure (annual average exposure), based on benzene's known mutagenic and carcinogenic properties, is 3.6 µg/m³. There are no national ambient air quality guidelines for toluene, ethylbenzene or xylene. The MfE had prepared an internal technical document "Health Effects of Eleven Hazardous Air Contaminants and Recommended Evaluation Criteria" (October 2000) that suggested a short-term (1 hour) average value of 22 µg/m³ for Benzene, 500 µg/m³ for Toluene and 1000 µg/m³ for Xylene as recommended guidelines values. However, these recommendations were not carried through to the final MfE guidelines published in 2002.

In January 2019 the Council implemented a coordinated monitoring programme to measure the concentrations of BTEX at 20 monitoring sites around the region.

The period of sampling was 503 hours (21 days). A conversion factor was applied to estimate an approximate peak short-term concentration that might have arisen during the full sampling period (assuming a steady-state source). These modelled concentrations are also presented in Table 7, alongside the actual concentrations as detected.

The results obtained for benzene at the Kaimiro Production Station AIR007846 site were 'less than' results, with no difference to the result for the field blank. That is, no benzene was actually detected at the site. Benzene at the AIR007817 site was higher, but below the recommended guidelines and much lower than the results obtained from an urban petrol station (Figure 6). The level of toluene and xylene were well below the recommended guidelines at both sites, while ethylbenzene was also low (AIR007817) or not detected (AIR007846).

Table 7 Actual and recalculated (p0.2) BTEX results from Kaimiro Production Station, January 2019

Site ID / Where	Time total Min.	Benzene (µg/m ³)		Toluene (µg/m ³)		Ethyl Benzene	o,m,p – (µg/m ³) Xylene Total	
		Lab. Results	1 hr. Calc.	Lab. Results	1 hr. Calc.	Lab. Results	Lab. Results	1 hr. Calc.
AIR007817 Kaimiro PS	502	1.37	4.7	1.30	4.5	0.48	0.88	3.0
AIR007846 Kaimiro PS (House)	502	<0.15	<0.5	0.36	1.3	<0.19	<0.43	<1.5
Blank**		<0.15	<0.5	<0.19	<0.7	<0.19	<0.43	<1.5
MfE recommended guidelines (2000), one -hour average. (µg/m ³)			22		500			1000

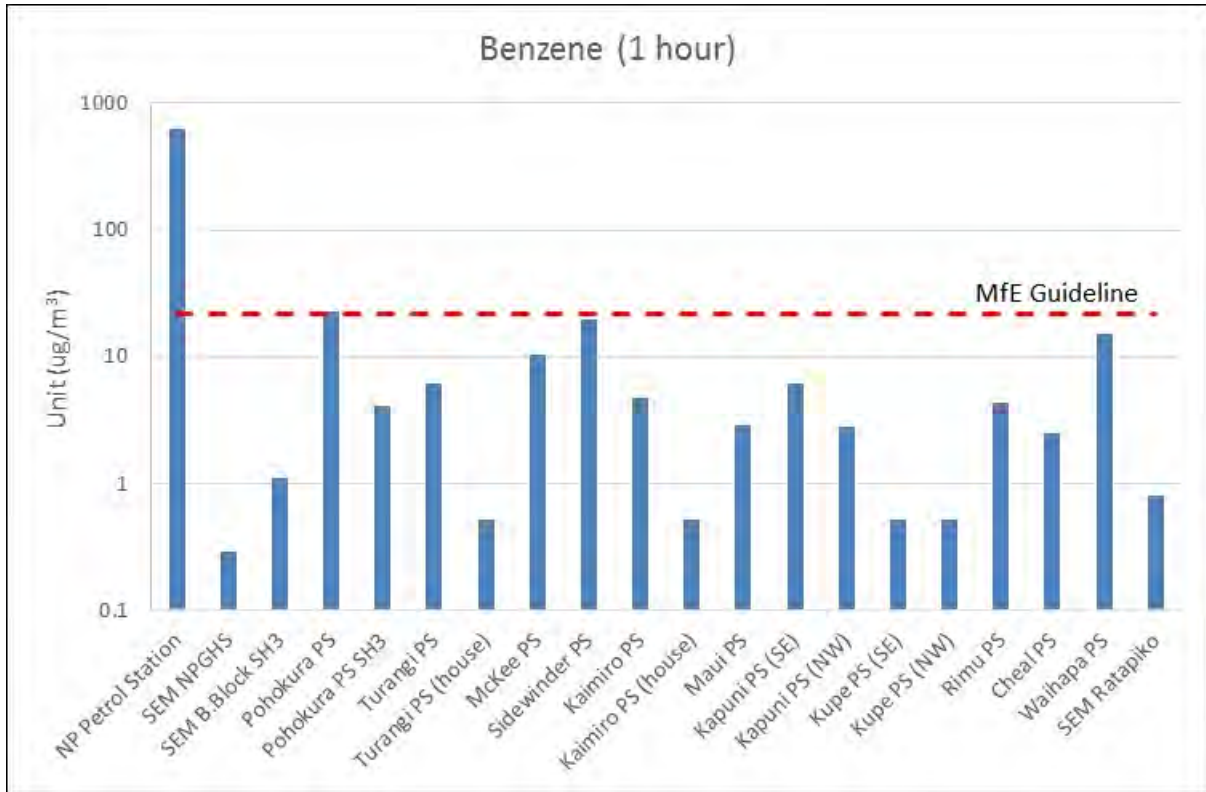


Figure 6 Regional benzene monitoring results 2019

Copies of air monitoring reports for this site are available from the Council upon request.

2.2.3 Summary of flaring volumes reported by GPL

During the monitoring period flaring was undertaken at Kaimiro Production Station and Radnor Production Station. Short periods of flaring (less than five minutes duration) occurred at Ngatoro-A occasionally due to unplanned outages.

Kaimiro Production Station

A summary of flaring volumes at Kaimiro Production Station is provided in Figure 7.

At Kaimiro Production Station flaring occurred monthly during the year with approximately 484,715 m³ flared. Flaring during the period occurred due to the Methanex plant shutdown, Kaimiro plant shutdown, power cuts, plant or well restarts, and compressor shutdowns and/or maintenance. One complaint regarding smoke emissions was received by Council in regard to Kaimiro Production Station, however it was not considered that consent conditions had been breached.

Radnor Production Station

Flaring occurred during most months at Radnor Production Station, with approximately 227,351 m³ flared (Figure 8). Flaring was associated with power cuts, unplanned maintenance and Methanex shutdowns.

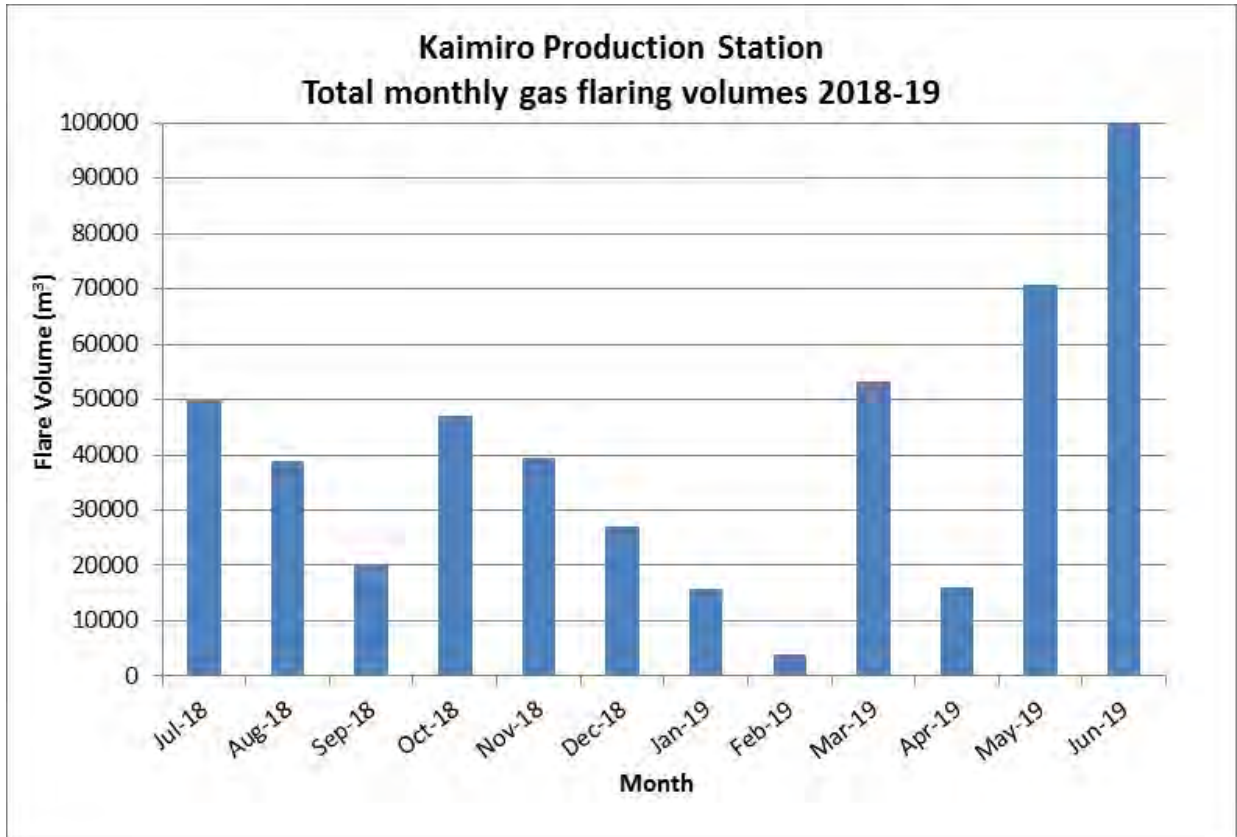


Figure 7 Summary of monthly gas flaring volumes at Kaimiro Production Station

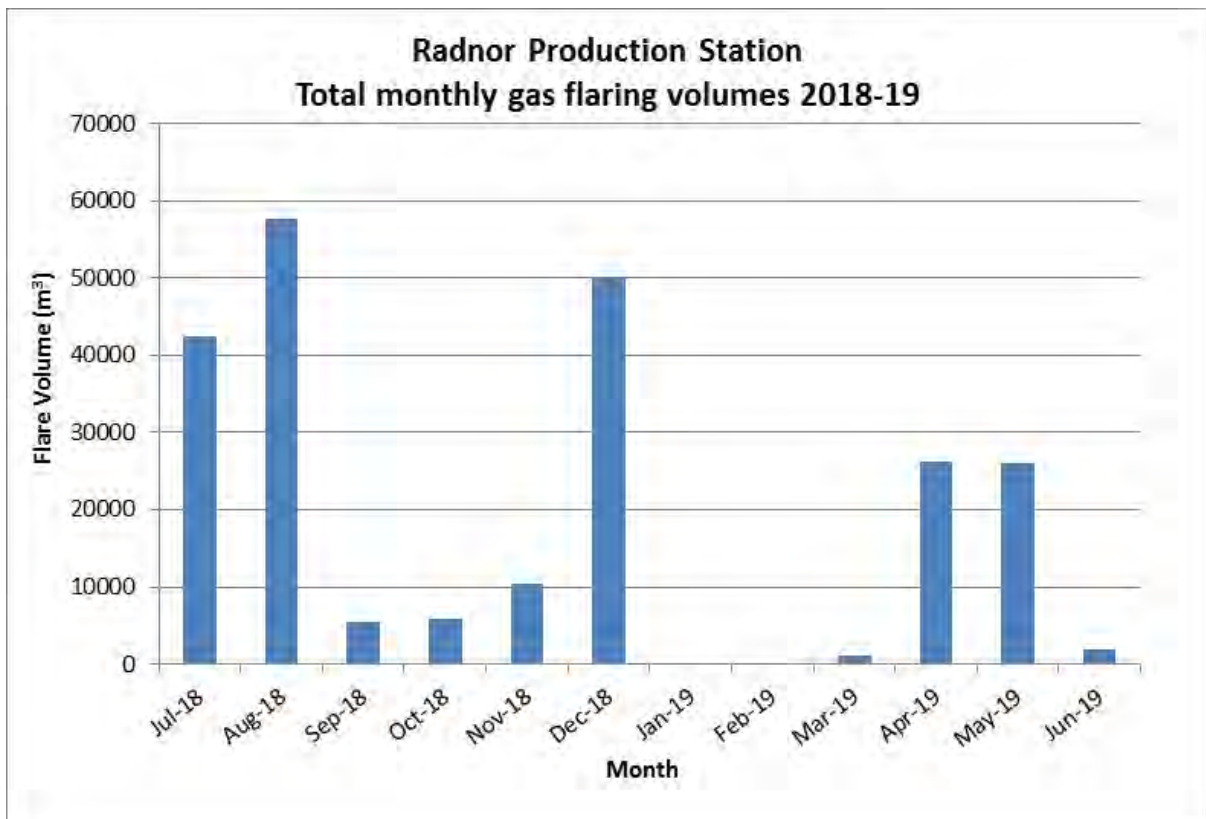


Figure 8 Summary of monthly gas flaring volumes at Radnor Production Station

2.3 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 GPL. 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).

Table 8 below sets out details of any incidents recorded, additional investigations, or interventions required by the Council in relation to GPL's activities during the 2018-2019 period. This table presents details of all events that required further investigation or intervention regardless of whether these were found to be compliant or not.

Table 8 Incidents, investigations, and interventions summary table

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
27 June 2019	A complaint was received regarding smoke and flaring at the Kaimiro Production Station	Y	No	Smoke was unable to be observed by the responding officer due to the call centre sending him to the wrong location. Investigation found flaring had occurred due to a plant trip. Overall it was considered that no breach had occurred.

3 Discussion

3.1 Discussion of site performance

Inspections of the Kaimiro, Radnor and Ngatoro sites during the 2018-2019 monitoring year found that they were generally well managed.

Kaimiro Production Station

The site was enlarged during the 2018-2019 period and sediment controls onsite were improved, with a combination of coconut matting, rock weirs, silt cloth, and filter bags being used.

Radnor Production Station

There were ongoing issues at Radnor Production Station due to stormwater entering the site from the neighbouring property. The existing stormwater system could not comply with the requirements of consent 9966-1 and works were undertaken to install a culvert, earth bunds, and a raised nib across the entrance track to divert excess stormwater away from the site. Bunding at the site was noted as being unsatisfactory on occasion. There were no issues with discharges to air at the site.

Ngatoro-A

The site was found to be neat and tidy during all inspections. Chemicals onsite were bunded appropriately and the stormwater system appeared to be functioning satisfactorily.

3.2 Environmental effects of exercise of consents

Kaimiro Production Station

Results of biomonitoring carried out in the Mangaoraka Stream indicated that the discharges were not having a significant adverse effect on the downstream water quality.

There were no adverse environmental effects recorded as a result of the exercise of the air discharge permit at the Kaimiro Production Station. The ambient air quality monitoring at the site showed that levels of carbon monoxide, combustible gases, PM₁₀ particulates, nitrogen oxides and the volatile organic compounds benzene, toluene, ethylbenzene and xylenes were all below levels of concern at the time of sampling. No offensive or objectionable odours were detected beyond the boundary during inspections. One complaint was received regarding smoke observed at the site, however this was not considered to be in breach of consent conditions.

Radnor Production Station

No adverse effects as a result of stormwater discharges or flaring were noted at the site during 2018-2019.

Ngatoro-A satellite site

Inspections of the site did not note any significant adverse effect on the downstream water quality.

The results of samples collected of the discharge and receiving waters complied with consent conditions.

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 9-16.

3.3.1 Kaimiro Production Station

Table 9 Summary of performance for consent 1334-3

Purpose: To discharge treated stormwater from the Kaimiro Production Station site into an unnamed tributary		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Best practicable option to prevent effects on environment	Site inspections	Yes
2. Maximum stormwater catchment	Site inspections	Yes
3. Contingency plan provided prior to commencement	Received	Yes
4. Site water directed for treatment through stormwater treatment system	Site inspections	Yes
5. Design, management and maintenance of stormwater system in accordance with application	Site inspections	Yes
6. Hazardous storage areas bunded with drainage to sumps	Site inspections	Yes
7. Limits on contaminants in the discharge	Samples not collected during period under review	N/A
8. Limits on chloride, BODCF and temperature increase below mixing zone	Samples not collected during period under review	N/A
9. Effects on receiving water below mixing zone	Inspections and biomonitoring	Yes
10. Annual preparation and maintenance of contingency plan relating to spills at the site	Plan up-to-date as of December 2017	Yes
11. Council advised prior to reinstatement of the site	Site not reinstated during period under review	N/A
12. Provisions for review of consent conditions	No further provision for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 10 Summary of performance for consent 4048-3

Purpose: To discharge emissions into the air from the flaring of hydrocarbons		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Limit on flaring duration	Site inspections and company logs	Yes
2. Neighbours notified prior to flaring	Information provided to neighbours	Yes
3. Council notified of continuous flaring	Notifications received	Yes
4. Consultation prior to alteration to plant equipment or processes	Site inspections and liaison with consent holder	Yes
5. Regard given to wind conditions during flaring	Site inspections and liaison with consent holder	Yes
6. Gas treated by liquid and solid separation and recovery	Site inspections	Yes
7. No liquid or solid hydrocarbons combusted through gas flare	Site inspections	Yes
8. Flare only used to dispose of substances from the well stream	Site inspections	Yes
9. Hydrocarbon storage vessels fitted with vapour recovery systems	Site inspections	Yes
10. Best practicable option to prevent effects on environment	Site inspections	Yes
11. No offensive odour or smoke at boundary of site	Site inspections	Yes
12. Limit on smoke opacity	Site inspections	Yes
13. Limit on carbon monoxide emissions	Ambient gas monitoring	Yes
14. Limit on nitrogen dioxide emissions	Ambient gas monitoring	Yes
15. No discharge of contaminant that is hazardous, toxic or noxious beyond boundary	Site inspections and ambient gas monitoring	Yes
16. No discharge of contaminant that exceeds specific WES limits	Ambient gas monitoring	Yes
17. Record of smoke emitting incidents	Annual air report received	Yes

Purpose: To discharge emissions into the air from the flaring of hydrocarbons		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
18. Provision of flaring logs to Council	Flaring logs received	Yes
19. Maintenance of flaring logs	Flaring logs received	Yes
20. Provision of annual air emissions report	Report received	Yes
21. Analysis of gas and crude oil stream	Not requested during period under review	N/A
22. Provisions for review of consent conditions	Optional review scheduled in June 2020, recommendation attached	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 11 Summary of performance for consent 5384-2

Purpose: To take groundwater from the Matemateaonga Formation		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Total volume abstracted not to exceed 550 m ³ /day or 6.4 L/s	Review of data provided by consent holder	Yes
2. Bore to be labelled	Site inspection	Yes
3. Installation and maintenance of water meter and datalogger	Site inspections	Yes
4. Provision of data annually by 31 July	Data provided	Yes
5. Documentation proving equipment has been installed and is accurate	Certification achieved	Yes
6. Water meter and datalogger to be accessible to Council staff	Site inspections	Yes
7. Council to be notified if equipment breaks down	No issues during the period	Yes
8. Best practicable option to prevent or minimise adverse environmental effects	Site inspections and liaison with consent holder	Yes
9. Lapse of consent		N/A
10. Provisions for review of consent conditions	Optional review scheduled in June 2020, recommendation attached	N/A

Purpose: To take groundwater from the Matemateaonga Formation		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

3.3.2 Radnor Production Station

Table 12 Summary of performance for consent 6394-1

Purpose: To discharge emissions to air during flaring from well workovers, in emergency situations, from a permanent pilot flame and other miscellaneous emissions associated with production activities at the Radnor-B wellsite		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notify Council prior to establishment of production operations	Notification received	Yes
2. Neighbours notified prior to flaring	Information provided to neighbours	Yes
3. Council notified of continuous flaring	Notifications received	Yes
4. Consultation prior to alteration to plant equipment or processes	Site inspections	Yes
5. Regard given to wind conditions during flaring	No complaints received from neighbours	Yes
6. Gas treated by liquid and solid separation and recovery	Site inspections	Yes
7. Notify Council of any failure to maintain liquid and solid separation	No failure during monitoring period	N/A
8. No liquid or solid hydrocarbons combusted through gas flare	Site inspections	Yes
9. Flare only used to dispose of substances from the well stream	Site inspections	Yes
10. Best practicable option to prevent effects on environment	Site inspections	Yes
11. No discharge of contaminant that is hazardous, toxic or noxious beyond boundary	Site inspections	Yes
12. No offensive odour or smoke at boundary of site	Site inspections	Yes

Purpose: To discharge emissions to air during flaring from well workovers, in emergency situations, from a permanent pilot flame and other miscellaneous emissions associated with production activities at the Radnor-B wellsite		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
13. Hydrocarbon storage vessels fitted with vapour recovery systems	Site inspections	Yes
14. Limit on smoke opacity	No assessed during monitoring period	N/A
15. Limit on carbon monoxide emissions	No assessed during monitoring period	N/A
16. Limit on nitrogen dioxide emissions	No assessed during monitoring period	N/A
17. No discharge of contaminant that exceeds specific WES limits	No assessed during monitoring period	N/A
18. Record of smoke emitting incidents	Flaring logs received	Yes
19. Maintenance of flaring logs	Flaring logs received	Yes
20. Supply monthly flaring information to Council	Flaring logs received	Yes
21. Provision of annual air emissions report	Report received	Yes
22. Analysis of gas and crude oil stream	Not requested	N/A
23. Lapse of consent	Consent exercised within lapse period	N/A
24. Provisions for review of consent conditions	No further option to review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 13 Summary of performance for consent 6399-1

Purpose: To take water from the Piakau Stream for hydrocarbon exploration purposes associated with the Radnor-B wellsite		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Best practicable option to prevent or minimise adverse environmental effects	Site inspections and liaison with consent holder	Yes
2. Notify Council prior to abstraction	No abstraction during period under review	N/A

Purpose: To take water from the Piakau Stream for hydrocarbon exploration purposes associated with the Radnor-B wellsite		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
3. Total volume abstracted not to exceed 100 m ³ /day or 25 L/s	No abstraction during period under review	N/A
4. Abstraction to cease when flow in Piakau Stream is below 45 L/sec	No abstraction during period under review	N/A
5. Maintenance of abstraction records	No abstraction during period under review	N/A
6. Exercise of consent in accordance with application	No abstraction during period under review	N/A
7. Intake structure to be screened	No abstraction during period under review	N/A
8. Lapse of consent	Consent exercised within lapse period	N/A
9. Provisions for review of consent conditions	No further provision for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 14 Summary of performance for consent 9966-1

Purpose: To discharge treated stormwater from hydrocarbon exploration and production operations at the Radnor-B wellsite through a roadside drain into an unnamed tributary of the Piakau Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Best practicable option to prevent effects on environment	Site inspections	Mostly. Some issues with site stormwater
2. Wellsite pad maximum size 2 hectares	Site inspections	Yes
3. Consent holder to notify Council of site works or well drilling operations	Notification received	Yes
4. Consent holder to maintain and regularly update a contingency plan	Plan up-to-date as of December 2017	Yes
5. Design, management and maintenance of stormwater system in accordance with application	Site inspections	Mostly. Issues with stormwater influx from neighbouring property

Purpose: To discharge treated stormwater from hydrocarbon exploration and production operations at the Radnor-B wellsite through a roadside drain into an unnamed tributary of the Piakau Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
6. Consent holder to take reasonable steps to prevent stormwater entering the site from adjacent land	Site inspections	Works completed before the end of monitoring period to remedy this
7. All discharges to flow to a perimeter drain and skimmer pit	Site inspections	Works completed before the end of monitoring period to remedy this
8. Skimmer pit capacity at least 112.5m ³	Site inspections	Yes
9. Skimmer pits to be lined with an impervious material and be fitted with a shut off valve	Site inspections	Yes
10. Perimeter drains and skimmer pits to be installed before any site works commence	Site inspections	Yes
11. Limits on contaminants in the discharge	Not assessed during period under review	N/A
12. pH may exceed 9.0 if due to photosynthetic activity in the skimmer pits	Not assessed during period under review	N/A
13. Limits on chloride, BOD and temperature increase below mixing zone	Not assessed during period under review	N/A
14. Effects on stream below mixing zone	Inspections	Yes
15. Council advised prior to reinstatement of the site	Site not reinstated during period under review	N/A
16. Consent lapse	Consent exercised	N/A
17. Provisions for review of consent conditions	Optional review scheduled in November 2022 if required	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		Good
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

3.3.3 Ngatoro-A satellite site

Table 15 Summary of performance for consent 4073-3

Purpose: To discharge treated stormwater from hydrocarbon exploration and production operations at the Ngatoro-A wellsite, onto land and into an unnamed tributary of the Ngatoro Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Best practicable option to prevent effects on environment	Site inspections	Yes
2. Maximum stormwater catchment	Site inspections	Yes
3. Consent holder to notify Council of site works or well drilling operations	No works during period under review	Yes
4. Consent holder to maintain and regularly update a contingency plan	Plan up-to-date as of December 2017	Yes
5. Design, management and maintenance of stormwater system in accordance with application	Site inspections	Yes
6. All discharge from the site to flow through a perimeter drain and skimmer pit	Site inspections	Yes
7. Skimmer pit capacity at least 102m ³	Site inspections	Yes
8. Skimmer pits to be lined with an impervious material and be fitted with a shut off valve	Site inspections	Yes
9. Perimeter drains and skimmer pits to be installed before any site works commence	Site inspections	Yes
10. Limits on contaminants in the discharge	Water sampling	Yes
11. pH may exceed 9.0 if due to photosynthetic activity in the skimmer pits	Water sampling	Yes
12. Limits on chloride, BOD and temperature increase below mixing zone	Water sampling	Yes
13. Effects on stream below mixing zone	Inspections	Yes
14. Council advised prior to reinstatement of the site	Site not reinstated during period under review	N/A
15. Provisions for review of consent conditions	No further option for review prior to expiry	N/A

Purpose: To discharge treated stormwater from hydrocarbon exploration and production operations at the Ngatoro-A wellsite, onto land and into an unnamed tributary of the Ngatoro Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 16 Summary of performance for consent 7295-1

Purpose: To discharge emissions into the air during flaring		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Council notified of continuous flaring	Liaison with consent holder – flaring occasional short duration (less than 5 minutes) only	Yes
2. Neighbours notified prior to flaring	Liaison with consent holder – flaring occasional short duration (less than 5 minutes) only	Yes
3. Consultation prior to alteration to plant equipment or processes	Site inspections	Yes
4. Regard given to wind conditions during flaring	Liaison with consent holder – flaring occasional short duration (less than 5 minutes) only	Yes
5. Gas treated by liquid and solid separation and recovery	Site inspections	Yes
6. Notify Council of any failure to maintain liquid and solid separation	Liaison with consent holder – flaring occasional short duration (less than 5 minutes) only	Yes
7. No liquid or solid hydrocarbons combusted through gas flare	Liaison with consent holder – flaring occasional short duration (less than 5 minutes) only	Yes
8. Best practicable option to prevent effects on environment	Site inspections	Yes
9. Flare only used to dispose of substances from the well stream	Site inspections	Yes
10. No offensive odour or smoke at boundary of site	Site inspections	Yes
11. Hydrocarbon storage vessels fitted with vapour recovery systems	Site inspections	Yes
12. Limit on smoke opacity	Not assessed during period under review	N/A
13. Limit on carbon monoxide emissions	Not assessed during period under review	N/A
14. Limit on nitrogen dioxide emissions	Not assessed during period under review	N/A

Purpose: To discharge emissions into the air during flaring		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
15. No discharge of contaminant that is hazardous, toxic or noxious beyond boundary	Not assessed during period under review	N/A
16. No discharge of contaminant that exceeds specific WES limits	Not assessed during period under review	N/A
17. Analysis of gas and crude oil stream	Not requested during monitoring period	N/A
18. Record of smoke emitting incidents	Report received	Yes
19. Maintenance of flaring logs	Report received	Yes
20. Provision of annual air emissions report	Report received	Yes
21. Lapse of consent	Consent exercised within lapse period	N/A
22. Provisions for review of consent conditions	Optional review scheduled in June 2021 if required	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

N/A = not applicable

Table 17 Evaluation of environmental performance over time

Year	Consent no	High	Good	Improvement req	Poor
2011-12	1334-3, 4048-3, 5384-1, 6218-1	4	-	-	-
	4073-2, 7295-1	2	-	-	-
	3951-2, 7220-1	2	-	-	-
2012-13	1334-3	-	1	-	-
	4048-3, 5384-1, 6218-1	3	-	-	-
	4073-2, 7295-1	2	-	-	-
	3951-37220-1	2	-	-	-
2013-14	1334-3	-	-	1	-
	4048-3, 5384-1, 6218-1	3	-	-	-
	4073-2	-	1	-	-
	7295-1	1	-	-	-
	3951-3, 7220-1	2	-	-	-
2014-15	1334-3, 4048-3, 5384-2	3	-	-	-
	4073-2, 7295-1	2	-	-	-

Year	Consent no	High	Good	Improvement req	Poor
	3951-3, 7220-1	2	-	-	-
2015-16	1334-3, 4048-3, 5384-2	3	-	-	-
	4073-2, 7295-1	2	-	-	-
	3951-3, 7220-1	2	-	-	-
2016-17	1334-3, 4048-3, 5384-2	3	-	-	-
	4073-2, 7295-1	2	-	-	-
	3951-3, 7220-1	2	-	-	-
2017-18	1334-3, 4048-3, 5384-2	3	-	-	-
	4073-2, 7295-1	2	-	-	-
	6394-1, 6399-1	2	-	-	-
	9966-1	-	1	-	-
Totals		49	3	1	-

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

3.4 Recommendations from the 2017-2018 Annual Report

In the 2017-2018 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at the Kaimiro Production Station, Radnor Production Station and Ngatoro-A satellite site in the 2018-2019 year continue at a similar level as in 2017-2018, with the addition of a one-off round of BTEX monitoring.
2. THAT should there be issues with environmental or administrative performance in 2018-2019, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the option for a review of resource consent 4073-3 in June 2019, as set out in condition 15 of the consent, not be exercised, as it is considered that the current conditions are adequate.

These recommendations were implemented.

3.5 Alterations to monitoring programmes for 2019-2020

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

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

The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki exercising resource consents.

It is proposed that for 2019-2020 that the programme is altered by reducing inspections from six per year to four.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the sites 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 2019-2020.

3.6 Exercise of optional review of consents

Resource consents 4048-3 and 5384-2 provide for an optional review of the consents in June 2020. Conditions 22 and 10, respectively, allow the Council to review the consents, for the purpose of ensuring the conditions are adequate to deal with any adverse effects on the environment.

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

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at Kaimiro Production Station, Radnor Production Station and the Ngatoro-A satellite site in the 2019-2020 year be amended from that undertaken in 2018-2019, by reducing the number of inspections per year from six to four.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the option for a review of resource consents 4048-3 and 5384-2 in June 2020, as set out in conditions of the consents, not be exercised, on the grounds that the current conditions are adequate.

Glossary of common terms and abbreviations

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

Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODCF	Filtered carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
BTEX	Benzene, toluene, ethylbenzene and xylenes (BTEX).
Bund	A wall around a tank to contain its contents in the case of a leak.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in mS/m.
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.
LEL	Lower Explosive Limit. The percentage of the lower explosive limit, expressed as methane that is detected in the air sampled.
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.
MfE	Ministry for the Environment.
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.
mS/m	Millisiemens per metre.
NES	National Environmental Standards
NO _x	Nitrogen oxides
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.

O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
PM ₁₀	Relatively fine airborne particles (less than 10 micrometre diameter, respectively).
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	<i>Resource Management Act 1991</i> and including all subsequent amendments.
SS	Suspended solids.
SQMCI	Semi quantitative macroinvertebrate community index.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
UI	Unauthorised Incident.
VOC	Volatile organic compounds.

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

Bibliography and references

- Ministry for the Environment. 2018. *Best Practice Guidelines for Compliance, Monitoring and Enforcement under the Resource Management Act 1991*. Wellington: Ministry for the Environment.
- Taranaki Regional Council (2019): *Greymouth Petroleum Acquisition Company Ltd Kaimiro Production Station Monitoring Programme Annual Report 2017-2018*. Technical Report 2018-56.
- Taranaki Regional Council (2018): *Greymouth Petroleum Acquisition Company Ltd Kaimiro Production Station Monitoring Programme Annual Report 2016-2017*. Technical Report 2017-54.
- Taranaki Regional Council (2017): *Greymouth Petroleum Kaimiro Production Station Monitoring Programme Annual Report 2015-2016*. Technical Report 2016-18.
- Taranaki Regional Council (2016): *Greymouth Petroleum Kaimiro Production Station Monitoring Programme Annual Report 2014-2015*. Technical Report 2015-108.
- Taranaki Regional Council (2015): *Greymouth Petroleum Kaimiro and Ngatoro Production Stations Monitoring Programme Annual Report 2013-2014*. Technical Report 2014-69.
- Taranaki Regional Council (2014): *Greymouth Petroleum Kaimiro and Ngatoro Production Stations Monitoring Programme Annual Report 2012-2013*. Technical Report 2013-89.
- Taranaki Regional Council (2013): *Greymouth Petroleum Kaimiro and Ngatoro Production Stations Monitoring Programme Annual Report 2011-2012*. Technical Report 2012-64.
- Taranaki Regional Council (2012): *Greymouth Petroleum Kaimiro and Ngatoro Production Stations Monitoring Programme Annual Report 2010-2011*. Technical Report 2011-62.
- Taranaki Regional Council (2011): *Greymouth Petroleum Kaimiro and Ngatoro Production Stations Monitoring Programme Annual Report 2009-2010*. Technical Report 2010-108.
- Taranaki Regional Council (2010): *Greymouth Petroleum Kaimiro and Ngatoro Production Stations Monitoring Programme Annual Report 2008-2009*. Technical Report 2009-57.
- Taranaki Regional Council (2009): *Greymouth Petroleum Kaimiro and Ngatoro Production Stations Monitoring Programme Annual Report 2007-2008*. Technical Report 2008-104.
- Taranaki Regional Council (2007): *Greymouth Petroleum Kaimiro and Ngatoro Production Stations Monitoring Programme Annual Report 2006-2007*. Technical Report 2007-26.
- Taranaki Regional Council (2006): *Greymouth Petroleum Kaimiro and Ngatoro Production Stations Monitoring Programme Annual Report 2005-2006*. Technical Report 2006-15.
- Taranaki Regional Council (2005): *Greymouth Petroleum Kaimiro and Ngatoro Production Stations Monitoring Programme Annual Report 2004-2005*. Technical Report 2005-11.
- Taranaki Regional Council (2004): *NZOG & Greymouth Petroleum Ngatoro Production Stations Monitoring Programme Annual Report 2003-2004*. Technical Report 2004-20.
- Taranaki Regional Council (2004): *Greymouth Kaimiro Production Station Monitoring Programme Annual Report 2003-2004*. Technical Report 2004-78.
- Taranaki Regional Council (2003): *New Zealand Oil and Gas Production Stations (Ngatoro A and B) Annual Report 2002-2003*. Technical Report 2003-77.
- Taranaki Regional Council (2003): *Greymouth Petroleum Acquisitions Company Limited Monitoring Programme Annual Report 2002-2003*. Technical Report 2003-68.

- Taranaki Regional Council (2002): *New Zealand Oil and Gas Production Stations (Ngatoro A and B) Annual Report 2001-2002*. Technical Report 2002-37.
- Taranaki Regional Council (2002): *Fletcher Challenge Energy Monitoring Programmes Annual Report 2001-2002*. Technical Report 2002-47.
- Taranaki Regional Council (2001): *New Zealand Oil and Gas Production Stations (Ngatoro A and B) Annual Report 2000-2001*. Technical Report 2001-24.
- Taranaki Regional Council (2001): *Fletcher Challenge Energy Taranaki Ltd Monitoring Programme Annual Report 2000-2001*. Technical Report 01-83.
- McWilliam H (2000): *Biomonitoring of the Ngatoro Stream sampled in relation to a wastewater discharge from the Ngatoro-A production site, October 1999*. TRC report HM199.
- Taranaki Regional Council (2000): *New Zealand Oil and Gas Production Stations (Ngatoro A and B) Annual Report 1999-2000*. Technical Report 2000-20.
- Taranaki Regional Council (2000): *Fletcher Challenge Energy Taranaki Ltd Monitoring Programme Annual Report 1999-2000*. Technical Report 00-24.
- Taranaki Regional Council (1999): *New Zealand Oil and Gas Production Stations (Ngatoro A and B) Annual Report 1998-99*. Technical Report 99-23.
- Taranaki Regional Council (1999): *Fletcher Challenge Energy Taranaki Ltd Monitoring Programme Annual Report 1998-1999*. Technical Report 99-16.
- Taranaki Regional Council (1998): *New Zealand Oil and Gas Production Stations (Ngatoro A and B) Annual Report 1997-98*. Technical Report 98-86.
- Taranaki Regional Council (1998): *Fletcher Challenge Energy Taranaki Ltd Air and Water Monitoring Report 1997/98*. Technical Report 98-61.
- Taranaki Regional Council (1997): *New Zealand Oil and Gas Production Stations (Ngatoro 1 and 2) Annual Report 1996-97*. Technical Report 97-90.
- Taranaki Regional Council (1997): *Fletcher Challenge Energy Taranaki Ltd Air and Water Monitoring Report 1996/97*. Technical Report 97-51.
- Taranaki Regional Council (1996): *New Zealand Oil and Gas Production Stations (Ngatoro 1 and 2) Annual Report 1995-96*. Technical Report 96-42.
- Taranaki Regional Council (1996): *Petrocorp Exploration Ltd Air and Water Monitoring Report 1995/96*. Technical Report 96-60.
- Taranaki Regional Council (1995): *New Zealand Oil and Gas Production Stations (Ngatoro 1 and 2) Annual Report 1994-95*. Technical Report 95-62.
- Taranaki Regional Council (1995): *Petrocorp Exploration Ltd Air and Water Monitoring Report 1994/95*. Technical Report 95-54.
- Taranaki Regional Council (1994): *New Zealand Oil and Gas Production Stations (Ngatoro 1 and 2) Annual Report 1993-94*. Technical Report 94-75.
- Taranaki Regional Council (1994): *Petrocorp Exploration Ltd Air and Water Monitoring Report 1993/94*. Technical Report 94-73.
- Taranaki Regional Council (1993): *Petrocorp Exploration Ltd Air and Water Monitoring Report 1992/93*. Technical Report 93-35A.

- Taranaki Regional Council (1992): *Petrocorp Exploration Ltd Air and Water Monitoring Report 1991/92*.
Technical Report 92-25.
- Taranaki Regional Council (1991): *Petrocorp Exploration Ltd Air and Water Monitoring Report 1990/91*.
Technical Report 91-25.
- Taranaki Regional Council (1990): *Petrocorp Exploration Ltd Air and Water Monitoring Report 1989/90*.
Technical Report 90-14.
- Thomas, B (2019): *Biomonitoring of two unnamed tributaries of the Mangaoraka Stream in relation to discharges from the Kaimiro Production Station, November 2018* (BT085).
- Thomas, B (2019): *Biomonitoring of two unnamed tributaries of the Mangaoraka Stream in relation to discharges from the Kaimiro Production Station, February 2019* (BT090).
- Tkachenko, V (2019): *Monitoring of nitrogen oxides (NOx) levels in Taranaki near the NOx emitting sites, year 2018-2019, June 2019*.
- Tkachenko, V (2019): *Air monitoring survey of hydrocarbon compounds (BTEX) in the Taranaki region 2019, August 2019*.
- Tkachenko, V (2019): *Ambient Gas (PM10, CO and LEL) Monitoring at Kaimiro Production Station during the 2018-2019 monitoring year, June 2019*.

Appendix I

Resource consents held by Greymouth Petroleum

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

Site	Consent number	Purpose	Granted	Review	Expires
Kaimiro Production Station	1334-3	To discharge treated stormwater from the Kaimiro Production Station into an unnamed tributary of the Mangaoraka Stream in the Waiongana Catchment	Jan 2002	-	June 2020
	4048-3	To discharge emissions into the air from the flaring of hydrocarbons arising from hydrocarbon production and hydrocarbon processing operations together with miscellaneous emissions at the Kaimiro Production Station	Jan 2008	June 2020	June 2026
Kaimiro-O	5384-2	To take groundwater from the Matemateaonga Formation for use in enhanced hydrocarbon recovery activities at the Kaimiro-O wellsite.	Sept 1988	June 2020	June 2032
Radnor Production Station	6394-1	To discharge emissions to air during flaring from well workovers, in emergency situations, from a permanent pilot flame and other miscellaneous emissions associated with production activities at the Radnor-B wellsite	June 2004	-	June 2022
	6399-1	To take water from the Piakau Stream for hydrocarbon exploration purposes associated with the Radnor-B wellsite	June 2004	-	June 2022
	9966-1*	To discharge treated stormwater from hydrocarbon exploration and production operations at the Radnor-B wellsite through a roadside drain into an unnamed tributary of the Piakau Stream	Sep 2014	Nov 2020	June 2028
Ngatoro-A	4073-3	To discharge treated stormwater from hydrocarbon exploration and production operations at the Ngatoro-A wellsite, onto land and into an unnamed tributary of the Ngatoro Stream	June 2016		June 2021
	7295-1	To cover discharge of emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Ngatoro-A site	May 2008	June 2021	June 2027

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: Greymouth Petroleum Acquisition Company Limited
P O Box 3394
Fitzroy
NEW PLYMOUTH 4341

Decision Date
(Change): 8 April 2014

Commencement Date
(Change): 8 April 2014 (Granted: 10 January 2002)

Conditions of Consent

Consent Granted: To discharge treated stormwater from the Kaimiro
Production Station site into an unnamed tributary of the
Mangaoraka Stream in the Waiongana catchment

Expiry Date: 1 June 2020

Review Date(s): June 2014

Site Location: Kaimiro Production Station, Upland Road, Inglewood

Legal Description: Lot 4 DP 436344 (Discharge source)
Lot 2 DP 19651 (Discharge site)

Grid Reference (NZTM) 1699783E–5664369N

Catchment: Waiongana

Tributary: Mangaoraka

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

Consent 1334-3.2

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 of the discharge on any water body.
2. The maximum stormwater catchment area shall be no more than 25,000 m².
3. Prior to the exercise of this consent, the consent holder shall provide for the written approval of the Chief Executive, Taranaki Regional Council, site specific details relating to contingency planning for the production site.
4. All site water to be discharged under this permit shall be directed for treatment through the stormwater treatment system for discharge in accordance with the specific conditions of this permit.
5. The design, management and maintenance of the stormwater system shall be generally undertaken:
 - in accordance with the stormwater management plan submitted to Taranaki Regional Council on 16 August 2012, in response to the request for further information for application 7156; and
 - as amended by the stormwater design report submitted with the application for consent 1334-3.2, prepared by BTW Company Limited and dated 28 February 2014.

These plans shall be followed at all times. If changes are proposed, the consent holder shall advise the Taranaki Regional Council one month prior to the changes to the plan.

6. Any above ground hazardous substances storage areas shall be bunded with drainage to sumps, or other appropriate recovery systems, and not to the stormwater catchment.
7. Constituents of the discharge shall meet the standards shown in the following table.

Constituent	Concentration
pH (range)	6.5 – 8.5
suspended solids	100 gm ⁻³
total recoverable hydrocarbons (infrared spectroscopic technique)	15 gm ⁻³
chloride	230 gm ⁻³

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

Consent 1334-3.2

8. After allowing for reasonable mixing, within a mixing zone extending 15 metres downstream of the discharge point, the discharge shall not give rise to any of the following effects in the receiving waters of the unnamed tributary of the Mangaoraka Stream:
 - a. an increase in temperature of more than 2 degrees Celsius; and
 - b. filtered carbonaceous biochemical oxygen demand shall not exceed 2.00 gm^{-3} ; or
 - c. shall not cause the chloride concentration to exceed 50 gm^{-3}
9. After allowing for reasonable mixing, within a mixing zone extending 15 metres downstream of the discharge point, the discharge shall not give rise to any of the following effects in the receiving waters of the unnamed tributary of the Mangaoraka Stream:
 - a. the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - b. any conspicuous change in the colour or visual clarity;
 - c. any emission of objectionable odour;
 - d. the rendering of fresh water unsuitable for consumption by farm animals; and
 - e. any significant adverse effects on aquatic life.
10. The consent holder shall prepare annually and maintain a contingency plan to the satisfaction of the Chief Executive, Taranaki Regional Council, outlining measures and procedures undertaken to prevent spillage or accidental discharge of contaminants, and procedures to be carried out should such a spillage or discharge occur.
11. The Chief Executive, Taranaki regional Council, shall be advised in writing at least 48 hours prior to the reinstatement of the site and the reinstatement shall be carried out so as to minimise effects on stormwater quality.
12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2008 and/or June 2014, 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 April 2014

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: Greymouth Petroleum Acquisition Company Limited
P O Box 3394
NEW PLYMOUTH 4341

Consent Granted
Date: 10 January 2008

Conditions of Consent

Consent Granted: To discharge emissions into the air from the flaring of hydrocarbons arising from hydrocarbon production and processing operations, together with miscellaneous emissions, at the Kaimiro Production Station at or about 2609726E-6225978N

Expiry Date: 1 June 2026

Review Date(s): June 2014, June 2020

Site Location: Upland Road, Inglewood

Legal Description: Pt Sec 115 Tarurutangi Dist Blk III Egmont SD

Consent 4048-3

General conditions

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

Special conditions

Duration

1. Flaring of gas from each well during well testing shall not occur on more than 30 days.

Information and notification

2. At least 24 hours before any flaring, other than in emergencies, the consent holder shall provide notification to all residents within 1000 metres of the site of the commencement of flaring. The consent holder shall include in the notification a 24-hour contact telephone number for a representative of the consent holder, and shall keep and make available to the Chief Executive, Taranaki Regional Council, a record of all queries and complaints received.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, whenever the continuous flaring of hydrocarbons [other than purge gas] is expected to occur for more than five minutes in duration. Notification shall be no less than 24 hours before the flaring commences. Notification shall include the consent number and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable if the consent holder does not have access to email.
4. No alteration shall be made to plant equipment or processes which may substantially alter the nature or quantity of flare emissions or other site emissions, including but not limited to the recovery of produced gas, other than as authorised by this consent, without prior consultation with the Chief Executive, Taranaki Regional Council.

Emissions from the site

5. Other than for the maintenance of a pilot flare flame, the consent holder shall have regard to the prevailing and predicted wind speed and direction at the time of initiation of, and throughout, any episode of flaring so as to minimise offsite effects.

Consent 4048-3

6. All gas that is flared must first be treated by effective liquid and solid separation and recovery to ensure that smoke emission during flaring is minimised.
7. No liquid or solid hydrocarbons shall be combusted through the gas flare system.
8. Only substances originating from the well stream and treated as outlined by conditions 6 and 7 shall be combusted within the flare pit.
9. All hydrocarbon storage vessels shall be fitted with vapour recovery systems.
10. The consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or potential effect on the environment arising from any emission to air from the flare or any other emissions to air from the Kaimiro Production Station.
11. There shall not be any offensive odour or smoke at or beyond the boundary of the property where the production station is located.
12. The opacity of any smoke emissions shall not exceed a level of 1 as measured on the Ringelmann Scale.
13. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the flare so that, whether alone or in conjunction with any other emissions from the production station, the maximum ground level concentration of carbon monoxide arising from the exercise of this consent measured under ambient conditions does not exceed 10 milligrams per cubic metre [mg/m^3] [eight-hour average exposure], or 30 mg/m^3 one-hour average exposure] at or beyond the boundary of the property.
14. The consent holder shall control all emissions of nitrogen oxides to the atmosphere from the flare so that, whether alone or in conjunction with any other emissions from the production station, the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 100 micrograms per cubic metre [$\mu\text{g}/\text{m}^3$] [24-hour average exposure], or 200 $\mu\text{g}/\text{m}^3$ [1-hour average exposure] at or beyond the boundary of the of the property.
15. The consent holder shall control emissions to the atmosphere, from the production station and flare, of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides so that, whether alone or in conjunction with any other emissions from the production station, is not hazardous or toxic or noxious at or beyond the boundary of the property.
16. The consent holder shall control emissions to the atmosphere from the production station and flare of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides so that, whether alone or in conjunction with any emissions from the flare, the maximum ground level concentration for any particular contaminant arising from the exercise of this consent measured at or beyond the boundary of the property, is not increased above background levels:

Consent 4048-3

- a) by more than 1/30th of the relevant Occupational Threshold Value-Time Weighted Average, or by more than the Short Term Exposure Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour]; or
- b) if no Short Term Exposure Limit is set, by more than three times the Time Weighted Average at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour].

Recording and reporting information

17. Each time there is visible smoke as a result of the exercise of this consent, the consent holder shall record the time, duration and cause. The consent holder shall make the record available to the Chief Executive, Taranaki Regional Council, upon request.
18. Each month, the consent holder shall supply to the Chief Executive, Taranaki Regional Council a record of flaring information in relation to the production station, and each wellsite. The flaring information supplied shall comprise: the type and amount of material flared [including any gas used to maintain a pilot flame], the date this was flared, the reason why flaring was undertaken, and an indication of whether smoke was produced from the flaring events.
19. The consent holder shall record and maintain a log of all continuous flaring events longer than five minutes duration, and any intermittent flaring lasting for an aggregate of ten minutes or longer in any 120-minute period. The log shall contain the date, the start and finish times of the flaring event, the quantity and type of material flared, and the reason for flaring. The log shall be made available to the Chief Executive, Taranaki Regional Council, upon request, and summarised annually in the report required under condition 20.
20. The consent holder shall provide to the Taranaki Regional Council during May of each year, for the duration of this consent, a report:
 - i) detailing any energy efficiency measures implemented on the site;
 - ii) detailing smoke emissions as required under condition 17;
 - iii) detailing any measures undertaken or proposed to reduce smoke emissions;
 - iv) detailing any measures undertaken or proposed to reduce flaring;
 - v) addressing any other issue relevant to the minimisation or mitigation of emissions from the flare;
 - vi) detailing any complaints received and any measures undertaken to address complaints; and
 - vii) reviewing all options and technological advances relevant to the reduction or mitigation of any discharge to air from the site, how these might be applicable and/or implemented at the site, and the benefits and costs of these advances.
21. The consent holder shall make available to the Chief Executive, Taranaki Regional Council, upon request, an analysis of a typical gas and condensate stream from the field, covering sulphur compound content and the content of carbon compounds of structure C₆ or higher number of compounds.

Review

22. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent within six months of receiving a report prepared by the consent holder pursuant to condition 20 of this consent, and/or by giving notice of review during the month of June 2014 and/or June 2020, for any of the following purposes:
- a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered or which it was not appropriate to deal with at the time;
 - b) requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge;
 - c) to alter, add or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant;
 - 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 gases which are products of combustion, and which is relevant to the air discharge from the Kaimiro Production Station.

Signed at Stratford on 10 January 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Greymouth Petroleum Acquisition Company Limited
PO Box 3394
New Plymouth 4341

Decision Date: 30 June 2016

Commencement Date: 30 June 2016

Conditions of Consent

Consent Granted: To discharge treated stormwater from hydrocarbon exploration and production operations at the Ngatoro-A wellsite, onto land and into an unnamed tributary of the Ngatoro Stream

Expiry Date: 1 June 2021

Review Date(s): June 2019

Site Location: Ngatoro-A wellsite, 561 Dudley Road, Inglewood

Grid Reference (NZTM) 1701212E-5659859N

Catchment: Waitara

Tributary: Manganui
Ngatoro

*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 actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.
2. Stormwater discharged shall be collected from a catchment area of no more than 7000 m².
3. At least 5 working days prior, the consent holder shall advise the Chief Executive, Taranaki Regional Council of the date of each of the following events:
 - a) commencement of any site works (site works includes the introduction of a drilling rig, drilling equipment or any other associated equipment for the purpose of drilling, testing, well stimulation or well workover that may introduce contaminants to the site);
 - b) commencement of any well drilling operation; and
 - c) recommencement of any site works or drilling operations following a period of inactivity exceeding 30 days.

If any of these events is rescheduled or delayed, the consent holder shall immediately provide further notice advising of the new date.

Any advice given in accordance with this condition shall include the consent number and the wellsite name and be emailed to worknotification@trc.govt.nz.

4. The consent holder shall maintain and regularly update a contingency plan that details measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not authorised by this consent and measures to avoid, remedy or mitigate the environmental effects of such a spillage or discharge. The plan shall be approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity prior to any discharge from the site.
5. Subject to the other conditions of this consent the design, management and maintenance of the stormwater system shall be undertaken in accordance with the information submitted in support of the application for this consent.
6. All discharges from the site, including from any containment pit or hydrocarbon combustion facility (e.g. flare pit, thermal oxidiser), shall flow to a perimeter drain and skimmer pit. Perimeter drains shall be designed, including by having a positive grade and low permeability, to ensure that runoff flows directly to a skimmer pit without ponding.

Consent 4073-3.0

7. The skimmer pit system shall have a combined capacity of no less than 102 m³ including a 'freeboard' of no less than 59 m³, and be designed to retain any hydrocarbons that enter them.
8. All skimmer pits and any other stormwater retention areas shall be lined with an impervious material to prevent seepage through the bed and sidewalls, and all skimmer pits shall have a valve that can be shut off to prevent any discharge from the site.
9. Perimeter drains and skimmer pits necessary to comply with the conditions of this consent shall be installed before any site works commences. Site works includes the introduction of a drilling rig, drilling equipment or any other associated equipment or facilities to the site for any purpose other than for the construction of the site.
10. Subject to condition 11 the constituents in the discharge shall meet the standards shown in the following table.

Constituent	Standard
pH	Within the range 6.0 to 9.0
suspended solids	Concentration not greater than 100 gm ⁻³
total recoverable hydrocarbons	Concentration not greater than 15 gm ⁻³ [as determined by infrared spectroscopic technique]

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

11. The pH may exceed 9.0 if the exceedance is a result photosynthetic activity within the skimmer pits, but in any case the discharge shall not result in the pH of the receiving water increasing by more than 0.5 pH units after allowing for a mixing zone of 25 metres.
12. After allowing for a mixing zone of 25 metres from the point of discharge into the unnamed tributary of the Ngatoro Stream, the discharge shall not cause any of the following effects in the receiving water:
 - a) an increase in the temperature of more than 2 degrees Celsius;
 - b) the filtered carbonaceous biochemical oxygen demand to exceed 2 gm⁻³; or
 - c) the chloride concentration to exceed 50 gm⁻³.
13. After allowing for a mixing zone of 25 metres from the point of discharge into the unnamed tributary of the Ngatoro Stream, the discharge shall not give rise to any 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.

Consent 4073-3.0

14. The consent holder shall advise the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the reinstatement of the site and the reinstatement shall be carried out so as to minimise adverse effects on stormwater quality. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
15. 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 2019 for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 30 June 2016

For and on behalf of
Taranaki Regional Council

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: Greymouth Petroleum Acquisition Company Limited
PO Box 3394
New Plymouth 4341

Decision Date: 24 July 2014

Commencement Date: 24 July 2014

Conditions of Consent

Consent Granted: To take groundwater from the Matemateaonga Formation for use in enhanced hydrocarbon recovery activities at the Kaimiro-O wellsite

Expiry Date: 01 June 2032

Review Date(s): June 2020, June 2026

Site Location: Kaimiro-O wellsite, 455 Alfred Road, Egmont Village
(Property owner: St Leger Manning Reeves & Robert Baker)

Legal Description: Pt Sec 115-116 Hua & Waiwhakaiho Hun (Site of take)

Grid Reference (NZTM) 1698651E-5663191N

Catchment: Waiwhakaiho

*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 total volume of water taken from the bore shall not exceed 550 cubic metres per day and/or 6.4 litres/second.
2. The bore shall be easily identifiable by permanent labels, which may be welded or engraved on the casing, or on the equivalent fixed part of the bore construction or associated building. The numbering on the label shall be the bore number assigned by the Taranaki Regional Council (GND2456).
3. Prior to exercising this consent the consent holder shall install, and thereafter maintain a water meter and a datalogger at the site of taking. The water meter and datalogger shall be tamper-proof and shall measure and record the rate and volume of water taken to an accuracy of $\pm 5\%$.

Note: Water meters and dataloggers must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters have a limited lifespan.

4. The records of water taken shall:
 - a. be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing;
 - b. specifically record the water taken as 'zero' when no water is taken; and
 - c. for each 12-month period ending on 30 June, be provided to the Chief Executive, Taranaki Regional Council within one month after end of that period.
5. Within 30 days of the installation of a water meter or datalogger, and at other times when reasonable notice is given, the consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that:
 - a. water measuring or recording equipment required by the conditions of this consent has been installed and/or maintained in accordance with the manufacturer's specifications; and/or
 - b. water measuring or recording equipment required by the conditions of this consent has been tested and shown to be operating to an accuracy of $\pm 5\%$.
6. The water meter and datalogger shall be accessible to Taranaki Regional Council officer's at all reasonable times for inspection and/or data retrieval.
7. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.

Consent 5384-2.0

8. At all times the consent holder shall adopt the best practicable option (BPO) to prevent or minimise any actual or likely adverse effect on the environment associated with the abstraction of groundwater, including, but not limited to, the efficient and conservative use of water.
9. This consent shall lapse on 30 September 2019, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
10. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2020 and/or June 2026 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 24 July 2014

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: Bridge Petroleum Limited
General Manager
P O Box 112341
Penrose
AUCKLAND

Change To
Conditions Date: 31 July 2006 [Granted: 10 June 2004]

Conditions of Consent

Consent Granted: To discharge emissions to air during flaring from well workovers, in emergency situations, from a permanent pilot flame and other miscellaneous emissions associated with production activities at the Radnor-B wellsite at or about GR: Q20:192-109

Expiry Date: 1 June 2022

Review Date(s): June 2010, June 2016

Site Location: Radnor-B Wellsite, Radnor Road, Midhirst
[Property owner: AB & LH Crowskey]

Legal Description: Lot 23 DP 18 Sec 47 Manganui Dist Blk XIII Huiroa SD

General conditions

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

Special conditions

Conditions 1 to 12 – unchanged

Information and notification

1. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least one month prior to the establishment of production operations at the Radnor-B wellsite.
2. At least 24 hours prior to any flaring, other than in emergencies, the consent holder shall undertake all practicable measures to notify residents within 1000 metres of the site of the commencement of flaring. The consent holder shall include in the notification a 24-hour contact telephone number for a representative of the consent holder, and shall keep and make available to the Chief Executive, Taranaki Regional Council, a record of all queries and/or complaints received.
3. The consent holder shall, whenever practicable, notify the Chief Executive, Taranaki Regional Council, whenever the continuous flaring of hydrocarbons [other than purge gas] is expected to occur for more than five minutes in duration. Notification shall, as far as practicable, be no less than 24 hours prior to such flaring being commenced.
4. No alteration shall be made to plant equipment or processes which may substantially alter the nature or quantity of flare emissions or other site emissions, including but not limited to the recovery of produced gas, other than as notified in this consent application, without prior consultation with the Chief Executive, Taranaki Regional Council, and the consent holder shall obtain any necessary approvals under the Resource Management Act 1991.

Emissions from the site

5. Other than for the maintenance of a pilot flare flame, the consent holder shall have regard to the prevailing and predicted wind speed and direction at the time of initiation of any episode of flaring or other combustion of hydrocarbons.
6. All gas being flared, at any time must first be treated by effective liquid and solid separation and recovery, as far as is practicable, to ensure that smoke emission during flaring is minimised.
7. If separation cannot be implemented and/or maintained at any time while there is a flow from the well, whether natural or induced, then the consent holder shall notify the Chief Executive, Taranaki Regional Council, and shall in any case re-establish liquid and solid separation and recovery within three hours.
8. Subject to special conditions 6 and 7, no liquid or solid hydrocarbons shall be combusted through the gas flare system other than in an emergency.
9. Only substances originating from the well stream and treated as outlined by conditions 6, 7, 8, and 10 are to be combusted within the flare pit.
10. The consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or potential effect on the environment arising from any emission to air from the flare or any other emissions to air from the Radnor-B wellsite. Any adoption of the best practicable option as outlined in this special condition shall be to the satisfaction of the Chief Executive, Taranaki Regional Council.
11. The consent holder shall not discharge any contaminant to air authorised by this consent at a rate or a quantity such that the contaminant, whether alone or in combination with other contaminants, is or is liable to be hazardous or toxic or noxious at or beyond the boundary of the wellsite, or beyond 100 metres of the flare, whichever distance is greater.
12. There shall not be any offensive odour or smoke, as determined by an enforcement officer of the Taranaki Regional Council, beyond the boundary of the wellsite or beyond 100 metres of the flare, whichever distance is greater, arising from the exercise of this consent.

Condition 13 – changed

13. All hydrocarbon storage vessels shall be fitted with vapour recovery systems as soon as practicable, but no later than 6th May 2007.

Conditions 14 to 24 – unchanged

14. The opacity of any smoke emissions shall not exceed a level of 1 as measured on the Ringelmann Scale for more than four minutes cumulative duration in any 60-minute period.
15. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the flare, whether alone or in conjunction with any other emissions from the wellsite, in order that the maximum ground level concentration of carbon monoxide arising from the exercise of this consent measured under ambient conditions does not exceed 10 mg/m³ [eight-hour average exposure], or 30 mg/m³ one-hour average exposure] at or beyond the boundary of the wellsite or beyond 100 metres from the flare, whichever distance is greater.
16. The consent holder shall control all emissions of nitrogen oxides to the atmosphere from the flare, whether alone or in conjunction with any other emissions from the wellsite, 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 100 micrograms per cubic metre [24-hour average exposure], or 200 micrograms per cubic metre [1-hour average exposure] at or beyond the boundary of the wellsite, or beyond 100 metres from the flare, whichever distance is greater.
17. The consent holder shall control emissions to the atmosphere from the wellsite and flare of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, whether alone or in conjunction with any emissions from the flare, in order that the maximum ground level concentration for any particular contaminant arising from the exercise of this consent measured at or beyond the boundary of the wellsite or beyond 100 metres from the flare, whichever distance is greater, is not increased above background levels:
 - a) by more than 1/30th of the relevant Occupational Threshold Value-Time Weighted Average, or by more than the Short Term Exposure Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour]; or
 - b) if no Short Term Exposure Limit is set, by more than three times the Time Weighted Average at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour].

Recording and reporting information

18. The consent holder shall keep and make available to the Chief Executive, Taranaki Regional Council, upon request, a record of all smoke-emitting incidents noting time, duration and cause.

Consent 6394-1

19. The consent holder shall keep and maintain a log of all continuous flaring incidents longer than five minutes, and any intermittent flaring lasting for an aggregate of ten minutes or longer in any 120-minute period. Such a log shall contain the date, the start and finish times, the quantity and type of material flared, and the reason for flaring. This log shall be made available to the Chief Executive, Taranaki Regional Council, upon request, and summarised annually in the report required under condition 20.
20. The consent holder shall supply to the Taranaki Regional Council each month a copy of flaring information comprising: the type and amount of material flared [including any gas used to maintain a pilot flame], the date this was flared, the reason why flaring was undertaken, and an indication of whether smoke was produced from such flaring events.
21. The consent holder shall provide to the Taranaki Regional Council during May of each year, for the duration of this consent, a report:
 - i) detailing gas combustion in the flare;
 - ii) detailing smoke emissions as required under condition 18;
 - iii) detailing any measures to reduce smoke emissions;
 - iv) detailing any measures to reduce flaring;
 - v) addressing any other issue relevant to the minimisation or mitigation of emissions from the flare;
 - vi) detailing any complaints received and any measures undertaken to address complaints; and
 - vii) reviewing all options and technological advances relevant to the reduction or mitigation of any discharge to air from the site, particularly but without limitation to gas capture and transfer, how these might be applicable and/or implemented at the site, and the benefits and costs of these advances.
22. The consent holder shall make available to the Chief Executive, Taranaki Regional Council, upon request, an analysis of a typical gas and crude oil stream from the field, covering sulphur compound content and the content of carbon compounds of structure C₆ or higher number of compounds.

Lapse and Review

23. This consent shall lapse on the expiry of 16 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.

Consent 6394-1

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

Signed at Stratford on 31 July 2006

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Bridge Petroleum Limited
P O Box 38187
Howick
AUCKLAND

Consent Granted
Date: 10 June 2004

Conditions of Consent

Consent Granted: To take water from the Piakau Stream for hydrocarbon exploration purposes associated with the Radnor-B wellsite at or about GR: Q20:192-109

Expiry Date: 1 June 2022

Review Date(s): June 2010, June 2016

Site Location: Radnor-B Wellsite, Radnor Road, Midhirst
[Property owner: A B & L H Crofskey]

Legal Description: Lot 23 DP 18 Sec 47 Manganui Dist Blk XIII Huiroa SD

Catchment: Patea

Tributary: Piakau South

Consent 6399-1

General conditions

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

Special conditions

1. At all times the consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effects on the environment associated with the abstraction of water from the Piakau Stream, including, but not limited to, the efficient and conservative use of water.
2. The consent holder shall notify the Taranaki Regional Council in writing at least 48 hours prior to any abstraction activity.
3. The volume of water abstracted shall not exceed 100 cubic metres/day at a rate not exceeding 25 litres/second.
4. The abstraction authorised by this consent shall cease when the flow in the Piakau Stream immediately below the abstraction site is less than 45 litres/second.
5. The consent holder shall maintain records of abstraction including date, pumping rates and volume abstracted, and shall make these records available to the Chief Executive, Taranaki Regional Council, upon request.
6. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 3092.
7. The consent holder shall ensure that the intake structure is appropriately screened to avoid the entrainment of freshwater fauna.
8. 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.

Consent 6399-1

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 2010 and/or June 2016, 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 10 June 2004

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Greymouth Petroleum Limited
P O Box 3394
NEW PLYMOUTH 4341

Consent Granted
Date: 12 May 2008

Conditions of Consent

Consent Granted: To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Ngatoro-A wellsite at or about 2611074E-6221732N

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: Ngatoro-A wellsite, Dudley Road, Inglewood
[Property owners: GD & VK Robinson]

Legal Description: Sec 11 Blk VIII Egmont SD

General conditions

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

Special conditions

Information and notification

1. The consent holder shall notify the Chief Executive, Taranaki Regional Council, whenever the continuous flaring of hydrocarbons [other than purge gas] is expected to occur for more than five minutes in duration. Notification shall be no less than 24 hours before the flaring commences. Notification shall include the consent number and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable if the consent holder does not have access to email.
2. At least 24 hours before any flaring, other than in emergencies, the consent holder shall provide notification to all residents within 1000 metres of the site of the commencement of flaring. The consent holder shall include in the notification a 24-hour contact telephone number for a representative of the consent holder, and shall keep and make available to the Chief Executive, Taranaki Regional Council, a record of all queries and complaints received in respect of any flaring activity.
3. No alteration shall be made to plant equipment or processes which may substantially alter the nature or quantity of flare emissions or other site emissions, including but not limited to the recovery of produced gas, other than as authorised by this consent, without prior consultation with the Chief Executive, Taranaki Regional Council.

Emissions from the site

4. Other than for the maintenance of a pilot flare flame, the consent holder shall have regard to the prevailing and predicted wind speed and direction at the time of initiation of, and throughout, any episode of flaring so as to minimise offsite effects.
5. All gas that is flared must first be treated by effective liquid and solid separation and recovery to ensure that smoke emission during flaring is minimised.

Consent 7295-1

6. If separation required by special condition 5 cannot be implemented or maintained at any time while there is a flow from the well, whether natural or induced, then the consent holder shall immediately advise the Compliance Manager, Taranaki Regional Council, and shall in any case re-establish liquid and solid separation and recovery within three hours.
7. Subject to special condition 6, no liquid or solid hydrocarbons shall be combusted through the gas flare system, other than in an emergency.
8. The consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or potential effect on the environment arising from any emission to air from the flare or any other emissions to air from the Ngatoro-A wellsite [including use of a separator during well clean-up].
9. Only substances originating from the well stream and treated as outlined by conditions 5, 6, 7, and 8 shall be combusted within the flare pit.
10. There shall not be any offensive odour or smoke, as determined by an enforcement officer of the Taranaki Regional Council, at or beyond the boundary of the property where the wellsite is located.
11. All hydrocarbon storage vessels shall be fitted with vapour recovery systems.
12. The opacity of any smoke emissions shall not exceed a level of 1 as measured on the Ringelmann Scale.
13. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the flare so that, whether alone or in conjunction with any other emissions from the wellsite, the maximum ground level concentration of carbon monoxide arising from the exercise of this consent measured under ambient conditions does not exceed 10 milligrams per cubic metre [mg/m^3] [eight-hour average exposure], or 30 mg/m^3 one-hour average exposure] at or beyond the boundary of the property where the wellsite is located.
14. The consent holder shall control all emissions of nitrogen oxides to the atmosphere from the flare so that, whether alone or in conjunction with any other emissions from the wellsite, the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 100 micrograms per cubic metre [$\mu\text{g}/\text{m}^3$] [24-hour average exposure], or 200 $\mu\text{g}/\text{m}^3$ [1-hour average exposure] at or beyond the boundary of the of the property where the wellsite is located.
15. The consent holder shall control emissions to the atmosphere, from the production station and flare, of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides so that, whether alone or in conjunction with any other emissions from the production station, is not hazardous or toxic or noxious at or beyond the boundary of the property.

Consent 7295-1

16. The consent holder shall control emissions to the atmosphere from the wellsite and flare of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides so that, whether alone or in conjunction with any emissions from the flare, the maximum ground level concentration for any particular contaminant arising from the exercise of this consent measured at or beyond the boundary of the property where the wellsite is located, is not increased above background levels:
- a) by more than 1/30th of the relevant Occupational Threshold Value-Time Weighted Average, or by more than the Short Term Exposure Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour]; or
 - b) if no Short Term Exposure Limit is set, by more than three times the Time Weighted Average at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour].

Recording and reporting information

17. The consent holder shall make available to the Chief Executive, Taranaki Regional Council, upon request, an analysis of a typical gas and condensate stream from the field, covering sulphur compound content and the content of carbon compounds of structure C₆ or higher number of compounds.
18. Each time there is visible smoke as a result of the exercise of this consent, the consent holder shall record the time, duration and cause. The consent holder shall make the record available to the Chief Executive, Taranaki Regional Council, upon request.
19. The consent holder shall record and maintain a log of all continuous flaring events longer than five minutes duration, and any intermittent flaring lasting for an aggregate of ten minutes or longer in any 120-minute period. The log shall contain the date, the start and finish times of the flaring event, the quantity and type of material flared, and the reason for flaring. The log shall be made available to the Chief Executive, Taranaki Regional Council, upon request, and summarised annually in the report required under condition 20.
20. The consent holder shall provide to the Taranaki Regional Council during May of each year, for the duration of this consent, a report:
- i) detailing any energy efficiency measures implemented on the site;
 - ii) detailing smoke emissions as required under condition 18;
 - iii) detailing any measures undertaken or proposed to reduce smoke emissions;
 - iv) detailing any measures undertaken or proposed to reduce flaring;
 - v) addressing any other issue relevant to the minimisation or mitigation of emissions from the flare;
 - vi) detailing any complaints received and any measures undertaken to address complaints; and
 - vii) reviewing all options and technological advances relevant to the reduction or mitigation of any discharge to air from the site, how these might be applicable and/or implemented at the site, and the benefits and costs of these advances.

Lapse and Review

21. This consent shall lapse 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.
22. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent within six months of receiving a report prepared by the consent holder pursuant to condition 20 of this consent, and/or by giving notice of review during the month of June 2015 and/or June 2021, for any of the following purposes:
 - a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered or which it was not appropriate to deal with at the time;
 - b) requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge;
 - c) to alter, add or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant;
 - 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 gases which are products of combustion, and which is relevant to the air discharge from the Ngatoro-A wellsite.

Signed at Stratford on 12 May 2008

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Greymouth Petroleum Central Limited
PO Box 3394
Fitzroy
New Plymouth 4341

Decision Date
(Change): 2 November 2018

Commencement Date
(Change): 2 November 2018 (Granted Date: 1 September 2014)

Conditions of Consent

Consent Granted: To discharge treated stormwater from hydrocarbon exploration and production operations at the Radnor-B wellsite through a roadside drain into an unnamed tributary of the Piakau Stream

Expiry Date: 1 June 2028

Review Date(s): 2-yearly intervals

Site Location: Radnor-B wellsite, 15 Radnor Road, Midhirst
(Property owner: Airport Farm Trustee Limited)

Grid Reference (NZTM) 1709334E-5649159N

Catchment: Patea

Tributary: 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 actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.
2. The wellsite pad shall be no greater than 2 hectares.
3. At least 5 working days prior, the consent holder shall advise the Chief Executive, Taranaki Regional Council of the date of each of the following events:
 - a) commencement of any site works (site works includes the introduction of a drilling rig, drilling equipment or any other associated equipment or facilities to the site for any purpose other than for the construction of the site);
 - b) commencement of any well drilling operation; and
 - c) recommencement of any site works or drilling operations following a period of inactivity exceeding 30 days.

If any of these events is rescheduled or delayed, the consent holder shall immediately provide further notice advising of the new date.

Any advice given in accordance with this condition shall include the consent number and the wellsite name and be emailed to worknotification@trc.govt.nz.

4. The consent holder shall maintain and regularly update a 'Contingency Plan' that details measures and procedures that will be undertaken in the event of spillage or discharges not authorised by this consent, including any discharge that contains stormwater that has flowed onto the wellsite from adjacent paddocks. The plan and any amended versions shall be provided to the Chief Executive, Taranaki Regional Council.
5. Subject to the other conditions of this consent the design, management and maintenance of the stormwater system shall be undertaken in accordance with the information submitted in support of the original application and any subsequent application to change the conditions of the consent, including;
 - the '*Stormwater Design Report for Radnor wellsite*' submitted with the original application, dated 31 July 2014; and
 - the '*Assessment of Environmental Effects*' (AEE) submitted with the original application, dated 31 July 2014.

Consent 9966-1.1

6. The consent holder shall take all reasonable steps to prevent stormwater from entering the well site from, the adjacent land, including undertaking the work shown in Appendix 1.
7. All discharges from the site, excluding the stormwater from the bunded areas in the production facility, shall flow to a perimeter drain and skimmer pit. Perimeter drains shall be designed, including by having a positive grade and low permeability, to ensure that runoff flows directly to a skimmer pit without ponding.
8. Skimmer pits shall have a combined capacity of no less than 112.5 m³ including a 'freeboard' of no less than 146.5 m³, and be designed to retain any hydrocarbons that enter them.
9. All skimmer pits and any other stormwater retention areas shall be lined with an impervious material to prevent seepage through the bed and sidewalls, and all skimmer pits shall have a valve that can be shut off to prevent any discharge from the site.
10. Perimeter drains and skimmer pits necessary to comply with the conditions of this consent shall be installed before any site works commences. Site works includes the introduction of a drilling rig, drilling equipment or any other associated equipment or facilities to the site for any purpose other than for the construction of the site.
11. Subject to condition 12 the constituents in the discharge shall meet the standards shown in the following table.

Constituent	Standard
pH	Within the range 6.0 to 9.0
suspended solids	Concentration not greater than 100 gm ⁻³
total recoverable hydrocarbons	Concentration not greater than 15 gm ⁻³ (as determined by infrared spectroscopic technique)
chloride	Concentration not greater than 230 gm ⁻³

This condition shall apply immediately after the skimmer pit at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

12. The pH may exceed 9.0 if the exceedance is a result photosynthetic activity within the skimmer pits, but in any case the discharge shall not result in the pH of the receiving water increasing by more than 0.5 pH units after allowing for a mixing zone of 25 metres determined from (NZTM) 1710199E-5648843N.
13. After allowing for a mixing zone of 25 metres, determined from (NZTM) 1710199E-5648843N, the discharge shall not cause any of the following effects in the receiving water:
 - a) an increase in the temperature of more than 2 degrees Celsius;
 - b) the filtered carbonaceous biochemical oxygen demand to exceed 2 gm⁻³; or
 - c) the chloride concentration to exceed 50 gm⁻³.

Consent 9966-1.1

14. After allowing for a mixing zone of 25 metres, determined from (NZTM) 1710199E-5648843N, the discharge shall not give rise to any 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.
15. The consent holder shall advise the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the reinstatement of the site and the reinstatement shall be carried out so as to minimise adverse effects on stormwater quality. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
16. This consent shall lapse on 30 September 2019, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
17. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review at 2-yearly intervals, 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 2 November 2018

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Appendix 1

