Methanex Motunui and Waitara Valley Combined Monitoring Programme Annual Report 2019-2020

Technical Report 2020-44

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Executive summary

Methanex New Zealand Ltd (Methanex) operates methanol production facilities located at Motunui and Waitara Valley, in the Manu, Waihi and Waitara River catchments. This report for the period July 2019 to June 2020 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess Methanex's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of Methanex's activities.

Methanex holds 11 resource consents, which include a total of 111 special conditions setting out the requirements that Methanex must satisfy. Methanex holds two consents to allow it to take and use water from two abstraction points on the Waitara River. Six consents allow the discharge of effluent/stormwater into the Manu and Waihi Streams and the Tasman Sea via the Waitara marine outfall. Methanex also holds two consents to discharge emissions into the air at its sites. Finally, one consent provides for a structure in the Waitara River associated with the water take.

During the monitoring period, Methanex demonstrated an overall High level of environmental performance at its Motunui site and a High level of environmental performance at its Waitara Valley site.

The Council's monitoring programme for the year under review included three inspections, continuous self-monitoring by Methanex (specifically involving collection of water samples for physicochemical analysis), review of regularly provided consent holder data and two inter-laboratory comparisons.

The monitoring showed that Methanex operated both sites in accordance with the requirements of their resource consents. As in previous years, the facilities were well managed and a high level of housekeeping was maintained. Four minor consent breaches were self-reported by the consent holder during the period under review. These matters were considered of low foreseeability, were appropriately addressed and mitigated and were considered by the Council to likely to result in negligible if any environmental impact.

During the year, Methanex demonstrated a high level of environmental and administrational performance and compliance with the resource consents at both facilities.

For reference, in the 2019-2020 year, consent holders were found to achieve a high level of environmental performance and compliance for 81% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 17% of the consents, a good level of environmental performance and compliance was achieved.

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

This report includes recommendations for the 2020-2021 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 2019 to June 2020 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Methanex New Zealand Ltd (Methanex). This company was formed on the first of January 2015, when the two previously separate Methanex companies (Methanex Motunui Ltd and Methanex New Zealand Ltd) were amalgamated.

Methanex operates a methanol production facility located on the coast at Motunui, close to Waitara (the Motunui site), and a second facility located 2.5 km south east and upstream of the mouth of the Waitara River (the Waitara Valley site). The Motunui site is located across the Manu and Waihi Stream catchments, and the Waitara Valley site is situated in the Waitara River catchment. Together, these facilities can produce up to 6,500 tonnes of methanol a day.

This report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by Methanex that relate to abstractions and discharges of water within the Waitara River catchment, and the air discharge permits held by Methanex to cover emissions to air from their 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 Methanex's use of water, land and air.

The Council began reporting its monitoring of Methanex in 1990. This report is the 40th report to be prepared by the Council to cover Methanex's various consented activities and their environmental performance.

1.1.2 Structure of this report

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

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

Section 2 presents the compliance monitoring of the Motunui site during the period under review, including scientific and technical data. Thereafter the results are discussed, together with their interpretations, and their significance for the environment.

Section 3 presents the compliance monitoring of the Waitara Valley site during the period under review, including scientific and technical data. Thereafter the results are discussed, together with their interpretations, and their significance for the environment.

Section 4 presents a summary of recommendations to be implemented in the 2020-2021 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 Methanex, 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 Methanex's approach to demonstrating consent compliance in site operations and management including the timely provision of information to Council (such as contingency plans and water take data) in accordance with consent conditions.

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

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

Environmental Performance

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

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

For example:

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

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

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

Administrative performance

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

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

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

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

For reference, in the 2019-2020 year, consent holders were found to achieve a high level of environmental performance and compliance for 81% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 17% of the consents, a good level of environmental performance and compliance was achieved.[1]

[1] The Council has used these compliance grading criteria for 16 years. They align closely with the four compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

1.2 Historical overview and process description

Historical overview

The Motunui facility was constructed in 1983 and was originally operated by the New Zealand Synthetic Fuels Corporation to produce petrol from natural gas, during the 'Think Big' era. The decision to build the facility was made under the *National Development Act 1979*. New Zealand Synthetic Fuels Corporation operated two production units, Methanol 1 and Methanol 2 as well as a gasoline to methanol plant. At that stage, crude methanol was an intermediate product in the process.

From 1995 to 2004 the Motunui site ran at close to full production. Around the end of this period, shifts in world demand favoured the production of high grade methanol and this became more profitable for Methanex than its then current operation of conversion of methanol to petrol. As a consequence the synthetic petrol part of the facility was de-commissioned and dismantled in October 2008 following a four year period during which the facility had remained idle. One production unit, Methanol 2, was restarted in 2008 and the restart of Methanol 1 took place in 2012. Presently the Motunui site operates at full capacity.

The Waitara Valley site was originally established by Petralgas Chemicals NZ Ltd (a 50:50 New Zealand government and Alberta Gas partnership) in 1983 as a self-contained facility to convert gas from the offshore Maui field into high grade methanol. Subsequently the facility changed ownership to Petrocorp and Fletcher Challenge Methanol until 1994 when Methanex Motunui Ltd gained ownership of the site. In 1989, a second distillation tower was installed at the site to enable crude methanol supplied from the Motunui site to be processed into high grade methanol at the Waitara Valley site. The construction of two methanol distillation towers at the Methanex Motunui site in 1994 and 1995 led to modifications of the Waitara Valley site, to allow transfer of crude and refined methanol between the two sites and the port. The Waitara Valley site which had continued to operate between 2004 and 2008 while production at the Motunui facility had ceased, was laid up in November 2008 soon after the restart of the larger Motunui facility. The Waitara Valley site retained importance as a storage facility and a load out site for product going by truck to Tauranga. A restart of the Waitara Valley facility took place in October 2013.

Methanol manufacture

Production of methanol from natural gas (sourced from various Taranaki fields) involves a three stage process. A brief outline of the methanol production process is given below:

Phase 1: Reforming

Natural gas entering the plant undergoes a preparation treatment involving the removal of contaminants (such as sulphur) prior to the reforming process. The processed gas is then mixed with steam (processed from water taken from the Waitara River) at approximately 500°C, before being passed through a reformer containing a nickel catalyst at 900°C. The heat is achieved by burning fuelgas, a mixture of natural gas and waste gases from within the process. Waste heat is recovered for steam generation before the flue gases are discharged to the atmosphere at about 110°C. A synthesis gas is produced in the reformer which contains hydrogen, carbon dioxide, carbon monoxide, methane and nitrogen.

Phase 2: Compression and synthesis

The next phase of the process requires the synthesis gas produced in the reformers to be pressurised (1,500 kPa to 8,600 kPa). The synthesis process involves changing the synthesis gas through a further chemical reaction to a form of crude methanol. This reaction involves the channelling of compressed gas into a methanol converter containing a copper/zinc catalyst which yields crude methanol.

Phase 3: Distillation

The distillation process is a low-pressure process, whereby the crude methanol is purified to form chemical grade methanol. There are two distillation towers at Waitara Valley and two at Motunui, which are used to carry out this process.

1.3 Resource consents

Methanex holds 11 resource consents, the details of which are summarised in the table below. Summaries of the conditions attached to each permit are set out in Section 2 and 3 of this report.

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

Table 1 Resource consents held my Methanex during the 2019-2020 period

Consent holder	Consent number	Purpose	Granted	Review	Expires
Water abstraction permits					
Methanex Motunui	0820-2	To take from Waitara River	29 April 2008	June 2015	1 June 2021
Methanex Waitara	0801-2	To take from Waitara River at two locations	29 April 2008	June 2015	1 June 2021
Water discharge permits					
Methanex Motunui	0822-2	To discharge uncontaminated stormwater to Waihi and Manu Streams	29 Nov 2012	June 2015	1 June 2027
Methanex Motunui	0825-3	To discharge uncontaminated stormwater to an unnamed tributary of the Waitara River	31 March 2008	June 2015	1 June 2021
Methanex Motunui	0827-3	To discharge wastewater to an unnamed tributary of the Waitara River	31 March 2008	June 2015	1 June 2021
Methanex Motunui	3400-2	To discharge treated wastewater and stormwater to the Tasman Sea	29 April 2008	June 2015	1 June 2021
Methanex Waitara	0802-2	To discharge stormwater to the Waitara River	31 March 2008	June 2015	1 June 2021
Methanex Waitara	3399-2	To discharge treated wastewater and stormwater to the Tasman Sea	29 July 2013	June 2015	1 June 2021
Air discharge permit					
Methanex Motunui	4042-3	To discharge contaminants to air	12 Feb 2008	June 2023	1 June 2028
Methanex Waitara	4045-3	To discharge contaminants to air	29 April 2008	June 2015	1 June 2021
Land use permits					
Methanex Waitara	3960-2	To construct rock groyne in the Waitara River	14 May 2003	June 2015	1 June 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 both 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;
- discussion over monitoring requirements;
- preparation for any consent reviews, renewals or new consent applications;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.4.3 Site inspections

Both the Motunui and Waitara Valley sites were inspected three times during the monitoring period. On one occasion, the monitoring included the inspection of the raw water intake facilities. A further two site visits were undertaken for the purpose of collecting split samples for inter-laboratory comparisons.

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 Methanex 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 Data review

Methanex undertakes a significant amount of self-monitoring of their own activities and associated environmental impacts. The data gathered is reported to the Council on a regular basis, and is reviewed by the Council to determine compliance with resource consent conditions.

The raw water abstraction rate from two locations on the Waitara River for the Motunui and Waitara Valley sites was measured continuously. Monthly reports detailing wastewater and stormwater discharge rates, volumes and composition were provided by Methanex to the Council. Wastewater effluent was monitored for a number of parameters with frequencies ranging from continuously (flow and pH) to monthly (trace metals).

These regular records provided to the Council are detailed in Table 2.

Table 2 Regular consent holder monitoring reporting requirements

Consent	Reporting requirement	Provision to the Council	
		Frequency required by consent	Frequency provided by consent holder
0820-2	Abstraction rate and volume	Yearly	Monthly
0801-2			
0802-2	Testing of stormwater quality	Consent not exercised	
0822-2	Testing of stormwater quality	Not specified	Monthly
3399-2 3400-2	Testing of treated waste and stormwater	Yearly	Monthly
	Records of volumes and rate discharged	Monthly	
	Records of chemical dosing	Yearly	
4045-3	Air quality monitoring	3 Yearly	3 Yearly
4042-3		2 Yearly	2 Yearly

Methanex is also required to provide the Council with several reports addressing various receiving environments, site activities and investigations. These reports are outlined below. Additional details of the reports received during the 2019-2020 monitoring year may be found in the Motunui and Waitara Valley results sections of this report (section 2 and 3).

Air emissions

Methanex is required to supply Council with a report every two years addressing air emission issues from Motunui. This report is a requirement of consent 4042-3 (granted in April 2008).

The Waitara Valley consent has similar requirements but different time frames. Consent 4045-3 requires a three yearly report on technological advances regarding various emissions (including the cooling tower plume), an inventory of emissions from the distillation tower, energy efficiency improvements and any other matters relating to the mitigation of emissions.

Methanex reports on emissions from both sites in a biennial report. The latest biennial report was received in September 2018 and addressed the monitoring, developments and investigations undertaken in 2016 and 2017. The next emissions report is expected later in 2020 and will cover the 2018 and 2019 calendar years.

Methanex is also required to supply Council with a report every five years addressing advances in technology to minimise the effect of the Motunui site's water vapour plume. This report is a requirement of consent 4042-3 (granted in April 2008). The most recent report was received in December 2019 and is included in this annual compliance monitoring report. The next report will be due in 2024.

Water take from the Waitara River

Methanex is required to supply Council with a report every two years addressing the programme Methanex has in place to reduce their use of water. This report is a new requirement of consent 0820-2 and 0801-2 (granted in April 2008). The most recent report was received during the 2018-2019 monitoring period and is discussed in section 2.2.3.1 of this report. These reports cover developments and initiatives over the two preceding years. The next report is expected by the end of 2020 and will cover the 2018 and 2019 calendar years.

Methanex is also required to supply Council with a report every five years showing the results of the testing of the water take pipeline. This report is a requirement of consent 0820-2 and 0801-2 (granted in April 2008). The first report was due in 2013. Practical limitations associated with the testing of the pipeline has

resulted in this report being delayed. The Council have been in ongoing discussions with Methanex in regard to this matter. A report was received in September 2018 detailing a video scope inspection of the pipeline. This was discussed in the previous monitoring report.

Contingency plans

Consent 3399-2 and 0822-2 both require the provision of a contingency plan by Methanex to the Council. It is required that these are maintained and consent 3399-2 specifies that the contingency plan should be reviewed every two years. These plans were received by the Council in September 2014 and a review of these was undertaken by Methanex in 2016 and January 2018. No changes were required. The next review is expected before the end of 2020.

Marine outfall

Every five years the Council may require Methanex to supply certification of the integrity and dilution performance of the marine outfall pipe. This is a pipe that provides for the discharge of wastewater/ stormwater approximately 1,250 m offshore from the mouth of the Waitara River in the Tasman Sea. The marine outfall report is a new requirement of consent 3400-2 and 3399-2 (granted in April 2008). The most recent report was provided during this monitoring period.

Treated stormwater and wastewater annual report

Methanex is also required to supply Council with a report annually addressing their waste treatment discharges. This is a requirement of consent 3400-2 and 3399-2 (granted in April 2008). An agreement was reached with the Council that as monthly reports are supplied by Methanex there would be no requirement for an additional annual report as effectively the collation of the monthly reports equate to annual reporting.

1.4.5 Inter-laboratory comparisons

On two occasions during the monitoring period samples from the Motunui site were taken by the Council and Methanex simultaneously. Similarly on two occasions samples were collected at the Waitara Valley site. Both laboratories analysed the samples for parameters relevant to the consents and the results were compared.

2 Motunui

2.1 Process description

The Motunui facility (Photo 1 and Figure 1) has two production units, with a combined methanol production capacity of 5,000 tonnes per day (1.82 million tonnes per year). The Methanol 2 production unit was restarted and began to produce methanol in October 2008 after lying idle for four years. The Motunui Methanol 1 production unit began producing methanol again in July 2012. Increased monitoring was implemented during that restart. The monitoring was reduced back to normal levels during 2013-2014 and has continued as such during the current monitoring period.

Photo 1 Cooling towers and distillation stacks at the Methanex Motunui site

Figure 1 presents the layout of the site and references various components that will be referred to in this report.

2.1.1 Water discharges

There are various sources of wastewater from processes associated with the methanol manufacturing activities at the site, including water treatment wastes, boiler, cooling tower and other blowdowns, sewage, process effluents and stormwater.

- Sludge removed from the clarifiers is allowed to settle in the sludge lagoons. The water from this process is either allowed to evaporate or is discharged via the outfall.
- Naturally occurring dissolved salts in the abstracted river water are removed using ion exchange resins. Process boiler condensates for reuse also go through ion exchangers to remove trace minerals. The resins are regenerated using sulphuric acid and sodium hydroxide. The waste flow is neutralised prior to discharge via the outfall.
- The on-site boilers are fed with demineralised water with added deposit and corrosion control agents. To prevent a build-up of contaminants in the boiler water a portion of the boiler water is continuously removed (blowdown) and replaced with fresh treated water. This wastewater goes to the blowdown pond and is discharged via the outfall.

- The cooling towers function by the evaporation of treated clarified river water. Dissolved river salts could build up rapidly in the water and therefore substantial quantities (about one seventh of the volume) is blown down during each recirculation cycle. The cooling water blowdown may contain corrosion inhibitors, dispersants, surfactants, biocides and antifoams. This wastewater also goes to the blowdown pond and is discharged via the outfall.
- Process wastewaters from the methanol plant saturators and miscellaneous wastes from gauge glasses, sample connections, pump pads, vessel drains and the like.

Those process effluents that require treatment are diluted with other cleaner waste streams and are passed through a trickling filter and activated sludge system before being discharged via the ocean outfall.

Historically, domestic effluent was pumped to a New Plymouth District Council (NPDC) sewer line for treatment at the Waitara Wastewater Treatment Plant (WWWTP). Thereafter the treated wastewater was discharged to the Tasman Sea via the Waitara marine outfall. In the 2013-2014 monitoring period, major work was undertaken to convert the WWWTP to a pump station. The Waitara pump station was commissioned on 15 October 2014 at which point pumping of Waitara municipal sewage to the New Plymouth Wastewater Treatment Plant (NPWWTP) commenced, and treatment and discharge of municipal sewage to the Tasman Sea via the Waitara marine outfall ceased.

Presently NPDC continues to own and operate the outfall. They have a contract in place with Methanex to use the structure. While Methanex is the only current routine user of the outfall, NPDC maintain responsibility for maintenance of it.

Stormwater from the processing areas of the site that has the potential to be contaminated, drains into the stormwater pond under gravity and is then pumped to the effluent treatment plant and discharged via the marine outfall. Stormwater from the tankage area is pumped over into the process sewers which flow to the storm pond. The stormwater falling on the non-process areas of the western half of the site (Figure 1) is directed by "v" ditches running alongside the roads to a dam/pond and then out to the Tasman Sea via the Manu Stream. Stormwater falling on the eastern side of the site is directed to unnamed tributaries of the Waihi Stream via outfalls and a small sedimentation pond.

Sludge from the storm pond, off-spec pond and blow down pond stored in lagoons 2, 3, and 4 was removed during 2006. The sludge in lagoon 1 is removed periodically and was most recently removed in September 2018 and disposed of to the Remediation NZ Uruti facility after the soil was analysed and confirmation was given by the Council.

With the site running at full production again, three of the four previously emptied sludge ponds are being used only for dewatering the less contaminated river-silt backwash from the Waitara River water. The other sludge pond (lagoon 1) is used to keep more contaminated waste streams separate.

Figure 1 Motunui site layout and water sampling site locations

2.1.2 Emissions to air

The major sources of emissions to air are shown in Figure 2. The greatest quantities of air discharges from the Methanex complex were emitted from the reformer stacks. The flue gases are the products of combustion reactions within the steam reformers. They comprise gases typical of any combustion processes based on natural gas i.e. nitrogen passing through the process unchanged from the atmospheric air drawn in to support combustion, water (from oxygen in the air reacting with hydrogen in natural gas), carbon dioxide (created similarly) and residual oxygen. There are also traces of nitrogen oxides due to atmospheric nitrogen oxidising in the heat of the reformers.

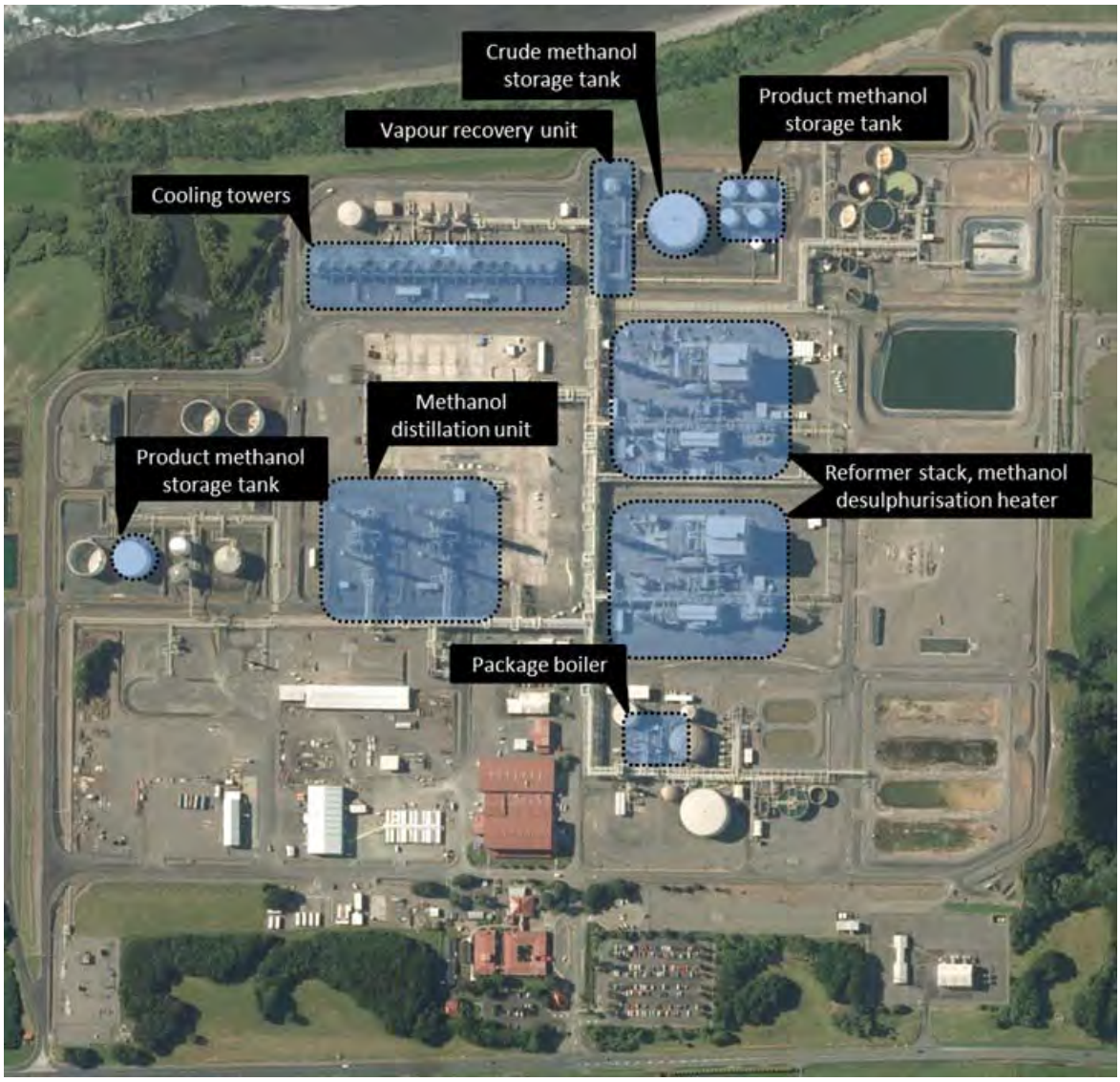

Figure 2 Major process air emission sources at Motunui

Energy efficiency and usage

The integrated nature of the site allows energy recovery and utilisation. At the same time, a large amount of energy is required to drive some of the reactions and refining stages. The volume of gas that may be accessed as raw feedstock by Methanex is fixed by the capacity of the feedstock systems, so that increased productivity and profitability are determined by in-house efficiency and loss control. More specifically, as in-plant efficiency increases, then the amount of carbon dioxide emitted as an exhaust gas per unit of product decreases.

The feedstock gas is preheated by excess heat recovered from other parts of the process, before being reformed to synthesis gas by the injection of steam and with additional heat energy generated by burning both natural gas and waste streams. The exhaust flue gases also have heat recovered from them, to preheat the feedstock gas and to raise steam.

The reaction of the synthesis gas over a catalyst to produce methanol releases heat, which is captured via heat exchanges for use elsewhere. Unreacted synthesis gases are bled off to avoid accumulation and are burnt in the reformer as fuel.

Distillation of the methanol to a chemical-grade (high purity) standard requires heat energy, partly supplied from the reformer process. Purge gases and liquids from the distillation process are recovered for further distillation, with any residues ("fusel oil") being burnt as fuel.

Initiatives to improve energy efficiency undertaken by Methanex have included communication sessions with shift workers to identify energy saving opportunities in addition to constant monitoring of energy performance.

2.1.3 Solid waste

Sludge from the clarifiers has been removed periodically, while the only opportunity to clean and remove sludge from the blowdown pond, cooling tower sump and off-spec pond is when the entire site is shutdown, as these facilities are in constant use.

The solid wastes generated on site are placed in contained areas and are allowed to dry prior to disposal. The dried sludge has in the past been disposed of to land in a consented area owned by Methanex just outside the boundary fence, northwest of the Motunui site.

Three of the four sludge lagoons are used to dewater river silt from the clarifiers. This sludge is kept separate from other more contaminated material (for example the solid waste cleaned from the other effluent ponds) so that it can be disposed of more easily. The lagoons have a large storage capacity and therefore disposal of dewatered sludge will occur on an infrequent basis.

2.2 Results

2.2.1 Site inspections

Site inspections are an important part of the monitoring programme, allowing discussion of Methanex's resource consents and relevant environmental issues. A Council report is written following each site inspection.

Council officers carried out three compliance monitoring site inspections on 02 August, 10 December 2019 and 04 March 2020 as well as two compliance monitoring sampling visits for the purpose of collecting a split sample on 03 December 2019 and 02 June 2020.

During the compliance monitoring site visits, various areas of the site were observed. This typically included inspecting the ponds and sludge lagoons, the containment and associated bunding, the cooling towers, the utilities area, the flare, the water/effluent treatment area and the stormwater discharge points to waterways either side of the Motunui site. Council officers inspected these areas for any apparent discharges, infrastructure issues/damage or potential risks.

The condition of any detectable emissions to air was also noted at each inspection, with particular reference to the cooling tower and the reformer.

02 August 2019

An inspection of both the Motunui and Waitara Valley facilities was undertaken by Council staff, accompanied by Ben Lawn (Methanex personnel). The Motunui site was inspected first and the following observations were made.

Overall the site was managed well with no off-site emissions or discharges detected. Routine maintenance on the cooling tower was underway at the time of the inspection and it was noted that Methanex are starting to use another approach using modular cells.

A very minor discharge that had been recently noted by Methanex personnel was pointed out to the inspecting officer. A similar set up at both Methanol reformers resulted in similar discharges. Mr Lawn noted that this was possibly a long term issue and had been part of the plant design. The discharge was occurring as a small drip or trickle (estimated to be 1L/hr). The discharge was likely condensate from the infrastructure overhead and was directed to the stormwater drains. Methanex were in the process of organising for the collection and redirection of the discharge to the wastewater system. Upon inspection the TRC officer considered that the discharge would have an insignificant effect on the receiving waters due to its volume and the likely contaminants present. She agreed that the redirection of the discharge was an appropriate response.

10 December 2019

An inspection of both the Motunui and Waitara Valley facilities was undertaken by Council staff, accompanied by Ben Lawn (Methanex personnel). The Motunui site was inspected first and the following observations were made.

During the inspection it was noted that 12 to 18 IBC containers were stored near the cooling tower area. Methanex staff explained that the containers had been used to hold methanol contaminated sludge. Only a couple of containers were still full. Stormwater drains were covered when these were laid down. They were located on a concrete pad with drainage to process waste.

Overall the site was managed well with no off-site emissions or discharges detected.

04 March 2020

An inspection of the Motunui and Waitara Valley facilities, as well as the intake structures was undertaken by Council staff, accompanied by Ben Lawn (Methanex personnel). The Motunui site was inspected first and the following observations were made.

The off-spec pond had been filled with river water as a short term contingency in case the water take from the river needed to stop. Methanex advised that water takes had again been reduced due to recent low flow levels in the Waitara River.

The site was found to be well managed with no off-site emissions or discharges detected.

The intake facility and associated structures were found to be in a good and tidy condition.

2.2.2 Surface water

2.2.2.1 Surface water abstraction monitoring by Methanex

Consent 0820-2 to take water from the Waitara River requires abstraction rates of less than 1,400 m^3/hr. All records provided by Methanex for the Motunui abstraction, show rates below the allowable maximum level.

Consent 0820-2 specifies that no water may be taken when the flow of the Waitara River at the Bertrand Road gauging station falls below 4,600 L/s. The Waitara River fell below this level for a short period over three days during February 2020. Appendix II shows the hydrographs for the Waitara River at Bertrand Road for the monitoring period. The first graph shows the whole monitoring year, while the second shows a

zoomed in view of when the consent limit was reached. Production continued through this period, with permission received from the Water Shortage Event Manager. Consideration was given to the extent to which the river level had fallen, the accuracy of flow gauges (margin of error) and weather forecasts. Given the short duration and that the Waitara River remained close to the 4,600 L/s cut off, environmental effects of the continued abstraction were unlikely to have any significant additional impact on the river.

Water use reduction report

The Council received a report from Methanex in September 2018 relating to water use reduction at the Motunui site during the 2016 and 2017 calendar years. The report was discussed in the previous annual compliance monitoring report. This biennial water use reduction report is a requirement of condition 4b of Consent 0820-2 (Motunui). The next water use reduction report is due before the end of 2020.

Pipeline integrity report and the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010

Condition 4 of Consent 0820-2 requires that Methanex undertake testing of the intake to the site every five years to establish pipeline integrity. This work was due to be completed during 2013. Methanex have investigated methods to undertake this effectively without damaging the existing infrastructure. They have remained in regular communication with Council on this matter, however have not been able to satisfy this condition of their consent. The Council is aware of the practical issues around achieving this and have accepted the information supplied by Methanex that indicates that the pipeline is unlikely to be significantly leaky.

Further discussion on the background of these issues is provided in the previous monitoring programme annual report (Technical Report 2019-30).

2.2.2.2 Effluent monitoring

During July 2019 to June 2020 the Motunui site was operating continuously, although refurbishment works meant that for short periods of time one of the two reformer units were not operating.

Effluent monitoring data gathered by Methanex was sent to the Council on a monthly basis. The data is made up of continuous online data, laboratory analysis of a 24-hour composite effluent sample and mass discharge of water treatment chemicals calculated by Methanex using chemical consumption data.

Photo 2 The Motunui site's blow down pond (decommissioned flare 2 can be seen in the background)

Continuous measurement

Flow and pH are measured by online analysers, and recorded continuously. The figures reported to the Council are daily averages (m^3/hr), daily maximum (L/s) and daily volume (m^3/day) for flow, and minima, maxima and daily averages for pH. A summary of the outfall effluent data is presented in Table 3.

Table 3 Summary of the Motunui site's monitoring results of plant effluent during 2019-2020

Consent 3400-2	Unit	Minimum	Maximum	Consent limit	Number of breaches
Continuous measurement					
Flow (daily average)	m^3/day	0	7,973	12,096	0
pH	-	6.0	8.9	6-9	0
Daily measurement					
Chemical oxygen demand	g/m^3	<25	90	200	0
Methanol	g/m^3	<2	<2	15	0
Suspended solids	kg/day	<7	247	500	0
Petroleum hydrocarbons	g/m^3	<1	<1	10	0
Monthly measurements					
Copper	g/m^3	<0.05	<0.05	0.50	0
Nickel	g/m^3	<0.10	<0.10	1.00	0
Zinc	g/m^3	<0.10	<0.10	1.00	0

A proportional sampler is used to create a daily composite sample representative of the daily flow of Motunui effluent. This is analysed by the Methanex laboratory, to determine compliance with their discharge consent 3400-2. A summary of this data is included in Table 3 above.

On numerous occasions a visual check of the effluent sample indicated hydrocarbons may be present (as a visible film), however subsequent sampling showed that the hydrocarbon concentrations were within consent limits.

Chemical dosing rates

Consent 3400-2 (for discharge of process waste from the Motunui site) sets mass discharge limits on the water treatment chemicals used on the site. Methanex calculates water treatment chemical mass discharge rates using chemical consumption data. A summary of this data for the monitoring period is presented in Table 4.

Table 4 Summary of Motunui chemical discharge data (calculated) for July 2019 to June 2020

Consent 3400-2 (special condition 8)					
Chemical	**Unit**	**Minimum**	**Maximum**	**Average**	**Consent Limit**
Betz Dearborn AE1115	kg/day	22	42	27	60
Cortrol OS 5601	kg/day	0	20	12	200
Cortrol OS 7780	kg/day	11	22	17	400
Flogard MS6209	kg/day	8	38	21	40
Foamtrol AF2290	kg/day	0	0	0	40

Consent 3400-2 (special condition 8)					
Chemical	**Unit**	**Minimum**	**Maximum**	**Average**	**Consent Limit**
Gengard GN8020	kg/day	55	140	90	300
Inhibitor AZ8104	kg/day	56	105	74	300
Klairaid PC 1190P	kg/day	68	167	101	600
Optisperse HTP 7330	kg/day	17	61	33	120
Optisperse HTP 73611	kg/day	14	87	31	120
Spectrus BD1501E	kg/day	4	10	7	70
Spectrus NX1100	kg/day	9	31	19	65
Steamate NA0880	kg/day	19	28	23	40

There were no breaches in chemical dosing limits during the monitoring period at this site.

Equivalent chemical

During the 2019-2020 monitoring period, there were no requests received to change water treatment chemicals as per the process set out in consent 3400-2.

Marine outfall report

A report on the structural integrity of the Waitara marine outfall was submitted to the Council on 23 December 2019. This is a requirement of special condition 19 of Consent 3400-2. OCEL consultants and New Plymouth Underwater had been contracted by NPDC to inspect and maintain the structure. Maintenance continues to focus on the removal of tubeworm growth and replacement of tie-down straps. NPDC engaged Beca to undertake a review of the information (including video footage of the length of the pipeline) gained during inspections. In their report (included with Appendix III), Beca conclude that the present maintenance efforts remains the most pragmatic approach to ensuring the on-going structural integrity of the marine outfall.

In 2013, a modelling exercise was carried out to determine the dilution performance of the outfall which was found to be within compliance limits as per special condition 4 of Consent 3400-2. As no significant changes to the plant operation have occurred since then, that modelling remains valid. In the Beca report it was noted that the diffuser is effective, with all 35 ports operational. The next report will be due upon request by the Council after five years.

Contingency plan

In accordance with consent 3400-2 and 0822-2, Methanex is required to maintain a comprehensive contingency plan for the Motunui site, which would be put into operation in the event of spillages, accidental discharges or pipeline failure. Methanex provided a revised plan including a 'Specific Response Procedure', a 'Notification of Environmental Exceedances Procedure', and a 'Reporting of Environmental Exceedances Procedure' for the Motunui site in November 2009. These spill contingency planning documents were found to be satisfactory. Consent 3400-2 requires revision of the spill contingency planning every two years. Methanex provided a revision of their contingency plan in June 2010, May 2012, September 2014, November 2016 and January 2018. These contingency plans were reviewed by Council officers and found to be satisfactory. The next review is expected by the end of 2020.

2.2.2.3 Uncontaminated stormwater

Stormwater outlets for uncontaminated stormwater are situated in the Waihi catchment on the eastern side of the Motunui site and at the sea cliff via the Manu Stream on the north western side of the site (Figure 1).

Photo 3 The Manu Stream sampling point at the Motunui site

Photo 4 The Waihi Stream sampling point at the Motunui site

Weekly grab samples of the stormwater discharges were taken and analysed for four water quality characteristics by Methanex staff. The two sampling sites are shown in Photo 3 and Photo 4. The analytical sample results provide an indicator as to whether or not the discharge was contaminated. The results of the Methanex stormwater monitoring for July 2019 to June 2020 are summarised in Table 5 below.

Table 5 Summary of Motunui stormwater monitoring data for 2019-2020

Consent 0822-2					
Parameter	**Unit**	**Minimum**	**Maximum**	**Average***	**Consent limit/ *Guideline***
Manu Stream (photo 3)					
pH	-	6.7	7.7	7.1	6 - 9.5
Petroleum hydrocarbons	g/m^3	N/A	<1	N/A	<5
Conductivity at 25°C	µs/cm	70.0	118.0	98.3	*<300 **
Total suspended solids	g/m^3	<6	**440**	21	<100
Visual hydrocarbons	# Pass / # Fail	Tests passed: All	Tests failed: 0	----	PASS
Waihi Stream (photo 4)					
pH	-	**4.8**	7.3	6.7	6 - 9.5
Petroleum hydrocarbons	g/m^3	N/A	<1	N/A	<5
Conductivity at 25°C	µs/cm	30.0	217.0	115.7	*<300 **
Total suspended solids	g/m^3	<6	**550**	16.96	<100
Visual hydrocarbons	# Pass / # Fail	Tests passed: All	Tests failed: 0	----	PASS

* Guideline value, not a consent requirement.

Manu Stream discharge

The quality of the stormwater discharge from the pond was within the agreed guideline or consent limits for uncontaminated stormwater on each monitoring occasion except for the suspended solid results in two samples collected in February 2020 (440 and 210 g/m^3). The reason for these exceedances was that the Manu Stream was not flowing at the time due to dry conditions and therefore sediment from the river bed was entrained with the sample as it was collected. This sample was therefore not representative as no discharge was occurring.

Waihi Stream

With the exception of total suspended solids and one pH result, the stormwater samples analysed from the Waihi Stream monitoring site were within agreed limits required by the consent. The two high suspended solids results (550 and 177 g/m^3) were recorded in December and were associated with the entrainment of sediment in samples that were collected under low flow, stagnant conditions (there was no discharge occurring at the time of sampling) and therefore are not representative of the actual stormwater discharge quality. The low pH result (4.8) recorded in January was similarly related to dry conditions where there was no flow to the Waihi Stream. Methanex arranged for the vacuum emptying of the outlet and disposal of this to waste water to ensure that there was no subsequent impact on downstream areas. The stream was also sampled at three points downstream with all pH results being returned within the normal range.

2.2.2.4 Inter-laboratory comparisons

On the 3rd of December 2019 and 2nd of June 2020, the Council and Methanex undertook an inter-laboratory comparison. Samples were collected from the composite outfall sampler and from two sites representing the effects of Motunui site's stormwater discharges on surface water. The results of the inter-laboratory comparisons, which also serve the purpose of compliance monitoring checks, are shown in Table 6 and Table 7. On the 2nd June, insufficient sample volume was available from the composite sampler to allow for

the full suite of testing to be performed on the TRC Motunui sample (pH and EC performed off methanol bottle). Results from both laboratories for the Motunui effluent samples met the consent limits during the monitoring period. A comparison of the laboratory results showed there were some minor variation in values determined by the laboratories, but overall there was reasonable agreement.

Table 6 Inter-laboratory comparison of Motunui outfall composite sample results

Parameter	Unit	Consent limits	3 December 2019		2 June 2020	
			Methanex	TRC	Methanex	TRC
Chemical oxygen demand	mg/L	200	42	48	70	-
Conductivity @ 25 °C	µs/cm		1,660	1,639	3,780	3,730
Copper – acid soluble	mg/L	0.5	<0.05	0.01	<0.05	-
Methanol	mg/L	15	<2	< 2	<2	<5
Nickel – acid soluble	mg/L	1.0	< 0.01	< 0.01	<0.10	-
pH		6.0-9.0	8.1	7.9	7.9	7.6
Total hydrocarbons	mg/L	10	< 1	< 4	<1	<4
Total suspended solids	mg/L	daily discharge <500 kg	12	14	19	-
Zinc – acid soluble	mg/L	1.0	<0.01	0.06	<0.10	-

Table 7 Results of Motunui stormwater inter-laboratory comparison between Methanex and the Council

Motunui site stormwater (Consent 0822-2)						
Parameter	Unit	Consent limits	Manu Stream (STW002012)		Waihi Stream (STW002013)	
			Methanex	TRC	Methanex	TRC
3 December 2019						
Conductivity @ 25°C	µs/cm	300*	104	100	134	131
pH		6.0-9.5	7.2	7.0	6.9	6.9
Total hydrocarbons	mg/L	5	< 1.0	< 0.7	< 1	< 0.7
Total suspended solids	mg/L	100	7	14	7	11
Zinc AS	mg/L		-	< 0.02		0.2
2 June 2020						
Conductivity @ 25°C	µs/cm	300*	82	82	37	37
pH		6.0-9.5	7.0	7.2	6.8	7.2
Total hydrocarbons	mg/L	5	<1	<0.7	<1	<0.7
Total suspended solids	mg/L	100	<6	5	<6	4

* Not a consent limit, but a guideline limit

2.2.2.5 Methanex Motunui annual report

Condition 20 of consent 3400-2 requires Methanex to provide the Council with an annual report on its wastewater treatment and disposal system, including monitoring results of the discharge and compliance with the consent.

Annual reports for July 2019 to June 2020 were received by Council via monthly reports, and fulfil this consent requirement.

2.2.3 Air

2.2.3.1 Inspections

During the 2019-2020 monitoring period the Council received no complaints in regard to air pollution from the Motunui site.

During site inspections, Council officers also inspect for air discharges such as odour and smoke around the Motunui site. No discharges were recorded during any of the inspections.

2.2.3.2 Consent requirements

Plume abatement report

Condition 5 of resource consent 4042-3 required a report, outlining options for reducing the adverse effects of the cooling tower plume. The consent specified that these reports should be provided in February 2009 and every five years thereafter. The most recent report was received in December 2019.

In 2014 Methanex had commissioned WorleyParsons to undertake a comprehensive study and provide a report. Methanex, in their 2019 report, have reviewed the 2014 report and found that the plant's operation and impact in terms of the cooling tower plume had not increased and that technology options had not changed. The considerations set out in the 2014 report remained valid. Methanex again looked into various refurbishment options and the replacement of the plume abatement technology. The decision to refurbish the cells to the original condition was again found to be the most practicable option. Methanex included information in their report on the progress towards completing this refurbishment work.

The report is included as Appendix IV to this report. The next plume abatement report is due towards the end of 2024.

Biennial air emissions report

Condition 6 of consent 4042-3 requires Methanex to provide the Council with a biennial report on its air emissions, including a revision of any technological advances in the reduction or mitigation of emissions, a detailed inventory of emissions (excluding carbon dioxide), outlining any energy efficiency measures, and addressing any other issues relevant to minimisation or mitigation of emissions.

A biennial report covering the period January 2016 to December 2017 was received in September 2018. The report was discussed and is included as an Appendix to the 2018-2019 Methanex Motunui and Waitara Valley Combined Monitoring Annual Report.

The next biennial report covering the 2018 and 2019 calendar years is due by the end of 2020, and will be discussed in the 2020-2021 compliance monitoring report.

2.2.4 Soil

Presently the sludge lagoons collect river silt that has been backwashed from the clarifiers. Infrequently, these sludge lagoons are cleaned out and spread to Motunui farmland as permitted by Rule 29 of the Regional Freshwater Plan.

2.2.5 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with the consent holder. During the year matters may arise which require additional activity by the Council for example provision of advice and information, or investigation

of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

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

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

In the 2019-2020 monitoring period there were four events (three confirmed as a minor non-compliance) that required follow-up recorded by the Council that were associated with Methanex's Motunui site.

Minor plant wastewater discharge

During the inspection on 2 August 2019, a very minor discharge of condensate around the reformers was pointed out to the inspecting officer by Methanex personnel. This discharge would have little if any effect on the receiving waters due to its volume and the likely contaminants present. Methanex arranged for the redirection of the discharge to wastewater and no further response was considered necessary. Further details on this incident are provided under Section 2.2.1 of this report.

Fish kill Waihi Stream weir

Methanex reported that on Monday, 13 January 2020, a sample was collected at the Waihi Stream discharge point and returned a pH of 4.8. At the time of sampling, it was dry and the pond was not flowing over the weir/discharging. Unusually, there were eels in the outlet (+/- 15). On Wednesday, 15 January, a sample was collected. The eels were dead and the pH result returned at 4.9. Methanex undertook further sampling of the Waihi downstream of the collection point and confirmed that the stream's pH was above 6. Methanex suggested that the rain on Monday could have allowed the eels to migrate up over the weir. It was confirmed that plans were in place to suck water from the outlet to prevent the discharge of this water to the stream. Methanex personnel noted that they had tested COD and it returned a result of less than 25 g/m^3. It was noted that high ambient temperatures preceded the incident and also that there was no algae. The matter was discussed with TRC's freshwater ecologist, no further action was required or considered necessary.

Wastewater pipeline leak

On the 14th of February 2020 Methanex were notified of a leak that was visible from a manhole on the wastewater pipeline on the corner of Brooks Terrace and Nelson Street in Waitara. On receiving the call their Operations department shut down the pipeline and notified Coregroup to repair the leak. Coregroup checked the breather valves and discovered a leak at the manhole which they fixed immediately. This incident was likely to result in little if any environmental impact as the wastewater has been treated and was discharged to a grassy area alongside the road.

Sewage spill

In June 2020, Methanex self-reported a minor sewerage spill (approximately 2m^3 dilute treated sewerage – this being a mixture of treated effluent and potable water) to land with the potential that some of this may have entered the pond that feeds the Manu Stream. Methanex responded by removing the contents of the sewerage plant and repairing the leak. The pond was tested for *E.coli* to determine if this had been impacted. Results (68 MPN/100 ml) were within the normal expected range for this waterbody and well below the recreational guideline limit.

Table 8 Incidents, investigations, and interventions summary table

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
02/08/2019	Minor plant wastewater discharge	N	No – very minor and would have had an insignificant impact on the receiving waters	Methanex addressed this discharge immediately upon becoming aware of it
15/01/2020	Fish kill at Waihi Stream weir	Y	No - Eels made their way into Methanex containment due to unusual conditions; no discharge to natural watercourse at time of incident	Investigation inconclusive. Probable that low pH in containment area resulted in fish kill
14/02/2020	Wastewater pipeline leak	N	No	Self-reported incident that was immediately addressed relating to pipework failure. Likely environmental impact insignificant
06/06/2020	Discharge of treated sewerage to land	N	No	This was a minor incident reported by Methanex with minimal to no likely environmental impact. Repair work to the leak was undertaken and the receiving waters monitored for potential impact

2.3 Discussion

2.3.1 Discussion of site performance

Previous high standards of housekeeping were apparent at all inspections undertaken at the Motunui site. The Motunui site is presently running at full capacity with both production units on line. Maintenance and improvements of the site have been undertaken during the period under review.

Methanex continued to manage consented activities well within consent limits over this monitoring period. Methanex has a contingency plan with respect to the operation of the wastewater consent at the Motunui site. Methanex maintains comprehensive spill contingency equipment on site, and personnel are trained with respect to spill response.

Production related emissions to air from the site continued during the period under review. No consent non-compliances were noted and no complaints were received regarding flaring or the cooling tower plumes.

2.3.2 Environmental effects of exercise of water abstraction permits

The Motunui consent allows for a water take of up to 1,400 m^3/hr. Typically the water take is much lower, in the region of 1,000 m^3/hr. In part, this is due to the water reduction initiatives instigated by Methanex. At certain stages of the monitoring year, only one of the two production units were operating, so reducing water demand considerably over those periods.

Methanex personnel have been in ongoing discussion with the Council on attaining compliance with their consent conditions in regard to water take pipeline integrity and flow meter positioning and verification issues. During the 2017-2018 Methanex installed and verified flowmeters at the point of take for both sites. They are presently compliant with the *Resource Management (Measurement and Reporting of Water Takes) Regulations 2010*.

2.3.3 Environmental effects of exercise of water discharge permits

Methanex staff continued to provide the Council with monthly monitoring data. The parameters measured were all found to comply with consented limits for the water discharge consents held.

Inter-laboratory comparisons between the Council and Methanex laboratories showed good agreement of results.

No visible environmental effects in any of the receiving watercourses were recorded during the site inspections.

2.3.4 Environmental effects of exercise of air discharge permits

The controls that Methanex have in place to minimise and mitigate the safety risks, in regard to air emissions, to site operators also ensures that there is a low likelihood of adverse environmental effects offsite. Modelling of air emissions when the site was at full capacity in 2001 has shown emissions levels far below consent limits which are set in line with National Environmental Air Quality Standards.

Neighbourhood effects

No offensive or objectionable odours were noted at the site boundary during any site visit undertaken by Council staff. Furthermore the Council has not received any specific complaints regarding the cooling tower plume through the monitoring period under review.

Ecological effects

No adverse environmental effects were detected during the period under review.

2.3.5 Evaluation of performance

A tabular summary of Methanex's compliance record under its current active consents for the 2019-2020 monitoring year is set out in Table 9 to Table 14.

Table 9 Summary of performance for Consent 0820-2

Purpose: *To take water from Waitara River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. The volume taken shall not exceed 1,400 m^3/hr	Daily maximum flow rates provided monthly	Yes

Purpose: *To take water from Waitara River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
2. The taking of water is managed to ensure that river flow no less than 4,600 L/s	Continuous gauging at Bertrand Road	No – Permission received to continue production from Water Shortage Event Manager
3. Installation and maintenance of a water meter for water take data	Monthly data reports provided	Yes
4. Water conservation measures– incl. five-yearly testing of pipeline integrity and two-yearly report on water conservation	Water conservation reports received September 2018. Pipeline testing is overdue. Methanex and Council have been in discussion on how best to achieve this	Water conservation report received Pipeline testing report on hold through discussion with Council
5. Appropriate screening of intake structure to prevent fish entrainment	Inspection and liaison with consent holder	Yes
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 10 Summary of performance for Consent 0822-2

Purpose: *To discharge of stormwater from outfalls into Waihi and Manu Streams*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adoption of best practicable option to minimise effects	Inspection and liaison with consent holder	Yes
2. Limitation on stormwater catchment area – specific to application refer to drawing g10637	Inspection and liaison with consent holder	Yes
3. Contingency plan to be maintained and followed in event of a spill. Contingency plan to be supplied to the Council	Contingency plan received and reviewed in 2018	Yes
4. Stormwater management plan to be maintained. To be supplied to the Council and approved	Stormwater management plan received and reviewed	Yes

Purpose: *To discharge of stormwater from outfalls into Waihi and Manu Streams*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
5. Discharge sample analysis. Sampling to occur at specified points from the Waihi Stream and the Manu Stream. Analysed for pH, TSS and total recoverable hydrocarbons	Sample analysis results received. With the exception of two TSS results and one pH result, these were within consent limits. The exceedance in TSS was attributed to sampling under stagnant conditions which likely resulted in the inclusion of bed sediment with the sample and therefore was not considered representative of the actual water quality as discharged. Similarly the pH result was obtained when there was no discharge to the receiving waters	Yes
6. Manu Stream: Discharge cannot cause specified adverse effects beyond mixing zone	Inspection – observation. Receiving water sample analysis	Yes
7. Waihi Stream: Discharge cannot cause specified adverse effects beyond mixing zone	Inspection – observation. Receiving water sample analysis	Yes
8. The Council is to be notified of any changes that may affect the nature of the discharge	No notification received	Yes
9. Review of consent	Next scheduled in June 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**

N/A = not applicable

Table 11 Summary of performance for Consent 0825-3

Purpose: *To discharge of stormwater from Motunui intake facility into Waitara River unnamed tributary*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Best practicable option to prevent and minimise adverse effects	Discussion with consent holder	Yes
2. Activity undertaken in accordance with application documentation	Liaison with consent holder	Yes
3. Discharge cannot cause specified increase in turbidity in Waitara River beyond the mixing zone	Liaison with consent holder	Yes
4. Lapse of consent	Consent given effect to	N/A
5. Review of consent	No further provision for review	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 12 Summary of performance for Consent 0827-3

Purpose: *To discharge wastewater from the Motunui in-take facility into Waitara River unnamed tributary*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Maximum daily discharge shall not exceed 1,000 m^3/day	Liaison with consent holder	Yes
2. Adoption of best practicable option	Ongoing liaison with consent holder	Yes
3. Activity undertaken in accordance with application documentation	Liaison with consent holder	Yes
4. Discharge cannot cause specified adverse effects on turbidity in Waitara River beyond the mixing zone	No incidents reported. Liaison with consent holder	Yes
5. Review of consent	No further provision for review	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 3400-2

Purpose: *To discharge effluent and stormwater into Tasman Sea*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Consent holder to adopt best practicable option to prevent or minimise adverse effects	Inspections, liaison and review of reported data. Methanex self-reported two incidents that involved the discharge of wastewater to land. Both incidents were minor in nature and promptly resolved. Minimal environmental effects were considered likely as a result of the discharges	Yes
2. Consent holder to maintain a record of the volume of effluent discharged each day	Monthly reports provided	Yes
3. Maximum daily discharge 12,096 m^3/day, 140 L/s	Monthly reports received	Yes
4. Minimum initial dilution of effluent 100:1	Outfall designed to specific design. Modelling exercise was undertaken; this was reported with the five-yearly marine outfall report received in December 2019	Yes
5. Maximum daily discharge of suspended solids 500 kg	Review of analytical information provided in self-monitoring data and inter-laboratory comparison	Yes
6. pH not to exceed range of 6 to 9	Review of analytical information provided in self-monitoring data and inter-laboratory comparison	Yes

Purpose: *To discharge effluent and stormwater into Tasman Sea*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
7. Limits on concentration of COD, hydrocarbons, methanol, copper, nickel, zinc	Review of analytical information provided in self-monitoring data and inter-laboratory comparison	Yes
8. Allowable water treatment chemicals and volumes	Liaison with consent holder and inspections	Yes
9. Maximum daily limit of treatment with Spectrus CT1300 in response to Legionella	Liaison with consent holder and consent holder reports. This condition was not exercised during this monitoring period	N/A
10. Approval from the Council required to discharge 'equivalent' chemical.	Not required during this monitoring period	N/A
11. Definition of 'equivalent'	N/A	N/A
12. Discharge of equivalent chemical requires written request	Not required	N/A
13. Conditions 5,6,7 and 8 apply to effluent prior to entry into outfall line	Monitoring and sampling carried out with regard to this requirement	Yes
14. Limits in conditions 7 and 8 apply unless the Council has given approval for a short term change	Not required	N/A
15. Effects on receiving waters	Historical marine ecological surveys (separate programme)	Yes
16. Consent holder to maintain contingency plan	Updated contingency plans provided January 2018 and reviewed as satisfactory	Yes
17. No domestic sewage in discharge	Liaison with consent holder. Domestic sewage is routed to the WWTP, not directly to the outfall	Yes
18. Consent holder to notify the Council at least seven days before consent is first exercised	Notification on file	Yes
19. Consent holder to certify the structural integrity and dilution performance of outfall at least every five years	Received a report satisfying this requirement	Yes
20. Consent holder to supply an annual effluent report by 31 March each year	Reports received monthly and reviewed as satisfactory	Yes
21. Lapse of consent	Consent given effect to	N/A
22. Review of consent	No further provision for review	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 14 Summary of performance for Consent 4042-3

Purpose: *To discharge emissions into the air – methanol distillation and ancillary facilities*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adoption of best practicable option to minimise adverse effects	Inspection and liaison with consent holder	Yes
2. Minimisation of emissions through control of processes	Inspection and liaison with consent holder	Yes
3. Consultation and approvals required prior to alterations to plant or processes	Inspection and liaison found no alterations to plant or processes requiring additional approvals	Yes
4. Provision of a report on cooling tower plume abatement	Report received December 2019. Next report expected in 2019	Yes
5. Biennial written air discharge emission and mitigation reports	Received September 2018. Next report expected by the end of 2020	Yes
6. Maximum ground-level concentrations of methanol beyond site boundary	Previous modelling has shown compliance when site in full operation	Yes
7. Maximum ground-level concentrations of carbon monoxide beyond boundary	Previous modelling has shown compliance when site in full operation	Yes
8. Maximum ground-level concentrations of nitrogen dioxide beyond boundary	Previous modelling has shown compliance when site in full operation	Yes
9. Maximum ground-level concentrations of other contaminants beyond boundary	Previous modelling has shown compliance when site in full operation	Yes
10. Inventory of emissions to be provided with biennial emission mitigation report	Received September 2018. Next report expected in 2020	Yes
11. No offensive or objectionable odour at the site boundary permitted	Inspection	Yes
12. Adverse effects on ecosystems not permitted	Inspection of surrounding environment found no adverse effects	Yes
13. Optional review provision – notification within 6 months of receiving report (condition 5)	Consent was reviewed as part of the renewal process – 4042-3, granted 12 February 2008	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 15 Evaluation of environmental performance over time

Year	Consent no	High	Good	Improvement req	Poor
2013-2014	0820-2	1			
	0822-2	1			
	0825-3	1			
	0827-3	1			
	3400-2	1			
	4042-3	1			
2014-2015	0820-2	1			
	0822-2	1			
	0825-3	1			
	0827-3	1			
	3400-2	1			
	4042-3	1			
2015-2016	0820-2	1			
	0822-2	1			
	0825-3	1			
	0827-3	1			
	3400-2	1			
	4042-3	1			
2016-2017	0820-2	1			
	0822-2	1			
	0825-3	1			
	0827-3	1			
	3400-2	1			
	4042-3	1			
2017-2018	0820-2	1			
	0822-2	1			
	0825-3	1			
	0827-3	1			
	3400-2	1			
	4042-3	1			
2018-2019	0820-2	1			
	0822-2	1			
	0825-3	1			
	0827-3	1			
	3400-2	1			

Year	Consent no	High	Good	Improvement req	Poor
	4042-3	1			
2019-2020	0820-2	1			
	0822-2	1			
	0825-3	1			
	0827-3	1			
	3400-2	1			
	4042-3	1			
Totals		42	0	0	0

In assessing a compliance and environmental performance ranking for Methanex, consideration was also given to the incidents that occurred during the monitoring period as well as overall environmental performance and risk management. During the period, Methanex demonstrated an overall high level of both environmental and administrational performance and compliance with the resource consents for the Motunui installation as defined in Section 1.1.4.

2.4 Recommendations from the 2018-2019 Annual Report

In the 2018-2019 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Methanex Motunui in the 2019-2020 year continue at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Recommendations 1 to 2 were fully implemented during the 2019-2020 monitoring period.

2.5 Alterations to monitoring programmes for 2020-2021

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

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

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

It is proposed that for 2020-2021 monitoring of consented activities at Methanex Motunui continue at the same level as in 2019-2020.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site(s) in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2020-2021.

2.6 Recommendations

1. THAT in the first instance, monitoring of consented activities at Methanex Motunui in the 2020-2021 year continue at the same level as in 2019-2020.
2. THAT should there be issues with environmental or administrative performance in 2020-2021, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

3 Waitara Valley

3.1 Process description

The Waitara Valley site had been shut down since 2008 and was restarted in October 2013 following significant maintenance and refurbishment work.

The Waitara Valley site (Photo 3) is a 1,500 tonne/day methanol production facility, which could produce 547,500 tonnes/year of chemical grade methanol. Actual production varies with the availability of natural gas.

Methanex Waitara Valley site is divided into several discrete areas associated with the on-site production of methanol (Figure 3).

The processing area includes the reformer, main compressor, and the distillation units (D1 & D2). The distillation towers are the tallest structures on the site at 51.5 metres, followed by the reformer stack at 38 metres. Product storage area consists of one substantial storage tank and six smaller tanks. A cooling tower and the main servicing facilities are located in the utility area. It is noted that the cooling tower technology in place at the Waitara Valley site differs from the system used at Motunui and the cooling tower is considerably smaller in size.

Photo 5 Methanex Waitara Valley site

Figure 3 Waitara Valley site layout and water sampling site location

3.1.1 Water discharges

There were various sources of wastewater from processes associated with the methanol manufacturing activities at the site, including water treatment wastes, boiler, cooling tower and other blowdowns, process effluents, domestic effluent and stormwater. The primary sources of water discharges, and the main features of the site are identified in Figure 3. This effluent is produced in a similar manner to that described in this report for the Motunui site (refer to section 2.1.1 of this report).

The Waitara marine outfall is the primary method used to dispose of stormwater and wastewater (excluding sewage) from the site.

Discharges to the Waitara River now occur very infrequently and only after consultation with Council. A small area of the site in the vicinity of the ponds and domestic wastewater treatment area flows overland to a small tributary of the river. A diesel tank in this higher risk area is bunded, and the sump under the diesel tank is sampled and tested prior to discharge.

3.1.2 Emissions to air

The principal emissions from the site were:

a. flue gases from the reformer furnace stack. These comprise typical products from the combustion of natural gas i.e. water vapour, oxygen, carbon dioxide, and traces of nitrogen oxides and carbon monoxide;
b. flue gases from the boiler stacks, which were similar to the above;
c. steam emissions from various vents;
d. water vapour and water droplets from the cooling tower, which could contain entrained water salts and treatment chemicals; and
e. organic vapours (particularly methanol) from the distillation column vents.

3.1.3 Solid wastes

Solid wastes were previously generated at the site. The main source of this was sludge from the ponds. When the ponds were de-sludged, the material was allowed to dry on-site and tested so that the appropriate method of disposal could be determined.

3.2 Results

3.2.1 Site inspections

Council officers carried out three compliance monitoring site inspections on 2 August, 10 December 2019 and 4 March 2020 as well as two compliance monitoring sampling visits for the purpose of collecting split samples on 3 December 2019 and 2 June 2020.

2 August 2019

An inspection was carried out by Council staff, accompanied by Ben Lawn (Methanex personnel). The following observations were made during inspection of the Waitara Valley site:

Overall the site was managed well and was found to be tidy with no off-site emissions or discharges detected.

10 December 2019

An inspection of both the Motunui and Waitara Valley facilities was undertaken by Council staff, accompanied by Ben Lawn (Methanex personnel). The Waitara Valley site was inspected after Motunui and the following observations were made.

The plant was shut down at the time of the inspection. Overall the site was managed well and was found to be tidy with no off-site emissions or discharges detected.

4 March 2020

An inspection of the Motunui and Waitara Valley facilities, as well as the intake structures was undertaken by Council staff, accompanied by Ben Lawn (Methanex personnel). The following observations were made during inspection of the Waitara Valley site:

Overall the site was well managed and tidy with no off-site emissions or discharges detected.

The intake facilities were also inspected and were found to be in a good and tidy condition.

3.2.2 Surface water

3.2.2.1 Surface water abstraction monitoring by Methanex

Since 1992, water for operation of the Waitara Valley site has been supplied from headworks constructed for supply of the Methanex Motunui site. The headworks are located approximately one kilometre above the Bertrand Road bridge, and supplement the supply from the original Mamaku Road headworks.

Daily volumes of water entering the Waitara Valley site from the Waitara River are recorded and reported to the Council on a monthly basis.

Consent 0801-2 allows Methanex to take up to 300 m^3/ hr from the Waitara River (Photo 6) when the river flow at the Bertrand Road gauging station is above 4,600 L/s (16,560 m^3/hr). A hydrograph of river flows at the Bertrand Road gauging station based on data for calculated mean daily flows during the 2019–2020 monitoring period is attached to this report as Appendix II. The Waitara River flow fell for a short period below the consent limit of 4,600 L/s during February 2020. As discussed in Section 2 of this report, production continued through this period, with permission received from the Water Shortage Event Manager. The environmental effects of the continued abstraction were unlikely to have any significant additional impact on the river.

Reported maximum daily abstraction rates were within allowable limits at all times.

Photo 6 Waitara Valley water take

Water use reduction report

The Council received a report from Methanex in September 2018 relating to water use reduction at Waitara Valley during the 2016 and 2017 calendar years. This report is a requirement of condition 5b of Consent 0801-2. In the report, Methanex note that their consumption of water on average is only 58% of the consented amount. Similarly to Motunui, the relatively low water use is attributed to efficient operation of the plant made possible by significant maintenance operations recently undertaken. Increased demineralisation run lengths for regeneration was another process that decreased water consumption. The next report is due before the end of 2020.

Resource Management (Measurement and Reporting of Water Takes) Regulations 2010

The installation and verification of the accuracy of the Waitara Valley site's raw water flow meter was undertaken during the 2017-2018 monitoring period. The Council has reviewed and accepted the reports relating to this.

3.2.2.2 Effluent monitoring

Wastewater from the Waitara Valley site is treated and discharged to the Waitara marine outfall. During the period under review, treated plant effluent comprised process and water treatment wastes and stormwater. The discharge is provided for by consent 3399-2.

Effluent monitoring data gathered by Methanex was sent to the Council on a monthly basis. The data is made up of continuous online data, laboratory analysis of a 24-hour composite effluent sample and mass discharge of water treatment chemicals calculated by Methanex using chemical consumption data.

Continuous measurement

Flow and pH were measured by online analysers, and recorded continuously at the Waitara Valley effluent discharge point. The figures reported to the Council were daily averages (m^3/hr), daily maximum (L/s) and daily volume (m^3/day) for flow, and minima, maxima and daily averages for pH.

A summary of this data is presented in Table 16 and Table 17.

Special condition 6 of consent 3399-2 states,

"THAT the pH of the effluent shall not exceed the range pH 6 to pH 9 unless it is to be combined with the lime treated wastewater from the Waitara Wastewater Treatment Plant, in which case, it shall not exceed the range of pH 6 to pH 11."

As the WWWTP ceased operation in August 2014, the pH values of 6 and 9 are used for assessing consent compliance.

Analysis of composite samples

A proportional sampler was used to create a daily composite sample representative of the daily flow of effluent. This was analysed by the Methanex laboratory, to determine compliance with their discharge consent 3399-2. A summary of this data is presented in Table 16.

Table 16 Summary of the Waitara Valley site's monitoring results of effluent during 2019-2020

	Unit	Minimum	Maximum	Consent limit	Number of breaches
Continuous measurement					
Volume of discharge	m^3/day	0	3,672	5,000	0
pH	-	6.0	9.0	6-11	0
Daily measurement					
Chemical oxygen demand	g/m^3	<25	66	200	0
Petroleum hydrocarbons	g/m^3	<1	<1	10	0
Methanol	g/m^3	<2	**29**	15	5
Suspended solids	kg/day	<3	89	500	0
Monthly measurements					
Ammonia	g/m^3	<0.01	32	200	0
Copper	g/m^3	<0.05	<0.05	0.5	0
Nickel	g/m^3	<0.10	<0.10	1.0	0
Zinc	g/m^3	<0.10	<0.10	2.0	0

The effluent discharge rates are limited by consent 3399-2 to a daily discharge of not more than 5,000 m^3 and at a maximum rate of 60 L/s. From the data provided by the consent holder, full compliance was maintained throughout the monitoring period with regard to this requirement.

All results were found to be within the consent limits with the exception of five methanol results from samples collected during July 2019. A methanol leak had occurred on the 19th of June resulting in methanol entering the stormpond. Due to heavy rainfall the stormpond reached full capacity and Methanex had to export to the marine outfall and Waitara River. The Council was notified of the event prior to commencement of export.

Chemical dosing rates

Consent 3399-2 (for discharge of process waste from the Waitara Valley site) sets mass discharge limits on the water treatment chemicals used on the site. Methanex calculated water treatment chemical mass discharge rates using chemical consumption data. A summary of this data for the monitoring period is presented in Table 17.

Table 17 Summary of Waitara Valley chemical discharge data (calculated) for July 2019 to June 2020

Consent 3399-2 (special condition 8)					
Chemical	**Unit**	**Minimum**	**Maximum**	**Average**	**Consent Limit**
Cortrol OS7780	kg/day	6	15	9	300
Flogard MS6209	kg/day	1	3	1	20
Foamtrol AF2290	kg/day	0	0	0	2
Gengard GN8020	kg/day	3	27	13	70
Inhibitor AZ8104	kg/day	3	13	6	30
Klaraid PC1192	kg/day	3	43	25	150
Optisperse HTP 73301	kg/day	0	18	9	50
Optisperse HTP 73611	kg/day	5	22	11	35
Optisperse PO5211A	kg/day	0	0	0	15
Solus AP25	kg/day	0	0	0	10
Spectrus BD1501E	kg/day	0	20	4	25
Spectrus NX1100	kg/day	0	3	1	9
Steamate NA0880	kg/day	1	18	9	25

With the exception of the methanol discharge incident, compliance with conditions on effluent composition was achieved throughout the monitoring period from July 2019 to June 2020.

Equivalent chemical

No water treatment chemical changes were requested during the 2019-2020 monitoring period.

Permitted activity – onsite sewage disposal

The Waitara Valley site has operated a sewage treatment unit since 2011 (when Methanex surrendered their consent to discharge sewage via the Waitara marine outfall). In May 2017 Methanex advised the Council that they intended to replace the existing unit with a new unit that would be of a larger capacity, as well as providing a higher level of treatment than the existing unit. The Council was advised that effluent quality from this type of system was expected to be better than 20 mg/L BOD_5 and 20 mg/L suspended solids with removal of over 99% of faecal coliforms. This effluent, similarly to the existing system, would be disposed of by trickling to the land below the site ponds. The Council were advised that the unit is a Hynds Submerged Aerated Filtration Wastewater System.

The matter was considered and was found to meet the permitted activity rule criteria of the RFWMP, as had the previous system.

3.2.3 Uncontaminated stormwater

All stormwater from process areas is contained on the Waitara Valley site in the stormwater pond. Consent 0802-2 allows for the discharge of uncontaminated stormwater to the Waitara River. In April 1994, Methanex made a decision to discharge all routine stormwater from the site via the Waitara marine outfall (consent 3399-2).

The Waitara River discharge (consent 0802-2) occurs very rarely and only when there is an extreme rainfall event, when the pumps to the outfall cannot keep up with the stormwater received from the site.

To monitor any effects to the Waitara River caused by the stormwater discharge, a total of 37 biological surveys of three sites were carried out between June 1983 and May 1994. No adverse effect on riverbed macroinvertebrate communities or algal populations were found, which could be attributed to the stormwater discharge.

This consent was exercised during the 2019-2020 monitoring period as set out under Section 3.3.

3.2.4 Inter-laboratory comparisons

The Council carried out two inter-laboratory comparisons during the monitoring period under review. Split samples were collected from the Waitara Valley site effluent, and analysed by Methanex and the Council. The results of the inter-laboratory comparisons are shown in Table 18. The exercise also serves as a compliance monitoring check.

Table 18 Inter-laboratory comparison on Waitara Valley effluent composite sample results

Parameter	Unit	Consent limits	3 December 2019		2 June 2020	
			Methanex	TRC	Methanex	TRC
Ammonia as N	mg/L		0.2	-	15	14.1
Chemical oxygen demand	mg/L	200	30	-	<25	22
Conductivity @ 25°C	µs/cm	*300**	1,940	-	2,250	2,200
Copper – acid soluble	mg/L	0.5	<0.05	-	<0.05	0.02
Methanol	mg/L	15	<2	<2	<2	<5
Nickel – acid soluble	mg/L	1.0	<0.10	-	<0.10	<0.01
pH		6.0-11.0	8.2	-	7.7	7.8
Total hydrocarbons	mg/L	10	<1	<4	<1	<4
Total suspended solids	mg/L	daily discharge <500 kg	25	-	8	6
Zinc – acid soluble	mg/L	1.0	<0.10	-	<0.10	0.07

* Guideline limit; not a consent limit

On the 3rd December, there was insufficient sample volume acquired from the composite sampler for the full suite of testing to be performed on the TRC Waitara Valley outfall sample.

Results from each laboratory for wastewater discharges met the consented water quality criteria on all occasions. Conductivity was elevated in the samples, but with consideration of previous analytical results, this was not considered to be of concern.

Overall there was good agreement between the inter-laboratory analytical sample results for the 2019-2020 monitoring period.

3.2.4.1 Methanex Waitara Valley annual report

Condition 15 of consent 3399 requires Methanex to provide the Council with an annual report on its wastewater disposal system, including the performance of the outfall and compliance with the consent. It was agreed in 2010 that this annual report would consist of monthly reports submitted to the Council on the performance of the wastewater disposal system. Methanex have produced and provided reports throughout the monitoring period and thus comply with this condition.

3.2.5 Air

3.2.5.1 Inspections

During the monitoring period, inspections of the Waitara Valley site were completed by an officer of the Council. Inspections are integrated for air and water related monitoring.

No discernible effects on the receiving environment beyond the site perimeter were noted during any of the inspections.

3.2.5.2 Consent requirements

Special condition 4 of resource consent 4045-3 requires that, every three years from the date of granting the consent, Methanex provides the Council with a report covering the following:

- Options for reducing or mitigating emissions, focusing on odorous emissions, carbon dioxide and the cooling tower plume.
- An emissions inventory (excluding carbon dioxide).
- Energy efficiency measures implemented at the Waitara Valley site.
- Any other relevant matters.

Methanex supplied a combined report for both Motunui and Waitara Valley in September 2018 covering the 2016 and 2017 calendar years. The next report will be due by the end of 2020 and will cover the 2018 and 2019 calendar years.

3.2.6 Soil

No discharges of soil to land were recorded during this monitoring period.

3.3 Investigations, interventions, and incidents

In the 2019-2020 monitoring period two events that required follow-up were recorded by the Council that were associated with Methanex's Waitara Valley site.

Methanol limit exceedance in stormwater and wastewater discharge to the Waitara River and marine outfall

On the 19th June 2019 a methanol leak occurred in Distillation 2 at the Waitara Valley Plant which resulted in methanol draining to the stormpond. The leak was attributed to an incorrect gasket being installed on the Distillation 2 overhead air condenser. This resulted in a failure which allowed a methanol leak to occur which subsequently drained to the stormpond.

Methanex responded to the incident by immediately stopping export to the marine outfall and recirculating the stormpond to allow the methanol concentration to decrease. The Council was notified of the event and regular communication maintained over the following days. Unfortunately the incident coincided with a period of prolonged rainfall and eventually Methanex had to discharge to the Waitara River and marine outfall. The recorded methanol concentration limit and dates of discharge are shown below:

03/07/2020	Marine outfall – 29 ppm methanol
04/07/2020	Marine outfall – 28 ppm methanol
	Waitara River - 71 ppm methanol
05/07/2020	Marine outfall – 29 ppm methanol
06/07/2020	Marine outfall – 19 ppm methanol

07/07/2020 Marine outfall – 16 ppm methanol

Given the high river levels and the extent of dilution via the marine outfall, the environmental impact of the discharge was likely to be no more than negligible. The Council found Methanex's response appropriate and accepted that while the incident occurred due to an installation error, it was unintentional and of low foreseeability. No further response was considered necessary.

Methanex provided an incident report which is included as Appendix V.

Consent limit breach: Methanol in groundwater

On 16 January 2020, Methanex personnel informed Council of an incident detected during routine groundwater bore sampling. The bore that was affected is located alongside the methanol export pump. Just prior to Christmas, a sample returned a result of 500 ppm methanol. The bore was resampled on the 14th of January and nearby bores were also sampled. The other bores showed no methanol detected while the original bore's methanol level was 410 ppm indicating that the contamination was relatively isolated. The only potential source identified was a previous leak from a nearby flange. However that incident was very minor and unlikely to have resulted in contamination of groundwater. The methanol export pump and pipework are all above ground and are continuously checked for leaks. Methanex suggested that potentially a leak could be running along the PVC pipe and that they had experienced this before. The water table was low and therefore the methanol was not being dispersed or broken down. Methanex continued to monitor the bore, but were unable to confirm the exact cause of the incident.

3.4 Discussion

3.4.1 Discussion of site performance

During each inspection by the Council, officers have noted that the facility is well managed, with a high standard of housekeeping apparent.

3.4.2 Environmental effects of exercise of water permits

Methanex continued to show good control of the activities permitted by the resource consents associated with the Waitara Valley site and no adverse environmental effects in relation to the water takes or discharges to the marine outfall were observed during the period under review.

3.4.3 Environmental effects of exercise of air discharge permit

Neighbourhood effects

Methanex continued to show good control of the activities permitted by the air discharge resource consents associated with the Waitara Valley site. No off-site effects were noted during the period under review.

Ecological effects

No adverse environmental effects were observed during the period under review.

3.4.4 Evaluation of performance

A tabular summary of Methanex's compliance record for the year under review is set out in Table 19 to Table 23.

Table 19 Summary of performance for Consent 0801-2

Purpose: To *take water from Waitara River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Limit on total volume of water from the two intakes no more than 300 m^3	Review of self-monitoring data provided monthly	Yes
2. Water take should be maximised from the Motunui intake structure	Liaison with the consent holder	Yes
3. Water take managed to ensure Waitara River flow at Bertrand Rd > 4,600 L/s. No taking to occur when the river level falls below this	Ongoing monitoring of river levels and Methanex self-monitoring data	No (notional) – Permission received to continue production from Water Shortage Event Manager
4. Installation and maintenance of an appropriate water meter and provision of records to the Council	Review of abstraction records provided to the Council	Yes
5. Provision of reports on the testing of pipeline integrity and water use reduction programmes	Water conservation reports received September 2018. Pipeline testing is overdue. Methanex and Council have been in discussion on how best to achieve this	Water conservation report received Pipeline testing report on hold through discussion with Council
6. Appropriate screening of intake to prevent fish entrainment	Inspection and liaison with consent holder	Yes
7. Lapse condition	N/A	N/A
8. Review provision	Adopted 2013/14 monitoring report recommendation to not review consent. No further provision for review	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 20 Summary of performance for Consent 0802-2

Purpose: *To discharge uncontaminated stormwater to the Waitara River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adoption of best practicable option	Inspections and liaison with consent holder	Yes
2. Activity to be undertaken generally in accordance with the consent application documentation	Inspection and liaison with consent holder	Yes
3. Any stormwater to be discharged to the Waitara River to be tested and results provided to the Council for approval before discharge	Inspection and liaison with consent holder	Yes
4. Specified chemical constituents not to be exceeded in the discharge	Inspection and liaison with consent holder	No – incident in which methanol contaminated stormwater had to be released to the Waitara River under high rainfall conditions. Likely environmental effect was considered negligible due to dilution
5. Specified prohibited effects on the receiving water	Inspection and liaison with consent holder	Yes
6. Lapse condition	N/A	N/A
7. Review provision	Adopted 2013/14 monitoring report recommendation to not review consent. No further provision for review	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 21 Summary of performance for Consent 3399-2

Purpose: *To discharge treated wastewater into the Tasman Sea*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Consent holder to adopt best practicable option to prevent or minimise adverse effects	Inspections and liaison with consent holder	Yes

Purpose: *To discharge treated wastewater into the Tasman Sea*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
2. Consent holder to maintain a record of the volume of effluent discharged each day	Monthly reports received	Yes
3. Maximum daily discharge 5,000 m^3/ day, 60 L/s	Monthly reports received	Yes
4. Minimum initial dilution of effluent 100:1	Outfall designed to specific design and physical modelling was undertaken. Review of effluent data and volumes discharged was also undertaken	Yes
5. Maximum daily discharge of suspended solids 500 kg	Monthly reports	Yes
6. pH not to exceed range of 6 to 11	Monthly reports	Yes
7. Limits on concentration of COD, hydrocarbons, methanol, ammonia, copper, nickel, zinc	Consent holder provided data	No – incident in which methanol contaminated stormwater had to be released to the outfall under high rainfall conditions. Likely environmental effect was considered negligible due to dilution
8. Allowable water treatment chemicals and volumes	Inspection and liaison with consent holder	Yes
9. Approval from the Council required to discharge 'equivalent' chemical	Not requested during this monitoring period	N/A
10. Definition of 'equivalent'	N/A	N/A
11. Discharge of equivalent chemical requires written request	Not requested during this monitoring period	N/A
12. Conditions 5, 6, 7 and 8 apply to effluent prior to entry into the outfall line	Monitoring/sampling undertaken in accordance with this provision	Yes
13. Limits in conditions 7 and 8 apply unless the Council has given approval for a short term change	Limits met	Yes
14. Effects on receiving waters	Previous marine ecological surveys (separate programme)	N/A
15. Consent holder to maintain contingency plan	Contingency plan in place	Yes

Purpose: *To discharge treated wastewater into the Tasman Sea*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
16. No domestic sewage in discharge after closure of Waitara Municipal WWTP	Inspection and liaison with consent holder	Yes
17. Consent holder to certify the structural integrity and dilution performance of outfall at least every five years	Report received December 2019. The dilution performance was analysed through a modelling exercise	Yes
18. Consent holder to supply an annual report by 31 March each year	Reports received monthly and reviewed as satisfactory	Yes
19. Lapse of consent	N/A	N/A
20. Review of consent	Adopted 2013/14 monitoring report recommendation to not review consent. No further provision for review	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 22 Summary of performance for Consent 3960-2

Purpose: *To construct a rock groyne in the Waitara River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Notification prior to maintenance works	No maintenance work required	N/A
2. Removal of structures when no longer required	Structure still required	N/A
3. Optional review provision re environmental effects	Adopted 2013/14 monitoring report recommendation to not review consent. No further provision for review	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		**N/A**
Overall assessment of administrative performance in respect of this consent		**N/A**

N/A = not applicable

Table 23 Summary of performance for Consent 4045-3

Purpose: *To discharge contaminants into the air*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adoption of best practicable options likely to minimise adverse effects on the environment	Ongoing inspection and liaison with consent holder	Yes

Purpose: *To discharge contaminants into the air*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
2. Minimisation of emissions through control of processes	Ongoing inspection and liaison with consent holder	Yes
3. Consultations prior to alterations to the plant or processes	Inspection and liaison found no alterations to plant or processes requiring additional approvals	Yes
4. Triennial written air discharge report	Report received September 2018	Yes
5. Maximum ground-level concentrations of methanol beyond boundaries	Previous modelling has shown compliance when site in full operation	Yes
6. Maximum ground-level concentrations of carbon monoxide beyond boundaries	Previous modelling has shown compliance when site in full operation	Yes
7. Maximum ground-level concentrations of nitrogen dioxide beyond boundaries	Previous modelling has shown compliance when site in full operation	Yes
8. Maximum ground-level concentrations of other contaminants beyond boundaries	Previous modelling has shown compliance when site in full operation	Yes
9. No offensive or objectionable odour at or beyond the site boundaries	Inspection	Yes
10. Adverse effects on ecosystems not permitted	Inspection of neighbourhood found no adverse effects	Yes
11. Optional review provision – notification within 6 months of receiving report (condition 4) re environmental effects	No review	N/A
12. Monitoring to the satisfaction of the Council	Annual review and ongoing liaison	Yes
13. Lapse condition	N/A	N/A
14. Review provision	Adopted 2013/14 monitoring report recommendation to not review consent. No further provision for review	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 24 Evaluation of environmental performance over time

Year	Consent no	High	Good	Improvement req	Poor
2013-2014	0801-2	1			
	0802-2	N/A			
	3399-2	1			
	3960-2	N/A			
	4045-3	1			
2014-2015	0801-2	1			
	0802-2	1			
	3399-2	1			
	3960-2	N/A			
	4045-3	1			
2015-2016	0801-2	1			
	0802-2	N/A			
	3399-2	1			
	3960-2	N/A			
	4045-3	1			
2016-2017	0801-2	1			
	0802-2	N/A			
	3399-2	1			
	3960-2	N/A			
	4045-3	1			
2017-2018	0801-2	1			
	0802-2	N/A			
	3399-2	1			
	3960-2	N/A			
	4045-3	1			
2018-2019	0801-2	1			
	0802-2	N/A			
	3399-2	1			
	3960-2	N/A			
	4045-3	1			
2019-2020	0801-2	1			
	0802-2	1			
	3399-2	1			
	3960-2	N/A			
	4045-3	1			

Year	Consent no	High	Good	Improvement req	Poor
Totals		23			

In assessing a compliance and environmental performance ranking for Methanex, consideration was also given to the incidents that occurred during the monitoring period as well as overall environmental performance and risk management. While two incidents were recorded, these were considered to have been of low foreseeability and of low to no environmental impact. During the period, Methanex demonstrated high level of environmental and administrative performance and compliance with their resource consents for the Waitara Valley site as defined in Section 1.1.4

3.5 Recommendations from the 2018-2019 Annual Report

In the 2018-2019 Annual Report, it was recommended:

1. THAT in the first instance, monitoring of consented activities at Methanex Waitara Valley in the 2019-2020 year continue at the same level as in 2018-2019.
2. THAT should there be issues with environmental or administrative performance in 2019-2020, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Recommendations 1 and 2 were implemented in full.

3.6 Alterations to monitoring programmes for 2020-2021

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

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

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

It is proposed that for 2020-2021 in the first instance, monitoring of consented activities at Methanex Waitara Valley site continue at the same level as in 2019-2020.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site(s) in question. The Council reserves the right to subsequently adjust the programme from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2020-2021.

3.7 Recommendations

1. THAT in the first instance, monitoring of consented activities at Methanex Waitara Valley in the 2020-2021 year continue at the same level as in 2019-2020.
2. THAT should there be issues with environmental or administrative performance in 2020-2021, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

4 Recommendations

A summary of the recommendations for the Motunui and Waitara Valley plants is as follows:

1. THAT in the first instance, monitoring of consented activities at both Methanex sites in the 2020-2021 year continue at the same level as in 2019-2020.
2. THAT should there be issues with environmental or administrative performance in 2020-2021, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Glossary of common terms and abbreviations

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

Bund	A wall around a tank to contain its contents in the case of a leak.
CBOD	Carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in µS/cm.
Council	The Taranaki Regional Council.
Cu*	Copper.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m^3/s).
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.
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.
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.
L/s	Litres per second.
m^2	Square metres.
m^3	Cubic metres.
mg/L	Milligrams per litre.
µS/cm	Microsiemens per centimetre.
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).
Ni	Nickle.
NPDC	New Plymouth District Council.
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.
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	*Resource Management Act* 1991 and including all subsequent amendments.
SS	Suspended solids.
Temp	Temperature, measured in °C (degrees Celsius).
WWTP	Wastewater treatment plant.
Zn*	Zinc.

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

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

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Appendix I

Resource consents held by Methanex

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

Water abstraction permits

Section 14 of the RMA stipulates that no person may take, use, dam or divert any water, unless the activity is expressly allowed for by a resource consent or a rule in a regional plan, or it falls within some particular categories set out in Section 14. Permits authorising the abstraction of water are issued by the Council under Section 87(d) of the RMA.

Water discharge permits

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

Air discharge permits

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

Discharges of wastes to land

Sections 15(1)(b) and (d) of the RMA stipulate that no person may discharge any contaminant onto land if it may then enter water, or from any industrial or trade premises onto land under any circumstances, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Permits authorising the discharge of wastes to land are issued by the Council under Section 87(e) of the RMA.

Land use permits

Section 13(1)(a) of the RMA stipulates that no person may in relation to the bed of any lake or river use, erect, reconstruct, place, alter, extend, remove, or demolish any structure or part of any structure in, on, under, or over the bed, unless the activity is expressly allowed for by a resource consent, a rule in a regional plan, or by national regulations. Land use permits are issued by the Council under Section 87(a) of the RMA.

Coastal permits

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

Water Permit

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

Name of Consent Holder:	Methanex Motunui Limited Private Bag 2011 NEW PLYMOUTH
Consent Granted Date:	29 April 2008

Conditions of Consent

Consent Granted:	To take water from two sites on the Waitara River for use at the Waitara Valley methanol plant at or about 2618429E-6240375N and 2619820E-6238250N
Expiry Date:	1 June 2021
Review Date(s):	June 2015
Site Location:	Waitara Valley Intake Structure, Mamaku Road, Waitara and Motunui Intake structure, East Bank, Waitara River
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 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 total volume of water taken from the two intake sites shall not exceed 300 cubic metres per hour.

2. The consent holder shall maximise the water take from the Waitara River at the Motunui intake structure and minimise abstraction at the Waitara Valley intake structure.

3. The taking of water authorised by this consent shall be managed to ensure that the flow in the Waitara River at Bertrand Road gauging station is no less than 4600 litres per second. No taking shall occur when the flow is less than 4600 litres per second.

4. The consent holder shall install, and thereafter maintain, a water meter that will record the rate and volume of water taken(date, hourly abstraction rate, and daily total abstraction) to an accuracy of ± 5% and make these records available to the Chief Executive, Taranaki Regional Council in a suitable digital format, no later than 31 July of each year. The water meter shall be capable of being equipped with a digital data logger compatible with the Taranaki Regional Council's hydrologic recording software.

5. Notwithstanding the terms and conditions of this consent the consent holder shall take all reasonable steps to avoid, remedy or mitigate any adverse effect on the environment arising from the exercise of this consent, including, but not limited to, the efficient and conservative use of water. This shall include:

   a. testing of the pipeline from the intake to the plant every five years to establish pipeline integrity; and
   b. a written report to the Chief Executive of Taranaki Regional Council, at intervals not exceeding two years, on the results of water use reduction programmes.

6. The consent holder shall ensure that the intake structure is appropriately screened to avoid the entrainment of fish. The intake shall be regularly monitored and maintained to achieve compliance with this condition.

7. 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.

8. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015, for the purpose of : [a] ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; [b] the amount of water authorised to be taken is consistent with the consent holders reasonable requirements.

Signed at Stratford on 29 April 2008

For and on behalf of
Taranaki Regional Council

_____

Director-Resource Management

Discharge Permit

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

Name of Consent Holder:	Methanex Motunui Limited Private Bag 2011 NEW PLYMOUTH
Consent Granted Date:	31 March 2008

Conditions of Consent

Consent Granted:	To discharge stormwater from the Waitara Valley Methanol Plant into the Waitara River at or about 2618495E-6241539N
Expiry Date:	1 June 2021
Review Date(s):	June 2015
Site Location:	Waitara Valley Methanol Plant, Mamaku Road, Waitara
Legal Description:	Lot 1 DP 13541 Blk V 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 the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

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

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

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

Special conditions

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

2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 4599. In the case of any contradiction between the documentation submitted in support of application 4599 and the conditions of this consent, the conditions of this consent shall prevail.

3. The consent holder shall test the levels of contaminants in the stormwater prior to discharge into the Waitara River and advise the Chief Executive of Taranaki Regional Council of the results. The stormwater shall not be discharged until the Chief Executive of Taranaki Regional Council has advised the consent holder that the discharge will comply with the standards specified in condition 5.

4. The following constituents of the discharge shall not be exceeded in the discharge:

Constituent	**Standard**
pH (range)	6.0-9.0
suspended solids	100 gm^{-3}
hydrocarbons	15 gm^{-3}
methanol	15 gm^{-3}

5. After allowing for a 50 metre mixing zone extending downstream of the discharge point the discharge shall not give rise to any of the following effects in the receiving waters of the Waitara River:

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

6. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

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

Signed at Stratford on 31 March 2008

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Water Permit

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

Name of Consent Holder:	Methanex Motunui Limited Private Bag 2011 NEW PLYMOUTH
Consent Granted Date:	29 April 2008

Conditions of Consent

Consent Granted:	To take water from the Waitara River for use at the Motunui plant at or about 2619820E-6238250N
Expiry Date:	1 June 2021
Review Date(s):	June 2015
Site Location:	Motunui Intake Structure, East Bank, Waitara River
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 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 volume of water taken shall not exceed 1400 cubic metres per hour.

2. The taking of water authorised by this consent shall be managed to ensure that the flow in the Waitara River at the Bertrand Road gauging station is no less than 4,600 litres per second. No taking shall occur when the flow is less than 4,600 litres per second.

3. The consent holder shall install, and thereafter maintain, a water meter that will record the rate and volume of water taken(date, hourly abstraction rate, and daily total abstraction) to an accuracy of ± 5% and make these records available to the Chief Executive, Taranaki Regional Council in a suitable digital format, no later than 31 July of each year. The water meter shall be capable of being equipped with a digital data logger compatible with the Taranaki Regional Council's hydrologic recording software.

4. Notwithstanding the terms and conditions of this consent the consent holder shall take all reasonable steps to avoid, remedy or mitigate any adverse effect on the environment arising from the exercise of this consent, including, but not limited to, the efficient and conservative use of water. This shall include:

   a. testing of the pipeline from the intake to the plant every five years to establish pipeline integrity; and

   b. a written report to the Chief Executive of Taranaki Regional Council, at intervals not exceeding two years, on the results of water use reduction programmes.

5. The consent holder shall ensure that the intake structure is appropriately screened to avoid the entrainment of fish. The intake structure shall be regularly monitored and maintained to achieve compliance with this condition.

6. 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.

7. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015, for the purpose of: [a] ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; [b] the amount of water authorised to be taken is consistent with the consent holders requirements.

Signed at Stratford on 29 April 2008

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

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

Name of Consent Holder:	Methanex Motunui Limited Private Bag 2011 NEW PLYMOUTH 4342
Decision Date:	29 November 2012
Commencement Date:	29 November 2012

Conditions of Consent

Consent Granted:	To discharge uncontaminated stormwater from outfalls into an unnamed tributary of the Waihi Stream at or about (NZTM) 1711804E-5683660N and into the the Manu Stream at or about (NZTM)1710848E-5683737N
Expiry Date:	1 June 2027
Review Date(s):	June 2015, June 2021
Site Location:	State Highway 3, Motunui, Waitara
Legal Description:	Lot 1 DP 324944 Pt Ngatirahiri 2F Pt Lot 1 DP 10081 Ngatirahiri 2C1C 2B2B2 2B2A1 2C1B 2B2A2B Pt 2B1 2B2A2A 2B2B1 2C1A [Discharge source & site]
Catchment:	Waihi

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

General condition

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

Special conditions

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

2. The stormwater discharged shall be from a catchment area not exceeding 240000 m^2 for the Waihi Stream tributary, and 294000 m^2 for the "Duck Pond", as specified in Methanex drawing number g10637 supplied with application 5748 .

3. The consent holder shall maintain a contingency plan that details measures and procedures to be undertaken to prevent spillage or any discharge of contaminants not authorised by this consent. The contingency plan shall be followed in the event of a spill or unauthorised discharge and shall be certified by the Chief Executive, Taranaki Regional Council as being adequate to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

4. The consent holder shall maintain a stormwater management plan that documents how the site is to be managed to minimise the contaminants that become entrained in the stormwater. This plan shall be followed at all times, shall be certified by the Chief Executive, Taranaki Regional Council, and 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.

5. Constituents of the discharge shall meet the standards shown in the following table.

Constituent	Standard
pH	Within the range 6.0 to 9.5
suspended solids	Concentration not greater than 100 gm^{-3}
total recoverable hydrocarbons	Concentration not greater than 5 gm^{-3}

This condition shall apply to the uncontaminated stormwater prior to entry into the body of water commonly known as the "Duck Pond" and the unnamed tributary of the Waihi Stream at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

6. After allowing for reasonable mixing, within a mixing zone extending to the downstream end of the body of water known as 'The Duck Pond' the discharge shall not give rise to any of the following effects in the receiving waters of the Manu 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.

7. After allowing for reasonable mixing, within a mixing zone extending 25 metres downstream of the discharge points into the unnamed tributary of the Waihi Stream the discharge shall not give rise to any of the following effects in the receiving waters of the Waihi 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.

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. 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 29 November 2012

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

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

Name of Consent Holder:	Methanex Motunui Limited Private Bag 2011 NEW PLYMOUTH
Consent Granted Date:	31 March 2008

Conditions of Consent

Consent Granted:	To discharge stormwater from the Motunui intake facility into an unnamed tributary of the Waitara River at or about 2619942E-6238671N
Expiry Date:	1 June 2021
Review Date(s):	June 2015
Site Location:	Motunui intake facility, Tikorangi Road, Waitara
Legal Description:	Pt Lot 2 DP 12099 Blk IX 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 the consent holder shall, within the time specified in the requirement, supply the information required relating to the exercise of this consent.

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

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

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

Special conditions

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

2. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 4594. In the case of any contradiction between the documentation submitted in support of application 4594 and the conditions of this consent, the conditions of this consent shall prevail.

3. After allowing for reasonable mixing, within a mixing zone extending 25 metres downstream of the confluence of unnamed tributary and the Waitara River, the discharge shall not give rise to an increase in turbidity of greater than 50% [as determined using NTU (nephelometric turbidity units)], in the receiving waters.

4. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

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

Signed at Stratford on 31 March 2008

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Discharge Permit

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

Name of Consent Holder:	Methanex Motunui Limited Private Bag 2011 NEW PLYMOUTH
Consent Granted Date:	31 March 2008

Conditions of Consent

Consent Granted:	To discharge wastewater from the Motunui intake facility into an unnamed tributary of the Waitara River at or about 2619942E-6238671N
Expiry Date:	1 June 2021
Review Date(s):	June 2015
Site Location:	Motunui Intake Station, Tikorangi Road, Waitara
Legal Description:	Pt Lot 2 DP 12099 Blk IX 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 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 maximum daily discharge shall not exceed 1000 cubic metres per day.

2. 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.

3. The exercise of this consent shall be undertaken generally in accordance with the documentation submitted in support of application 4595. In the case of any contradiction between the documentation submitted in support of application 4595 and the conditions of this consent, the conditions of this consent shall prevail.

4. After allowing for reasonable mixing, within a mixing zone extending 25 metres downstream of the confluence of the unnamed tributary with the Waitara River, the discharge shall not give rise to an increase in turbidity of greater than 50% [as determined using NTU (nephelometric turbidity units)], in the receiving waters.

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

Signed at Stratford on 31 March 2008

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Coastal Permit

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

Name of Consent Holder:	Methanex Motunui Limited Private Bag 2011 NEW PLYMOUTH
Consent Granted Date:	29 April 2008

Conditions of Consent

Consent Granted:	To discharge treated wastewater and stormwater from the Waitara Valley methanol plant into the Tasman Sea via the Waitara marine outfall at or about 2615711E-6246696N
Expiry Date:	1 June 2021
Review Date(s):	June 2015
Site Location:	at or beyond 1250 metre offshore from Waitara River mouth
Catchment:	Tasman Sea

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

General conditions

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

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

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

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

Special conditions

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

2. The consent holder shall maintain a record of the volume of effluent discharged each day to an accuracy of ±5% and make these records available to the Chief Executive, Taranaki Regional Council in a digital format compatible with Council software, no later than 20th of the following month.

3. The maximum daily discharge shall be 5000 cubic metres per day at a maximum rate of 60 litres per second.

4. The consent holder shall ensure that the minimum initial dilution of the effluent above the outfall diffuser shall be 100:1.

5. The maximum daily discharge of suspended solids shall be 500 kilograms.

6. The consent holder shall ensure that the pH of the effluent shall not exceed the range of pH 6 to pH 9 unless it is to be combined with the lime treated wastewater from the Waitara Wastewater Treatment Plant, in which case, it shall not exceed the range pH 6 to pH 11.

7. On the basis of 24-hour flow proportioned composite samples, constituents of the discharge shall meet the standards shown below:

Constituent	**Standard**
Chemical oxygen demand	concentration no greater than 200 gm^{-3}
Hydrocarbons	concentration no greater than 10 gm^{-3}
Methanol	concentration no greater than 15 gm^{-3}
Ammonia	concentration no greater than 200 gm^{-3}
Copper	concentration no greater than 0.5 gm^{-3}
Nickel	concentration no greater than 1.0 gm^{-3}
Zinc	concentration no greater than 2.0 gm^{-3}

8. Subject to condition 9, only the water treatment chemicals listed in Table 1 shall be discharged, and the daily quantity discharged shall not exceed the limits given Table 1 below.

Table 1: List of water treatment chemicals

Purpose	**Trade name**	**Maximum Daily discharge (kg)**
Corrosion control in high pressure boiler	Optisperse HTP 7330 & 73611	50
Corrosion control in medium pressure boiler	Optisperse PO5211A	15
Oxygen removal from boiler feed water	Cortrol OS7780	300
pH control of steam/condensate to prevent corrosion.	Steamate NA0880	25
Corrosion control of re-circulating cooling water.	Continuum AEC3109	100
Control biological activity in cooling water	Spectrus BD1500	50
Corrosion control of re-circulating cooling water	Inhibitor AZ8104	30
Reduce foam formation of cooling water	Foamtrol AF2290	2
Coagulant	Klaraid PC 1192	150

9. In addition to the water treatment chemical listed in Table 1 [condition 8], water treatment chemicals considered to be 'equivalents' may be discharged as an alternative to those listed in Table 1, provided approval for the equivalent chemical has been given by the Chief Executive of Taranaki Regional Council in accordance with condition 11.

10. For the purpose of this consent an 'equivalent' is defined as a chemical that, when compared the chemical listed in Table 1, the Chief Executive of Taranaki Regional Council has determined that:

a) it is of a similar nature and used for a similar purpose;
b) it has similar breakdown products; and
c) it has potential environmental effects that are similar.

11. Any discharge of an equivalent chemical in accordance with condition 9, shall only occur after a written request to discharge an equivalent chemical has been approved by Chief Executive Taranaki Regional Council. Any such request shall include:

a) name of equivalent chemical;
a) proposed concentration of equivalent in the discharge; and
b) details of the nature of the chemical including its breakdown products; and
c) an assessment of the potential effects of the change on the receiving environment.

Note that the Chief Executive of Taranaki Regional Council may take up to 20 days to consider the request.

12. Special conditions 5, 6, 7 and 8 apply to effluent prior to entry into the outfall line, at a designated sampling point approved by the Chief Executive of Taranaki Regional Council.

13. The limits in special conditions 7 and 8 apply unless the Chief Executive of Taranaki Regional Council has given approval for a short term change for the purpose of routine maintenance including physical and chemical cleaning and catalyst changeouts, as per condition 11.

14. After allowing for reasonable mixing, being outside of a zone of 200 metres from the centreline of the outfall diffuser, the discharge shall not give rise to any of the following effects in the receiving waters:

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) any significant adverse effects on aquatic life, habitats or ecology;
e) any undesirable biological growths.

15. The consent holder shall maintain a comprehensive contingency plan, to be put into operation to prevent unauthorised discharge resulting from spillages, accidental discharges or pipeline failure. The plan shall be provided to the Chief Executive, Taranaki Regional Council no more than thirty [30] days after this consent is first exercised and thereafter reviewed at two yearly intervals.

16. There shall be no domestic sewage [human effluent] in the discharge authorised by this consent following the closure of the Waitara municipal wastewater treatment plant.

17. At the request of the Chief Executive, Taranaki Regional Council, but at intervals of no less than five years, the consent holder shall certify the structural integrity and dilution performance of the outfall.

18. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, an annual report on its waste treatment system discharges. The annual report shall include:

    a) daily volumes;
    b) results of any and all analyses undertaken by or on behalf of the consent holder; and
    c) compliance with the consent.

    This report shall be provided by the 31st March each year and covering the previous calendar year period.

19. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

20. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 or within 3 months of receipt of notification under condition 11, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 29 April 2008

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Coastal Permit

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

Name of Consent Holder:	Methanex Motunui Limited Private Bag 2011 NEW PLYMOUTH 4342
Decision Date (Change):	29 July 2013
Commencement Date (Change):	29 July 2013 (Granted: 29 April 2008)

Conditions of Consent

Consent Granted:	To discharge treated wastewater and stormwater from the Waitara Valley Methanol Plant into the Tasman Sea via the Waitara marine outfall
Expiry Date:	1 June 2021
Review Date(s):	June 2015 and/or within 3 months of notification under special condition 11
Site Location:	At or beyond 1250 metre offshore from Waitara Rivermouth
Grid Reference (NZTM)	1705615E-5684951N
Catchment:	Tasman Sea

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

General conditions

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

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

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

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

Special Conditions

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

2. The consent holder shall maintain a record of the volume of effluent discharged each day to an accuracy of ±5% and make these records available to the Chief Executive, Taranaki Regional Council in a digital format compatible with Council software, no later than 20th of the following month.

3. The maximum daily discharge shall be 5000 cubic metres per day at a maximum rate of 60 litres per second.

4. The consent holder shall ensure that the minimum initial dilution of the effluent above the outfall diffuser shall be 100:1.

5. The maximum daily discharge of suspended solids shall be 500 kilograms.

6. The consent holder shall ensure that the pH of the effluent shall not exceed the range of pH6 to pH 9 unless it is to be combine with the line treated wastewater from the Waitara Wastewater Treatment Plant, in which case, it shall not exceed the range pH 6 to pH 11.

7. On the basis of 24-hour flow proportioned composite samples, constituents of the discharge shall meet the standards shown below:

Constituent	Standard
Chemical oxygen demand	concentration no greater than 200 gm^{-3}
Hydrocarbons	concentration no greater than 10 gm^{-3}
Methanol	concentration no greater than 15 gm^{-3}
Ammonia	concentration no greater than 200 gm^{-3}
Copper	concentration no greater than 0.5 gm^{-3}
Nickel	concentration no greater than 1.0 gm^{-3}
Zinc	concentration no greater than 2.0 gm^{-3}

8. Subject to condition 9, only the water treatment chemicals listed in Table 1 shall be discharged, and the daily quantity discharged shall not exceed the limits given Table 1 below.

Table 1: List of water treatment chemicals

Purpose	Trade name	Maximum Daily discharge (kg)
Corrosion control in high pressure boiler	Optisperse HTP 73301 & 73611	50
Corrosion control in medium pressure boiler	Optisperse PO5211A	15
Oxygen removal from boiler feed water	Cortrol OS7780	300
pH control of steam/condensate to prevent corrosion.	Steamate NA0880	25
Corrosion control of re-circulating cooling water.	Gengard GN8020 Flogard MS6209	70 20
Biocidal dispersant	Spectrus BD1500	50
Corrosion control of re-circulating cooling water	Inhibitor AZ8104	30
Reduce foam formation of cooling water	Foamtrol AF2290	2
Coagulant	Klaraid PC 1192	150
Secondary biocide	Spectrus CT1300	5

9. In addition to the water treatment chemical listed in Table 1 (condition 8), water treatment chemicals considered to be 'equivalents' may be discharged as an alternative to those listed in Table 1, provided approval for the equivalent chemical has been given by the Chief Executive of Taranaki Regional Council in accordance with condition 11.

10. For the purpose of this consent an 'equivalent' is defined as a chemical that, when compared the chemical listed in Table 1, the Chief Executive of Taranaki Regional Council has determined that:

    a) it is of a similar nature and used for a similar purpose;
    b) it has similar breakdown products; and
    c) it has potential environmental effects that are similar.

11. Any discharge of an equivalent chemical in accordance with condition 9, shall only occur after a written request to discharge an equivalent chemical has been approved by Chief Executive Taranaki Regional Council. Any such request shall include:

    a) name of equivalent chemical;
    a) proposed concentration of equivalent in the discharge; and
    b) details of the nature of the chemical including its breakdown products; and
    c) an assessment of the potential effects of the change on the receiving environment.

    Note that the Chief Executive of Taranaki Regional Council may take up to 20 days to consider the request.

12. Special conditions 5, 6, 7 and 8 apply to effluent prior to entry into the outfall line, at a designated sampling point approved by the Chief Executive of Taranaki Regional Council.

13. The limits in special conditions 7 and 8 apply unless the Chief Executive of Taranaki Regional Council has given approval for a short term change for the purpose of routine maintenance including physical and chemical cleaning and catalyst changeouts, as per condition 11.

14. After allowing for reasonable mixing, being outside of a zone of 200 metres from the centreline of the outfall diffuser, the discharge shall not give rise to any of the following effects in the receiving waters:

    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) any significant adverse effects on aquatic life, habitats or ecology;
    e) any undesirable biological growths.

15. The consent holder shall maintain a comprehensive contingency plan, to be put into operation to prevent unauthorised discharge resulting from spillages, accidental discharges or pipeline failure. The plan shall be provided to the Chief Executive, Taranaki Regional Council no more than thirty (30) days after this consent is first exercised and thereafter reviewed at two yearly intervals.

16. There shall be no domestic sewage (human effluent) in the discharge authorised by this consent following the closure of the Waitara municipal wastewater treatment plant.

17. At the request of the Chief Executive, Taranaki Regional Council, but at intervals of no less than five years, the consent holder shall certify the structural integrity and dilution performance of the outfall.

18. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, an annual report on its waste treatment system discharges. The annual report shall include:

    a) daily volumes;
    b) results of any and all analyses undertaken by or on behalf of the consent holder; and
    c) compliance with the consent.

    This report shall be provided by the 31st March each year and covering the previous calendar year period.

19. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

20. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 or within 3 months of receipt of notification under condition 11, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 29 July 2013

For and on behalf of
Taranaki Regional Council

_____

Director-Resource Management

Coastal Permit

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

Name of Consent Holder:	Methanex Motunui Limited Private Bag 2011 NEW PLYMOUTH
Consent Granted Date:	29 April 2008

Conditions of Consent

Consent Granted:	To discharge treated wastewater and stormwater from the Motunui methanol plant into the Tasman Sea via the Waitara marine outfall at or about 2615711E-6246696N
Expiry Date:	1 June 2021
Review Date(s):	June 2015
Site Location:	At or beyond 1250 metres offshore from Waitara River mouth
Catchment:	Tasman Sea

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

General conditions

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

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

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

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

Special conditions

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

2. The consent holder shall maintain a record of the volume of effluent discharged each day to an accuracy of ±5% and make these records available to the Chief Executive, Taranaki Regional Council in a digital format compatible with Council software, no later than 20th of the following month

3. The maximum daily discharge shall be 12,096 cubic metres per day at a maximum rate of 140 litres per second.

4. The consent holder shall ensure that the minimum initial dilution of the effluent above the outfall diffuser shall be 100:1.

5. The maximum daily discharge of suspended solids shall be 500 kilograms.

6. The consent holder shall ensure that the pH of the effluent shall at all times be within the range of pH 6 to pH 9.

7. On the basis of 24-hour flow proportioned composite samples, constituents of the discharge shall meet the standards shown below.

Constituent	**Standard**
Chemical oxygen demand	concentration no greater than 200 gm^{-3}
Hydrocarbons	concentration no greater than 10gm^{-3}
Methanol	concentration no greater than 15 gm^{-3}
Copper	concentration no greater than 0.5 gm^{-3}
Nickel	concentration no greater than 1.0 gm^{-3}
Zinc	concentration no greater than 1.0 gm^{-3}

8. Subject to condition 9, only the water treatment chemicals listed in Table 1 shall be discharged, and the daily quantity discharged shall not exceed the limits given in Table 1.

Table 1: List of water treatment chemicals

Purpose	Trade name	Maximum Daily
Corrosion control in high pressure boiler	Optisperse HTP 7330 & 73611	120
Corrosion control in medium pressure boiler	Optisperse PO5211A	20
Oxygen removal from boiler feed water	Cortrol OS7780	400
pH control of steam/condensate to prevent corrosion.	Steamate NA0880	40
Corrosion control of recirculating cooling water.	Continuum AEC3109	300
Control biological activity in cooling water	Spectrus BD1500	200
Corrosion control of recirculating cooling water	Inhibitor AZ8104	300
Control biological activity in cooling water	Spectrus NX1100	50
Control biological activity in cooling water	Spectrus CT1300	20
Corrosion control of recirculating cooling water	Flogard MS6207	40
Reduce foam formation of cooling water	Foamtrol AF2290	40
Coagulant	Klaraid PC 1190P	600
Flocculant	Betzdearborn AE1115	60

9. In addition to the water treatment chemicals listed in Table 1, water treatment chemicals determined to be 'equivalents' may be discharged as an alternative to those listed in Table 1, provided approval for the equivalent chemical has been given by the Chief Executive of Taranaki Regional Council in accordance with condition 11.

10. For the purpose of this consent an 'equivalent' is defined as a chemical that, when compared the chemical listed in Table 1, the Chief Executive of Taranaki Regional Council has determined that:

    a) it is of a similar nature and used for a similar purpose;
    b) it has similar breakdown products; and
    c) it has potential environmental effects that are similar.

11. Any discharge of an equivalent chemical in accordance with condition 9, shall only occur after a written request to discharge an equivalent chemical has been approved by Chief Executive Taranaki Regional Council. Any such request shall include:

    a) name of equivalent chemical;
    b) proposed concentration of equivalent in the discharge; and
    c) details of the nature of the chemical including its breakdown products; and
    d) an assessment of the potential effects of the change on the receiving environment.

    Note that the Chief Executive of Taranaki Regional Council may take up to 20 days to consider the request.

12. Special conditions 5, 6, 7 and 8, apply to effluent prior to entry into the outfall line, at a designated sampling point approved by the Chief Executive of Taranaki Regional Council.

13. The limits in special conditions 7 and 8 apply unless the Chief Executive of Taranaki Regional Council has given approval for a short term change for the purpose of routine maintenance including physical and chemical cleaning and catalyst changeouts, as per special condition 11.

14. After allowing for reasonable mixing, being outside of a zone of 200 metres from the centreline of the outfall diffuser, the discharge shall not give rise to any of the following effects in the receiving waters:

    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) any significant adverse effects on aquatic life, habitats or ecology;
    e) any undesirable biological growths

15. The consent holder shall maintain a comprehensive contingency plan, to be put into operation to prevent unauthorised discharge resulting from spillages, accidental discharges or pipeline failure. The plan shall be provided to the Chief Executive, Taranaki Regional Council no more than 30 days after this consent is first exercised and thereafter reviewed two yearly intervals.

16. No discharge of domestic sewage [human effluent] shall be permitted under the exercise of this consent.

17. The consent holder shall notify the Chief Executive, Taranaki Regional Council at least seven days before this consent is first exercised.

18. The consent holder shall on request by the Chief Executive, Taranaki Regional Council, but at intervals of no less than five years, certify the structural integrity and dilution performance of the outfall.

19. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, an annual report on its waste treatment system discharges. The annual report shall include:

    a) daily volumes;
    b) results of any and all analyses undertaken by or on behalf of the consent holder;
    c) compliance with the consent.

    This report shall be provided by the 31st March each year and covering the previous calendar year period.

20. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

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 or within 3 months of receipt of notification under special condition 11, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 29 April 2008

For and on behalf of
Taranaki Regional Council

_____

Director-Resource Management

Coastal Permit

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

Name of Consent Holder:	Methanex Motunui Limited Private Bag 2011 NEW PLYMOUTH 4342
Decision Date [change]:	18 July 2012
Commencement Date [change]:	18 July 2012 [Granted: 29 April 2008]

Conditions of Consent

Consent Granted:	To discharge treated wastewater and stormwater from the Motunui methanol plant into the Tasman Sea via the Waitara marine outfall at or about (NZTM) 1705615E-5684951N
Expiry Date:	1 June 2021
Review Date(s):	June 2015 and/or within 3 months of receiving notification under special condition 12
Site Location:	At or beyond 1250 metres offshore from Waitara River mouth
Catchment:	Tasman Sea

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

General condition

a. The consent holder shall pay to the Taranaki Regional Council [the Council] all the administration, monitoring and supervision costs of this consent, fixed in accordance with 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 consent holder shall maintain a record of the volume of effluent discharged each day to an accuracy of ±5% and make these records available to the Chief Executive, Taranaki Regional Council in a digital format compatible with Council software, no later than 20th of the following month

3. The maximum daily discharge shall be 12,096 cubic metres per day at a maximum rate of 140 litres per second.

4. The consent holder shall ensure that the minimum initial dilution of the effluent above the outfall diffuser shall be 100:1.

5. The maximum daily discharge of suspended solids shall be 500 kilograms.

6. The consent holder shall ensure that the pH of the effluent shall at all times be within the range of pH 6 to pH 9.

7. On the basis of 24-hour flow proportioned composite samples, constituents of the discharge shall meet the standards shown below.

Constituent	**Standard**
Chemical oxygen demand	concentration no greater than 200 gm^{-3}
Hydrocarbons	concentration no greater than 10gm^{-3}
Methanol	concentration no greater than 15 gm^{-3}
Copper	concentration no greater than 0.5 gm^{-3}
Nickel	concentration no greater than 1.0 gm^{-3}
Zinc	concentration no greater than 1.0 gm^{-3}

8. Subject to condition 10, only the water treatment chemicals listed in Table 1 shall be discharged, and the daily quantity discharged shall not exceed the limits given in Table 1.

Table 1: List of water treatment chemicals

Purpose	Trade name	Maximum Daily discharge (kg)
Corrosion control in high pressure boiler	Optisperse HTP 7330 & 73611	120
Corrosion control in medium pressure boiler	Optisperse PO5211A	20
Oxygen removal from boiler feed water	Cortrol OS7780	400
pH control of steam/condensate to prevent corrosion.	Steamate NA0880	40
Corrosion control of recirculating cooling water.	Continuum AEC3109	300
Control biological activity in cooling water	Spectrus BD1500	200
Corrosion control of recirculating cooling water	Inhibitor AZ8104	300
Control biological activity in cooling water	Spectrus NX1100	50
Control biological activity in cooling water	Spectrus CT1300	20
Corrosion control of recirculating cooling water	Flogard MS6207	40
Reduce foam formation of cooling water	Foamtrol AF2290	40
Coagulant	Klaraid PC 1190P	600
Flocculant	Betzdearborn AE1115	60

9. The maximum daily limit of the water treatment chemical 'Spectrus CT1300' may be increased to 40kg/day in response to increased levels of the bacteria Legionella if detected by the consent holder, to minimise the risk to human health. The Consent holder must notify the Council within 24 hours if this increased dose is utilized.

10. In addition to the water treatment chemicals listed in Table 1, water treatment chemicals determined to be 'equivalents' may be discharged as an alternative to those listed in Table 1, provided approval for the equivalent chemical has been given by the Chief Executive of Taranaki Regional Council in accordance with condition 12.

11. For the purpose of this consent an 'equivalent' is defined as a chemical that, when compared the chemical listed in Table 1, the Chief Executive of Taranaki Regional Council has determined that:

    a) it is of a similar nature and used for a similar purpose;
    b) it has similar breakdown products; and
    c) it has potential environmental effects that are similar.

12. Any discharge of an equivalent chemical in accordance with condition 10, shall only occur after a written request to discharge an equivalent chemical has been approved by Chief Executive Taranaki Regional Council. Any such request shall include:

    a) name of equivalent chemical;
    b) proposed concentration of equivalent in the discharge; and
    c) details of the nature of the chemical including its breakdown products; and
    d) an assessment of the potential effects of the change on the receiving environment.

    Note that the Chief Executive of Taranaki Regional Council may take up to 20 days to consider the request.

13. Special conditions 5, 6, 7 and 8, apply to effluent prior to entry into the outfall line, at a designated sampling point approved by the Chief Executive of Taranaki Regional Council.

14. The limits in special conditions 7 and 8 apply unless the Chief Executive of Taranaki Regional Council has given approval for a short term change for the purpose of routine maintenance including physical and chemical cleaning and catalyst changeouts, as per special condition 12.

15. After allowing for reasonable mixing, being outside of a zone of 200 metres from the centreline of the outfall diffuser, the discharge shall not give rise to any of the following effects in the receiving waters:

    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) any significant adverse effects on aquatic life, habitats or ecology;
    e) any undesirable biological growths

16. The consent holder shall maintain a comprehensive contingency plan, to be put into operation to prevent unauthorised discharge resulting from spillages, accidental discharges or pipeline failure. The plan shall be provided to the Chief Executive, Taranaki Regional Council no more than 30 days after this consent is first exercised and thereafter reviewed two yearly intervals.

17. No discharge of domestic sewage [human effluent] shall be permitted under the exercise of this consent.

18. The consent holder shall notify the Chief Executive, Taranaki Regional Council at least seven days before this consent is first exercised.

19. The consent holder shall on request by the Chief Executive, Taranaki Regional Council, but at intervals of no less than five years, certify the structural integrity and dilution performance of the outfall.

20. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, an annual report on its waste treatment system discharges. The annual report shall include:

    a) daily volumes;
    b) results of any and all analyses undertaken by or on behalf of the consent holder;
    c) compliance with the consent.

    This report shall be provided by the 31st March each year and covering the previous calendar year period.

21. This consent shall lapse on the expiry of five years after the date of issue of this consent, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.

22. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 or within 3 months of receipt of notification under special condition 12, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 18 July 2012

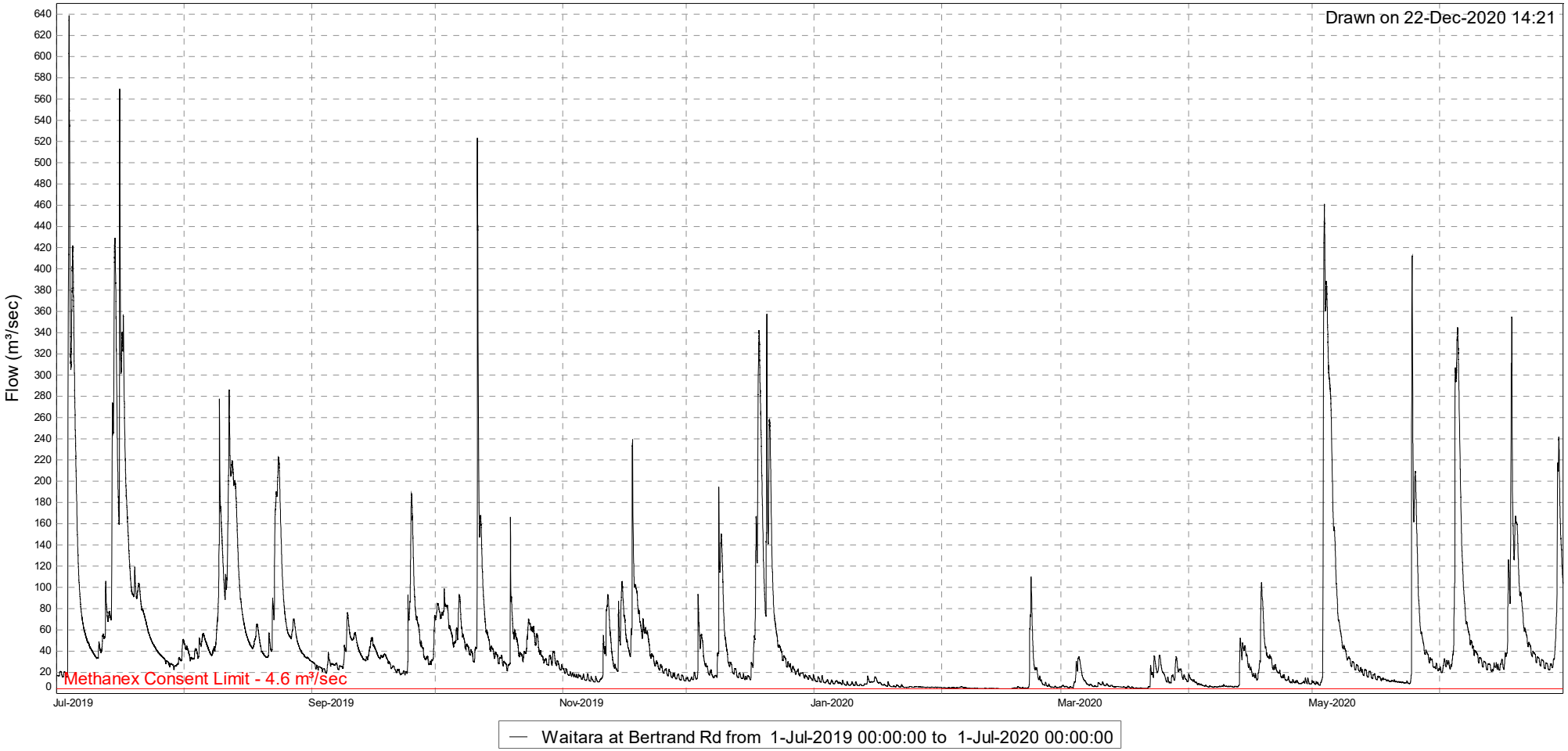
For and on behalf of
Taranaki Regional Council

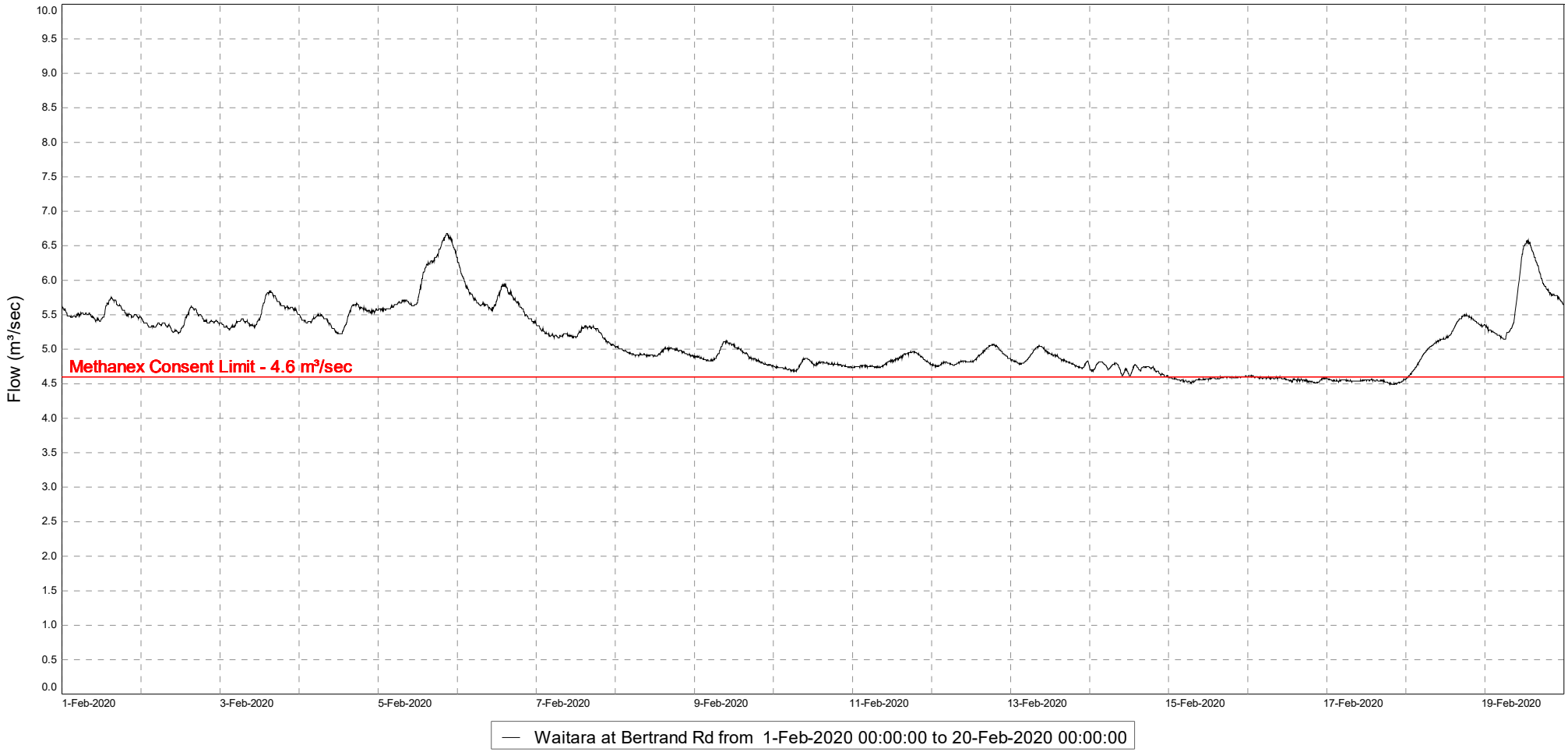
_____

Director-Resource Management

Appendix II

Hydrograph for the Waitara River at Bertrand Road for the monitoring period July 2019 to June 2020


Drawn on 22-Dec-2020 14:21
Flow (m³/sec)
640
620
600
580
560
540
520
500
480
460
440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
Methanex Consent Limit - 4.6 m³/sec
Jul-2019
Sep-2019
Nov-2019
Jan-2020
Mar-2020
May-2020
Waitara at Bertrand Rd from 1-Jul-2019 00:00:00 to 1-Jul-2020 00:00:00


Flow (m³/sec)
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Methanex Consent Limit - 4.6 m³/sec
1-Feb-2020
3-Feb-2020
5-Feb-2020
7-Feb-2020
9-Feb-2020
11-Feb-2020
13-Feb-2020
15-Feb-2020
17-Feb-2020
19-Feb-2020
Waitara at Bertrand Rd from 1-Feb-2020 00:00:00 to 20-Feb-2020 00:00:00

Appendix III

Waitara Marine Outfall Report

methanex
the power of agility

A RESPONSIBLE CARE® COMPANY

Private Bag 2011
New Plymouth 4342

T: (06) 754 9700
F: (06) 754 9701

23 December 2019

Taranaki Regional Council
Private Bag 713
Stratford

Attention: Helen Gerrard

WAITARA MARINE OUTFALL REPORT FOR METHANEX NZ LTD.
5 – YEARLY REPORT (2019)

1. Introduction

Methanex New Zealand Ltd is to certify the structural integrity and dilution performance of the Waitara Marine Outfall to meet conditions in the consents granted for discharging wastewater and storm-water from its Motunui and Waitara Valley methanol production plants.

The consents are:

Motunui Plant:	3400-2
Waitara Valley Plant:	3399-2

2. Summary of Methanex Use and Management of the Outfall

Over the previous five years Methanex continued to use the outfall for the discharge of wastewater associated with the production of Methanol at both the Motunui and Waitara Valley sites, including storm-water from the operational areas of the sites. The NPDC continues to own and operate the outfall, with a contract in place between Methanex and the NPDC which allows for Methanex's use of the outfall and with NPDC carrying the responsibility to maintain its condition. Methanex is currently the only routine user of the outfall, with NPDC discharges being negligible.

methanex
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New Plymouth 4342

T: (06) 754 9700
F: (06) 754 9701

3. Structural Integrity of the Outfall

Over this reporting period the NPDC have engaged OCEL Consultants and New Plymouth Underwater to inspect and carry out maintenance on the outfall. Work on the outfall continues to be problematic with very few windows of opportunity for diving with clear visibility. The inspection and maintenance continues to concentrate on the maintenance of the tie-down strap integrity and the removal of tube worm growth.

The most recent diving inspection and work on the diffuser was undertaken in May 2019, with a full video of the length of the pipeline having been recorded. NPDC subsequently engaged Beca to carry out a review of the information gained during this, and earlier inspections. The report by Beca is attached to this letter and includes observations and recommendations.

Beca concludes that "Undertaking ongoing monitoring and maintenance to address tube worm growths, corrosion protection (anodes) and other issues with tie-downs, with 'best endeavours' is the most pragmatic approach."

4. Dilution Performance of the Outfall

A modelling report was commissioned for the dilution performance of the outfall in Dec. 2013, and was lodged with TRC in 2014. The modelling was carried out using flows from the Methanex plants only as the NPDC planned to divert the sewage flows from the Waitara area to the NP Waste Water Treatment Plant early in 2014.

This report is still valid, with no changes having happened in Methanex's operation and use of the outfall. The results of the report showed that the diffuser meets the required minimum average initial dilution of 100:1

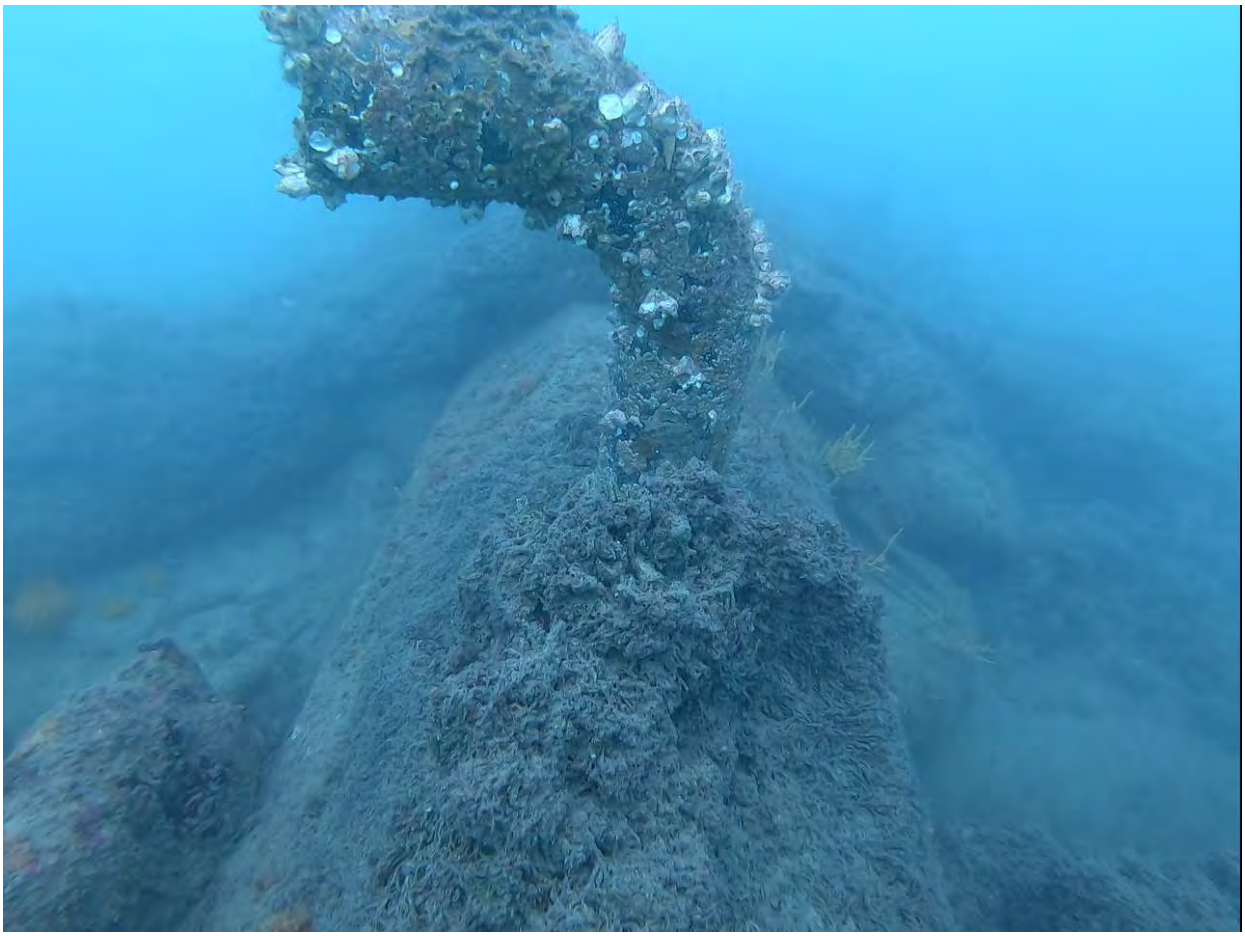
Report Prepared by:

Gary Rielly
Methanex NZ Ltd

Waitara Outfall Inspection Review

Prepared for New Plymouth District Council
Prepared by Beca Limited

18 December 2019



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1.2 Limitations 2

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3.2 Diffuser Section 5

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3.4 Inshore Section 6

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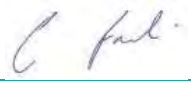
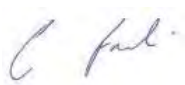
Revision History

Revision Nº	Prepared By	Description	Date
A	**Ian Goss**	Draft for Client Review	1 Oct 2019
B	**Ian Goss**	Incorporating Client comments	26 Nov 2019
C	Chris French	Final	18 Dec 2019

Document Acceptance

Action	Name	Signed	Date
Prepared by	**Ian Goss**		18 Dec 2019
Reviewed by	**Chris French**		18 Dec 2019
Approved by	**Chris French**		18 Dec 2019
on behalf of	Beca Limited		

Executive Summary

This report provides a review of a recent visual inspection of the Waitara Wastewater Outfall pipeline. The dive inspection was undertaken in conditions of good visibility, and a video record and accompanying detailed log presented in a report by New Plymouth Underwater.

A number of anomalies related to structural tie-downs required to maintain the structural stability of the pipeline on the seabed were identified, as was extensive colonisation of marine growth. This growth had the effect of obscuring potential further structural issues that had been previously identified and has also resulted in the accumulation of large areas of tubeworm casings fixed to the pipe which attract additional hydrodynamic load to the pipeline and affect its stability.

Previous inspections, the most recent in 2009/10, had the advantage of closer access to the structural details and repairs undertaken, and identified similar issues that are likely to be obscured by the marine growth now present. Concerns were raised at the time of the 2009/10 inspection that 50% of the added weights on the diffuser were not effective due to deterioration of the tie-down components. Records provided by NPDC indicate that maintenance works have been focussed on addressing these anamolies, including the removal of tubeworm growths, the addition of corrosion protection, and clamps / tie-downs.

An analysis of the stability of the outfall under a numerically modelled wave climate carried out in 2010 concluded that it was marginally stable under a 10-year return period wave event from the north with all of the added weights secure and effective.

The latest inspection has revealed further loss or reduction of effectiveness of a number of the tie-down components, and the presence of significant areas of tubeworm growth on both the diffuser and the main pipeline. New Plymouth Underwater has made a number of recommendations in relation to maintenance.

Determining the design life of the pipeline, with or without the maintenance and improvements made over the years, is very difficult, due to a number of variable factors. Undertaking ongoing monitoring and maintenance to address tube worm growths, corrosion protection (anodes) and other issues with tie-downs, with “best endeavours” is the most pragmatic approach.

1 Introduction

1.1 Scope of Report

This report presents the results of a review of the visual underwater inspection of the Waitara Marine Outfall Pipeline undertaken by New Plymouth Underwater (NPU) on 20 March 2019 and recorded in their report of 3 May 2019 (Ref 1). The brief was to undertake a basic visual inspection of the pipeline, anchorage systems and diffuser system. Marine growth removal and any physical intervention work was not part of the scope. The inspection included the recording of a video of the diver's progress along the pipeline which is provided with the report. There is no commentary on the video, but a detailed log of observations and interpretations is provided with the report.

1.2 Limitations

This report is based on a review of the findings of reports provided by New Plymouth District Council covering the two latest outfall inspections of 2019 and 2009/10, and an assessment of the theoretical stability of the outfall pipeline under modelled design wave conditions prepared by OCEL Consultants NZ Limited in 2010. The findings of these reports which are listed as references are relied on as a valid basis for this review.

2 Background

The Waitara Outfall was constructed in 1977 and comprised a prestressed concrete pipeline secured to resist environmental loadings by a system steel clamps connected to steel piles driven into the seabed. A refurbishment providing the addition of concrete mass designed to provide adequate stability under design conditions independent of the piled supports was completed over 1993/4, and also included the insertion of a PE liner to the concrete pipeline and the addition of a concrete coated and lined steel diffuser ballasted with additional concrete components.

Regular inspection and maintenance was carried out on the pipeline at 3 to 5 year intervals subsequent to the refurbishment and until 2010. Observations from this period are summarised in the OCEL Consultants NZ Limited report dated 2010 which reports specifically on the inspection of that year. NPU personnel were involved in these inspections and the maintenance work arising, so are familiar with the history and details of the outfall and have access to the earlier inspection records.

According to available NPDC records, the following maintenance works have been undertaken since 2010:

Year	Summary of Works Undertaken
2019	• 3 diffusers cleaned and unblocked. Involved localised removal of marine growth, undoing flanges, cleaning out, putting diffuser back on and checking for flow. All were successful. • Anodes replaced at clamp locations 6 through 18. I think they actually mean that anodes were installed because they were never there in the first place (see notes further below). • The diver's maintenance report notes that the following need to be completed (but there is no indication that this has been undertaken yet): – Removal of tubeworm – Anode installation on all remaining clamp locations
2018	• Anode installation attempted but not successful because anode clamps were too small to fit onto the I-Beam piles and braces holding the clamps. • Marine growth cleaned from bracket locations 1 through 14.

Year	Summary of Works Undertaken
	• Small and large anodes installed at clamp locations 19 through 28.
2017	No information available
2016	• A procedure was developed to inspect and check flow performance of diffusers. The key concern here appears to be sediment and sand build-up. • Bolts replaced on clamps 21-26 • Diffusers 1 and 2 inspected. Diffuser 1 fully blocked to top of pipeline. Diffuser 2 had approx.. 20mm of gravelly material in base of pipeline
2015	• OCEL Consultants recommended that the outfall dispersion model be re-run with the impact of closing off ports 8, 12 and 16, and installing duck bills to see what impact this has on capacity and hydraulics within the pipeline. No information is available on whether this has been undertaken. • OCEL Consultants recommended that anodes on the clamps that do not have them (28 in total) be undertaken. • Tubeworms “cavi blasted”. It is not clear how much was removed but looks like they did at least 3 days of it. Subsequent minutes suggest about half of tubeworm replacement has been completed. • Hand cleaning of pipeline with scrapers. Noted that anode at bracket no. 1 had 65% remaining at the time. Clamp no. 5 had badly corroded clamp. Clamp no. 6 had outer half shell of clamp missing. • Replaced bolts on clamps 6 – 13. Clamp 10 identified to be in poor condition. Big clusters of tubeworms found between brackets 6 and 13.
2014	• Bag 17 inshore of diffuser 35 – drilled two anchor holes, grouted in anchors and took measurements for strop. • Block 7 – pack underneath with bags of cement to ensure no gap between pipeline and blocks for mobilisation of both blocks in extreme event. Approx 20 bags placed, additional bags required to complete. • Ditto for Diffuser 11. Packed 15 bags, another 6 required. • Diffusers 28-29 identified to have large gap that requires packing.
2013	• OCEL Consultants advised that diffuser cleaning may need to be done again in 4 years’ time • Saddles installed on diffuser section, some still to be done on old section • OCEL Consultants noted that the old “fabric system” (I think this refers to strops?) failed and this is the first time using anchors. The anodes would have a 5 year life, and easy to replace. A few old anchors are still to be replaced. • Inspection of bag at diffuser 35 for options. • Drilled bag 18 on seaward side of old diffuser. This bag had a fabric strop that required tightening. Epoxy grout in anchors and measure for cables to replace strop. • Attached G-clamp anodes to bag 17. • Drill, epoxy grout and order cables for bag 24. • Install cables and anodes at bags 18, 24 and 11 • Fir CP cable extension at bag 15 • Tighten loose cable at bag 13 • Anomaly report produced which showed that:

Year	Summary of Works Undertaken
	– Bag 1 and 2 has anodes missing – Bag 1 has 300mm gap between pipe and bag on one side – Bag 2 has loose wire strop – Bag 11 has loose wire strop – Bag 10 has 100mm gap between bag and pipe on one side – Bag 12 has loose wire strop • Recommended that the status of the old anchorage system be reviewed for maintaining it as a functional structural system and anode replacement. Compare estimates against a rock dump option for stabilising old pipeline.
2012	• Drilled bags at diffuser ports 28 and 33 (8 holes in total). Epoxy grout in anchors and measure for strops. Fit strops and anodes. • Strop and anodes fitted bag 11 diffuser 24 offshore • Anode and CP cable check at: – Bag 5 diffuser 8 inshore and offshore – Bag 8 diffuser 16 inshore and offshore – Bag 10 diffuser 20 inshore and offshore • Tubeworm sample obtained. Identified as Sabellaria kaiparansis, which builds a tube of sand particles. Apparently common around NZ coast. • Placed ear tags around diffusers up to diffuser 35 for diver location / reference • Appears that drilling and grouting occurred at a few bags • Keith Armstrong noted that tubeworm growth had been removed from diffuser section, but not the remainder of the outfall. • Drawings produced by OCEL of anchorages • OCEL Consultants undertook loading calculations and provided an email report to NPDC. Key takeaways are: – Identified that there is a 63% chance in a 10 year period of a northerly event (presume this means storm event) resulting in the outfall becoming unstable. This event presents the highest risk to the outfall. – However this calculation of the loading does not take into account any restraint provided be the original piled support system. – It is likely that an event has occurred in the lifetime of the outfall and it has not failed. – The existing piles must be providing some stability but this will deteriorate over time, and has not been allowed for in the design / stability calculations. These steel pile supports can be maintained as structural elements if anodes and closure bolts n the clamps are replaced.

The 1993/4 refurbishment project was intended to extend the design life of the outfall by 25 years, which would take its design life to year 2018. In reality, determining the design life of the pipeline, with or without the maintenance and improvements made over the years, is very difficult, due to a number of variable factors. As noted later in this report, undertaking ongoing monitoring and maintenance to address tube worm growths, corrosion protection (anodes) and other issues with tie-downs, with “best endeavours” is the most pragmatic approach. Further analysis should also be undertaken to confirm risks to the pipeline from ongoing deterioration and one-off events, so that a cost-benefit approach can be used to determine if it is worth pursuing further long-term maintenance and upgrade works.

3 2019 Inspection

3.1 General

The 2019 inspection was made in very good diving and visibility conditions and provides a good record of video, photographic and written summary of observations. Of particular note in reviewing these records is the degree of marine growth present and its limitation of inspection of detail. The inspection undertaken was arranged to provide an overview only, with no intervention to expose components previously reported as in deteriorated condition, and limited detailed inspection of components.

The systems of providing ballast to stabilise the pipeline consist of a variety of combinations of pairs of mass components placed either side of the pipe and connected to each other by tension components which pass over the pipeline and comprise synthetic fabric mats, nylon or wire strops. In many cases the detail and condition of connections of these components is concealed by marine growth but are required to be sound to provide continuing stability to the pipeline. For this reason, visual inspection provides an overview of structural integrity only, confirming that components are still in place but not necessarily providing confidence that they are in suitable condition to resist design loads that may only be applied at infrequent intervals.

3.2 Diffuser Section

The diffuser section has 35 vertical riser pipes bolted to flanges on the top of the main pipeline. NUW inspection reports that all 35 ports were noted as operational. This was confirmed by feeling that a jet of water was being ejected from each diffuser port, and is further evidenced by he movement of fluid at the diffuser ports in the inspection videos.

Connections of the risers to the main pipe flanges were mostly obscured by marine growth but barring physical damage caused by trawls or anchors, it is expected the cathodic protection provided by the anodes on the diffuser will maintain these components in serviceable condition. The anodes are connected to the steel pipeline component of the diffuser and 10 out of a total of 11 were recorded as secure and, by appearance, working satisfactorily.

Anchorage of the diffuser is provided by the combined mass of the concrete encased steel pipeline and the added mass components. The condition of the added mass components and their connections to the pipeline are reported as in satisfactory condition, noting our comments related to the marine growth above. NUW recognise this constraint and note that localised cleaning is required to allow full visual assessment. The weight block components that are connected to each other across the pipe with wire cables require cathodic protection to maintain the steel components including wire rope, shackles, turnbuckles, anchorages etc. Anodes and connecting cables for these items were observed and reported as sound. One section of saddle mat connecting grout bags either side of the diffuser pipe is noted as having partially failed, although it is not clear what proportion of damage is present, and removal of marine growth will be required to assess this. In general, the overall anchorage of the diffuser by tie-downs as reported by NPU appears reasonably sound.

Two sections of free-span are reported under the diffuser. The extent of these is not recorded, and is not able to be estimated from the video. The seabed in this area includes boulder bed with moving distribution of sediment, so such exposure can be expected to be evident from time to time. The pipe is a substantial structural member capable of spanning reasonable distances submerged without damage. Free-spans

should be quantified and monitored in conjunction with the pipe's structural capacity to assess the option of installing intermediate grout bag support at mid span.

Marine growth including significant build-up of tubeworm casing was observed on the diffuser and is prolific in places. This build-up, particularly the harder materials, attracts additional loadings from waves and currents and reduces the capacity of the pipeline components to resist these conditions. Build-up should be removed from diffuser risers, and the main pipeline, with care taken to avoid damage to saddle mats and securing components.

3.3 Transition Connection

The transition between the inshore prestressed pipeline and the diffuser comprises a short custom fabricated PE section to accommodate the change in alignment between the PE liner in the inshore prestressed concrete pipe, and the steel pipe component of the diffuser section. As pointed out in the NUW report this exposed PE section is the weakest structural component of the outfall and is shown as free-spanning between the two adjacent sections. It is not known whether the design provided for this, and in addition there is heavy general marine growth and tubeworm adding to its exposure. This section should be reviewed in terms of its structural capacity. The pipeline connections are reported as sound, and metal hardware components protected from corrosion by connection to sacrificial anodes.

3.4 Inshore Section

The inshore section comprises the original outfall pipeline running approximately 1115m inshore from the transition connection to the inshore manhole connection. The dive inspection covered the seaward 820m of this section to the seajoint beyond which the pipeline becomes buried and thus protected from hydrodynamic loadings.

The inshore section was originally secured to the seabed by 28 driven H piles on alternating sides of the pipeline which were connected to the pipe by substantial steel clamps. These are shown diagrammatically in the NPU report Section 6.2. When the outfall was refurbished in 1993 the contribution of these components to pipeline stability was disregarded and replaced with the provision of additional mass in the same manner as described above for the new diffuser. The piles and brackets, although theoretically redundant, were maintained for a number of years following the refurbishment with the replacement of bolts and anodes as required to retain effectiveness. This appears to have been discontinued over recent years with the inspection results identifying a number of anomalies related to the piled system identified. These include missing clamp components, damaged clamps and support brackets and many cases of missing anodes. The general degradation of these components suggests that the additional security they could provide to the pipeline stability is unreliable and indeterminate, and without concerted effort will continue to deteriorate.

The systems providing additional mass to the pipeline to provide stability on this section of pipeline comprise predominantly Type A configuration weights which are made up of fabric mats draped over the pipe with in-situ filled grout bags on either side. These are shown diagrammatically on the OCEL Consultants NZ Limited (OCEL) drawing in Section 6.1 of the NPU report, but the installation method means that the completed grout bags are closer to the pipe and the mats fit to more of the circumference of the pipe as can be observed in the video record. The recorded observations for the inspection of this section of the pipeline refer to four instances of failed saddle mats, and several more of partial tears and degradation. While this represents a small proportion of the tie down components on this 820m length of pipeline, it indicates the ongoing deterioration of these items. The widespread marine growth is also likely to obscure more similar instances that have been previously noted but not observed on this inspection.

Marine growth is widespread and substantial tubeworm clusters are distributed along the length of the pipeline.

4 Comparison with 2010 Inspection Report

The inspection immediately prior to the current 2019 NPU inspection was undertaken in May 2009 and January 2010 by OCEL in conjunction with NPU. The reports from these last two inspections presented in Ref 2 were compared to establish if there were any obvious changes in condition.

There are numerous differences in description of pipeline sections and components of the pipeline between the two inspection reports. The 2009/10 report comments on specific instances of tie down system types and failures or deterioration. Some of these components are reported in the 2019 report as secure but refer to only one tie down component where the 2009/10 report notes pairs of straps for the same component, with one set having failed. The 2009/10 report also refers to fill material in grout bags breaking down, and variable fill levels in grout bags, issues that cannot be identified by visual overview. One explanation for these discrepancies is that significant repairs that we are not aware of have been made between the two inspections to restore effectiveness of some of the components. One example of this possibility is the presence of grout bags on the diffuser pipeline which were not mentioned in the earlier report. Another explanation is that with time and changes in personnel a lot of the detailed history and knowledge of the condition and performance of different tie down components, and progressive repairs and stabilisation work, has gradually been diluted.

Both reports present a similar overall picture of gradual loss of effectiveness of pipeline ballast required to meet design stability conditions, and proliferation of marine growth including large outcropping of tubeworm colonies which add significantly to the pipe outer cross section.

The 2009/10 report provides some technical assessment and discussion of the status of the outfall at that time in relation to the design capacity. For the diffuser alone, it was estimated that of the added weight required for the pipeline to remain stable in the 100-year design condition less than 50% was reliable. The view presented by OCEL was that the types of failure to tie-down systems were progressive once initiated, with ongoing wave induced loadings inflicting further damage to loosened or torn components. The work undertaken since 2010 (as noted in Section 2), to install new tie-downs and connections, and improve cathodic protection, will have gone some way to restore the integrity of the pipe. However, precisely measuring the degree of improvement would be very difficult, even with further dive inspections to confirm the effectiveness of the improvements.

5 OCEL 2010 Stability Assessment

OCEL was commissioned by the Waitara Outfall Management Board to undertake a theoretical check of the stability of the Waitara outfall. The assessment done was based on a separate assessment to define the design wave conditions at the outfall site undertaken by MetOcean Solutions Limited, which used numerical modelling techniques to determine a hindcast based wave climate from which wave loadings on the pipeline could be derived for various return periods. Using these inputs and the current velocities used in the original design, OCEL undertook an assessment of the stability of the outfall pipeline with the added weights as designed for the 1993/4 refurbishment.

The conclusions presented in the 2010 OCEL report (Ref 3) were that with the added weight applied during the refurbishment being fully effective, the stability of the outfall is marginal in a high wave event from the north in excess of a 10-year return period. The outfall was considered to be stable in the design required 100-year return period maximum wave events from the west provided the installed weights are effective, and

tubeworm growth is not present. The greater stability of the outfall under waves from the west is the result of waves from that direction being more closely aligned with the pipeline, compared with the waves from the north which apply a greater transverse component of loading to the pipeline.

The effects of tubeworm growth are discussed in the report, with increase in pipe diameter caused by tubeworm growth of the scale observed having the potential to increase hydrodynamic forces on the bare pipeline (the design basis) by 100 %, and inertia forces by 300%. For this reason, the presence of well-established and extensive tubeworm growth is considered a serious issue in stability. As noted in Section 2, efforts have been made to remove tubeworm growth since 2010. However, the extent of removal is not entirely clear, and will be an ongoing issue to manage. Therefore, given the seriousness of tubeworm growth to outfall stability, removal of tubeworms will need to be a high priority and regular maintenance item.

In terms of the performance of the tie-down components the OCEL report points out that significance of the ties between pairs of weights on opposite sides of the pipeline is not in holding the pipe down under wave loading, but rather in ensuring that both weights are mobilised in resisting lateral movement of the pipe.

6 Conclusions

The NPU report presents the record of a visual inspection only of the Waitara outfall pipeline as required by the brief. The inspection was carried out in very good diving conditions and provides a valuable up-to-date record of the condition of obviously visible features, and identifies a number of anomalies related to the connection of added weight components, original piled anchorage supports, and the proliferation of marine growth. Extensive marine growth including tubeworm colonies obscures much of the detail recorded during earlier inspections related to the effectiveness of connection of weight to the pipeline. Assessment of the overall security of the outfall requires more information in relation to these issues, although it must be recognised that because of the nature of the components and the environment, and the work required to fully establish the condition, realistic assessment is unlikely to be achieved.

The review of the theoretical stability of the pipeline carried out by OCEL for the Waitara Outfall Management Board in 2010 concludes that the refurbished outfall (added diffuser and ballast weight in 1993/4) was only ever marginally stable under a 10-year design condition of waves from the north. However, this assessment ignored the contribution of the piled clamp supports, which should be providing some additional stability support. Any reduction of the effectiveness of the added weight as has been identified as anomalies by NPU, and the previous 2009/10 inspection reduce this stability.

The work in the interim period between the 2010 and 2019 reports has been focused on at least maintaining the structural stability of the outfall pipeline, and made improvements to problems identified in 2010. Determining whether this has substantially increased the design life of the pipeline would be very difficult to ascertain.

Neither the latest NPU inspection nor the previous inspection has identified signs of movement or evidence of instability of the outfall, although it must be realised that while the design wave conditions have been identified on statistical return periods, damaging events can be expected in any year.

The latest inspection has revealed loss or reduction of effectiveness of a number of the tie-down components, and the presence of significant areas of tubeworm growth on both the diffuser and the main pipeline. New Plymouth Underwater has made a number of recommendations in relation to maintenance. The most immediate of these are:

1. The removal of tubeworm and encrusted marine growth

2. Exposure and monitoring of damage and deterioration of saddle mats and grout bag weights. Rather than the cutting and removal proposed by NPU, the priority should be the maintenance of the effectiveness of these tie-down components by repair or installation of alternative fixings.

In addition, Beca propose the following additional items:

3. Undertake further stability analysis and risk assessment, within the constraints of available information and the particular as constructed configuration of the supports, with particular attention to the following:

    a. Assessment of the structural capacity of the PE transition section inshore of the diffuser in relation to the requirement for provision of additional support over this section.

    b. Measurement of freespans as a basis for ongoing monitoring and review of limits of structural capacity of loaded sections.

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15. Meeting Minutes of Waitara Outfall Management (WOM) Group, 30 August 2012
16. Meeting Minutes of Waitara Outfall Management (WOM) Group, 8 June 2012

17. Meeting Minutes of Waitara Outfall Management (WOM) Group, 9 March 2012
18. Meeting Minutes of Waitara Outfall Management (WOM) Group, 24 February 2012
19. Meeting Minutes of Waitara Outfall Management (WOM) Group, 20 October 2011
20. Meeting Minutes of Waitara Outfall Management (WOM) Group, 7 April 2010

Appendix IV

Motunui cooling tower plume abatement feasibility report

December 23, 2019

Taranaki Regional Council
Private Bag 713
Stratford

Attention: Helen Gerrard

MOTUNUI COOLING TOWER PLUME ABATEMENT FEASABILITY
5 – YEARLY REPORT (2019)

Introduction

This report is being provided to satisfy clause 5 of consent 4042-3 – Consent to Discharge Contaminants into the Air from the Motunui Methanol Plant. At the time of the last report (2014) WorleyParsons was commissioned to carry out a comprehensive report which studied plume abatement feasibility for the tower, and this was lodged with TRC. Since that time, the cooling tower operation and cooling water requirements at the site have remained unchanged and the technology available, with its associated costs, are still valid. Additionally, Methanex has continued to receive no complaints regarding the plume during this reporting period.

In the 2014 report, the following options to minimize the visibility of the plume were analysed:

- Retrofit existing cooling tower
- New cooling tower
- Installation of 'helper' cooling towers

The proposed plume abatement options were all assessed as being neither practical or economically justifiable and also a large amount of energy would be required to reduce what is essentially a visible effect.

Plume Abatement Analysis since 2014

In the duration since 2014, Methanex has concentrated its efforts on increasing the efficiency of the cooling tower, working with engineers from the cooling tower consultants Breezewater (Australia). Four options were considered:

1. Cell refurbishment to original condition
2. Cell refurbishment to original condition including plume abatement technology
3. Cell refurbishment to original condition to accommodate plume abatement in the future
4. Cell replacement with a new design that includes plume abatement technology

The cost to install plume abatement on the existing cooling tower is estimated at NZ$31 million (options 2 and 3, with cell refurbishment cost not included). Option 4 would require NZ$40million investment, this includes a new cooling tower and basin (additional cost of demolishing existing cooling tower not included).

These options were discounted for the same reasons as stated in the 2014 report, with a further study being made into refurbishing the tower to the original condition (option 1)

Cooling Tower Efficiency and Refurbishment Programme

The cooling tower is made up of 18 cells and was originally designed to satisfy the cooling water demands of three plants (two crude methanol plants and the associated Methanol to Gasoline plant). From 2012 the Motunui plant has been operating a full rate (without the Methanol to Gasoline plant, but with methanol distillation load), and this is 80% of the original design cooling load requirement.

Since 2014, Methanex has investigated the performance of the cooling tower and this has established that efficiency was being lost due to blocked fill pack. Based on this assessment a decision was made to implement a programme which progressively upgrades the tower, while the plant is still in operation. This will increase the efficiency per cell, with an associated possibility of reducing the total cells used in the tower in the future.

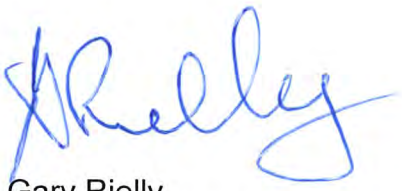
This upgrade was begun in in March 2014 and is refurbishing the cooling tower cell by cell to bring it back to full efficiency, using the latest and more thermally efficient fill materials available. To date two cells have been refurbished with a further three currently in progress, using Breezewater as the advisors and suppliers The method currently being used is off site fabrication of the cells then bringing them to site in modules, demolishing the existing cells and installing the new ones in modules. All mechanical equipment is re-used.

As the tower was originally designed for a larger cooling load requirement, and with the upgrade in thermal efficiency of the tower, less than 18 cells may be able to meet the cooling duty required when the refurbishment is completed. As the tower is progressively upgraded, a detailed assessment will be carried out to ensure less cells will still satisfy the cooling water circulation loading, while maintaining cooling water supply temperatures at design ambient conditions.

Conclusion

It is acknowledged that for a cooling tower without plume abatement the visible plume is mostly dependent on the atmospheric conditions at the time; that is the plume is visible on cold and still, or very humid days. However, as a significant plume reduction from the existing Motunui cooling tower would require a disproportionate investment, with a running cost increase of power between 50% to 100%, Methanex's position continues to be that this is not a practical or sustainable option. This is primarily due to the consideration of the large additional amount of power required to operate a tower with plume reduction technology fitted, along with the environmental aspects of the associated generation and transmission, and with the installation costs taken into account, to reduce what is essentially a visual effect.

As an alternative, Methanex is progressing with the refurbishment of the existing cells of the cooling tower, including the installation of more thermally efficient fill. It is envisaged that this will result in an increase in total evaporation for a given set of atmospheric conditions (ambient temperature and humidity), with an associated small, but noticeable, reduction in the effect on the visual effects of the plume from the tower.



Gary Rielly
Methanex NZ Ltd.

Appendix V

Consent breach – Methanol limit exceedance in stormwater and wastewater discharge

Methanex New Zealand

Incident Investigation Report

Waitara Valley Wastewater Exceeding Methanol Limit + Stormpond Discharged to the Waitara River

3rd July 2019

Incident Details:

Incident Title:	Waitara Valley wastewater composite sample exceeding methanol limit + WV wastewater discharged to Waitara River with methanol exceedance
Incident Number:	IN-TAR-20190703-001 + IN-TAR-20190703-002
Incident Date:	03/07/19
Location:	Waitara Valley
Investigation Team:	**Ben Lawn, Terry Richardson**

Incident Summary:

On the 19th June 2019 a methanol leak occurred in Distillation 2 at the Waitara Valley Plant which resulted in methanol draining to the stormpond. Exporting of wastewater to the Waitara Marine Outfall was immediately ceased and the stormpond was placed on recirculation. A subsequent grab sample of the stormpond showed a methanol result of 580 ppm being present which is above the resource consent limit of 15 ppm. An air compressor was put in place to provide further aeration of the pond and bacteria was added to promote biodegradation.

The stormpond and checkpond both began to reach full capacity over the next 11 days and exporting to the outfall was required to begin before the methanol was able to be reduced to an acceptable amount. This resulted in the composite sample exceeding the methanol limit of 15 ppm from the 3/07/19 – 7/07/19 with results of 29 ppm, 28 ppm, 29 ppm, 19 ppm and 16 ppm respectively.

During this period there was also heavy rainfall which resulted in the wastewater export pumps being unable to keep up with the amount of stormwater being received in the stormpond. Due to this the decision was made for the stormpond to be discharged to the Waitara River with the methanol being above the limit of 15ppm (result of 71 ppm of methanol prior to discharge).

The leak of methanol to the stormpond resulted in an exceedance of the consented wastewater discharge methanol limit. Methanex notified this incident to the Taranaki Regional Council (TRC) and maintained communication as it occurred. This investigation report details the timeline of the event and the causal factors, with associated corrective actions to prevent a reoccurrence and ensure improvement.

Figure 1: Aerial image of the Waitara Valley Plant showing the pipeline from the stormpond to the Waitara River

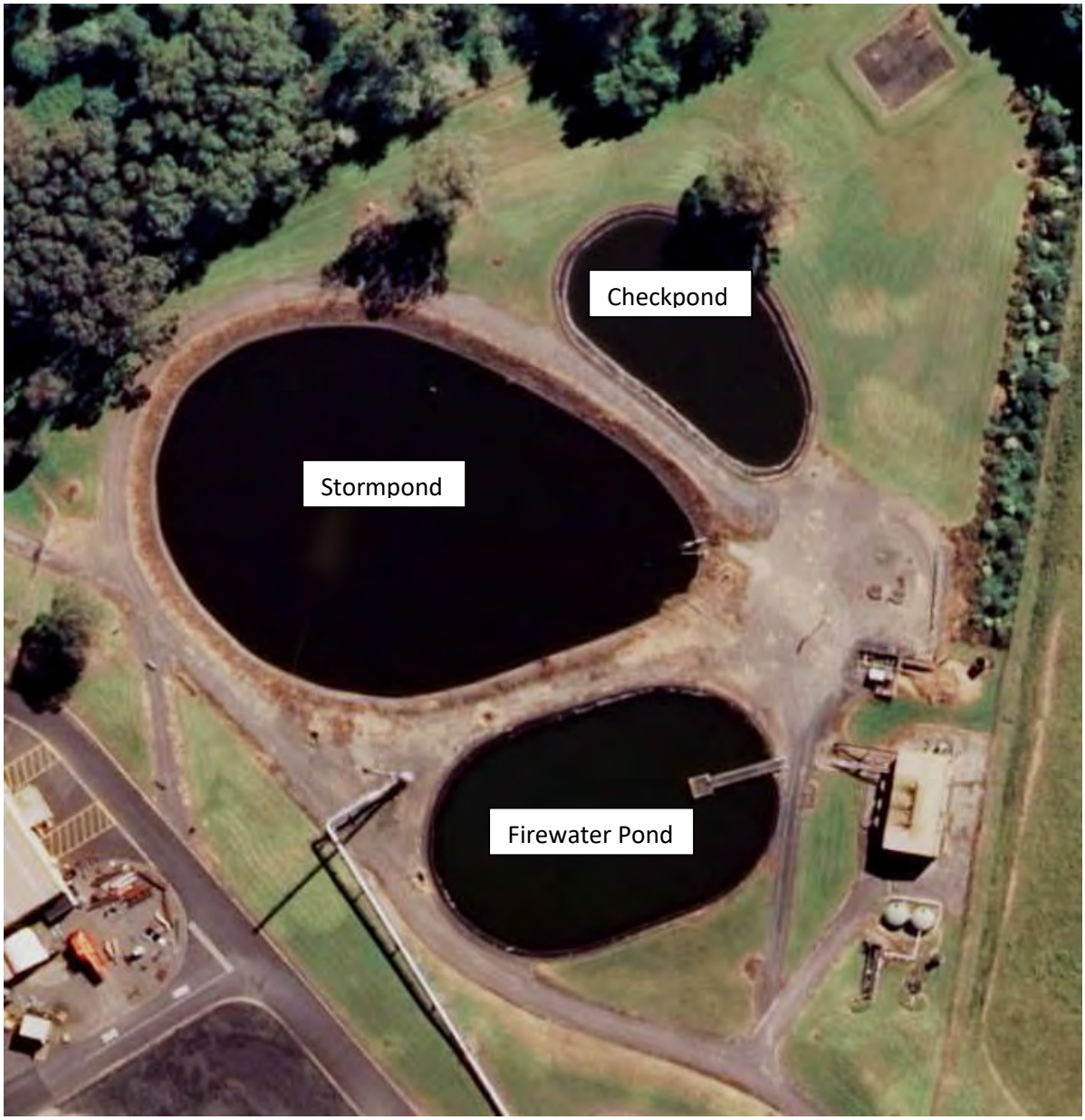


Figure 2: Aerial Image of the Wastewater System Ponds

Wastewater System Overview:

The wastewater system is comprised of two ponds, the stormpond and the checkpond. The stormpond is a 14,000 m3 pond which receives the wastewater from plant operations as well as the rainwater from all paved areas of the Waitara Valley site. During normal operations the stormpond is pumped into the checkpond which has a capacity of 2000 m3 where it is tested prior to discharge to ensure the wastewater is within the consent limits.

The stormpond and the checkpond are both able to be recirculated via recirculation pumps as well as be discharged to the outfall. When either pond is being exported a composite sampler operates and takes a sample for analysis. Both ponds have the ability to be mixed together and the stormpond can be mixed with the nearby firewater pond. The stormpond is also able to be discharged to the Waitara River through a gravity fed pipeline. Before this is performed a grab sample is taken as the pipeline does not operate through the composite sampler.

Incident Timeline (key moments):

19th June – Methanol leak on Distillation 2 header box gasket occurs resulting in methanol entering the stormpond. The stormpond was placed on recirculation and exporting to the outfall was ceased. Subsequent testing of the stormpond show 580 ppm of methanol was present.

20th June – 1st July – The stormpond continued to be recirculated with no exporting to the outfall. The checkpond was exported to outfall due to no methanol being present. An air compressor and tubing was set up within 24hrs to allow for further aeration of the stormpond, and bacteria was added to promote biodegradation of the methanol.

The stormpond was diluted with the firepond, and wastewater was also pumped to the tank bunds to allow for extra capacity and delay the need to export the stormpond for as long as possible. During this period the stormpond reduced to 140ppm of methanol.

On the 30th the Operations Shift Team Leader advised the Environmental Adviser that the stormpond was reaching full capacity and would be required to be exported soon to prevent an uncontrolled overflow of the pond. It was decided that the exporting of the stormpond would commence when needed to prevent this. The checkpond was continued to be exported to the outfall as this was uncontaminated. The Environmental Adviser informed the TRC of the situation through the environmental hotline and email to the site contact, detailing the steps taken and the likelihood that the stormpond would be exported soon to prevent and overflow.

2nd July – The stormpond reached maximum capacity and exporting to the outfall was required to begin. The stormpond had a methanol level of 110ppm. The stormpond was mixed with the checkpond for ~3 hours to allow for further dilution and exported to the outfall.

3rd July – The composite sample returned a methanol result of 29 ppm which exceeds the consent limit of 15 ppm (3399-2). The stormpond was continued to be recirculated and aerated while the checkpond was exported to the outfall.

Heavy rain occurred which resulted in the stormpond increasing faster than the pumps could export to the outfall.

After discussion between the Assistant Operations Manager, Environmental Adviser and Operations Shift Team Leader it was decided that due to the heavy rain the stormpond would need to be discharged to the Waitara River under consent 0802-2 to prevent an uncontrolled overflow. A grab sample was taken of the stormpond and analysed for methanol, TSS, pH and hydrocarbons in preparation of the need to discharge the stormpond to the Waitara River. The methanol of the stormpond was 84 ppm at the time (all other parameters were within limits). The TRC were notified of the situation by the Environmental Adviser as per the conditions of consent 0802-2.

4th July – The stormpond was released to the Waitara River at 0500hrs due to the pond reaching maximum capacity. A grab sample was taken before the discharge with a methanol result of 71 ppm.

The stormpond and checkpond were continued to be exported to the outfall in conjunction with the stormpond being discharged to the river to reduce the level of the ponds as much as possible. The composite sample returned a methanol result of 28 ppm.

5th July – The heavy rain had ceased and the stormpond was able to stop being discharged to the Waitara River at 1700hrs.

The stormpond and checkpond were continued to be exported to the outfall to bring the ponds down to a manageable level as they were still at a high level. The composite sample returned a methanol result of 29 ppm.

6th July - The stormpond and checkpond were continued to be exported to the outfall. The composite sample returned a methanol result of 19 ppm.

7th July – The stormpond was placed on recirculation and the checkpond was continued to be exported. The composite sample returned a methanol result of 16 ppm.

8th July – Stormpond and checkpond were continued to be exported to the outfall. The composite sample returned a methanol result of 2 ppm.

What Should have happened:

The methanol leak should have not occurred; however the leak should have been contained within the stormpond and naturally degraded to be within consent limits before any discharge occurred.

What actually happened:

The leak resulted in the stormpond being above the limit for methanol content. The stormpond and checkpond filled to full capacity before the methanol was able to be degraded to be within the consent limit of 15 ppm. To prevent an uncontrolled overflow the stormpond and checkpond were discharged to the outfall with a maximum of 29 ppm of methanol. Heavy rains then occurred which resulted in the ponds filling faster than the pump was able to export to the outfall. To prevent an uncontrolled overflow the stormpond was released to the Waitara River for 36 hours with a maximum of 71 ppm of methanol. The TRC were notified and kept informed of this incident throughout the process.

How did this happen:

The resulting methanol in the stormpond was managed within the ability of the plant. The strategy for reducing the contamination involved recirculation, aeration and dilution of the stormpond, the addition of bacteria and implementing additional storage. However the low winter temperatures at the time of the contamination meant that biodegradation was subsequently reduced, resulting in the methanol decreasing at a slower rate than expected. Due to this the ponds eventually reached full capacity before the methanol was able to be reduced below the consent limit, and the decision was made to discharged to the outfall to prevent an overflow.

The stormpond was required to be discharged to the Waitara River when heavy rainfall occurred. This has happened infrequently over the winter periods where the rainfall results in the stormpond

filling faster than the export pumps can discharge the wastewater to the outfall, and a gravity discharge to the Waitara River is required. In this case there was heavy rainfall however the export pumps were operating at a reduced capacity which contributed to the need to discharge to the river. New export pumps were installed in 2015 as part of the upgrade to the outfall pipeline joining into the Motunui pipeline. Since the installation the export pumps have not been able to operate at the previous capacity.

Key Investigation Findings and Conclusions:

The cause of the D2 leak was investigated separately to this incident and determined the causal factor to be due to an incorrect gasket being installed on the D2 overhead air condenser. This resulted in a failure which allowed a methanol leak to occur which subsequently went to grade and drained to the stormpond. At present a technical review is being performed on the gasket composition and once complete further corrective actions will be developed based on the review findings.

There is an opportunity to also review the current wastewater system at Waitara Valley and determine if there are improvements to be made in the management of a contaminated stormpond based upon this incident. It is recommended that the wastewater system is reviewed for improvements, and a strategy documented from this, outlining the operational steps to take in the event of a contamination of the stormpond. It is recommended that the plant change request (PCR) for the previous installation of new wastewater export pumps is reviewed and an investigation into the current underperforming export pump capacity is undertaken to identify a cause and solution.

A team will be assembled to perform these reviews of the wastewater system and the current discharge capacity of the export pumps. The findings of this will form corrective actions or opportunities for improvement to ensure that any further incidents of this nature are prevented.