Cheal Petroleum Ltd
Cheal Production Station
Monitoring Programme
Annual Report
2023/24
Technical Report 2024-52

Taranaki
Regional Council

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Taranaki Regional Council
Private Bag 713
Stratford

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Executive summary

Cheal Petroleum Ltd (the Company), a subsidiary of Matahio Energy Ltd, operates a hydrocarbon production station located on Mountain Road at Ngaere, in the Waingongoro catchment and in the Ngāti Ruanui rohe. The Cheal Production Station receives hydrocarbon products via pipelines from the Cheal group of wellsites for treatment to oil and gas specifications for supply. This report for the period July 2023 to June 2024 details the monitoring programme administered by Taranaki Regional Council (the Council) to assess the Company's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of the Company's activities.

During the monitoring period, Cheal Petroleum Ltd demonstrated a high level of environmental performance and high level of administrative performance.

The Company holds three resource consents in relation to the Cheal Production Station, which include a total of 42 conditions setting out the requirements that the Company must comply with. The Company holds one consent to take and use groundwater for water flooding purposes, one consent to discharge stormwater and treated wastewater onto land in circumstances where it may enter an unnamed tributary of the Mangawharawhara Stream, and one consent to discharge contaminants to air from activities at the site. The Council's monitoring programme for the year under review included four inspections of the production station, six water samples collected for physicochemical analysis, and an ambient air quality survey. The Company provided data for their groundwater abstraction and natural gas flaring.

The Company's network of five wellsites which supply hydrocarbons to the production station collectively have nine resource consents for discharges of contaminants to air, discharges of treated stormwater and production water to land or waterways, and to take groundwater from the Mangawharawhara Stream. The wellsites are inspected annually but no environmental sampling is undertaken due to the relatively small scale of the activities.

Inspections of the stormwater management systems at all sites found that they were generally well maintained and at the time there was no visible effect on waterways from the discharges. The results of samples from the combined stormwater and production water discharge at the production station were much lower than the water quality limits set out in the consents. Further, the results of the tributary samples indicate that contaminants in the discharges from the site are not likely to be having significant adverse effects on the water quality.

Monitoring of the ambient air quality in the vicinity of the Cheal Production Station found that concentrations of hazardous air pollutants were low, and overall discharges from the site are not likely to be having a significant adverse effect on local air quality. The volume of natural gas discharged by non-routine flaring was greater than the previous two years although this was largely due to mechanical failure of the nitrogen unit and a delay to its replacement.

For reference, in the 2023/24 year, consent holders were found to achieve a high level of environmental and administrative performance for 864 (89%) of the 967 consents monitored through the Taranaki tailored monitoring programmes, while for another 75 (8%) of the consents a good level of environmental performance and compliance was achieved. A further 26 (3%) of consents monitored required improvement in their performance, while the remaining two (<1%) achieved a rating of poor.

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

This report includes recommendations for the 2024/25 year in section 4.

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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 2023 to June 2024 by Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Cheal Petroleum Ltd (the Company). The Company operates a hydrocarbon production station on Mountain Road at Ngaere, in the Waingongoro catchment and in the Ngāti Ruanui iwi rohe.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by the Company that relate to abstractions and discharges of water within the Waingongoro catchment, and the air discharge consent which authorises emissions to air from the site. This report is the 14th annual report to be prepared by Council for the Cheal Production Station.

1.1.2 Structure of this report

Section 1 of this report sets out general information about:

- consent compliance monitoring under the *Resource Management Act 1991* (RMA) and the Council's obligations;
- the Council's approach to monitoring sites though annual programmes;
- the resource consents held by the Company in the Waingongoro catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted in the Company's site/catchment.

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

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

Section 4 presents recommendations to be implemented in the 2024/25 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 consents, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' in as much as is appropriate for each activity. Monitoring programmes are not only based on existing consent 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 use, to move closer to achieving sustainable development of the region's resources.

1.1.4 Evaluation of environmental performance

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

For reference, in the 2023/24 year consent holders were found to achieve a high level of environmental performance and compliance for 864 (89%) of the 967 consents monitored through the Taranaki tailored monitoring programmes, while for another 75 (8%) of the consents a good level of environmental performance and compliance was achieved. A further 26 (3%) of consents monitored required improvement in their performance, while the remaining two (<1%) achieved a rating of poor.

1.2 Location and process description

The Cheal Production Station is approximately 4km south of Stratford on Mountain Road (State Highway 3). The operational area is 21.2ha and located on a rural property surrounded by pasture. The nearest residential houses are 300m to the west-southwest. A tributary joins the site at the northern boundary and passes through a paddock before being diverted through a culvert under Mountain Road. The tributary joins with the Mangawharawhara Stream approximately 550m to the south.

The Cheal-A wellsite was first established on Mountain Road at Ngaere by NZOG Services Ltd in 1995. Austral Pacific developed the neighbouring Cheal-B wellsite in July 2006 and started construction of the Cheal Production Station adjacent to the Cheal-A wellsite in late 2006. The production station was commissioned in August 2007 and the tie-in to the Cheal-B pipeline was complete in December 2007.

The owners of the Cheal facilities, including Austral Pacific Energy (NZ) Ltd, were placed in receivership in April 2009. The consents were transferred to Cheal Petroleum Ltd in October 2009. The production station continued to operate during this transition. Consents for Austral Pacific's Cardiff wellsite on Brookes Road were transferred to Cheal Petroleum in December 2010 and this site is now known as Cheal-C. Cheal Petroleum Ltd is now a subsidiary of Matahio Energy Ltd

Consents were granted to Cheal Petroleum for construction of three additional exploration wellsites in the area, Cheal-D, Cheal-E and Cheal-G. Construction and commissioning of a multiphase pipeline from Cheal-E to the production station was undertaken during the 2014/15 monitoring year.

The Cheal Production Station receives hydrocarbon products via pipelines from the Cheal group of wellsites for processing to oil and gas specifications for supply. Some gas is used to power the site processes and to generate electricity for supply. Construction of a new gas processing plant and pipelines was completed in the 2012/13 year to process raw inlet gas to New Zealand gas specifications for delivery on the First Gas

pipeline system for domestic use. Stormwater and production water from the Cheal-A wellsite and production station operational area is collected in a large skimmer pit at the northwest corner of the site prior to discharge into a tributary of the Mangawharawhara Stream (Figure 1).

Intentional flaring of wellstream gas is conducted under circumstances such as well maintenance, shutdowns and mechanical failures. Flaring takes place in a flare pit on the eastern boundary (Figure 1).

Photo 1 Cheal Production Station

1.3 Resource consents

1.3.1 Cheal-A wellsite and production station

The Company holds three resource consents for discharges from the Cheal-A wellsite and the production station which are co-located, the details of which are summarised in the table below. Summaries of the conditions attached to each consent are set out in Section 3.3 of this report. A summary of the various consent types issued by the Council is included in Appendix I, as are copies of all consents held by the Company during the period under review.

Table 1 Consents relating to the Cheal Production Station

Consent number	Purpose	Granted	Review	Expires
4727-2	To discharge treated stormwater and produced water from hydrocarbon exploration and production operations at the Cheal-A wellsite and Cheal Production Station, onto and into land in circumstances where it may enter an unnamed tributary of the Mangawharawhara Stream	Nov 2011	-	June 2029
7906-1	To discharge emissions into the air during flaring and to discharge miscellaneous emissions from tank vents and generators arising from hydrocarbon production activities including emergency situations and well workovers at the Cheal-A wellsite and Cheal Production Station	Nov 2011	-	June 2029
10290-1	To take and use groundwater, including the incidental take of geothermal heat and energy, for water flooding purposes	Sep 2016	June 2029	June 2035

1.3.2 Wellsites

The Company also holds consents for five offsite exploration and hydrocarbon producing at wellsites and wellheads associated with the production station. A summary of these consents is provided in Table 2 below.

Table 2 Consents relating to activities at wellsites associated with Cheal Production Station

Wellsite	Consent number	Purpose	Issue date	Expiry
Cheal-B	**6814-1**	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Cheal-B wellsite	23/3/2006	2022*
	6815-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Cheal-B wellsite onto and into land in the vicinity of the Ngaere Stream in the Patea catchment	23/3/2006	2022*
Cheal-C	**6403-1.2**	To discharge treated stormwater, treated produced water and treated wastewater at the Cheal-C wellsite onto and into land in the vicinity of an unnamed tributary of the Mangawharawhara Stream in the Waingongoro catchment	22/7/2004	2023*
	7780-2	To take and use water from an unnamed tributary of the Mangawharawhara Stream for hydrocarbon exploration activities at the Cheal-C wellsite	22/7/2014	2029
	9262-1	To discharge emissions to air associated with production activities from up to 10 wells at the Cheal-C wellsite, including: flaring associated with emergencies (including operational emergencies) and maintenance; emissions from gas treatment or production plants; and minor emissions from other miscellaneous activities	11/6/2012	2029
Cheal-D	**9534-1**	To discharge emissions to air associated with hydrocarbon producing wells at the Cheal-D wellsite	5/6/2013	2028
	9535-1	To discharge treated stormwater, treated surplus drilling water and treated produced water from hydrocarbon exploration and production operations at the Cheal-D wellsite, onto land and into an unnamed tributary of the Kahikatea Stream	2/4/2013	2028
Cheal-E	**9549-1**	To discharge emissions to air associated with hydrocarbon producing wells at the Cheal-E wellsite	1/11/2013	2028
Cheal-E	**9550-1**	To discharge treated stormwater, treated surplus drilling water and treated produced water from hydrocarbon exploration and production operations at the Cheal-E wellsite, onto land and into an unnamed tributary of the Ngaere Stream	6/5/2013	2028

* Consent continues to operate under s124 of RMA

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the RMA imposes obligations on 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 on 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 Production Station site consisted of three primary components.

1.4.2 Programme liaison and management

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

- liaison with the Company about consent conditions, their interpretation and application;
- discussion about monitoring requirements;
- preparing for consent reviews, replacements or new consent applications;
- advice about the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.4.3 Site inspections

Four inspections of the Cheal Production Station and one of the associated wellsites were conducted during the monitoring period. With regard to consents for discharges to land or water the main points of interest were plant processes that generate contaminated water, the stormwater management system, the skimmer pits and a visual inspection of discharges if they were occurring. The inspections also observed plant processes which have air discharges, as well as noting any odour, dust, noxious or offensive emissions. Data which the company is required to collect were submitted during the monitoring year or were requested by Council.

1.4.4 Environmental sampling

Monitoring of the combined production water and stormwater discharge and the Mangawharawhara Stream tributary is undertaken by Council to assess compliance with conditions of the Company's resource consents, and to assess water quality in general. Water quality samples were collected from the combined discharge and two locations in the tributary in September 2023.

The Council undertakes instrumental monitoring of air quality around the site to assess compliance with air discharge Consent 7906-1 and to assess air quality in general. Instrumental monitoring of air quality at the boundary of the site was conducted this year. In November monitoring of ambient gas levels was undertaken using a Rae Systems MultiRae multi-gas meter for 24 hours near the flare pit. A TSI Dusttrak was co-located with the MultiRae and monitored ambient particulate concentrations for eight hours. In January 2024 two UMEX-200 passive samplers were deployed for 21 days to measure ambient concentrations of NO_x.

2. Results

2.1 Inspections

Inspections of the Cheal Production Station and associated wellsites were carried out on four occasions in the 2023/24 year.

16 August 2023

The sites inspected were Cheal-A, -B, -C, -D, -E, -G. The inspections were carried out over one day. It was fine at the time of inspection. In general the sites were tidy and clean with minimal activity occurring. The sites were being maintained with weed spraying and grass cutting evident. The majority of ring drains were vegetated with grasses that helped with controlling and treating sediment laden stormwater. Hydrocarbon sheen was not observed within the skimmer pits or in puddles on any of the sites. The majority of skimmer pits were all in good order with goose neck pipes functioning as required. The turbidity of the pits varied from slightly turbid to clear. The majority of the discharges were onto land before flowing to surface water. No effects were noted in the grass (such as burnt patches or dead grass) or within the streams.

The wellhead has been removed from Cheal-D, Cheal-G had been returned to pasture. At Cheal-B the inspector noted some staining around the compressor shed which had tracked toward the ringdrain. The operator was advised that this should be investigated and remedied. When inspecting the Wingrove wellsite the inspector expressed concerns about a discharge from a valve directly onto a grating and into the cellar below. The operator was advised to clean it up and prevent it occurring again.

25 October 2023

A compliance monitoring inspection of Cheal-A and the Production Station was carried out to check for compliance with resource consent conditions. Activities associated with stormwater management such as appropriate bunding, as well as air discharge quality were assessed. Those conditions that were assessed were found to be compliant, with no issues noted.

14 May 2024

The sites were found to be compliant with the relevant consent conditions at the time of inspection.

At Cheal-A the workshop area was clean and tidy with everything contained on the pad. Covers were being used over drums/bunds out on site. The skimmer pit looked normal with no sheens noted. There were issues with the nitrogen unit and flaring volumes were more than normal. Some smoke was noted but it quickly dissipated. Temporary slop tanks that had been in use have been replaced with a permanent tank within a bund. Works were being carried out to the HS 2 tank. Two buckets were on the ground and some spillage had occurred. It was noted that this spillage had been wiped under the unit, rather than picked up and removed. Adjacent to this was an IBC on top of temporary piping. This IBC contained product and was not bunded. The operator was advised to replace it with water.

At Cheal-B good erosion and sediment controls were in place following works to unearth pipeline and make repairs. The majority of the bank was covered with coconut matting, good pasture strike was observed. Silt cloth had been placed at the base of the bank, and coconut matting lined the stream bank.

The skimmer pits at Cheal-E had been upgraded and the level was now sitting at the normal height. Weed spraying had occurred in some of the ring drain and onsite. Some staining noted below E6 although only minor. Other minor stains noted around site. Advised staff of a stain under the pipe rack near E5. They weren't aware of it and advised they would check it out. Pump 2 had been removed from site. The operator

was advised that it would be a great opportunity to remove staining below and around the area where the pump sits.

25 June 2024

The inspection of Cheal-A & -E Production Station found that all consent conditions that were assessed were compliant at the time of inspection. No issues were noted.

2.2 Water

2.2.1 Combined discharge monitoring

Figure 1 Location of the water quality monitoring sites

Water quality sampling of the combined treated stormwater and production water discharge from the Production Station and Cheal-A wellsite was conducted on 7 September 2023 following heavy rain. The location of the sampling site (IND001056) is shown in Figure 1. The outfall is from a novaflow pipe into a swale which joins the tributary to the west of the site.

Resource Consent 4727-2 imposes limits on the several parameters of the combined discharge to minimise adverse effects on the receiving waterways. The survey results show the discharge was in compliance with the limits at these time of sampling (Table 3). The chloride concentration was 3.7 grams per cubic metre (g/m^3), much lower than the consent limit of $50g/m^3$, while the suspended solids result was $4g/m^3$ which is significantly lower than the limit of $100g/m^3$. Additionally, no hydrocarbons were present above the laboratory level of detection.

The range of results for all parameters over a 5 year period (2019-2024) is presented in Table 3. All results have complied with their relevant consent limits during that period. Chloride concentrations have been below 40 percent (%) of the consent limit, and the highest suspended solids result was 27% of the consent limit. Notably, the laboratory analysis for hydrocarbons has never returned detectable levels.

Table 3 Results of the combined discharge monitoring from the Cheal Production Station

Parameter	Units	07 September 2023	5 year range	Consent limits
Chloride	g/m^3	3.7	1.1-17.4	50
Conductivity @ 25°C	mS/m	4.4	1.7-13.5	-
Hydrocarbons	g/m^3	<0.7	<0.7	15
pH		6.0	6-6.9	6.0 – 9.0
Suspended solids	g/m^3	4	4-27	100
Temperature	°C	12.5	9.8-16	-
Turbidity	FNU	3.6	1.27-17.3	-

2.2.2 Receiving environment monitoring

Water quality sampling of two locations in the tributary was undertaken within 10 minutes of the sample from the combined discharge. Monitoring site MWW000237 (Figure 1) is a pond overflow from the neighbouring property which enters the tributary before the combined discharge. Monitoring site MWW000238 (Figure 1) is located several tens of metres from the where the combined discharge enters the tributary and the differences between the results indicates the effects of the discharge.

Consent 4727-2 limits the temperature difference between upstream and downstream of the discharge to 2 degrees Celsius (°C). During this year's survey the temperature difference was -0.1°C. There was only a slight variation in the other parameters. The greatest difference was in the suspended solids results which were 7g/m^{3}at the upstream location and 10g/m^3 at the downstream location, a difference of 3g/m^3. The difference is likely accounted for by the suspended solids in the stormwater discharge which was 4g/m^3.

The consent also places limits on values such as colour and visual clarity, presence of floatable or suspended material, objectionable odour or effect on aquatic life. None of these effects were observed during the inspection.

Table 4 also includes the range of results for the last five years of monitoring. Overall, the differences in the results from each site during that period are small, the greatest difference being in the maximum turbidity values with a difference of 2.1 Formazin Nephelometric Units (FNU). Further, the maximum results are below any human health or ecotoxic thresholds.

Table 4 Results of the tributary water quality monitoring

Parameter	Date	7 September 2023		5 year range	
	Units	Upstream (MWW000237)	Downstream (MWW000238)	Upstream (MWW000237)	Downstream (MWW000238)
Chloride	g/m^3	12.7	12.9	11-14.8	10.5-15
Conductivity @ 25°C	mS/m	12.8	12.9	11-14.8	10.6-14.5
Hydrocarbons	g/m^3	<0.7	<0.7	<0.7	<0.7
pH		7.0	6.9	6.8-7.5	6.8-7.3
Suspended solids	g/m^3	7	10	3-10	4-10
Temperature	°C	13.3	13.2	10.1-17.5	10.2-17.4
Turbidity	FNU	4.8	3.8	2.4-15	3.1-12.9

2.2.3 Groundwater abstraction

Consent 10290-1.1 authorises the abstraction of groundwater for the purposes of water flooding, and the company also uses groundwater for wellsite and production needs. The abstraction rate is restricted to 8 litres per second (L/s) and the maximum daily abstraction volume is limited to 800m³.

As shown in Figure 2 and Figure 3 groundwater abstraction during the 2023/24 period was less than the relevant limits. Daily abstraction did not exceed 400m³, 50 % of the limit, and the abstraction rate was not greater than 6L/s, or 75% of the limit.

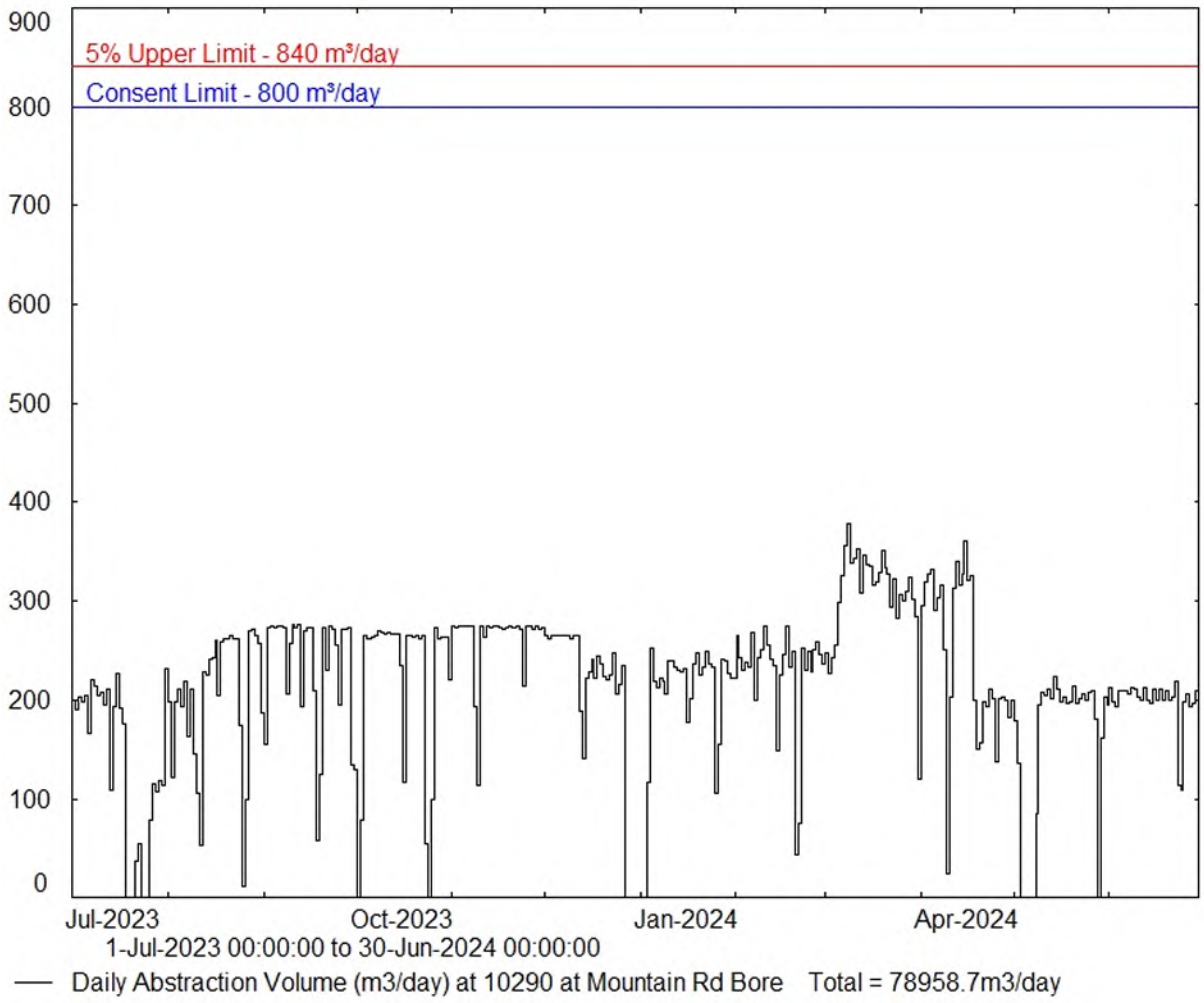

Figure 2 Daily groundwater abstraction volume at Cheal Production Station 2023/24

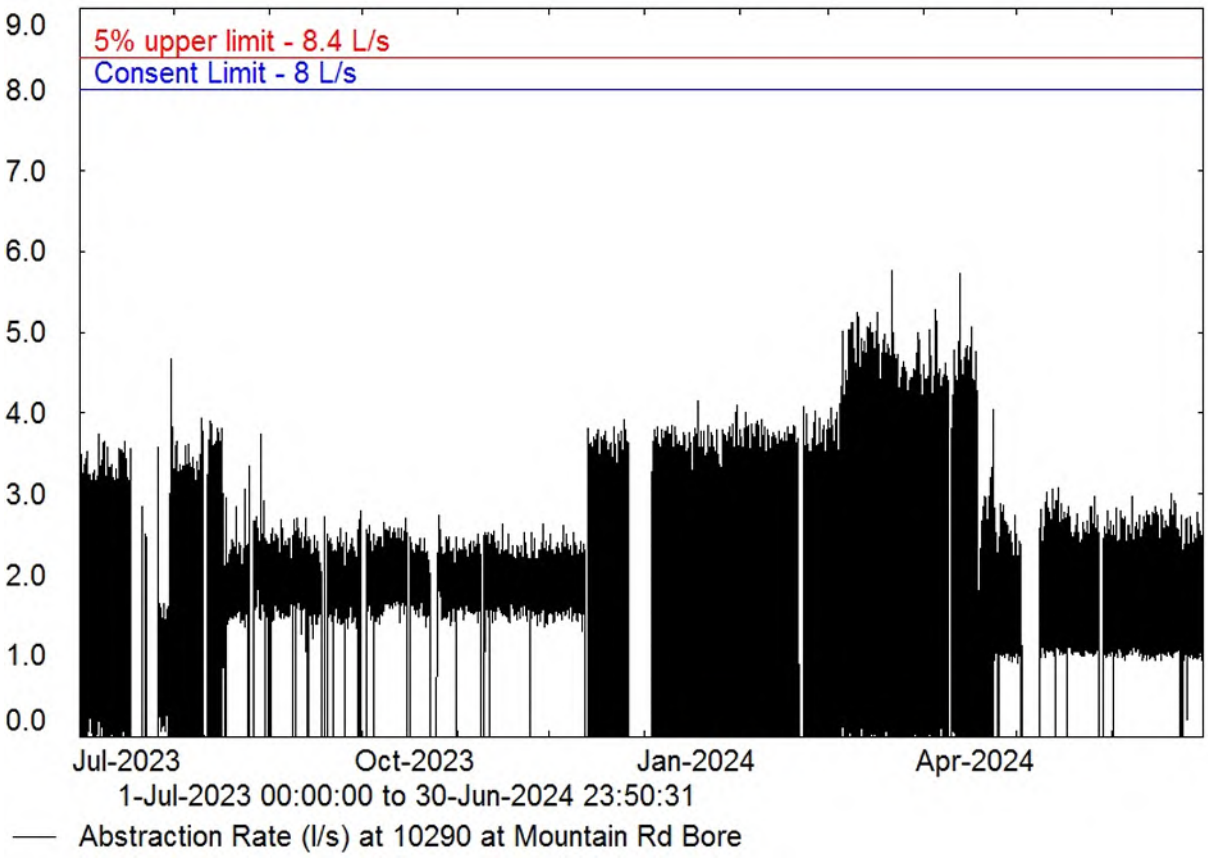

Figure 3 Groundwater abstraction rate at Cheal Production Station 2023/24

2.3 Air

2.3.1 Receiving environment monitoring

There was no flaring of wellstream gas during the deployments of monitoring instruments so any contributions to air quality are likely from fugitive plant emissions, unsealed surfaces, vehicle emissions and rural activities surrounding the site.

Carbon monoxide and combustible gases

Exposure to low levels of CO can cause nausea, dizziness, and disorientation. Higher levels of CO can cause coma, collapse and loss of consciousness. The National Environmental Standards for Air Quality (NES: AQ, MfE, 2004) includes an Ambient Air Quality Standard (AAQS) for exposure to CO of 10 milligrams per cubic metre (mg/m^3) averaged over an 8 hour (hr) period. Lower Explosive Limit (LEL) is the concentration of flammable gas, vapour, or mist in ambient air, below which an explosive gas atmosphere will not be formed. In past years methane has been used as a proxy for LEL and is measured using the MultiRae.

During this monitoring year a MultiRae gas detector was deployed on 29 November 2023 and recovered approximately 24 hours later. There was no flaring of wellstream gas during the deployment however, there may be fugitive emissions from equipment. During the deployment the concentration of CO and LEL recorded by the instrument did not exceed zero at any time.

This may be due to:

- Absence of or minimal emissions from the site
- Equipment malfunction
- Unfavourable wind conditions

The consent conditions for air discharges from the Cheal Production Station have specific limits related to particular gases. Special condition 9 of Consent 7906-1 requires the consent holder to not exceed relevant AAQS beyond the production station's boundary. The limit on carbon monoxide is expressed as 10mg/m³ for an eight hour average exposure. Annual monitoring over the past nine years (2015-2024) has shown a range in the maximum concentration of carbon monoxide between 1.03 and 10.4mg/m³. The average concentration has ranged between 0.06 and 0.52mg/m³, all of which complied with consent conditions. During the last deployment in 2022 the instrument recorded methane at 0% of the LEL. This record of low results is to be expected given that methane will likely readily disperse over the distance between the source and the instrument.

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 during monitoring carried out over the previous eight years did the level of explosive gases downwind of the Cheal Production Station reach any more than a trivial level.

All historical CO and percentage LEL results have been significantly lower than the relevant human health-based limits, and there have not been any significant changes to activities on site. On this basis it is unlikely that the concentration of CO and percentage LEL at the monitoring site during this monitoring year would be significantly different than last year.

PM_{10} particulate

Particulate matter with an aerodynamic diameter of 10 micromillimeters (µm) or smaller (PM_{10}) can enter deep into the lungs significantly reducing the exchange of gases across the lung walls. Inhalation of PM_{10} at high concentrations can cause cardiovascular conditions such as asthma and chronic pulmonary diseases. Particulate matter smaller than 2.5µm can penetrate the lungs and enter the bloodstream.

PM_{10} is derived from multiple natural and anthropogenic sources including vehicle emissions, crustal matter and the combustion of fossil fuels. The Cheal Production Station is located in a rural area and the background level of PM_{10} is likely to be a result of emissions from vehicles using State Highway 3, dust from unsealed roads, and other rural activities such as fertiliser application.

A DustTrak instrument was co-located with the MultiRae during the November 2023 survey and the results of the particulate monitoring survey are presented in Table 5 below. The maximum (five minute average) PM_{10} concentration was 358 micrograms per cubic metre (µg/m³) and the 99th percentile (%ile) was 354µg/m³. The maximum $PM_{2.5}$ result was 330µg/m³ and the 99%ile was 327µg/m³. These results are an order of magnitude higher than the results from any other monitored site and on this basis it's likely that they are an error. For comparison, in 2021 the 24-hour average particulate concentrations were measured at between 3.2 and 7.4µg/m³. At Sidewinder production station during this monitoring year the 99%ile of PM_{10} and $PM_{2.5}$ concentrations was 13.8µg/m³.

Table 5 Results of particulate monitoring 29 November 2023

Pollutant	Maximum (µg/m³)	99%ile (µg/m³)	Average (µg/m³)
PM_{10}	358	354	152
$PM_{2.5}$	330	327	141

The AAQS for PM_{10} is 50µg/m³ (averaged over a 24hr period) and the World Health Organisation guideline value is 15µg/m³ (averaged over a 24hr period). The results reported during this year's monitoring are approximately 20 times higher than these criteria. At these concentrations any people in the vicinity may have experienced acute effects. The Company advised that there was no flaring during the deployment and nothing unusual was reported at the time.

Nitrogen oxides

A portion of total NO_x includes nitrogen dioxide (NO_2) which can cause adverse health impacts as a result of short and long-term exposure durations. Short-term exposure to high concentrations can result in the inflammation of airways which may exacerbate asthma and other pre-existing respiratory problems. Long-term exposure to NO_2 may adversely impact lung development in children, and may lead to the development of asthma. The risk of developing certain forms of cancer and premature death also increases with long-term exposure to NO_2. The AAQS for NO_2 of 200µg/m³ as a 1-hour average. A non-statutory guideline value of 100µg/m³ as a 24-hour average is also provided in the Ambient Air Quality Guidelines (AAQG, MfE, 2002).

The NO_x data are used as a proxy for NO_2 and the calculated TWAs are compared to the relevant health-based assessment criteria for NO_2 in Table 6 below.

Table 6 Lab data and calculated TWA (<=less than the limit of detection)

Monitoring site	NO_x result (µg)	NO_x 1-hr average (µg/m³)	NO_x 24-hr average (µg/m³)
AIR007831	<0.3	1.04	0.55
AIR007832	<0.3	1.04	0.55
NO_2 Assessment criteria		**200 (AAQS)**	**100 (AAQG)**

As shown in Table 6 the quantity of NO_x present on the passive samplers was below the level that can be reliably measured by the laboratory. Based on these results the calculated 1-hr average concentration of NO_x was a maximum of 1.04µg/m³ at each location. This result is significantly lower than the NO_2 AAQS limit of 200µg/m³. It is also the second lowest recorded results at this location since monitoring started in 2012. Similarly, the 24-hr average concentration at each of the monitoring locations was a maximum of 0.55µg/m³. This result is significantly lower than the AAQG of 100µg/m³.

Only a portion of NO_X is NO_2 and therefore the actual concentration of NO_2 at the monitoring locations will be somewhat less than reported. The 1-hr and 24-hr results are likely to be representative of background concentrations in rural areas.

2.3.2 Volume of gas flared

Routine operational flaring of process gas at Production Station is continuous and occurs under normal conditions in a low pressure flare. Non-routine flaring of wellstream gas may be required under certain circumstances and the Company is required to report this to the Council on a monthly basis. In March 2024 the Company reported that a nitrogen unit had failed and consequently the site had to continuously flare wellstream gas until 5 June 2024.

This year, the Company reported 103 flaring incidents, mostly due to mechanical failure, process upset or plant shut down. The cumulative duration of flaring was 1349 hours and 4.85% of the incidents resulted in visible smoke emissions. No smoke-related complaints were received from the public.

A summary of the monthly non-routine flaring volumes at Cheal Production Station is provided in Figure 4. The highest monthly volume of gas flared was 205,000m³ in October due to a facility shutdown and mechanical failures. This was approximately 25% of the gas flared during the monitoring year.

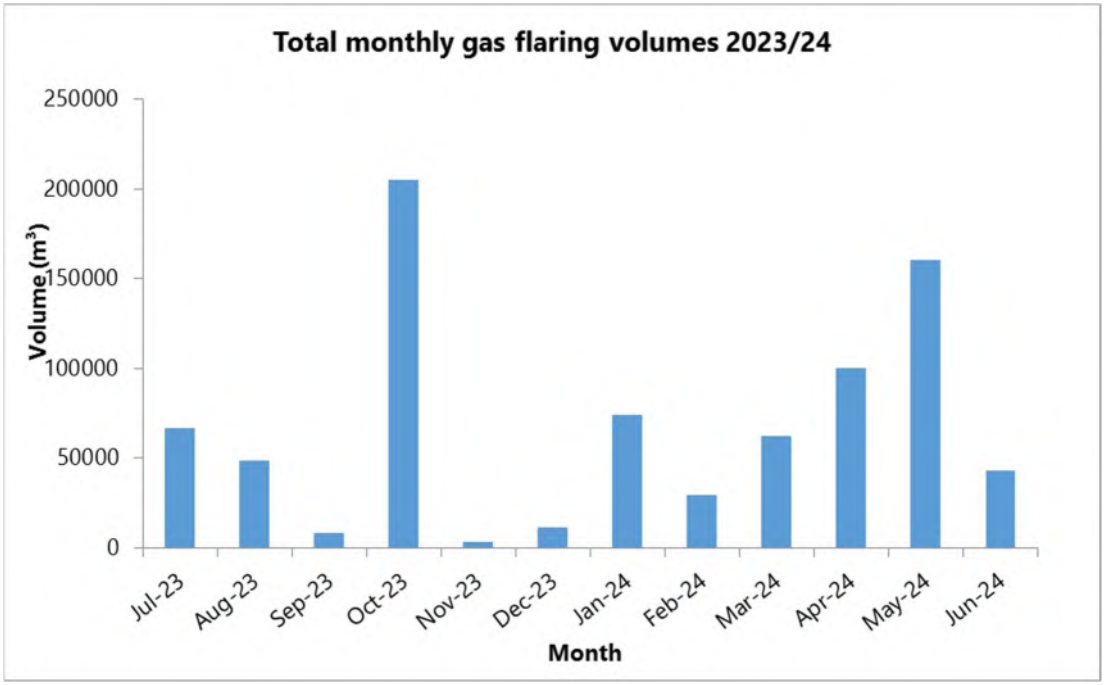

Figure 4 Monthly gas flaring volumes from Cheal Production Station 2023/24

The total amount of gas flared during the monitoring year was 812,946 m³ which is the second highest annual volume reported in five years (Figure 5). During the previous four monitoring periods the annual volume of gas flared has ranged between 363,477 and 924,520m³.

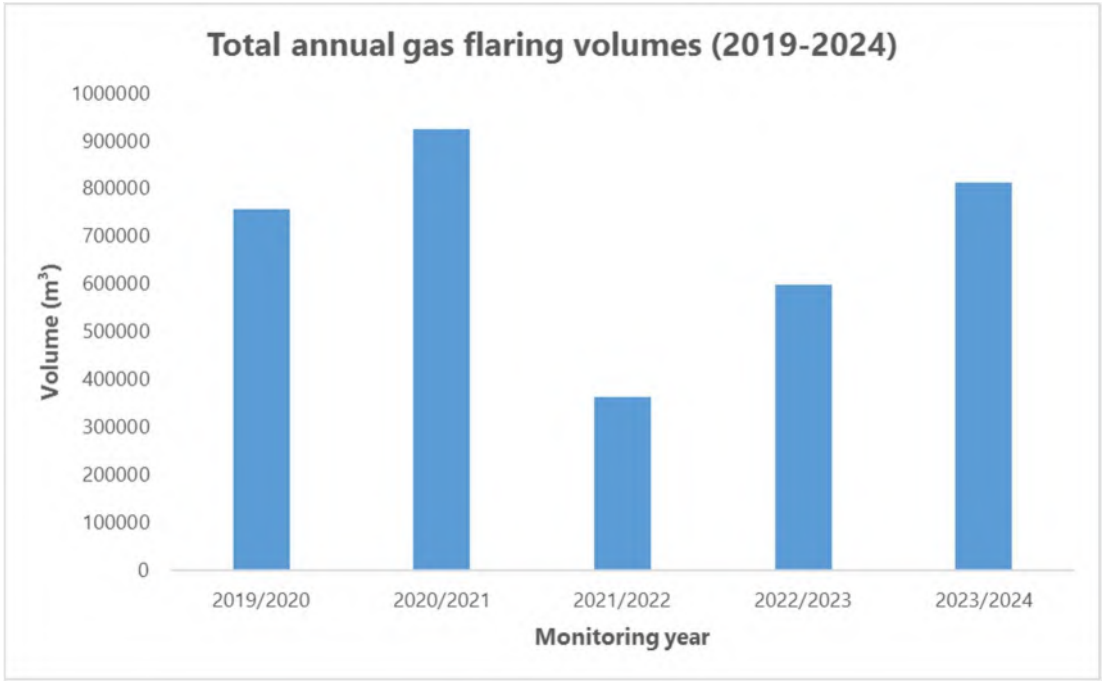

Figure 5 Annual gas flaring volumes from Cheal Production Station 2019-2024

2.4 Incidents, investigations, and interventions

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with the Company. 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. The record includes events where the individual/organisation concerned has 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 potential for legal liability the Council must be able to prove by investigation that the individual/organisation is the source of the incident (or that the allegation cannot be proven).

In the 2023/24 period, the Council was not required to undertake significant additional investigations or interventions, or record incidents in association with the Company's resource consent conditions or provisions in Regional Plans.

3. Discussion

3.1 Site performance

Monitoring of the Cheal Production Station and associated wellsites during the 2023/24 year found that the sites were generally well managed. Small spills and stained ground were noted during some of the inspections and discussion was held with staff regarding improving systems and processes to ensure that any spills were prevented, and that these were cleaned up immediately if they did occur.

During last year's inspections the inspector noted that the skimmer pit at Cheal-E was not functioning adequately. The skimmer pit was repaired and upgraded during this monitoring year and performs adequately.

Inspections of the stormwater management system at Cheal-A and the production station found them well maintained and in good condition, these systems are important for minimising discharges of contaminants into the Managawharawhara Stream.

The only smoke discharge observed during inspections was on 14 May 2024 and it was described as 'light' and dissipated within a short time.

3.2 Environmental effects

Analysis of the quality of the combined stormwater and production water discharge found that the contaminants were well significantly lower than the limits set out in the relevant consent. The results of the Mangawharawhara Stream tributary monitoring were similar to that of the combined discharge, indicating that the stormwater management system and skimmer pits are adequately treating water before it is discharged from the site. Overall, the combined discharge is not likely to be causing significant contamination of the tributary.

There were no significant adverse effects on the environment found as a result of the exercise of the air discharge consent. The ambient air quality monitoring at the site showed that levels of NO_2 were less than the level of detection at the time of sampling, and therefore substantially lower than any human health-based criteria. Gases and fine particulate are not thought to be approaching levels which pose a risk to human health based on historical results. No offensive or objectionable odours or dust beyond the boundary were observed during inspections and no complaints have been received from the public.

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 5-7.

Table 7 Summary of performance for consent 4727-2

Purpose: To discharge treated stormwater and produced water from hydrocarbon exploration and production operations at the Cheal-A wellsite and Cheal Production Station, onto and into land in circumstances where it may enter an unnamed tributary of the Mangawharawhara Stream		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option	Inspections	Yes
2. Stormwater collection from catchment area no larger than 3ha	Inspections	Yes
3. Advise Council at least 7 days before site works commence	Notifications received	Yes

Purpose: To discharge treated stormwater and produced water from hydrocarbon exploration and production operations at the Cheal-A wellsite and Cheal Production Station, onto and into land in circumstances where it may enter an unnamed tributary of the Mangawharawhara Stream		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
4. A contingency plan be maintained detailing measures to avoid, remedy and mitigate spillage or discharge	Latest update October 2023	Yes
5. Management and maintenance of stormwater system	Inspections	Yes
6. Stormwater and produced water treated through stormwater system before discharged	Inspections	Yes
7. Design of skimmer pits to meet minimum size and hydrocarbon capture requirements	Inspections and water sampling	Yes
8. Skimmer pits and stormwater retention areas to be lined	Inspections	Yes
9. Constituents meet specified standards	Water sampling	Yes
10. Temperature increase less than 2°C after 25m mixing zone	Water sampling	Yes
11. No effects to receiving waters after 25m mixing zone	Inspections and water sampling	Yes
12. Advise Council prior to reinstatement of site	Site still active	N/A
13. Review provision	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

Table 8 Summary of performance for consent 7906-1

Purpose: To discharge emissions into the air during flaring and to discharge miscellaneous emissions from tank vents and generators arising from hydrocarbon production activities including emergency situations and well workovers at the Cheal-A wellsite and Cheal Production Station		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt the best practicable option	Inspections and review of records	Yes
2. Maintain a flaring log	Review of records	Yes
3. Provide monthly flaring data	Records received	Yes
4. Provide an annual air emission report	Report received	Yes
5. Keep a record of all smoke emitting incidents and complaints	Review of records	Yes
6. Provide analysis of typical gas and crude oil stream from the wells	Analysis not requested	N/A
7. No alterations to plant, equipment or processes without prior consultation	Inspections and liaison with consent holder	Yes
8. Notification of flaring events longer than 5 minutes duration	Notifications received	Yes
9. Emissions are controlled in order to meet requirements of the ambient air quality standards	Air monitoring	Yes
10. All emissions to the atmosphere are controlled	Inspections and air monitoring	Yes
11. Tanks used as hydrocarbon storage vessels are fitted with vapour recovery systems	Inspections	Yes

Purpose: To discharge emissions into the air during flaring and to discharge miscellaneous emissions from tank vents and generators arising from hydrocarbon production activities including emergency situations and well workovers at the Cheal-A wellsite and Cheal Production Station		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
12. Review provision	No further option for review prior to expiry	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

Table 9 Summary of performance for consent 10290-1

Purpose: To take and use groundwater, including the incidental take of geothermal heat and energy, for water flooding purposes		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Provide bore completion log prior to exercising consent	Information received	Yes
2. The bore shall tap one aquifer only	Bore completion log	Yes
3. Annulus of bore to be sealed with grout	Inspection and bore completion log	Yes
4. Top of casing to be at least 300mm above concrete pad	Inspection	Yes
5. Wellhead to be suitable protected from vehicle damage	Site inspection	Yes
6. Bore to be easily identifiable by permanent labels	Site inspection	Yes
7. Water sample to be collected and analysed	Sample collected on 10 October 2016	Yes
8. Rate of take not to exceed 8L/sec or 800m^3 per 24 hours	Abstraction data provided	Yes
9. Water meter and datalogger to be installed at the site	Site inspection	Yes
10. Water records from 1 July to 30 June to be supplied by 31 July annually	Records received	Yes
11. Documentation certifying the water measuring and recording equipment to be supplied at installation and every 5 years thereafter	Verified August 2022, next due August 2027	Yes
12. Council to be advised of equipment failure	Notification	N/A
13. Water meter and datalogger to be accessible to Council staff	Inspection	Yes
14. Record of groundwater levels to be provided	Records provided	Yes
15. Consent holder to adopt best practicable option to prevent or minimise adverse effects	Inspection and review of data	Yes
16. Lapse of consent	Consent has been exercised	N/A
17. Review provision	Next option for review in June 2029	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

Table 10 Evaluation of environmental performance over time

Year	Consent numbers	High	Good	Improvement req	Poor
2019/20	4727-2, 7906-1, 10290-1	3	-	-	-
2020/21	4727-2, 7906-1, 10290-1	3	-	-	-
2021/22	4727-2, 7906-1, 10290-1	3	-	-	-
2022/23	4727-2, 7906-1, 10290-1	2	1	-	-
2023/24	4727-2, 7906-1, 10290-1	3	-	-	-

During the year the Company demonstrated a high level of both environmental performance and administrative compliance with the resource consents for the Cheal Production Station as defined in Appendix II. Minor 'housekeeping' matters were identified during the inspections but these had negligible effects on the environment and were attended to promptly. There were also minor 'housekeeping' matters at the wellsites however, these consents are not subject to ratings in this report and do not affect the overall programme rating.

3.4 Recommendations from the 2022/23 Annual Report

In the 2022/23 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at the Cheal Production Station in the 2023/24 year continue at the same level as in 2022/23.
2. THAT should there be issues with environmental or administrative performance in 2023/24, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Recommendation one was implemented, while it was not considered necessary to undertaken additional monitoring as per recommendation two.

3.5 Alterations to monitoring programmes for 2024/25

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 consents, and the need to maintain a sound understanding of industrial processes within Taranaki exercising resource consents.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site(s) 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 2024/25.

4. Recommendations

1. THAT the frequency of instrumental air monitoring shall be reduced to every two years on the basis that results have been very low for several years now.
2. THAT all other monitoring of consented activities at the Cheal Production Station in the 2024/25 year continue at the same level as in 2023/24.
3. THAT should there be issues with environmental or administrative performance in 2024/25 monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Glossary of common terms and abbreviations

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

Biomonitoring	Assessing the health of the environment using aquatic organisms.
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.
FNU	Formazin Nephelometric Units
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident Register	The Incident Register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
m^2	Square Metres.
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.
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).
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal consents (Sections 12, 14 and 15), water consents (Section 14) and discharge consents (Section 15).

RMA	*Resource Management Act 1991* and including all subsequent amendments.
SS	Suspended solids.
Temp	Temperature, measured in °C (degrees Celsius).
UI	Unauthorised Incident.
VOC	Volatile organic compounds.

For further information on analytical methods, contact a manager within the Environment Quality Department.

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Taranaki Regional Council (2005): Rata Energy NZ Ltd & Austral Pacific Energy (NZ) Limited Cheal Production Wells Monitoring Programme Annual Report 2004-2005, Technical Report 2005-16.

Appendix I

Resource consents held by Cheal Petroleum Ltd

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

Water abstraction consents

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

Water discharge consents

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. Consents authorising discharges to water are issued by the Council under Section 87(e) of the RMA.

Air discharge consents

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

Land use consents

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 consents are issued by the Council under Section 87(a) of the RMA.

Coastal consents

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 consents 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:	Cheal Petroleum Limited P O Box 402 NEW PLYMOUTH 4340
Decision Date (Change):	29 April 2013
Commencement Date (Change):	29 April 2013 (Granted: 10 November 2011)

Conditions of Consent

Consent Granted:	To discharge treated stormwater and produced water from hydrocarbon exploration and production operations at the Cheal-A wellsite and Cheal Production Station, onto and into land in circumstances where it may enter an unnamed tributary of the Mangawharawhara Stream
Expiry Date:	1 June 2029
Review Date(s):	June 2017, June 2023
Site Location:	Cheal-A wellsite and Cheal Production Station, 4723 Mountain Road, Ngaere (Property owners: JR & RP Lightoller)
Legal Description:	Pt Sec 24 Blk VI Ngaere SD (Discharge source & site)
Grid Reference (NZTM)	1712269E-5639504N
Catchment:	Waingongoro
Tributary:	Mangawharawhara

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 3 hectares.

3. At least 7 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, and
   b) commencement of any well drilling operation.

   If either of these events is rescheduled or delayed after advice is given, 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 a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.

4. The consent holder shall maintain a contingency plan that, to the satisfaction of the Chief Executive, Taranaki Regional Council, 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 contingency plan shall be provided to the Council prior to discharging from the site.

5. The design, management and maintenance of the stormwater system shall be undertaken in accordance with the information submitted in support of the consent application 5603 in particular sections 7.2 and 8.1, and consent application 7378.

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.

7. Skimmer pits shall have a combined capacity of no less than 250 m^3, 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. 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 50 gm^{-3}

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

11. After allowing for a mixing zone of 25 metres, 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.

12. 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.

13. 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 2017 and/or June 2023, 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 29 April 2013

For and on behalf of
Taranaki Regional Council

_____

Chief Executive

Discharge Permit

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

Name of Consent Holder:	Cheal Petroleum Limited P O Box 402 NEW PLYMOUTH 4340
Decision Date:	10 November 2011
Commencement Date:	10 November 2011

Conditions of Consent

Consent Granted:	To discharge emissions into the air during flaring and to discharge miscellaneous emissions from tank vents and generators arising from hydrocarbon production activities including emergency situations and well workovers at the Cheal-A wellsite and Cheal Production Station at or about (NZTM) 1712310E-5639497N
Expiry Date:	1 June 2029
Review Date(s):	June 2017, June 2023
Site Location:	Cheal-A wellsite and Cheal Production Station, Mountain Road, Ngaere [Property owners: JR & RP Lightoller]
Legal Description:	Pt Sec 24 Blk VI Ngaere SD [site of discharge]

General condition

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

Special conditions

Exercise of consent

1. The consent holder shall at all times adopt the best practicable option [as defined in section 2 of the Resource Management Act 1991] to prevent or minimise any actual or likely adverse effects on the environment associated with the discharge of contaminants into the environment arising from the emissions to air from the flare.

Recording and submitting information

2. The consent holder shall keep and maintain a log of all continuous flaring incidents lasting longer than 5 minutes and any intermittent flaring lasting for an aggregate of 10 minutes or longer in any 60-minute period. The log shall contain the date, the start and finish times, the quantity and type of material flared, and the reason for flaring. The log shall be made available to the Chief Executive, Taranaki Regional Council, upon request, and summarised annually in the report required under condition 4. Flaring, under normal operation in the low pressure flare, of rich mono-ethylene glycol degasser vapour, condensate tank vapours, non-condensibles from tri-ethylene glycol/mono-ethylene glycol regeneration and purge gas shall be excluded from this requirement.

3. 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.

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

    a) detailing gas combustion at the production station flare, including but not restricted to routine operational flaring and flaring logged in accordance with condition 2;
    b) detailing any measures that have been undertaken by the consent holder to improve the energy efficiency of the production station;
    c) detailing any measures to reduce smoke emissions;
    d) detailing any measures to reduce flaring;
    e) addressing any other issue relevant to the minimisation or mitigation of emissions from the production station flare; and
    f) detailing any complaints received and any measures undertaken to address complaints.

5. The consent holder shall keep and make available to the Chief Executive, Taranaki Regional Council, upon request, a record of all smoke emitting incidents, noting time, duration and cause. The consent holder shall also keep, and make available to the Chief Executive, upon request, a record of all complaints received as a result of the exercise of this consent.

Information and notification

6. The consent holder shall make available to the Chief Executive, Taranaki Regional Council upon request, an analysis of a typical gas and/or condensate stream from the Mt Messenger Formation and Urenui Formation, covering sulphur compound content and the content of compounds containing six or more carbon atoms in their molecular structure.

7. Prior to undertaking any alterations to the plant equipment, processes or operations, which may substantially alter the nature or quantity of flare emissions other than as described in the consent application, the consent holder shall first consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991.

8. The consent holder shall notify the Chief Executive, Taranaki Regional Council, as soon as practicable, whenever the continuous flaring of hydrocarbons [other than the flaring of rich mono-ethylene glycol degasser vapour, condensate tank vapours, non-condensibles from tri-ethylene glycol/mono-ethylene glycol regeneration and purge gas] is expected to occur for more than five minutes in duration.

Preventing and minimising emissions

9. The consent holder shall control all emissions of carbon monoxide, nitrogen dioxide, fine particles [PM_{10}] and sulphur dioxide to the atmosphere from the site, in order that the maximum ground level concentration of any of these contaminants arising from the exercise of this consent measured under ambient conditions does not exceed the relevant ambient air quality standard as set out in the Resource Management [National Environmental Standards for Air Quality Regulations, 2004] at or beyond the boundary of the property on which the site is located.

10. The consent holder shall control all emissions to the atmosphere from the site of contaminants other than those expressly provided for under special condition 7, in order that they do not individually or in combination with other contaminants cause a hazardous, noxious, dangerous, offensive or objectionable effect at or beyond the boundary of the property on which the site is located.

11. All permanent tanks used as hydrocarbon storage vessels, shall be fitted with vapour recovery systems.

Review

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 2017 and/or June 2023, for the purposes of:

    a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or
    b) requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; and/or
    c) to alter, add or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant or contaminants.

Signed at Stratford on 10 November 2011

For and on behalf of
Taranaki Regional Council

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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:	Cheal Petroleum Limited PO Box 402 New Plymouth 4340
Decision Date (Change):	31 October 2017
Commencement Date (Change):	31 October 2017 (Granted Date: 8 September 2016)

Conditions of Consent

Consent Granted:	To take and use groundwater, including the incidental take of geothermal heat and energy, for water flooding purposes
Expiry Date:	1 June 2035
Review Date(s):	June 2023, June 2029
Site Location:	Cheal-A wellsite, 4273 Mountain Road, Ngaere
Grid Reference (NZTM)	1712385E-5639375N
Catchment:	Waingongoro
Tributary:	Mangawharawhara

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. Before exercising this consent The consent holder shall ensure that a bore completion report (driller's log) that includes the information listed below is completed for GND2590 and provided to the Taranaki Regional Council for approval:

    a) Well/bore location in GPS Coordinates, ground RL and stick up heights;
    b) A sketch or drawing of the drilling project area, showing the location of all bores and their location in relation to nearby pertinent features;
    c) Stratigraphic log;
    d) Drilled depth and final bore depth;
    e) Screen and casing details and depths;
    f) Static water level;
    g) Water quality data collected during and after drilling;
    h) Name of bore owner;
    i) Location of the drilling project;
    j) Description of the drilling project;
    k) Project number or job reference, and resource consent number or permit if applicable;
    l) Start and finish dates of well/bore drilled;
    m) Drilling method used;
    n) Name and address of driller;
    o) Description of grouting method and volumes used;
    p) Name of personnel on site including driller, driller crew and supervisor;
    q) Name of person preparing the drilling log;
    r) Technique used and time for the well development;
    s) Any results of the tests for discharge of water.

2. The bore shall tap no more than one aquifer. All aquifers and permeable zones of differing pressure or water quality shall be sealed to prevent the interconnection or movement of groundwater between aquifers and permeable zones.

3. The annulus of the bore shall be sealed with grout to prevent fluid movement down the sides of the bore casing.

4. The top of the casing shall be no less than 300 mm above the concrete pad and the bore shall be covered or capped to prevent contaminants entering the bore and underlying groundwater.

5. The wellhead shall be suitably constructed and/or adequately protected (e.g. by fencing or a building) to ensure that it is not vulnerable to damage by any vehicles that may have access to the vicinity.

6. 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 well construction or associated building. The numbering on the label shall be the bore number assigned by Taranaki Regional Council (GND2590).

7. Within 14 days of it being completed a water sample shall be collected from the well and analysed for a suite of parameters that characterise the water in the aquifer.

   Note: Unless already taken, this sample will be taken by Taranaki Regional Council staff during the monitoring inspection and the cost of analysis charged to the consent holder.

8. The rate of taking shall not exceed 8 litres per second, and the volume taken in any 24 hour period ending at midnight (New Zealand Standard Time) shall not exceed 800 cubic metres.

9. Before exercising this consent the consent holder shall install, and thereafter maintain a water meter and a datalogger at the site of taking (or a nearby site in accordance with Regulation 10 of the *Resource Management (Measurement and Reporting of Water Takes) Regulations 2010*). 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 ± 5%. Records of the date, the time and the rate and volume of water taken at intervals not exceeding 15 minutes, shall be made available to the Chief Executive, Taranaki Regional Council at all reasonable times.

   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 and dataloggers have a limited lifespan.

10. 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.

11. The consent holder shall provide the Chief Executive, Taranaki Regional Council with a document from a suitably qualified person certifying that water measuring and recording equipment required by the conditions of this consent ('the equipment'):

    (a) has been installed and/or maintained in accordance with the manufacturer's specifications; and/or

    (b) has been tested and shown to be operating to an accuracy of ± 5%.

    The documentation shall be provided:

    (i) within 30 days of the installation of a water meter or datalogger;

    (ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by this consent; and

    (iii) no less frequently than once every five years.

12. 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.

13. The water meter and datalogger shall be accessible to Taranaki Regional Council officers at all reasonable times for inspection and/or data retrieval.

14. The consent holder shall provide a record of groundwater levels interpreted from pressure transducer data.

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

16. This consent shall lapse on 30 September 2021, 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 during the month of June 2023 and/or June 2029 for the purposes of:

    a. 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; and/or

    b. to require any data collected in accordance with the conditions of this consent to be transmitted directly to the Council's computer system, in a format suitable for

Signed at Stratford on 31 October 2017

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

Appendix II

Categories used to evaluate environmental and administrative performance

Categories used to evaluate environmental and administrative performance

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

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

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

Environmental Performance

High: No or inconsequential (short-term duration, less than minor in severity) breaches of consent or regional plan parameters resulting from the activity; no adverse effects of significance noted or likely in the receiving environment. The Council did not record any verified unauthorised incidents involving environmental impacts and was not obliged to issue any abatement notices or infringement notices in relation to such impacts.

Good: Likely or actual adverse effects of activities on the receiving environment were negligible or minor at most. There were some such issues noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party but these items were not critical, and follow-up inspections showed they have been dealt with. These minor issues were resolved positively, co-operatively, and quickly. The Council was not obliged to issue any abatement notices or infringement notices in relation to the minor non-compliant effects however, abatement notices may have been issued to mitigate an identified potential for an environmental effect to occur.

For example:

- High suspended solid values recorded in discharge samples however, the discharge was to land or to receiving waters that were in high flow at the time;
- Strong odour beyond boundary but no residential properties or other recipient nearby.

Improvement required: Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self-reports, or during investigations of incidents reported to the Council by a third party. Cumulative adverse effects of a persistent minor non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.

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

Administrative performance

High: The administrative requirements of the resource consents were met, or any failure to do this had trivial consequences and were addressed promptly and co-operatively.

Good: Perhaps some administrative requirements of the resource consents were not met at a particular time however, this was addressed without repeated interventions from the Council staff. Alternatively adequate reason was provided for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.

Improvement required: Repeated interventions to meet the administrative requirements of the resource consents were made by Council staff. These matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance.

Poor: Material failings to meet the administrative requirements of the resource consents. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.