Methanex Motunui and Waitara Valley Combined Monitoring Programme Annual Report 2013-2014

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Taranaki Regional Council
Private Bag 713
STRATFORD

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Executive summary

Methanex New Zealand Limited Ltd (Methanex) operates methanol production facilities located at Motunui and Waitara Valley, in the Waitara River catchment. The Motunui facility restarted methanol production in October 2008 after four years of the plant lying idle. The Waitara Valley plant was laid up in November 2008 soon after the restart of the larger Motunui facility. The Motunui facility was operating at approximately 50% production up until 2012. A restart of the Waitara Valley plant took place in October 2013 and presently both plants are operating at near full production.

This report for the period July 2013–June 2014 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess Methanex's environmental performance during the period under review, and the results and 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; an unnamed tributary of the Waitara River; 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.

Resource consent 3399-2 for the discharge of effluent from the Waitara Valley plant to the Tasman Sea, was varied during the monitoring year. The variation was in anticipation of the restart of this plant and included some changes to consented water treatment chemicals.

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

The Council's monitoring programme for the year under review included two site inspections, continuous self monitoring by Methanex (specifically involving analysis of water samples collected for physicochemical analysis), review of regularly provided consent holder data, two inter-laboratory comparisons and one inspection relating to the Resource Management (for Measurement and Reporting of Water Takes) Regulations 2010. An incident investigation was also undertaken at the site.

The monitoring showed that Methanex operated both plants 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. There were two incidents recording non-compliance in respect of Methanex's Waitara Valley plant during the period under review. These related to the discharge of sulphuric acid from pipework to the ground below the Waitara Valley plant and the discharge of plant wash water at the same point immediately following the first incident. Both incidents resulted due to the poor state of repair of the contingency containment.

During the year, Methanex demonstrated an overall high level of environmental performance with the resource consents at its Motunui facility. An improvement in Methanex's environmental performance is desirable at the Waitara Valley plant due to the two incidents

that occurred during the monitoring period. The administrational level of compliance with their consents was high at both the Motunui and Waitara Valley sites.

For reference, in the 2013-2014 year, 60% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 29% demonstrated a good level of environmental performance and compliance with their consents.

This report includes recommendations for the 2014-2015 year, including a recommendation relating to an optional review of 10 of the 11 consents.

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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 the annual report for the period July 2013 to June 2014 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by Methanex New Zealand Limited (Methanex). This Company was formed on the first of January 2015, when the two previously separate Methanex companies (Methanex Motunui Limited and Methanex New Zealand Limited) were amalgamated.

Methanex operates a methanol production facility located on the coast at Motunui, close to Waitara, and a second plant located in the Waitara Valley. Both plants are situated in the Waitara River catchment. Together these plants can produce up to 6,500 tonnes of methanol a day.

This report covers 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 34th 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 compliance monitoring under the RMA and the Council's obligations and general approach to monitoring sites though annual programmes, the resource consents held by Methanex in the Waitara River catchment, 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 sites.

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 2014-2015 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 *Resource Management Act 1991* (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);
(e) risks to the neighbourhood or environment.

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

1.1.4 Evaluation of environmental and administrative performance

Besides discussing the various details of the performance and extent of compliance by the consent holder during the period under review, this report also assigns a rating as to Methanex's environmental and administrative performance.

Environmental performance is concerned with actual or likely effects on the receiving environment from the activities during the monitoring year. **Administrative performance** is concerned with 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 significant environmental impacts and was not obliged to issue any abatement notices or infringement notices in relation to such impacts.

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

  For example:

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

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

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

Administrative performance

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

- **Good** Perhaps some administrative requirements of the resource consents were not met at a particular time, however these are 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 2013-2014 year, 60% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 29% demonstrated a good level of environmental performance and compliance with their consents.

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 plant 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 plant 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 the Company than its current operation of conversion of methanol to petrol. As a consequence the synthetic petrol part of the plant was de-commissioned and dismantled in October 2008 following a four year period during which the plant had remained idle. One production unit, Methanol 2, was restarted in 2008 and the restart of Methanol 1 took place in 2012. Presently the plant operates at full capacity.

The Waitara Valley plant was originally established by Petralgas Chemicals NZ Limited (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 plant changed ownership to Petrocorp and Fletcher Challenge Methanol until 1994 when Methanex Motunui Limited gained ownership of the plant. In 1989, a second distillation tower was installed at the plant to enable crude methanol supplied from the Motunui plant to be processed into high grade methanol at the Waitara Valley plant. The construction of two methanol distillation towers at the Methanex Motunui site in 1994 and 1995 led to modifications of the Waitara Valley plant, to allow transfer of crude and refined methanol between the two

sites and the port. The Waitara Valley plant 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 plant 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 under pressure (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 the Waitara Valley plant and two at the Motunui plant which are used to carry out this process.

1.3 Resource consents

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

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. Methanex currently holds two abstraction consents for the Waitara River.

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. Methanex currently holds five water discharge consents. One consent, permitting the discharge of treated wastewater and stormwater was varied during the monitoring period.

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. Methanex currently holds two air discharge consents.

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. Methanex no longer holds a consent for the discharge of contaminants onto land as sludge disposal is undertaken as a permitted activity under the Regional Freshwater Management Plan .

A summary of the consents presently held by Methanex in relation to activities at its Motunui and Waitara Valley sites is given in Table 1 below. Where separate consents are held for the same activity at the different sites, these consents typically share similar or identical conditions. Further detail on Methanex's consents is provided in section 2 and 3 of this report. A copy of each of the consents can be found in Appendix I.

Table 1 Summary of consents presently held by Methanex

Consent	Purpose	Site to which the consent relates
0820-2	Water take from Waitara River	Motunui
0822-2	Discharge uncontaminated stormwater to Waihi and Manu streams	Motunui
0825-3	Discharge uncontaminated stormwater to an unnamed tributary of the Waitara River	Motunui, at the Motunui intake
0827-3	Discharge wastewater to an unnamed tributary of the Waitara River	Motunui, at the Motunui intake
3400-2	Discharge treated wastewater and stormwater to the Tasman Sea	Motunui
4042-3	Discharge contaminants to air	Motunui
0801-2	Water take from Waitara River at two locations	Waitara Valley
0802-2	Discharge stormwater to the Waitara River	Waitara Valley
3399-2	Discharge treated waste water and stormwater to the Tasman Sea	Waitara Valley
3960-2	Construct rock groyne in the Waitara River	Waitara Valley
4045-3	Discharge contaminants to air	Waitara Valley

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the RMA sets out obligations upon the Council to gather information, monitor, and conduct research on the exercise of resource consents, and the effects arising, within the Taranaki region and report upon these.

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

The monitoring programme for the Motunui and Waitara Valley sites previously ran from 1 January to the 31 December. In 2013 the programme was amended and now runs from 01 July to 30 June. As a result of this change some of the required information obtained from the consent holder has not been received within the 2013-2014 monitoring year. This information will be reported on in 2014 -2015 compliance monitoring report.

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

1.4.3 Site inspections

Both the Motunui and Waitara Valley sites were visited four times during the monitoring period. An additional inspection of only the Motunui facility was undertaken at the end of the monitoring period to determine compliance with the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010. Site visits mainly involved compliance inspections and the taking of 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 the consent holder 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 environmental performance. The data gathered is reported to the Council on a monthly 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 plant was measured continuously. Monthly reports detailing wastewater and stormwater discharge rates, volumes and composition were provided by Methanex to the Council. Plant effluent was monitored for a number of parameters with frequencies ranging from continuously (flow and pH) to monthly (trace metals). Abstraction of raw water from the Waitara River and effluent discharges at the Waitara Valley plant occurred sporadically during the first few months of the monitoring year due to the restart, thereafter monitoring was continuous.

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.

Air emissions

Methanex is required to supply Council with a report every two years addressing air emission issues from the Motunui plant. 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. A biennial report for 2008 and 2009 was received in 2010. A second biennial report was received in August 2012 covering the 2010 and 2011 years. The next biennial report is expected in 2014 and should cover the monitoring, developments and investigations undertaken in 2012 and 2013.

Methanex is also required to supply Council with a report every five years addressing advances in technology to minimise the effect of the Motunui plant's water vapour plume. This report is a requirement of consent **4042-3** (granted in April 2008). The last report was received in 2009, and the next report will be due in 2014.

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 first report was received in March 2010 and the second report was received in August 2012. The next report is due in 2014. These reports cover developments and initiatives over the two preceding 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 new requirement of consent **0820-2** and **0801-2** (granted in April 2008). The first report was due in 2013.

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 provided to the Council last in May 2012 and a review of these is expected again in 2014.

Marine outfall
Every five years Methanex is required to supply Council with certification of the integrity and dilution performance of the marine outfall pipe. This report is a new requirement of consent **3400-2** and **3399-2** (granted in April 2008). The first report was due in 2013. Methanex have had discussions with Council with regard to this work due to a number of issues. This report has now been received during this monitoring period.

Treated stormwater and waste water annual report
Methanex is also required to supply Council with a report annually addressing their marine waste treatment plan. This is a requirement of consent **3400-2** and **3399-2** (granted in April 2008). The last report covered the 2008 year, and was received in 2009. 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 Waitara Valley methanol plant and the Motunui plant were taken simultaneously by the Council and Methanex. Both laboratories analysed the samples for parameters relevant to the consents and the results were compared.

2. Motunui

2.1 Process description

The Motunui 'Methanol 2' plant (shown below in Photo 1) was restarted and began to produce methanol in October 2008 after lying idle for four years. The Motunui 'Methanol 1' plant began producing Methanol again in July 2012. Increased monitoring was implemented during that restart. The monitoring was reduced back to normal levels during the 2013 to 2014 monitoring period.

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

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 waste water 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 waste water 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.

Domestic effluent was pumped to a New Plymouth District Council sewer line for treatment at the Waitara Wastewater Treatment Plant.

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 the "Duck 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 was removed later after drying out over the 2007 summer. All of the sludge was disposed of at Redvale landfill at that time.

With the plant running at full production again, two 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 two sludge ponds will be 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 when the plant recommenced production. 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.

Energy efficiency and usage
The integrated nature of the plant allows energy recovery and utilisation. At the same time, a large amounts 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 the Company 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 were 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 plant is shutdown, as these facilities are in constant use. The solid wastes are placed in the sludge lagoons at the south eastern corner of the site and are allowed to dry. The dried sludge and on occasion spent catalyst and resin, have in the past been disposed of to land in a consented area owned by Methanex just outside the site boundary fence, northwest of the plant site. The last sludge disposal occurred in 2000.

In 2004 the majority of the sludge disposal area was sold to Shell Todd Oil Services and has since been used as part of the Pohokura Production Station development. With the restart of the Motunui plant it is intended to use two of the four sludge lagoons 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 and spent ion exchange resins) 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.

Figure 2 Major process air emission sources at the Motunui plant

2.2 Resource consents

Methanex currently holds six resource consents for the operation of its Motunui petrochemical plant. A summary of the requirements imposed by each of the consents is provided in Sections 2.2.1 to 2.2.4 and copies of the resource consents are included in Appendix I.

A list of the consents currently held by Methanex during the monitoring period in relation to the Motunui plant is given in **Error! Reference source not found.**.

The early consents for this site were granted to New Zealand Synthetic Fuels Corporation Limited as National Development (New Zealand Synthetic Fuels Corporation Limited) Order 1982 under the National Development Act 1979. In May 1993, the consents were transferred to Methanex Motunui Limited, following the merger of Fletcher Challenge Methanol and Methanex Corporation Canada.

Consents 3400, 0820, 0825, 0827 and 4042 were due to expire during 2008 and 2009. These consents were renewed in 2008. Consent 0822 expired and was renewed in 2012. Consents 1244 and 1245 related to taking ground water and discharging ground water to the Waihi and other streams for the purpose of ground stabilisation and protecting the plant against seismic hazards. These consents expired in 2009 and were not renewed. Consents 4543 and 4640 related to air emissions from the methanol distillation process. These were surrendered by Methanex as they were superseded by the new air discharge consent 4042-3.

Table 3 Consents held in relation to the Motunui plant, January 2010 - June 2013

Consent	Granted	Review date	Expiry date	Purpose	Volume (m^3/day)
0820-2	29/04/08	30/06/15	1/06/21	Water take from Waitara River	33,600
0822-2	29/11/12	1/06/15	1/06/27	Discharge uncontaminated stormwater to Waihi and other streams	-
0825-3	31/03/08	1/06/15	1/06/21	As above	-
0827-3	31/03/08	30/06/15	1/06/21	As above	-
3400-2	29/04/08	30/06/15	1/06/21	Discharge treated plant effluent and contaminated stormwater to Tasman Sea	12,096
4042-3	12/02/08	30/06/18	1/06/28	Discharge to air from methanol and gasoline manufacture	-

2.2.1 Water abstraction permits

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

Consent 1244 for the abstraction of groundwater of up to a maximum of 5,184 m^3/day (60 l/s) expired on 1 June 2009. The consent was issued for the purpose of the site de-watering to minimise the risk of substrate liquefaction in the event of seismic activity. Methanex ceased exercising this consent on 5 December 2004 and with current scientific knowledge, the abstraction is no longer considered necessary for stability of the plant during seismic activity. Redundant infrastructure pertaining to this consent may still be seen around the Motunui site.

Methanex holds one consent to abstract surface water for use at the Motunui site as described below.

Consent 0820-2: Abstraction from Waitara River
Methanex holds water permit **8020-2** for the abstraction of water from the Waitara River for use in the Motunui methanol production plant. This permit was issued by the Council on 29 April 2008 under Section 87(d) of the RMA. It is due to expire on 01 June 2021.

Consent 0820-1 was originally granted in October 1981, originally for an abstraction rate of between 370 and 500 l/s depending on river flow volumes. The point of abstraction is on the true right bank, 10 kilometres from the sea. River flow volumes are measured at the Bertrand Road gauging site two kilometres downstream of the abstraction point.

A variation to the consent was granted in December 1986, permitting an additional 130 l/s. Additional requirements imposed by the conditions of the variation related mainly to monitoring and provision of information. Consent 0820-1 expired on 12 March 2009 and was superseded by renewed consent 0820-2.

A further variation to this consent was granted on 15 November 2005 to allow Methanex to supply water abstracted under this consent to Shell Todd Oil Services for their horizontal directional drilling associated with the development of the Pohokura field. The purpose of the varied consent was changed to read:

> "*To take from the Waitara River a maximum quantity of 130 l/s (in addition to the 370 l/s permitted by the National Development (New Zealand Synthetic Fuels Corporation Limited) Order 1982) at times when the river flow at the Bertrand Road gauging station is greater than 6,000 l/s, for the purpose of water supply to the Methanex site and the adjacent Pohokura Horizontal Directional Drilling site*".

The conditions of the consent were unchanged.

Consent 0820-2 includes seven special conditions.

Special conditions 1 and 2 of this renewed consent set out a maximum rate of abstraction of 1,400 m^3/hr (approximately 390 l/s) when the flow rate of the Waitara River measured at Bertrand Road is greater than 4,600 l/s. No water is to be taken when the river falls below this level.

Special condition 3 requires the installation and maintenance of a water meter and specifies the technical requirement around this.

Special condition 4 requires the consent holder to avoid, remedy and mitigate any adverse effects as a consequence of exercising the consent.

Special condition 5 requires screening of the intake structure to prevent the entrainment of fish.

Special condition 6 and 7 are lapse and review provisions.

2.2.2 Water discharge permits

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

Methanex currently holds three consents to discharge water from the Motunui site, as described below.

Consent 0822-2: Discharge of uncontaminated stormwater to an unnamed tributary of the Waihi Stream

The original consent 0822-1 was granted on 25 May 1981 and was due to expire on 12 March 2012.

Special condition 1 of the original consent required that any stormwater originating from process or tankage areas, or areas where the level of contamination or likely contamination is significant, shall be retained in the stormwater holding pond for treatment and discharge via the marine outfall.

In 2005, during the period that the site was not operating, Methanex sought a change in special condition 1 of consent 0822-1. This was to allow for free draining of uncontaminated stormwater from the entire site as the site power was to be isolated and all other services to the site disconnected or decommissioned including the on-site waste water treatment plant.

The requested change of wording to the condition would enable stormwater from the listed areas to be discharged into the Waihi and other streams but ensured that when the plant was operating again, the stormwater would be treated and discharged via the marine outfall.

With the renewed activity at the plant all stormwater from the processing and tankage areas are again controlled in holding ponds and discharged via the marine outfall at Waitara.

Consent 0822-1 expired in March 2012 and a renewal, Consent 0822-2 presently provides for the discharge of stormwater from the plant site. This permit was issued by the Council on 29 November 2012 under Section 87(e) of the RMA. It is due to expire on 1 June 2027.

The number of special conditions was reduced from twenty six to nine. The pH range was changed from 6.5-9.3 to 6-9.5 following discussions with Council regarding the natural fluctuations of pH. In addition the consent defines the catchment areas for the collection of stormwater as: 240,000 m^2 for the tributary of the Waihi Stream and 294,000 m^2 for the Duck Pond which feeds the Manu Stream. A plan (number g10637) was supplied with the application.

Special condition 1 requires that the best practicable option is adopted at all times.

Special condition 2 specifies the catchment area.

Special condition 3 requires the maintenance of a contingency plan.

Special condition 4 requires the preparation of a stormwater management plan.

Special condition 5 requires that the constituent of the discharge shall meet certain standards.

Special conditions 6 and 7 place restrictions on changes in water quality of the tributaries of the Waihi Stream or Manu Stream.

Special condition 8 relates to changes in chemical use or processes around the site that could affect the nature of the discharge.

Special condition 9 is a review provision.

Consent 0825-3: Discharge of stormwater from water supply headworks to Waitara River tributary

The original consent (consent 0825-1) granted in 1982, provided for the discharge of up to 2,000 m^3/day of stormwater, including emergency water treatment plant overflow, from a water supply headworks to an unnamed tributary of the Waitara River off the end of Tikorangi Road. The stormwater enters the small tributary via an energy dissipation structure about 50 metres from the river. A new consent was issued on 8 September 1993 for a period until 12 March 2009. That consent was again renewed in March 2008 (0825-3). It is to be reviewed in 2015 and will expire in 2021. Consent 0825-3 differs from the earlier consent in that it does not limit the volume or rate of water discharged but instead limits the increase in turbidity of the receiving waters to no more than a 50% increase after reasonable mixing.

Special Condition 1 requires that the consent holder adopt the best practicable option to prevent or minimise adverse effects on the environment.

Special condition 2 requires that the consent be exercised in accordance with the documentation supplied in support of the application.

Special condition 3 limits an increase in turbidity in receiving waters.

Special condition 4 and 5 are lapse and review provisions.

Consent 0827-3: Discharge of wastewater from water supply headworks to Waitara River tributary

The original consent was granted in 1982 and a new consent was issued on 8 September 1993 for a period until 12 March 2009. Consent 0827-2 provided for the discharge of up to 1,000 m^3/day of wastewater containing settled solids, including solids generated by cleaning a water supply line, from a water supply headworks to an unnamed tributary of the Waitara River off the end of Tikorangi Road. The wastewater enters the small tributary via an energy dissipation structure about 50 metres from the river.

A special condition in consent 0827-2 required that the timing of scouring or cleaning operations coincide with periods of high turbidity in the river. In contrast, the current renewed consent (consent 0827-3) requires a limit of a 50% increase in turbidity as measured in NTU after a reasonable mixing zone in the receiving waters.

The consent was renewed as consent 0827-3 on 31 March 2008 with the intention of a review in 2015 and expiry in 2021.

Special condition 1 limits the maximum daily discharge to 1,000 m^3/day.

Special condition 2 requires that the consent holder adopt the best practicable option to prevent or minimise adverse effects on the environment.

Special condition 3 requires that the consent be exercised in accordance with the documentation supplied in support of the application.

Special condition 4 limits an increase in turbidity in receiving waters.

Special condition 5 is a review provision.

Consent 3400-2: Discharge of plant effluent to Tasman Sea
Coastal consent 3400-2 provided for the discharge of up to 12,096 m^3/day of treated wastewater and stormwater from the manufacture of methanol and synthetic gasoline. The discharge is into the Tasman Sea via a pipeline extending about 1,250 metres off shore from the Waitara River mouth. The maximum rate of discharge is 140 l/s. The previous consent 3400-1 also provided for inclusion of up to 1,000 m^3/year of treated water draw-off from gasoline storage tanks at the Omata Tank Farm, however this has been removed from the consent 3400-2 granted in 2008.

The consent was varied on 18 July 2012 following problems that year with maintaining levels of the bacterium *Legionella* at safe numbers (<10 cfu/100 ml). The variation included a new condition to allow the maximum daily limit of the water treatment chemical 'Spectrus CT1300' to be increased to 40 kg/day if a spike in the numbers of the bacteria *Legionella* is detected. This was to ensure that future outbreaks of *Legionella* could be effectively controlled and also allowed for increased dosing when the Methanol 1 plant was brought online. The variation was granted on 18 July 2012 and the consent is due to expire in June 2021.

Special condition 1 requires that the consent holder adopt the best practicable option to prevent or minimise adverse effects on the environment.

Special condition 2 requires the consent holder to keep records of the volume of effluent and provide these to the Council on a monthly basis.

Special condition 3 limits the volume and rate of the discharge.

Special condition 4 requires a minimum initial dilution factor to be met.

Special condition 5 limits the concentration of suspended solids.

Special condition 6 and 7 require certain water quality parameters to be met.

Special condition 8 limits what water treatment chemicals may be used and their relative dosing limits.

Special conditions 9 to 12 and 14 discuss the requirements of Methanex to advise the Council of any proposed changes in water treatment or cleaning chemicals, or equivalent chemicals, in order that limitations may be placed on their discharge, if necessary, for protection of the receiving waters.

Special condition 13 specifies the sampling point for condition 5, 6, 7 and 8.

Special condition 15 outlines what effects the discharge may not give rise to after a mixing zone of 200 metres.

Special condition 16 requires a contingency plan, to maintained and put into operation in the event of spillage, accidental discharge, or pipeline failure.

Special condition 17 states discharge of domestic sewage is not a permitted activity under this consent.

Special condition 18 requires Methanex to notify the Council at least seven days prior to the consent first being exercised.

Special conditions 19 and 20 require reports to be received from Methanex. Methanex must certify the structural integrity and dilution performance of the outfall at least every 5 years. An annual report on the performance of the effluent disposal system is also required and must detail compliance with conditions of the consent.

Special conditions 21 and 22 deal with the lapse and the review provisions of the consent.

Other consents to discharge from the Waitara Outfall

Historically consent 3400 was one of several resource consents that provide for the discharge of wastes via the Waitara outfall. Methanex was originally planned to have its own marine outfall. The local iwi, Te Atiawa, fought against this decision, and won a change to have the effluent discharged through a renovated joint outfall at the mouth of the Waitara River.

Four separate but contemporaneous consents were granted in October 1989 for a period until 2008. The consents had identical conditions in respect of the outfall itself, contingency plans, annual reports, and investigation and remedy of unauthorised discharges. The conditions on effluent composition differed, except for those relating to the municipal and meatworks effluents, which passed through the same effluent plant.

In recent years, the discharges at the outfall have originated from three sources, these being the two Methanex sites and the New Plymouth District Council (NPDC) wastewater treatment plant (WWTP). The latter was constructed in 1991 and 1992 by NPDC and AFFCO (a meat-works Company which used the outfall until 1997). It is located on Queen Street in Waitara, and was used to treat both domestic and meat-works effluent which had previously been discharged through the outfall with minimal treatment.

In 2007, Methanex applied for replacement consents for the discharge of wastewater to the marine environment via the marine outfall from its Waitara Valley and Motunui Methanol production sites. After researching options, Methanex opted to proactively

install its own on-site sewage treatment system for the Waitara Valley plant that enables discharge of the treated effluent to land. In 2011 the system was installed and commissioned and has worked successfully since, with the purified effluent being disposed of directly on-site. Subsequently, Methanex has now voluntarily surrendered consent to discharge human sewage from the Waitara Valley plant to the marine environment.

Methanex and NPDC have a joint agreement to oversee the refurbishment and maintenance of the outfall (previously the responsibility of the Waitara Outfall Management Board which was disestablished in 2010). During 1991, the Waitara Outfall Management Board undertook a refurbishment of the outfall to provide a 25 year life period and to improve the initial dilution. This process involved an impervious plastic liner inserted through the pipeline, improvement of the stability of the pipeline on the seabed, and installation of a new diffuser.

NPDC is now the owner and administrator of the outfall, and Methanex has a contract in place with NPDC for access to discharge through it. NPDC retains responsibility for the maintenance of the outfall.

During the 2013-2014 monitoring period, NPDC were in the process of converting the Waitara WWTP to a transfer pump station (and associated pipeline infrastructure) that would redirect wastewater to the New Plymouth WWTP. Therefore in the next monitoring period it is anticipated that only Methanex will hold resource consents to regularly discharge treated process water from its two sites, via the Waitara marine outfall. The discharge from the Waitara marine outfall, at that stage, will contain no sewage. NPDC will still hold a consent for the discharge of partially treated municipal sewage, however this consent will only be exercised as a contingency during unusually high volume flows of wastewater such as exceptional stormwater infiltration.

Key discharge consents associated with the Waitara marine outfall are summarised in **Error! Reference source not found.** below.

Table 4 Discharges from the Waitara Outfall

	Consent holder	Effluent source	Volume m^3/day	Current status
3397-2	New Plymouth District Council	Treated domestic, minor industrial and stormwater	11,950 (previously 7,258)	This consent is to be surrendered upon completion of the redirection of waste to New Plymouth WWTP as well as the completion of required compliance monitoring.
7862-1	New Plymouth District Council	Screened and disinfected municipal wastewater	Limited period not volume	The discharge is permitted during conversion of the Waitara WWTP to the Waitara Pump Station. Once the conversion has occurred, no further discharges under this consent are permitted.
7861-1	New Plymouth District Council	Screened untreated municipal wastewater	Limited period not volume	This consent will become active upon the commencement of pumping to the New Plymouth WWTP. This discharge is only permitted in the event of high rainfall events when the instantaneous inflow to the Waitara Pump Station exceeds 280 l/s, or when the inflow to the pump station exceeds 18,800 m^3 in the previous 24-hour period, or when the storage tanks at the Waitara Pump Station are full and the inflow to the Waitara Pump Station exceeds the transfer pumping rate of 140 l/s.

	Consent holder	Effluent source	Volume m^3/day	Current status
3398-2	Anzco Foods Waitara Limited	Treated wastes arising from food manufacturing and associated activities	12,960	As of July 2009, Anzco Foods Waitara Ltd discharge under a trade waste agreement with NPDC. They withdrew their application for consent renewal on 23 July 2010.
3399-2	Methanex Motunui Limited	Methanol plant (Waitara Valley)	5,000	Presently exercise this consent.
3400-2	Methanex Motunui Limited	Methanol plant (Motunui)	12,096	Presently exercise this consent.

The Council reports separately on the results of the compliance monitoring programmes implemented in respect of the outfall.

2.2.3 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.

Methanex holds one discharge consent for the Motunui site.

Consent 4042-3: Discharges to air from the Motunui methanol plant
Methanex holds air consent 4042, to cover the discharge of emissions to air from activities associated with the production of methanol (and previously gasoline) at the Motunui site.

The Council issued this permit on 23 March 1994 as a resource consent under Section 87(e) of the RMA. A minor variation to remove requirements relating to carbon dioxide emissions was granted on 6 April 2005. It was due to expire on 1 June 2009 but has been renewed, the new consent (4042-**3**) commenced on 12 February 2008 and expires in June 2021.

There are 17 special conditions attached to this consent.

Special condition 1 requires that the consent holder adopt the best practicable option to prevent or minimise adverse effects on the environment.

Special condition 2 requires that the consent be exercised in accordance with the documentation supplied in support of the application.

Special condition 3 requires that emissions are minimised.

Special condition 4 sets out requirements if certain alterations are made to the plant.

Special condition 5 requires that the consent holder commission reports detailing the technology available in regards to minimisation of the adverse effects of the water vapour plume from the cooling tower. These are to be supplied to the Council every five years.

Special condition 6 requires that another report be prepared and supplied to the Council every two years detailing how emissions from the plant may be minimised or mitigated and containing an inventory of these emissions. It also requires that improvements in energy efficiency be detailed in the report.

Special condition 7 to 10 limits the ground level concentrations of methanol, carbon monoxide, and nitrogen dioxide.

Special condition 11 requires that the consent holder compile and maintain an inventory of emissions discharged from the site and include this with the reporting set out in special condition 6.

Special condition 12 restricts offensive or objectionable odour at or beyond the property boundary.

Special condition 13 restricts significant adverse ecological effects.

Special condition 14 – 17 refer to the monitoring, review and lapse of the consent.

2.2.4 Discharge 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.

Methanex currently does not hold any consents to discharge sludge waste onto or into land, all sludge is currently held in purpose-built lagoons for dewatering and later disposed of appropriately to land as permitted by Rule 29 of the Regional Fresh Water Plan for Taranaki (RFWP).

2.3 Results

2.3.1 Site inspections

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

Council officers carried out two compliance monitoring site inspections on 28 August 2013 and 26 November 2013 as well as two compliance monitoring sampling visits for the purpose of collecting a split sample on 06 December 2013 and 20 May 2014.

The compliance monitoring site inspections considered the chemical dosing systems as well as effluent and stormwater treatment and monitoring systems. The condition of any detectable emissions to air were also noted at each inspection, with particular reference to the cooling tower and the reformer. The methanol storage tank area and oil storage were also inspected during the visits. Methanex no longer has a large waste oil container, instead small waste oil drums and empty drums are stored in the waste oil storage area.

28 August 2013 at 1400hrs
An inspection of both the Motunui and Waitara Valley facilities was undertaken by Council staff, accompanied by Gary Rielly and Ben Lawn (Methanex personnel). The Motunui site was inspected first. It was noted that there was a reasonable high level of activity at Motunui. The site was producing and contractors were preparing for a turn-around of the Methanol 2 plant. The sludge pond situation had not changed, some of the ponds were reasonably full, the plan to dispose the sludge (potentially to land) was to be discussed at a later date. There were no issues noted at the storm pond, which was at a reasonably low level with some gulls present at the time of the inspection. The Waihi Stream stormwater discharge point was inspected and no issues noted. The holding pond was discharging at a steady rate, the discharge was clear with no foam, odour or sheen observed. No issues were noted at the cooling tower. The effluent sampler was working, fridge temperature was recorded at 1.4 deg C and pH was 7.93. The duckpond stormwater discharge point was inspected, water level was high, but very little if any discharge was occurring at the time of inspection. There were no concerns noted with this pond either.

26 November 2013 at 0930hrs
An inspection of the Methanex facilities at Motunui and Waitara Valley was conducted by Council staff with Gary Rielly (Methanex). The Motunui site was inspected first. One of water treatment plant sludge ponds was being de-sludged at the time of the inspection and the silt was to be spread on the paddock north of the flare stacks. Methanex staff outlined that sample results of the silt would be made available. The untreated storm water discharge points into the Waihi Stream and the duck pond appeared compliant and no sheen or discolouration was noted. The effluent treatment system was working well and no odours were detected. Overall, the site was well managed and tidy.

Overall site housekeeping had continued to be of a high standard for the monitoring period of July 2013 to June 2014. Methanex staff were cooperative and the site looked to be well managed. There was no evidence noted during the site visits of non-compliance with the Methanex Motunui consents.

2.3.2 Production unit restart programme

The Motunui Methanol 2 production unit was restarted and began to produce methanol in October 2008. Variation to consent conditions had previously been granted on 30 March 2005 to allow continuous stormwater discharge to either the Waihi Stream or the Duck Pond while the plant was not operating. With the resumption of activity on the site when Methanol 1 was brought online (in July 2012), all stormwater from process and tankage areas were again required to be controlled and treated before discharge via the marine outfall.

During the restart, there were no significant issues identified in relation to this. No further *Legionella* issues had been detected by Methanex and the effluent treatment system had been working without issue. Monitoring showed no adverse effects resulting as a consequence of these restarts. As a result inspection frequency was reduced during this monitoring year.

During 2013 Methanol 2 was briefly shut down between September and November for maintenance work. Production continued through this time by Methanol 1.

2.3.3 Surface water

2.3.3.1 Surface water abstraction monitoring by the Company

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

Consent 0802-2 specifies that no water may be taken when the flow of the Waitara River at the Bertrand Road gauging station falls below 4,600 litres per second. On one occasion during April 2014 the Waitara River flow fell below this level. The event was short lived and the flow recovered to above the consented level by the next day. The breach of consent was considered insignificant as the flow was marginally less than the consented limit and for only brief periods of time on the same day. Appendix III shows the hydrographs for the Waitara River at Bertrand Road for the monitoring period.

Council officers visited Methanex on 26 June 2014 to undertake a verification of the accuracy of the Motunui raw water flow meter (Photo 2). This inspection was to determine compliance with Resource Management (Measurement and Reporting of Water Takes) Regulations 2010. Methanex staff have been in ongoing discussion with the Council on attaining compliance with the regulations at their facility.

Photo 2 Motunui Raw water flow meter

Condition 4 of Consent 0820-2 requires that Methanex undertake testing of the intake to the plant every five years to establish pipeline integrity. This work was due to be done during 2013. Methanex are presently in discussion with Council staff in how to approach this effectively without damaging the existing infrastructure.

2.3.3.2 Effluent monitoring

During the period July 2013 to June 2014 the Motunui plant was operating at full production capacity, with both of its two reformer units 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.

Continuous measurement
Flow and pH are measured by online analysers, and recorded continuously. The figures reported to the Council are daily averages (m^3/h), 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 5.

Table 5 Summary of the Motunui plant's monitoring results of plant effluent during 2013-2014

	Unit	Minimum	Maximum	Consent limit	Number of breaches
Continuous measurement					
Flow (daily average)	m^3/day	n/a	6,835	12,096	0
pH	-	4.96*	8.93	6-9	0**
Daily measurement					
Chemical oxygen demand	g/m^3	5	69	200	0
Methanol	g/m^3	1	1	15	0
Suspended solids	kg/day	1	78	500	0
Petroleum hydrocarbons	g/m^3	0	1	10	0
Monthly measurements					
Copper	g/m^3	<0.05	0.01	0.50	0
Nickel	g/m^3	<0.10	0.01	1.00	0
Zinc	g/m^3	<0.10	0.23	1.00	0

* Consent breach recorded on 24 April 2014. Daily average was 7.6, minimum was 4.96
** Consent limit breach was due to inaccurate data recording, true pH was compliant with consent

Methanex staff investigated the low pH of 5 recorded on 24 April 2014. They found that it had occurred at 11:24 am, and Methanex was not pumping during this period as the pumps had shutdown at 8:42 am and restarted at 12:40 pm. They reported that the pH meter would often drop down when there is nothing flowing through it, giving inaccurate data and that pH levels were at normal levels during pumping with a low of 7.0 and a maximum of 8.1.

A proportional sampler is used to create a daily composite sample representative of the daily flow of plant 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 5 above.

On numerous occasions a visual check of the effluent sample indicated hydrocarbons were present, 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 6.

Table 6 Summary of Motunui chemical discharge data (calculated) for July 2013 to June 2014

Consent 3400-2 (special condition 8)					
Chemical	**UNIT**	**Minimum**	**Maximum**	**Average**	**Consent Limit**
Gengard GN8020*	kg/day	60	126	94	300
Spectrus BD1500	kg/day	5	17	8	200
Inhibitor AZ8104	kg/day	49	93	69	300
Steamate NA0880	kg/day	7	26	17	40
Cortrol OS 7780	kg/day	11	103	46	400
Optisperse HTP 7330	kg/day	17	65	39	120

Consent 3400-2 (special condition 8)					
Chemical	UNIT	Minimum	Maximum	Average	Consent Limit
Optisperse HTP 73611	kg/day	16	80	32	120
Foamtrol AF2290	kg/day	0	0	0	40
Betz Dearborn AE1115	kg/day	12	42	22	60
Flogard MS6209**	kg/day	11	38	16	40
Spectrus CT1300	kg/day	0	16	8	20
Spectrus NX1100	kg/day	0	0	0	50
Klairaid PC 1190P	kg/day	18	113	54	600
Continuum AEC3109	kg/day	0	0	0	300
Optisperse PO5211A	kg/day	0	0	0	20

*Gengard GN8020 has been approved as an equivalent chemical to replace Continuum AEC3109
**Flogard MS6209 has been approved as an equivalent chemical to replace Flogard MS6207

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

Marine outfall report
A five-yearly report on the structural integrity of the Waitara marine outfall was received from Methanex on 3 February 2014 (this report is included as Appendix IV). This is a requirement of special condition 19 of Consent 3400-2. OCEL consultants have been contracted by NPDC (who retain responsibility for maintenance of this structure) to inspect and maintain the structure. Significant maintenance of the structure took place in 2012 and 2013 following the OCEL report finding various potential risks associated with the structural integrity of the outfall and its ability to resist the impact of a 100 year environmental event. Work undertaken to address the issues has included the removal of tube worm growth and the replacement of tie-down straps. 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.

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 plant 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 and May 2012. The 2014 contingency plan was not received during this monitoring period and is expected later during 2014. It will be reported on in the next compliance monitoring report.

'Equivalent Chemical'
On 18 October 2012 Methanex applied for approval to replace chemicals under condition 11 of consent 3400-2 for 'equivalent chemicals'. Two chemicals, Continuum AEC3109 and Flogard MS6207, were to be replaced with Gengard GN8020 and Flogard MS6209. The chemicals are used as dispersants to eliminate build-up of calcium phosphate and calcium carbonate scale to reduce steel corrosion. Permission was granted on 1 November 2012, no consent variation was required. This was the most

recent of a number of similar applications that have occurred in the past. These changes are necessary as more effective, efficient and safer chemicals become available are adopted by the industry.

2.3.3.3 Uncontaminated stormwater

Stormwater outlets for uncontaminated stormwater are situated in the Waihi catchment on the eastern side of the plant and at the sea cliff via the 'Duck Pond' on the northern side of the plant (Figure 1).

Weekly grab samples of the stormwater discharges were taken and analysed for four water quality characteristics by Methanex staff. The values of these four parameters provide an indicator as to whether or not the discharge was contaminated. The results of the Methanex stormwater monitoring for July 2013 to June 2014 are summarised in Table 7 below.

Table 7 Summary of Motunui stormwater monitoring data for 2013-2014

Consent 0822-2					
Parameter	Unit	Minimum	Maximum	Average*	Consent limit *Guideline*
Duck Pond					
pH	-	6.80	7.70	7.13	6 - 9.5
Petroleum hydrocarbons	g/m^3	<1	2	<1	<5
Conductivity at 25°C	µs/cm	35.0	140.0	93.1	*300 max**
Total suspended solids	g/m^3	<6	330.0	15.4	100 max
Visual hydrocarbons	# Pass / # Fail	Tests passed:42	Tests failed: 1	----	PASS
Waihi Stream					
pH	-	6.30	7.30	6.64	6 - 9.5
Petroleum hydrocarbons	g/m^3	<1	<1	<1	<5
Conductivity at 25°C	µs/cm	27.00	320.00	186.49	*300 max**
Total suspended solids	g/m^3	<6.00	14.00	<6.00	100 max
Visual hydrocarbons	# Pass / # Fail	Tests passed: 42	Tests failed: 0	----	PASS

Numbers presented as less than a number are divided in half for averages.
* Guideline value, not a consent requirement.

Duck Pond discharge

The quality of the stormwater discharge from the Duck Pond was mostly well within the agreed guideline or consent limit for uncontaminated stormwater on each monitoring occasion. The exception was suspended solids which was in breach of the consent limits (100 g/m^3) on the following dates:

26 February 2014	330 g/m^3
07 March 2014	180 g/m^3

The high values were attributed to the dry conditions over February and March 2014. As a result of the very low water level at the duckpond, the samples taken were mixed with the sediment from the pond floor resulting in high suspended solid values. The matter was discussed with Council staff at the time.

Waihi Stream
The water samples analysed from the Waihi Stream monitoring site were well within agreed limits required by the consent.

A renewal of consent 0822 was issued on 29 November 2012. The pH range was changed from 6.5-9.3 to 6-9.5. The change in the pH range followed discussions with Council regarding the natural fluctuations of pH within the system. Council agreed that the large range in pH was a result of natural fluctuations and not due to contaminants entering the stormwater and therefore agreed to the change in the pH range on renewal of the consent.

Moderately high conductivity readings (exceeding the guide of 300 µS/cm) for the Waihi Stream were noted. These exceedances were relatively insignificant and Consent 0822-1 does not set a limit for conductivity. Previously Methanex initiated an investigation programme which included setting up four monitoring boreholes around underground sumps to monitor groundwater quality.

2.3.3.4 Inter-laboratory comparisons

On two occasions during the monitoring period, the Council carried out inter-laboratory comparisons on both the composite outfall sample and the plant stormwater. The results of the inter-laboratory comparisons, which also serve the purpose of compliance monitoring checks, are shown in Table 8 and Table 9. 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, these discrepancies were considered to be within a reasonable range and therefore presented no cause for concern.

Table 8 Inter-laboratory comparison of Motunui outfall composite sample results

Motunui Outfall - IND003005 (Consent 3400-2)						
Parameter Unit		**Consent limits**	**6 December 2013**		**20 May 2014**	
			Methanex	**TRC**	**Methanex**	**TRC**
Ammonia as N	mg/l		0.1	0.161	<0.1	0.172
Chemical oxygen demand	mg/l	200	18	22	26	27
Conductivity @ 25 °C	µs/cm		1070	1041	1610	1584
Copper	mg/l	0.5	<0.05	0.01	<0.05	0.01
Methanol	mg/l	15	<2	<1	<2	<1
Nickel	mg/l	1.0	<0.01	<0.02	<0.10	<0.02
pH		6.0-9.0	8	7.9	8	7.7
Total hydrocarbons	mg/l	10	<1	<0.5	<1	<0.5
Total suspended solids	mg/l	daily discharge <500kg	<6	8	<6	4
Zinc	mg/l	1.0	0.23	0.135	0.11	0.089
Turbidity	NTU			2.4	2.7	2.0

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, these discrepancies were considered to be within a reasonable range and therefore presented no cause for concern.

Table 9 Results of Motunui stormwater inter-laboratory comparison between Methanex and the Council

Motunui plant stormwater (Consent 0822-2)						
Parameter	**Unit**	**Consent limits**	**Duckpond**		Waihi Stream	
			Methanex	**TRC**	**Methanex**	TRC
6 December 2013						
Ammonia as N	mg/L		<0.1	0.006	0.8	0.083
Conductivity @ 25ºC	µs/cm	300*	55	50.6	64	60.5
Copper	mg/L				<0.05	
Nickel	mg/L				<0.10	<0.02
pH		6.0-9.5	7.1	7.2	6.5	6.7
Total hydrocarbons	mg/L	5	<1	<0.5	<1	<0.5
Total suspended solids	mg/L	100	10	5	<6	2
Zinc	mg/L		<0.1	0.036	0.16	0.132
Turbidity	NTU			6.1		1.6
Zinc filtered	mg/L		<0.1	0.027	0.19	0.124
20 May 2014						
Ammonia as N	mg/L		<0.1	0.014	<0.1	0.023
Conductivity @ 25ºC	µs/cm	300*	84	80.3	302	297
Copper	mg/L		<0.05	<0.01	<0.05	<0.01
Nickel	mg/L			<0.02	<0.10	<0.02
pH		6.0-9.5	7	7	6.4	6.4
Total hydrocarbons	mg/L	5	<1	<0.5	<1	<0.5
Total suspended solids	mg/L	100	24	7	<6	<2
Zinc	mg/L		<0.10	0.017	<0.10	0.052
Turbidity	NTU		4.2	4.5	0.7	0.47
Zinc filtered	mg/L				<0.10	0.05

* Not a consent limit, but a guideline limit

Results from each laboratory for stormwater discharges met the consented water quality criteria on all occasions. Conductivity was elevated in the 2014 samples, but with consideration of the other analytical results, this was not considered to be of concern.

Overall there was good agreement between the inter-laboratory analytical sample results. However there was some discrepancy in the total suspended solid values in 2014. In May 2014, suspended solids measured by Methanex at Motunui outfall were approximately three times higher than that measured by the Council. This level of discrepancy in results has similarly been found in inter-laboratory sampling undertaken in 2010. Potentially the turbidity values may indicate that there was some floatable matter in the sample and this could have influenced the suspended solids results. The suspended solids results were however all within the consent limits for the inter-laboratory comparison samples.

2.3.3.5 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 2013 to June 2014 were received by Council via monthly reports, and fulfil this consent requirement. In addition to this Methanex provided an annual summary report for the 2013 calendar year. This was received in December 2014.

2.3.4 Air

2.3.4.1 Inspections

During the monitoring period under review, Methanex increased production with all plants operational by the end of June 2014. During this time the Council did not receive any complaints regarding odour or other discharges to air from neighbours. No effects on the receiving environment beyond the plant perimeter were detected during any of the site inspections.

2.3.4.2 Consent requirements

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. A report was received from Methanex in April 2009 and the next report was expected during 2014. The original report was written by Transfield Worley Services and considered two options, retrofitting of an additional structure or the replacement of the cooling tower. At the time that the report was written, the Motunui site was operating at significantly reduced capacity and there was no foreseeable or expected increase in future production. A second report, expected in July 2014, will be reported on in the next compliance monitoring 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 2010 to 2011 was received in August 2012, the next biennial report was expected in August 2014 and was received in 2015. It will be discussed in the next compliance monitoring report.

2.3.5 Soil

Methanex no longer holds any consent to discharge contaminants to land. Historically Methanex held a consent (ref. 4907-1) to dispose of approximately 2,000 tonnes of river silt/sludge annually. The majority of the disposal area was sold to Shell Todd Oil Services, and a partial transfer of the consent occurred in 2004. In November 2007 the Council received an application for surrender of the consent as the remaining area affected by sludge disposal that was still owned by Methanex has had the

contaminated material removed. Soil samples have been analysed from the area to confirm that no sludge is remaining. The area has been reinstated with topsoil and grass. The Council granted the surrender of the consent on 3 December 2007.

Presently the sludge lagoons collect river silt that has been backwashed from the clarifiers. In time this silt will be spread to land belonging to Methanex as permitted by Rule 29 of the RFWP.

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

The Council operates and maintains a register of all complaints or reported and discovered excursions from acceptable limits and practices, including non-compliance with consents, which may damage the environment. The Incident Register (IR) 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).

During the monitoring period, there were no incidents recorded by the Council that were associated with the Motunui plant.

2.4 Discussion

2.4.1 Discussion of plant performance

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

Methanex continued to manage activities allowed by the consents it holds for the site well within consent limits over this monitoring period. Methanex has a current 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.

2.5 Environmental effects of exercise of consents

2.5.1 Environmental effects of exercise of water abstraction permits

The Motunui consent allows for a water take of 1,400 m^3/hr, but typically the water take is much lower, in the range of 500 – 1,000 m^3/hr. This is due to the water reduction initiatives instigated by Methanex and the fact that at certain stages only one of the two reforming units was being run.

2.5.2 Environmental effects of exercise of water discharge permits

Methanex staff continued to provide the Council with monthly monitoring data which when compared, agreed well with the Council's own independent sample analysis. With the exception of a couple of insignificant exceedances the parameters measured were within consented limits for the water discharge consents held.

Inter-laboratory comparisons between the Council and Methanex laboratories generally showed good agreement of results; however on occasion there were discrepancies between the total suspended solids concentrations where Methanex measurements were significantly higher than those recorded by the Council. As the sample was slightly turbid, the potential for floatable matter influencing suspended solid results was considered a potential explanation.

2.5.3 Environmental effects of exercise of air discharge permits

The controls in place to minimise and mitigate the safety risks to operators onsite of air pollution also ensure that there is a low likelihood of adverse environmental effects offsite. Modelling of air emissions when the plant 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 undertaking 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.

2.6 Evaluation of performance

A tabular summary of Methanex's compliance record under its current active consents for the year under review is set out in Table 10 to Table 15.

Table 10 Summary of performance for Consent 0820-2 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
2. The taking of water is managed to ensure that river flow no less than 4,600 l/s.	Continuous gauging at Bertrand Road. One minor non-compliance – due to short period of time over which it occurred it is considered insignificant.	Yes
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 expected by the end of 2014. Pipeline testing is due, however Methanex and Council have been in discussion on how best to achieve this.	Not as yet required
5. Appropriate screening of intake structure to prevent fish entrainment.	Inspection.	Not monitored during this monitoring year
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 11 Summary of performance for Consent 0822-2 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 2012. Further review expected later in 2014.	Yes
4. Stormwater Mangement Plan to be maintained. To be supplied to the Council and approved.	Stormwater Management Plan received and reviewed.	Yes
5. Discharge sample analysis. Sampling to occur from a point prior to entry to "Duck Pond". Analysed for pH, SS and total recoverable hydrocarbons.	Sample analysis results received. All within consent limits with the exception of two suspended solid results. The high values were attributed to climatic conditions at the time.	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 2015 and/or 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 12 Summary of performance for Consent 0825-3 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

Condition requirement	Means of monitoring during period under review	Compliance achieved?
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 affect to.	N/A
5. Review of consent.	Next scheduled in June 2015.	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 13 `Summary of performance for Consent 0827-3 Discharge of wastewater into Waitara River unnamed tributary

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Maximum daily discharge shall not exceed 1,000m^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.	Inspection not scheduled for 2013-2014.	N/A
5. Review of consent.	Next scheduled in June 2015.	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 3400-2 Discharge of 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.	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 and reported with the five-yearly marine outfall report received in February 2014.	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
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. One occasions in 2014 when pH was outside consented range. Satisfactory explanations received from consent holder and accepted by the council.	Yes
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. Variation granted July 2012 for increase in 'Spectrus CT1300' chemical. This condition was not exercised.	N/A
10. Approval from the Council required to discharge 'equivalent' chemical.	Permission for approval to replace two chemicals applied for 18 October 2012 and granted 1 November 2012.	Yes
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.	N/A
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.	Marine ecological surveys (separate programme).	Yes
16. Consent holder to maintain contingency plan.	Contingency plans provided June 2010, June 2011, June 2012 and reviewed as satisfactory. Next review expected later in 2014.	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	Reports received monthly and reviewed as satisfactory.	Yes

Condition requirement	Means of monitoring during period under review	Compliance achieved?
year.		
21. Lapse of consent.	Consent given affect to.	N/A
22. Review of consent.	Next scheduled in 2015 if required.	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

Table 15 Summary of performance for Consent 4042-3 Discharge of 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 (plant not operating).	Yes
4. Provision of a report on cooling tower plume abatement.	Report received April 2009. Next report expected later in 2014.	Yes
5. Biennial written air discharge emission and mitigation reports.	Received March 2010, August 2012. Next report expected later in 2014.	Yes
6. Maximum ground-level concentrations of methanol beyond site boundary.	Previous modelling has shown compliance when plant in full operation.	Yes
7. Maximum ground-level concentrations of carbon monoxide beyond boundary.	Previous modelling has shown compliance when plant in full operation.	Yes
8. Maximum ground-level concentrations of nitrogen dioxide beyond boundary.	Previous modelling has shown compliance when plant in full operation.	Yes
9. Maximum ground-level concentrations of other contaminants beyond boundary.	Previous modelling has shown compliance when plant in full operation.	Yes
10. Inventory of emissions to be provided with biennial emission mitigation report.	Received March 2010, August 2012. Next expected in August 2014.	Yes
11. No offensive or objectionable odour at the plant 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

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

N/A = not applicable

During the year at their Motunui facility, Methanex demonstrated an overall high level of environmental and high level of administrative performance with the resource consents as defined in Section 1.1.4.

2.7 Recommendations from the 2010-2013 Report

In the 2010-2013 Report it was recommended:

1. THAT the Council discusses the feasibility of certifying the integrity and dilution performance of the marine outfall pipe with Methanex to ensure compliance with condition 19 of consent 3400-2.

2. THAT Methanex continue with plans to carry out testing to establish water intake pipe integrity at intervals of at least every five years and continue to provide a written report to the Council every two years outlining the results of water use reduction initiatives. This report is a requirement of consent 0820-2 (condition 4).

3. THAT inspections for the purposes of the monitoring of compliance with consents remain at quarterly intervals.

4. THAT monitoring of air emissions from the Motunui site in 2013-14 remain at the same level as previous years.

5. THAT Methanex continue to annually review and update any changes to the specific and comprehensive contingency plan to prevent and respond to any unauthorised effluent discharges that may arise from spillages, accidental discharges or pipeline failure as required by special condition 15 of consent 3400-2.

6. THAT Methanex supply information confirming that the flow meter on the water intake has been installed as per manufacturer's specifications and that the flow meter and record keeping meets the Resource Management (for Measuring and Reporting of Water Takes) Regulations 2010 and/or an exemption from the water meter location requirements is obtained from the Council.

7. THAT the Council notes there was no need to review consent 4042-3 in June 2013.

Recommendation 1, 3, 4, 5 and 7 were fully implemented in the monitoring period.

There has been ongoing discussion between Methanex and the Council staff with regard to the five yearly water intake pipe integrity report. There are some complexities in determining the best method to undertake the required testing without damaging the existing infrastructure. The water use reduction initiatives report also required by consent 0820-2 is expected to be received later in 2014 (covering initiatives undertaken in 2012-2013 calendar years). As the reports were received within two calendar years of

each other, this condition was met and therefore this part of recommendation 2 was implemented.

To some extent recommendation 6 has been implemented with continued discussions underway between Methanex and the Council's hydrology staff on obtaining an exemption on the water meter location requirements while the accuracy of the Motunui raw water flow meter was verified in June 2014.

2.8 Alterations to monitoring programmes for 2014-15

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account the extent of information made available by previous authorities, its relevance under the RMA the obligations of the Act in terms of monitoring emissions/discharges and effects, and subsequently 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 emitting to the atmosphere/discharging to the environment.

The compliance monitoring programme for 2013-2014 (excluding any additional monitoring specifically programmed around the restarts) was essentially unchanged from that for 2012-2013, on the grounds that the Methanex Motunui plant has maintained a high level of environmental performance and the existing monitoring program was adequate to provide sufficient data to assess environmental performance. It is now proposed that for 2014-2015, the programme be maintained at the same level as the programme for 2013-2014.

Recommendations to this effect are attached to this report.

2.9 Exercise of review of consent

All six resource consents relating to the operation of the Motunui plant provide for an optional review of the consent in June 2015. The conditions in each consent that allows the Council to review the consent, are presented in Table 16 together with the applicable grounds for that review.

Table 16 Review provisions in consents held in relation to the Motunui plant

Consent	Review date	Review Condition	For the purpose of:
0820-2	30/06/15	7	[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 holder's requirements.
0822-2	1/06/15	9	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;
0825-3	1/06/15	5	
0827-3	30/06/15	5	
3400-2	30/06/15	22	

Consent	Review date	Review Condition	For the purpose of:
4042-3	30/06/18	17	

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

2.10 Recommendations

1. THAT monitoring of water abstractions from the Methanex Motunui Plant in the 2014-2015 year continue at the same level as in 2013-2014.
2. THAT monitoring of water discharges from the Methanex Motunui Plant in the 2014-2015 year continue at the same level as in 2013-2014.
3. THAT monitoring of air emissions from the Methanex Motunui Plant in the 2014-2015 year continue at the same level as in 2013-2014.
4. THAT the Council considers whether or not the current water meter location is acceptable.
5. THAT Methanex continue with discussions with Council staff on the required testing to establish water intake pipeline integrity at intervals of at least every five years and that this either result in the undertaking of the required testing or a variation of consent conditions.
6. THAT the option of a review of the Methanex Motunui plant resource consents in June 2015, not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.

3. Waitara Valley

3.1 Process description

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

The Waitara Valley plant (Photo 3) is a 1,500 tonne/day methanol production facility, which could produce 900,000 tonnes/year of chemical grade methanol. Actual production varies with the availability of natural gas.

Methanex Waitara Valley plant 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 meters. 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 plant differs from the system used at the Motunui plant and the cooling tower is considerably smaller in size.

Photo 3 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 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 waste water 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. nitrogen, 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.

However during this monitoring period the site was restarted following a long dormant period and therefore little solid wastes have been generated onsite.

3.2 Resource consents

Methanex holds five active resource consents (excluding renewals) for the operation of the Waitara Valley plant. A summary of the requirements imposed by each of the consents is provided in Sections 3.2.1 to 3.2.4 and copies of the resource consents are included in Appendix II.

A summary list of the consents held by Methanex in relation to the Waitara Valley plant is given in Table 17.

The early consents were granted to Petralgas Chemicals NZ Limited. In May 1993, the Company was changed to Methanex Waitara Valley Limited, following the merger of

Fletcher Challenge Methanol and Methanex Corporation Canada. The consents were transferred under the name of Methanex Motunui Limited in 2005.

Table 17 Consents held in relation to the Waitara Valley plant, July 2013 – June 2014

Consent	Purpose	Volume (m^3/day)	Review date	Expiry date
0801-2	Water take from Waitara River for the Waitara Valley petrochemical plant	7,200	Jun 2015	Jun 2021
0802-2	Discharge stormwater from the Waitara Valley plant to the Waitara River	-	Jun 2015	Jun 2021
3399-2	Discharge treated waste water and stormwater to Tasman Sea	5,000	Jun 2015	Jun 2021
3960-2	Construct rock groyne in Waitara River	-	Jun 2015	Jun 2021
4045-3	Discharge to air from methanol plant	-	Jun 2015	Jun 2021

3.2.1 Water abstraction permits

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

Methanex holds one resource consent to abstract water for the Waitara Valley petrochemical plant as described below:

Consent 0801-2: Abstraction from the Waitara River
Methanex holds water consent 0801 to cover the abstraction at two points upstream of the methanol plant. The original permit was issued by the Council on 23 July 1980 under Section 87(d) of the RMA. It was due to expire in May 2008 and renewed as Consent 0801-2 on 29 April 2008. This consent will expire in June 2021.

There are 8 special conditions attached to this consent.

Special conditions 1 and 3 set out a maximum rate of abstraction of 300 m^3/hr (approximately 83 l/s) when the flow rate of the Waitara River measured at Bertrand Road is greater than 4,600 l/s. No water is to be taken when the river falls below this level.

Special condition 2 requires that the consent holder must maximise the water take from the Motunui intake structure and minimise that taken from the old Waitara Valley intake.

Special condition 4 requires the installation and maintenance of a water meter and specifies the technical requirement around this.This condition specifies the format and frequency at which the water abstraction records be forwarded to the Council.

Special condition 5 requires the consent holder to avoid, remedy and mitigate and adverse effects as a consequence of exercising the consent. This includes five yearly testing and reporting of the pipeline integrity between the plant and take as well as the provision of a two yearly report on water use reduction programmes.

Special condition 6 requires screening of the intake structure to prevent the entrainment of fish.

Special condition 7 and 8 are lapse and review provisions.

3.2.2 Land use permit

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.

3960-2: Rock groyne in Waitara River
Methanex holds land use permit 3960 which provides for the construction of a rock groyne in the Waitara River to control against river bed degradation in the vicinity of the water intake structure. This permit was issued by the Council on 23 September 1991 under Section 87(e) of the RMA. It was due to expire on 1 June 2003. The consent was renewed on 14 May 2003 and is due to expire on 1 June 2021. There are three special conditions attached to the consent.

Condition 1 requires that the consent holder notify the Council prior to undertaking maintenance that may impact on the bed of the river.

Condition 2 requires that when the structures are no longer required, they be removed and the area reinstated, and that the Council must be notified prior to their removal.

Condition 3 provides for a review of the consent to be undertaken in June 2015. The consent is due to expire on 1 June 2021.

3.2.3 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.

Methanex currently holds two consents to discharge water from the Motunui site, as described below.

Consent 0802-2: Discharge of uncontaminated stormwater to the Waitara River
The original discharge permit (Consent 0802-1) was granted by the Council on 25 May 1981 under Section 87(e) of the RMA. That consent expired in June 2008. The renewed consent (Consent 0802-2) presently provides for the discharge of stormwater to the Waitara River from the Waitara Valley plant and is due to expire in June 2021.

There are seven special conditions attached to this consent:

Special condition 1 requires that the consent holder adopt the best practicable option to prevent or minimise adverse effects on the environment.

Special condition 2 requires that the consent be exercised in accordance with the documentation supplied in support of the application.

Special condition 3 requires that the consent holder test the levels of contaminants in the stormwater prior to discharge and report these to Council.

Special condition 4 limits the concentration of certain analytes in the discharge and specifies the pH range.

Special condition 5 require certain water quality parameters to be met downstream of the discharge point and mixing zone.

Special conditions 6 and 7 relate to the lapse and review provisions of the consent.

Consent 3399-2: Discharge of plant effluent to Tasman Sea
Methanex holds coastal discharge consent 3399-2 to cover the discharge of treated wastes, including process and water treatment wastes and domestic sewage, and contaminated stormwater from the Waitara Valley plant into the Tasman Sea. The discharge occurs via the Waitara marine outfall which discharges approximately 1,250 metres offshore from the Waitara River mouth. This consent was granted by the Council on 11 October 1989 under Section 87(e) of the RMA with an expiry date in May 2008. The renewed consent (Consent 3399-2) presently provided for the discharge of up to 5,000 m^3/day, with a maximum discharge rate of 60 l/s.

In June 2013 Methanex applied for a variation of this consent in anticipation of the Waitara Valley plant restart. During the years that the plant had been idle there were some advances in cooling water treatment technology which Methanex wished to implement upon the restart of the plant. The changes were also considered likely to align with the already instigated treatment programme at the nearby Motunui plant. Methanex requested that two chemicals used in the water treatment programme be replaced with two equivalent water treatment chemicals.

The application was for routine dosing of 'Spectrus CT1300' as part of the water treatment programme at Waitara Valley. The recent detection of elevated *Legionella* bacteria at the Motunui site had illustrated the potential risk to human health involved with restarting a dormant production plant. *Legionella* bacteria, when breathed into the lungs in ultra-small droplets, have high potential to cause Legionnaires Disease, which is potentially fatal. It was noted that the cooling tower system includes areas where this exact condition of droplet size is present, and Methanex aimed to control levels to <10 cfu/mL to eliminate the potential human health risk. They identified that this risk could be controlled for through the use of a chemical biocide such as 'Spectrus CT1300'.

The consent variation resulted in Table 1 of special condition 8 being changed to include 'Spectrus CT1300' in the list of water treatment chemicals, with a maximum daily discharge rate of 5 kg. The cooling water treatment chemical 'Continuum AEC3109' was also replaced with the equivalent chemicals 'Gengard GN8020' and 'Flogard MS6209'. These chemicals are used as dispersants to eliminate build up of calcium phosphate and calcium carbonate scale, and to reduce steel corrosion.

The proposed replacement chemicals are essentially the same as the original product and are designed to function in the same manner. There are two minor differences between the previous and the varied dosing programme:

1. Gengard GN8020 contains a new generation calcium phosphate dispersant which has the same functionality as that contained in Contiuum AEC3109, but is more stable under cooling tower conditions (high temperatures and presence of halogens).

2. Flogard MS6209 contains ortho-phosphate as well as zinc sulphate; in the existing regime, the ortho-phosphate is contained in Continuum AEC3109 instead.

The likely environmental effects and relating to this change were considered at the time of the application and found to be negligible.

Condition 8 of the consent was modified on 29 July 2013 to include and replace these chemicals.

There are 20 special conditions attached to this consent:

Special condition 1 requires that the consent holder adopt the best practicable option to prevent or minimise adverse effects on the environment.

Special condition 2 requires the consent holder to keep records of the volume of effluent and provide these to the Council on a monthly basis.

Special condition 3 limits the volume and rate of the discharge.

Special condition 4 requires a minimum initial dilution factor to be met.

Special condition 5 limits the concentration of suspended solids.

Special condition 6 and 7 require certain water quality parameters to be met.

Special condition 8 limits what water treatment chemicals may be used and their relative dosing limits.

Special conditions 9 to 11 and 13 discuss the requirements of Methanex to advise the Council of any proposed changes in water treatment or cleaning chemicals, or equivalent chemicals, in order that limitations may be placed on their discharge, if necessary, for protection of the receiving waters.

Special condition 12 specifies the sampling point for condition 5, 6, 7 and 8.

Special condition 14 outlines what effects the discharge may not give rise to after a mixing zone of 200 metres.

Special condition 15 requires a contingency plan, to maintained and put into operation in the event of spillage, accidental discharge, or pipeline failure. The plan is to be provided to Council initially after the granting of the consent and reviewed by the consent holder thereafter on a two yearly basis.

Special condition 16 specifies that the discharge of domestic sewage (human effluent) will not be permitted following the planned closure of the Waitara municipal WWTP.

Special conditions 17 and 18 require reports to be received from Methanex. Methanex must certify the structural integrity and dilution performance of the outfall at least every 5 years. An annual report on the performance of the effluent disposal system is also required and must detail compliance with conditions of the consent.

Special conditions 19 and 20 relate to the lapse and review provisions of the consent.

Methanex lodged a separate application [4967] for the domestic sewage component of their Waitara Valley discharge. Subsequently, in 2011, Methanex implemented an onsite sewage treatment system, which discharges as treated water to grass on site. Accordingly, from January 2010 until September 2011 Methanex had the ability to discharge their treated sewage through the outfall under consent 3399-1 (in accordance with section 124 of the RMA).

3.2.4 Air discharge permit

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

Methanex holds one discharge consent for the Waitara Valley site.

Consent 4045-3: Discharges to air from the Waitara Valley methanol plant
Methanex holds air discharge consent 4045, to cover the discharge of emissions from combustion and other activities associated with the production of methanol at the Waitara Valley plant.

The Council issued this permit on 6 December 1995 as a resource consent under Section 87(e) of the RMA. A minor variation to remove requirements relating to carbon dioxide emissions was granted on 6 April 2005. The consent was due to expire on 1 June 2008 but has been renewed as consent 4045-3, granted in April 2008 and is now due to expire in June 2021.

There are 14 special conditions attached to this consent.

Special condition 1 requires that the consent holder adopt the best practicable option to prevent or minimise adverse effects on the environment.

Special condition 2 requires the consent holder to operate all plant and processes to keep emissions to a practical minimum.

Special condition 3 specifies that the consent holder must notify the Council prior to any plant or process change which is likely to substantially change the amount or nature of emissions.

Special condition 4 requires the consent holder to supply a report to the Council, every three years. It must include a review of emission control technology, an emissions inventory, energy efficiency measures and any other relevant issues.

Special conditions 5 through 8 set limits on various gaseous contaminants (methanol, carbon monoxide, and nitrogen oxides) to protect the receiving environment and human health.

Special condition 9 restricts offensive or objectionable odour at or beyond the property boundary.

Special condition 10 specifies that the discharges authorised by the consent should not cause significant adverse effects on local ecosystems.

Special condition 11 is a review condition, including provisions for review of best practicable options in emission control technology.

Special condition 12 requires effects monitoring.

Special condition 13 is a lapse condition.

Special condition 14 allows for provisional review.

3.3 Results

3.3.1 Site inspections

As outlined in section 2.5.1 of this report Council officers carried out two compliance monitoring site inspections on 28 August 2013 and 26 November 2013 as well as two compliance monitoring sampling visits for the purpose of collecting a split sample on 06 December 2013 and 20 May 2014.

On 28 August 2013 at 1400hrs
An inspection of both facilities was undertaken by Council staff, accompanied by Gary Rielly and Ben Lawn (Methanex). At the time of inspection, both sites showed reasonably high levels of activity. The Waitara Valley site was inspected after the Motunui site. It was noted that it was approaching re-start, with many contractors onsite performing extensive maintenance of the pipework. No spills or issues were observed around the site, the ponds looked in good condition. The cooling water towers were in use, with no issues noted. The reformer was not yet operative. Methanex were aiming to restart the Waitara Valley site in the next couple of weeks. No significant issues were noted during the inspection.

On 26 November 2013 at 0930hrs
An inspection of the Methanex facilities at Motunui and Waitara Valley was conducted with Gary Rielly (Methanex). The Waitara Valley site was inspected after the Motunui site. The ponds were inspected and no sheens or issues were noted. Housekeeping at the site was good and overall the site was tidy. An incident had been reported and dealt with prior to this inspection in October at this site. It related to a sulphuric acid discharge to ground as a result of a hole that had formed in the concrete drain from the bunded containment area (refer to section 3.4 of this report for further detail). The damaged channel near the sulphuric acid pumps had been sealed up with a temporary patch of epoxy. Council staff were informed that a stainless steel liner would be installed in the channel and then sealed over for a permanent repair.

3.3.2 Surface water

3.3.2.1 Surface water abstraction monitoring by the Company

Since 1992, water for operation of the Waitara Valley methanol plant has been supplied from headworks constructed for supply of the Methanex Motunui plant. 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 plant 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 when the river flow at the Bertrand Road gauging station is above 4,600 l/s (16,560 m^3/hour). A hydrograph of river flows at the Bertrand Road gauging station based on data for calculated mean daily flows during the 2013 – 2014 monitoring period is attached to this report as Appendix III. On one occasion during April 2014 the Waitara River flow fell below this level. The event was short lived and the flow recovered to above the consented level by the next day. The breach of consent was considered insignificant as

the flow was marginally less than the consented limit and for only brief periods of time on the same day. Reported maximum daily abstraction rates were within allowable limits at all times.

3.3.2.2 Effluent monitoring

Wastewater from the Waitara Valley plant is treated and discharged to the Waitara marine outfall. During the period under review, treated plant effluent comprised process and water treatment wastes, domestic effluent 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 are measured by online analysers, and recorded continuously at the Waitara Valley effluent discharge point. 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 this data is presented in Table 18 and Table 19.

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 Waitara wastewater treatment plant ceased operation after the end of the monitoring period, the maximum pH values of 6 and 11 are used for assessing consent compliance.

Analysis of composite samples
A proportional sampler is used to create a daily composite sample representative of the daily flow of plant effluent. This is analysed by the Methanex laboratory, to determine compliance with their discharge consent 3399-2. A summary of this data is presented in Table 18.

Table 18 Summary of the Waitara Valley plant's monitoring results of plant effluent during 2013-2014

	Unit	Minimum	Maximum	Consent limit	Number of breaches
Continuous measurement					
Flow (daily average)	m^3/day	0	3,860	5,000	0
pH	-	6.7	9.99	6-11	0
Daily measurement					
Petroleum hydrocarbons	g/m^3	0	1	10	0
Methanol	g/m^3	0	2	15	0
Suspended solids	kg/day	0	58	500	0
Monthly measurements					

	Unit	Minimum	Maximum	Consent limit	Number of breaches
Ammonia*	g/m^3	<0.1	16	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	0.19	2.0	0

* Ammonia testing was reinitiated in the monitoring period. Previously, agreement was reached with Council during the 2010 calendar year to discontinue ammonia measurements until the plant becomes operational, The plant remained shut down until 2013 and thus there were no sources of ammonia on site.

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 calculates water treatment chemical mass discharge rates using chemical consumption data. A summary of this data for the monitoring period is presented in Table 19.

Table 19 Summary of Waitara Valley chemical discharge data (calculated) for July 2013 to June 2014

Water treatment chemicals - consent 3399-2 (calculated)					
	Unit	Minimum	Maximum	Consent limit	Number of breaches
Klaraid PC1192	Kg/day	0	45	150	0
Spectrus BD1500	Kg/day	0	18	50	0
Inhibitor AZ8104	Kg/day	0	28	30	0
Steamate NA0880	Kg/day	0	24	25	0
Cortrol OS7780	Kg/day	0	51	300	0
Optisperse HTP 73301	Kg/day	0	19	50	0
Optisperse HTP 73611	Kg/day	0	47	50	0
Optisperse PO5211A	Kg/day	0	0	15	0
Foamtrol AF2290	Kg/day	0	0	2	0
Gengard GN8020	Kg/day	0	13	70	0
Spectrus CT1300	Kg/day	0	0	5	0
Flogard MS6209	Kg/day	0	2	20	0

Compliance with conditions on plant effluent composition and discharge rate were achieved throughout the monitoring period from July 2013 to June 2014.

Marine outfall report

As discussed in section 2.5.3.2, a five-yearly report on the structural integrity and dilution performance of the Waitara Marine outfall was received from Methanex on 3 February 2014. This is a requirement of special condition 17 of Consent 3399-2. Maintenance of the outfall is on-going while the dilution performance was found to meet the consent requirements.

3.3.3 Inter-laboratory comparisons

The Council carried out inter-laboratory comparisons on two occasions 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 **Error! Reference source not found.**. The exercise also serves as a compliance monitoring check.

Table 20 Inter-laboratory comparison on Waitara Valley effluent composite sample results

Waitara Valley process effluent - IND002005 (Consent 3399-2)						
Parameter Unit		Consent limits	6 December 2013		20 May 2014	
			Methanex	TRC	Methanex	TRC
Ammonia as N	mg/l		1.0	1.62	3.4	3.64
Chemical oxygen demand	mg/l	200	32	43	25	22
Conductivity @ 25 °C	µs/cm	*300**	3910	3839	2600	2530
Copper	mg/l	0.5	<0.05	0.03	<0.05	0.01
Methanol	mg/l	15	<2	<1	<2	<1
Nickel	mg/l	1.0	<0.10	<0.02	<0.10	<0.02
pH		6.0-11.0	8.1	8	7.9	7.8
Total hydrocarbons	mg/l	10	<1	<0.5	<1	<0.5
Total suspended solids	mg/l	daily discharge <500kg	8	2	<6	2
Zinc	mg/l	1.0	0.1	0.118	<0.1	0.044
Turbidity	NTU			2.4	2.3	1.2

* Guideline limit; not a consent limit

Results from each laboratory for stormwater discharges met the consented water quality criteria on all occasions. Conductivity was elevated in the 2014 samples, but with consideration of the other analytical results, this was not considered to be of concern.

Overall there was good agreement between the inter-laboratory analytical sample results.

In the 2013 - 2014 monitoring period sample analytical results showed reasonable agreement.

3.3.3.1 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 monthly reports throughout the monitoring period and thus comply with this condition.

3.3.3.2 Uncontaminated stormwater

All stormwater from process areas is contained on the Waitara Valley site in the stormwater pond. Consent 0802 allows for the discharge of uncontaminated stormwater to the Waitara River. In April 1994, the Company made a decision to

discharge all routine stormwater from the site via the Waitara marine outfall (consent 3399).

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.

3.3.4 Air

3.3.4.1 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 plant perimeter were noted during any of the inspections.

3.3.4.2 Consent requirements

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 March 2010 and August 2012. The reports were discussed in the previous 2010-2013 compliance monitoring report..

3.4 Investigations, interventions, and incidents

In 2013-2014 there were two non-compliant events (relating to the same incident) recorded by Council that were associated with Methanex's Waitara Valley plant.

Discharge of Sulphuric Acid to Land (Incident IN/23973)
On 10 October 2013 at 0300hrs the Council received a self notification from Methanex's Waitara Valley plant regarding a spill of approximately 10.5 m^3 of 98% sulphuric acid into the ground. The event resulted due to the presence of a hole in the concrete drain from a bunded containment area.

The incident originated due to a leak in a transfer pump on the pipe work leading from the storage tank to the plant. This resulted in the acid being discharged and captured within a bunded area. The bunded area directs all spills to a drain which leads to a storage sump where any discharge is subsequently treated and discharged to the storm pond. A hole in the drain leading to the sump (as shown in photo 4) however resulted in the spill flowing out the hole and into the soil below the plant.

Photo 4 Point of discharge – the hole in the concrete channel

Associated with this spill was a second discharge of plant wash water into the ground via the same hole in the drain leading to the plant's neutralisation sump. This occurred as following the discovery of the hole in the drain, when Methanex continued to use the drain without carrying out immediate repairs.

Council staff conducted an investigation in relation to the circumstances surrounding the acid spill. As a result, an abatement notice was issued requiring works to be undertaken to prevent reoccurrence; and to undertake an investigation to ascertain the level of soil and groundwater contamination and supply details to this Council of the results of the investigation and proposed works to remediate any soil or groundwater contamination. This included the drilling and sampling of at least three new groundwater wells located evenly across down gradient (in relation to ground water flow) of the spill location. A letter of explanation and the report were received. The report is attached in Appendix V. Methanex found that the majority of the acid that had been discharged from the leak escaped to ground and acknowledged that low pH values were recorded from the sampling of groundwater bores around the site, but indicated that the ground water pH value had been relatively low prior to the discharge while the Waitara Valley plant was shut down. The environmental impact of this discharge was considered likely to be low given the sampling results of the groundwater bores. Methanex responded effectively and appropriately once the incident was discovered.

Council staff met with Methanex staff to discuss the investigation and likely enforcement. Two infringement notices were issued in response to this incident based on the contravention of Section 15(1)(d) of the RMA.

3.5 Discussion

3.5.1 Discussion of plant performance

During each inspection by the Council, officers have noted that the facility is well managed, with a high standard of housekeeping apparent. However two incidents relating to a sulphuric acid and wastewater discharge were recorded during the monitoring period and both of these could have been avoided with better risk management.

Methanex submitted an updated spill contingency plan for the Waitara Valley site in 2010, 2011 and 2012. An updated contingency plan will be expected later in 2014.

3.5.1.1 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.

3.5.1.2 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.

3.5.2 Evaluation of performance

A tabular summary of Methanex's compliance record for the year under review is set out in **Error! Reference source not found.** to Table 25.

Table 21 Summary of performance for Consent 0801-2 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 300m^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 > 4,600L/s. No taking to occur when the river level falls below this.	Ongoing monitoring of river levels and Methanex self-monitoring data.	No – Insignificant breach for a short period.
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

Condition requirement	Means of monitoring during period under review	Compliance achieved?
5. Provision of reports on the testing of pipeline integrity and water use reduction programmes.	Water reduction report submitted 2010 and 2012.The next report is expected before the end of 2014. The Council and Methanex are discussing appropriate methods for testing of pipeline integrity.	Yes
6. Appropriate screening of intake to prevent fish entrainment.	Ongoing consultation.	Yes
7. Lapse condition.	N/A	N/A
8. Review provision.	Next scheduled in June 2015.	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		Good

N/A = not applicable

Table 22 Summary of performance for Consent 0802-2 Discharge of uncontaminated stormwater to 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.	N/A – not exercised
2. Activity to be undertaken generally in accordance with the consent application documentation.	Inspections and liaison with consent holder.	N/A
3. Any stormwater to be discharged to the Waitara River to be tested and results provided to the Council for approval before discharge.	No discharge of site stormwater to Waitara River in the period under review.	N/A
4. Specified chemical constituents not to be exceeded in the discharge.	Consent not exercised.	N/A
5. Specified prohibited effects on the receiving water.	Consent not exercised.	N/A
6. Lapse condition.	N/A	N/A
7. Review provision.	Next scheduled in 2015 if required.	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		N/A

Table 23 Summary of performance for Consent 3399-2 Discharge of treated wastes 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 separate programme).	Yes
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.	Monthly reports.	Yes
8. Allowable water treatment chemicals and volumes.	Inspection and liaison with consent holder.	Yes
9. Approval from the Council required to discharge 'equivalent' chemical.	Included in consent variation.	Yes
10. Definition of 'equivalent'.	N/A	N/A
11. Discharge of equivalent chemical requires written request .	Consent variation.	Yes
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.	N/A
13. Limits in conditions 7 and 8 apply unless the Council has given approval for a short term change.	No approval given.	N/A
14. Effects on receiving waters.	Marine ecological surveys (separate programme).	N/A
15. Consent holder to maintain contingency plan.	Contingency plan received 2010, 2011 and 2012. A significant review was completed in 2012. Was not requested in the 2013-2014 period.	Yes
16. No domestic sewage in discharge after closure of Waitara Municipal WWTP.	Domestic sewage discharged to land.	Yes
17. Consent holder to certify the structural integrity and dilution performance of outfall at least every five years.	Report received February 2014. A commercial diver survey was undertaken to inspect the integrity of the outfall in November 2013. 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

Condition requirement	Means of monitoring during period under review	Compliance achieved?
19. Lapse of consent.	N/A	N/A
20. Review of consent.	Next scheduled in 2015 if required.	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		High High

Table 24 Summary of performance for Consent 3960-2 Construction of 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.	Next scheduled in 2015 if required.	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		N/A

Table 25 Summary of performance for Consent 4045-3 Discharge of 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
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	Some liaison during restart process including consent changes. Inspection and liaison found no alterations to plant or processes requiring additional approvals.	Yes
4. Triennial written air discharge report	Report received March 2010 and August 2012. Next expected in 2015.	Yes
5. Maximum ground-level concentrations of methanol beyond boundaries	To be reviewed upon receipt of the next triennial air report.	N/A
6. Maximum ground-level concentrations of carbon monoxide beyond boundaries	To be reviewed upon receipt of the next triennial air report.	N/A
7. Maximum ground-level concentrations of nitrogen dioxide beyond boundaries	To be reviewed upon receipt of the next triennial air report.	N/A
8. Maximum ground-level concentrations of other contaminants beyond boundaries	To be reviewed upon receipt of the next triennial air report.	N/A

Condition requirement	Means of monitoring during period under review	Compliance achieved?
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	Next scheduled in 2015 if required.	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High
Overall assessment of administrative performance in respect of this consent		High

In assessing a compliance and environmental performance ranking for Methanex, consideration was also given to the incidents that occurred during the monitoring period. Therefore during the period, Methanex demonstrated an improvement desired level of environmental performance and compliance with the resource consents for the Waitara Valley installation. This rating would have been an overall high level of environmental performance if solely considering compliance with their consents. The overall administrational performance was high.

3.5.3 Recommendations from the 2009 Annual Report

In the 2010-2013 Annual Report, it was recommended:

1. THAT inspections continue to remain at quarterly intervals with equivalent emphasis on activities at the Motunui site and the Waitara Valley site due to the planned restart of the Waitara Valley methanol plant in July/August 2013.
2. THAT monitoring of water abstractions and discharges at the Methanex Waitara Valley plant in the year 2013/14 continues at the same level as in previous years.
3. THAT monitoring of air emissions from the Methanex Waitara Valley plant in the year 2013/14 increase as appropriate for the restart of the plant planned for July/August 2013.
4. THAT Methanex continue to provide an up to date, specific and comprehensive contingency plan to prevent and respond to any unauthorised effluent discharges that may arise from spillages, accidental discharges or pipeline failure as required by special condition 15 of consent 3399-2.
5. THAT Methanex continue with plans to carry out testing to establish water intake pipe integrity at intervals of at least every five years and continue to provide a written report to the Council every two years outlining the results of water use

reduction initiatives. This action is required by special condition 5 of consent 0801-2.

6. THAT monitoring of ammonia in the treated wastewater and stormwater from the Waitara Valley methanol plant to the Tasman Sea via the Waitara marine outfall be resumed following the restart of production at the plant, planned for July/August 2013

Recommendations 1,2, 4 and 6 were carried out in full.

An increase in air emission monitoring as per recommendation 3 was not implemented, by the Council due to a low likelihood of any adverse effects given the recent monitoring of the Motunui restart. The concern regarding increase in *Legionella* bacterium associated with the restart of cooling towers was proactively responded to by means of a consent variation allowing the dosing of a new chemical for the purpose of sterilisation of the cooling towers.

To some extent recommendation 5 has been implemented with continued discussions underway between Methanex and the Council's hydrology staff on obtaining an exemption on the water meter location requirements while the accuracy of the Waitara Valley raw water flow meter is to be verified in July 2014 and will be reported on in the 2014-2015 compliance monitoring report.

3.5.4 Alterations to monitoring programmes for 2014-2015

In designing and implementing the monitoring programmes for air/water discharges in the region, the Council has taken into account the extent of information made available by previous authorities, its relevance under the RMA the obligations of the Act in terms of monitoring emissions/discharges and effects, and subsequently 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 emitting to the atmosphere/discharging to the environment.

The compliance monitoring programme for 2013-2014 was amended from that for 2012-2013, on the grounds that the Methanex Waitara Valley plant would be restarted during the course of the 2013-2014 year and as such the existing monitoring program was amended to provide sufficient data to assess environmental performance. It is now proposed that for 2014-2015, the programme be maintained at the same level as the programme for 2013-2014.

Recommendations to this effect are attached to this report.

3.5.5 Exercise of review of consent

Four of the resource consents relating to the operation of the Waitara Valley plant provide for an optional review of the consent in June 2015. The conditions in each consent that allows the Council to review the consent, are presented in Table 26 together with the applicable grounds for that review.

Table 26 Review provisions in consents held in relation to the Motunui plant

Consent	Review date	Review Condition	For the purpose of:
0801-2	01/06/15	8	[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.
0802-2	01/06/15	7	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;
3399-2	01/06/15	20	
4045-3	01/06/15	14	
3960-2	01/06/15	3	

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

3.6 Recommendations

1. THAT monitoring of water abstractions from the Methanex Waitara Valley plant in the 2014-2015 year continue at the same level as in 2013-2014.
2. THAT monitoring of water discharges from the Methanex Waitara Valley plant in the 2014-2015 year continue at the same level as in 2013-2014.
3. THAT monitoring of air emissions from the Methanex Waitara Valley plant in the 2014-2015 year continue at the same level as in 2013-2014.
4. THAT the Council notes the current water meter location as acceptable
5. THAT Methanex continue to investigate the required testing to establish water intake pipe integrity at intervals of at least every five years and that this either results in undertaking of the required testing or a variation of consent conditions.
6. THAT the option of a review of the Methanex Waitara Valley plant resource consents in June 2015, not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.

4. Summary of recommendations

1. THAT monitoring of water abstractions from the Methanex Motunui and Waitara Valley plant in the 2014-2015 year continue at the same level as in 2013-2014.
2. THAT monitoring of water discharges from the Methanex Motunui and Waitara Valley plant in the 2014-2015 year continue at the same level as in 2013-2014.
3. THAT monitoring of air emissions from the Methanex Motunui and Waitara Valley plant in the 2014-2015 year continue at the same level as in 2013-2014.
4. THAT the Council considers whether or not the current water meter location is acceptable.
5. THAT Methanex continue to investigate the required testing to establish water intake pipe integrity at intervals of at least every five years and that this either results in undertaking of the required testing or a variation of consent conditions.
6. THAT the option of a review of the Methanex Motunui and Waitara Valley plant resource consents in June 2015, not be exercised, on the grounds that current conditions are adequate to deal with any potential adverse effects.

Glossary of common terms and abbreviations

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

Biomonitoring	Assessing the health of the environment using aquatic organisms.
BOD	Biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate.
BODF	Biochemical oxygen demand of a filtered sample.
Bund	A wall around a tank to contain its contents in the case of a leak.
CBOD	Carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate.
cfu	Colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample.
COD	Chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m.
Council	The Taranaki Regional Council
Cu*	Copper.
Cumec	A volumetric measure of flow- 1 cubic metre per second (1 m^3/s).
DO	Dissolved oxygen.
DRP	Dissolved reactive phosphorus.
F	Fluoride.
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
IR	Incident Register – contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
l/s	Litres per second.
m^2	Square metres.
m^3	Cubic metres.

MCI	Macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats.
mg/l	Milligrams per litre.
mS/m	Millisiemens per metre.
Mixing zone	The zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).
Ni	Nickle.
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
NPDC	New Plymouth District Council
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
PM_{10}	Relatively fine airborne particles (less than 10 micrometre diameter).
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal 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.
Sulphuric Acid	A strong, dense, colourless and oily acid, used commonly for commercial/manufacturing purposes. It has strong dehydrating properties and is also a good oxidising agent.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.
WWTP	Waste water 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 the Council's laboratory.

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Appendix I

Resource consents held by Methanex New Zealand Limited for the Motunui plant

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 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

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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:	12 February 2008

Conditions of Consent

Consent Granted:	To discharge contaminants into the air from the Motunui methanol plant and ancillary facilities at or about 2621399E-6245496N
Expiry Date:	1 June 2028
Review Date(s):	June 2013, June 2018, June 2023
Site Location:	Main North Road, Motunui, Waitara
Legal Description:	Lot 1 DP 334095 Pt Ngatirahiri 2F Blk Pt Lot 1 DP 10081 Ngatirahiri 2C1A Blk Ngatirahiri 2C1C Blk Lot 1 DP 16686 Pt Ngatirahiri 2B2B2 Blk Ngatirahiri 2B2A1 Blk Ngatirahiri 2C1B Blk Ngatirahiri 2B2A2B Blk

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 4596. In the case of any contradiction between the documentation submitted in support of application 4596 and the conditions of this consent, the conditions of this consent shall prevail.

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

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

5. The consent holder shall commission reports that detail the technology that could minimise the adverse effects of the water vapour plume from the cooling tower. These reports shall:

a) be prepared by an appropriately qualified independent person approved by the Chief Executive, Taranaki Regional Council;

b) be provided to the Chief Executive, Taranaki Regional within 12 months of the commencement of this consent [in accordance with Section 116 of the Resource Management Act 1991] and at intervals not exceeding 5 years thereafter;

c) detail the: costs; expected levels of reduction in adverse effects; and practical implications of introducing the technology(s) at the Motunui plant;

d) provide an assessment of what constitutes the "best practicable option" for minimising the adverse effects of the water vapour plume from the cooling tower.

6. Other than as provided for under condition 5, the consent holder shall also provide to the Chief Executive, Taranaki Regional Council, within two years from the date on which this consent is granted and every two years thereafter a written report:

a) reviewing any technological advances in the reduction or mitigation of emissions, especially but not exclusively in respect of potential or actual odorous emissions, how these might be applicable and implemented at the Motunui plant, and the costs and benefits of these advances; and

b) detailing an inventory of emissions [excluding carbon dioxide] from the site of such contaminants as the Chief Executive, Taranaki Regional Council may from time to time specify following consultation with the consent holder; and

c) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the Motunui petrochemical plant; and

d) addressing any other issue relevant to the minimization or mitigation of emissions from the site that the Chief Executive, Taranaki Regional Council considers should reasonably be included.

7. The consent holder shall control all emissions of methanol to the atmosphere from the site, so as to ensure that maximum ground level concentrations of methanol do not exceed 9 mg/m^3 measured as a one hour average under ambient conditions, at or beyond the boundary of the site.

8. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the site, so as to ensure that the maximum ground level concentration of carbon monoxide measured under ambient conditions does not exceed 10 mg/m^3 [average exposure over any period of eight hours or longer], or 30 mg/m^3 [one hour average], at or beyond the boundary of the site.

9. The consent holder shall control all emissions of nitrogen dioxide or its precursors to the atmosphere from the site, so as to ensure that the maximum ground level concentration of nitrogen dioxide measured under ambient conditions does not exceed 200 ug/m^3 [one hour average], or 100 ug/m^3 [twenty four hour average], at or beyond the boundary of the site.

10. The consent holder shall control all emissions to the atmosphere from the site of contaminants other than methanol, carbon monoxide, and nitrogen dioxide and its precursors, so as to ensure that the maximum ground level concentration for any particular contaminant at or beyond the boundary of the site is not increased above background levels:

    a) by more than 1/30 th of the relevant Occupational Threshold Value Time Weighted Average, or by more than the Short Term Exposure Limit at any time; or

    b) if no Short Term Exposure Limited is set, by more than three times the Time Weighted Average at any time [Workplace Exposure Standards effective from 2002, Department of Labour].

11. The consent holder shall compile an inventory of emissions discharged to air from the incinerator stacks including the date, time, nature of discharge and any visual impact of emissions offsite. The data gathered shall be supplied as part of report on air emissions stated in special condition 6.

12. The discharges authorised by this consent shall not give rise to an odour at or beyond the boundary of the site that in the opinion of at least one enforcement officer of the Taranaki Regional Council, is offensive or objectionable.

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

14. Pursuant to section 128(1)(a) of the Resource Management Act, the Taranaki Regional Council, may review any or all of the conditions of this consent by giving notice of review within six months of the provision of a written report under special conditions 5 or 6; for the purpose of reviewing the best practicable option or options available to reduce or remove any adverse effects on the environment [including, but not limited to, minimisation of the cooling tower plume], or to deal with any significant adverse ecological effect on any ecosystems, including but not limited to habitats, plants, animals, microflora, and microfauna.

15. The exercise and effects of this consent shall be monitored to the satisfaction of the Chief Executive, Taranaki Regional Council.

16. 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.

17. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2013 and/or June 2018 and/or June 2023, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 12 February 2008

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Appendix II

Resource consents held by Methanex New Zealand Limited for the Waitara Valley plant

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

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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 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

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

Consent 3960-2

TARANAKI REGIONAL COUNCIL

CHIEF EXECUTIVE
PRIVATE BAG 713
47 CLOTEN ROAD
STRATFORD
NEW ZEALAND
PHONE 06-765 7127
FAX 06-765 5097

Please quote our file number on all correspondence

Land Use Consent

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

Name of Consent Holder:	Methanex Motunui Limited Private Bag 2011 NEW PLYMOUTH
Consent Granted Date:	14 May 2003

Conditions of Consent

Consent Granted:	To construct and maintain a rock groyne in the Waitara River to control against further river bed degradation at or about GR: Q19:185-405
Expiry Date:	1 June 2021
Review Date(s):	June 2009, June 2015
Site Location:	Pump Station, Mamaku Road, Waitara
Legal Description:	River Reserve 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

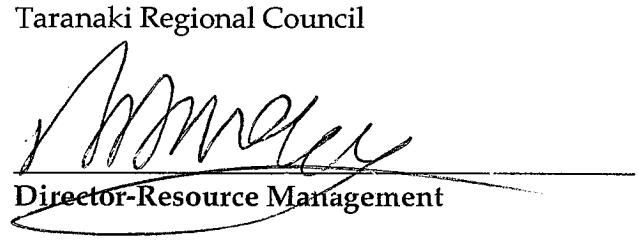
1. That the consent holder shall notify the Consents Section of the Taranaki Regional Council at least 24 hours prior to any maintenance works which would involve disturbance of, or deposition to the riverbed, or discharges to water.

2. That the structures authorised by this consent shall be removed and the area reinstated, if and when the structures are no longer required. The consent holder shall notify the Consents Section of the Taranaki Regional Council at least 48 hours prior to structure removal and reinstatement.

3. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2009 and/or June 2015, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Transferred at Stratford on 26 April 2005

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:	29 April 2008

Conditions of Consent

Consent Granted:	To discharge contaminants into the air from the Waitara Valley methanol plant at or about 2618266E-6241201N
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

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 [including but not limited to, minimising carbon dioxide emissions] to prevent or minimise any actual or likely adverse effect on the environment arising from emissions from the site. `Best practicable option' [as defined in section 2 of the Resource Management Act 1991] shall be determined by the Taranaki Regional Council, taking into account the information supplied by the consent holder under condition 4 of this consent, and following review as set out under condition 11 of this consent.

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

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

4. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, within three years from the date on which this consent is granted and every three years thereafter a written report:

a) reviewing any technological advances in the reduction or mitigation of emissions, especially but not exclusively in respect of potential or actual odorous emissions and the cooling tower plume, how these might be applicable and/or implemented at the Waitara Valley methanol plant, and the costs and benefits of these advances; and

b) detailing an inventory of emissions [excluding carbon dioxide] from the methanol distillation tower of such contaminants as the Chief Executive, Taranaki Regional Council may from time to time specify following consultation with the consent holder; and

c) detailing any measures that have been taken by the consent holder to improve the energy efficiency of the Waitara Valley methanol plant; and

d) addressing any other issue relevant to the minimisation or mitigation of emissions from the site that the Chief Executive, Taranaki Regional Council, considers should be included.

5. The consent holder shall control all emissions of methanol to the atmosphere from the site, so as to ensure that maximum ground level concentrations of methanol do not exceed 9 mg/m^3 measured as a one hour average under ambient conditions, at or beyond the boundary of the site.

6. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the site, so as to ensure that the maximum ground level concentration of carbon monoxide measured under ambient conditions does not exceed 10 mg/m^3 [average exposure over any period of eight hours or longer], or 30 mg/m^3 [one hour average], at or beyond the boundary of the site.

7. The consent holder shall control all emissions of nitrogen dioxide or its precursors to the atmosphere from the site, so as to ensure that the maximum ground level concentration of nitrogen dioxide measured under ambient conditions does not exceed 200 ug/m^3 [one hour average], or 100 ug/m^3 [twenty four hour average], at or beyond the boundary of the site.

8. The consent holder shall control all emissions to the atmosphere from the site of contaminants other than methanol, carbon dioxide, carbon monoxide, and nitrogen dioxide and its precursors, so as to ensure that the maximum ground level concentration for any particular contaminant at or beyond the boundary of the site is not increased above background levels:

a) by more than 1/30 th of the relevant Occupational Threshold Value Time Weighted Average, or by more than the Short Term Exposure Limit at any time; or

b) if no Short Term Exposure Limited is set, by more than three times the Time Weighted Average at any time [Workplace Exposure Standards effective from 2002, Department of Labour].

9. The discharges authorised by this consent shall not give rise to an odour at or beyond the boundary of the site that in the opinion of at least one enforcement officer of the Taranaki Regional Council, is offensive or objectionable.

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

11. Pursuant to section 128(1)(a) of the Resource Management Act, the Taranaki Regional Council, may review any or all of the conditions of this consent by giving notice of review within six months of the provision of a written report under special condition 4; for the purpose of reviewing the best practicable option or options available to reduce or remove any adverse effects on the environment, or to deal with any significant adverse ecological effect on any ecosystems, including but not limited to habitats, plants, animals, microflora, and microfauna.

12. The exercise and effects of this consent shall be monitored to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council.

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

14. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 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 29 April 2008

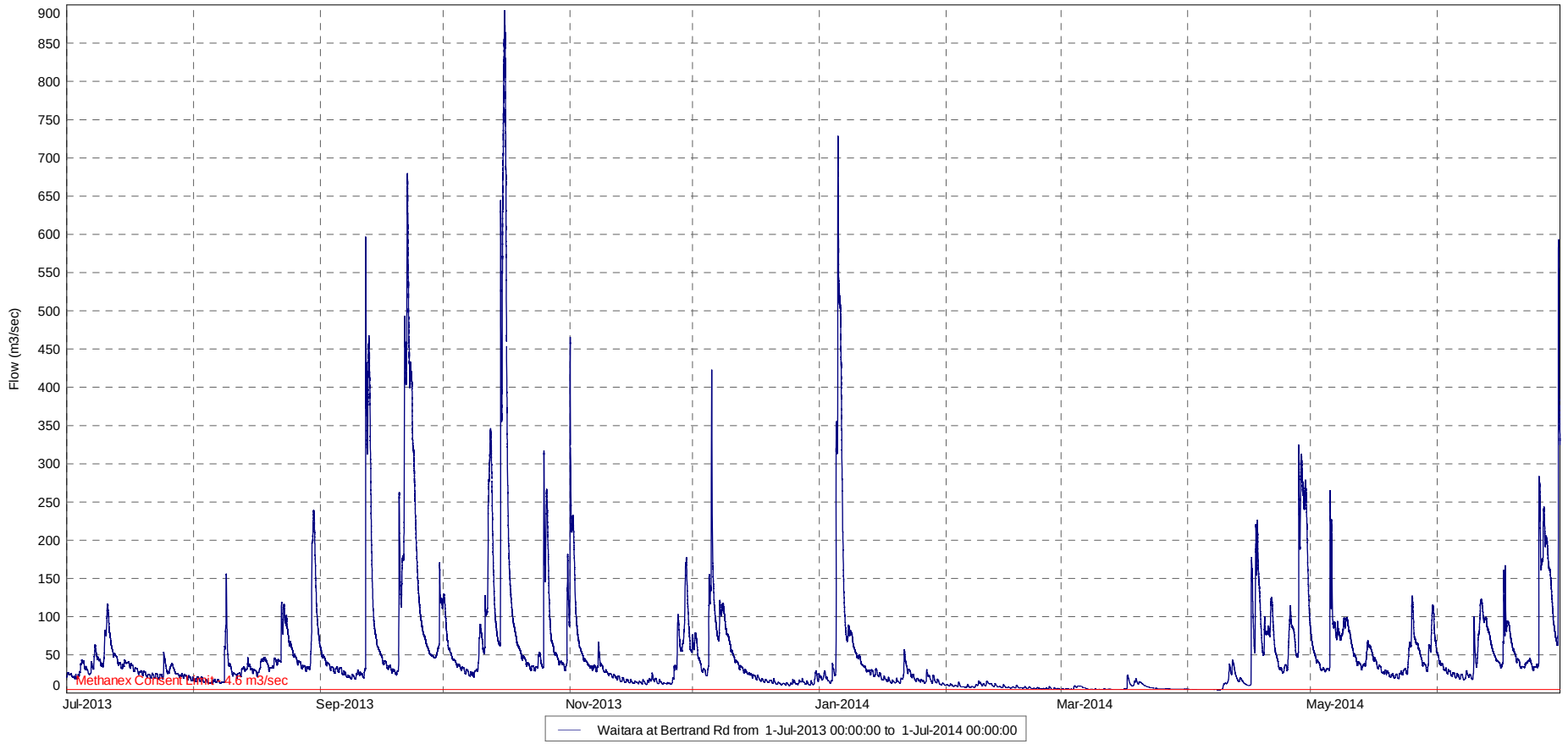
For and on behalf of
Taranaki Regional Council

_____

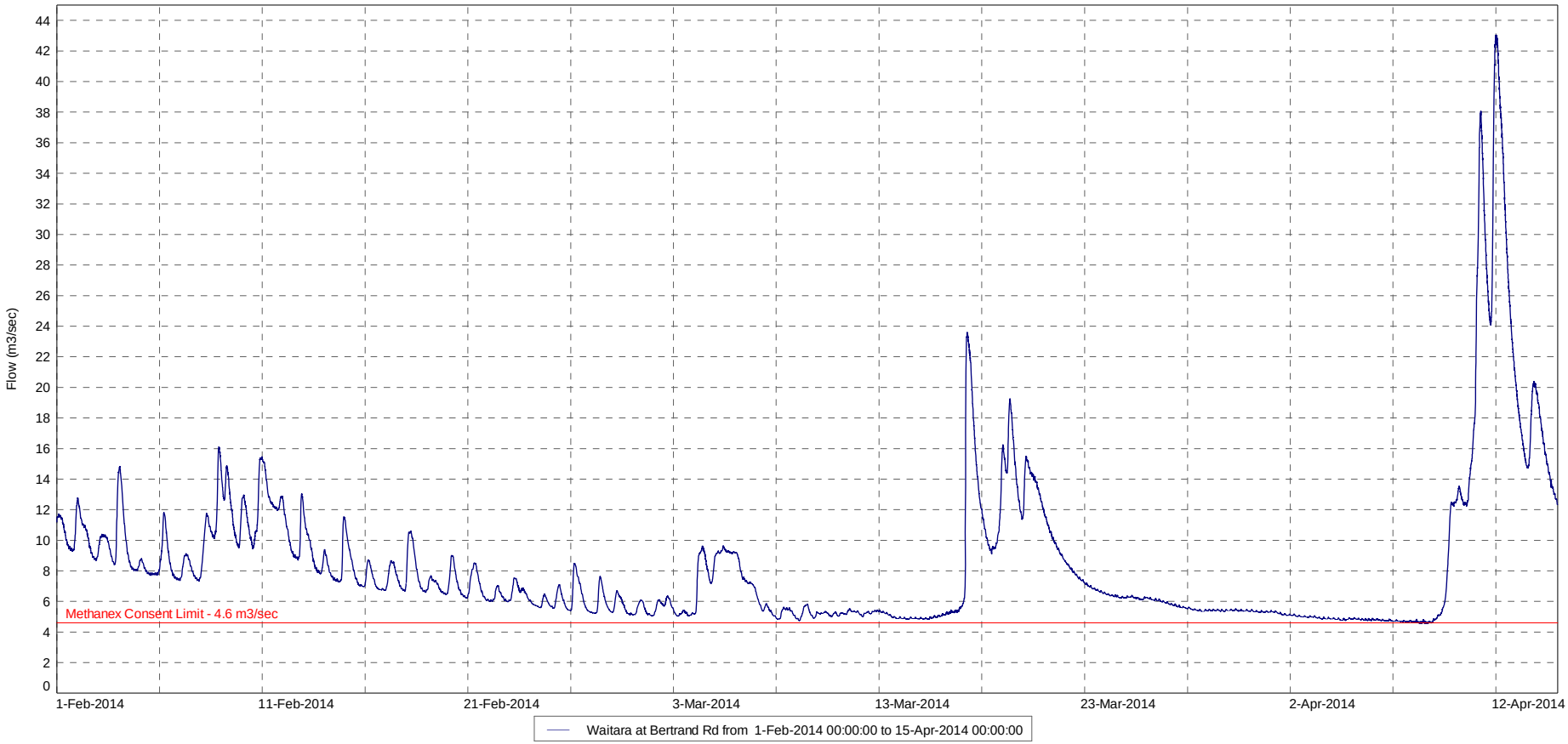
Director-Resource Management

Appendix III

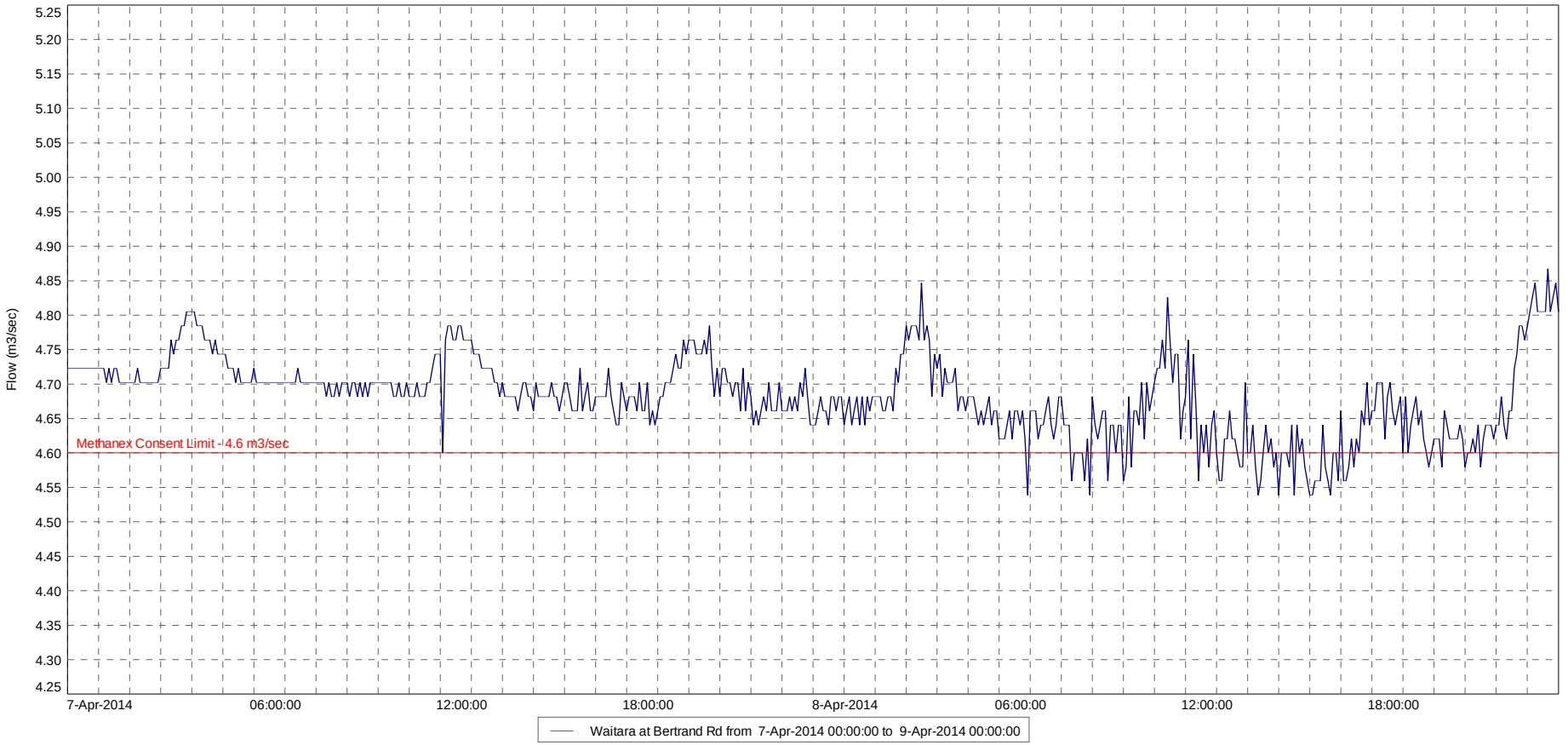
Hydrograph for the Waitara River at Bertrand Road for the monitoring period July 2013 to June 2014



Hydrograph showing the flow of the Waitara River at Bertrand Road 01 July 2013 to 30 June 2014. The consent limit is shown in red. The hydrographs following this show detail through reducing the scale of the graph to a smaller range in time and flow.



Hydrograph showing detail of extended dry period between February and April 2014



Hydrograph showing detail at which consent limit was reached on 08 April 2014

Appendix IV

Methanex New Zealand Limited
Waitara Marine Outfall Report 2014

Methanex New Zealand Limited
409 Main North Road, SH3
Motunui
Private Bag 2011
New Plymouth 4342
New Zealand

Telephone: +64 6 754 9700
Facsimile: +64 6 754 9701

www.methanex.com

METHANEX®

A Responsible Care® Company

January 29, 2014
File No: R40 0243

Taranaki Regional Council
Private Bag 713
Stratford

Attention: Scott Cowperthwaite

WAITARA MARINE OUTFALL REPORT FOR METHANEX NZ LTD.
5 – YEARLY REPORT (2014)

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 plants were not at full production, with associated lower plant wastewater to the outfall, however storm-water from the plant areas of the sites was all discharged via the outfall. The NPDC owns and operates the outfall, and a board was historically in place (Waitara Outfall Management Board - WOMB) to manage and maintain it, with Methanex being one of the members of the board. In 2010 the Board was annulled and a contract was put in place between Methanex and the NPDC which allows for Methanex's use of the outfall with NPDC carrying the responsibility to maintain its condition.

3. Structural Integrity of the Outfall

Over this reporting period the WOMB and subsequently the NPDC have engaged OCEL Consultants to inspect and carry out maintenance on the outfall. Early in this period inspection revealed some loss of tie-down strap integrity and

a significant build-up of tube worm growth, the combined effect being a concern over the integrity of the pipeline in a storm event, and plans were immediately put in place to remedy this situation. Underwater work on the outfall is problematic with very few windows of opportunity for diving with clear visibility, but as of the date of this report significant tubeworm growth has been removed and a large amount of replacement of tie-down straps has taken place.

The most recent diving inspection and work on the diffuser was undertaken on the 25 Nov. 2013. This inspection showed the diffuser section and first three seaward bays of the outfall section to be in good condition. It was noted that tube worm growth is re-establishing on sections of the diffuser cleaned previously a couple of years ago, and a regular programme of removing this growth has been recognized.

Reports and correspondence relating to this work are enclosed.

4. Dilution Performance of the Outfall

A modelling report was commissioned for the dilution performance of the outfall in Dec. 2013. The modelling was carried out using flows from the Methanex plants only as the NPDC plan to divert the sewage flows from the Waitara area to the NP Waste Water Treatment Plant early in 2014. From this point the Methanex discharges will be the only regular use of the outfall, with Waitara sewage potentially being discharged only in emergency events.

This report is enclosed, with the results showing that the diffuser meets the required minimum average initial dilution of 100:1

Report Prepared by:

Gary Rielly
Responsible Care, Environment and Quality Leader

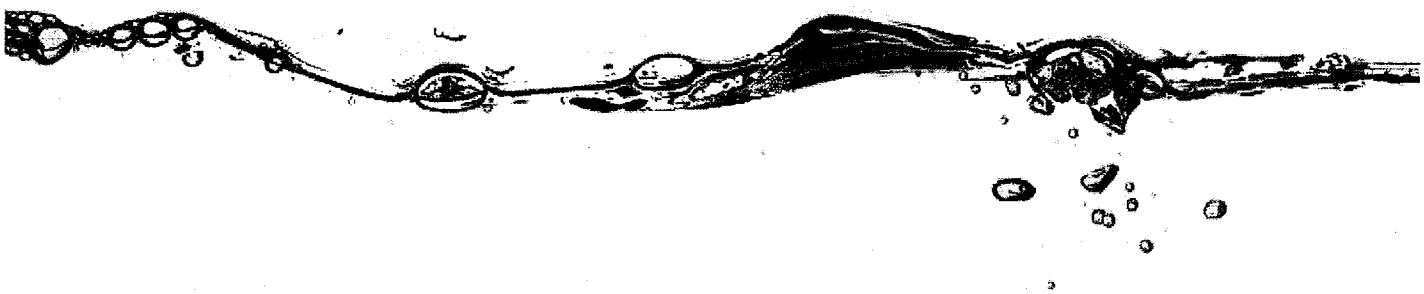
Report

Waitara Outfall Initial Dilution Study

Prepared for New Plymouth District Council (Client)

By CH2M Beca Limited

20 December 2013



Revision History

Revision N°	Prepared By	Description	Date
A	Steven Brockliss	Dilution calcs	**13/12/2013**

Document Acceptance

Action	Name	Signed	Date
Prepared by	Steven Brockliss		**13/12/2013**
Reviewed by	Rob Fullerton		**20/12/2013**
Approved by	Rob Fullerton		**20/12/2013**
on behalf of	**CH2M Beca Limited**		

Table of Contents

1 Introduction

The New Plymouth District Council (NPDC) and Methanex Motunui Ltd hold Discharge Consents for the Waitara Marine Outfall. Consent Special Condition 18 requires that the dilution performance of the outfall is certified at 5 yearly intervals. Consent Special Condition 4 requires the outfall to achieve a minimum initial dilution of 100:1 above the outfall diffuser.

CH2M Beca (Beca) has been engaged by NPDC to undertake this study.

The outfall performance has been evaluated using modern outfall diffuser analysis software package (USEPA Visual Plumes) to determine the initial dilution of the outfall when operating at the maximum consented flow rates for both the Motunui and Waitara Valley Methenex Plants.

2 Outfall Parameters

2.1 Original Outfall Design

The Waitara Marine Outfall diffuser was designed to provide an average initial dilution of 100:1 at the landward diffuser port with a total discharge rate of 223 litres per second at mean sea level (MSL) conditions.

2.2 Outfall Diffuser Configuration

The outfall, excluding diffuser, is 1521m long with the diffuser being 110m long.

The diffuser section is a concrete encased steel pipe with cement mortar lining and an internal diameter of 521mm. There are 35 discharge ports at 3m centres, fitted with fabricated HDPE risers and nozzles. The nozzles discharge horizontally alternating from left to right, 1200mm above the sea bed. Nozzle diameters range from 80mm at the landward end to 100mm at the seaward end.

The outfall data summary is shown in table 1.

Table 1: Waitara Outfall Data

Design Parameter	
Diffuser length (m)	110
Port configuration	Horizontal jet discharging alternate sides
Number of ports	35
Port diameter (m)	0.08 (landward end) – 0.10 (seaward end)
Port spacing (m)	3
Port elevation (m)	1.2 above seabed
Water depth MLWS (m)	9.7 (landward end) – 10.7m (seaward end)
Water depth MSL (m)	11.4 (landward end) – 12.4 (seaward end)

3 Initial dilution calculation

The initial dilution was calculated using the USEPA Visual Plumes (2001) software package (UM3 Model). UM3 is an acronym for the three dimensional Updated Merge (UM) model for simulating single and multiport submerged discharges.

This software calculates the centre line and average dilution of a discharge from a submerged port in quiescent ambient conditions or in the presence of a flowing current. The centre line dilution represents the minimum dilution in the centre of the plume. The average dilution represents the mean dilution across the plume based on a Gaussian distribution.

The model accounts for merging plumes, where expanding plumes from each port of a multi-port diffuser merge before reaching the water surface. Merging plumes have a lower initial dilution than separate plumes.

The Taranaki Regional Council Methanex discharge consents allow up to 12,096 cubic meters per day at a maximum rate of 140 litres per second from the Motunui Plant, and up to 5000 cubic meters per day at a maximum rate of 60 litres per second from the Waitara Valley plant. A mean daily flow rate of 53 l/s for the combined Motunui and Waitara Valley Methanex plants was determined from analysis of the Methanex annual daily wastewater flow reports (2003),

The initial dilution was calculated at both MSL and Mean Low Water Spring (MLWS) for the estimated daily average and maximum consented wastewater flows for both Motunui and Waitara Valley plants, and for the mean flow design capacity of the outfall. Zero current conditions produce the lowest dilutions so the outfall performance was determined with a 0.0m/s ambient current.

3.1 Results

The dilution performance of the outfall with an alternating port orientation was initially calculated for one side of the diffuser, i.e. 17 ports discharging at 6 meter centres, to determine whether plume merging occurred. The result showed that at the highest flow plumes did not merge. The initial dilution results for a single port diffuser are therefore applicable to the performance of the multi-port diffuser.

Initial dilutions were calculated at MSL and MLWS water levels at the lower boundary of the surface field.

A summary of the UM3 Model results are shown in Tables 2 and 3. The computer output is included in the Appendix.

Table 2: Predicted Outfall Initial Dilution at MSL

MSL	Landward Port		Seaward Port	
Outfall flow m^3s^{-1}	Daily Average 0.053 (53 $L.s^{-1}$)	Maximum Consented 0.200 (200 $L.s^{-1}$)	Daily Average 0.053 (53 $L.s^{-1}$)	Maximum Consented 0.200 (200 $L.s^{-1}$)
Average Dilution	232:1	119:1	268:1	128:1
Centreline Dilution	121:1	62:1	139:1	66:1

Table 3: Predicted Outfall Initial Dilution at MLWS

MLWS	Landward Port		Seaward Port	
Outfall flow m^3s^{-1}	Daily Average 0.053 (53 $L.s^{-1}$)	Maximum Consented 0.200 (200 $L.s^{-1}$)	Daily Average 0.053 (53 $L.s^{-1}$)	Maximum Consented 0.200 (200 $L.s^{-1}$)
Average Dilution	173:1	93:1	202:1	99:1
Minimum Centreline Dilution	90:1	48:1	105:1	51:1

4 Original design dilution

The calculated initial dilution values at MSL from the original refurbishment design are shown in Table 4.

Table 4: Original Refurbishment Design Dilution

	Landward Port	Seaward Port
Average Dilution at MSL and a flow rate of 223 $L.s^{-1}$	115:1	115:1

The initial dilutions calculated with Visual Plumes are consistent with the refurbishment design initial dilution calculations.

5 Summary

The initial dilutions for the Waitara Marine Outfall have been modelled using USEPA Visual Plumes software package. The average initial dilution of wastewater flows at both MSL and MLWS was calculated for the combined maximum consented flow rate and recorded mean flow rate from the Motunui and Waitara Valley plants.

The diffuser meets the required minimum average initial dilution of 100:1 above the outfall when measured at MSL for the maximum consented flow of 200L/s. The diffuser average initial dilution for maximum consented flows at MLWS is predicted to be marginally below the minimum 100:1 (average 96:1).

For the measured mean flow of 53L/s from the Methanex plants the average initial dilution is predicted to be about 250:1.

Appendix

Plume Model Output

Water Level (m)	**MLWS**	**8.5**	**Port Diameter**	**0.08**	**Flow Rate (m3/s)**	**0.2**	**Max Consented**
Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Disprsn	
m	m/s	deg	psu	C	kg/kg	m0.67/s2	
0	0	0	33	15	0	0.0003	
9.7	0	0	33	15	0	0.0003	
P-dia	P-elev	V-angle	H-angle	Ports	P-depth	Ttl-flo	Eff-sal
(m)	(m)	(deg)	(deg)	()	(m)	(m3/s)	(psu)
0.08	1.2	0	180	1	8.5	0.00571	0
Froude number:	8.067						

	Depth	P-dia	Dilutn	CL-diln	x-posn
Step	(m)	(m)	()	()	(m)
0	8.5	0.08	1	1	0.0;
10	8.5	0.0963	1.213	1	-0.0423;
20	8.499	0.117	1.474	1	-0.094;
30	8.497	0.143	1.791	1	-0.157;
40	8.492	0.173	2.178	1.131	-0.234;
50	8.483	0.211	2.649	1.376	-0.328;
60	8.466	0.256	3.224	1.674	-0.44;
70	8.436	0.309	3.923	2.037	-0.575;
80	8.391	0.36	4.639	2.409	-0.708;
90	8.336	0.406	5.339	2.772	-0.831;
100	8.268	0.449	6.066	3.15	-0.949;
110	8.184	0.491	6.862	3.563	-1.068;
120	8.078	0.535	7.781	4.04	-1.189;
130	7.941	0.581	8.898	4.62	-1.318;
140	7.761	0.634	10.34	5.367	-1.457;
150	7.512	0.7	12.31	6.394	-1.612;
160	7.185	0.781	15	7.789	-1.777;
170	6.805	0.872	18.28	9.492	-1.931;
180	6.37	0.975	22.28	11.57	-2.076;
190	5.876	1.092	27.15	14.1	-2.213;
200	5.317	1.224	33.09	17.18	-2.343;
210	4.684	1.374	40.33	20.94	-2.466;

220	3.97	1.543	49.16	25.53	-2.583;
230	3.165	1.734	59.92	31.11	-2.695;
240	2.257	1.949	73.04	37.93	-2.802;
250	1.235	2.192	89.03	46.23	-2.904;
260	0.0825	2.467	108.5	56.35	; Water surface
Lower Boundary (m)	1.02	88%			
Average Dilution at surface field boundary			92.6		
Centre line dilution at 1.02m			48.1		

Water Level (m)	**MSL**	**11.4**	**Port Diameter**	**0.08**	**Flow Rate (m3/s)**	**0.200**	**Max Consented Outflow**	
Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Disprsn		
m	m/s	deg	psu	C	kg/kg	m0.67/s2		
0	0	0	33	15	0	0.0003		
11.4	0	0	33	15	0	0.0003		
P-dia	P-elev	V-angle	H-angle	Ports	P-depth	Ttl-flo	Eff-sal	Temp
(m)	(m)	(deg)	(deg)	()	(m)	(m3/s)	(psu)	(C)
0.08	1.2	0	180	1	10.2	0.00571	0	15

Froude number: 8.067

Step	Depth (m)	P-dia (m)	Dilutn ()	CL-diln ()	x-posn (m)
0	10.2	0.08	1	1	0.0;
10	10.2	0.0963	1.213	1	-0.0423;
20	10.2	0.117	1.474	1	-0.094;
30	10.2	0.143	1.791	1	-0.157;
40	10.19	0.173	2.178	1.131	-0.234;
50	10.18	0.211	2.649	1.376	-0.328;
60	10.17	0.256	3.224	1.674	-0.44;
70	10.14	0.309	3.923	2.037	-0.575;
80	10.09	0.36	4.639	2.409	-0.708;
90	10.04	0.406	5.339	2.772	-0.831;
100	9.968	0.449	6.066	3.15	-0.949;
110	9.884	0.491	6.862	3.563	-1.068;
120	9.778	0.535	7.781	4.04	-1.189;
130	9.641	0.581	8.898	4.62	-1.318;
140	9.461	0.634	10.34	5.367	-1.457;
150	9.212	0.7	12.31	6.394	-1.612;
160	8.885	0.781	15	7.789	-1.777;
170	8.505	0.872	18.28	9.492	-1.931;
180	8.07	0.975	22.28	11.57	-2.076;
190	7.576	1.092	27.15	14.1	-2.213;
200	7.017	1.224	33.09	17.18	-2.343;

210	6.384	1.374	40.33	20.94	-2.466;
220	5.67	1.543	49.16	25.53	-2.583;
230	4.865	1.734	59.92	31.11	-2.695;
240	3.957	1.949	73.04	37.93	-2.802;
250	2.935	2.192	89.03	46.23	-2.904;
260	1.783	2.467	108.5	56.35	-3.003;
270	0.485	2.776	132.3	68.69	-3.097;
273	0.0644	2.876	**140.**4	72.89	Water surface
Lower Boundary (m)	1.19	88%			

Average Dilution at surface field boundary	**119.**4
Center line dilution at 1.19m	62.0

WAITARA OUTFALL MANAGEMENT BOARD

STABILITY CHECK ON THE WAITARA OUTFALL

March 2010

CONSULTANTS NZ LIMITED

49 Crownhill Street
PO Box 151
New Plymouth 4340

Telephone 06 7512310
Fax 06 7512310
Email: ocel@clear.net.nz

OCEL House
276 Antigua Street
PO Box 877
Christchurch 8140
Telephone 03 3790444
Fax 03 3790333
Email: mail@ocel.co.nz

1.4, reflecting a combination of wave induced and tidal currents, a C_L value of 0.9 and a C_M value of 3.3. The original analysis is likely to have used similar values for C_L and C_M and a C_D value of 1.0.

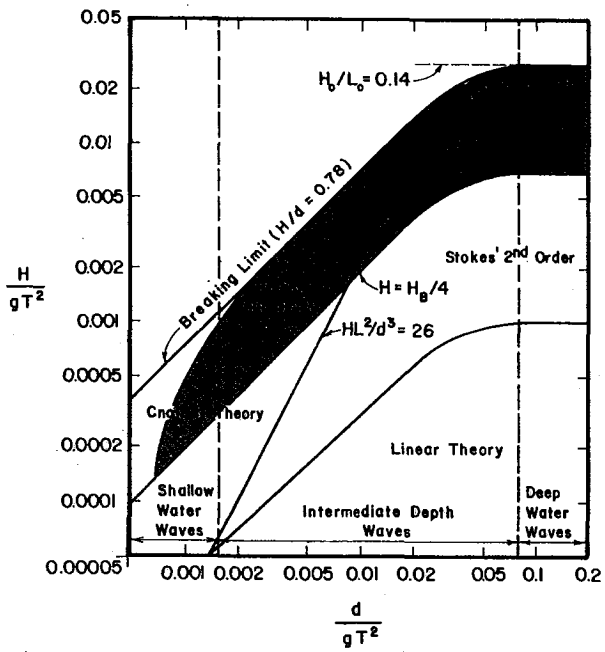
4.0 WAVE ENERGY ENVIRONMENT

The original analysis will have been based on wave hindcasting in the absence of recorded wave data but no details of the wind data used are available. The wave hindcast results are given in terms of wave height and the angle of incidence along the line of the outfall pipe. The angles will have been derived from a wave refraction analysis using the deepwater wave heights and directions. What offshore directions were considered is also not known but the fact that the maximum angle of incidence to the line of the outfall is 36° indicates that waves from the north were not considered as significant, the largest waves arrive from the western sector, following refraction.

The maximum wave heights along the outfall are given as limited by the breaking wave limit although the limit used in the original study is higher than the criterion (Le Mèhautè) normally used – breaking wave height H_b = 0.78d where d is the water depth. The original analysis has used a limit (obtained by dividing wave height by depth) of 0.82.

The MSL hindcast analysis is far more sophisticated than the original analysis being based on a global wind model that has only been available within the last ten years. The maximum wave heights are limited by the breaking wave limit but are slightly lower than for the original analysis as a consequence of the lower breaking criterion constant – 0.82 versus 0.78.

The MSL report uses stream function wave theory to derive the maximum water particle velocities and accelerations from the wave heights. The original report is likely to have used linear wave theory. Stream function or cnoidal wave theory are the only theories applicable for the close to broken wave condition – as shown in Figure No 1 – but linear wave theory, despite its limitations, produces a reasonable estimate of the wave particle velocities close to the bottom. It will underestimate the velocities for the breaking wave condition underestimating the hydrodynamic forces. Stream function theory was used for the OCEL stability check.



Ranges of suitability for various wave theories as suggested by Le Méhauté

Figure No 1

For the upper 1% of wave height events directional wave statistics were reported (MSL) for 10 locations along the outfall, on the assumption that the upper 1% of wave events will suitably characterise the wave directionality under the storm wave extrema. Median and maximum results are provided for the angle of incidence. The MSL report separately presents an annual joint probability distribution of the significant wave height and the mean wave direction at peak energy for a site off the end of the outfall in 25 m water depth. This confirms that the highest waves are predominantly from the 45° sector centred on west. The MSL data indicates that on average incoming waves are, after refraction, *'typically quite co-linear with the outfall heading'*. At the offshore end of the outfall the median angle of incidence is 19.6°, as compared to the -36°/+25° angle given for the same position in the original design. The orthogonal reduction factor, sin θ, where θ is the angle of incidence is much less for the median wave direction identified in the MSL report than for the original design, 0.34 versus 0.59. The MSL report notes however that the hindcast storm population has several large wave events that approach the pipeline – from the north – at greater angles of incidence , up to 48°. The orthogonal reduction factor is then much less at 0.74. Because of the importance of this, potentially high waves at a large angle to the pipeline from the north sector, 45° wide, MSL was asked to look closer at this aspect. The results of the refined annual joint probability analysis are shown in Figure No 2. There is no escaping the fact that high wave events are possible from the north giving an angle of incidence to the pipeline in excess of 45°. MSL report that the 100 year return period height for waves from the north is Hs 6.51 m versus 9.02 from the west.

From	-50	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	
To	-45	-40	-35	-30	-25	-20	-15	-10	-5	0	5	10	15	20	25	30	35	
> 3 <= 3.25	6.9	16	3.4	2.3	4.6	1.1	2.3	3.4	1.1	3.4	2.3	0	12.6	117.7	132.6	6.9	0	316.6
> 3.25 <= 3.5	2.3	2.3	4.6	0	1.1	1.1	0	3.4	2.3	0	0	0	10.3	97.1	124.6	2.3	0	251.4
> 3.5 <= 3.75	1.1	3.4	4.6	0	3.4	1.1	1.1	3.4	0	0	1.1	0	0	93.7	59.4	0	0	172.3
> 3.75 <= 4	5.7	4.6	0	0	3.4	1.1	0	0	0	1.1	0	0	3.4	34.3	26.3	0	0	79.9
> 4 <= 4.25	0	0	0	0	2.3	0	0	0	0	1.1	0	0	5.7	17.1	30.9	0	0	57.1
> 4.25 <= 4.5	0	0	0	0	0	0	0	0	0	0	0	0	2.3	30.9	13.7	0	0	46.9
> 4.5 <= 4.75	0	0	0	0	0	0	0	0	0	1.1	1.1	3.4	0	16	5.7	0	0	27.3
> 4.75 <= 5	0	0	0	0	0	0	0	0	0	0	3.4	1.1	0	19.4	1.1	0	0	25
> 5 <= 5.25	0	0	0	0	0	0	0	0	0	0	0	0	0	17.1	0	0	0	17.1
> 5.25 <= 5.5	0	0	0	0	0	0	0	0	0	0	0	0	0	4.6	0	0	0	4.6
> 5.5 <= 5.75	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1	0	0	0	1.1
> 5.75 <= 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUM	16	26.3	12.6	2.3	14.8	4.4	3.4	10.2	3.4	6.7	7.9	4.5	34.3	449	394.3	9.2	0	1000

Figure No 2

5.0 CURRENTS

The original design information gives the 100 year return period steady state current velocity as 1.4 m/sec at 70° to the outfall. The 10 year return period current is given as 0.9 m/sec at 70° to the outfall and this current was combined with the 100 year return period wave induced particle velocity for the design condition. The same approach was followed for the OCEL stability check. This may well be overly conservative and it is recommended that MSL be engaged to better define the current regime.

6.0 STABILITY ANALYSIS RESULTS

The OCEL stability analysis check showed that the pipeline is stable for the 100 return period wave from the west but not for the 100 year return period design condition from the north. These conclusions are for the pipe as designed, not for the pipe with tube worm growth. The calculations also assume that the added weights are effective. The 10 year return period current was taken as coincident with the 100 year return period wave conditions, as per the original design, but the theoretical justification for this is not known.

The effect of the tube worm growth is to greatly increase the hydrodynamic loads on the pipeline. For the tube worm growth identified on the diffuser, up to 700 mm high, projecting out 375 mm at mid pipe, the tube worm increases the hydrodynamic force by close to 100% and the inertia force by 300%. The

tube worm needs to be cleaned off to ensure stability in the 100 year return period event for waves from the west as well as the north.

At the time that the outfall was refurbished in 1993/94 concrete block and grout bag weights were added to increase the weight of the pipeline. To effectively increase the weight of the pipeline the weights were either draped over the pipeline or connected so that the connecting link bore down on the pipeline. Increasing the weight of the pipeline was taken literally. In actual fact the weights are just as effective butting up against the pipe, not directly adding weight to it. The weights work by mobilising lateral resistance as the hydrodynamic loads on the pipeline push it against the blocks or grout bags. However for the added 'weights' to be fully effective they must be linked together so that when the pipeline pushes against one bag the weight of the bag on the other side of the pipeline is also mobilised to help with the lateral resistance. The lift force on the pipeline does not exceed the submerged weight of the pipeline so the weight does not have to physically hold the pipeline down. The OCEL stability check was based on the increased pipe weight identified for the refurbished design. Where the connection between bags has failed it needs to be reinstated.

No account has been taken of the piled anchorages in the OCEL stability analysis. It is understood that they are still connected to the original outfall pipeline and were not disconnected as was proposed at the time of the refurbishment.

High waves from the north were apparently not considered in the original design. The MSL joint probability analysis shows that while they are infrequent they can occur and have to be considered. There is one problem with this. If the pipeline is unstable when exposed to the 100 year return period wave from the north, combined with the 10 year return period current, why hasn't it failed already? The extended pipeline with a diffuser length added but no extra piles has been in operation for 16 years. The probability of the 100 year event occurring in that time is:

$$p = 1 - (1 - 1/T_R)^N$$

Where:

T_R is the return period of the event
N is the design life

For T_R = 100 years and N = 16 years the probability of the 100 year event occurring within the 16 years to date is .15. The diffuser section could withstand close to a 4 m significant wave height from the north, with the 10 year return period current running at the same time. Peter McComb has advised that the return period for the Hs = 4 m event from the north is approximately 10 years. The probability of encountering a 10 year return period event in the life to date is .81, high.

It is then highly likely that at least a 10 year event has been experienced during the life of the outfall so far, why hasn't the pipe failed? For the length of the original outfall the presence of the piles provides increased lateral resistance not allowed for in the analysis. There were no piles used on the diffuser section so the degree of redundancy afforded by the piles is not available. The lateral resistance allowed for in the analysis is friction only, taken at a friction coefficient of μ = 0.7. This is for pure Coulomb sliding friction and does not allow for any passive earth pressure type resistance where the soil must be pushed out of the way. The PIPESTAB program allows for the development of passive earth pressure resistance as the pipeline vibrates into the seabed and this accounts for the reduced pipeline weights relative to traditional analysis given by the program. While it is unlikely that the pipeline will work its way down into the seabed boulders the lateral force resistance may be higher than allowed for by the analysis. For the grout bags cast in place on the bottom the lateral resistance will be higher than for straight friction. There is no objective way to quantify this other than through a very detailed bottom survey.

The value of the tidal current velocity taken as coincident with the maximum wave conditions is important and needs to be better quantified. With no current the diffuser section could survive the maximum wave height from the north.

7.0 CONCLUSION

Based on the results of the stability analysis check the stability of the outfall is marginal in a high wave event from the north in excess of a 10 year return period. That conclusion assumes that the 10 year return period tidal current is coincident with the maximum wave event. The theoretical basis for this assumption which dates from the original design is not known and needs to be checked. Despite the potential vulnerability to a maximum wave event from the north, an event in excess of what the pipe should be able to tolerate, a 10 year return period event, it has not failed. The probability of experiencing at least a 10 year return period event in the time since the diffuser was installed is high. The same also applies to the original outfall but it has a degree of redundancy in the lateral resistance available, redundancy provided by the original piled anchorages.

The outfall is stable in the 100 year return period maximum wave events from the west provided that the tube worm growths on the pipeline, which greatly increase the hydrodynamic loads, are removed. The connections between the pairs of concrete weights and grout bags along the pipe must also be reinstated to ensure that both weights are effective in providing lateral support to the pipeline.

With regard to the perceived instability in maximum wave events from the north more work needs to be done on defining the tidal current speeds to be taken coincident with the maximum wave conditions before any additional support work in addition of maintenance – removing tube worm, reinstating links - is undertaken. Much also depends on how long the outfall is expected to last.

NEW PLYMOUTH DISTRICT COUNCIL

UNDERWATER INSPECTION

WAITARA WASTEWATER OUTFALL

MAY 2009 and JANUARY 2010

by

CONSULTANTS NZ LIMITED

49 Crownhill Street
PO Box 151
New Plymouth

Telephone 06 7512310
Fax 06 7512310
Email: ocel@clear.net.nz

OCEL House
276 Antigua Street
PO Box 877
Christchurch
Telephone 03 3790444
Fax 03 3790333
Email: mail@ocel.co.nz

INDEX

1.0 GENERAL

OCEL Consultants NZ Limited was instructed by the New Plymouth District Council (NPDC) via e-mail of 27 Jan 2009 to undertake a series of activities on the Waitara Wastewater Outfall. These activities included carrying out previously identified repairs, a video and diver inspection of the outfall, and to assess the current stability of the outfall.

On Thursday 29 May 2009 following an extended spell of calm weather, an underwater inspection was undertaken.

This inspection covered from the seaward end of the diffuser to bracket 27 inshore.

Because of poor visibility on the May 2009 inspection it was not practical to video this section and the diver inspection was carried out in very difficult conditions.

Inspection of the rest of the outfall from inshore burial to bracket 28 was undertaken on Wednesday 20 January 2010. Again visibility was not suitable for a video of the outfall. Visibility reduced to near zero on the seaward end of the original outfall and the new diffuser section.

2.0 SITE VISITS

Three site visits have been undertaken.

2.1 29 May 2009

A diving inspection of the diffuser section was undertaken in restricted visibility conditions. An interim report has been issued for this site visit because of concerns about the number of Type B hold down systems that had failed on the diffuser section since the previous inspection. The results of this May 2009 inspection are included in this report.

2.2 18 January 2010

A visit was made on 18 January 2010 to plot the location and alignment of the outfall from the seaward end of the diffuser to inshore burial. The alignment and coordinates were forwarded to Metocean Services Limited (MSL) for determination of the wave climate, wave induced current velocities and accelerations on the pipeline along its length. This information to then be used for deriving loads and corresponding stability requirements for the outfall. No diving work was done on this site visit nor has a report been produced. OCEL drawing DR-991201-001 Rev 2 records the location information and is appended.

2.3 20 January 2010

This site visit was for diver inspection from inshore burial out to junction of old pipeline with the diffuser section. Visibility deteriorated badly at the seaward end and on the diffuser and the inspection was terminated.

3.0 INSPECTION COMMENTS

3.1 May 2009

May 2009 inspection comments cover the diffuser section (115 m) only.

During the underwater inspection the condition of the various components that are the pipeline or hold/support the pipeline in position were noted. A comparison was then made with items as listed in the 'As Constructed' drawings (and summarised in OCEL Consultants Limited drawing DR-960312-005 Rev 3). Any observed anomalies or previously unrecorded damage was identified. This drawing will be updated to reflect the new damage as DR-960312-005 Rev 4 on completion of the workscope.

Only the 115 m long diffuser section was effectively inspected in the poor environmental conditions encountered. Five new failures of the Type B fabric hold down straps were found at 5 separate sites on the diffuser section. The failure mechanism is not fully known however the ongoing failure of these fabric straps is now a very serious concern. It must be anticipated that the remaining fabric straps will also fail shortly.

While considerable redundancy is believed to have been built into the outfall during construction, the number of failing/failed Type A and B hold down systems in the sections of outfall inspected so far are a serious concern as they connect the pipe to its various anchoring components.

The failure of the straps will leave the diffuser section, in particular, seriously under weight for "on seabed" stability under design wave and current load conditions.

The increase in kelp, mussels and tubeworms along the outfall represent the ongoing colonisation of the outfall by marine flora and fauna. It may become necessary to restrict the growth of these items on the pipeline in the future to limit the additional environmental loadings that they generate on the structure. No flow was observed between diffuser ports 1 and 21.

3.2 January 2010

We have combined the May 2009 inspection comments for the short section of the original outfall inspected, with the January 2010 inspection comments for the rest of the original outfall.

Along the original outfall new damage identified was:

Junction – Pile 28	1 Type A grout failing 2 Type A saddles failed 1 Type A saddle damaged 2 m tear
Pile 27 – Pile 26	1 Type A saddle failed
Pile 25 – Pile 24	2 Type A saddle failed
Pile 23 – Pile 22	1 Type A saddle failed

Pile 5 – Pile 4	1 small Type A not found
Pile 4 – Pile 3	1 small Type A saddle failed
Pile 3	Caisson and pile leaning seaward
Pile 2	Outer clamp missing and pile caisson damaged with support structure twisted towards shore

Prolific and significant tube worm growth observed from Bracket 7 to the seaward end of the diffuser.

Along the original outfall, seven Type A hold down systems (six large and one small) have failed completely since the 2005 inspection. One other large Type A is failing slowly with the grout breaking up and crumbling, another has a 2 m tear in the saddle material and one small Type A that was originally between Pile 5 and 4 has not been seen for several years and is removed from the drawing.

Finding seven new Type A hold down system failures and two other, that are suspect for long term functionality, is a serious concern for the structural integrity of the original outfall structure.

Two other items identified from the inspection are of concern:

- that bracket 2 has been hit by a heavy object that has moved and twisted the support bracket. No damage to the pipeline was readily visible through the marine growth on the pipeline and with the restricted visibility.

- the prolific and significant growth of the tubeworms over the outfall from pile 7 to the seaward end of the diffuser has the potential to considerably increase wave/current drag loads on the outfall. This may affect the requirements for additional weight to provide on seabed stability for design wave loads.

Both the May 2009 and January 2010 inspections were undertaken in conditions of restricted visibility. The combination of restricted underwater visibility and obliteration of pipeline features and details by the tubeworm explosion means that not all areas of damage or degradation may have been found on these two inspections.

In total along the pipeline and diffuser seven Type B systems and eight Type A systems have failed or are in a serious state of degradation since the 2005 inspection.

4.0 INSPECTION RESULTS

Note - main changes and observations found in the May 2009 and January 2010 inspections are shown in bold type.

UNDERWATER INSPECTION DIVE LOG 29 May 2009

Location	Comments
Diffuser No 1	No flow.
Diffuser No 2	No flow.
Tie Down	Type B. Between diffusers 1 and 3. Straddling diffuser 2. OK. **Double grout bags, well filled.**
Anode	**Good condition little wastage.**
Diffuser No 3	No flow.
Diffuser No 4	No flow.
Tie Down	Type A. Between diffusers 3 and 5. Straddling diffuser 4. Tear inshore end of saddle cloth 1,000 mm long. Seaward tear starting, 200 mm long.
Diffuser No 5	No flow.
Anode	**OK.**
Tie Down	Type C. Between diffusers 5 and 6. Anodes working and OK. **Approx dimensions 1.7 x 1.7 x 0.7 m (approximately 2.03 m^3 and 2.83 tonnes/block in water).**
Diffuser No 6	No flow.
Tie Down	Type C. Between diffusers 6 and 7. Anodes OK.
Diffuser No 7	**No flow.**
Tie Down	Type B. OK. Straddles diffuser 8. **Double bags, good fill. Inshore strap failed (new 2009).**
Diffuser No 8	**No flow.**
Diffuser No 9	**No flow.**
Clamp	Steel clamp around pipeline. Used during construction. **Considerable tube worm growth.**
Diffuser No 10	**No flow.**

Anode	Pipeline anode. **Anode OK. Tube worms overgrowing.**
Diffuser No 11	**No flow.**
Tie Down	Type B. Straddles diffuser 12. **Seaward strap has failed (new 2009). Double grout bags, good fill.**
Diffuser No 12	**No flow. Prolific tube worm growth, 300 mm.**
Diffuser No 13	**No flow.**
Diffuser No 14	**No flow.**
Tie Down	Type C. **Anodes good.** Wires OK.
Anode	Pipeline anode working. **Little wastage.**
Diffuser No 15	**No flow.**
Tie Down	Type B. Straddles diffuser No 16. Seaward end hold down strap OK. Inshore end hold down strap pulled out east side, not providing any hold down restraint. Note - this pull out is an old failure from the construction phase.
Diffuser No 16	**No flow.**
Diffuser No 17	**No flow.**
Tie Down	Type C. OK. Anodes working. **Block size approx 2.0 x 1.8 x 0.6 m (approximately 2.16 m^3, 3.0 tonnes/block in water).**
Diffuser No 18	**No flow.**
Anode	Pipeline anode. Not Active.
Diffuser No 19	**No flow.**
Tie Down	Type B. Straddles diffuser 20. Inshore fabric hold down strap broken west side (2000), support cushions now on east side. **Seaward strap failing (new 2009). Type B now ineffective.**
Diffuser No 20	**No flow observed.**
Diffuser No 21	Diffuser has been replaced previously (2000). Flowing. **NB. First diffuser observed flowing.**
Diffuser No 22	OK. Flowing.
Anode	Pipeline anode working. 95% remaining. **Good condition.**
Diffuser No 23	OK. Flowing. Support bag underneath pipeline.

Tie Down	Type B. Straddles diffuser 24. **Seaward strap failed (new 2009). Bags well filled with grout.**
Diffuser No 24	OK. Flowing.
Diffuser No 25	OK. Flowing.
Clamp	Steel clamp around pipeline. Used during construction. **Considerable tubeworm overgrowth.**
Diffuser No 26	OK. Flowing.
Tie Down	Type C. OK. Anodes working. Cushion pillow OK.
Anode	Pipeline anode working. 90% remaining. OK.
Diffuser No 27	OK. Flowing.
Tie Down	Type A. Straddles diffuser 28. Saddle cloth badly damaged. No hold down capacity inshore half. **Seaward section has now failed. This bag is now ineffective (2005).** Attempts to convert to a Type B tie down have not been successful. Both tie down straps have had anchorage failures. Note - both of these anchorage failures are from the construction phase.
Diffuser No 28	OK. Flowing.
Diffuser No 29	OK. Flowing.
Tie Down	Type C. OK. Anodes west **60%** remaining. Anode east **50%** remaining. Prolific tubeworm growth.
Diffuser No 30	OK. Flowing.
Anode	Pipeline anode working. 95% remaining. Support bag underneath pipeline OK (2002).
Diffuser No 31	OK. Flowing.
Diffuser No 32	OK. Flowing.
Tie Down	Type B. Straddles diffuser 33. **Seaward strap OK. Inshore strap failed (new 2009). Bags well filled.**
Diffuser No 33	OK. Flowing.
Diffuser No 34	OK. Flowing. **Support bag underneath pipeline.**
Anode	Pipeline anode working 85% remaining.
Tie Down	Type C. OK. **Anodes OK. Heavy tube worm growth on concrete blocks.**

Diffuser No 35	OK. Flowing.
Tie Down	Type B modified. Webbing strap at seaward end with two corroded steel straps further inshore. OK. **Anodes fitted to steel straps (2005). All anodes consumed 2009.**
Anode	Pipeline anode working. OK.
Anode	Pipeline anode connected by cables to flanged joint and gibault joint is working. OK.
CP Cables	OK.
Tube Worms	Tube worm growth developing along top of diffuser pipeline first reported in 2000 **has increased significantly in size and height.**
Flange Joint	Well covered in marine growth. OK.
Make up Spool Piece	HDPE spool piece joining diffuser to new liner run inside old concrete pipeline. OK. Marine growth covering.
Gibault Joint	Well covered in marine growth. OK.
Junction	At junction of old concrete pipeline and the emergence of the HDPE pipeline there is significant tubeworms growth.

UNDERWATER INSPECTION DIVE LOG 20 JANUARY 2010

Junction to Pile 28	**Type B.** Hold down strop slightly loose. **(New 2002). Needs tightening. Still requires tightening 2010.** **Three Type A - third Type A appears to be failing. Grout in bag exposed and breaking up (2009). Difficult to identify and inspect in the conditions existing.** **Type D.** Inshore hold down cable **very loose (2009), requires tightening. (New 2002).** Seaward cable **(slightly loose 2005).** Seaward anodes 60% remaining. Anode west, **snapped CP cable (2002/2003)** 40% anode remaining. East anode OK, 50% remaining. **Six Type A - four of the six appear OK other 2 failing/failed:** **Type A. Damaged saddle cloth, 2 m tear west side (2009)** **Type A. Tear inshore east increased to 2 m long (2005) now effectively failed (2009)** Type A. OK **Type A. Failed (2009)**

	Type A. OK
	Type A. OK.
	Old diffuser vent in concrete pipeline.
	Old clamp partly around pipeline. Part of old diffuser vent.
	Old diffuser vent in concrete pipeline.
	Large clumps of tubeworms around bracket 28. (2009).
Pile 28 to Pile 27	Four Type A, OK. May be 5 Type A, 2nd partly over 1st which is slightly torn. Bags generally not well filled.
Pile 27 to Pile 26	Type A. Ripped inshore east 1 m (2002).
	1 Type D. OK. Anodes OK.
	4 Type A. 3 rd effectively failed (2010).
Pile 26 to Pile 25	8 Type A. OK. Variable grout fill.
Pile 25 to Pile 24	**6 Type A. 2nd and 4th bags failed. (2010) ie 4 only effective.**
Pile 24 to Pile 23	1 Type A. OK.
Pile 23 to Pile 22	**4 Type A. 3 partly filled, 2nd failed. (2010) ie 3 only partly effective.**
Pile 22 to Pile 21	Type A. OK.
	Type D. Buried under tubeworms. Both wires slightly loose. (2005). Anodes buried. Wire not corroding.
Pile 21 to Pile 20	Type D. Seaward wire slightly loose. **Tubeworm covered, anodes buried. Concrete blocks buried under tubeworms. (2010).**
	Type D. OK. **Tubeworm covered, anodes buried. (2010).**
Pile 20 to Pile 19	2 Type A. 1st bad fill, 2nd OK.
Pile 19 to Pile 18	1 Type A. OK. **Prolific tubeworm growth 600 to 700 mm high. (2010).**
Pile 18 to Pile 17	1 Type A. **(Not found under tubeworms and poor visibility, 2010).**
Pile 17 to Pile 16	1 Type A. Minor damage to saddle cloth 2005. **Tubeworms 600 mm high. (2010).**
Pile 16 to Pile 15	2 Type A. Both OK. **Tubeworms 500 mm high. (2010).**

Pile 15 to Pile 14	1 Type A. OK. **Tubeworms prolific up to 700 mm and 1.5 m wide across top of pipeline. (2010).**
Pile 14 to Pile 13	1 Type A. OK, approx 6 m long x 2 m wide x 0.5 m deep. **Tubeworms 500 mm deep. (2010).**
Pile 13 to Pile 12	1 Type A. OK, approx 6 m x 1.8 m x 0.5 m. **Tubeworms 500 mm deep by 1.5 m wide. (2010).**
Pile 12 to Pile 11	1-Type A. OK. **Tubeworms 500 mm+ and prolific. (2010).**
Pile 11 to Pile 10	1 Type A. OK. **Tubeworm growth prolific, 300 mm high. (2010).**
Pile 10 to Pile 9	2 Type A. Both OK. **Tubeworm clumps. (2010).**
Pile 9 to Pile 8	No Bags. **Tubeworm clumps along top but continuous along sides. (2010).**
Pile 8 to Pile 7	1 Type A. OK large bag. **Tubeworms in small clumps. (2010).**
Pile 7 to Pile 6	1 Type A. Old large bag, approx 5.4 m long x 1.5 m wide x 0.3 m deep. Outer clamp section missing off Pile 6. (2005).
Pile 6 to Pile 5	1 Type A. OK, small bag. Tipped up and against pile 5. OK approx 50% effective.
Pile 5 to Pile 4	**No Bag. Original Type A small, not found. Has been missing for several inspections. Assume bag has failed. (2010).**
Pile 4 to Pile 3	1 Type A, small. **Bag has failed. Caisson and pile leaning seaward.**
Pile 3 to Pile 2	No Bags. **Outer clamp of Pile 2 missing. Caisson twisted, vertical seam weld failed and opened up 100 – 150 mm. Twist is towards shore. No sign of outer clamp in immediate vicinity. Water depth at time of dive (approx 10.30 am 20/1/2010) to top of pipeline 5.6 m and top of pile 4.1 m. Top of very heavy walled pile did not appear to be damaged. 2010.**
Pile 2 to Pile 1	1 Type A, small. Dimensions approx 1.3 m wide x 1.7 m wide x 0.3 m deep.
Sea Joint	Steel sleeve OK. Large anode still connected to sleeve by wire and clamps. Anode has very little wastage. Opening in top of sleeve OK. Pipeline has less burial on east side.
Burial	Approximately 35 m inshore of inshore end of steel sleeve and 45 m inshore of Pile 1.

General Note

The original hold down system (pre 1994) consisting of pile, caisson, bracket and clamp are continuing to corrode. In particular some of the bolts that hold the clamp components together are likely to fail shortly. Tender documentation indicates these components were to be removed on completion of the outfall refurbishment. These components were not removed and are still attached to the pipeline. Their condition is not monitored as part of the inspection programme.

5.0 DISCUSSION

5.1 May 2009

While one inspection dive covering the diffuser section only has been undertaken to date, the inspection has revealed serious degradation of some components.

The discovery of 5 new failures in Type B hold down systems on the diffuser section indicates a systemic failure which will certainly result in the remaining Type B components failing completely, most likely within a short time frame.

Information obtained on the design submerged weight requirements for the diffuser shows there is approximately 93 tonnes of additional submerged weight required to achieve stability under the design 100 year return period environmental conditions.

If all of the remaining six Type B and one badly damaged Type A are considered ineffective because of the systemic failure the diffuser section is only being stabilised by seven Type C systems with a combined submerged weight of 42 tonnes. ie there is a deficit of 51 tonnes submerged weight along the diffuser to achieve stability under design environmental conditions.

The six remaining Type B still have one strap straddling the pipeline. The integrity of this strap considering the recent failures is extremely dubious and from engineering and risk considerations should be considered non functional.

It should be noted that the Type B systems were originally Type A systems that failed previously. The failure mechanism for the Type A's was identified during the construction phase. Grout bags that provided the hold down capacity/submerged weight for each of these systems are available alongside the diffuser section and could normally be used to provide an alternative and more robust hold down system. This has been done previously but requires a reasonable amount of diving work at each site.

Diving work would involve drilling holes in grout bags, epoxy grouting in fabricated steel padeyes, fitting steel wire ropes between padeyes, tighten wire ropes using turnbuckles or similar and fitting cathodic protection/anodes to the steel components. This has been done previously on two Type D systems along the outfall.

The observed lack of flow through the seaward diffuser ports has been previously identified as a potential problem. This can lead to internal deposition of sand/silt from seawater exchange through the diffuser ports and reduced hydraulic efficiency of the outfall should greater capacity be required in the future from that currently required.

5.2 January 2010

Of the sixty six hold down systems on the original outfall considered as contributing, 56 only are considered as being functional as at January 2010 though some work is required on several Type D to improve their effectiveness. The failures are primarily in the saddle cloth that spans across the concrete outfall connecting the two grout filled bags together. Failure areas have been by damage to the saddle cloth at a stress point or from a poorly positioned./tensioned saddle cloth after the filling of the grout bags.

Either of these conditions provide weak points where the wave induced currents work on loose or damaged points on the saddle cloth and over time a tear or rip develops which propagates to failure of the saddle cloth and the hold down capability of the Type A systems.

With this number of failures on both the diffuser and old pipeline section the redetermination of the hold down requirements becomes a significant item in determining the risk to the outfall and the remedial actions required to provide stability.

The very large increase in the tubeworm colonisation of the outfall and diffuser is likely to have a significant increase on the wave and current induced loads on the outfall through the increased area exposed to drag and lift forces, and the increased volume exposed to inertia forces. The magnitude of these increased loads needs to be determined from the forthcoming wave load analysis.

Remedial options may include:

- removal of tubeworms. This has to be done carefully in areas where there are Type A or Type B systems so as not to damage the fabric saddles or fabric straps
- converting failed Type A systems into Type D systems
- placing additional Type C systems
- using the previously redundant original bracket and clamp systems to provide some additional restraint. Some remedial work (ie anodes, bolts and two outer clamps) would be required.

A copy of the Drawing DR 960312-005 Rev 4, which shows the latest failures is attached for information and to assist in interpreting the information presented.

It is planned to continue the previously identified repairs, inspection and video of the remainder of the outfall when conditions are suitable.

We are available to discuss this report and options.

6.0 SUMMARY AND RECOMMENDATIONS

Since 2005 there has been significant failure of the Type B and Type A hold down systems. All Type B systems have to be considered as ineffective in any considerations of present and future pipeline stability requirements.

A number of Type A systems have failed and there is long term potential for more to fail as abrasion and fatigue of the fabric of the saddle material continues under wave induced loads.

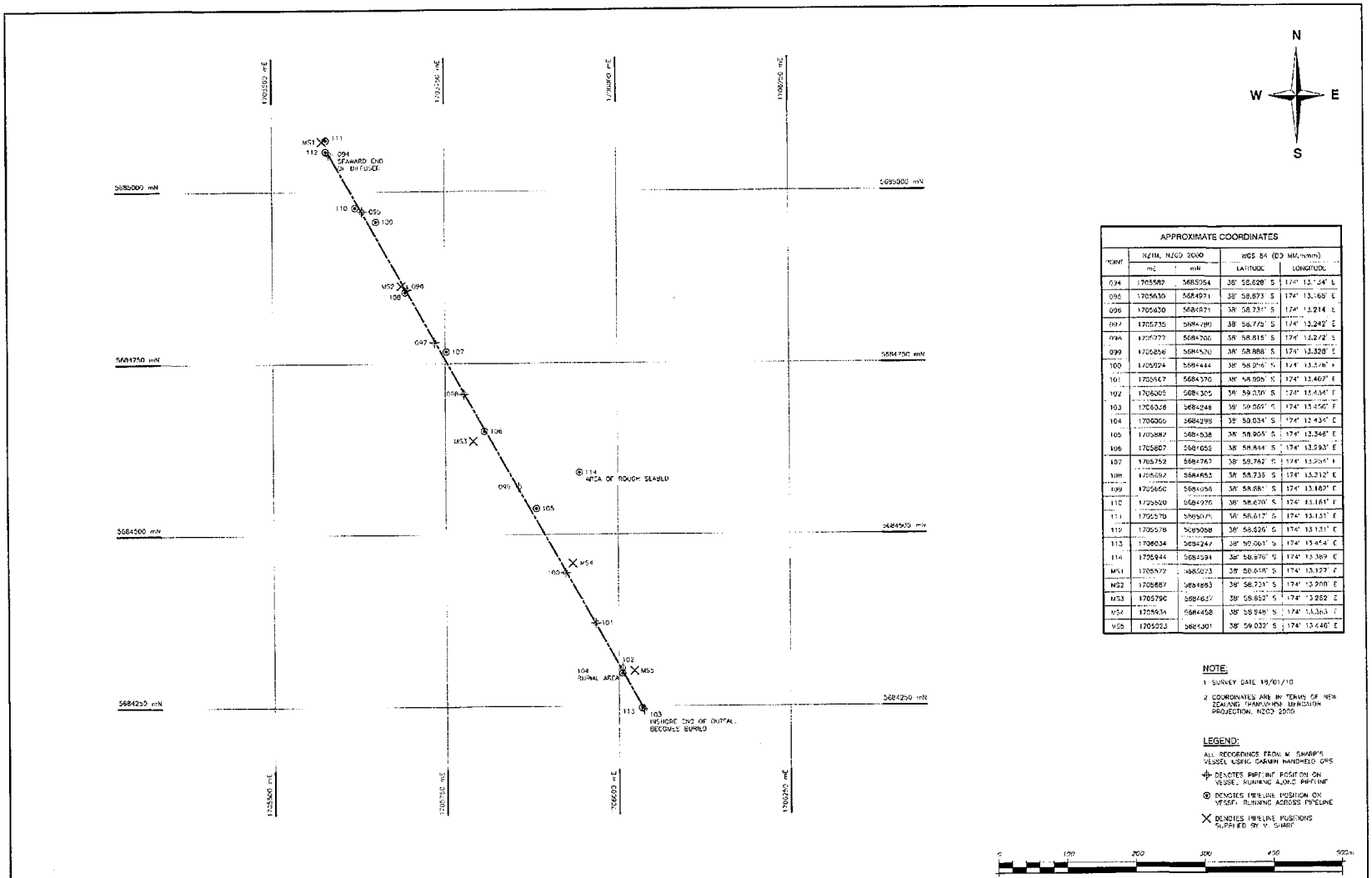
The major growth of tubeworm colonies along the outfall provides a much larger area for wave induced forces to act on. This will increase the submerged weight requirements of the hold down system for on the seabed stability requirements.

There are several remedial options available to increase or re-establish on the seabed stability. Any of the options will be time consuming and costly given the nature of the environment at the work site.

The magnitude of the remedial work is dependent on the results of the wave load analysis currently under review.

The length of the outfall is not shown correctly on the current Marine Charts. This needs correcting.

7.0 ATTACHMENTS



N
W E
S

APPROXIMATE COORDINATES				
POINT	NZTM, NZVD 2000		WGS 84 (DD MM.mmm)	
	mE	mN	LATITUDE	LONGITUDE
094	1705582	5685054	39° 58.628' S	174° 13.134' E
095	1705630	5684971	39° 58.873' S	174° 13.165' E
096	1705630	5684871	39° 58.731' S	174° 13.214' E
097	1705735	5684780	39° 58.778' S	174° 13.242' E
098	1705777	5684700	39° 58.815' S	174° 13.272' E
099	1705856	5684620	39° 58.858' S	174° 13.328' E
100	1705924	5684444	39° 58.956' S	174° 13.376' E
101	1706047	5684370	39° 58.995' S	174° 13.462' E
102	1706005	5684305	39° 59.030' S	174° 13.434' E
103	1706038	5684248	39° 59.062' S	174° 13.456' E
104	1706000	5684299	39° 59.034' S	174° 13.434' E
105	1705882	5684538	39° 58.905' S	174° 13.348' E
106	1705807	5684652	39° 58.844' S	174° 13.293' E
107	1705752	5684767	39° 58.782' S	174° 13.254' E
108	1705692	5684853	39° 58.735' S	174° 13.212' E
109	1705650	5684956	39° 58.681' S	174° 13.182' E
110	1705620	5684976	39° 58.670' S	174° 13.161' E
111	1705579	5685075	39° 58.617' S	174° 13.131' E
112	1705578	5685068	39° 58.626' S	174° 13.131' E
113	1706034	5684247	39° 59.061' S	174° 13.454' E
114	1705944	5684594	39° 58.876' S	174° 13.389' E
MS1	1705572	5685073	39° 58.618' S	174° 13.127' E
MS2	1705687	5684863	39° 58.731' S	174° 13.208' E
MS3	1705790	5684657	39° 58.652' S	174° 13.282' E
MS4	1705934	5684458	39° 58.945' S	174° 13.383' E
MS5	1706053	5684301	39° 59.032' S	174° 13.446' E

NOTE:

1 SURVEY DATE 19/01/10

2 COORDINATES ARE IN TERMS OF NEW ZEALAND (NAD1980) MERCATOR PROJECTION, NZVD 2000

LEGEND:

ALL RECORDINGS FROM M. SHARP'S VESSEL USING GARMIN HANDHELD GPS

DENOTES PIPELINE POSITION ON VESSEL RUNNING ALONG PIPELINE

DENOTES PIPELINE POSITION ON VESSEL RUNNING ACROSS PIPELINE

DENOTES PIPELINE POSITIONS SUPPLIED BY M. SHARP

0 100 200 300 400 500m

Scale 1:5000

DO NOT SCALE FROM DRAWING

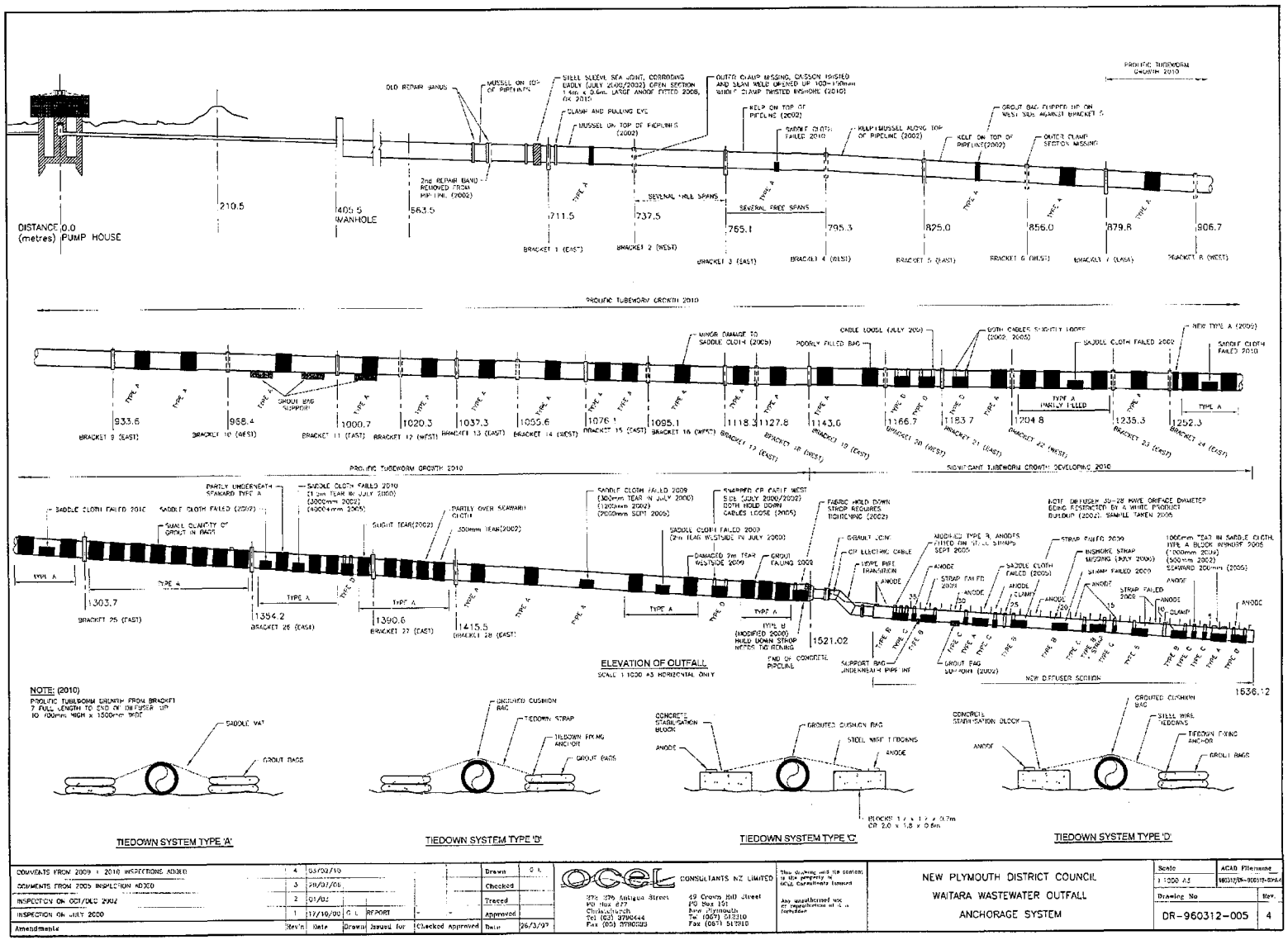
Amendments	Rev'n	Date	Drawn	Issued for	Checked	Approved
POSITIONS SUPPLIED BY M SHARP ADDED	2	21/01/10	AVE	PRELIMINARY		
PRELIMINARY ISSUE FOR INFORMATION	1	21/01/10	AVE	PRELIMINARY		

Drawn AVE
Checked
Traced
Approved
Date 21/10

OCEL CONSULTANTS NZ LIMITED
370-378 Antigua Street, PO Box 879, Christchurch, Tel (03) 5760444, Fax (03) 3790883
48 Crown Hill Street, PO Box 120, New Plymouth, Tel (067) 512010, Fax (067) 512010

NEW PLYMOUTH DISTRICT COUNCIL
WAITARA OUTFALL INSPECTION
PLAN OF OUTFALL

Scale (A3)	ACAD Filename
1:5000	991201/DR-991201-001R
Drawing No.	Rev.
DR-991201-001	2


DISTANCE 0.0 (metres) PUMP HOUSE
MANHOLE
BRACKET 1 (EAST)
BRACKET 2 (WEST)
BRACKET 3 (EAST)
BRACKET 4 (WEST)
BRACKET 5 (EAST)
BRACKET 6 (WEST)
BRACKET 7 (EAST)
BRACKET 8 (WEST)
PROLIFIC TUBEWORM GROWTH 2010
SEVERAL FREE SPANS
SEVERAL HOLE SPANS
SADDLE CLOTH FAILED 2010
SADDLE CLOTH FAILED 2009
SADDLE CLOTH FAILED 2008
SIGNIFICANT TUBEWORM GROWTH DEVELOPING 2010
ELEVATION OF OUTFALL
SCALE 1:1000 AS HORIZONTAL ONLY
NOTE: (2010)
PROLIFIC TUBEWORM GROWTH FROM BRACKET 7 FULL LENGTH TO END OF DIFFUSER UP TO 700mm HIGH x 1500mm WIDE
TIEDOWN SYSTEM TYPE 'A'
TIEDOWN SYSTEM TYPE 'B'
TIEDOWN SYSTEM TYPE 'C'
TIEDOWN SYSTEM TYPE 'D'
NEW DIFFUSER SECTION
NEW PLYMOUTH DISTRICT COUNCIL
WAITARA WASTEWATER OUTFALL
ANCHORAGE SYSTEM
DR-960312-005
4

WAITARA OUTFALL UPDATE FROM 22 NOVEMBER 2012

Since the last meeting on 22nd November 2012 there have been two major works actiivities and one minor at the site.

22-24 November 2012

Bay Underwater returned on morning of 22 Nov and continued on the previous workscope.

- Drilled bags at diffuser ports 28 and 33 (8 holes in total)
- Epoxy grout in anchors and measure for strops
- Have 4 strops fabricated for pickup next day
- Fit strops and anodes

Work was stopped on the Saturday morning (24 Nov) for safety reasons as weather deteriorated and dive team was demobilised.

29-31 Jan 2013

New Plymouth Underwater went to the site on 29 Jan and continued drilling and fitting items as below plus a video inspection.

- Inspect bag at diffuser 35 for options
- Drilled bag 18 on the seaward end of the old diffuser. NB this bag had a fabric strop that required tightening. These have failed previously so requested replace with cable strops and epoxy anchors.
- Epoxy grout in anchors and measure for cables
- Checked status of two other bags.
- Have cables fabricated
- Attached g-clamp anodes to bag 17
- Drill bag 24 (problems with crumbly grout)
- Epoxy grout in anchors bag 24 and order cable
- Re-tension cables inshore and offshore on bag 22.
- Fit cables and anodes bag 18
- Fit cables and anodes bag 24
- Fit cable and anodes bag 11

- Fit CP cable extension bag 15
- Tighten loose cable bag 13 inshore
- Inspect and video diffuser section of outfall while conditions were reasonable

An anomaly report was produced by NPUW from the video which notes.

- Bag 1 has 2 anodes missing
- Bag 1 has a 300mm gap between pipe and bag on one side.
- Bag 2 has a loose wire strop
- Bag 11 has a loose wire strop
- Bag 10 has a 100mm gap between pipe and bag on one side
- Bag 12 has a loose wire strop

A half day visit was made to the site in February to trial the cavi-blaster while it was available. Mike Sharp was happy with its capability to cut through the tube worms and its rate of progress

LOOK AHEAD

Complete the outstanding work on the outfall identified in the anomalies above plus drill epoxy grout in anchors and secure bag inshore of diffuser 35.

Hessian sacks have been fabricated for filling with "quickcrete" concrete for packing of gaps between grout bags and pipeline.

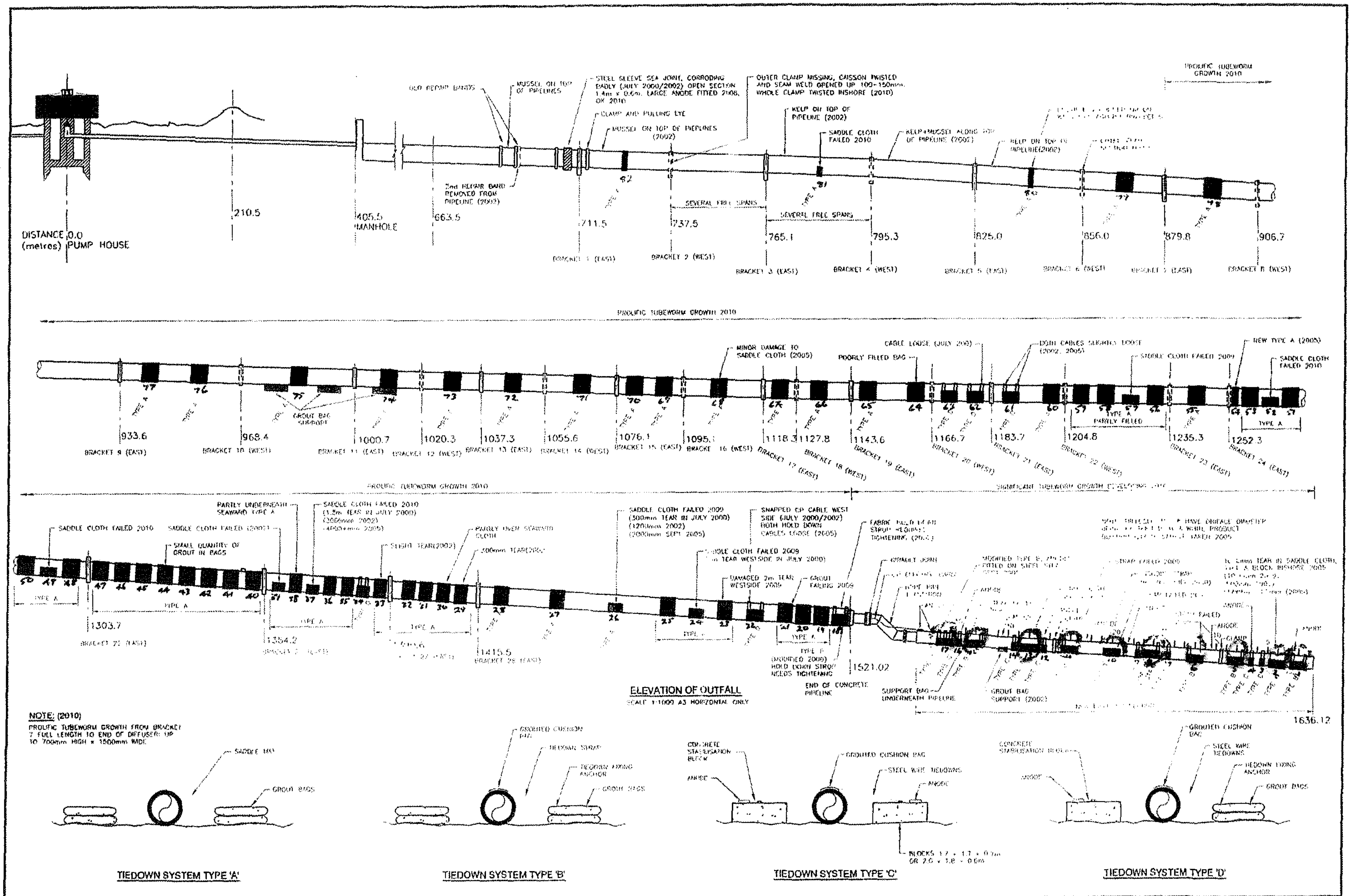
When conditions suitable and equipment available, progress along old outfall removing tube worm growth.

Examine the status of the old anchorage system for advantage of maintaining it as a functional structural unit and anode requirement. Compare estimates against a rock dump option for stabilising old pipeline.

Check status of anode at inshore steel sleeve inshore of bracket 1. Replace anode if necessary.

Examine in more detail damage to bracket 2 (hit by a vessel?)

Update drawing DR 960312-005



Amendments	Rev'n	Date	Drawn	Issued for	Checked	Approved
COMMENTS FROM 2009 + 2010 INSPECTIONS ADDED	4					
COMMENTS FROM 2005 INSPECTION ADDED						
INSPECTION ON OCT/DEC 2002						
INSPECTION ON JULY 2000	1					

Drawn | Checked | Traced | Approved | Date 26/3/97

OCEL CONSULTANTS NZ LIMITED

49 Crown Hill Street
PO Box 151
New Plymouth
Tel (067) 512310
Fax (067) 512310

Fax (03) 3790333

NEW PLYMOUTH DISTRICT COUNCIL
WAITARA WASTEWATER OUTFALL
ANCHORAGE SYSTEM

Scale: 1:1000 A3
Drawing No.: DR-960312-005
Rev.: 4

Gary Rielly

From: Keith Armstrong <keith.armstrong@ocel.co.nz>
Sent: Wednesday, 18 December 2013 4:33 p.m.
To: Gary Rielly
Cc: hopek@npdc.govt.nz
Subject: Waitara Outfall Status

Hi Gary,
At the site visit to New Plymouth Underwater you asked for a brief status update on the Waitara Outfall. Hope the below meets your requirements.

A diving inspection and work on the diffuser was undertaken on the 25 Nov. An underwater video was made in reasonable visibility at the same time. A copy of the video and log will be forwarded shortly.

Review of the video shows the diffuser section and first three seaward bays of the old outfall section to be in good condition. This was the length that was inspected while other work was being undertaken.

Several other visits have been made during the year to bring the anchorage system up to the design requirements as the old anchor system continues to fail because of inherent design problems. This involves drilling holes grouting in anchors fitting wire strops and turnbuckles and securing the pipeline and anchor system together.

Some minor packing of gaps between the pipeline and anchor bags is required in three places to ensure full mobilization of the anchorage system if ever required. It is noted that tube worm growth is re-establishing on sections of the diffuser cleaned previously a couple of years ago.

Tube worm removal is the major outstanding item for the next program of work plus installation of an additional anchorage system at diffuser 35 where the old system is now suspect. .

Plan is to work consistently into shore removing excessive tube worm growth and identifying any additional remedial requirements as progress is made.

Regards

Keith Armstrong.

Keith Armstrong
OCEL Consultants NZ Ltd
PO Box 151
NEW PLYMOUTH 4340
NEW ZEALAND

(64) 06 7512310 phone/fax
(64) 0274 313966

Appendix V

Waitara Valley Site Discharge of Sulphuric Acid to Ground
October 2013

Methanex New Zealand Limited
409 Main North Road, SH3
Motunui
Private Bag 2011
New Plymouth 4342
New Zealand

Telephone: +64 6 754 9700
Facsimile: +64 6 754 9701

www.methanex.com

METHANEX®

A Responsible Care® Company

19/11/2013
File No: R40-0243

The General Manager
Taranaki Regional Council
Private Bag 713
Stratford

Attention: B.E. Pope

Waitara Valley Site Discharge of Sulphuric Acid to Ground

In reference to the letter sent to you on 13/11/13, enclosed is a copy of the Methanex incident investigation carried out into this discharge, along with actions put in place to prevent a re-occurrence. If any clarification is needed please do not hesitate to contact myself to discuss.

Gary Rielly
Sustainability and Quality Leader

Incident Investigation Report – WV Acid Spill

Incident Number: NZ007369
Incident Classification: Major
Incident Location: Waitara Valley
Incident Date and Time: 4:56 PM 9th October 2013
Investigation Date: 10/10/2013
Investigation Team: Mike La Franchie
Taproot Review Date: 24/10/2013
Taproot Review Team: Kelly Wilson, Mike Stewart Jacks, Greg George, Emma Drew
SMT Review Date: 11/11/13
SMT Review Team: Meg Mahoney, Dave Bull, Nick Stonier, Stephen Houghton, Brian Ropitini, Gary Rielly, Jane Patterson, Wade Alsweiler

Incident Summary:

What Happened
The J-413A acid transfer pump developed a leak. The leaking acid sprayed to grade within the acid pump enclosure and ran into the containment drain. The drain had a hole in it and the liquid entered the ground below the acid enclosure.

Estimated Impact
10.5 m3 of 98% sulphuric acid exited the tank, approximately 0.3m3 of acid was consumed by the mixed bed 1 cation regeneration. Minimal pH reduction effect was observed in the neutralization sump, therefore it appears that the majority of the 10.5m3 of acid entered the ground underneath the acid enclosure secondary containment. Taranaki Regional Council issued Methanex with an abatement notice to cease using this section of the plant until the drain holes were repaired. Ground water samples have showed pH as low as 4.8. However it is noted that the ground water pH was depressed prior to this incident occurring. An unknown event occurred in late 2008 or early 2009 reducing the bore 3 ground water from a typical result of 6.5 to 5.5. This low pH existed while the Waitara Valley plant was shut down 2008 through to 2013.

Immediate Cause
Flange set leaked due to lack of tension on the studs (finger tight)
Secondary containment was not fit for service.

Learnings
Secondary containment systems are not currently part of the asset integrity program, or part of ready for startup checks.

Initial Conditions:

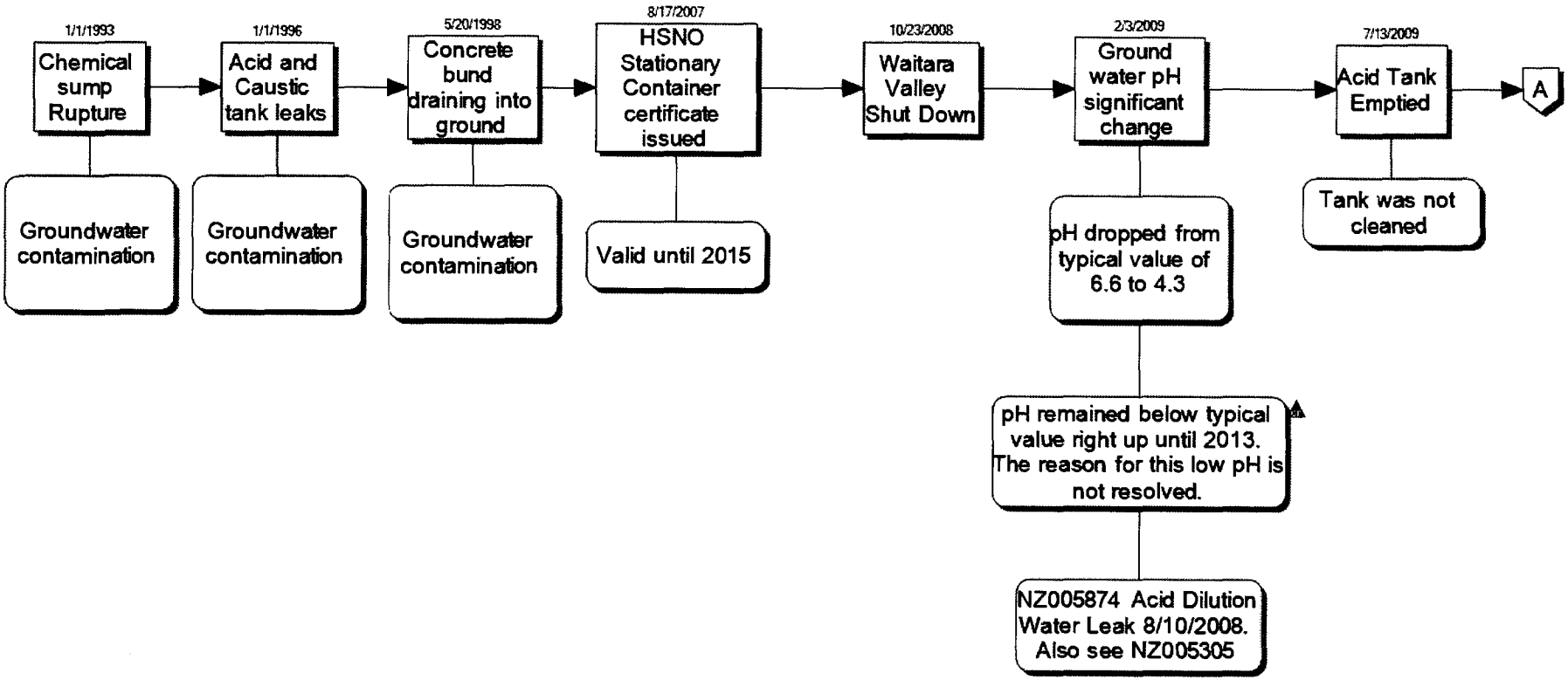
Waitara valley plant working through many operational issues post restart. Operations team very busy, not yet settled into a business as usual mode. The Waitara Valley operational team is newly formed, and still developing running plant experience.

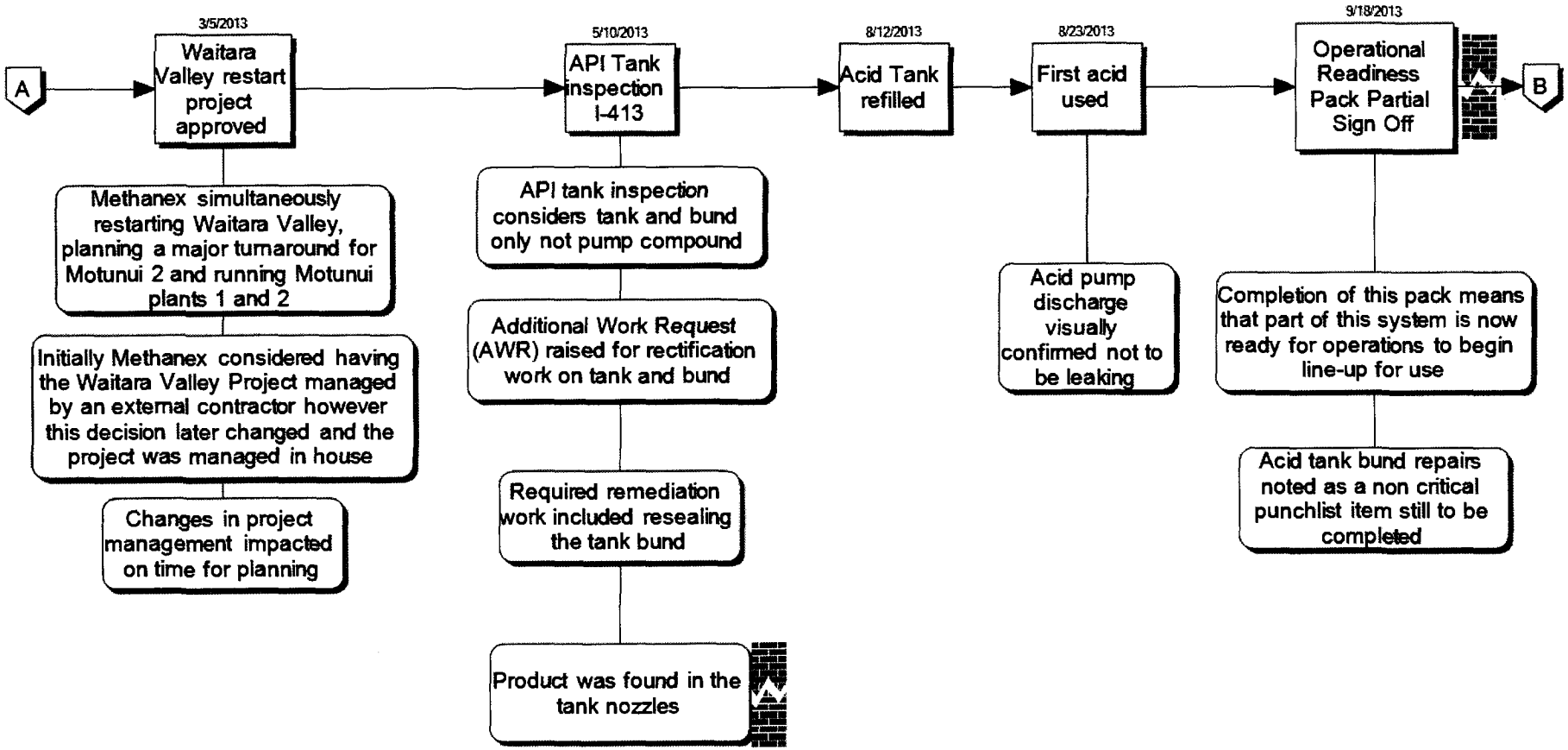
Initiating Event: (The initial failure that triggered the incident or led to its discovery)

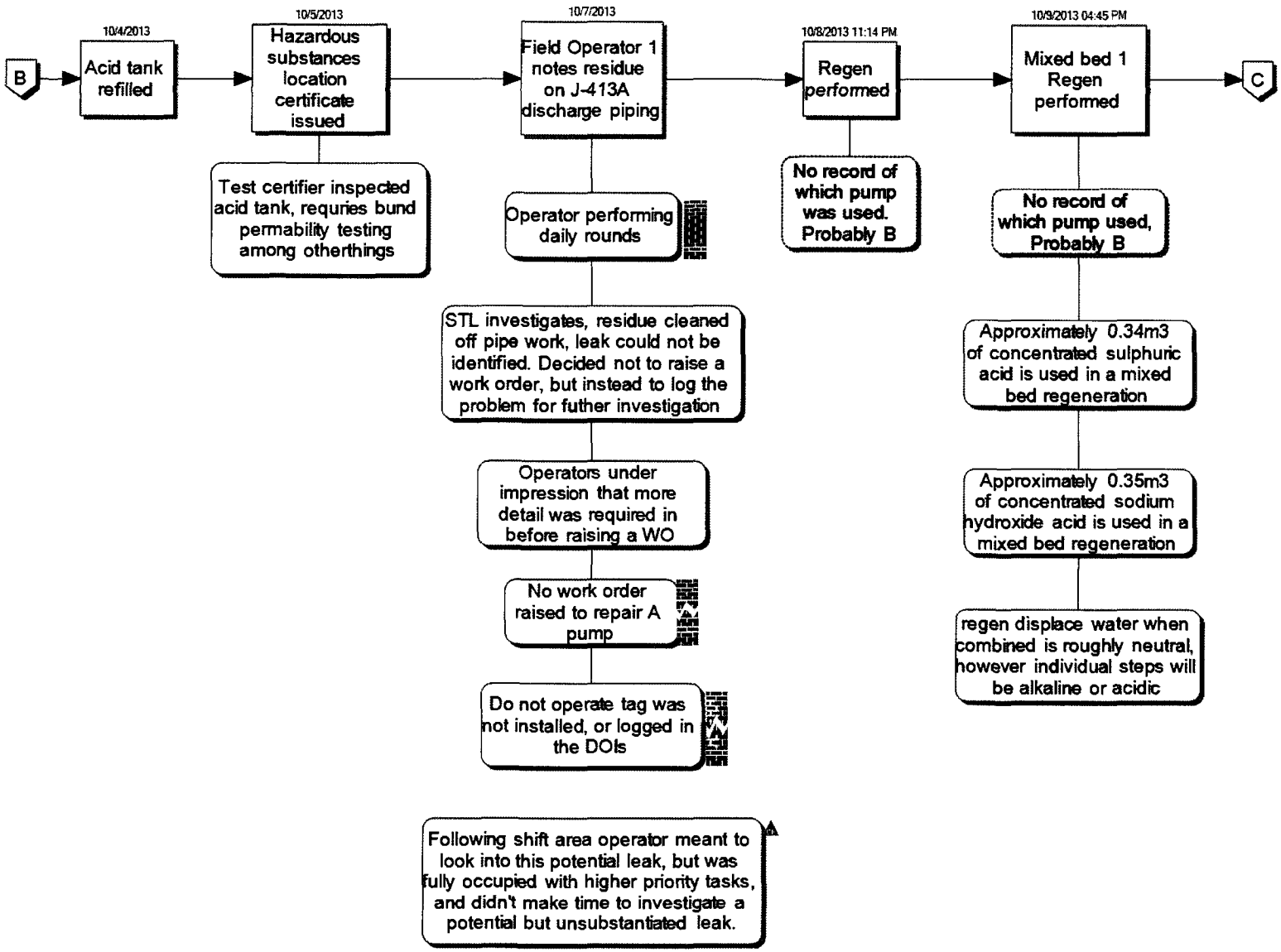
Starting J-413A to perform a Mixed Bed 1 resin regeneration.

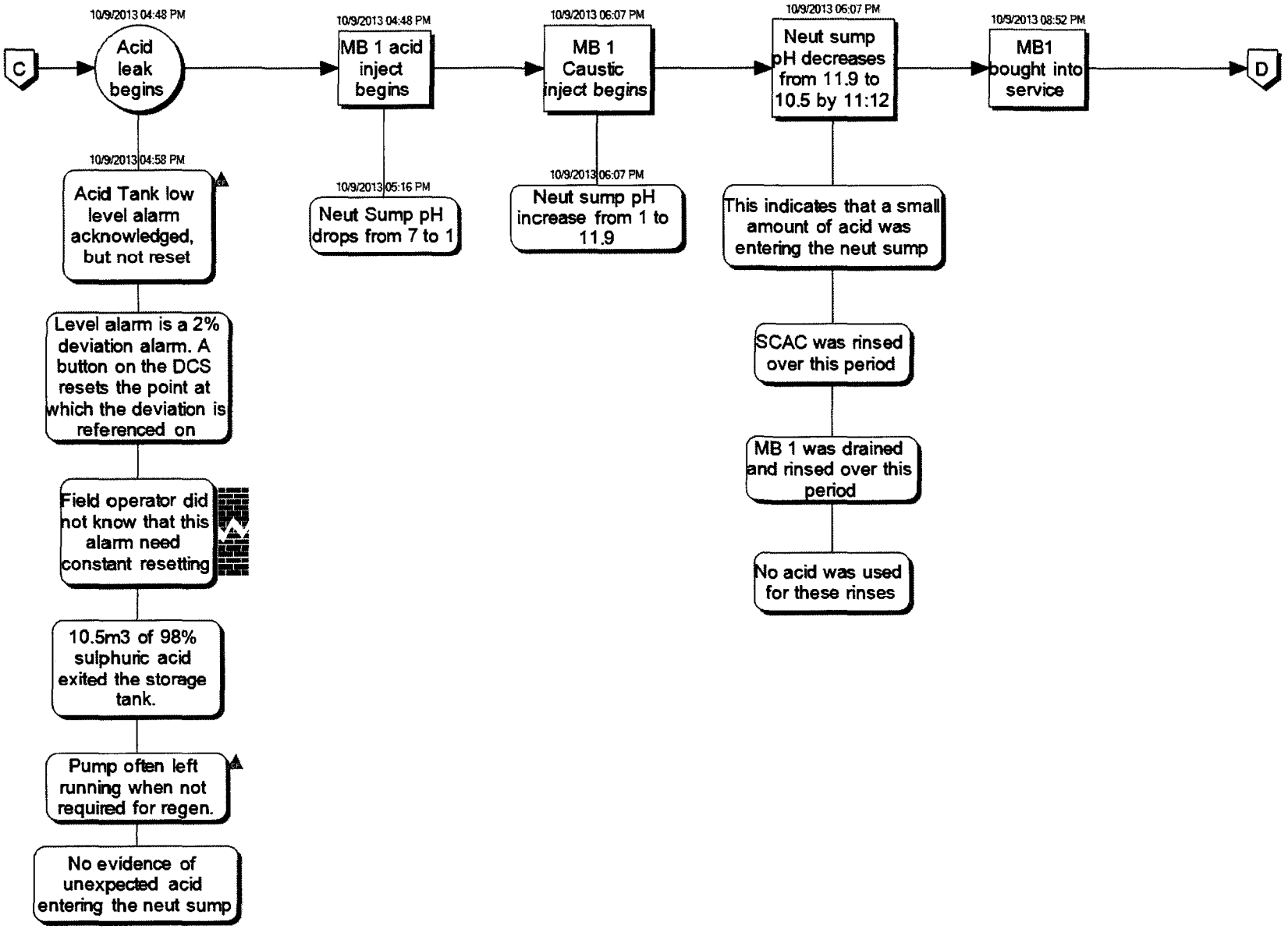
Events and Causal Factors Chart

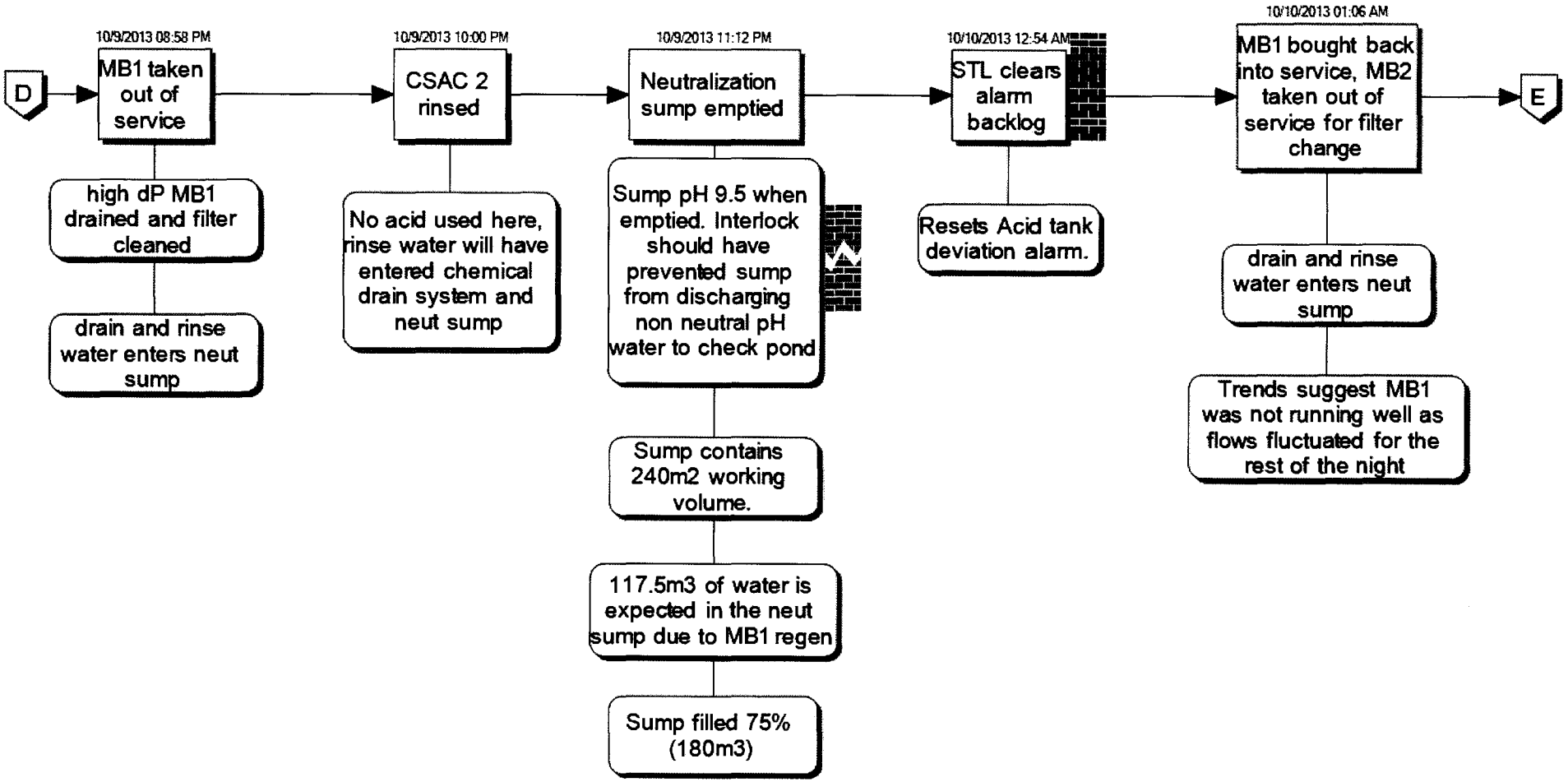
Note: Yellow shaded items are assumptions

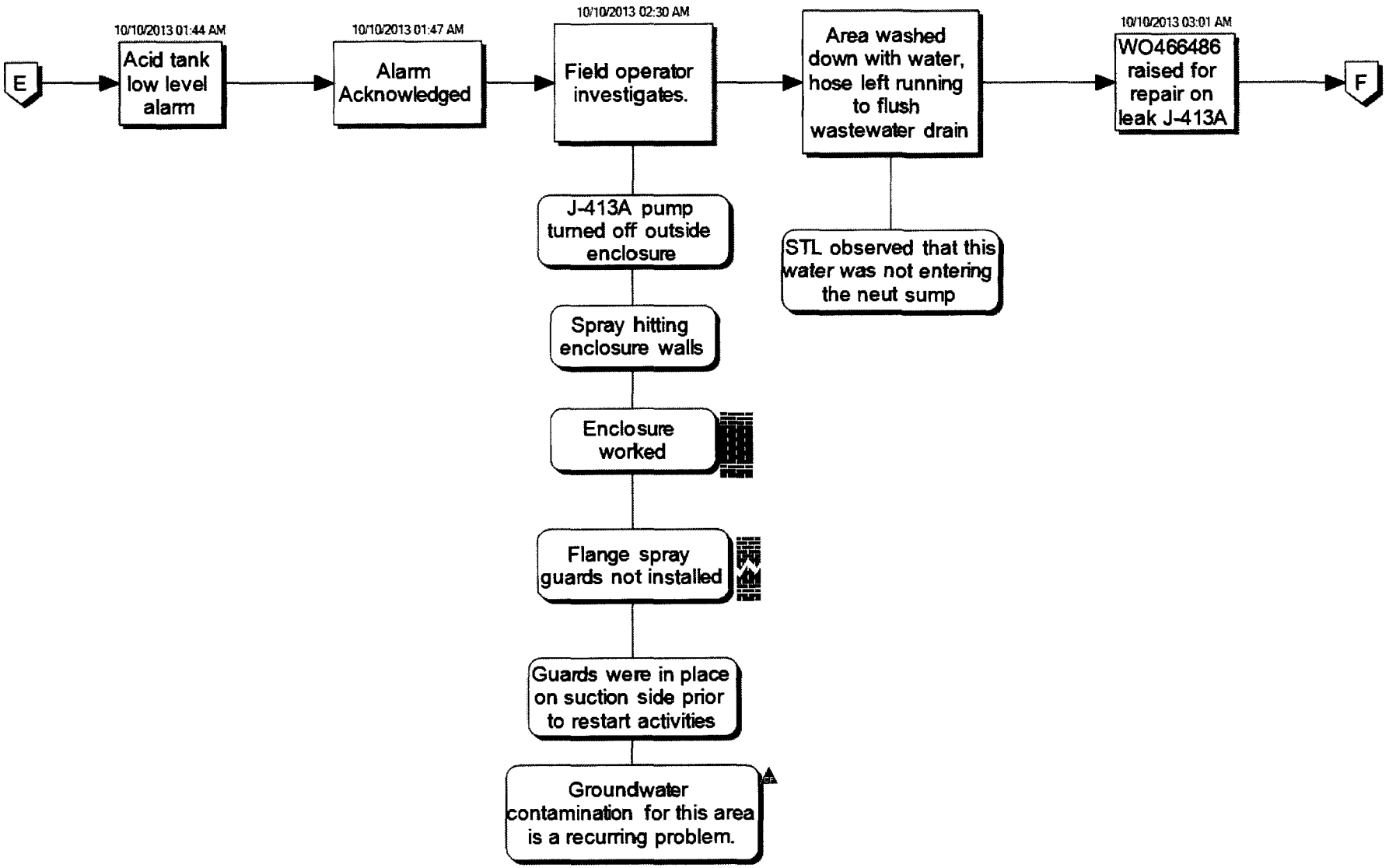


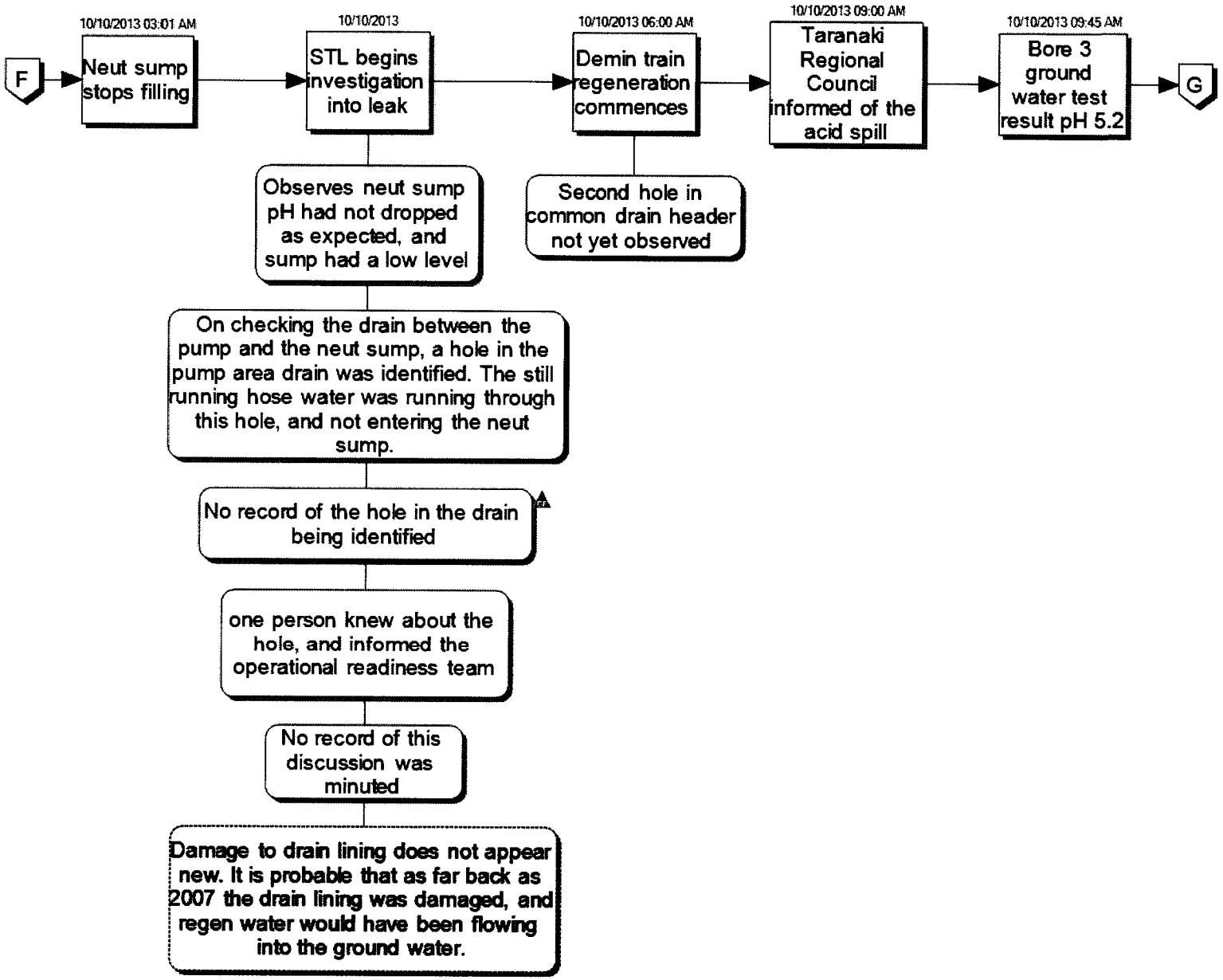

A
3/5/2013
Waitara Valley restart project approved
Methanex simultaneously restarting Waitara Valley, planning a major turnaround for Motunui 2 and running Motunui plants 1 and 2
Initially Methanex considered having the Waitara Valley Project managed by an external contractor however this decision later changed and the project was managed in house
Changes in project management impacted on time for planning
5/10/2013
API Tank inspection I-413
API tank inspection considers tank and bund only not pump compound
Additional Work Request (AWR) raised for rectification work on tank and bund
Required remediation work included resealing the tank bund
Product was found in the tank nozzles
8/12/2013
Acid Tank refilled
8/23/2013
First acid used
Acid pump discharge visually confirmed not to be leaking
9/18/2013
Operational Readiness Pack Partial Sign Off
Completion of this pack means that part of this system is now ready for operations to begin line-up for use
Acid tank bund repairs noted as a non critical punchlist item still to be completed
B

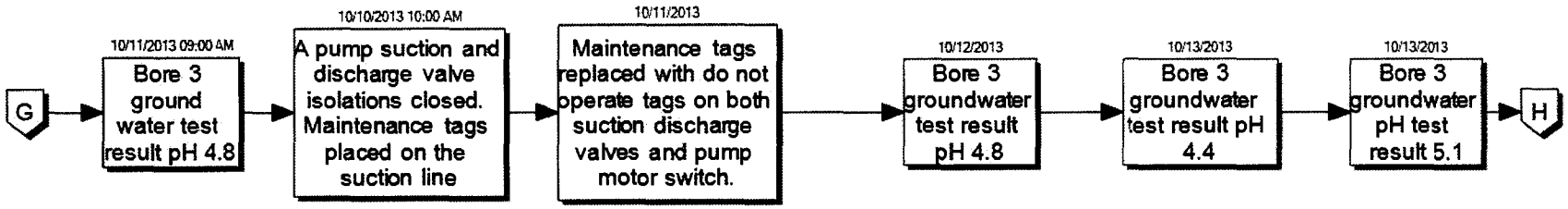

B
10/4/2013
Acid tank refilled
10/5/2013
Hazardous substances location certificate issued
Test certifier inspected acid tank, requries bund permability testing among otherthings
10/7/2013
Field Operator 1 notes residue on J-413A discharge piping
Operator performing daily rounds
STL investigates, residue cleaned off pipe work, leak could not be identified. Decided not to raise a work order, but instead to log the problem for futher investigation
Operators under impression that more detail was required in before raising a WO
No work order raised to repair A pump
Do not operate tag was not installed, or logged in the DOIs
Following shift area operator meant to look into this potential leak, but was fully occupied with higher priority tasks, and didn't make time to investigate a potential but unsubstantiated leak.
10/8/2013 11:14 PM
Regen performed
No record of which pump was used. Probably B
10/9/2013 04:45 PM
Mixed bed 1 Regen performed
No record of which pump used, Probably B
Approximately 0.34m3 of concentrated sulphuric acid is used in a mixed bed regeneration
Approximately 0.35m3 of concentrated sodium hydroxide acid is used in a mixed bed regeneration
regen displace water when combined is roughly neutral, however individual steps will be alkaline or acidic
C

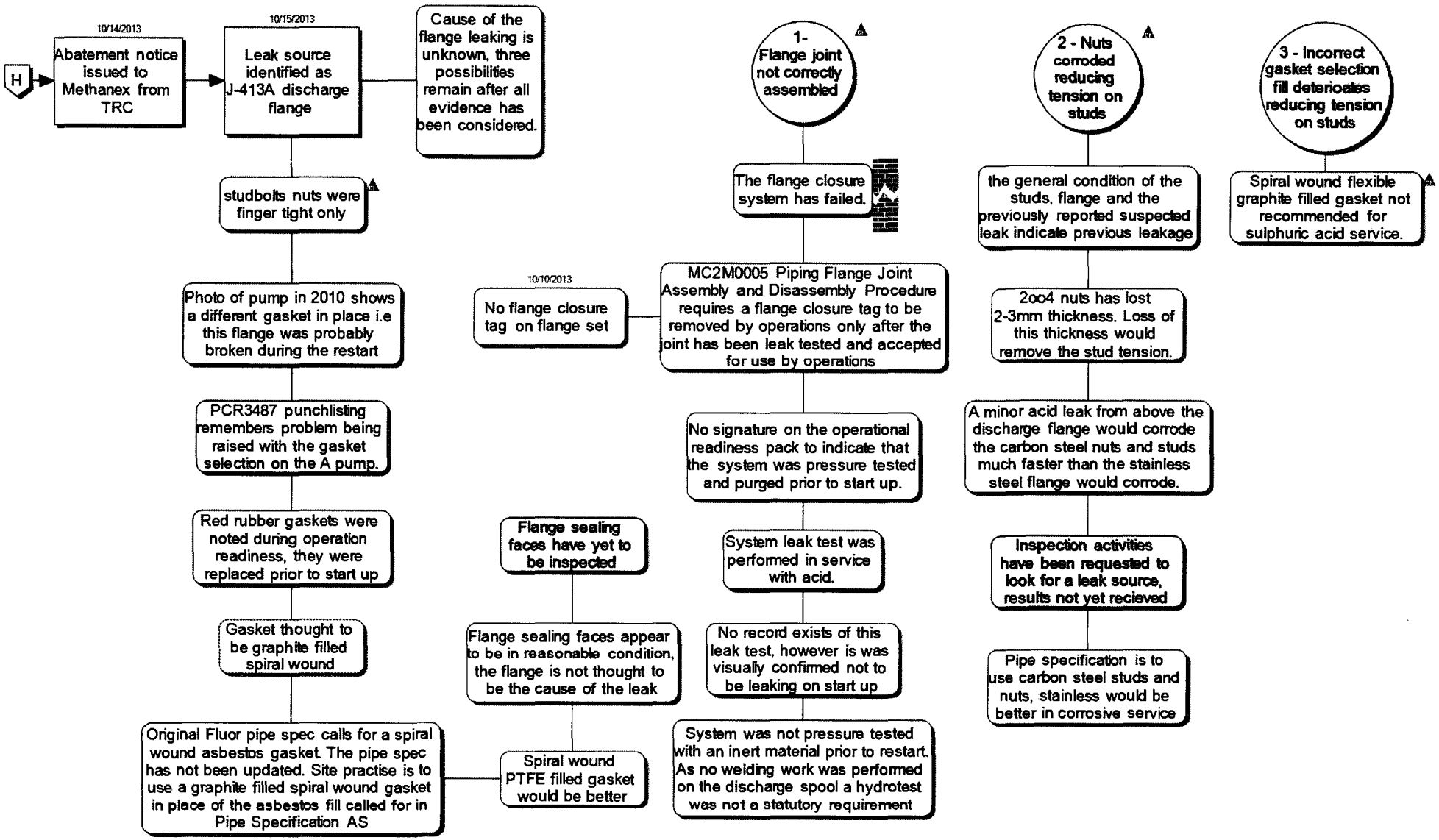

C
10/9/2013 04:48 PM
Acid leak begins
10/9/2013 04:48 PM
MB 1 acid inject begins
10/9/2013 06:07 PM
MB 1 Caustic inject begins
10/9/2013 06:07 PM
Neut sump pH decreases from 11.9 to 10.5 by 11:12
10/9/2013 08:52 PM
MB1 bought into service
D
10/9/2013 04:58 PM
Acid Tank low level alarm acknowledged, but not reset
Level alarm is a 2% deviation alarm. A button on the DCS resets the point at which the deviation is referenced on
Field operator did not know that this alarm need constant resetting
10.5m3 of 98% sulphuric acid exited the storage tank.
Pump often left running when not required for regen.
No evidence of unexpected acid entering the neut sump
10/9/2013 05:16 PM
Neut Sump pH drops from 7 to 1
10/9/2013 06:07 PM
Neut sump pH increase from 1 to 11.9
This indicates that a small amount of acid was entering the neut sump
SCAC was rinsed over this period
MB 1 was drained and rinsed over this period
No acid was used for these rinses


D
10/9/2013 08:58 PM
MB1 taken out of service
high dP MB1 drained and filter cleaned
drain and rinse water enters neut sump
10/9/2013 10:00 PM
CSAC 2 rinsed
No acid used here, rinse water will have entered chemical drain system and neut sump
10/9/2013 11:12 PM
Neutralization sump emptied
Sump pH 9.5 when emptied. Interlock should have prevented sump from discharging non neutral pH water to check pond
Sump contains 240m2 working volume.
117.5m3 of water is expected in the neut sump due to MB1 regen
Sump filled 75% (180m3)
10/10/2013 12:54 AM
STL clears alarm backlog
Resets Acid tank deviation alarm.
10/10/2013 01:06 AM
MB1 bought back into service, MB2 taken out of service for filter change
drain and rinse water enters neut sump
Trends suggest MB1 was not running well as flows fluctuated for the rest of the night
E


E
10/10/2013 01:44 AM
Acid tank low level alarm
10/10/2013 01:47 AM
Alarm Acknowledged
10/10/2013 02:30 AM
Field operator investigates.
Area washed down with water, hose left running to flush wastewater drain
10/10/2013 03:01 AM
WO466486 raised for repair on leak J-413A
F
J-413A pump turned off outside enclosure
STL observed that this water was not entering the neut sump
Spray hitting enclosure walls
Enclosure worked
Flange spray guards not installed
Guards were in place on suction side prior to restart activities
Groundwater contamination for this area is a recurring problem.


F
10/10/2013 03:01 AM
Neut sump stops filling
10/10/2013
STL begins investigation into leak
10/10/2013 06:00 AM
Demin train regeneration commences
10/10/2013 09:00 AM
Taranaki Regional Council informed of the acid spill
10/10/2013 09:45 AM
Bore 3 ground water test result pH 5.2
G
Observes neut sump pH had not dropped as expected, and sump had a low level
Second hole in common drain header not yet observed
On checking the drain between the pump and the neut sump, a hole in the pump area drain was identified. The still running hose water was running through this hole, and not entering the neut sump.
No record of the hole in the drain being identified
one person knew about the hole, and informed the operational readiness team
No record of this discussion was minuted
Damage to drain lining does not appear new. It is probable that as far back as 2007 the drain lining was damaged, and regen water would have been flowing into the ground water.


G
10/11/2013 09:00 AM
Bore 3 ground water test result pH 4.8
10/10/2013 10:00 AM
A pump suction and discharge valve isolations closed. Maintenance tags placed on the suction line
10/11/2013
Maintenance tags replaced with do not operate tags on both suction discharge valves and pump motor switch.
10/12/2013
Bore 3 groundwater test result pH 4.8
10/13/2013
Bore 3 groundwater test result pH 4.4
10/13/2013
Bore 3 groundwater pH test result 5.1
H


H
10/14/2013
Abatement notice issued to Methanex from TRC
10/15/2013
Leak source identified as J-413A discharge flange
Cause of the flange leaking is unknown, three possibilities remain after all evidence has been considered.
studbolts nuts were finger tight only
Photo of pump in 2010 shows a different gasket in place i.e this flange was probably broken during the restart
PCR3487 punchlisting remembers problem being raised with the gasket selection on the A pump.
Red rubber gaskets were noted during operation readiness, they were replaced prior to start up
Gasket thought to be graphite filled spiral wound
Original Fluor pipe spec calls for a spiral wound asbestos gasket. The pipe spec has not been updated. Site practise is to use a graphite filled spiral wound gasket in place of the asbestos fill called for in Pipe Specification AS
Spiral wound PTFE filled gasket would be better
Flange sealing faces have yet to be inspected
Flange sealing faces appear to be in reasonable condition, the flange is not thought to be the cause of the leak
10/10/2013
No flange closure tag on flange set
MC2M0005 Piping Flange Joint Assembly and Disassembly Procedure requires a flange closure tag to be removed by operations only after the joint has been leak tested and accepted for use by operations
No signature on the operational readiness pack to indicate that the system was pressure tested and purged prior to start up.
System leak test was performed in service with acid.
No record exists of this leak test, however is was visually confirmed not to be leaking on start up
System was not pressure tested with an inert material prior to restart. As no welding work was performed on the discharge spool a hydrotest was not a statutory requirement
1- Flange joint not correctly assembled
The flange closure system has failed.
2 - Nuts corroded reducing tension on studs
the general condition of the studs, flange and the previously reported suspected leak indicate previous leakage
2oo4 nuts has lost 2-3mm thickness. Loss of this thickness would remove the stud tension.
A minor acid leak from above the discharge flange would corrode the carbon steel nuts and studs much faster than the stainless steel flange would corrode.
Inspection activities have been requested to look for a leak source, results not yet recieved
Pipe specification is to use carbon steel studs and nuts, stainless would be better in corrosive service
3 - Incorrect gasket selection fill deterioates reducing tension on studs
Spiral wound flexible graphite filled gasket not recommended for sulphuric acid service.

Immediate Corrective Actions:
Pump shut down to shut leak.
Acid washed into drain (subsequently flowed into soil)
TRC informed of the spill
Further demineralization train resin regenerations (demin regens) stopped once hole in drain was identified
Holes in drain temporarily repaired to allow demin regens to re-commence
Ground water samples collected and analysed for pH.

Causes and Corrective Actions

Correction Actions				
Causal Factor	Root Cause	Corrective Action	By Who	By When
1. No record of the hole in the drain being identified	Management System - SPAC not strict enough	1) The Waitara Valley operational readiness check sheets cover all tagged equipment. Secondary containment does not have a tag number, and therefore was not checked as part of the operational readiness prestart checks. Add secondary containment to the operational readiness pre start checklists.	Dave Bull	1/12/2014
		2) Review the scope of what equipment is included and excluded in Methanex Asset integrity. In light of this incident examine secondary containment, process sewers and make recommendations	Stephen Houghton	1/12/2014
	Procedures - Wrong – Situation not covered	As per Action 1		
	Management Systems	3) Perform investigation to determine why a root cause investigation was not performed, into the 2009 indication of groundwater contamination in the shutdown Waitara Valley Bore 3.	Jane Patterson	1/6/2014
2. Groundwater contamination in this area is a reoccurring problem	Equipment difficulty	4) Inspect Motunui acid and caustic above ground primary and secondary containment to ensure its suitability for service.	Stephen Houghton	31/12/2013
		5) Review primary and secondary containment to ensure its suitability for service. Scope to include concentrated and dilute acid and caustic storage and pipework, and demineralization train effluent collection and neutralization system	Nick Stonier	1/12/2015
	Management Systems	6) Perform investigation to determine if the 2013 acid leak is related to the historic acid and caustic leaks that occurred in the raw water treatment unit (1993, 1996, 1998).	Jane Patterson	1/6/2014

3. Acid Tank low level alarm acknowledged, but not reset	Human Engineering – Non Fault Tolerant System – errors not detectable	7) The acid tank level deviation alarm requires resetting manually. Operator did not know this alarm needed resetting, result was the next shift did not receive timely alarm notification that the level in the acid tank was changing. Perform alarm management on the Waitara Valley site	Nick Stonier	1/12/2015
		8) The acid tank level deviation alarm requires resetting manually. Operator did not know this alarm needed resetting, result was the next shift did not receive timely alarm notification that the level in the acid tank was changing. Alter the Acid tank I-413 alarming system to improve the likelihood of unexpected tank level changes being identified.	Nick Stonier	1/7/2014
4. Pump often left running when not required for regen.	Equipment difficulty – Design Specs Need Improvement	9) Review Waitara Valley demin train regeneration logic looking to minimise the time the acid and caustic system is pressurized. Motunui pumps auto start and stop the acid and caustic pumps.	Nick Stonier	1/7/2014
5. Following shift area operator meant to look into this potential leak, but was fully occupied with higher priority tasks, and didn't make time to investigate a potential but unsubstantiated leak.	Work direction, Preparation, Scheduling needs improvement	10) Ensure Waitara Valley field operators work scheduling (permits in area) still enable sufficient time for routine operational tasks (i.e. area walk around, proactive monitoring etc).	Dave Bull	1/7/2014
	Human Engineering, Work Environment, Equipment Guard Needs Improvement	11) Investigate methods of improving the Waitara valley acid/caustic pump skid area to improve primary containment integrity	Nick Stonier	31/12/2014
6. *2 - Nuts corroded reducing tension on studs*	Equipment difficulty – Design Specs Need Improvement	12) Change pipe specs to specify stainless steel studs and nuts in services aggressively corrosive to carbon steel.	Nick Stonier	1/6/2014
7. *3 – Incorrect gasket selection*	Equipment difficulty – Design Specs Need Improvement	13) Specify a gasket that is fit for service.	Nick Stonier	1/6/2014

8. *1- Flange joint not correctly assembled*	Human Performance difficulty	There is no evidence to identify the cause of this failure. As no evidence exists the following areas should be investigate for improvement opportunities. 14) Investigate Flange joint closure system for improvement opportunities – particular the removal of flange closure tags	Stephen Houghton	1/12/2014
		15) Investigate the depth of checking operations perform prior to starting the plant looking for improvement opportunities.	Dave Bull	1/12/2014
		16) Investigate the Methanex approach to pre start up leak testing for improvement opportunities	Dave Bull	1/12/2014
		17) Investigate what proactive asset integrity checks outside of statutory requirements should be conducted. Scope should include all equipment that failure of which would contribute to a major incident, or ability to control a major incident.	Stephen Houghton	1/12/2015

Related issues requiring follow-up

Correction Actions			
Issue	Corrective Action	By Who	By When
9. Management systems not being followed	18) GO2GE001 Pre-startup Operational Readiness Audit Standard was not correctly followed. The audit team selection did not meet the procedure criteria. The project team was not prepared for the audit. The audit was conducted before systems were finished. Work with Global Experts Team to ensure the procedure is pitched at the correct level	Greg Dollimore	1/12/2014
	19) No drawings in Methanex document management system for Waitara Valley neutralization system installed in 2003 EWR 2039. MOC never updated plant records. Update plant records.	Nick Stonier	1/12/2014
	20) Pipe specification not updated since 1982. It calls for asbestos gaskets. Update all pipe specifications, Motunui and Waitara Valley to ensure they do not require use of unavailable items, or items no longer considered fit for service.	Nick Stonier	1/12/2015
	21) Acid pipework not pressure tested prior to start up. Develop a lineout and pressure test standard operating procedure for this section of plant.	Dave Bull	1/12/2014
	22) Slip on flange against the flange discharge face. Pipe spec calls for a socket weld flange. Ensure pipework meets pipe specification, or ensure a deviation from procedure is documented	Stephen Houghton	1/12/2014
	23) Install flange protectors as required by the pipe specification.	Stephen Houghton	1/12/2013

Distribution List:
Brian Ropitini - Director, Manufacturing
Dave Bull - Operations Manager
Meg Mahoney - Public Affairs Manager
Jayne Francis - Director, Corporate Resources
Greg Dollimore – Projects Manager
Andrew Maycock – Finance Manager
Stephen Houghton- Maintenance Manager
Jane Patterson – Responsible Care Manager
Nick Stonier – Technical Manager