

Todd Petroleum Mining Company Limited
McKee Production Station and Power Plant
Monitoring Programme
Annual Report
2015-2016

Technical Report 2016-26

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Executive summary

Todd Petroleum Mining Company Limited (the Company) operates a petrochemical production station and adjacent power plant located on Otaraoa Road near Tikorangi, bridging the Waitara and Onaero catchments. The McKee Production Station processes oil and gas from the Company's McKee and Mangahewa groups of wellsites and includes electricity generation and LPG production facilities. Located to the south of the production station, the McKee Power Plant was completed and commissioned during the 2012-2014 period. This 100 MW electricity generating facility provides both peak and base load power for the national grid. This report for the period July 2015 to June 2016 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company's environmental 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.

The Company's subsidiaries, Todd Energy Limited and Nova Energy Limited, hold 15 resource consents for the sites, which include a total of 137 conditions setting out the requirements that the Company must satisfy. The subsidiaries hold two consents to allow for the take and use of water, five consents to discharge stormwater and wastewater, four consents to discharge emissions into the air, one consent to allow the diversion of unnamed tributaries of the Mangahewa Stream, and three consents regarding the installation and use of structures.

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

The Council's monitoring programme for the year under review included six inspections of the facilities, six water and six stream sediment samples collected for physicochemical analysis, two biomonitoring surveys of receiving waters, and two ambient air quality surveys.

Stormwater system inspections showed that discharges from the sites complied with consent conditions at the time. Receiving water inspections and sampling showed that the discharges were not causing any adverse effects on the Waitara River or Mangahewa Stream at the time of monitoring.

Biomonitoring in the Mangahewa Stream found that the community health at the upstream site ranged from above average health in summer to average health in autumn. The downstream site community health was of average health with lower indicator values than the previous year. Hydrocarbons from historical contamination were not detected in the stream sediment at the upstream site, but were present at lower concentrations than previous years in the lower site sediment. Further monitoring will be undertaken to assess the trends in sediment hydrocarbon concentrations and stream community health.

There were no adverse effects on the environment resulting from the exercise of the air discharge consents. The ambient air quality monitoring at the production station showed that levels of carbon monoxide, combustible gases, PM10 particulates and nitrogen oxides were all below levels of concern at the time of sampling. No offensive or objectionable odours were detected beyond the boundary during inspections and there were no complaints in relation to air emissions from the sites.

During the period under review, the Company demonstrated an overall high level of both environmental performance and administrative compliance with the resource consents. There were no unauthorised incidents recorded by the Council in relation to the Company's activities. The McKee Production Station and Power Plant were well managed and maintained.

For reference, in the 2015-2016 year, 71% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 24% demonstrated a good level of environmental performance and compliance with their consents.

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 high level.

This report includes a recommendation for the 2016-2017 year.

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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 2015 to June 2016 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by subsidiaries of Todd Petroleum Mining Company Ltd (the Company). Todd Energy Ltd operates the McKee Production Station (including the Mangahewa production facilities) and Nova Energy Ltd operates the McKee Power Plant situated on Otaraoa Road at Tikorangi, bridging the Waitara and Onaero catchments.

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 Waitara and Onaero catchments, and the air discharge permits 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 the Company's use of water, land and air, and is the 26th combined annual report by the Council for the McKee facilities.

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 the Company in the Waitara and Onaero 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 McKee facilities.

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 2016-2017 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 the Company, this report also assigns them a rating for their environmental and administrative performance during the period under review.

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

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

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

Environmental Performance

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

For example:

- High suspended solid values recorded in discharge samples, however the discharge was to land or to receiving waters that were in high flow at the time;
- Strong odour beyond boundary but no residential properties or other recipient nearby.
- **Improvement required:** Likely or actual adverse effects of activities on the receiving environment were more than minor, but not substantial. There were some issues noted during monitoring, from self reports, or in response to unauthorised incident reports. Cumulative adverse effects of a persistent minor non-compliant activity could elevate a minor issue to this level. Abatement notices and infringement notices may have been issued in respect of effects.
- **Poor:** Likely or actual adverse effects of activities on the receiving environment were significant. There were some items noted during monitoring, from self reports, or in response to unauthorised incident reports. Cumulative adverse effects of a persistent moderate non-compliant activity could elevate an 'improvement required' issue to this level. Typically there were grounds for either a prosecution or an infringement notice in respect of effects.

Administrative performance

- **High:** The administrative requirements of the resource consents were met, or any failure to do this had trivial consequences and were addressed promptly and co-operatively.
- **Good:** Perhaps some administrative requirements of the resource consents were not met at a particular time, however this was addressed without repeated interventions from the Council staff. Alternatively adequate reason was provided

for matters such as the no or late provision of information, interpretation of 'best practical option' for avoiding potential effects, etc.

- **Improvement required:** Repeated interventions to meet the administrative requirements of the resource consents were made by Council staff. These matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance.
- **Poor:** Material failings to meet the administrative requirements of the resource consents. Significant intervention by the Council was required. Typically there were grounds for an infringement notice.

For reference, in the 2015-2016 year, 71% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 24% demonstrated a good level of environmental performance and compliance with their consents.

1.2 Process description



Photo 1 McKee Production Station

The McKee Production Station (MPS) is situated on Otaraoa Road, near Tikorangi and was commissioned in November 1984. It receives and processes oil and gas from a number of wellsites within the area. The Mangahewa Production Station is adjacent to the MPS and processes hydrocarbons from the Mangahewa wellsites. It came on-stream in September 2001. The surrounding land is predominantly dairying.

Raw product from the wellsites is separated into gas, crude oil and condensate. These products are transported via either pipeline or road tanker to the Omata tank farm in New Plymouth. Produced water is a by-product of the process and this is deep well injected. All uncontaminated stormwater from the McKee and Mangahewa sites passes through a skimmer pit at the McKee site and discharges to the Mangahewa Stream. Treated impounded stormwater is discharged to the Waitara River.

A gas-powered electricity generation plant (EGP), comprised of three generation units, capable of producing a total of up to 9.1 MW of electricity, was commissioned early in 2009. During the 2012-2014 monitoring period, an adjoining LPG plant was completed and commissioned in the southern corner of the site.

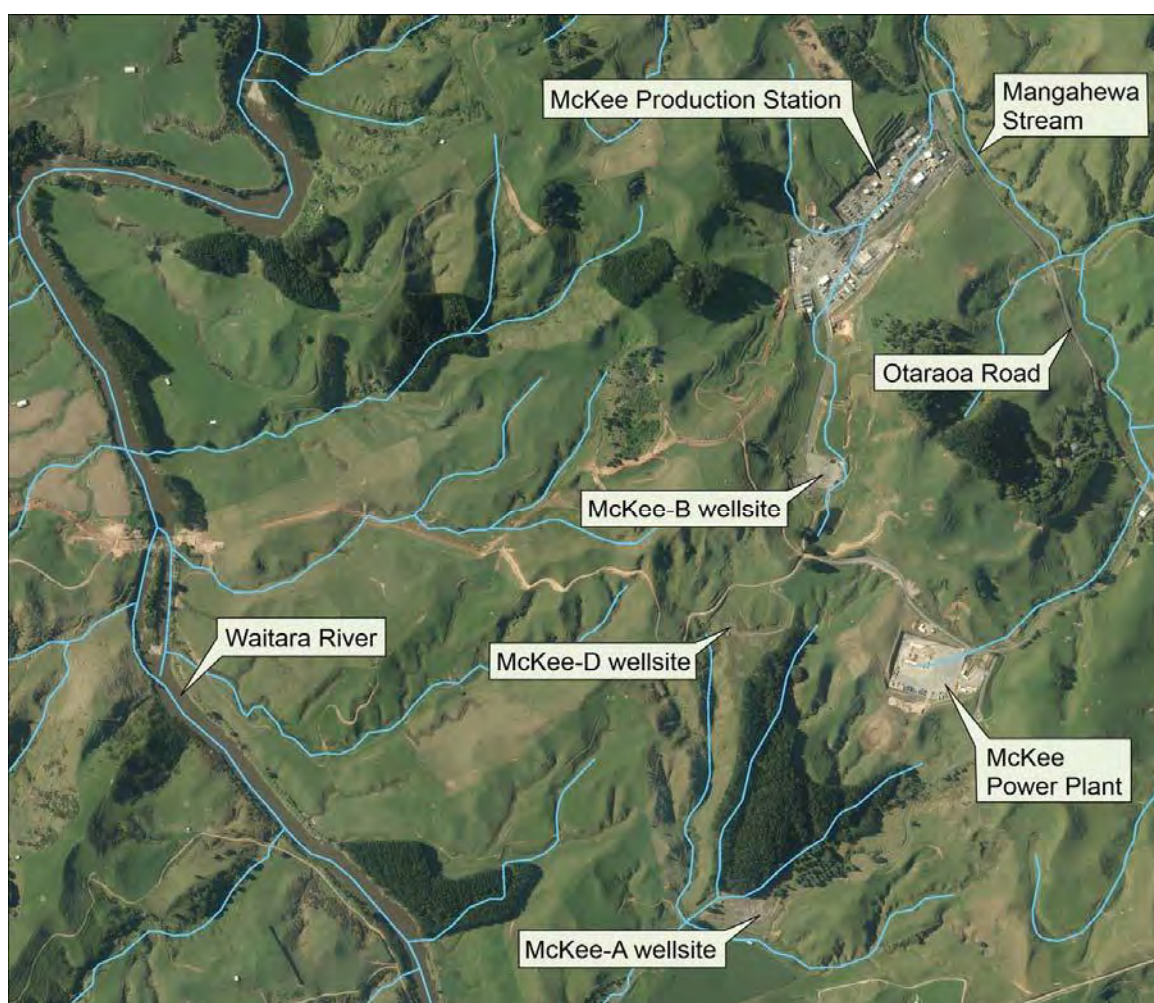


Figure 1 Location of the McKee Production Station and Power Plant

The McKee Power Plant (MPP) was also completed and commissioned during the 2012-2014 monitoring period. This electricity generating facility utilises two 50 MW gas-fired turbines to provide both peak and base load power for the national grid. Fuel gas for the MPP is supplied from the MPS via a 1 km high pressure pipeline. Stormwater and treated process water from the site is directed to a 250 m³ retention pond on the eastern side of the site. Overflow from this pond is discharged to an unnamed tributary of the Mangahewa Stream to the north. The locations of MPS and MPP are shown in Figure 1.

1.3 Resource consents

A summary of the consents for activities at MPS during the monitoring period is given in Table 1. Details of these consents are provided in Sections 1.3.1 to 1.3.5.

Table 1 Resource consents for activities at McKee Production Station held by Todd Energy Ltd

Consent number	Purpose of consent	Issue date	Next review	Expiry
1157-1	Discharge stormwater to Mangahewa Stream	28/9/1983	-	2023
1158-1	Discharge stormwater to Waitara River	28/9/1983	-	2023
1159-1	Divert stormwater to Mangahewa Stream	08/8/1983	-	2023
1226-1	Take and use water from Mangahewa Stream	08/8/1984	-	2023
1227-1	Mangahewa Stream intake weir	08/8/1984	-	2023
4006-2	Erect and maintain Waitara River bridge	14/7/1999	2021	2033
4050-3	Discharge emissions to air (MPS)	30/9/2009	2021	2027
7290-1	Discharge emissions to air (EGP)	24/6/2008	2021	2027
7435-1	Discharge stormwater (LPG Plant)	08/7/2009	2021	2039
7436-1	Discharge emissions to air (LPG Plant)	08/7/2009	2021	2039

A summary of the consents for activities at MPP during the monitoring period is given in Table 2. Details of these consents are provided in Sections 1.3.1 to 1.3.5.

Table 2 Resource consents for activities at McKee Power Plant held by Nova Energy Ltd

Consent number	Purpose of consent	Issue date	Next review	Expiry
2393-3	Take and use water from Mangaone Stream	29/02/2016	2018	2033
4560-2	Discharge wastewater to Waitara River	07/01/2003	-	2021
7920-1	Discharge stormwater and wastewater to unnamed tributary of Mangahewa Stream	12/10/2011	2021	2031
7921-1	Discharge emissions to air	12/10/2011	2021	2031
7922-1	Water outlet structure installation and use	12/10/2011	2021	2031

1.3.1 Water abstraction permits

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

Todd Energy holds water abstraction permit **1226-1** to take water from the Mangahewa Stream for process, fire fighting and domestic purposes associated with operation of the McKee Production Station. This permit was originally issued on 14 March 1984 under the *Water and Soil Conservation Act 1967* to Petroleum Corporation of NZ Ltd. It was transferred to Shell Todd Oil Services Ltd on 10 April 2002, to Todd Taranaki Ltd on 31 May 2006 and, finally, to Todd Energy on 15 November 2013. It is due to expire on 1 June 2023.

There are five special conditions attached to this consent.

Condition 1 requires the consent holder to maintain a minimum flow through the Mangahewa Stream.

Condition 2 requires the use of an accurate flow measuring and recording device and provides for the supply of flow data to the Council.

Condition 3 requires the intake structure to be designed and constructed so as to minimise stream disturbance and permit fish passage.

Condition 4 requires information on the location and design of the intake structure to be provided to Council prior to construction.

Condition 5 is a review provision.

Nova Energy held water abstraction permit **2393-2** to take water from the Mangaone Stream for use in a gas fired Power Station. This permit was originally issued as a water take for oilfield water flooding purposes on 17 February 1988 under the *Water and Soil Conservation Act 1967* to Petroleum Corporation of NZ Ltd then transferred to Fletcher Challenge Energy Taranaki Ltd and renewed under Section 87(d) of the RMA on 22 August 1997. It was subsequently transferred to Shell Todd Oil Services Ltd on 10 April 2002, to Todd Taranaki Ltd on 31 May 2006, to Bay of Plenty Energy on 22 June 2011 (when the purpose was changed to its current form) and, finally, to Nova Energy on 8 April 2013. It expired on 1 June 2015 and the Company continued to operate under this consent during the renewal process as allowed by Section 124 of the RMA.

Water abstraction permit **2393-3** to take water from the Mangaone Stream for use in a gas fired Power Station was renewed under Section 87(d) of the RMA on 29 February 2016. It is due to expire on 1 June 2033.

There are ten special conditions attached to this consent.

Condition 1 limits the maximum rate of abstraction.

Conditions 2 to 6 require the installation and maintenance of a water meter and datalogger, and provide for Council access to the equipment and recorded data.

Condition 7 prevents taking when flow in the Waitara River is low.

Condition 8 requires the consent holder to adopt the best practicable option to prevent or minimise adverse effects.

Condition 9 requires the intake to be screened to prevent harm to fish.

Condition 10 is a review provision.

These permits are attached to this report in Appendix I.

1.3.2 Water discharge permits

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

Todd Energy holds water discharge permit **1157-1** to discharge uncontaminated stormwater from the site of the McKee Production Facility into an unnamed tributary of the Mangahewa Stream. This permit was originally issued on 28 September 1983 under the *Water and Soil Conservation Act 1967* to Petroleum Corporation of NZ Ltd. It was transferred to Shell Todd Oil Services Ltd on 10 April 2002, to Todd Taranaki Ltd on 31 May 2006 and, finally, to Todd Energy on 15 November 2013. It is due to expire on 1 June 2023.

There are ten special conditions attached to this consent.

Condition 1 requires the consent holder to ensure the stream can cope with the increased volume of water.

Condition 2 requires the consent holder to ensure that works associated with the exercise of this consent be designed to minimise disturbance of the bed and banks of the stream.

Condition 3 requires mitigation or prevention of erosion resulting from the exercise of the consent.

Condition 4 requires the corrective measures applied to have the approval of the Chief Executive of the Council.

Condition 5 requires the consent holder to install a sampling chamber in the main stormwater discharge line.

Condition 6 requires the stormwater layout and discharge points to be provided to the Chief Executive of the Council prior to construction.

Condition 7 requires the consent holder to provide a contingency plan.

Condition 8 prevents adverse effects in the receiving waters.

Condition 9 addresses monitoring requirements.

Condition 10 is a review provision.

Todd Energy also holds water discharge permit **1158-1** to discharge treated impounded stormwater from the site of the McKee Production Facility into the Waitara River. This permit was originally issued on 28 September 1983 under the *Water and Soil Conservation Act 1967* to Petroleum Corporation of NZ Ltd. It was transferred to Shell Todd Oil Services Ltd on 10 April 2002, to Todd Taranaki Ltd on 31 May 2006 and, finally, to Todd Energy on 15 November 2013. It is due to expire on 1 June 2023.

There are 17 special conditions attached to this consent.

Condition 1 requires contaminated stormwater to be stored and treated prior to discharge.

Condition 2 requires mitigation or prevention of erosion resulting from the exercise of the consent.

Condition 3 states that any corrective measures applied are to be to the satisfaction of the Council.

Condition 4 requires a sampling chamber be installed in the treated stormwater discharge line prior to the outfall.

Condition 5 requires the stormwater layout and discharge points be provided to the Chief Executive prior to construction.

Condition 6 requires the consent holder to supply specifications of the works to the Chief Executive prior to the exercise of the consent.

Condition 7 requires the appointment of a suitable wastewater operator on the site.

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

Conditions 9, 10 and 11 protect the receiving water from adverse effects.

Condition 12 requires a management plan be provided to the Chief Executive of the Council prior to the exercise of the consent.

Condition 13 requires a contingency plan be provided to the Chief Executive prior to the exercise of the consent.

Conditions 14, 15 and 16 address monitoring requirements.

Condition 17 is a review provision.

Todd Energy also holds water discharge permit **7435-1** to discharge stormwater into an unnamed tributary of the Mangahewa Stream in the Onaero catchment from a LPG Plant. This permit was issued to Todd Taranaki Ltd by the Council on 8 July 2009 under Section 87(e) of the RMA. It was transferred to Todd Energy on 15 November 2013 and is due to expire on 1 June 2039.

There are 12 special conditions attached to this consent.

Conditions 1 and 2 concern best practicable option and the catchment area.

Conditions 3 to 6 relate to information to be provided, notification, contingency and management planning.

Conditions 7 and 8 relate to stormwater treatment and hazardous substances storage.

Conditions 9 and 10 concern discharge quality and receiving water effects.

Conditions 11 and 12 are lapse and review provisions.

Nova Energy holds water discharge permit **4560-2** to discharge wastewater from filter backwashing and tank cleaning into the Waitara River. This permit was issued by the Council on 7 January 2003 under Section 87(e) of the RMA to Shell Todd Oil Services Ltd. It was transferred to Todd Taranaki Ltd on 31 May 2006, then to Bay of Plenty Energy on 15 June 2011 and to Nova Energy on 8 April 2013. It is due to expire on 1 June 2021.

There are three special conditions attached to this consent.

Condition 1 requires the exercise of the consent to be in accordance with the documentation submitted in support of the application.

Condition 2 describes visual effects which must not be observed below the mixing zone.

Condition 3 is a review provision.

Nova Energy also holds water discharge permit **7920-1** to discharge wastewater and stormwater from a retention pond at the McKee Power Plant, into water and onto and into land where it may enter an unnamed tributary of the Mangahewa Stream. This permit was issued to Bay of Plenty Energy Ltd by the Council on 12 October 2011 under Section 87(e) of the RMA. It was transferred to Nova Energy on 8 April 2013 and is due to expire on 1 June 2031.

There are 11 special conditions attached to this consent.

Conditions 1 and 2 concern best practicable option and the catchment area.

Condition 3 requires treatment of potentially contaminated stormwater.

Conditions 4 and 5 place limits on constituents in the discharge and effects below the mixing zone.

Conditions 6, 7 and 8 relate to contingency and management planning, and notification of changes that may alter the nature of the discharge.

Condition 9 requires stream fencing and riparian planting in accordance with the existing Riparian Management Plan for the property.

Conditions 10 and 11 are lapse and review provisions.

These permits are attached to this report in Appendix I.

1.3.3 Water permit

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

Todd Energy holds water permit **1159-1** to divert unnamed tributaries of the Mangahewa Stream in the vicinity of the McKee Production Facility, and to discharge surface water run-off from adjacent land into the Mangahewa Stream, to permit construction and operation of the said facility. This permit was issued on 28 September 1983 under the *Water and Soil Conservation Act 1967* to Petroleum Corporation of NZ Ltd. It was transferred to Shell Todd Oil Services Ltd on 10 April 2002, then to Todd Taranaki Ltd on 31 May 2006 and, finally, to Todd Energy on 15 November 2013. It is due to expire on 1 June 2023.

There are six special conditions attached to this consent.

Condition 1 requires that plans and locations of the diversions are forwarded to Council prior to commencement of construction.

Condition 2 requires that the natural channels of the streams below the diversion are capable of coping with the increased flow.

Condition 3 states that the consent holder shall prevent or mitigate any erosion that occurs.

Condition 4 states that any corrective action taken shall be to the satisfaction of the Council.

Condition 5 allows the Council to carry out biological monitoring on the Mangahewa Stream.

Condition 6 is a review provision.

The permit is attached to this report in Appendix I.

1.3.4 Air discharge permit

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

Todd Energy holds air discharge permit **4050-3** to discharge emissions into the air arising from the flaring of hydrocarbons associated with production activities at the McKee-C wellsite and from hydrocarbon processing operations and miscellaneous emissions at the McKee Production Station. This permit was issued by the Council on 30 September 2009 under Section 87(e) of the RMA. It is due to expire on 1 June 2027.

There are 21 special conditions attached to this consent.

Condition 1 requires the adoption of the best practicable option.

Condition 2 relates to vapour recovery.

Condition 3 concerns the opacity of smoke emissions.

Conditions 4 to 8 relate to levels of contaminants at or beyond the boundary.

Conditions 9 to 12 concern record keeping and reporting.

Conditions 13 and 14 of the permit relate specifically to MPS.

Conditions 15 to 20 of the permit relate specifically to the McKee-C wellsite.

Condition 21 is a review provision.

Todd Energy also holds air discharge permit **7290-1** to discharge emissions into the air from natural gas combustion and other related activities associated with the operation of an electricity generation plant at the McKee Production Station. This permit was issued by the Council on 24 June 2008 under Section 87(e) of the RMA. It is due to expire on 1 June 2027.

There are ten special conditions attached to this consent.

Condition 1 requires the adoption of the best practicable option.

Condition 2 requires consultation with Council prior to significant alterations.

Conditions 3 to 8 relate to levels of contaminants at or beyond the boundary.

Conditions 9 and 10 are lapse and review provisions.

Todd Energy also holds air discharge permit **7436-1** to discharge emissions to air from the flaring of natural gas in emergency situations and miscellaneous emissions associated with the treatment of gas at the McKee LPG Plant and the Mangahewa Extraction Train 2. This permit was issued by the Council on 8 July 2009 under Section 87(e) of the RMA. It was altered on 24 October 2012 to include emissions from the MET2 plant and is due to expire on 1 June 2039.

There are 12 special conditions attached to this consent.

Condition 1 requires the adoption of the best practicable option.

Condition 2 requires consultation with Council prior to significant alterations.

Condition 3 requires the consent holder to minimise emissions.

Condition 4 concerns the monthly provision of flaring information.

Conditions 5 to 10 relate to levels of contaminants at or beyond the boundary.

Conditions 11 and 12 are lapse and review provisions.

Nova Energy holds air discharge permit **7921-1** to discharge emissions to air from the combustion of natural gas and other miscellaneous emissions from the McKee Power Plant. This permit was issued by the Council on 12 October 2011 under Section 87(e) of the RMA. It is due to expire on 1 June 2031.

There are nine special conditions attached to this consent.

Condition 1 requires the adoption of the best practicable option.

Condition 2 requires a report every six years demonstrating compliance with the first condition.

Conditions 3, 4 and 5 require the consent holder to minimise emissions.

Condition 6 sets a minimum height above ground level for the discharge point.

Condition 7 prohibits any direct significant adverse effects on Taranaki ecosystems.

Conditions 8 and 9 are lapse and review provisions.

These permits are attached to this report in Appendix I.

1.3.5 Land use permits

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

Section 14 (1)(a) of the RMA stipulates that no person may take, use, dam or divert any water (other than coastal water) unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations.

Todd Energy holds land use permit **1227-1** to construct a weir control for the McKee Production Site water intake on the Mangahewa Stream in the Onaero Catchment. This permit was originally issued on 14 March 1984 under the *Water and Soil Conservation Act 1967* to Petroleum Corporation of NZ Ltd. It was transferred to Shell Todd Oil Services Ltd on 10 April 2002, to Todd Taranaki Ltd on 31 May 2006 and, finally, to Todd Energy on 15 November 2013. It is due to expire on 1 June 2023.

There are seven special conditions attached to this consent.

Condition 1 requires the consent holder to submit plans and proposed locations prior to commencement of construction.

Condition 2 requires the consent holder to minimise disturbance to the bed and banks of the river channel at both low flows and design flood levels.

Condition 3 requires the consent holder to prevent or mitigate any erosion.

Condition 4 requires the intake structure be designed and constructed to permit passage of fish.

Condition 5 requires that a minimum flow of 5 litres/second is maintained in the Mangahewa Stream.

Condition 6 requires the operation of the sluice pipe through the weir, for the purposes of de-silting the impoundment.

Condition 7 is a review provision.

Todd Energy also holds land use permit **4006-2** to erect, place and maintain a bridge over the Waitara River for oil field access purposes. This permit was issued by the Council on 14 July 1999 under Section 87(e) of the RMA to Fletcher Challenge Energy Taranaki Ltd. It was transferred to Shell Todd Oil Services Ltd on 10 April 2002, to Todd Taranaki Ltd on 31 May 2006 and, finally, to Todd Energy on 15 November 2013. It is due to expire on 1 June 2023.

There are four special conditions attached to this consent.

Condition 1 requires that the consent holder notifies the Council prior to any works being undertaken, which would involve disturbance of or deposition to the riverbed or discharges to water.

Conditions 2 and 3 require that the structure authorised by the consent be maintained to ensure the conditions of the consent are met, and that the structure is to be removed and the area reinstated if and when it is no longer required.

Condition 4 is a review provision.

Nova Energy holds land use permit **7922-1** to install and use a stormwater and wastewater outlet structure in an unnamed tributary of the Mangahewa Stream associated with the McKee Power Plant. This permit was issued by the Council on 12 October 2011 under Section 87(e) of the RMA. It is due to expire on 1 June 2031.

There are nine special conditions attached to this consent.

Conditions 1 and 2 place requirements on the design and construction of the outlet.

Condition 3 requires notification prior to commencement and upon completion of the works.

Conditions 4 and 5 require the minimisation of streambed disturbance and discharge of sediment during the works.

Condition 6 requires that the structure is removed and the area reinstated if and when it is no longer required.

Condition 7 prohibits alteration to the natural flow of the river or the restriction of fish passage.

Conditions 8 and 9 are lapse and review provisions.

These permits are attached to this report in Appendix I.

1.3.6 Wellsite consents

Todd Energy also holds consents for production activities at wellsites associated with MPS. A summary of these consents is provided in Table 3.

Table 3 Consents for production activities at wellsites associated with McKee Production Station

Wellsite	Consent number	Purpose	Issue date	Expiry
Makara-B	4883-2	To discharge treated stormwater and treated produced water from the Makara-B wellsite into an unnamed tributary of the Mangaone Stream in the Waitara catchment	28/05/2009	2027
	4884-2	To discharge emissions into the air from hydrocarbon exploration and production testing operations and miscellaneous emissions associated with eight wells at the Makara-B wellsite	07/04/2005	2021
Mangahewa-A	4919-2	To discharge treated stormwater from hydrocarbon exploration and production operations at the Mangahewa-A wellsite onto and into land and into an unnamed tributary of the Waitara River	27/10/2000	2021
	4920-3	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Mangahewa-A wellsite	25/08/2008	2021
Mangahewa-C	6967-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Mangahewa-3 wellsite onto and into land in the vicinity of an unnamed tributary of the Waiau Stream	19/10/2006	2021
	6974-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Mangahewa-3 wellsite	19/10/2006	2021
	7180-1	To discharge water containing contaminants from the hydrotesting of pipelines onto and into land at the Mangahewa-3 wellsite	14/12/2007	2021
	9594-1	To take and use groundwater for water supply purposes associated with hydrocarbon exploration and production activities	18/06/2013	2027
Mangahewa-D	7404-1	To take water from the Manganui River for wellsite and well drilling activities during hydrocarbon exploration and production operations at the Mangahewa-D wellsite	19/11/2008	2021
	7405-1	To discharge emissions to air during flaring from well workovers and in emergency situations, and to discharge miscellaneous emissions associated with production activities at the Mangahewa-D wellsite	05/02/2009	2027
	7407-1	To discharge treated stormwater, treated produced water and surplus drill water from hydrocarbon exploration and production operations at the Mangahewa-D wellsite onto and into land in the vicinity of an unnamed tributary of the Manganui River in the Waitara catchment	28/11/2008	2027
	9903-1	To take and use groundwater from a bore for general water supply purposes at the Mangahewa-D wellsite	26/05/2014	2033
Mangahewa-E	9453-1	To discharge treated stormwater and produced water from hydrocarbon exploration and production operations at the Mangahewa-E wellsite, onto land and into an unnamed tributary of the Waiau Stream	01/02/2013	2027
	9455-1	To discharge emissions to air associated with hydrocarbon producing wells at the Mangahewa-E wellsite	31/01/2013	2027
Mangahewa-G	10021-1	To discharge emissions to air associated with hydrocarbon producing wells at the Mangahewa-G wellsite	09/12/2014	2033
	10022-1	To discharge treated stormwater from hydrocarbon exploration and production operations at the Mangahewa-G wellsite, into an unnamed tributary of the Mangahewa Stream	08/01/2015	2033
	10026-1	To take and use water from a spring fed pond on an unnamed tributary of the Mangahewa Stream for hydrocarbon exploration activities at the Mangahewa-G wellsite	24/11/2014	2020

Wellsite	Consent number	Purpose	Issue date	Expiry
McKee-A	3666-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the McKee-A wellsite onto and into land and into an unnamed tributary in the Waitara catchment	22/04/2003	2033
McKee-B	3667-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production activities at the McKee-B wellsite onto and into land and into an unnamed tributary of the Mangahewa Stream in the Onaero catchment	28/04/2003	2033
	7462-1	To discharge emissions into the air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the McKee-B wellsite	21/04/2009	2027
McKee-C	3668-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations and electricity generation operations and associated activities at the McKee-C wellsite onto and into land and into an unnamed tributary of the Mangahewa Stream in the Onaero catchment	28/04/2003	2033
McKee-D	3669-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the McKee-D wellsite onto and into land and into an unnamed tributary in the Waitara catchment	28/04/2003	2033
McKee-E	4626-2	To discharge treated stormwater and treated produced water from the McKee-E wellsite into the Mangahewa Stream in the Onaero catchment	28/05/2009	2027
Mystone-A	4388-2	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Mystone-A wellsite onto and into land within the vicinity of an unnamed tributary of the Mangaone Stream in the Waitara catchment	13/05/2009	2027
	7455-1	To take water from the Manganui River for wellsite and well drilling activities during hydrocarbon exploration and production operations at the Mystone-A wellsite	13/03/2009	2021
	7459-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Mystone-A wellsite	31/03/2009	2027
Pouri-A	3671-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Pouri-A wellsite onto and into land and into an unnamed tributary of the Mangahewa Stream in the Onaero catchment	16/09/2003	2033
Pukemai-A	3670-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production activities at the Pukemai-A wellsite onto and into land and into the Pukemai Stream in the Onaero catchment.	28/04/2003	2033
Toetoe-A	3676-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Toetoe-A wellsite onto and into land and into the Mangaone Stream in the Waitara catchment	30/04/2003	2033
Toetoe-B	3677-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production activities at the Toetoe-B wellsite onto and into land and into an unnamed tributary of the Mangaone Stream in the Waitara catchment	28/04/2003	2033

Wellsite	Consent number	Purpose	Issue date	Expiry
Tuhua-A	3672-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production activities at the Tuhua-A wellsite onto and into land and into the Pouri Stream in the Onaero catchment	28/04/2003	2033
Tuhua-B	3673-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production activities at the Tuhua-B wellsite onto and into land and into the Pouri and Pukemai Streams in the Onaero catchment	28/04/2003	2033
Tuhua-C	3674-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production activities at the Tuhua-C wellsite onto and into land and into an unnamed tributary of the Pouri Stream in the Onaero catchment	28/04/2003	2033
Tuhua-D	3675-2	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Tuhua-D wellsite onto and into land and into the Pouri and Pukemai Streams in the Onaero catchment	28/04/2003	2033
Tuhua-E	4440-2	To discharge emissions into the air from the flaring of hydrocarbons and miscellaneous emissions associated with (a) hydrocarbon exploration and production testing operations and (b) emissions from production at the Tuhua-E wellsite	30/04/2003	2021

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 MPS, MPP and associated sites 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;
- in discussion over monitoring requirements;
- preparation for any reviews;
- renewals;
- new consents;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.4.3 Site inspections

The McKee sites were visited six times during the monitoring period. With regard to consents for the abstraction of or discharge to water, the main points of interest were plant processes with potential or actual discharges to receiving watercourses, including contaminated stormwater and process wastewaters. Air inspections focused on plant processes with associated actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. Sources of data being collected by the Company were identified and accessed, so that performance in respect of operation, internal monitoring, and supervision could be reviewed by the Council. The neighbourhood was surveyed for environmental effects.

1.4.4 Chemical sampling

The Council undertook sampling of the discharges from the MPS and MPP sites and the water quality of the receiving waters of the Mangahewa Stream.

The MPS discharge to the Mangahewa Stream was sampled on one occasion, and the sample analysed for chlorides, conductivity, hydrocarbons, pH and suspended solids. The Mangahewa Stream sites were sampled concurrently, and the samples analysed for chlorides, conductivity, hydrocarbons, pH, suspended solids and turbidity.

The MPP discharge to the tributary of the Mangahewa Stream was sampled on one occasion, and the sample analysed for free chlorine, hydrocarbons, pH and suspended solids. The tributary downstream of the MPP discharge was sampled concurrently and analysed for the same constituents.

The impounded stormwater which is discharged to the Waitara River was sampled once, and the samples analysed for chlorides, conductivity, hydrocarbons, pH and suspended solids.

The Council also undertook sampling of the ambient air quality outside the boundary of the site. A multi-gas meter was 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). A PM10 particulate monitor was deployed concurrently with the multi-gas meter. Two nitrogen oxide measuring devices were also deployed in the vicinity of the plant on one occasion during the year under review. The Company supplied data on flaring causes and flare and fuel gas volumes throughout the period.

1.4.5 Biomonitoring surveys

Biological surveys were performed on two occasions in the Mangahewa Stream to determine whether or not the discharge of stormwater from the MPS has had a detrimental effect upon the communities of the stream. Soft sediment samples were taken concurrently from three sites and analysed for hydrocarbons.

2. Results

2.1 Water

2.1.1 Inspections

Six inspections of MPS and MPP were undertaken during the period under review. The following was found during the inspections:

14 August 2015

A site inspection was undertaken after several extreme rainfall events. Some erosion and subsidence of the site had been repaired. All ancillary equipment was secure. The stormwater discharge points were clear of any contaminants and the water take area in the Mangahewa Stream had been cleaned out. No flaring was being undertaken.

27 November 2015

The site inspection found that all contingencies for stormwater, storage and bunding were secure. Ring drains and stormwater discharge and abstraction points in the Mangahewa Stream showed no evidence of any impact. Frogs were present in the ring drain providing evidence of good water quality. No flaring was taking place during the inspection, and no odours or smoke were noted. The tanker load out area was observed to be neat and tidy.

22 February 2016

The McKee Production Station site was neat and tidy. The truck load out area was clear of all contaminants. Bunds were clear and the stormwater system was unobstructed, with no evidence of any effect from any previous discharges in the nearby Mangahewa Stream or about the water take area. There was no evidence of any flaring or off site effects as a result of any previous flaring.

26 May 2016

The site was inspected after very heavy rainfall and following a prolonged period of extreme weather events. The discharge point to the Mangahewa Stream did not indicate any effects from the stormwater discharge or the water take. Flaring was minimal and no smoke or odours were noted. Overall the site was neat and tidy and well managed.

31 May 2016

A check of the pumping station and water take area, as well as the stormwater discharge point into the Mangahewa Stream, after recent heavy rain showed that there were no effects from the two consented activities (water take and discharge).

30 June 2016

A site inspection was undertaken after excessive rainfall over the preceding week. The inspection paid particular attention to stormwater discharges and silt controls. The stormwater discharge to the nearby Mangahewa Stream had not caused any effect and the water take area was satisfactory. The ring drain was clear, apart from the usual and natural iron oxide build up. Bunds were all clear of contaminants and API separators were fit for purpose and operating normally. Minimal flaring was being undertaken with no smoke or odours noted.

2.1.2 Results of abstraction and discharge monitoring

General stormwater from the MPS is discharged to the Mangahewa Stream via a skimmer pit (sampled at STW001119). Impounded stormwater from within bunded areas filters through a treatment system prior to discharge to the Waitara River (sampled at STW002007). Overflow from the treated water retention pond at the MPP is discharged to a tributary of the Mangahewa Stream (STW002085). Discharges and related stream sampling sites are shown in Figure 2.

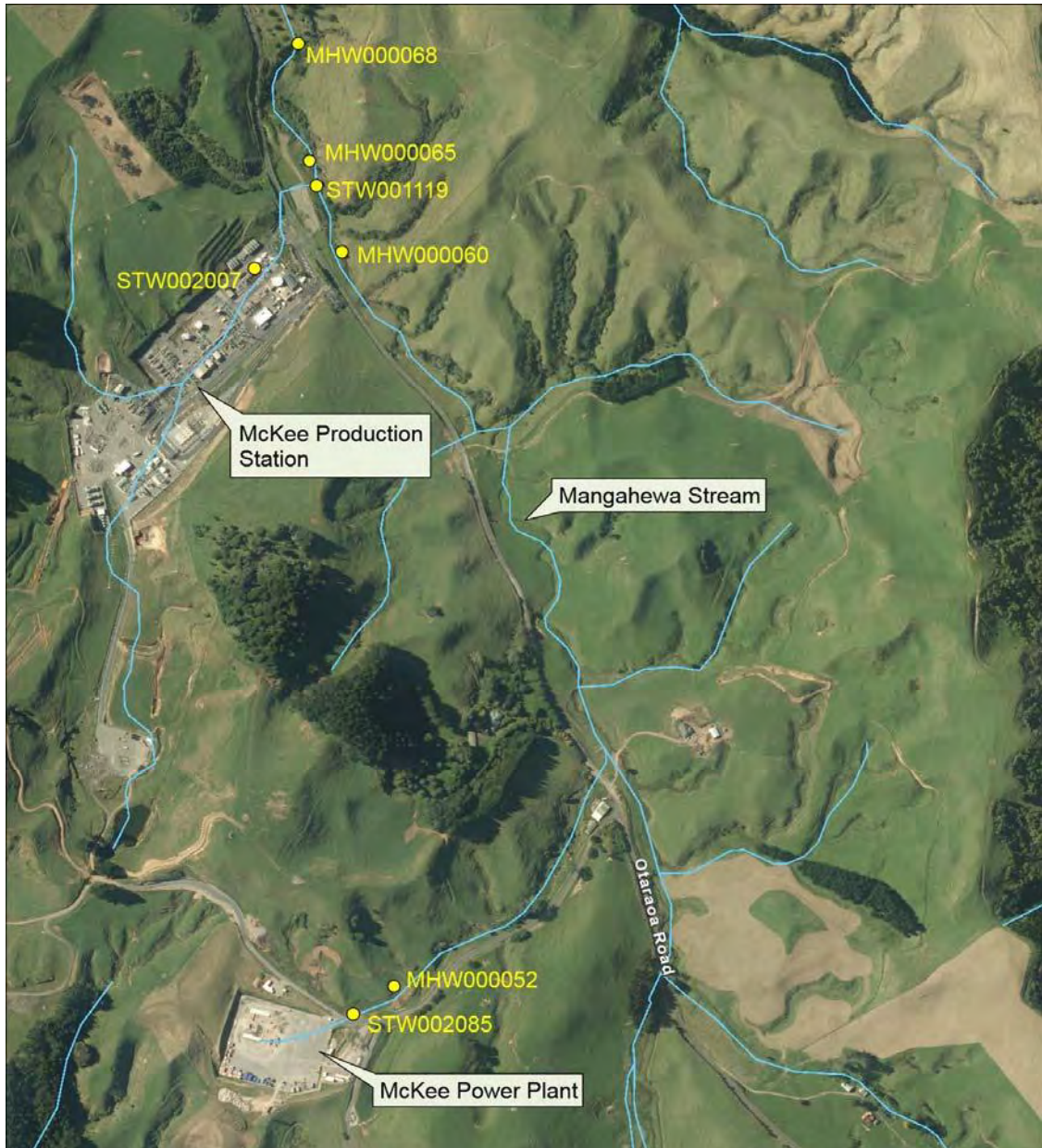


Figure 2 Sampling sites relating to McKee Production Station and Power Plant

2.1.2.1 Discharge to the Mangahewa Stream from MPS

Water quality sampling of the discharge to the Mangahewa Stream was undertaken on one occasion during the 2015-2016 period. Table 4 presents the results of this sampling.

Table 4 Monitoring results for MPS stormwater discharge to Mangahewa Stream (site STW001119)

Parameter	Units	18 May 2016	Consent 7435-1 limits
Chloride	g/m ³	10.1	50
Conductivity	mS/m	9.5	-
Hydrocarbons	g/m ³	< 0.5	15
pH		7.1	6.0 – 9.0
Suspended solids	g/m ³	13	100
Temperature	Deg.C	14.2	-

The results are indicative of a clean stormwater discharge at the time of sampling, with parameters well below the limits imposed by consent 7435-1.

2.1.2.2 Discharge to the Waitara River

Water quality sampling of the impounded stormwater which is discharged to the Waitara River was undertaken once during the 2015-2016 period. Table 5 presents the results of this sampling.

Table 5 Monitoring results for stormwater discharge to Waitara River (site STW002007)

Parameter	Units	18 May 2016	Consent 1158-1 limits
Chloride	g/m ³	35.9	-
Conductivity	mS/m	17.1	-
Hydrocarbons	g/m ³	1.1	90% <10, 10% <20
pH		7.6	6.5 – 8.5
Suspended solids	g/m ³	6	30
Temperature	Deg.C	15.1	< 20

The results are again indicative of clean stormwater at the time of sampling, with parameters well below the limits imposed by consent 1158-1.

Results provided by Todd Energy from self-monitoring of the water quality of the stormwater discharged to the Waitara River during the period under review showed compliance with all applicable consent conditions on all occasions, except for two slight exceedances (out of 57) of the suspended solids limit. These would be very unlikely to have had an impact on the water quality of the Waitara River due to the massive dilution involved.

2.1.2.3 Discharge to an unnamed tributary of the Mangahewa Stream from MPP

Water quality sampling of the discharge to the tributary of the Mangahewa Stream from MPP was undertaken once during the 2015-2016 period. Table 6 presents the results of this sampling.

Table 6 Monitoring results for MPP discharge to tributary of the Mangahewa Stream (site STW002085)

Parameter	Units	18 May 2016	Consent 7435-1 limits
Free chlorine	g/m ³	< 0.1	0.1
Hydrocarbons	g/m ³	< 0.5	15
pH		6.7	6.0 – 9.0
Suspended solids	g/m ³	14	100
Temperature	Deg.C	14.2	-

The results are indicative of a clean discharge at the time of sampling, with no free chlorine or hydrocarbons detected.

The company provided approximately weekly self-monitoring results from the discharge to the upper and lower culverts and from within the stream and these showed compliance with all parameters, with the exception of two slightly low pH values (5.8 and 5.9). It would be unlikely that these would have had any impact on water quality.

**Photo 2** McKee Production Station stormwater discharge to the Mangahewa Stream

2.1.3 Results of receiving environment monitoring

2.1.3.1 Chemical

Water quality sampling of the Mangahewa Stream was undertaken in conjunction with stormwater discharge sampling. The results are presented in Table 7.

Table 7 Receiving environment results for Mangahewa Stream in relation to MPS

Parameter	Units	18 May 2016	
		Upstream [site MHW000060]	Downstream [site MHW000065]
Chloride	g/m ³	11.6	10.6
Conductivity	mS/m	9.1	8.6
Hydrocarbons	g/m ³	< 0.5	< 0.5
pH		6.8	6.9
Temperature	Deg.C	13.4	13.4
Suspended solids	g/m ³	110	110
Turbidity	NTU	80	89

The results show minimal impact of discharges from MPS on the water quality of the Mangahewa Stream at the time of sampling. This indicates compliance with the conditions of consents 1157-1 and 7435-1.

Water quality sampling of the unnamed tributary of the Mangahewa Stream in relation to the MPP discharge was undertaken in conjunction with stormwater discharge sampling. The results are presented in Table 8. An upstream sample could not be collected as the tributary above the discharge point was completely enclosed with vegetation.

Table 8 Receiving environment results for the Mangahewa Stream tributary in relation to MPP

Parameter	Units	18 May 2016	
		Upstream [site MHW000050]	Downstream [site MHW000052]
Free chlorine	g/m ³	-	< 0.1
Hydrocarbons	g/m ³	-	< 0.5
pH		-	6.8
Suspended solids	g/m ³	-	14
Temperature	Deg.C	-	13.9

The results are indicative of good water quality in the tributary. No free chlorine or hydrocarbons were detected downstream of the MPP discharge.

Due to historical contamination, the sediments on the bed of the Mangahewa Stream in the vicinity of MPS have been found to contain hydrocarbons. Monitoring of the levels of these hydrocarbons has been undertaken in previous years in conjunction with biomonitoring surveys to determine their impact on the health of the stream communities and whether the concentrations are decreasing over time due to degradation and/or downstream transport.

Table 9 shows the results of soft sediment sampling for the period 2011 to 2016. The sampling locations are shown in Figure 2.

Table 9 Soft sediment sampling of the Mangahewa Stream for hydrocarbons 2011 - 2016

Date	Hydrocarbons in sediment - mg/kg dry weight		
	100m u/s of discharge [site MHW000060]	50m d/s of discharge [site MHW000065]	250m d/s of discharge [site MHW000068]
3 June 2011	49	130	190
12 April 2013	< 10	170	56
6 June 2014	< 0.5	94	(no sample)
8 January 2015	11	34	87
2 April 2015	20	114	62
9 December 2015	< 14	39	40
1 April 2016	< 18	< 17	99

Monitoring during the 2015-2016 period did not detect hydrocarbons in the sediments at the upstream site. At the middle site, there was a lower than average concentration in the December sample and levels were below the detection limit in the April sample. Concentrations were similar to previous years at the lower site, 250 metres downstream of the MPS discharge point. Sediment monitoring will continue to be undertaken to establish if there is a declining trend in hydrocarbon concentrations.

2.1.3.2 Biomonitoring

The Council's standard 'kick-sampling' technique was used at two established sites to collect streambed macroinvertebrates from the Mangahewa Stream on 9 December 2015 and 1 April 2016. The sites are shown in Figure 2 as MHW000060 (Site 1) and MHW000065 (Site 2). Samples were sorted and identified to provide the number of taxa (richness), MCI score and SQMCI_s score for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI_s takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities particularly if non-organic impacts are occurring. Significant differences in either the MCI or the SQMCI_s between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

The December 2015 macroinvertebrate survey was undertaken during moderate flows. Flows were higher than that observed during the previous survey and as a result, there was a slight improvement in taxa richness at both sites, which recorded moderate community richnesses. While the recovery in community richness recorded in the previous seven surveys remained, there was some deterioration noted at site 2 in the survey. At the time of sampling and processing of the survey, no hydrocarbon odour was noted from the downstream sample, and sediment samples at site 2 indicated that the degree of hydrocarbon contamination had reduced slightly from the previous (April 2015) sampling.

The site upstream of the production station recorded a macroinvertebrate community in above average health, with a MCI score seventeen units higher than the median, being one of the highest MCI scores recorded at this site to date. The SQMCI_s was 0.7 units higher than the median. The site downstream recorded a taxa richness of 22, five taxa higher than the median taxa richness. The MCI score was also similar to the median, but represented a significant reduction from that recorded in the previous survey. The SQMCI_s score was also significantly less than that recorded in the previous survey, and the median score for this site. These results indicate that the macroinvertebrate community at site 2 was in average to below average health, and in significantly poorer condition than that recorded in the April 2015 survey. This is in contrast to that recorded upstream, which was found to be in above average health.

The April 2016 survey was undertaken during a period of low flows. Both sites recorded scores similar to their respective medians for all invertebrate metrics, although taxa richnesses and MCI scores were substantially lower than those recorded in the preceding (December 2015) survey. SQMCI_s score had not changed significantly during this time. Hydrocarbon concentrations were similar to those recorded in the previous survey, although no hydrocarbon odour was noted at the time of sampling. The decrease in taxa richnesses and MCI scores is likely to be related to the low flow conditions at the time of sampling.

Although no hydrocarbon odour was noted during sampling in either spring or autumn, the elevated concentration of hydrocarbons cannot be discounted as a continuing factor potentially affecting community health. It is possible that subtle impacts of the hydrocarbon contamination will manifest as reduced abundances, as opposed to reduced MCI and SQMCI_s scores. It remains to be seen whether future results reflect a relationship between macroinvertebrate community health and hydrocarbon concentration in the sediment. It should be noted that it has not been determined whether the hydrocarbon contamination is a remnant effect from the well blow-out that occurred here in 1995, or whether it is recent contamination.

It was recommended that sediment samples continue to be collected and analysed for hydrocarbons, and that this sampling is undertaken in conjunction with the macroinvertebrate surveys.

The full biomonitoring reports are attached to this report in Appendix II.

2.1.4 Summary of water abstractions reported by Todd Energy and Nova Energy

Figures 3 to 6 provide summaries of the abstraction volumes for consented water takes in relation to the McKee and Mangahewa facilities. No water was abstracted under the water take consent for Mangahewa-D (7404-1), Mangahewa-E (9456-1) or Mystone-A wellsite (7455-1) during the period under review. All daily volumes for all of the abstractions were within the limits stipulated by their respective consents.

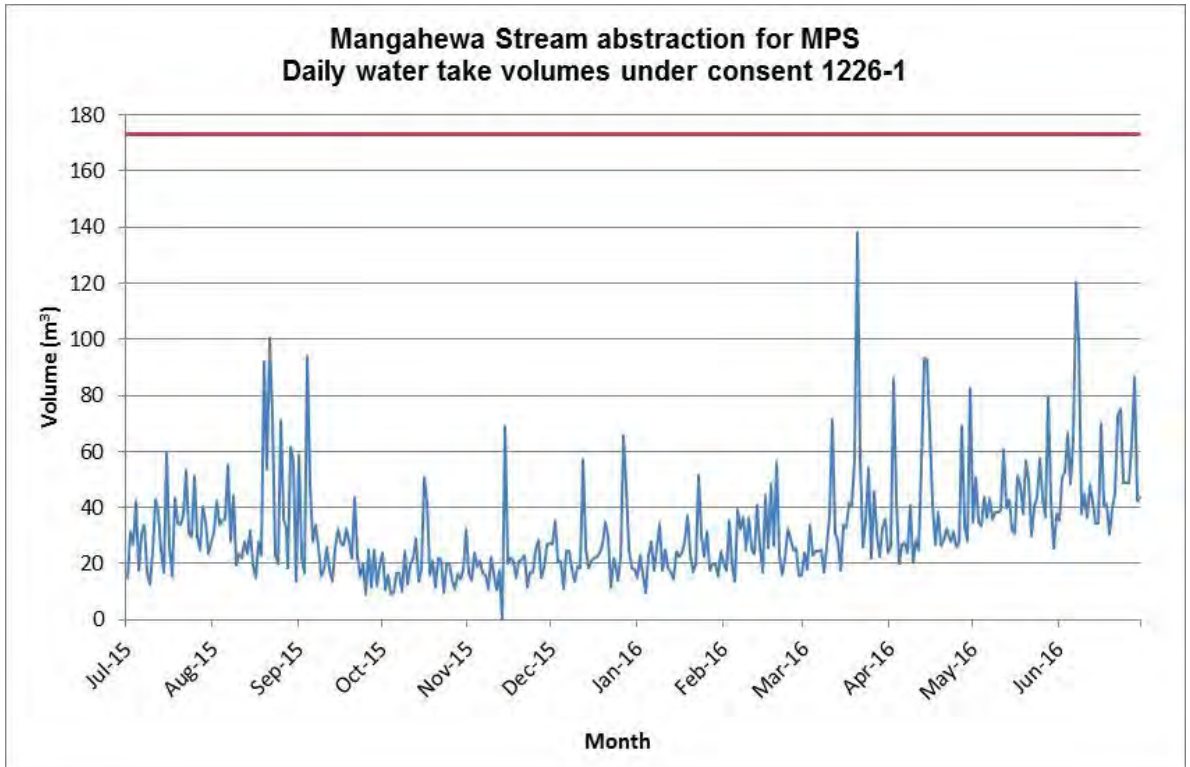


Figure 3 Daily water abstraction volumes for MPS under consent 1226-1

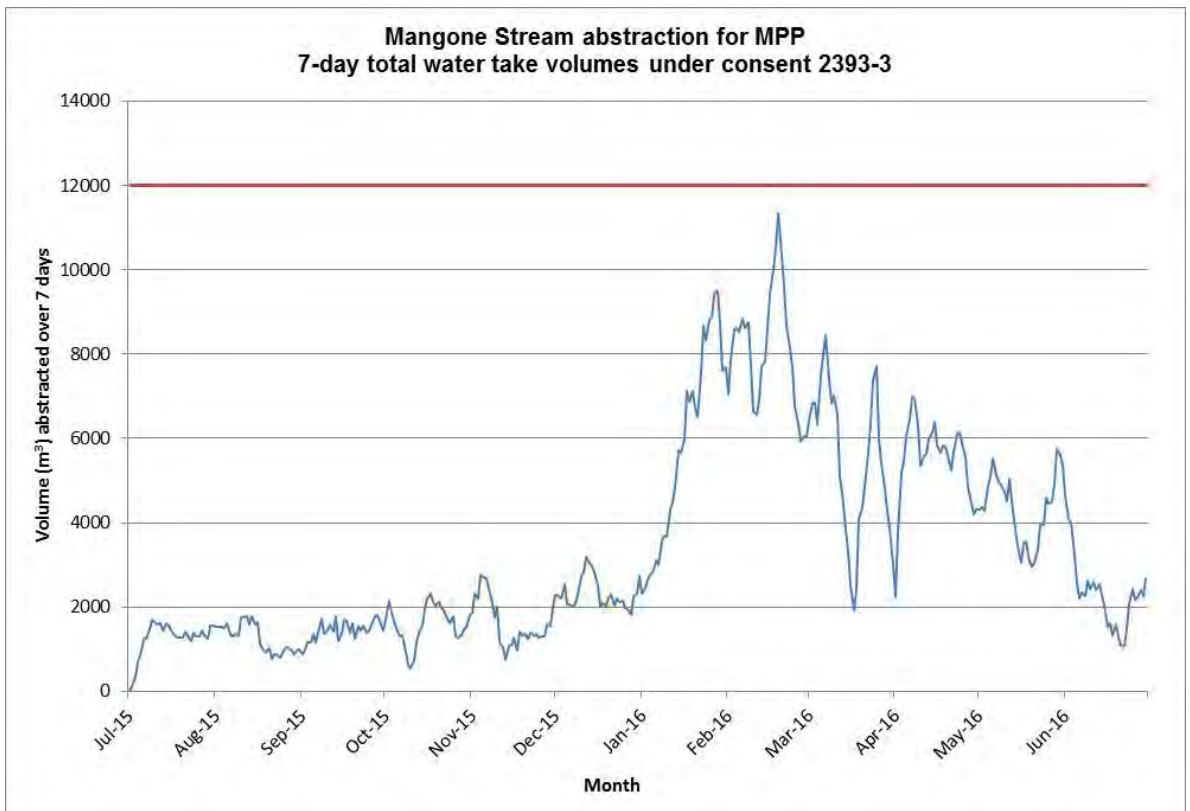


Figure 4 7-day total water abstraction volumes for MPP under consent 2393-3

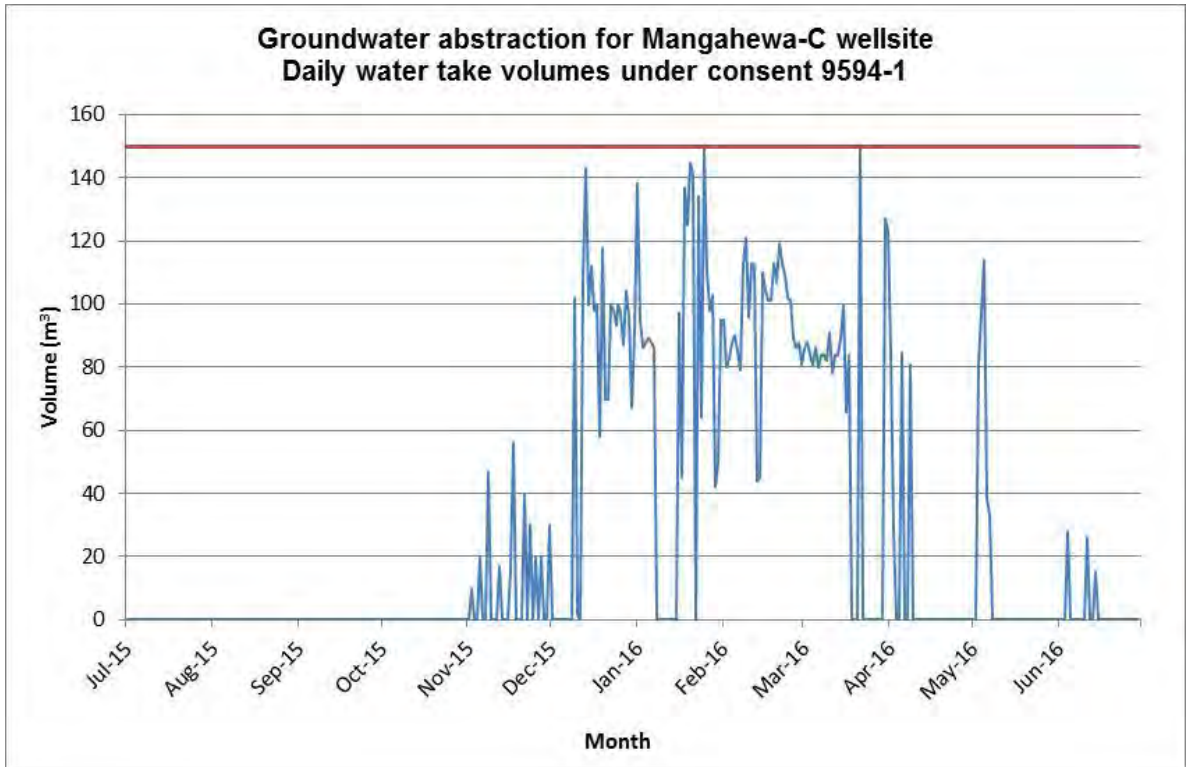


Figure 5 Daily groundwater abstraction volumes for Mangahewa-C under consent 9594-1

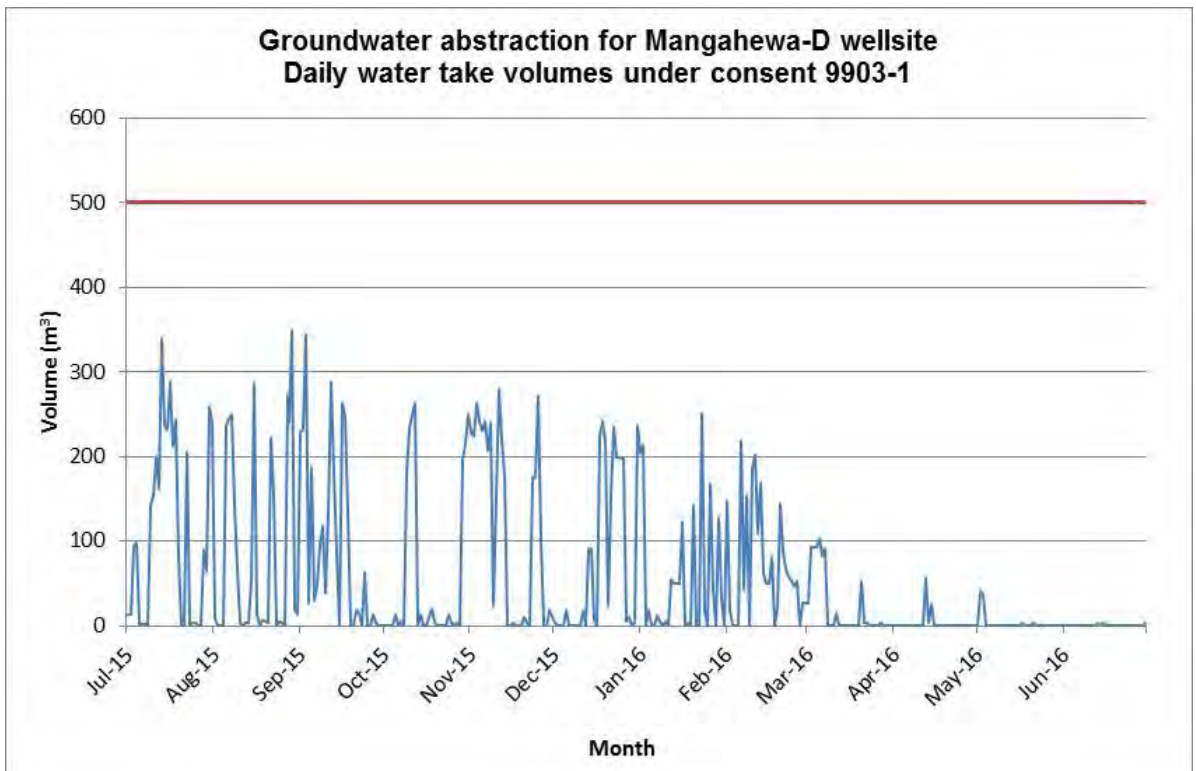


Figure 6 Daily groundwater abstraction volumes for Mangahewa-D under consent 9903-1

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. Air discharges were all found to be satisfactory and no offensive or objectionable odours were noted during the inspections.

2.2.2 Results of receiving environment 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 plant. The deployment lasted approximately 44 hours, with the instrument placed in a down-wind 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 7.

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.



Figure 7 Air monitoring sites at McKee Production Station for 2015-2016

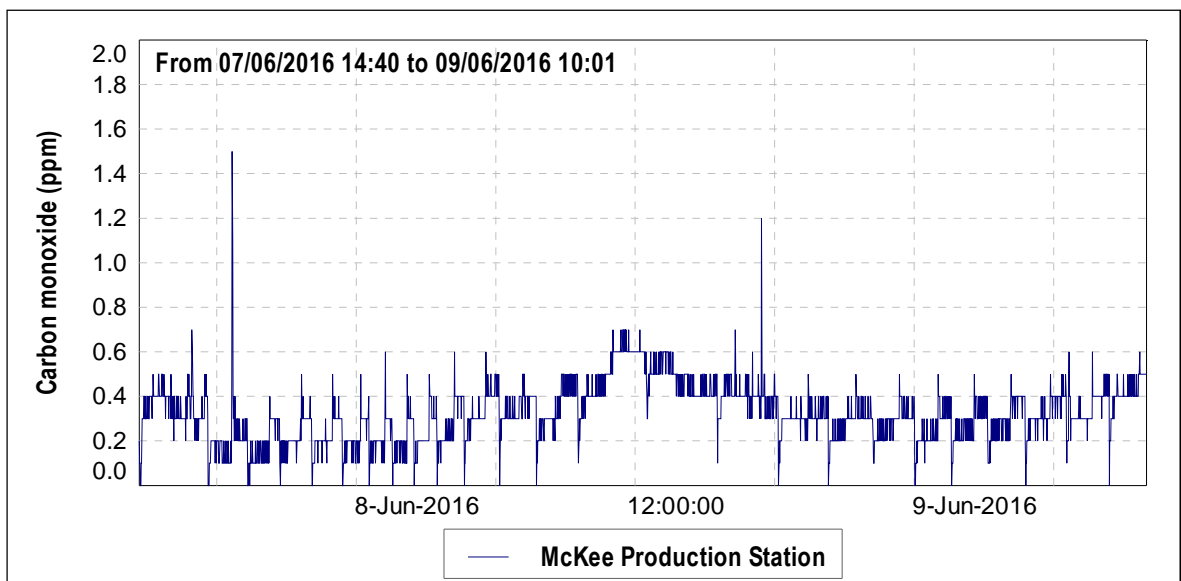
The details of the sample run are summarised in Table 10 and the data from the sample run are presented graphically in Figure 8.

The consents covering air discharges from MPS have specific limits related to particular gases. Special condition 5 of consent 4050-3 sets a limit on the carbon monoxide concentration at or beyond the production station's boundary. The limit is expressed as 10 mg/m³ for an eight hour average or 30 mg/m³ for a one hour average exposure. The maximum concentration of carbon monoxide found during the monitoring run was 1.5 mg/m³, while the average concentration for the entire dataset was 0.3 mg/m³, which comply with consent conditions. This is similar to the pattern found in previous years.

Table 10 Results of carbon monoxide and LEL monitoring at McKee Production Station

Period		7 to 9 June 2016 (44 hours)
Max	CO (ppm)	1.50
	LEL (%)	0.10
Mean	CO (ppm)	0.30
	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.

**Figure 8** Ambient CO levels in the vicinity of the McKee Production Station

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 MPS reach any more than a trivial level.

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 MPS. The deployment lasted approximately 45 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 7. The results of the sample run are presented in Figure 9 and Table 11.

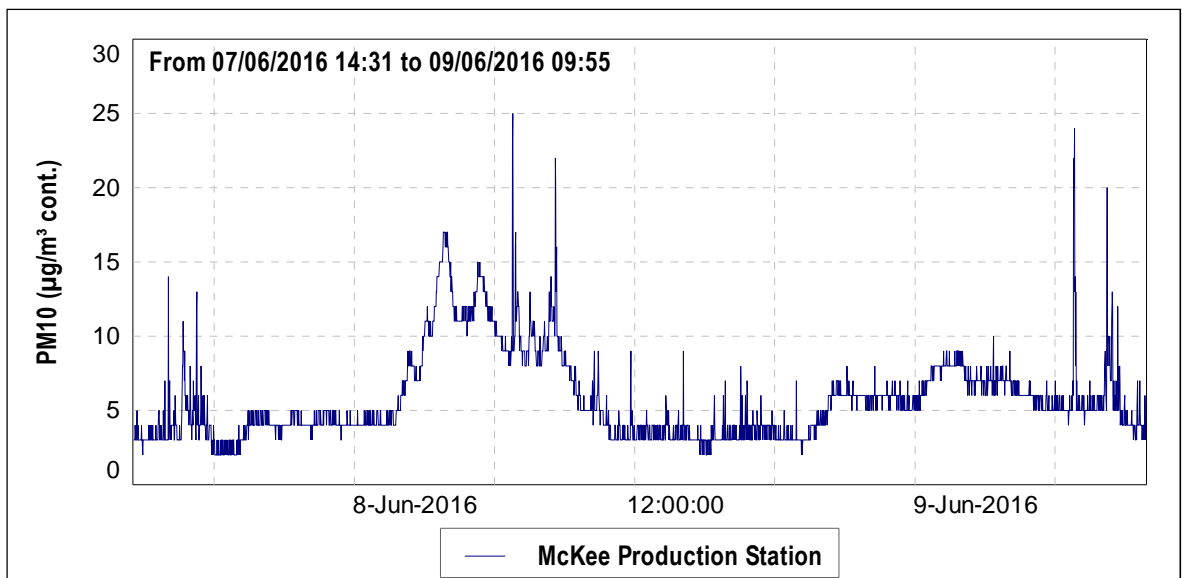


Figure 9 PM10 concentrations ($\mu\text{g}/\text{m}^3$) at the McKee Production Station

Table 11 Daily averages of PM10 results from monitoring at McKee Production Station

	7 to 9 June 2016 (45 hours)	
24 hr. set	Day 1	Day 2
Daily average	6.1 $\mu\text{g}/\text{m}^3$	5.1 $\mu\text{g}/\text{m}^3$
NES limit (24 hour average)	50 $\mu\text{g}/\text{m}^3$	

During the 45 hour run, from 7 to 9 June 2016, the average recorded PM10 concentration was 6.1 $\mu\text{g}/\text{m}^3$ for the first 24 hour period and 5.1 $\mu\text{g}/\text{m}^3$ for the second 24 hour period. These daily averages equate to 12.2% and 10.2%, respectively, of the 50 $\mu\text{g}/\text{m}^3$ value that is set by the NES. Background levels of PM10 in the region have been found to be typically around 11 $\mu\text{g}/\text{m}^3$.

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 28 NO_x monitoring sites (including two sites in the vicinity of MPS) 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 consents covering air discharges from MPS have specific limits related to particular gases. Special condition 6 of consent 4050-3 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 1-hour average or 100 µg/m³ for a 24-hour average exposure.

NO_x passive adsorption discs were placed at two locations in the vicinity of MPS on one occasion during the year under review. The discs were left in place for a period of 21 days. The calculated 1-hour and 24-hour theoretical maximum NO_x concentrations found at MPS during the year under review equates to 1.72 µg/m³ and 9.10 µg/m³, respectively. The results show that the ambient ground level concentration of NO_x is well below the limits set out by consent 4050-3.

The full air monitoring reports are attached to this report in Appendix III.

2.2.3 Summary of flaring and fuel use reported by the Company

Summaries of flaring and fuel use at MPS are provided in Figures 10 and 11.

During the period under review, the Company kept the Council informed of all non-routine flaring at MPS. The majority of this flaring related to planned maintenance, repairs, plant and wellsite configuration changes, power outages and compressor trips. No visible smoke events were recorded. There was no flaring associated with the exercise of the air discharge consents for the McKee EGP (7290-1) or MPP (7921-1).

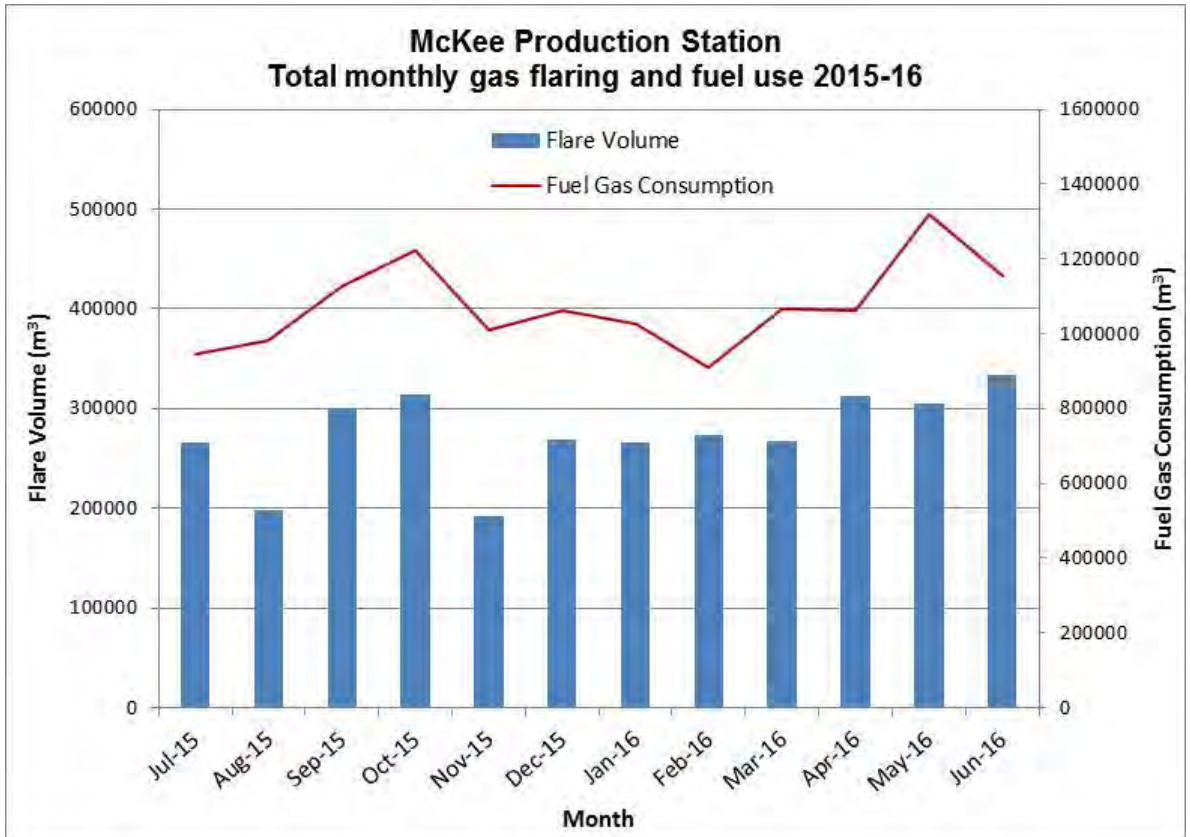


Figure 10 Monthly gas flaring and fuel use for McKee Production Station under consent 4050-3

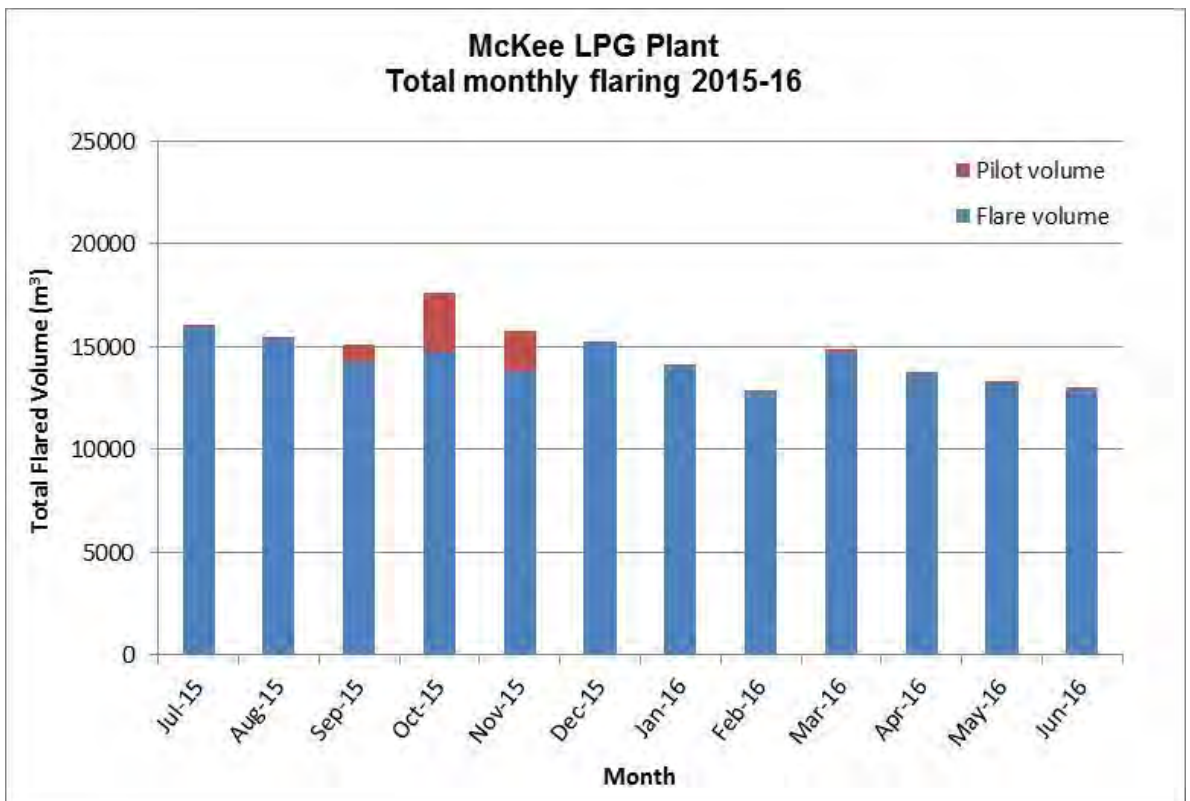


Figure 11 Monthly flaring volumes for McKee LPG Plant under consent 7436-1

2.3 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with the 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 courses of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

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

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

In the 2015-2016 period, the Council was not required to undertake significant additional investigations and interventions, or record incidents, in association with the Company's conditions in resource consents or provisions in Regional Plans.

3. Discussion

3.1 Discussion of site performance

Inspections of the MPS and MPP during the 2015-2016 period found that the sites were well managed and the stormwater systems were maintained to a satisfactory standard. Emissions to air were well controlled. All water abstractions complied with the requirements of their respective consents.

3.2 Environmental effects of exercise of consents

Stormwater system inspections showed that discharges from the sites complied with consent conditions at the time. Receiving water inspections and sampling showed that the discharges were not causing any adverse effects on the Waitara River or Mangahewa Stream at the time of monitoring.

Biomonitoring in the Mangahewa Stream found that the community health at the upstream site ranged from above average health in summer to average health in autumn. The downstream site community health was of average health with lower indicator values than the previous year. Hydrocarbons from historical contamination were not detected in the stream sediment at the upstream site, but were present at lower concentrations than previous years in the lower site sediment. Further monitoring will be undertaken to assess the trends in sediment hydrocarbon concentrations and stream community health.

There were no adverse effects on the environment resulting from the exercise of the air discharge consents. The ambient air quality monitoring at the production station showed that levels of carbon monoxide, combustible gases, PM10 particulates and nitrogen oxides were all below levels of concern at the time of sampling. No offensive or objectionable odours were detected beyond the boundary during inspections and there were no complaints in relation to air emissions from the sites.

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Tables 12-26.

Table 12 Summary of performance for Consent 1157-1

Purpose: To discharge uncontaminated stormwater from the site of the McKee Production Station to an unnamed tributary of the Mangahewa Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Ensure the stream can cope with increased volume of water	Inspection	Yes
2. Minimise disturbance of the stream	Inspection	Yes
3. Prevent or mitigate erosion	Inspection	Yes
4. Corrective measures applied are to be to the satisfaction of the Council	Inspection	Yes

Purpose: To discharge uncontaminated stormwater from the site of the McKee Production Station to an unnamed tributary of the Mangahewa Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
5. Install a sampling chamber in the main stormwater line	Inspection	Yes
6. Stormwater design and discharge points to be forwarded to Council	Information received	Yes
7. Provide contingency plan	Latest version approved 6 August 2014	Yes
8. Discharge not to affect receiving water	Sampling	Yes
9. Council may carry out biological monitoring	Biomonitoring undertaken	Yes
10. Review provision	Provision for review every five years	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 1158-1

Purpose: To discharge treated impounded stormwater from the site of the McKee Production Facility into the Waitara River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Stormwater to be directed for treatment prior to discharge	Inspection	Yes
2. Prevent or mitigate erosion	Inspection	Yes
3. Corrective measures applied are to be to satisfaction of Council	Inspection	Yes
4. Install a sampling chamber in the main stormwater line	Inspection	Yes
5. Stormwater layout design and discharge points are to be forwarded to the Council	Information received	Yes
6. Supply specifications of works to Council	Information received	Yes
7. Trained operator onsite capable of operation of all aspects of the treatment works	Inspection	Yes
8. Limits on contaminants in the discharge	Sampling	Yes
9. Discharge shall have no other effect on the receiving water	Sampling and inspection	Yes

Purpose: To discharge treated impounded stormwater from the site of the McKee Production Facility into the Waitara River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
10. Discharge not to cause adverse effects on the biological community of the Waitara River	Not monitored during the period under review	N/A
11. Discharge not to alter colour or clarity of the water	Inspection	Yes
12. Management plan	Management Plan received	Yes
13. Spill plan	Latest version approved 6 August 2014	Yes
14. Council may undertake ecological monitoring of the receiving water	Not monitored during the period under review	N/A
15. Toxicological monitoring of discharge	Not undertaken during the period under review	N/A
16. Monitoring of discharge shall be undertaken as required	Records received	Yes
17. Review provision	Provision for review every five years	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 14 Summary of performance for Consent 1159-1

Purpose: To divert unnamed tributaries of the Mangahewa Stream in the vicinity of the McKee Production Facility, and to discharge surface water run-off from adjacent land into the Mangahewa Stream, to permit construction and operation of the said facility		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Plans and location of diversions to be forwarded to Council	Received	Yes
2. Ensure natural channels of stream can cope with increased flow	Inspection	Yes
3. Prevent or mitigate erosion	Inspection	Yes
4. Any corrective measures are to be to the satisfaction of Council	Inspection	Yes
5. Council may carry out biological monitoring	Biomonitoring undertaken	Yes
6. Review provision	Provision for review every five years	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 15 Summary of performance for Consent 1226-1

Purpose: To take water from the Mangahewa Stream for process, fire fighting and domestic purposes associated with operation of the McKee Production Station		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Minimum flow of at least 5 litres/sec to be maintained in tributary	Not assessed	N/A
2. Install metering system and forward records to Council	Records provided to Council	Yes
3. Intake structure to be designed to minimise disturbance	Inspection	Yes
4. Submit plans of intake structure	Provided	Yes
5. Review provision	Provision for review every five years	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 16 Summary of performance for Consent 1227-1

Purpose: To construct a weir control for the McKee Production Site water intake on the Mangahewa Stream in the Onaero Catchment		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Submit plans and location of all works	Received	Yes
2. Works to minimise disturbance to beds and banks of river channel flows	Inspection	Yes
3. Prevent or mitigate any erosion	Inspection	Yes
4. Intake structure to be designed and constructed to permit passage of fish upstream	Inspections. Triennial fish survey next scheduled in 2017-2018	Yes
5. Minimum flow of no less than 5 litres/sec in the Mangahewa Stream	Not assessed	N/A
6. Operation of sluice pipe for desilting only with written approval of Council	No requests to undertake desilting	N/A
7. Review provision	Provision for review every five years	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 17 Summary of performance for Consent 2393-3

Purpose: To take water from the Mangaone Stream in the Waitara catchment for use in a gas fired Power Station		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Abstraction rate not to exceed 36 l/sec or 12,000m ³ over seven days	Abstraction records received	Yes
2. Install and maintain a water meter and data logger at the take point	Meter installed and verified	Yes
3. Provide certification of the measuring and recording equipment	Certification received February 2015, next due before February 2020	Yes
4. Notify the Council of any malfunctions and repairs	None undertaken	N/A
5. The equipment shall be accessible to the Council at all reasonable times	Inspection	Yes
6. Provide records in a suitable format	Abstraction records received	Yes
7. No taking when flow in Waitara River is less than 4,600 l/s	Flow did not drop below 4,600 l/s	Yes
8. Adoption of best practicable option	Inspection	Yes
9. Design and screen the intake to avoid entrapment of fish	Inspection	Yes
10. Review provision	Next option for review in 2018	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 18 Summary of performance for Consent 4006-2

Purpose: To erect, place and maintain a bridge over the Waitara River for oil field access purposes		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Notify Council prior to maintenance works which may disturb the river bed	No works undertaken	N/A
2. Structure shall be maintained to ensure conditions of consent are met	Inspection	Yes
3. Structure shall be removed and area reinstated when no longer required	Structure still in use	N/A
4. Review provision	Next option for review in 2021	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 19 Summary of performance for Consent 4050-3

Purpose: To discharge emissions into the air arising from the flaring of hydrocarbons associated with production activities at the McKee-C wellsite and from hydrocarbon processing operations and miscellaneous emissions at the McKee Production Station		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent holder shall adopt the best practicable option	Inspection	Yes
2. Hydrocarbon storage vessels are to be fitted with vapour recovery systems	Inspection	Yes
3. Opacity of smoke emissions shall not exceed 1 on the Ringlemann Scale	Not assessed	N/A
4. There shall be no offensive odour or smoke beyond the boundary	Inspection	Yes
5. Limits on CO concentration at or beyond the boundary	Ambient air sampling	Yes
6. Limits on NOx concentration at or beyond boundary	Ambient air sampling	Yes
7. No hazardous/toxic/noxious emissions at or beyond boundary	Inspection and ambient air sampling	Yes
8. Limit on increase of contaminant concentrations at or beyond boundary	Not assessed	N/A
9. Gas and condensate analysis to be made available	Not requested	N/A
10. Consent holder to record occasions of visible smoke	Inspection	Yes
11. Consent holder to maintain flaring log	Inspection and log received by Council	Yes
12. Provision of flaring and emissions report each May	Report received by Council	Yes
13. No alterations to be made without consulting Council prior	Inspection	Yes
14. No liquid or solid hydrocarbons to be combusted except in emergency	Inspection and consent holders records	Yes
15. Council to be notified of flaring	Notifications received	Yes
16. Consent holder to notify residents within 1 km prior to flaring	No complaints received	Yes
17. Wind speed and direction to be taken into consideration for flaring	No complaints received	Yes
18. Gas flared to be treated by effective separation and recovery	Inspection	Yes
19. Council to be notified if separation fails	No incidents during period	N/A

Purpose: To discharge emissions into the air arising from the flaring of hydrocarbons associated with production activities at the McKee-C wellsite and from hydrocarbon processing operations and miscellaneous emissions at the McKee Production Station		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
20. Only well stream substances to be combusted in flare pit	Inspection and records	Yes
21. Review provision	Next option for review in 2021	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 20 Summary of performance for Consent 4560-2

Purpose: To discharge wastewater from filter backwashing and tank cleaning into the Waitara River		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Exercise of consent to be in accordance with information submitted in support of application	Inspection	Yes
2. Discharge not to cause effects beyond mixing zone	Inspection	Yes
3. Review provision	No further review options	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 21 Summary of performance for Consent 7290-1

Purpose: To discharge emissions into the air from natural gas combustion and other related activities associated with the operation of an electricity generation plant at the McKee Production Station		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Adoption of the best practicable option	Inspection	Yes
2. Consult with Council prior to alterations	Inspection	Yes
3. Dangerous levels of airborne contaminants at or beyond the boundary not allowed	Air quality monitoring	Yes
4. Odour, dust or smoke that is offensive or obnoxious or objectionable at or beyond the boundary not allowed	Inspection	Yes
5. Hazardous, toxic or noxious contaminants at or beyond the boundary not allowed	Inspection and air quality monitoring	Yes

Purpose: To discharge emissions into the air from natural gas combustion and other related activities associated with the operation of an electricity generation plant at the McKee Production Station		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
6. Maximum ground level concentration of carbon monoxide at or beyond the boundary	Air quality monitoring	Yes
7. Maximum ground level concentration of nitrogen dioxide at or beyond the boundary	Air quality monitoring	Yes
8. Specified maximum ground level concentrations for contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides	Not assessed	N/A
9. Lapse condition	Not applicable – consent exercised	N/A
10. Review provision	Next option for review in 2021	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 22 Summary of performance for Consent 7435-1

Purpose: To discharge stormwater into an unnamed tributary of the Mangahewa Stream in the Onaero catchment from a LPG Plant		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent holder shall adopt the best practicable option	Inspection and liaison with consent holder	Yes
2. Maximum catchment area 7,800 m ²	Site plans	Yes
3. Provide site plans	Plans received	Yes
4. Notify Council prior to exercise of consent	Notifications received	Yes
5. Maintain contingency plan	Latest version approved 6 August 2014	Yes
6. Maintain stormwater management plan	Plan received	Yes
7. Stormwater directed to treatment system	Inspection	Yes
8. Hazardous substance storage to be bunded	Inspection	Yes
9. Limits contaminants in the discharge	Sampling	Yes
10. Discharge not to cause certain effects in receiving waters	Inspection and sampling	Yes

Purpose: To discharge stormwater into an unnamed tributary of the Mangahewa Stream in the Onaero catchment from a LPG Plant		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
11. Lapse provision	Not applicable - consent exercised	N/A
12. Review provision	Next option for review in 2021	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 23 Summary of performance for Consent 7436-1

Purpose: To discharge emissions to air from the flaring of natural gas in emergency situations and miscellaneous emissions associated with the treatment of gas at the McKee LPG Plant and the Mangahewa Extraction Train 2		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent holder shall adopt the best practicable option	Inspection	Yes
2. No alterations to be made without consulting Council prior	Inspection	Yes
3. Consent holder to minimise emissions	Inspection	Yes
4. Monthly flaring information to be provided to Council	Information received	Yes
5. No dangerous levels of contaminants at or beyond the boundary	Inspection and ambient air sampling	Yes
6. There shall be no offensive/obnoxious/objectionable odour/dust/smoke at or beyond the boundary	Inspection	Yes
7. No hazardous/toxic/noxious emissions at or beyond boundary	Inspection and ambient air sampling	Yes
8. Limits on CO concentration at or beyond boundary	Ambient air sampling	Yes
9. Limits on NOx concentration at or beyond boundary	Ambient air sampling	Yes
10. Limit on increase of contaminant concentrations at or beyond boundary	Not assessed	N/A
11. Lapse provision	Not applicable - consent exercised	N/A
12. Review provision	Next option for review in 2021	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 24 Summary of performance for Consent 7920-1

Purpose: To discharge wastewater and stormwater from a retention pond at the McKee Power Plant, into water and onto and into land where it may enter an unnamed tributary of the Mangahewa Stream		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent holder shall adopt the best practicable option	Inspection	Yes
2. Maximum catchment area 4.2 hectares	Inspection	Yes
3. Ensure all potentially contaminated stormwater is directed for treatment prior to discharge	Inspection	Yes
4. Limits on contaminants in discharge	Sampling	Yes
5. Effects on receiving water below the mixing zone	Inspection and sampling	Yes
6. Prepare and maintain contingency plan	Plan approved	Yes
7. Prepare and maintain stormwater management plan	Plan approved	Yes
8. No alterations to be made that may alter the discharge without consulting the Council	No changes proposed	Yes
9. Undertake and maintain fencing and riparian planting	Inspection	Yes
10. Lapse provision	Not applicable – consent exercised	N/A
11. Review provision	Next option for review in 2021	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 25 Summary of performance for Consent 7921-1

Purpose: To discharge emissions to air from the combustion of natural gas and other miscellaneous emissions from the McKee Power Plant		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent holder shall adopt the best practicable option	Inspection	Yes
2. Provision of report demonstrating compliance with condition 1 every six years	Not required during monitoring period under review	N/A
3. Maximum ground level concentration of carbon monoxide, nitrogen dioxide, PM10 and sulphur dioxide at or beyond the boundary	Air quality monitoring	Yes

Purpose: To discharge emissions to air from the combustion of natural gas and other miscellaneous emissions from the McKee Power Plant		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
4. Hazardous, toxic or noxious contaminants at or beyond the boundary not allowed	Air quality monitoring	Yes
5. Maximum discharge rate for nitrogen oxides	Self-monitoring	Yes
6. Minimum discharge stack height	Construction complete	Yes
7. Discharges shall not give rise to significant adverse environmental effects	Inspection, sampling and results of self-monitoring	Yes
8. Lapse provision	Not applicable – consent exercised	N/A
9. Review provision	Next option for review in 2021	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 26 Summary of performance for Consent 7922-1

Purpose: To install and use a stormwater and wastewater outlet structure in an unnamed tributary of the Mangahewa Stream associated with the McKee Power Plant		
Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Constructed in accordance with application	Construction complete	Yes
2. Minimum pipe diameter of 525 mm	Construction complete	Yes
3. Notification of installation	Notification received	Yes
4. Minimisation of streambed disturbance	Inspection	Yes
5. Undertake works in accordance with Council guidelines	Inspection	Yes
6. Removal and reinstatement when no longer required	Structure still in use	N/A
7. Shall not alter flow or restrict passage of fish	Inspection	Yes
8. Lapse provision	Not applicable – consent exercised	N/A
9. Review provision	Next option for review in 2021	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

During the period under review, the Company demonstrated an overall high level of both environmental performance and administrative compliance with the resource consents as defined in Section 1.1.4. There were no unauthorised incidents recorded by the Council in relation to the Company's activities. The MPS and MPP were well managed and maintained.

3.4 Recommendations from the 2014-2015 Annual Report

In the 2014-2015 Annual Report, it was recommended:

1. THAT monitoring of consented activities at the McKee Production Station, Power Plant and associated facilities in the 2015-2016 year continue at the same level as in 2014-2015.
2. THAT the option for review of resource consents 7920-1, 7921-1 and 7922-1 in June 2016, as set out in their respective conditions, not be exercised on the grounds that the current conditions are considered adequate to deal with any adverse effects on the environment arising from the exercise of these resource consents.

These recommendations were implemented.

3.5 Alterations to monitoring programmes for 2016-2017

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

- the extent of information made available by previous authorities;
- its relevance under the RMA;
- its obligations to monitor emissions/ discharges and effects under the RMA; and
- to report to the regional community.

The Council also takes into account the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of industrial processes within Taranaki emitting to the atmosphere/ discharging to the environment.

It is proposed that for 2016-2017 that the programme remains unchanged from that of 2015-2016.

4. Recommendations

1. THAT monitoring of consented activities at the McKee Production Station, Power Plant and associated facilities in the 2016-2017 year continue at the same level as in 2015-2016.

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.
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 20°C and expressed in mS/m.
EGP	The electricity generation plant at McKee Production Station.
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.
mg/m ³	Milligrams per cubic meter.
MPP	McKee Power Plant.
MPS	McKee Production Station.
mS/m	Millisiemens per metre.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
NH ₄	Ammonium, normally expressed in terms of the mass of nitrogen (N).
NH ₃	Unionised ammonia, normally expressed in terms of the mass of nitrogen (N).
NO ₃	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.

O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
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).
ppm	Parts per million. Equal to 1mg/L (water) or 1mg/kg (soil).
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.
µg/m	Micrograms per cubic meter of air, equivalent to one-millionth of a gram per cubic meter of air.

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

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Appendix I

**Resource consents held by
Todd Energy Limited and Nova Energy Limited**
(For a copy of the signed resource consent
please contact the TRC consent department)

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

Name of
Consent Holder: Todd Energy Limited
P O Box 802
NEW PLYMOUTH

Decision Date
(Change): 8 August 1984

Commencement Date
(Change): 8 August 1984 [Granted: 28 September 1983]

Conditions of Consent

Consent Granted: To discharge up to 325 litres/second of uncontaminated stormwater from the site of McKee Production Facility into an unnamed tributary of the Mangahewa Stream at or about GR: Q19:255-343

Expiry Date: 1 June 2023

Site Location: Grantee's property,
near unnamed tributary of Mangahewa Stream

Legal Description: Pt Otaraoa No 3 DP 2961 Blk X Waitara SD

Catchment: Onaero

Tributary: Mangahewa

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

General conditions

- a) This right is subject to all the relevant provisions of the Water and Soil Conservation Act 1967, and any regulations made thereunder. It is the obligation of the grantee of this right to comply with all statutory requirements relating to the exercise thereof.
- b) The Taranaki Regional Council may prescribe the method of management of this right, including the limitation of periods during which the right may be fully exercised, if a water shortage or other abnormal circumstance occurs in the locality.
- c) The grantee shall keep such records relating to the exercise of this right as may reasonably be required by the Taranaki Regional Council and shall, if so requested, supply this information to the Taranaki Regional Council. Further, the grantee shall, at his own expense, if the Taranaki Regional Council so requests, install such measuring devices as are considered reasonably necessary by the Taranaki Regional Council for the acquisition of such records.
- d) This right is granted subject to the Taranaki Regional Council or its servants or agents being permitted such access as is reasonably required for the purposes of carrying out inspections and measurements in connection with this right.
- e) The standards, techniques and methods of monitoring of this right shall be to the specific approval of the Chief Executive, Taranaki Regional Council.
- f) The design, construction and maintenance of any works relating to the right shall be to a standard adequate to meet the conditions of this right, so that the exercise of this does not cause damage to any property or injury to any person.
- g) This right may be cancelled in writing to the grantee by the Taranaki Regional Council if the right is not exercised within twelve months of the date of grant or such longer time as the Chief Executive, Taranaki Regional Council, may approve.
- h) This right may be terminated by the Taranaki Regional Council upon not less than 12 months notice in writing to the grantee if, in the opinion of the Taranaki Regional Council, the public interest so requires, but without prejudice to the grantee to apply for a further right in respect of the same matter.
- i) The actual and reasonable cost of supervision of this right, including certification, approval, monitoring, water sampling and analyses, be met by the grantee.
- j) The Grantee shall provide to the Chief Executive, Taranaki Regional Council, on his request (and, at his discretion, for his approval) plans, specifications and maintenance programmes of works associated with the exercise of this right, showing that the conditions of this right are able to be met.
- k) Before the Taranaki Regional Council or its Chief Executive:
 - i) imposes any requirement or makes any request under General Condition (c);
or
 - ii) grants or withholds any approval under the provisions of this right; or

Consent 1157-1

- iii) makes any determination as to any programme or supervision or monitoring or as to the actual and reasonable cost to be met by the Grantee; or
- iv) makes any determination as to adequacy under General Conditions (f) and/or (j);

the Taranaki Regional Council shall confer with the Grantee to enable agreement to be reached between the Taranaki Regional Council and the Grantee on the subject matter and costs thereof, provided that if any dispute arises concerning the matters dealt with in (i)-(iv) above, the dispute shall be referred to an independent arbitrator to be mutually agreed upon, the arbitration to be conducted in accordance with the Arbitration Act 1908, or in such a manner as the parties affecting may agree upon.

Special conditions

1. That the Grantee shall be responsible for ensuring that the natural channels of the streams below the discharge point, for a distance to be decided upon by agreement between the Chief Executive, Taranaki Regional Council and the Grantee, are capable of coping with the increased volumes of water.
2. That the works associated with the exercise of this right shall be designed to minimise disturbance to the bed and banks of the stream channels both at low flows and design flood levels, subject to Condition 1 above.
3. That the Grantee shall, where possible, prevent or mitigate any erosion which may occur as a result of works associated with the exercise of this right.
4. That any corrective measures applied as a result of (2) and (3) above shall be to the satisfaction of the Chief Executive, Taranaki Regional Council.
5. That the Grantee shall install a sampling chamber in the main stormwater discharge lines, to the satisfaction of the Chief Executive, Taranaki Regional Council.
6. That plans for stormwater design layout and discharge points shall be forwarded to the Chief Executive, Taranaki Regional Council, for his approval prior to the commencement of construction.
7. That the Grantee shall provide, for the approval of the Chief Executive, Taranaki Regional Council, a contingency plan for actions to be taken in the event of a spillage or accumulation of off-specification effluent, at least three months or such shorter time as the Chief Executive, Taranaki Regional Council may allow, prior to the exercise of this right.
8. That the discharge shall not alter the level or concentration of suspended solids, oils and hydrocarbons, pH, temperature or any other parameter in the receiving water, without prior written approval of the Chief Executive, Taranaki Regional Council.
9. That the Taranaki Regional Council may carry out a programme of biological monitoring of the Mangahewa Stream environment, subject to Section 24K of the Water and Soil Conservation Act 1967.

Consent 1157-1

10. That there shall be a review by the Grantee and Taranaki Regional Council of all conditions, restrictions and prohibitions every five years, and if as a result of this review the Grantee or the Taranaki Regional Council require a variation, then the variation procedures shall be pursuant to Section 24B of the Water and Soil Conservation Act 1967.

Transferred at Stratford on 15 November 2013

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Todd Energy Limited
P O Box 802
NEW PLYMOUTH

Decision Date
(Change): 8 August 1984

Commencement Date
(Change): 8 August 1984 [Granted: 28 September 1983]

Conditions of Consent

Consent Granted: To discharge up to 10 litres/second of treated impounded stormwater from the site of the McKee Production Facility into the Waitara River at or about GR: Q19:241-337

Expiry Date: 1 June 2023

Site Location: East Bank Of Waitara River

Legal Description: Pt Otaraoa No 3 DP 2961 Blk X Waitara SD

Catchment: Waitara

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

General conditions

- a) This right is subject to all the relevant provisions of the Water and Soil Conservation Act 1967, and any regulations made thereunder. It is the obligation of the grantee of this right to comply with all statutory requirements relating to the exercise thereof.
- b) The Taranaki Regional Council may prescribe the method of management of this right, including the limitation of periods during which the right may be fully exercised, if a water shortage or other abnormal circumstance occurs in the locality.
- c) The grantee shall keep such records relating to the exercise of this right as may reasonably be required by the Taranaki Regional Council and shall, if so requested, supply this information to the Taranaki Regional Council. Further, the grantee shall, at his own expense, if the Taranaki Regional Council so requests, install such measuring devices as are considered reasonably necessary by the Taranaki Regional Council for the acquisition of such records.
- d) This right is granted subject to the Taranaki Regional Council or its servants or agents being permitted such access as is reasonably required for the purposes of carrying out inspections and measurements in connection with this right.
- e) The standards, techniques and methods of monitoring of this right shall be to the specific approval of the Chief Executive, Taranaki Regional Council.
- f) The design, construction and maintenance of any works relating to the right shall be to a standard adequate to meet the conditions of this right, so that the exercise of this does not cause damage to any property or injury to any person.
- g) This right may be cancelled in writing to the grantee by the Taranaki Regional Council if the right is not exercised within twelve months of the date of grant or such longer time as the Chief Executive, Taranaki Regional Council, may approve.
- h) This right may be terminated by the Taranaki Regional Council upon not less than 12 months notice in writing to the grantee if, in the opinion of the Taranaki Regional Council, the public interest so requires, but without prejudice to the grantee to apply for a further right in respect of the same matter.
- i) The actual and reasonable cost of supervision of this right, including certification, approval, monitoring, water sampling and analyses, be met by the grantee.
- j) The Grantee shall provide to the Chief Executive, Taranaki Regional Council, on his request (and, at his discretion, for his approval) plans, specifications and maintenance programmes of works associated with the exercise of this right, showing that the conditions of this right are able to be met.
- k) Before the Taranaki Regional Council or its Chief Executive:
 - i) imposes any requirement or makes any request under General Condition (c);
or
 - ii) grants or withholds any approval under the provisions of this right; or

Consent 1158-1

- iii) makes any determination as to any programme or supervision or monitoring or as to the actual and reasonable cost to be met by the Grantee; or
- iv) makes any determination as to adequacy under General Conditions (f) and/or (j);

the Taranaki Regional Council shall confer with the Grantee to enable agreement to be reached between the Taranaki Regional Council and the Grantee on the subject matter and costs thereof, provided that if any dispute arises concerning the matters dealt with in (i)-(iv) above, the dispute shall be referred to an independent arbitrator to be mutually agreed upon, the arbitration to be conducted in accordance with the Arbitration Act 1908, or in such a manner as the parties affecting may agree upon.

Special conditions

1. That any stormwater originating from process or tankage areas, or areas where the level of contamination or likely contamination is significant, or is contaminated in the opinion of the Chief Executive, Taranaki Regional Council, shall be retained in the stormwater holding pond for treatment and discharged via the treatment system as treated stormwater.
2. That the Grantee shall, where possible, prevent or mitigate any erosion which occurs as a result of works associated with the exercise of this right.
3. That any corrective measures applied as a result of (2) above shall be to the satisfaction of the Chief Executive, Taranaki Regional Council.
4. That the Grantee shall install a sampling chamber in the treated stormwater discharge line to the outfall, to the satisfaction of the Chief Executive, Taranaki Regional Council
5. That plans for stormwater design layout, discharge point and works shall be forwarded to the Chief Executive, Taranaki Regional Council, for the written approval, prior to the commencement of construction.
6. The Grantee shall supply specifications of all works associated with the exercise of this right showing that the special conditions of the right particularly (8) and (9) can be met, at least three months prior to the exercise of this right for the written approval of the Chief Executive, Taranaki Regional Council.
7. That at all times of plant operation a suitably trained operator be available on site capable of operation of all aspects of the treatment works, to the satisfaction of the Chief Executive, Taranaki Regional Council.
8. That on the basis of 24 hour flow-proportioned composite samples, components of the effluent stream shall conform to the following:

Temperature	<20°C
pH	6.5 – 8.5
Total recoverable hydrocarbons	90% of samples <10 g/m ³ the balance of samples <20 g/m ³
Suspended solids	<30 g/m ³

Consent 1158-1

9. That other than specified in Condition 8 above, the discharge shall not alter the level of concentration of any other parameter in the receiving water, without prior written approval of the Chief Executive, Taranaki Regional Council
10. The discharge shall cause no adverse effects to the biological communities of the Waitara River.
11. That the discharge shall not alter to a conspicuous extent the natural colour and clarity of the receiving water.
12. That the grantee shall provide an Effluent Disposal Management Plan for the plant, including commissioning phases, at least three months (or such shorter time as the Chief Executive, Taranaki Regional Council, may allow) prior to the exercise of this right for the approval of the Chief Executive, Taranaki Regional Council.
13. That the Grantee shall provide a Contingency Plan for actions to be taken in the event of a spillage or accumulation of off-specification effluent, at least three months (or such shorter time as the Chief Executive, Taranaki Regional Council may allow) prior to the exercise of this right, for the approval of the Chief Executive, Taranaki Regional Council
14. That ecological monitoring of the receiving water may be carried out by the Taranaki Regional Council to determine the effects of the discharge on in-stream ecology, subject to Section 24K of the Water and Soil Conservation Act 1967.
15. The Commission may undertake such toxicological testing of the final discharge from time to time, as may be required by the Chief Executive, Taranaki Regional Council, subject to Section 24K of the Water and Soil Conservation Act 1967.
16. The Grantee shall undertake such monitoring of the final discharge as may be required by the Chief Executive, Taranaki Regional Council (Section 24K of the Water and Soil Conservation Act 1967).
17. That there shall be a review by the Grantee and Taranaki Regional Council of all conditions, restrictions and prohibitions every five years, and if as a result of this review the Grantee or the Taranaki Regional Council require a variation, then the variation procedures shall be pursuant to Section 24B of the Water and Soil Conservation Act 1967.

Transferred at Stratford on 15 November 2013

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: Todd Energy Limited
P O Box 802
NEW PLYMOUTH

Decision Date 8 August 1984
(Change)

Commencement Date 8 August 1984 (Granted: 28 September 1983)
(Change)

Conditions of Consent

Consent Granted: To divert unnamed tributaries of the Mangahewa Stream in the vicinity of the McKee Production Facility, and to discharge surface water run-off from adjacent land into the Mangahewa Stream, to permit construction and operation of the said facility at or about GR: Q19:255-343

Expiry Date: 1 June 2023

Site Location: Grantee's property,
near unnamed tributary of Mangahewa Stream

Legal Description: N/A

Catchment: Onaero

Tributary: Mangahewa

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

General conditions

- a) This right is subject to all the relevant provisions of the Water and Soil Conservation Act 1967, and any regulations made thereunder. It is the obligation of the grantee of this right to comply with all statutory requirements relating to the exercise thereof.
- b) The Taranaki Regional Council may prescribe the method of management of this right, including the limitation of periods during which the right may be fully exercised, if a water shortage or other abnormal circumstance occurs in the locality.
- c) The grantee shall keep such records relating to the exercise of this right as may reasonably be required by the Taranaki Regional Council and shall, if so requested, supply this information to the Taranaki Regional Council. Further, the grantee shall, at his own expense, if the Taranaki Regional Council so requests, install such measuring devices as are considered reasonably necessary by the Taranaki Regional Council for the acquisition of such records.
- d) This right is granted subject to the Taranaki Regional Council or its servants or agents being permitted such access as is reasonably required for the purposes of carrying out inspections and measurements in connection with this right.
- e) The standards, techniques and methods of monitoring of this right shall be to the specific approval of the Chief Executive, Taranaki Regional Council.
- f) The design, construction and maintenance of any works relating to the right shall be to a standard adequate to meet the conditions of this right, so that the exercise of this does not cause damage to any property or injury to any person.
- g) This right may be cancelled in writing to the grantee by the Taranaki Regional Council if the right is not exercised within twelve months of the date of grant or such longer time as the Chief Executive, Taranaki Regional Council, may approve.
- h) This right may be terminated by the Taranaki Regional Council upon not less than 12 months notice in writing to the grantee if, in the opinion of the Taranaki Regional Council, the public interest so requires, but without prejudice to the grantee to apply for a further right in respect of the same matter.
- i) The actual and reasonable cost of supervision of this right, including certification, approval, monitoring, water sampling and analyses, be met by the grantee.
- j) The Grantee shall provide to the Chief Executive, Taranaki Regional Council, on his request (and, at his discretion, for his approval) plans, specifications and maintenance programmes of works associated with the exercise of this right, showing that the conditions of this right are able to be met.
- k) Before the Taranaki Regional Council or its Chief Executive:
 - i) imposes any requirement or makes any request under General Condition (c);
or
 - ii) grants or withholds any approval under the provisions of this right; or

Consent 1159-1

- iii) makes any determination as to any programme or supervision or monitoring or as to the actual and reasonable cost to be met by the Grantee; or
- iv) makes any determination as to adequacy under General Conditions (f) and/or (j);

the Taranaki Regional Council shall confer with the Grantee to enable agreement to be reached between the Taranaki Regional Council and the Grantee on the subject matter and costs thereof, provided that if any dispute arises concerning the matters dealt with in (i)-(iv) above, the dispute shall be referred to an independent arbitrator to be mutually agreed upon, the arbitration to be conducted in accordance with the Arbitration Act 1908, or in such a manner as the parties affecting may agree upon.

Special conditions

1. That plans and locations for the proposed diversions shall be forwarded to the Chief Executive, Taranaki Regional Council, for his written approval prior to commencement of construction.
2. That the Grantee shall be responsible for ensuring that the natural channels of the streams below the diversion, for a distance to be decided upon by agreement between the Chief Executive, Taranaki Regional Council and the Grantee, are capable of coping with the increased volumes of water.
3. That the Grantee shall, where possible, prevent or mitigate any erosion which occurs as a result of works associated with the exercise of this right.
4. That any corrective measures applied as a result of (2) and (3) above shall be to the satisfaction of the Chief Executive, Taranaki Regional Council.
5. That the Taranaki Regional Council may carry out a programme of biological monitoring of the Mangahewa Stream environment, subject to Condition (1) above.
6. That there shall be a review by the Grantee and Taranaki Regional Council of all conditions, restrictions and prohibitions every five years, and if as a result of this review the Grantee or the Taranaki Regional Council require a variation, then the variation procedures shall be pursuant to Section 24B of the Water and Soil Conservation Act 1967.

Transferred at Stratford on 15 November 2013

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: Todd Energy Limited
 P O Box 802
 NEW PLYMOUTH

Decision Date 8 August 1984
(Change):

Commencement Date 8 August 1984 (Granted: 14 March 1984)
(Change):

Conditions of Consent

Consent Granted: To take up to 172,800 litres/day of water at a maximum
 rate of 2 litres/second from the Mangahewa Stream for
 process and domestic purposes associated with operation
 of the Mckee Production Station at or about GR: Q19:256-
 344

Expiry Date: 1 June 2023

Site Location: Mangahewa Stream, Otaraoa Road, Waitara

Legal Description: Pt Otaraoa No 3 DP 2961 Blk X Waitara SD

Catchment: Onaero

Tributary: Mangahewa

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

General conditions

- a) This right is subject to all the relevant provisions of the Water and Soil Conservation Act 1967, and any regulations made thereunder. It is the obligation of the grantee of this right to comply with all statutory requirements relating to the exercise thereof.
- b) The Taranaki Regional Council may prescribe the method of management of this right, including the limitation of periods during which the right may be fully exercised, if a water shortage or other abnormal circumstance occurs in the locality.
- c) The grantee shall keep such records relating to the exercise of this right as may reasonably be required by the Taranaki Regional Council and shall, if so requested, supply this information to the Taranaki Regional Council. Further, the grantee shall, at his own expense, if the Taranaki Regional Council so requests, install such measuring devices as are considered reasonably necessary by the Taranaki Regional Council for the acquisition of such records.
- d) This right is granted subject to the Taranaki Regional Council or its servants or agents being permitted such access as is reasonably required for the purposes of carrying out inspections and measurements in connection with this right.
- e) The standards, techniques and methods of monitoring of this right shall be to the specific approval of the Chief Executive, Taranaki Regional Council.
- f) The design, construction and maintenance of any works relating to the right shall be to a standard adequate to meet the conditions of this right, so that the exercise of this does not cause damage to any property or injury to any person.
- g) This right may be cancelled in writing to the grantee by the Taranaki Regional Council if the right is not exercised within twelve months of the date of grant or such longer time as the Chief Executive, Taranaki Regional Council, may approve.
- h) This right may be terminated by the Taranaki Regional Council upon not less than 12 months notice in writing to the grantee if, in the opinion of the Taranaki Regional Council, the public interest so requires, but without prejudice to the grantee to apply for a further right in respect of the same matter.
- i) The actual and reasonable cost of supervision of this right, including certification, approval, monitoring, water sampling and analyses, be met by the grantee.
- j) The Grantee shall provide to the Chief Executive, Taranaki Regional Council, on his request (and, at his discretion, for his approval) plans, specifications and maintenance programmes of works associated with the exercise of this right, showing that the conditions of this right are able to be met.
- k) Before the Taranaki Regional Council or its Chief Executive:
 - i) imposes any requirement or makes any request under General Condition (c);
or
 - ii) grants or withholds any approval under the provisions of this right; or

Consent 1226-1

- iii) makes any determination as to any programme or supervision or monitoring or as to the actual and reasonable cost to be met by the Grantee; or
- iv) makes any determination as to adequacy under General Conditions (f) and/or (j);

the Taranaki Regional Council shall confer with the Grantee to enable agreement to be reached between the Taranaki Regional Council and the Grantee on the subject matter and costs thereof, provided that if any dispute arises concerning the matters dealt with in (i)-(iv) above, the dispute shall be referred to an independent arbitrator to be mutually agreed upon, the arbitration to be conducted in accordance with the Arbitration Act 1908, or in such a manner as the parties affecting may agree upon.

Special conditions

1. That a minimum flow of not less than 5 litres/second should be maintained in the tributary at all times except when due to natural conditions.
2. That the Grantee shall install a metering system to continuously record the abstraction rate with an error of less than 10%, and shall supply this record or parts of this records to the Taranaki Regional Council at the Taranaki Regional Council's request.
3. That the intake structure shall be designed to minimise disturbance to the stability of the bed and banks of the streams/river's channels both at low flows and flood levels. The intakes shall be so designed, constructed, maintained and modified so as to permit upstream passage of fish.
4. That the Grantee shall submit plans of the intake structure, its location, and the metering system to the Taranaki Regional Council for written approval by the Chief Executive, prior to commencement of construction.
5. That there shall be a review by the Grantee and Taranaki Regional Council of all conditions, restrictions and prohibitions every five years, and if as a result of this review the Grantee or the Taranaki Regional Council require a variation, then the variation procedures shall be pursuant to Section 24B of the Water and Soil Conservation Act 1967.

Transferred at Stratford on 15 November 2013

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of Consent Holder: Todd Energy Limited
P O Box 802
NEW PLYMOUTH

Decision Date: 14 March 1984

Commencement Date: 14 March 1984

Conditions of Consent

Consent Granted: To construct a weir control for the Mckee Production Site water intake on the Mangahewa Stream in the Onaero Catchment at or about GR: Q19:256-344

Expiry Date: 1 June 2023

Site Location: Mangahewa Stream, Otaraoa Road, Waitara

Legal Description: Pt Otaraoa No 3 DP 2961 Blk X Waitara SD

Catchment: Onaero

Tributary: Mangahewa

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

General conditions

- a) This right is subject to all the relevant provisions of the Water and Soil Conservation Act 1967, and any regulations made thereunder. It is the obligation of the grantee of this right to comply with all statutory requirements relating to the exercise thereof.
- b) The Taranaki Regional Council may prescribe the method of management of this right, including the limitation of periods during which the right may be fully exercised, if a water shortage or other abnormal circumstance occurs in the locality.
- c) The grantee shall keep such records relating to the exercise of this right as may reasonably be required by the Taranaki Regional Council and shall, if so requested, supply this information to the Taranaki Regional Council. Further, the grantee shall, at his own expense, if the Taranaki Regional Council so requests, install such measuring devices as are considered reasonably necessary by the Taranaki Regional Council for the acquisition of such records.
- d) This right is granted subject to the Taranaki Regional Council or its servants or agents being permitted such access as is reasonably required for the purposes of carrying out inspections and measurements in connection with this right.
- e) The standards, techniques and methods of monitoring of this right shall be to the specific approval of the Chief Executive, Taranaki Regional Council.
- f) The design, construction and maintenance of any works relating to the right shall be to a standard adequate to meet the conditions of this right, so that the exercise of this does not cause damage to any property or injury to any person.
- g) This right may be cancelled in writing to the grantee by the Taranaki Regional Council if the right is not exercised within twelve months of the date of grant or such longer time as the Chief Executive, Taranaki Regional Council, may approve.
- h) This right may be terminated by the Taranaki Regional Council upon not less than 12 months notice in writing to the grantee if, in the opinion of the Taranaki Regional Council, the public interest so requires, but without prejudice to the grantee to apply for a further right in respect of the same matter.
- i) The actual and reasonable cost of supervision of this right, including certification, approval, monitoring, water sampling and analyses, be met by the grantee.
- j) The Grantee shall provide to the Chief Executive, Taranaki Regional Council, on his request (and, at his discretion, for his approval) plans, specifications and maintenance programmes of works associated with the exercise of this right, showing that the conditions of this right are able to be met.
- k) Before the Taranaki Regional Council or its Chief Executive:
 - i) imposes any requirement or makes any request under General Condition (c);
or
 - ii) grants or withholds any approval under the provisions of this right; or

Consent 1227-1

- iii) makes any determination as to any programme or supervision or monitoring or as to the actual and reasonable cost to be met by the Grantee; or
- iv) makes any determination as to adequacy under General Conditions (f) and/or (j);

the Taranaki Regional Council shall confer with the Grantee to enable agreement to be reached between the Taranaki Regional Council and the Grantee on the subject matter and costs thereof, provided that if any dispute arises concerning the matters dealt with in (i)-(iv) above, the dispute shall be referred to an independent arbitrator to be mutually agreed upon, the arbitration to be conducted in accordance with the Arbitration Act 1908, or in such a manner as the parties affecting may agree upon.

Special conditions

1. That the Grantee shall submit plans and the proposed locations of all works associated with this right to the Chief Executive, Taranaki Regional Council for written approval prior to commencement of construction.
2. That the works associated with the exercise of this right shall be designed to minimise disturbance to the bed and banks of the river channel both at low flows and design flood levels.
3. That the Grantee shall, where possible, prevent or mitigate any erosion which may occur as a result of works associated with the exercise of this right.
4. That the intake structure shall be so designed, constructed and maintained so as to permit the upstream passage of fish.
5. That a minimum flow of not less than 5 litres/second should be maintained in the Mangahewa Stream at all times.
6. That the operation of the sluice pipe through the weir, for the purposes of desilting the impoundment, shall only take place following the obtaining of prior written approval from the Chief Executive, Taranaki Regional Council.
7. That there shall be a review by the Grantee and Taranaki Regional Council of all conditions, restrictions and prohibitions every five years, and if as a result of this review the Grantee or the Taranaki Regional Council require a variation, then the variation procedures shall be pursuant to Section 24B of the Water and Soil Conservation Act 1967.

Transferred at Stratford on 15 November 2013

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: Nova Energy Limited
PO Box 10141
Wellington 6143

Decision Date: 29 February 2016

Commencement Date: 29 February 2016

Conditions of Consent

Consent Granted: To take water from the Mangaone Stream for use in a gas fired Power Station

Expiry Date: 1 June 2033

Review Date(s): June 2018 and 3-yearly intervals thereafter

Site Location: McKee Oil Field, Bristol Road, Inglewood

Grid Reference (NZTM) 1714710E-5670423N (Site of take)
1715631E-5671543N (Site of use)

Catchment: Waitara

Tributary: Mangaone

*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 rate of taking shall not exceed 36 litres per second, and the volume taken in any 7-day period ending at midnight (New Zealand Standard Time) shall not exceed 12,000 cubic metres.
2. 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 $\pm 5\%$. 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.

3. 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 $\pm 5\%$.

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.
4. 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.
 5. Any water meter or datalogger shall be accessible to Taranaki Regional Council officers at all reasonable times for inspection and/or data retrieval. In addition the data logger shall be designed and installed so that Taranaki Regional Council officers can readily verify that it is accurately recording the required information.

Consent 2393-3.0

6. 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) from a date no later than 1 September 2016, be transmitted directly to the Taranaki Regional Council's computer system, in a format suitable for providing a 'real time' record over the internet.
7. No taking shall occur when the flow of the Waitara River at the Bertrand Road flow recorder is less than 4,600 litres per second.

Advice Note:

During a serious temporary shortage of water the Taranaki Regional Council may, in accordance with section 329 of the Resource Management Act 1991, direct that water is allocated as it considers appropriate at the time. In issuing any such direction the Taranaki Regional Council will have regard to any allocation priorities that may be set out in any of its Standard Operating Procedures.

8. 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.
9. The consent holder shall ensure that the intake is screened to avoid fish (in all stages of their life-cycle) entering the intake or being trapped against the screen.
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 2018 and/or June 2021 and/or June 2024 and/or June 2027 and/or June 2030, for the purposes 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 February 2016

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

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

Name of
Consent Holder: Todd Energy Limited
P O Box 802
NEW PLYMOUTH

Decision Date: 14 July 1999

Commencement Date: 14 July 1999

Conditions of Consent

Consent Granted: To erect, place and maintain a bridge over the Waitara River for oil field access purposes at or about GR: Q19:248-322

Expiry Date: 1 June 2033

Review Date(s): June 2003, June 2009, June 2015, June 2021, June 2027

Site Location: Waitara River, Bristol/McKee Road, Waitui

Legal Description: Road Reserve Blk XIV Waitara SD

Catchment: Waitara

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

General conditions

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

Special conditions

- 1. That the consent holder shall notify the Taranaki Regional Council, at least 48 hours prior to the commencement and upon completion of any subsequent maintenance works which would involve disturbance of or deposition to the riverbed or discharges to water.
- 2. That the structure[s] authorised by this consent shall be maintained to ensure the conditions of this consent are met.
- 3. That the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure[s] are no longer required. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to structure[s] removal and reinstatement.
- 4. That the Taranaki Regional Council may review any or all of the conditions of this consent by giving notice of review during the month of June 2003 and/or June 2008 and/or June 2015 and/or June 2021 and/or June 2027, for the purpose of ensuring that the conditions adequately deal with the environmental effects arising from the exercise of this consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 15 November 2013

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Todd Energy Limited
PO Box 802
New Plymouth 4340

Decision Date
(Change): 24 June 2015

Commencement Date
(Change): 24 June 2015 (Granted Date: 30 September 2009)

Conditions of Consent

Consent Granted: To discharge emissions into the air from flaring of hydrocarbons associated with the production activities at the McKee-C wellsite, the Mangahewa Expansion Compression facility and from hydrocarbon processing operations and miscellaneous emissions at the McKee Production Station

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: McKee-C wellsite, 1334 Otaraoa Road, Tikorangi

Legal Description: Lot 2 DP 474093 Lot 1 DP 14374

Grid Reference (NZTM) 1715282E-5672495N and 1715153E-5672258N

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

General conditions

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

Special conditions

1. The consent holder shall 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 McKee Production Station or McKee-C wellsite or the Mangahewa Expansion Compression facility, including use of a separator during well clean-up.
2. All liquid hydrocarbon storage vessels shall be fitted with vapour recovery systems.
3. The opacity of any smoke emissions shall not exceed a level of 1 as measured on the Ringelmann Scale.
4. 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 production station and wellsite is located.
5. 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 production station and wellsite are located.
6. 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 production station and wellsite are located.

Consent 4050-3.1

7. The consent holder shall control emissions to the atmosphere, from the production station, wellsite 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.
8. The consent holder shall control emissions to the atmosphere from the production station, 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).
9. 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.
10. 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.
11. 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 12.
12. 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 smoke emissions as required under condition 11;
 - ii) detailing any measures undertaken or proposed to reduce smoke emissions;
 - iii) detailing any measures undertaken or proposed to reduce flaring;
 - iv) addressing any other issue relevant to the minimisation or mitigation of emissions from the flare.

McKee Production Station and the Mangahewa Expansion Compression (MEC) facility

13. 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.
14. No liquid or solid hydrocarbons from the McKee Production Station and the Mangahewa Expansion Compression facility shall be combusted through the gas flare system, other than in an emergency.

McKee-C wellsite

15. The consent holder shall notify the Chief Executive, Taranaki Regional Council, whenever the continuous flaring of hydrocarbons (other than purge gas) from the McKee-C wellsite 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.
16. At least 24 hours before any flaring from the McKee-C wellsite, 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.
17. 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 from the McKee-C wellsite so as to minimise offsite effects.
18. All gas that is flared from the McKee-C wellsite must first be treated by effective liquid and solid separation and recovery to ensure that smoke emission during flaring is minimised.
19. If separation required by special condition 18 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.
20. Only substances originating from the well stream and treated as outlined by conditions 18 and 19 shall be combusted within the flare pit.

Review

21. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 and/or June 2021, for 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.

Signed at Stratford on 24 June 2015

For and on behalf of
Taranaki Regional Council

B G Chamberlain
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: Nova Energy Limited
P O Box 10141
WELLINGTON 6143

Decision Date: 7 January 2003

Commencement Date: 7 January 2003

Conditions of Consent

Consent Granted: To discharge wastewater from filter backwashing and tank cleaning into the Waitara River

Expiry Date: 1 June 2021

Review Date(s): June 2009, June 2015

Site Location: McKee Oilfield, Bristol Road, Waitui, Inglewood

Legal Description: Pt Rimutauteka 12 DP 658 Blk XIV Waitara SD

Grid Reference (NZTM) 1714714E-5670564N

Catchment: Waitara

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

General conditions

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

Special conditions

- 1. The exercise of this consent shall be conducted in accordance with the information submitted in support of the application and to ensure that the conditions of this consent are met at all times.
- 2. That after allowing for reasonable mixing in a zone of 100 metres downstream of the discharge point, the discharge shall not give rise to all or any of the following effects in the receiving water:
 - i) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - ii) any conspicuous change in the colour or visual clarity;
 - iii) any emission of an objectionable odour;
 - iv) any significant adverse effects on aquatic life, habitats, or ecology;
 - v) any undesirable biological growths.
- 3. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2009 and/or June 2015, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 8 April 2013

For and on behalf of
Taranaki Regional Council



Director-Resource Management

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

Name of Consent Holder: Todd Energy Limited
P O Box 802
NEW PLYMOUTH 4340

Decision Date: 24 June 2008

Commencement Date: 24 June 2008

Conditions of Consent

Consent Granted: To discharge emissions into the air from natural gas combustion and other related activities associated with the operation of an electricity generation plant at the McKee Production Station at or about (NZTM) 1715334E-5672399N

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: McKee Production Station, Otaraoa Road, Tikorangi

Legal Description: Lot 1 DP 14374 Blk X Waitara SD

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

General conditions

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

Special conditions

1. Notwithstanding any other conditions of this consent the consent holder shall at all times adopt the best practicable option [as defined in Section 2 of the Resource Management Act 1991] to prevent or minimise any 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 site.
2. Prior to undertaking any alterations to the plant, processes or operations, which may significantly change the nature or quantity of contaminants emitted to air from the site, 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.
3. The discharges authorised by this consent shall not, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent held by the consent holder, give rise to any dangerous levels of airborne contaminants at or beyond the boundary of the property including but not limited to any risk of fire or explosion.
4. The discharges authorised by this consent shall not, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent held by the consent holder, give rise to any odour or dust or smoke that is offensive or obnoxious or objectionable at or beyond the boundary of the property on which the production station is located.

Consent 7290-1

5. The consent holder shall not discharge any contaminant to air from the site at a rate or a quantity such that the contaminant, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent held by the consent holder, is or is liable to be hazardous or toxic or noxious at or beyond the boundary of the property where the electricity generation plant is located.
6. The consent holder shall control all discharges of carbon monoxide to the atmosphere from the site, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent held by the consent holder, 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 milligrams per cubic metre [eight-hour average exposure], or 30 milligrams per cubic metre [one-hour average exposure] at or beyond the boundary of the property on which the production station is located.
7. The consent holder shall control all discharges of nitrogen dioxide or its precursors to the atmosphere from the site, whether alone or in conjunction with any other discharges to the atmosphere from the site arising through the exercise of any other consent held by the consent holder, 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 200 micrograms per cubic metre [one hour average exposure], or 100 micrograms per cubic metre [twenty-four hour average exposure], at or beyond the boundary of the property on which the production station is located.
8. The consent holder shall control discharges to the atmosphere from the site of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, whether alone or in conjunction with any other emissions from the site arising through the exercise of any other consent held by the consent holder, 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 property on which the production station is located, is not increased above background levels:
 - a) by more than 1/30th of the relevant Workplace Exposure Standard-Time Weighted Average [exposure averaged over a duration as specified for the Workplace Exposure Standard-Time Weighted Average], or by more than 1/10th of the Workplace Exposure Standard-Short Term Exposure Limit over any short period of 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 the General Excursion Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour].
9. 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.

Consent 7290-1

10. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 and/or June 2021, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 15 November 2013

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of Consent Holder: Todd Energy Limited
P O Box 802
NEW PLYMOUTH 4340

Decision Date: 8 July 2009

Commencement Date: 8 July 2009

Conditions of Consent

Consent Granted: To discharge stormwater into an unnamed tributary of the Mangahewa Stream in the Onaero catchment from a LPG Plant at or about (NZTM) 1715355E-5672389N

Expiry Date: 1 June 2039

Review Date(s): June 2015, June 2021, June 2027, June 2033

Site Location: McKee Production Station, Otaraoa Road, Waitara

Legal Description: Lot 1 DP 14374 Blk X Waitara SD

Catchment: Onaero

Tributary: Mangahewa

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

General conditions

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

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects of the discharge on any water body.
2. The stormwater discharged shall be from a catchment area not exceeding 7,800 m².
3. Within one month of the completion of the development of the site the consent holder shall provide, to the written satisfaction of the Chief Executive, Taranaki Regional Council, detailed plans of stormwater catchment and drainage pathways, including clean areas, potentially contaminated areas, and bunded areas, and the containment, treatment and discharge systems put into place.
4. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz. Notification by fax or post is acceptable only if the consent holder does not have access to email.
5. The consent holder shall maintain a contingency plan. The contingency plan shall be adhered to in the event of a spill or emergency and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council, detail 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.

6. The consent holder shall maintain a stormwater management plan. This plan shall be adhered to at all times and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council document how the site is to be managed in order to minimise the contaminants that become entrained in the stormwater. The plan shall include but not necessarily be limited to:
 - a. management of the interceptor system.
 - b. the loading and unloading of materials;
 - c. maintenance of conveyance systems; and
 - d. general housekeeping.
7. All stormwater discharged under this permit shall be directed for treatment through the stormwater treatment system for discharge in accordance with the special conditions of this permit.
8. Any above ground hazardous substances storage areas shall be bunded with drainage to sumps, or other appropriate recovery systems, and not directly to the stormwater catchment.
9. The following concentrations shall not be exceeded in the discharge,

Component	Concentration
pH (range)	6.0-9.0
suspended solids	100 gm ⁻³
total recoverable hydrocarbons [infrared spectroscopic technique]	15 gm ⁻³
chloride	50 gm ⁻³

This condition shall apply prior to the entry of the treated stormwater into the unnamed tributary of the Mangahewa Stream at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

10. After allowing for reasonable mixing, within a mixing zone extending 25 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 Mangahewa 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;
 - e) any significant adverse effects on aquatic life.
11. This consent shall lapse on 30 September 2014, 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 7435-1

12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 and/or June 2021 and/or June 2027 and/or June 2033, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 15 November 2013

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Todd Energy Limited
P O Box 802
NEW PLYMOUTH 4340

Decision Date
(Change): 24 October 2012

Commencement
Date (Change): 24 October 2012 (Granted: 8 July 2009)

Conditions of Consent

Consent Granted: To discharge emissions to air from the flaring of natural gas in emergency situations and miscellaneous emissions associated with the treatment of gas at the McKee LPG Plant and the Mangahewa Extraction Train 2 at or about (NZTM) 1715363E-5672126N

Expiry Date: 1 June 2039

Review Date(s): June 2015, June 2021, June 2027, June 2033

Site Location: McKee Production Station, Otaraoa Road, Waitara

Legal Description: Lot 1 DP 14374 Blk X Waitara SD
(Discharge source & site)

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

General conditions

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

Special conditions

1. The consent holder shall at all times adopt the best practicable option [as defined in Section 2 of the Resource Management Act 1991] to prevent or minimise any 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 site.
2. Prior to undertaking any alterations to the plant, processes or operations, which may significantly change the nature or quantity of contaminants emitted to air from the site, 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.
3. The consent holder shall minimise the emissions and impacts of air contaminants discharged from the site by the selection of the most appropriate process equipment, process control equipment, emission control equipment, methods of control, supervision and operation, and the proper and effective operation, supervision, control and maintenance of all equipment and processes.
4. 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.
5. The discharges authorised by this consent shall not, whether alone or in conjunction with any other emissions from the McKee Production Station, give rise to any dangerous levels of airborne contaminants at or beyond the boundary of the property including but not limited to any risk of fire or explosion.

6. The discharges authorised by this consent shall not, whether alone or in conjunction with any other emissions from the McKee Production Station arising through the exercise of any other consent held by the consent holder, give rise to any odour or dust or smoke that is offensive or obnoxious or objectionable at or beyond the boundary of the property on which the production station is located.
7. The consent holder shall not discharge any contaminant to air from the site at a rate or a quantity such that the contaminant, whether alone or in conjunction with any other emissions from the McKee Production Station arising through the exercise of any other consent held by the consent holder, is or is liable to be hazardous or toxic or noxious at or beyond the boundary of the property where the LPG plant is located.
8. The consent holder shall control all discharges of carbon monoxide to the atmosphere from the site, whether alone or in conjunction with any other emissions from the McKee Production Station arising through the exercise of any other consent held by the consent holder, 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 milligrams per cubic metre [eight-hour average exposure], or 30 milligrams per cubic metre [one-hour average exposure] at or beyond the boundary of the property on which the LPG plant is located.
9. The consent holder shall control all discharges of nitrogen dioxide or its precursors to the atmosphere from the site, whether alone or in conjunction with any other discharges to the atmosphere from the McKee Production Station arising through the exercise of any other consent held by the consent holder, 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 200 micrograms per cubic metre [one hour average exposure], or 100 micrograms per cubic metre [twenty-four hour average exposure], at or beyond the boundary of the property on which the LPG plant is located.
10. The consent holder shall control discharges to the atmosphere from the site of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, whether alone or in conjunction with any other emissions from the McKee Production Station arising through the exercise of any other consent held by the consent holder, 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 property on which the LPG plant is located, is not increased above background levels:
 - a) by more than 1/30th of the relevant Workplace Exposure Standard-Time Weighted Average [exposure averaged over a duration as specified for the Workplace Exposure Standard-Time Weighted Average], or by more than 1/10th of the Workplace Exposure Standard-Short Term Exposure Limit over any short period of 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 the General Excursion Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour].

Consent 7436-1

11. This consent shall lapse on 30 September 2014, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 and/or June 2021 and/or June 2027 and/or June 2033, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 15 November 2013

For and on behalf of
Taranaki Regional Council

Director-Resource Management

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

Name of
Consent Holder: Nova Energy Limited
P O Box 10141
WELLINGTON 6143

Decision Date: 12 October 2011

Commencement Date: 12 October 2011

Conditions of Consent

Consent Granted: To discharge wastewater and stormwater from a retention pond at the McKee Power Plant, into water and onto and into land where it may enter an unnamed tributary of the Mangahewa Stream

Expiry Date: 1 June 2031

Review Date(s): June 2016, June 2021, June 2026

Site Location: McKee Production Station, Otaraoa Road, Tikorangi

Legal Description: Pt Lot 6 DP 658 [Discharge source & site]

Grid Reference (NZTM) 1715628E-5671566N

Catchment: Onaero

Tributary: Mangahewa

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

General condition

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

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any adverse effects on the environment from the exercise of this consent.
2. The stormwater discharged shall be from a catchment area not exceeding 4.2 hectares comprising of 2.2 hectares from the plant pad and runoff from 2 hectares of adjacent land.
3. All stormwater from areas of potential contamination shall be directed for treatment through a hydrocarbon interceptor prior to entering the retention pond for discharge in accordance with the special conditions of this permit.
4. Constituents of the discharge shall meet the standards shown in the following table.

Constituent	Standard
pH	Within the range 6.0 to 9.0
suspended solids	Concentration not greater than 100 gm ⁻³
total recoverable hydrocarbons	Concentration not greater than 15 gm ⁻³
free chlorine	Concentration not greater than 0.1 gm ⁻³

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

5. After allowing for reasonable mixing, within a mixing zone extending 25 metres downstream of the discharge point, the discharge shall not, either by itself or in combination with other discharges, give rise to any or all of the following effects in the receiving water:
 - a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - b) any conspicuous change in the colour or visual clarity;
 - c) any emission of objectionable odour;
 - d) the rendering of fresh water unsuitable for consumption by farm animals;
 - e) any significant adverse effects on aquatic life.
6. Within three months of the granting of this consent, the consent holder shall prepare and maintain a contingency plan. The contingency plan shall be adhered to in the event of a spill or emergency and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council, detail 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.

Consent 7920-1

7. Within three months of the granting of this consent, the consent holder shall prepare and maintain a stormwater management plan. This plan shall be adhered to at all times and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council document how the site is to be managed in order to minimise the contaminants that become entrained in the stormwater. The plan shall include but not necessarily be limited to:
- a) the loading and unloading of materials;
 - b) maintenance of conveyance systems;
 - c) general housekeeping; and
 - d) management of the interceptor system.

Note: A Stormwater Management Plan template is available in the Environment section of the Taranaki Regional Council's web site www.trc.govt.nz.

8. The consent holder shall notify the Chief Executive, Taranaki Regional Council, prior to making any changes to the processes or operations undertaken at the site, or the chemicals used or stored on site, that could alter the nature of the discharge. Any such change shall then only occur following receipt of any necessary approval under the Resource Management Act. Notification shall include the consent number, a brief description of the activity consented and an assessment of the environmental effects of any changes, and be emailed to consents@trc.govt.nz.
9. The consent holder shall undertake and maintain fencing and riparian planting in accordance with the Riparian Management Plan for the property [RMP 90346] before 1 October 2014 along 2.16 kilometres of stream bank [i.e. 1.08 kilometres on each side of the stream].
10. This consent shall lapse on 31 December 2016, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
11. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review:
- a) during the month of June 2015 and/or June 2021 and/or June 2026; and/or
 - b) within 3 months of receiving a notification under special condition 8 above;

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

Transferred at Stratford on 8 April 2013

For and on behalf of
Taranaki Regional Council



Director-Resource Management

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

Name of
Consent Holder: Nova Energy Limited
P O Box 10141
WELLINGTON 6143

Decision Date: 12 October 2011

Commencement Date: 12 October 2011

Conditions of Consent

Consent Granted: To discharge emissions to air from the combustion of natural gas and other miscellaneous emissions from the McKee Power Plant

Expiry Date: 1 June 2031

Review Date(s): June 2016, June 2021, June 2026

Site Location: McKee Production Station, Otaraoa Road, Tikorangi

Legal Description: Pt Lot 6 DP 658 [Discharge source & site]

Grid Reference (NZTM) 1715521E-5671616N and 1715507E-5671577N

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

General condition

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

Special conditions

1. The consent holder shall adopt the best practicable option to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants into the environment from the property.

Note: With respect to this consent, the consent holder's property is defined as the area shown in the map attached.

2. By 31 October 2013 and every six years thereafter, the consent holder shall provide to the Council a written report that demonstrates compliance with condition 1 above. The report shall include but not necessarily be limited to:
 - a) A review of any of technological advances in the reduction or mitigation of emissions, how these might be applicable and/or implemented at the power station, and the costs and benefits of these advances; and
 - b) An inventory of emissions from the site of such contaminants as the Chief Executive, Taranaki Regional Council, may from time to time specify following consultation with the consent holder; and
 - c) Documentation showing that emissions of contaminants is the minimum that can be reasonably achieved; and
 - d) Details of any measures that have been taken by the consent holder to improve the energy efficiency of the power station.
3. The consent holder shall control all emissions of carbon monoxide, nitrogen dioxide, fine particles [PM₁₀] 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.
4. The consent holder shall control all emissions to the atmosphere from the site of contaminants other than those expressly provided for under special condition 3, 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.

Consent 7921-1

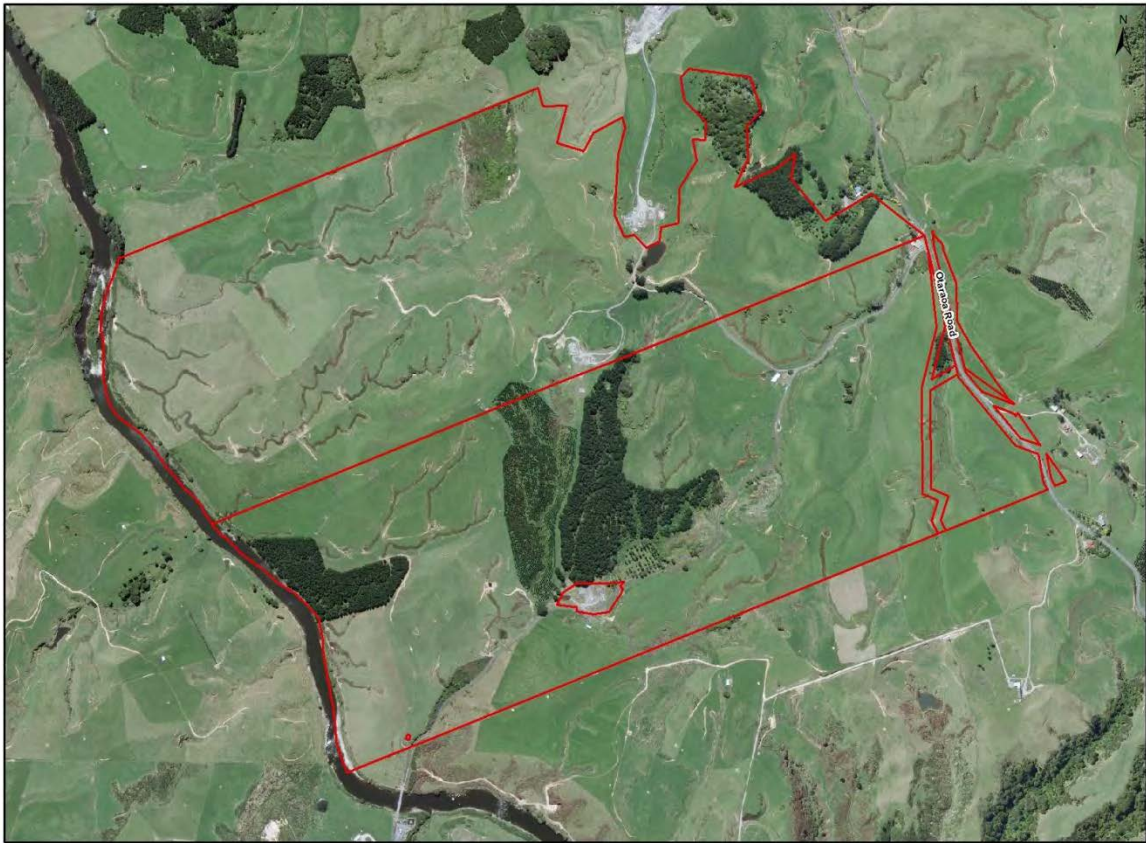
5. With the exception of any period of 15 minutes following the initiation of start-up of a turbine or in any period of 5 minutes prior to the cessation of the generation of electricity from a turbine, the consent holder shall take all practicable steps to control emissions of nitrogen oxides to the atmosphere to ensure that the following rates of discharge are not exceeded:
 - a) a combined total mass emission rate from the two gas turbine stacks of 44.6 kg/hour; and
 - b) a mass emission rate per gas turbine stack of 5.7g s⁻¹.
6. The minimum height of discharge of the products of combustion from the turbines shall be 14.5 metres above ground level.
7. The discharges authorised by this consent shall not give rise to any direct significant adverse ecological effect on any ecosystems in the Taranaki region, including but not limited to habitats, plants, animals, microflora and microfauna.
8. This consent shall lapse on 31 December 2016, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
9. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2016 and/or June 2021, and/or June 2026 for any of the following purposes:
 - a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or
 - b) requiring the consent holder to adopt specific practices in order to achieve the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge.

Transferred at Stratford on 8 April 2013

For and on behalf of
Taranaki Regional Council



Director-Resource Management



Map Showing the property boundary

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

Name of
Consent Holder: Nova Energy Limited
P O Box 10141
WELLINGTON 6143

Decision Date: 12 October 2011

Commencement Date: 12 October 2011

Conditions of Consent

Consent Granted: To install and use a stormwater and wastewater outlet structure in an unnamed tributary of the Mangahewa Stream associated with the McKee Power Plant

Expiry Date: 1 June 2031

Review Date(s): June 2016, June 2021, June 2026

Site Location: McKee Production Station, Otaraoa Road, Tikorangi

Legal Description: Pt Lot 6 DP 658 [Site of structure]

Grid Reference (NZTM) 1715548E-5671506N

Catchment: Onaero

Tributary: Mangahewa

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

General condition

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

Special conditions

1. The structure shall be constructed in accordance with drawing 5/2665/1/7424 sheet 2 dated 3/08/2011 and a plan view drawing dated 29/09/2011-01, and provided to the Taranaki Regional Council on 29/08/2011 and 29/09/2011 respectively. In the case of any contradiction between the drawing[s] and the conditions of this consent, the conditions of this consent shall prevail.
2. The outlet pipe shall have a diameter no less than 525 mm.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the commencement and upon completion of the initial installation. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
4. The consent holder shall ensure that the area and volume of streambed disturbance is, as far as practicable, minimised and any areas that are disturbed are, as far as practicable, reinstated.
5. The consent holder shall take all reasonable steps to:
 - a. minimise the amount of sediment discharged to the stream;
 - b. minimise the amount of sediment that becomes suspended in the stream; and
 - c. mitigate the effects of any sediment in the stream.

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

6. Except with the written agreement of the Chief Executive, Taranaki Regional Council, the structure[s] authorised by this consent shall be removed and the area reinstated, if and when the structure is no longer required. A further resource consent may be required to authorise the removal of the structure, and the consent holder is advised to seek advice from the Council on this matter.
7. The exercise of this consent shall not alter the natural flow of the river or restrict the passage of fish.
8. This consent shall lapse on 31 December 2016, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

Consent 7922-1

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 2016 and/or June 2021 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.

Transferred at Stratford on 8 April 2013

For and on behalf of
Taranaki Regional Council



Director-Resource Management

Appendix II

Biomonitoring reports

To Job Manager, Callum MacKenzie
From Technical Officer, Katie Blakemore
Document 1690639
Report No KB007
Date 26 May 2016

Biomonitoring of the Mangahewa Stream in relation to the McKee Production Station, April 2016

Introduction

This was the second of two biomonitoring surveys relating to the McKee Production Station undertaken in the 2015-16 monitoring year. While sites 1, 2 and 4 were monitored by some previous surveys in the Mangahewa Stream, in order to determine recovery over this reach of the stream following a small pipeline leakage of hydrocarbon products referenced in previous surveys, documented recovery required that only sites 1 and 2 were monitored by the more recent surveys. Results from surveys performed since 2000-2001 monitoring year are discussed in the reports referenced by this report. Previously the McKee Production Station was under Fletcher Challenge Energy ownership. It was owned for a period by Shell Todd Oil Services Ltd and was then transferred to Todd Taranaki Ltd.

Methods

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from all substrate types at two sites (sites 1 and 2) in the Mangahewa Stream (Table 1, Figure 1) on 1 April 2016. This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001).

Table 1 Biomonitoring sites in the Mangahewa Stream, sampled in relation to the McKee Production Station

Site no	Site code	Grid reference (NZTM)	Location	Altitude (masl)
1	MHW000060	E1715626 N5672668	Upstream of stormwater discharge and intake pond	120
2	MHW000065	E1715568 N5672791	150m downstream of McKee Production Station	120

Samples were preserved with Kahle's Fluid for later sorting and identification under a stereomicroscope according to Taranaki Regional Council methodology using protocol P1 of NZMWG protocols for sampling macroinvertebrates in wadeable streams (Stark et al. 2001). Macroinvertebrate taxa found in each sample were recorded based on the abundance categories in Table 2.

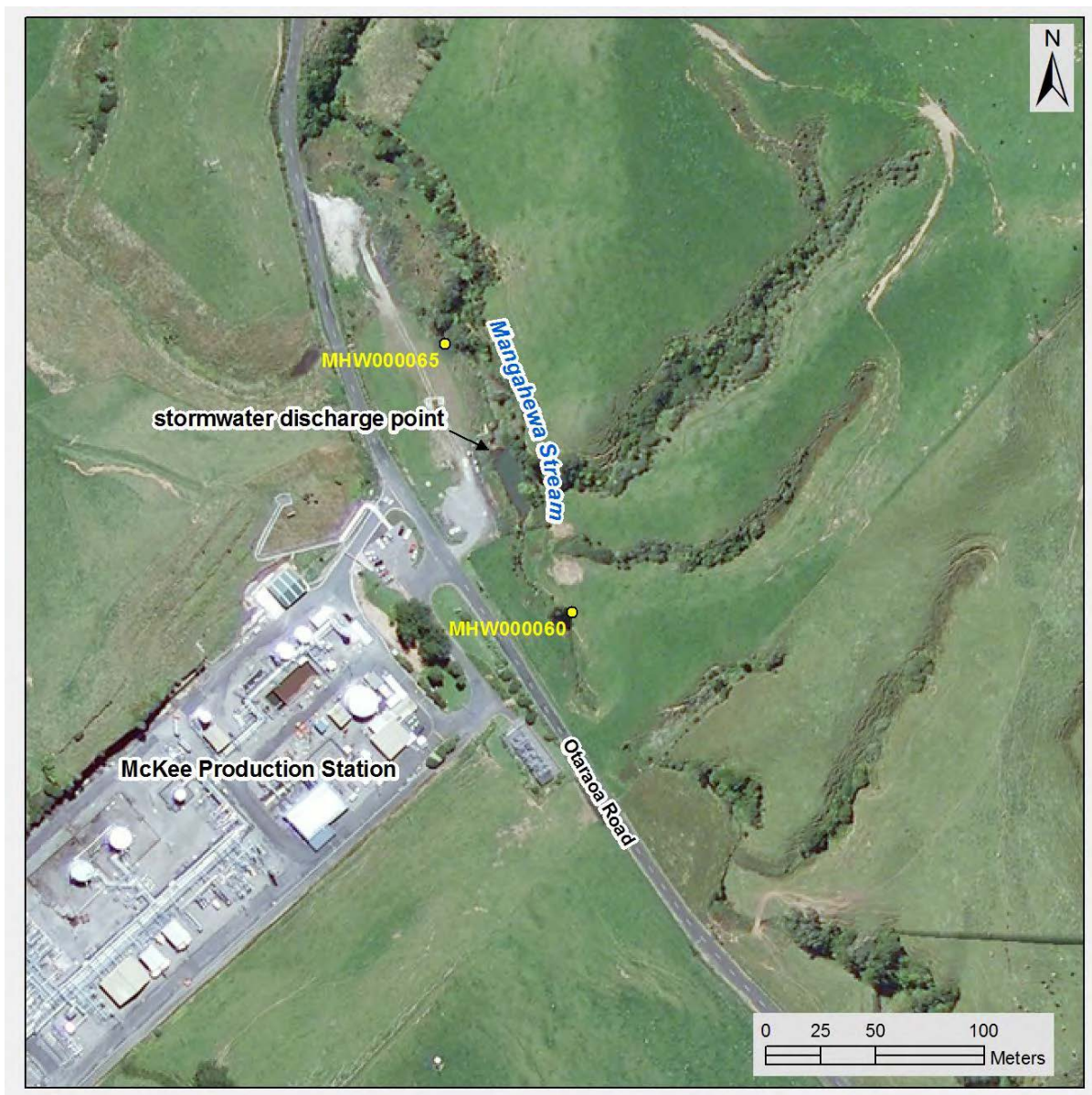


Figure 1 Biomonitors sites in the Mangahewa Stream related to the McKee Production Station

Table 2 Macroinvertebrate abundance categories

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

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams. Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1. Sensitivity scores for certain taxa have been modified in accordance with Taranaki experience. By averaging the scores obtained from a list of taxa taken from one site and multiplying by a

scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. However, other physical variables such as sedimentation, temperatures, water velocity, and dissolved oxygen levels may also affect the MCI values because the taxa that are able to tolerate extremes in these variables generally have lower sensitivity scores. More 'sensitive' communities inhabit less polluted waterways. A gradation of biological water quality conditions based upon MCI ranges which has been adapted for Taranaki streams and rivers (TRC, 2013) from Stark's classification (Stark, 1985; Boothroyd and Stark, 2000) (Table 3).

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

Grading	MCI
Excellent	>140
Very Good	120-140
Good	100-119
Fair	80-99
Poor	60-79
Very Poor	<60

A semi-quantitative MCI value (SQMCIs) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these products, and dividing by the sum of the loading factors (Stark, 1998 and 1999). The loading factors were 1 for rare (R), 5 for common (C), 20 for abundant (A), 100 for very abundant (VA) and 500 for extremely abundant (XA). Unlike the MCI, the SQMCIs is not multiplied by a scaling factor of 20, so that its corresponding range of values is 20x lower.

Results

At the time of this survey there was a steady, low, uncoloured flow which was clear at site 1 but slightly cloudy at site 2. This current survey was carried out 41 days after a fresh in excess of 3x median flow and 42 days after a fresh in excess of 7x median flow. Water temperatures were in the range 16.1 – 16.2 °C at the two sites. At site 1, the upstream ‘control’ site, the substrate was predominantly coarse gravel, with smaller amounts of fine gravel, sand, silt and cobble. Site 2, the ‘primary impact’ site had a slightly coarser substrate which was predominantly cobble, with small amounts of coarse and fine gravel, silt, sand and boulder. A light silt coating was present on the streambed at both sites. Banks were mostly stable at both sites, and a high level of stock damage was noted at site 1 but none was noted at site 2. Both sites had patchy periphyton mats and periphyton filaments, as well as patches moss and leaves and macrophytes on the streambed. Site 1 also had patches of wood on the streambed, but this was absent at site 2. Overhanging vegetation provided partial shading at both sites.

Macroinvertebrate communities

This small hill country stream usually supports macroinvertebrate communities with low to moderate numbers of taxa and moderate to low proportions of ‘sensitive’ taxa. The results of previous surveys are summarised in Table 4, together with the current results which are also presented in Table 5 and illustrated in Figures 2 and 3.

Table 4 Numbers of macroinvertebrate taxa and MCI values recorded in previous surveys of the Mangahewa Stream in relation to the McKee Production Station from March 1983, together with current results

Site	Numbers of taxa				MCI values			SQMCI values			
	N	Median	Range	Current	Median	Range	Current	N	Median	Range	Current
1	68	15	4-25	16	75	48-98	78	31	3.4	1.3-4.4	3.9
2	63	17	3-31	14	82	27-98	74	31	3.4	1.9-4.1	2.7

Table 5 Macroinvertebrate fauna of the Mangahewa Stream in relation to McKee Production Station discharges sampled on 1 April 2016

Taxa List	Site Number	MCI score	1	2
	Site Code		MHW000060	MHW000065
	Sample Number		FWB16189	FWB16190
NEMERTEA	Nemertea	3	A	A
ANNELIDA (WORMS)	Oligochaeta	1	R	A
	Lumbricidae	5	-	R
HIRUDINEA (LEECHES)	Hirudinea	3	R	-
MOLLUSCA	Lymnaeidae	3	R	-
	<i>Physa</i>	3	R	R
	<i>Potamopyrgus</i>	4	VA	A
CRUSTACEA	Ostracoda	1	R	-
EPHEMEROPTERA (MAYFLIES)	<i>Austroclima</i>	7	C	-
	<i>Coloburiscus</i>	7	-	R
ODONATA (DRAGONFLIES)	<i>Antipodochlora</i>	5	R	-
COLEOPTERA (BEETLES)	Hydraenidae	8	R	-
MEGALOPTERA (DOBSONFLIES)	<i>Archichauliodes</i>	7	R	-
TRICHOPTERA (CADDISFLIES)	<i>Hydropsyche (Aoteapsyche)</i>	4	-	C
	<i>Hydrobiosis</i>	5	-	R
	<i>Oxyethira</i>	2	R	C
DIPTERA (TRUE FLIES)	Eriopterini	5	R	-
	Orthoclaadiinae	2	R	A
	Tanytarsini	3	-	C
	<i>Austrosimulium</i>	3	R	C
	Stratiomyidae	5	-	R
ACARINA (MITES)	Acarina	5	R	R
No of taxa			16	14
MCI			78	74
SQMCIs			3.9	2.7
EPT (taxa)			1	3
%EPT (taxa)			6	21
'Tolerant' taxa		'Moderately sensitive' taxa	'Highly sensitive' taxa	

R = Rare C = Common A = Abundant VA = Very Abundant XA = Extremely Abundant

Site 1 - upstream of Production Station

Results to date for this site are illustrated in Figure 2.

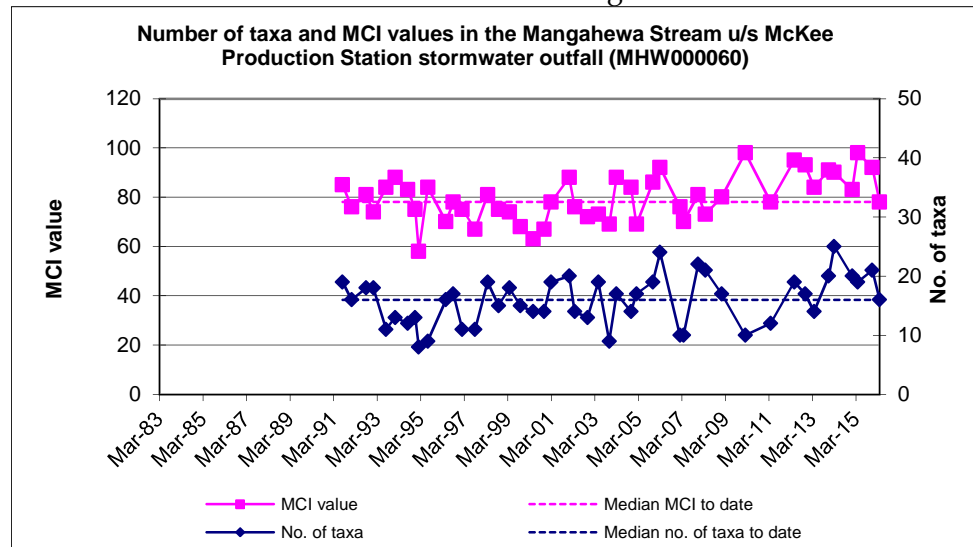


Figure 2 Number of taxa and MCI scores at site 1, upstream of the McKee Production Station in the Mangahewa Stream

A moderately low taxa richness of 16 taxa was found at site 1, one taxon more than the median taxa richness previously recorded at this site and five taxa less than the taxa richness recorded in the previous survey (Figure 2, Table 4). The community was characterised by two 'tolerant' taxa, the proboscis worm (*Nemertea*) and the mud snail (*Potamopyrgus*) (Table 5). The relatively low SQMCI_s score of 3.9 units reflected the dominance of these tolerant taxa, but was insignificantly higher than the previously recorded median SQMCI_s score for this site (Stark 1998) (Table 4). A MCI score of 78 units was recorded at this site in the current survey, categorising the site having 'poor' macroinvertebrate community health. This is similar to the long term median for this site (Figure 2, Table 4), but is significantly lower than the previously recorded score of 92 units (Stark 1998) (Figure 2).

Site 2 – 150m downstream of Production Station discharges

Results to date for this site are illustrated in Figure 3.

A moderately low taxa richness of fourteen taxa was found at site 2, three taxa less than the median taxa richness for this site and eight taxa less than the previously recorded taxa richness for this site, but within the range of previously recorded taxa richnesses (Figure 3, Table 4). The community was characterised by four 'tolerant' taxa, [proboscis worms (*Nemertea*), oligochaete worms, mud snail (*Potamopyrgus*) and midges (*Orthocladinae*)] (Table 5). A MCI score of 74 units was recorded in the current survey, categorising the site as having 'poor' macroinvertebrate community health (Table 3). This is insignificantly lower than the median previously recorded MCI score for this site, but is significantly lower than the score of 85 units recorded in the previous survey (Stark 1998) (Figure 3, Table 4). A relatively low SQMCI_s score of 2.7 units was recorded in the current survey. This is not significantly different from either the previously recorded SQMCI_s score of 2.4 units or the previously recorded median for this site (Stark 1998) (Table 4). In this sample, six of the fourteen taxa were recorded as rare (fewer than 5 individuals), and five 'moderately sensitive' taxa were present, with the other nine taxa being classed as 'tolerant'. All five 'moderately sensitive' taxa were rare. This is reflected in the low SQMCI_s score.

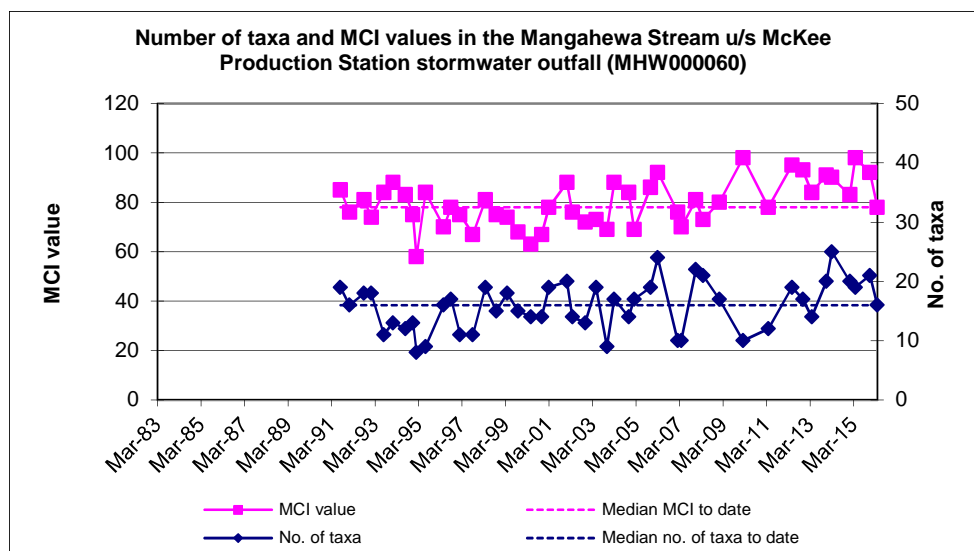


Figure 3 Number of taxa and MCI scores at site 2, 150m downstream of the McKee Production Station in the Mangahewa Stream

Discussion and conclusions

The Council's 'kick-sampling' technique was used at three sites to collect benthic macroinvertebrates from the Mangahewa Stream in relation to discharges from the McKee Production Station. 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 SQMCI_s 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 SQMCI_s takes into account relative abundances of taxa as well as sensitivity to pollution. Significant differences in taxa richness, MCI or SQMCI_s between sites may indicate the degree of adverse effects (if any) of the discharge being monitored.

Recorded scores for all macroinvertebrate community metrics were similar to their respective medians for each site. Furthermore, there were no significant differences in either taxa richness or MCI scores between sites 1 and 2 in the current survey. A significant decrease in SQMCI_s score of 1.2 units between sites 1 and 2 was recorded, reflecting the higher number of abundant 'tolerant' taxa recorded at site 2. Taxa richnesses and MCI scores for both sites were lower than the scores recorded in the previous survey, while SQMCI_s scores were similar to the scores recorded in the previous survey for each site respectively.

The February 2010 and April 2011 surveys recorded low taxa richnesses of 13 and 14 taxa at site 2. In the 2011 survey, during sample collection and processing a strong hydrocarbon odour was noted indicating that a discharge of hydrocarbons had occurred recently, which had had a toxic affect on the macroinvertebrate communities. This is further supported by the observations made during processing of that sample, that there were very few individuals recorded (10 of 14 taxa recorded less than five individuals, most only 1 or 2 specimens), and that those individuals present were very small. There were no such observations made during

sampling and processing of the current sample, indicating that no such discharge had preceded the current survey, similar to that concluded in the previous eight surveys. Since this time, a recovery has been documented, and taxa richnesses have improved. However, the current survey recorded a taxa richness of only 14 taxa at site 2, equal to that found in the April 2011 survey.

This April 2016 survey was carried out during a period of extended low flow conditions, with a steady low flow recorded at the time of sampling. The previous survey was carried out under higher flow conditions, with a swift, moderate flow recorded on that occasion. Under low flow conditions, organisms are more likely to experience extremes of variables such as water temperature, conductivity and dissolved oxygen levels. There is also less dilution of any discharges that may occur. Therefore organisms which cannot tolerate these conditions may die or deliberately drift downstream to avoid the unfavourable conditions (catastrophic drift), thus reducing taxa richness. The low flow conditions also reduce the area of habitat available, directly impacting the organisms present. This is one possible explanation for the decreased taxa richnesses and MCI scores recorded in the current survey compared to the previous survey.

No hydrocarbon odour was recorded at either site at the time of sampling. Hydrocarbon concentrations in the sediment were relatively similar to those recorded in the previous survey. Hydrocarbons can have a toxic influence on macroinvertebrates, potentially causing lower taxa richnesses and/or abundances. Further, it is possible that any effects of the hydrocarbons have been exacerbated by the low flow conditions in the current survey, resulting in the decreased MCI scores and taxa richnesses recorded in this survey. Although no odour was noted, the presence of hydrocarbons cannot be discounted as a continuing factor affecting macroinvertebrate community health.

Summary

The Council's standard 'kick-sampling' technique was used at two established sites to collect streambed macroinvertebrates from the Mangahewa Stream on 1 April 2016. Samples were sorted and identified to provide the number of taxa (richness), MCI score and SQMCI_s score for each site.

This April 2016 survey was undertaken during a period of low flows. Both sites recorded scores similar to their respective medians for all invertebrate metrics, although taxa richnesses and MCI scores were substantially lower than those recorded in the preceding (December 2015) survey. SQMCI_s score had not changed significantly during this time. Hydrocarbon concentrations were similar to those recorded in the previous survey, although no hydrocarbon odour was noted at the time of sampling. The decrease in taxa richnesses and MCI scores is likely to be related to the low flow conditions at the time of sampling. If any impacts on the macroinvertebrate communities occurred as a result of the hydrocarbon contamination, it is possible that these could have been exacerbated by the low flow conditions. However, there is insufficient evidence to determine whether the lower taxa richnesses and MCI scores are a result of the hydrocarbon contamination, the low flow conditions, or a combination of the two. Further monitoring will be needed to determine whether future results reflect a relationship between macroinvertebrate community health and hydrocarbon concentrations in the sediment. It should be noted that it has not been determined whether the hydrocarbon contamination is a remnant effect from the well blow-out that occurred here in 1995, or whether it is recent contamination.

It is recommended that sediment samples continue to be collected and analysed for hydrocarbons, and that this sampling is undertaken in conjunction with the macroinvertebrate surveys.

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To Job Manager, C McKenzie
From Scientific Officer, B Jansma
Doc No 1703720
Report No BJ281
Date 23 June 2016

Biomonitoring of the Mangahewa Stream in relation to stormwater discharges from the McKee Production Station of Todd Taranaki Ltd, December 2015.

Introduction

This was the first of two biomonitoring surveys relating to the McKee Production Station undertaken in 2015-16 monitoring year. While sites 1, 2 and 4 were monitored by some previous surveys in the Mangahewa Stream, in order to determine recovery over this reach of the stream subsequent to a small pipeline leakage of hydrocarbon products referenced in previous surveys, documented recovery required that only sites 1 and 2 were monitored by the more recent surveys. The results from surveys performed since the 2000-2001 monitoring year are discussed in the reports referenced in this report. Previously the McKee Production Station was under Fletcher Challenge Energy ownership. It was owned for a period by Shell Todd Oil Services Ltd and was then transferred to Todd Taranaki Ltd.

Methods

The standard '400 ml kick-sampling' technique was used to collect streambed macroinvertebrates from all substrate types at two sites (sites 1 and 2) in the Mangahewa Stream (Table 1, Figure 1) on 9 December 2015. This 'kick-sampling' technique is very similar to Protocol C1 (hard-bottomed, semi-quantitative) of the New Zealand Macroinvertebrate Working Group (NZMWG) protocols for macroinvertebrate samples in wadeable streams (Stark et al, 2001).

Table 1 Biomonitoring sites in the Mangahewa Stream, sampled in relation to the McKee Production Station

Site no	Site code	Grid reference (NZTM)	Location	Altitude (masl)
1	MHW000060	E1715626 N5672668	Upstream of stormwater discharge and intake pond	120
2	MHW000065	E1715568 N5672791	150m downstream of McKee Production Station	120

Samples were preserved with Kahle's Fluid for later sorting and identification under a stereomicroscope according to Taranaki Regional Council methodology using protocol P1 of NZMWG protocols for sampling macroinvertebrates in wadeable streams (Stark et al. 2001). Macroinvertebrate taxa found in each sample were recorded as:

R (rare)	= less than 5 individuals;
C (common)	= 5-19 individuals;
A (abundant)	= estimated 20-99 individuals;
VA (very abundant)	= estimated 100-499 individuals;
XA (extremely abundant)	= estimated 500 individuals or more.

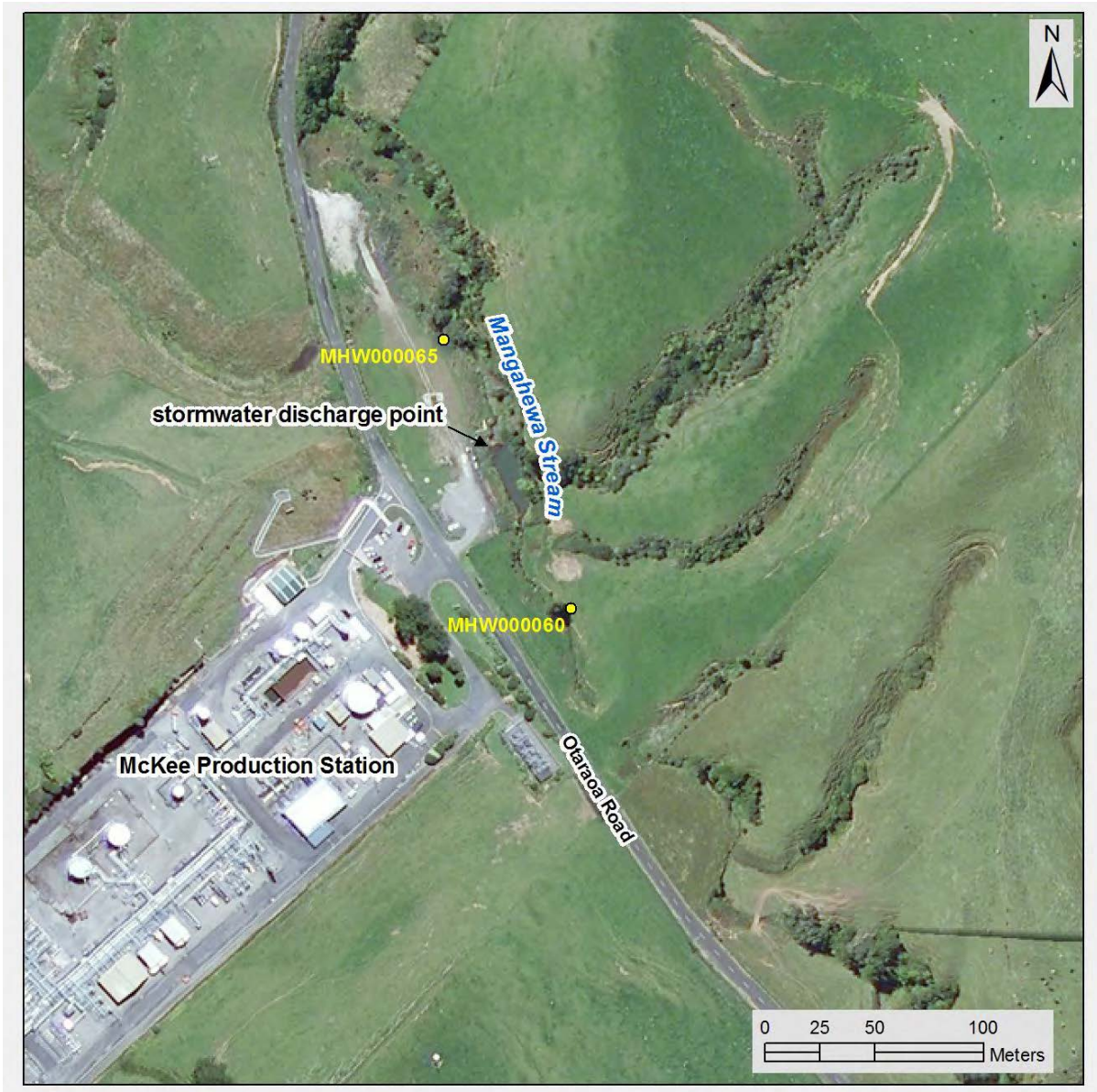


Figure 1 Biomonitors sites in the Mangahewa Stream related to the McKee Production Station.

Stark (1985) developed a scoring system for macroinvertebrate taxa according to their sensitivity to organic pollution in stony New Zealand streams. Highly 'sensitive' taxa were assigned the highest scores of 9 or 10, while the most 'tolerant' forms scored 1. Sensitivity scores for certain taxa have been modified in accordance with Taranaki experience. By averaging the scores obtained from a list of taxa taken from one site and multiplying by a scaling factor of 20, a Macroinvertebrate Community Index (MCI) value was obtained. The MCI is a measure of the overall sensitivity of macroinvertebrate communities to the effects of organic pollution. More 'sensitive' communities inhabit less polluted waterways.

A semi-quantitative MCI value (SQMCI_s) has also been calculated for the taxa present at each site by multiplying each taxon score by a loading factor (related to its abundance), totalling these products, and dividing by the sum of the loading factors (Stark, 1998 and 1999). The loading factors were 1 for rare (R), 5 for common (C), 20 for abundant (A), 100 for very abundant (VA) and 500 for extremely abundant (XA). Unlike the MCI, the SQMCI_s is not multiplied by a scaling factor of 20, so that its corresponding range of values is 20x lower.

Results and discussion

At the time of this morning survey there was a moderate, uncoloured and clear flow at both sites in the Mangahewa Stream. The current survey followed 10 days after a stream fresh in excess of 7 times median flow. At site 1, upstream of the McKee Production Station, the substrate was predominantly fine and coarse gravel, with a moderate amount of sand and silt, and some cobble. Downstream of the production station at site 2, the substrate had a slightly coarser composition, with more cobble and some boulder noted. Both sites had more algae than that noted in the previous survey, with algal filaments patchy and site 2 also having some patchy mats. Site 2 also supported patchy growths of moss. The downstream site was partially shaded by riparian vegetation whereas the upstream site was unshaded, with the site located between slumped pasture banks (due to localised seepages and inadequate riparian protection). Hydrocarbon odours were last noted while sampling site 2 in the April 2011 survey, with the last nine surveys (including the current one) being free of this odour. It was also not apparent during processing of the sample.

Macroinvertebrate communities

This small hill country stream usually supports macroinvertebrate communities with low to moderate numbers of taxa and moderate to low proportions of 'sensitive' taxa. The results of previous surveys are summarised in Table 2, together with the current results, which are also presented in Table 3 and illustrated in Figures 2 and 3.

Table 2 Numbers of macroinvertebrate taxa and MCI values recorded in previous surveys of the Mangahewa Stream in relation to the McKee Production Station from March 1983, together with current results

Site	Numbers of taxa				MCI values			SQMCI _s values			
	N	Median	Range	Current	Median	Range	Current	N	Median	Range	Current
1	67	15	4-25	21	75	48-98	92	30	3.4	1.3-4.4	4.1
2	62	17	3-31	22	82	27-98	85	30	3.4	1.9-4.1	2.4

Table 3 Macroinvertebrate fauna of the Mangahewa Stream in relation to McKee Production Station discharges sampled on 9 December 2015

Taxa List	Site Number	MCI score	1	2
	Site Code		MHW000060	MHW000065
	Sample Number		FWB15372	FWB15373
NEMERTEA	Nemertea	3	R	R
ANNELIDA (WORMS)	Oligochaeta	1	A	VA
	Lumbricidae	5	R	R
MOLLUSCA	<i>Physa</i>	3	-	R
	<i>Potamopyrgus</i>	4	A	A
CRUSTACEA	Paraleptamphopidae	5	R	-
EPHEMEROPTERA (MAYFLIES)	<i>Austroclima</i>	7	A	C
	<i>Deleatidium</i>	8	C	-
	<i>Zephlebia group</i>	7	R	-
PLECOPTERA (STONEFLIES)	<i>Zelandobius</i>	5	R	R
ODONATA (DRAGONFLIES)	<i>Antipodochlora</i>	5	R	-
HEMIPTERA (BUGS)	<i>Anisops</i>	5	-	R
	<i>Microvelia</i>	3	R	-
COLEOPTERA (BEETLES)	Elmidae	6	C	-
	Hydraenidae	8	R	-
TRICHOPTERA (CADDISFLIES)	<i>Hydropsyche (Aoteapsyche)</i>	4	R	R
	<i>Costachorema</i>	7	-	R
	<i>Hydrobiosis</i>	5	A	A
	<i>Psilochorema</i>	6	C	R
	Oeconesidae	5	-	R
DIPTERA (TRUE FLIES)	<i>Aphrophila</i>	5	-	R
	<i>Limonia</i>	6	-	R
	<i>Maoridiamesa</i>	3	-	C
	Orthocladiinae	2	A	A
	<i>Polypedilum</i>	3	C	C
	<i>Paradixa</i>	4	R	-
	Empididae	3	R	R
	Muscidae	3	-	C
	<i>Austrosimulium</i>	3	C	R
ACARINA (MITES)	Acarina	5	-	R
No of taxa			21	22
MCI			92	85
SQMCIs			4.1	2.4
EPT (taxa)			7	7
%EPT (taxa)			33	32
'Tolerant' taxa		'Moderately sensitive' taxa	'Highly sensitive' taxa	

R = Rare C = Common A = Abundant VA = Very Abundant XA = Extremely Abundant

Site 1 (upstream of production station)

Results to date for this site are illustrated in Figure 2.

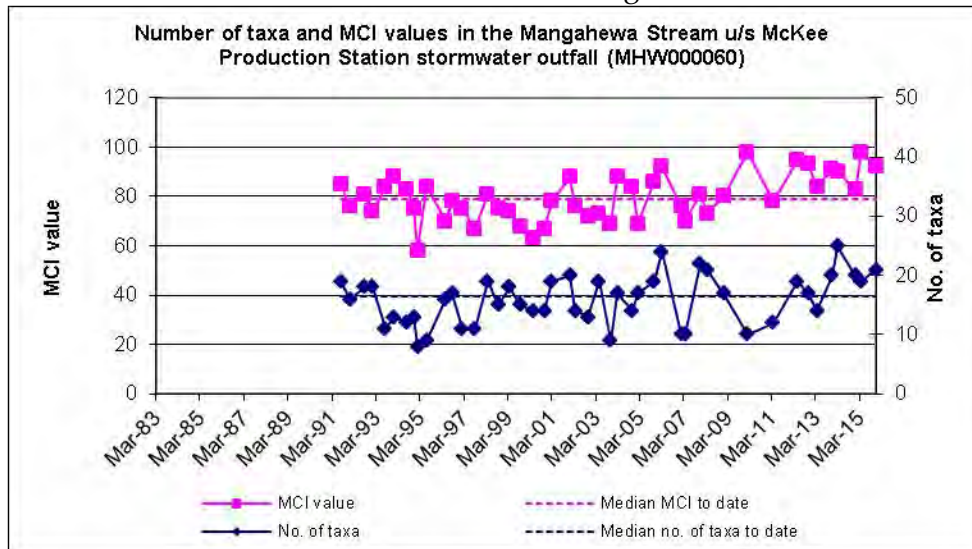


Figure 2 Number of taxa and MCI scores at site 1 in the Mangahewa Stream

A relatively high richness (21 taxa) was found at site 1, six taxa more than the median number of taxa from previous surveys at this site, but well within the range of that previously recorded (Table 2, Figure 2). The community was characterised by two 'moderately sensitive' taxa (mayfly (*Austroclima*) and caddisfly (*Hydrobiosis*), and three 'tolerant' taxa (oligochaete worms, *Potamopyrgus* snails and orthoclad midge larvae). This is similar to the number of abundant taxa recorded in the previous survey, reflecting the similar flow conditions observed. The fact that the community was dominated by similar numbers of 'sensitive' and 'tolerant' taxa was reflected in the SQMCI_s value of 4.1 units, which on a general scale is relatively low. However, in comparison to previous surveys, it is higher than the long term median for this site (Table 2). Overall, this result is a reflection of an enriched habitat dominated by a softer, finer substrate but with an improved periphyton cover. The proportion of 'tolerant' taxa present in the community (48% of taxa number) was quite low for this site, and resulted in a MCI score of 92 units. This was seventeen units higher than the median of previous scores, a statistically significant difference (Stark, 1998) (Figure 2, Table 2), and similar to that recorded in the previous survey. This indicates that the community at this site was in above average health.

Site 2 (150 m downstream of production station discharges)

Results to date at this site are illustrated in Figure 3.

A taxa richness of 22 taxa was recorded at site 2, five taxa more than the median of numbers recorded from all previous surveys at this site, but similar to that recorded in the previous survey (Figure 3). This richness was also similar to the richness recorded at site 1 (above the discharge), being only one taxon more (Table 2). This is considered a continuation of the significant recovery recorded since the February 2010 and April 2011 surveys, which recorded 13 and 14 taxa respectively. In the 2011 survey, during sample collection and processing a strong hydrocarbon odour was noted indicating that a discharge of hydrocarbons had occurred recently, which had had a toxic affect on the macroinvertebrate communities. This was further supported by the observations made during processing of that sample, that there were very few individuals recorded (10 of 14 taxa recorded less than five individuals, most only 1 or 2 specimens), and that those individuals present were very small. There were no such observations made during sampling and processing of the current sample, and coupled

with the relatively improved taxa richness, this indicates that no such discharge had preceded the current survey, similar to that concluded in the previous six surveys.

In the previous April 2015 survey, only one taxon was recorded as abundant at this site, being the 'tolerant' snail *Potamopyrgus*. This represented a reduction in the number of taxa recorded in abundance. The current survey indicates a recovery, with one 'moderately sensitive' caddisfly recorded in abundance (*Hydrobiosis*) and three 'tolerant' taxa (oligochaete worms, *Potamopyrgus* snails and orthoclad midge larvae). It is also worth noting that 14 (64%) of the taxa recorded at this site were present as rarities, being represented by less than five individuals. Sediment sampling in the stream does indicate that there is an increased concentration of hydrocarbons in the substrate, although the concentration detected in the sediment during this survey was lower than that in the previous survey. It is possible that these hydrocarbons have had a toxic influence, and their reduced concentration during the current survey (relative to the previous survey) may have contributed to the improved invertebrate abundance. Although no hydrocarbon odour was noted during sampling, the elevated concentration of hydrocarbons cannot be discounted as a continuing factor affecting community health.

There were some differences in community composition between sites (only 12 of the 30 taxa recorded were common to both sites). However, there was only a seven unit reduction in MCI score, with site 2 recording a score of 85 units. This MCI score represented a thirteen unit reduction from that recorded in the previous survey, which recorded the highest MCI score for this site to date, but was three units higher than the median score for this site (Table 2 and Figure 3). There was however a large drop in SQMCI_s score at site 2 (when compared with site 1), being a 1.7 unit reduction to a score of 2.4 units. This score was 1.7 units less than that recorded in the previous survey, and 1.0 unit less than the median for this site. The reasons for this reduction include the loss of 'highly sensitive' taxa, but was primarily the increased abundance of highly 'tolerant' oligochaete worms and reduced abundance of 'moderately sensitive' *Austroclima* mayflies.

These results indicate that the community was in average to below average health. This contrasts to that recorded upstream, and to the sediment sampling, which indicated a reduced hydrocarbon concentration. It remains to be seen whether future results reflect a relationship between macroinvertebrate community health and hydrocarbon concentration in the sediment. It is possible that subtle impacts of the hydrocarbon contamination will manifest as reduced abundances, as opposed to reduced MCI and SQMCI_s scores.

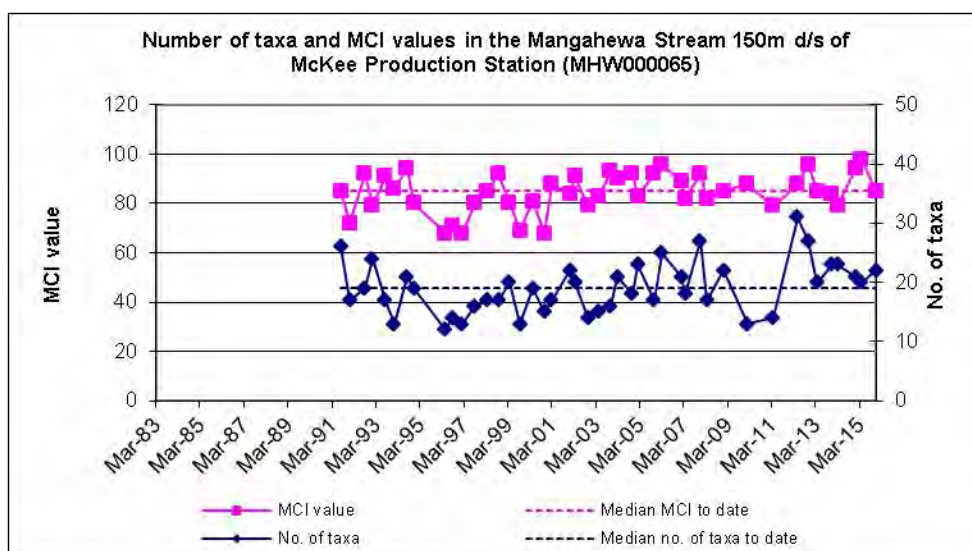


Figure 3 Number of taxa and MCI scores at site 2 in the Mangahewa Stream

Summary

The Council's standard 'kick-sampling' technique was used at two established sites to collect streambed macroinvertebrates from the Mangahewa Stream on 9 December 2015. Samples were sorted and identified to provide the number of taxa (richness), MCI score and SQMCI₅ score for each site.

The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effects of organic pollution in stony streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to environmental conditions. The SQMCI₅ takes into account taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities particularly if non-organic impacts are occurring. Significant differences in either the MCI or the SQMCI₅ between sites indicate the degree of adverse effects (if any) of the discharges being monitored.

This December 2015 macroinvertebrate survey was undertaken during moderate flows. Flows were higher than that observed during the previous survey and as a result, there was a slight improvement in taxa richness at both sites, which recorded moderate community richnesses. While the recovery in community richness recorded in the previous seven surveys remained, there was some deterioration noted at site 2 in the current survey. At the time of sampling and processing of the current survey, no hydrocarbon odour was noted from the downstream sample, and sediment samples at site 2 indicated that the degree of hydrocarbon contamination had reduced slightly from the previous (April 2015) sampling.

The site upstream of the production station recorded a macroinvertebrate community in above average health, with a MCI score seventeen units higher than the median, being one of the highest MCI scores recorded at this site to date. The SQMCI₅ was 0.7 units higher than the median. The site downstream recorded a taxa richness of 22, five taxa higher than the median taxa richness. The MCI score was also similar to the median, but represented a significant reduction from that recorded in the previous survey. The SQMCI₅ score was also significantly less than that recorded in the previous survey, and the median score for this site. These results indicate that the macroinvertebrate community at site 2 was in average to below average health, and in significantly poorer condition than that recorded in the April 2015 survey. This is in contrast to that recorded upstream, which was found to be in above average health. Sediment sampling in the stream does indicate that there is an increased concentration of hydrocarbons in the substrate. It is possible that subtle impacts of the hydrocarbon contamination will manifest as reduced abundances, as opposed to reduced MCI and SQMCI₅ scores.

Although no hydrocarbon odour was noted during sampling, the elevated concentration of hydrocarbons cannot be discounted as a continuing factor potentially affecting community health. It remains to be seen whether future results reflect a relationship between macroinvertebrate community health and hydrocarbon concentration in the sediment. It should be noted that it has not been determined whether the hydrocarbon contamination is a remnant effect from the well blow-out that occurred here in 1995, or whether it is recent contamination.

It is recommended that sediment samples continue to be collected and analysed for hydrocarbons, and that this sampling is undertaken in conjunction with the macroinvertebrate surveys.

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Appendix III

Air monitoring reports

Memorandum

To Fiza Hafiz, Scientific Officer – State of the Environment
Job Managers - Callum MacKenzie, Emily Roberts, James Kitto
From Brian Cheyne, Scientific Officer – Air Quality
File Frodo # 1718841
Date 22 July 2016

Monitoring of nitrogen oxides (NO_x) levels in Taranaki near the NO_x emitting sites, year 2015-2016

From 2014 onwards, the Taranaki Regional Council (TRC) has implemented a coordinated region-wide monitoring programme to measure NO_x, not only at individual compliance monitoring sites near industries that emit NO_x, but simultaneously at the urban sites (the Council regional state of the environment programme) to determine exposure levels for the general population. The programme involves deploying all measuring devices on the same day, with retrieval three weeks later. This approach will assist the Council to further evaluate the effects of local and regional emission sources and ambient air quality in the region.

Nitrogen oxides

Nitrogen oxides (NO_x), a mixture of nitrous oxide (N₂O), nitric oxide (NO) and nitrogen dioxide (NO₂), are produced from natural sources, motor vehicles and other fuel combustion processes. Indoor domestic appliances (gas stoves, gas or wood heaters) can also be significant sources of nitrogen oxides, particularly in areas that are poorly ventilated. NO and NO₂ are of interest because of potential effects on human health.

Nitric oxide is colourless and odourless and is oxidised in the atmosphere to form nitrogen dioxide. Nitrogen dioxide is an odorous, brown, acidic, highly corrosive gas that can affect our health and environment. Nitrogen oxides are critical components of photochemical smog – nitrogen dioxide produces the brown colour of the smog.

Environmental and health effects of nitrogen oxides

Nitrogen dioxide is harmful to vegetation, can fade and discolour fabrics, reduce visibility, and react with surfaces and furnishings. Vegetation exposure to high levels of nitrogen dioxide can be identified by damage to foliage, decreased growth or reduced crop yield.

Nitric oxide does not significantly affect human health. On the other hand, elevated levels of nitrogen dioxide cause damage to the mechanisms that protect the human respiratory tract and can increase a person's susceptibility to, and the severity of, respiratory infections and asthma. Long-term exposure to high levels of nitrogen dioxide can cause chronic lung disease. It may also affect sensory perception, for example, by reducing a person's ability to smell an odour.

National environmental standards and guidelines

In 2004, national environmental standards (NES) for ambient (outdoor) air quality were introduced in New Zealand to provide a guaranteed level of protection for the health of New Zealanders. The national standard for nitrogen dioxide (NO₂) is set out below.

In any 1-hour period, the average concentration of nitrogen dioxide in the air should not be more than 200 µg/m³.

Before the introduction of the national environmental standards, air quality was measured against the national air quality guidelines. The national guidelines were developed in 1994 and revised in 2002 following a comprehensive review of international and national research and remain relevant. The national guideline for nitrogen dioxide (NO₂) is set out below.

In any 24-hour period, the average concentration of nitrogen dioxide in the air should not be more than 100 µg/m³.

Nitrogen dioxide limits are also set in the special conditions of the resource consents. The consents limits are the same as those imposed under the NES and MfE's guideline.

Measurement of nitrogen oxides

The Taranaki Regional Council has been monitoring nitrogen oxides (NO_x) in the Taranaki region since 1993 using passive absorption discs. Research to date indicates that this is an accurate method, with benefits of simplicity of use and relatively low cost. To date more than 660 samplers of nitrogen oxides have been collected in Taranaki region. Discs are sent to EUROFINs ELS Ltd. Lower Hutt for analysis. Passive absorption discs are placed at the nominated sites. The gases diffuse into the discs and any target gases (nitrogen dioxide or others) are captured.

In the 2015-16 year, passive absorption discs were placed on one occasion at twenty four sites, staked about two metres off the ground for a period of 21 days, for the purpose of Compliance Monitoring.

Conversion of exposure result to standardised exposure time period

From the average concentration measured, it is possible to calculate a theoretical maximum daily or one hour concentrations that may have occurred during the exposure period. Council data on NO_x is gathered over a time period other than exactly 24 hours or one hour. There are mathematical equations used by air quality scientists to predict the maximum concentrations over varying time periods. These are somewhat empirical, in that they take little account of local topography, micro-climates, diurnal variation, etc. Nevertheless, they are applied conservatively and have some recognition of validity.

One formula in general use is of the form:

$$C(t_2) = C(t_1) \times \left(\frac{t_1}{t_2}\right)^p$$

where C(t) = the average concentration during the time interval t, and p = a factor lying between 0.17 and 0.20. When converting from longer time periods to shorter time periods, using p = 0.20 gives the most conservative estimate (i.e. the highest calculated result for time period t₂ given a measured concentration for time period t₁). Using the 'worst case' factor of p = 0.20, the monitoring data reported above has been converted to equivalent 'maximum' 1-hour and 'maximum' 24-hour exposure levels.

Results

The location of the NO_x monitoring sites are shown in Figure 1 and the details of the NO_x results are presented in Table 1 and Figure 2.

Table 1 Actual (laboratory) and recalculated ambient NO_x results, NES and MfE guideline.

	Survey at	Site code	NO _x (µg/m ³) Lab. results	NO _x 1/hr (µg/m ³) Theoretical max.	NO _x 24/hr (µg/m ³) Theoretical max.
Petrochemical	McKee PS	AIR007901	1.9	6.5	3.5
		AIR007902	8.1	27.8	14.8
	Turangi PS	AIR007922	3.8	13.1	6.9
		AIR007824	3.3	11.3	6.0
	Kaimiro PS	AIR007817	1.2	4.1	2.2
		AIR007818	4.0	13.8	7.3
	Sidewinder PS	AIR007831	0.8	2.8	1.5
		AIR007832	0.8	2.8	1.5
	Maui PS	AIR008201	1.3	4.5	2.4
		AIR008214	2.4	8.3	4.4
	Kupe PS	AIR007827	2.1	7.2	3.8
		AIR007830	1.4	4.9	2.6
	Kapuni PS	AIR003410	5.9	20.3	10.7
		AIR003411	7.0	24.1	12.7
	Cheal PS	AIR007841	1.5	5.2	2.7
		AIR007842	2.0	6.9	3.6
Waihapa PS	AIR007815	1.5	5.2	2.7	
	AIR007816	2.6	8.9	4.7	
Ballance AUP	AIR003401	4.2	14.4	7.7	
	AIR003404	6.9	23.8	12.6	
Dairy factory	Fonterra	AIR002410	3.4	11.7	6.2
		AIR002711	4.8	16.5	8.7
		AIR002412	4.3	14.8	7.8
		AIR002413	4.1	14.1	7.5
National Environmental Standard (NES) and MfE guideline				200 (NES)	100 (guideline)

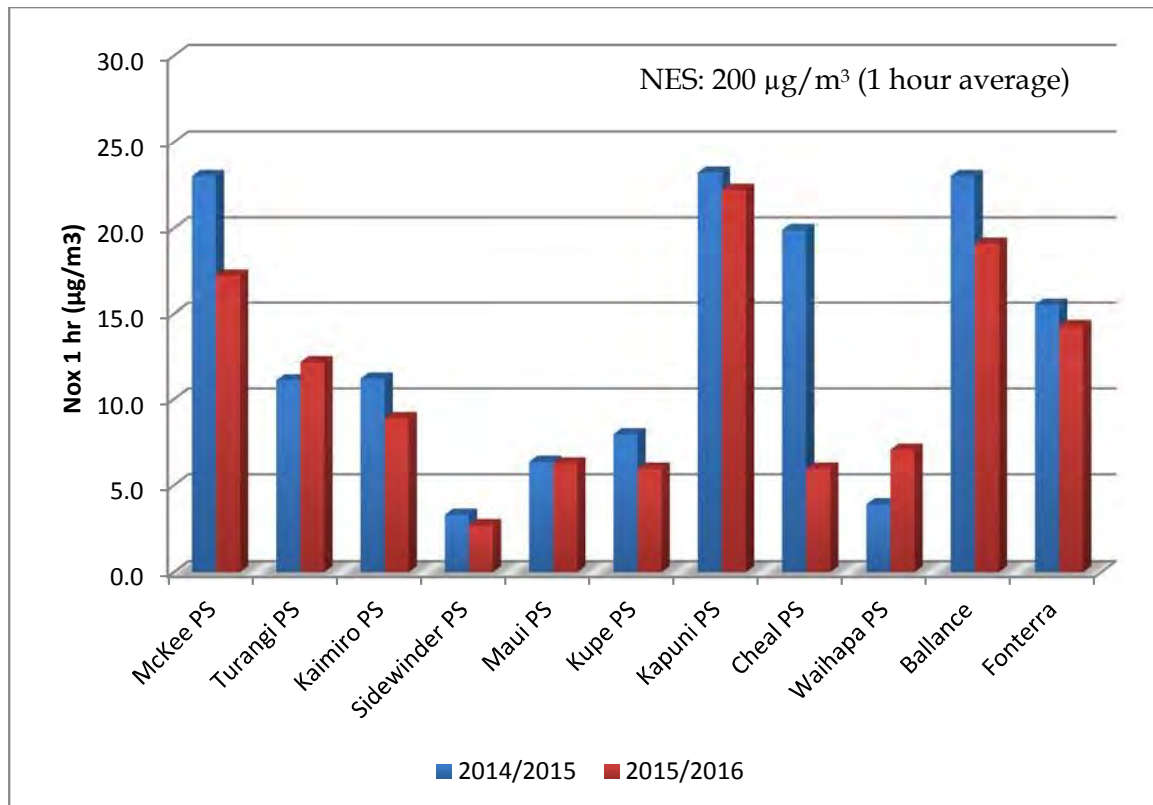


Figure 2 Average NO_x levels at 11 surveyed locations throughout the region (year 2014-2016).

Discussion

The calculated 1-hour and 24-hour theoretical maximum concentrations (using a power law exponent of 0.2) ranged from 2.8 $\mu\text{g}/\text{m}^3$ to 27.8 $\mu\text{g}/\text{m}^3$ and 1.5 $\mu\text{g}/\text{m}^3$ to 14.8 $\mu\text{g}/\text{m}^3$ respectively. The highest results in 2015-16 monitoring year were obtained from the NO_x emitting sites at four different locations:

1. Around the Fonterra's Whareroa co-generation plant.
2. In Kapuni heavy industrial area around the STOS production station and
3. Ballance ammonia/urea plant.
4. And from the sites at McKee production station and power generation plant.

All values were within the National Environmental Standards, Ministry for the Environment Ambient Air Quality Guidelines and the respective resource consents limits. This continues the pattern found in previous years.

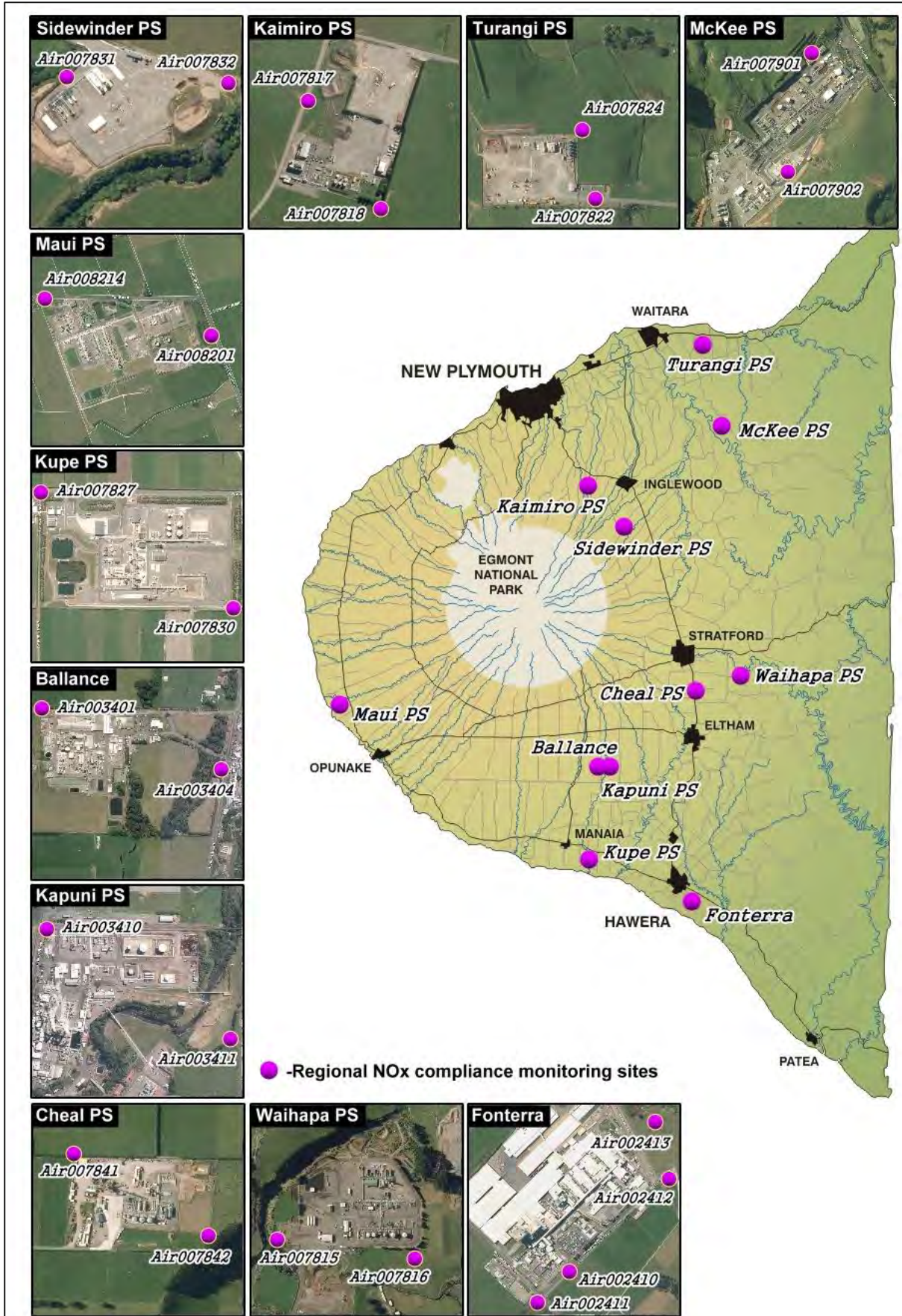


Figure 1 NOx monitoring sites in Taranaki Region, 2015-2016

Ministry for the Environment environmental performance indicator

Ministry for the Environment uses an environmental performance indicator to categorise air quality. These categories are set out in Table 2 and further details of the entire NO_x results are set out in Table 3.

Table 2 Environmental Performance Indicator air quality categories

Measured value	Less than 10% of NES	10-33% of NES	33-66% of NES	66-100% of NES	More than 100% of NES
Category	<i>excellent</i>	<i>good</i>	<i>acceptable</i>	<i>alert</i>	<i>action</i>

Table 3 Categorisation of results (2015-16 monitoring year)

National Environmental Standard for NO ₂ = 200 µg/m ³ - 1 hour average.		
Category	Measured values	
Excellent	<10% of the NES, (0-20µg/m ³)	20 (83%)
Good	10-33% of the NES, (20-66µg/m ³)	4 (17 %)
Acceptable	33-66% of the NES, (66-132 µg/m ³)	0 (0%)
Alert	66-100% of the NES, (132-200 µg/m ³)	0 (0%)
Total number of samples		24 (100%)

Conclusion

The monitoring showed that 83% of the 1-hour average results fell into Ministry's 'excellent' categories and 17% of the results lay within Ministry's 'good' category. No results ever entered the 'acceptable' or 'alert' categories, i.e., no results ever exceeded the National Environmental Standard of 200µg/m³.

These results, and all regional monitoring to date, have shown that Taranaki has very clean air, and on a regional basis there are no significant pressures upon the quality of the air resource.

Memorandum

To Job Manager, Callum MacKenzie
From Scientific Officer - Air Quality, Brian Cheyne
File 1756771
Date October 11, 2016

Ambient Gas (PM10, NOx, CO and LEL) Monitoring at McKee Production Stations during 2015-2016 monitoring year

Introduction

In June 2016 and January 2016 as part of the compliance monitoring programme for the McKee production station, a survey of ambient air quality sampling was carried out by the Taranaki Regional Council (the Council) in the vicinity of the plant. The main objectives were to measure:

- The concentrations of PM10 using a portable data logging TSI 'DustTrak';
- To measure the concentrations of the nitrogen oxides (NOx) using a passive sampling method, that gives a result for average exposure;
- And to measure carbon monoxide (CO) using a portable multi gas meter that provides instantaneous data throughout the monitoring period.

The findings of this study are presented in this memorandum, together with the locations of the monitoring sites which are provided in Figure 1.

Carbon monoxide (CO) and Lower explosive limit (LEL)

During the monitoring year, a multi-gas meter was deployed on one occasion in the vicinity of the plant. The deployment lasted approximately 44 hours, with the instrument placed in a down-wind 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).

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.



Figure 1 Air monitoring sites at McKee production station (2015-2016)

The details of the sample run are summarised in Table 1 and the data from the sample run are presented graphically in Figure 2.

The consents covering air discharges from the McKee production station have specific limits related to particular gases. Special condition 5 of consent 4050-3 set a limit on the carbon monoxide concentration at or beyond the production station's boundary. The limit is expressed as 10 mg/m³ for an eight hour average or 30 mg/m³ for a one hour average exposure. The maximum concentration of carbon monoxide found during the monitoring run was 1.5 mg/m³ with average concentration for the entire dataset was only 0.3 mg/m³ which comply with consent conditions. This is in line with the pattern found in previous years.

Table 1 Results of carbon monoxide and LEL monitoring at McKee production station

Period (from-to)		07/06/2016 14:40 to 09/06/2016 10:01
Max	CO(ppm)	1.50
	LEL(%)	0.10
Mean	CO(ppm)	0.30
	LEL(%)	0.00
Min	CO(ppm)	0.00
	LEL(%)	0.00

Note: (1) the instrument records in units of ppm. At 25°C, 1 atm.
 1ppm CO = 1.145 mg/m³

(2) See text for explanation of LEL. 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.

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 McKee production station reach any more than a trivial level.

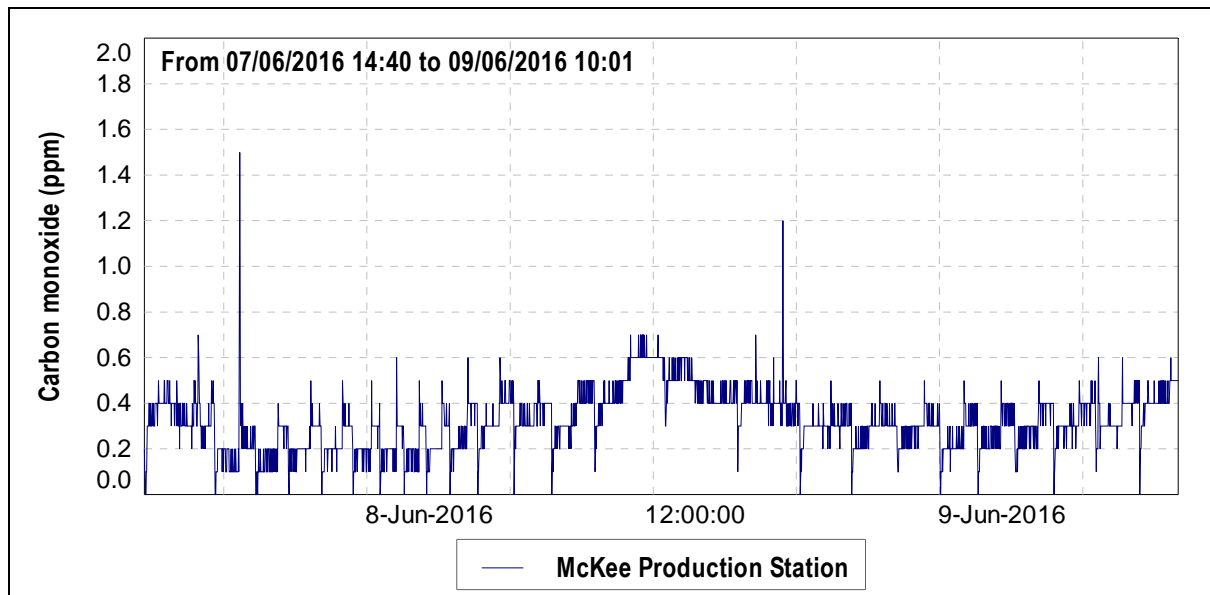


Figure 2 Graph of ambient CO levels in the vicinity of the McKee Production Station (year 2015-16).

PM10

In September 2004 the Ministry for the Environment made public National Environmental Standards (NESs) relating to certain air pollutants. The NES for PM10 is 50 $\mu\text{g}/\text{m}^3$ (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 the McKee production station. The deployment lasted approximately 45 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 1.

The details of the sample run are presented in Figure 3 and Table 2.

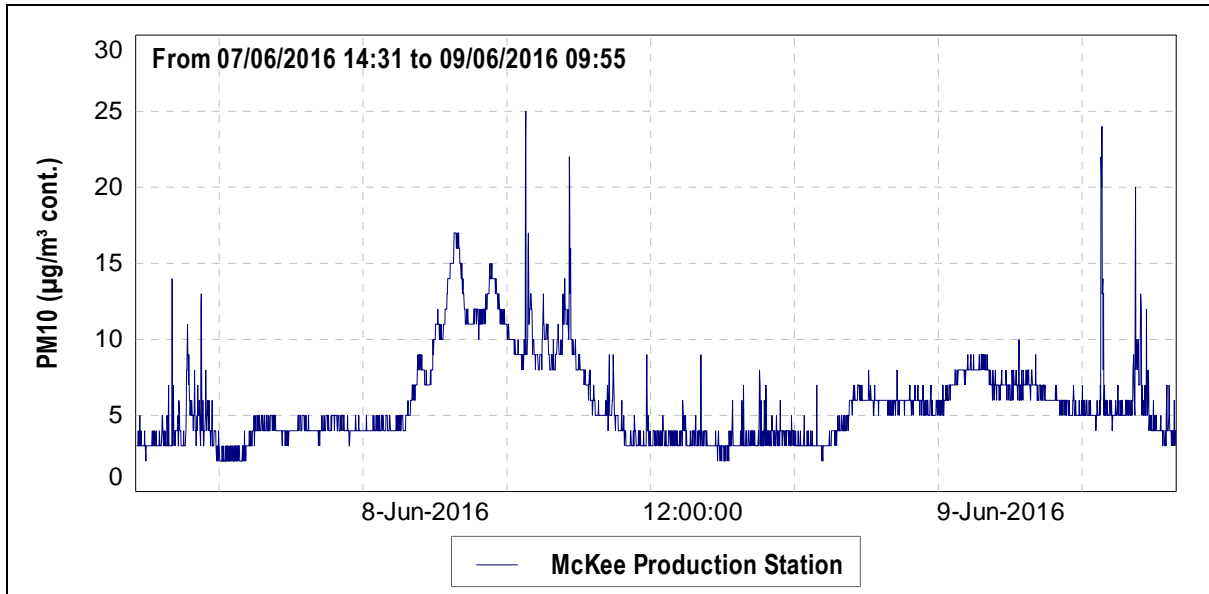


Figure 2 PM10 concentrations ($\mu\text{g}/\text{m}^3$) at the McKee production station (2015-16)

	(45 hours) (07/06-09/06/2016)	
24 hr. set	Day 1	Day 2
Daily average	6.1 $\mu\text{g}/\text{m}^3$	5.1 $\mu\text{g}/\text{m}^3$
NES	50 $\mu\text{g}/\text{m}^3$	

Table 1 Daily mean of PM10 results during two days' monitoring at McKee production station

During the 45-hour run, from 7th of June to 9nd of June 2016, the average recorded PM₁₀ concentration for the first 24 hour period was 6.1 $\mu\text{g}/\text{m}^3$ and 5.1 $\mu\text{g}/\text{m}^3$ for the second 24 hour period. These daily means equate to 12.2% and 10.2%, respectively, of the 50 $\mu\text{g}/\text{m}^3$ value that is set by the National Environmental Standard.

Background levels of PM₁₀ in the region have been found to be typically around 11 $\mu\text{g}/\text{m}^3$.

Nitrogen oxides (NOx)

From 2014 onwards, the Council has implemented a coordinated region-wide compliance monitoring programme to measure NOx. The programme involves deploying all measuring devices at 28 NOx monitoring sites (including two sites in the vicinity of the McKee 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 complete report covering region-wide NOx monitoring is attached in the Appendix to this memorandum.

The consents covering air discharges from the McKee production station have specific limits related to particular gases. Special condition 6 of consent 4050-3 set a limit on the nitrogen dioxide concentration at or beyond the production station's boundary. The limit is expressed as 100 $\mu\text{g}/\text{m}^3$ for a 24 hour average or 200 $\mu\text{g}/\text{m}^3$ for a one hour average exposure.

NO_x passive adsorption discs were placed at two locations in the vicinity of the McKee production station on one occasion during the year under review. The discs were left in place for a period of 21 days.

The calculated 1-hour and 24-hour theoretical maximum NO_x concentrations found at the McKee production station during the year under review equates to 1.72µg/m³ and 9.10 µg/m³ respectively. The results show that the ambient ground level concentration of NO_x is well below the limits set out by consent 4050-3.