WestSide New Zealand Limited
Rimu Production Station
Monitoring Programme
Annual Report
2017-2018

Technical Report 2018-42

ISSN: 1178-1467 (Online)
Document: 2105605 (Word)
Document: 2147138 (Pdf)

Taranaki Regional Council
Private Bag 713
STRATFORD

February 2019

Executive summary

WestSide New Zealand (WestSide) operates a petrochemical production station located on Mokoia Road at Mokoia, in the Manawapou catchment. This report for the period July 2017 to June 2018 describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess the Company's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of the Company's activities.

The Company holds two resource consents, which include a total of 26 conditions setting out the requirements that the Company must satisfy. The Company holds one consent to allow it to discharge treated stormwater onto and into land and into an unnamed tributary of the Manawapou River, and one consent to discharge contaminants into the air at this site.

During the monitoring period, WestSide New Zealand demonstrated an overall high level of environmental performance.

The Council's monitoring programme for the year under review included four inspections and two ambient air quality analyses.

The monitoring showed that the site was well managed. All consent conditions relating to site operations and management were complied with. There was one Unauthorised Incident relating to the Rimu Production Station during the period under review.

During the monitoring period, the Company demonstrated a high level of both environmental performance and administrative compliance with respect to their resource consents.

For reference, in the 2017-2018 year, consent holders were found to achieve a high level of environmental performance and compliance for 76% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 20% of the consents, a good level of environmental performance and compliance was achieved.

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

This report includes recommendations for the 2018-2019 year.

Table of contents

List of tables

List of figures

List of photos

1 Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2017 to June 2018 by the Taranaki Regional Council (the Council) on the monitoring programme associated with resource consents held by WestSide New Zealand (WestSide). WestSide operates a petrochemical production station situated on Mokoia Road at Mokoia, in the Manawapou catchment.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents held by the Company that relate to discharges of water within the Manawapou catchment, and the air discharge permit held by WestSide to cover emissions to air from the site.

One of the intents of the *Resource Management Act 1991* (RMA) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of the Company's use of water, land and air, and is the 17th combined annual report by the Council for the Rimu Production Station.

1.1.2 Structure of this report

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

- consent compliance monitoring under the RMA and the Council's obligations;
- the Council's approach to monitoring sites though annual programmes;
- the resource consents held by the Company in the Manawapou catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at the Rimu Production Station.

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

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

Section 4 presents recommendations to be implemented in the 2018-2019 monitoring year.

A glossary of common abbreviations and scientific terms, and a bibliography, are presented at the end of the report.

1.1.3 The Resource Management Act 1991 and monitoring

The RMA primarily addresses environmental 'effects' which are defined as positive or adverse, temporary or permanent, past, present or future, or cumulative. Effects may arise in relation to:

a. the neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;
b. physical effects on the locality, including landscape, amenity and visual effects;
c. ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;

d. natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and

e. risks to the neighbourhood or environment.

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

1.1.4 Evaluation of environmental and administrative performance

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

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

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

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

Environmental Performance

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

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

For example:

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

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

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

Administrative performance

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

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

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

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

For reference, in the 2017-2018 year, consent holders were found to achieve a high level of environmental performance and compliance for 76% of the consents monitored through the Taranaki tailored monitoring programmes, while for another 20% of the consents, a good level of environmental performance and compliance was achieved.

1.2 Process description

The Rimu Production Station (Photo 1) receives oil and gas recovered from the Rimu, Kauri and Manutahi wells and includes condensate, gas and LPG processing plants. The oil and gas are separated and treated to produce condensate suitable for export from the site; gas suitable for export into Vector's pipeline; and LPG suitable for sale and export. Construction started in May 2001 and the plant was commissioned between February and April 2002.

The Rimu Production Station is situated on Mokoia Road, between the coast and State Highway 3, south east of Hawera. The production station covers approximately 6 hectares on an area of 9.5 hectares of land leased by WestSide. The land is situated on top of a coastal terrace. The closest residential dwelling is approximately 800 metres from the production station. The surrounding land use is largely pastoral.

Stormwater from the production station, including potentially contaminated stormwater from the production area and tank storage area, is treated through an API separator and then directed into a polyethylene lined storage pond located at the southern edge of the site. The pond has a storage capacity of 3,600 m^3 and it serves as a settlement pond and a fire water source in the event of an emergency. Water from the stormwater pond is discharged by pipe onto land to the east of the site where it flows into an unnamed tributary of the Manawapou River.

The production station and associated wellsites were divested to WestSide New Zealand Limited on 1 November 2016 from Origin Energy Resources NZ Limited.

Photo 1 Rimu Production Station

1.3 Resource consents

The Company holds two resource consents the details of which are summarised in Table 1 below and outlined in sections 1.3.1 to 1.3.2.

Table 1 Summary of consents held by WestSide for the Rimu Production Station

Consent number	Purpose	Granted	Review	Expires
5744-2	To discharge treated stormwater from the Rimu Production Station onto and into land and into an unnamed tributary of the Manawapou River	November 2016	June 2022	June 2034
5746-2	To discharge contaminants into the air from the Rimu Production Station, including flaring and miscellaneous emissions	November 2016	June 2022	June 2034

1.3.1 Water discharge permit

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.

WestSide holds water discharge permit **5744-2.0** to discharge treated stormwater from the Rimu Production Station onto and into land and into an unnamed tributary of the Manawapou River. This permit

was issued by the Council on 1 November 2016 as a resource consent under Section 87(e) of the. It is due to expire on 1 June 2034.

Condition 1 requires the adoption of the best practicable option.

Condition 2 imposes a limit on the stormwater catchment area.

Condition 3 requires the preparation and maintenance of a contingency plan.

Condition 4 requires that the design, management and maintenance of the stormwater system be in accordance with the information submitted in support of the application.

Conditions 5 to 7 deal with the design, capacity and lining of perimeter drains, skimmer pits and stormwater retention areas.

Conditions 8 to 11 set standards for certain constituents in the discharge, and state effects not to occur in the receiving waters beyond the established mixing zone.

Condition 12 deals with reinstatement of the site.

Condition 13 is a review provision.

The permit is attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consent which is appended to this report.

1.3.2 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.

WestSide holds air discharge permit **5746-2.0** to discharge contaminants into the air from the Rimu Production Station, including flaring and miscellaneous emissions. This permit was issued by the Council on 1 November 2016 as a resource consent under Section 87(e) of the RMA. It is due to expire on 1 June 2034.

Condition 1 requires the adoption of the best practicable option.

Conditions 2 to 5 deal with recording and submitting information in relation to flaring.

Conditions 6 to 8 provide for information on gas streams, and notification of changes or flaring.

Conditions 9 to 12 deal with preventing and minimising emissions.

Condition 13 is a review provision.

The permit is attached to this report in Appendix I.

This summary of consent conditions may not reflect the full requirements of each condition. The consent conditions in full can be found in the resource consent which is appended to this report.

1.3.3 Related consents

WestSide also holds consents for production activities at wellsites associated with the Rimu Production Station. Details of these consents are summarised in Table 2.

Table 2 Consents for production activities at wellsites associated with the Rimu Production Station

Wellsite	Consent number	Purpose	Issue date	Expiry
Kauri-A	5730-1	To discharge treated stormwater and treated site water from hydrocarbon exploration and production operations at the Kauri Te Pakakohi-A wellsite onto and into land	01/12/2000	2022
	5731-1	To discharge emissions into the air from the flaring of hydrocarbons and miscellaneous emissions associated with hydrocarbon exploration and production testing operations involving up to 32 zones and from production flaring at the Kauri Te Pakakohi-A wellsite	01/12/2000	2022
Kauri-A & F	6129-1	To discharge emissions to air from flaring (at either the Kauri-F or Kauri Te Pakakohi-A wellsites) associated with production activities and miscellaneous emissions at the Kauri-F wellsite	06/03/2003	2022
Kauri-C	5928-2	To discharge treated stormwater from hydrocarbon exploration and production operations from the Kauri-C wellsite onto and into land	01/11/2016	2034
Kauri-D	5951-2	To discharge treated stormwater from hydrocarbon exploration and production operations at the Kauri-D wellsite onto and into land	01/11/2016	2034
Kauri-F	6130-1	To discharge emissions to air from flaring associated with production activities and miscellaneous emissions at the Kauri-F wellsite	26/02/2003	2022
Kauri-E	6140-1	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Kauri-E wellsite onto and into land and into the Waikaikai Stream	24/04/2003	2022
	6141-1	To discharge treated stormwater, uncontaminated treated site water and uncontaminated treated production water from hydrocarbon exploration and production operations at the Kauri-E Wellsite onto and into land and into the Mangaroa Stream	22/04/2003	2022
Manutahi-A	6299-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-A wellsite	05/04/2004	2022
	6300-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-A wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	05/04/2004	2022

Wellsite	Consent number	Purpose	Issue date	Expiry
Manutahi-B	6305-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-B wellsite	21/04/2004	2022
	6306-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-B wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	20/04/2004	2022
Manutahi-C	6311-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-C wellsite	06/04/2004	2022
	6312-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-C wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	06/04/2004	2022
Manutahi-D	6317-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-D wellsite	20/04/2004	2022
	6318-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-D wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	20/04/2004	2022
Manutahi-E	6323-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-E wellsite	08/06/2004	2022
	6324-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-E wellsite onto and into land in the vicinity of the Mangaroa Stream and Lake Kaikoura	13/07/2004	2022
Manutahi-F	6329-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-F wellsite	09/06/2004	2022
	6330-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-F wellsite onto and into land in the vicinity of the Mangaroa Stream and Lake Kaikoura	16/07/2004	2022
Manutahi-G	6335-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-G wellsite	01/06/2004	2022

Wellsite	Consent number	Purpose	Issue date	Expiry
Manutahi-G	6336-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-G wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	01/06/2004	2022
Manutahi-H	6341-1	To discharge emissions to air during flaring from well workovers and in emergency situations associated with production activities at the Manutahi-H wellsite	02/06/2004	2022
	6342-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Manutahi-H wellsite onto and into land in the vicinity of an unnamed tributary of the Mangaroa Stream	02/06/2004	2022
Rimu-A	5322-2	To discharge treated stormwater from hydrocarbon exploration and production operations at the Rimu-A wellsite onto land and into an unnamed tributary of the Manawapou River	01/11/2016	2034
Rimu-A	5324-2	To discharge contaminants to air from hydrocarbon exploration at the Rimu-A wellsite, including combustion involving flaring or incineration of petroleum recovered form natural deposits, in association with well development or redevelopment and testing or enhancement of production flows	01/11/2016	2034
Rimu-B	5625-1	To discharge treated stormwater and treated site water from hydrocarbon exploration and production operations at the Rimu-B wellsite onto and into land and into an unnamed tributary of the Manawapou River	27/06/2000	2022
	5626-1	To discharge emissions into the air from the flaring of hydrocarbons and miscellaneous emissions associated with hydrocarbon exploration and production testing operations involving up to 10 zones and from production flaring at the Rimu-B wellsite	27/06/2000	2022
Pohutukawa-A	6749-1	To discharge treated stormwater and treated produced water from hydrocarbon exploration and production operations at the Pohutakawa-A wellsite onto and into land in the vicinity of the Waikaikai Stream	28/11/2005	2022
	6751-1	To discharge emissions to air during flaring from well workovers and in emergency situations and miscellaneous emissions associated with production activities at the Pohutakawa-A wellsite	28/11/2005	2022

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the RMA sets obligations upon the Council to gather information, monitor and conduct research on the exercise of resource consents within the Taranaki region. The Council is also required to assess the effects arising from the exercising of these consents and report upon them.

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

The monitoring programme for the Rimu Production Station consisted of three primary components.

1.4.2 Programme liaison and management

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

- ongoing liaison with resource consent holders over consent conditions and their interpretation and application;
- in discussion over monitoring requirements;
- preparation for any consent reviews, renewals or new consent applications;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

1.4.3 Site inspections

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

1.4.4 Chemical sampling

The Rimu Production Station stormwater discharge was scheduled to be sampled twice. With the unnamed tributary of the Manawapou River scheduled to be sampled concurrently at two sites. However no samples were collected during the monitoring period, these will next be collected during 2018-2019.

The Council undertook sampling of the ambient air quality outside the boundary of the site. A multi-gas meter was deployed on one occasion in the vicinity of the plant, with monitoring consisting of continuous measurements of gas concentrations for the gases of interest (carbon monoxide and combustible gases). A PM_{10} particulate monitor was deployed concurrently with the multi-gas meter. Two nitrogen oxide measuring devices were also deployed in the vicinity of the plant on one occasion during the year under review.

2 Results

2.1 Water

2.1.1 Inspections

Four inspections were carried out at the Rimu Production Station and associated wellsites during the 2017-2018 monitoring period, on 11 October and 9 November 2017, and 8 January and 27 March 2018.

Site inspections found the site to be neat, tidy and well managed. All stormwater was diverted through various treatment facilities and no effects of any off-site discharge were observed. Separators were clean and clear.

Minimal flaring was observed during inspections, and no odours or smoke were noted.

2.2 Air

2.2.1 Inspections

Air inspections were carried out in conjunction with site inspections as discussed in section 2.1.1 above. No issues regarding air quality were noted during the monitoring period.

2.2.2 Results of receiving environment monitoring

2.2.2.1 Carbon monoxide and combustible gases

During the monitoring year, a multi-gas meter was deployed on one occasion in the vicinity of the plant. The deployment lasted approximately 45 hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continuous measurements of gas concentrations for the gases of interest (carbon monoxide and combustible gases). The monitoring sites used in the year under review are shown in Figure 1.

Figure 1 Air monitoring sites at Rimu Production Station for 2017-2018

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

The details of the sample run are summarised in Table 3 and the data from the sample run are presented graphically in Figure 2.

Table 3 Results of carbon monoxide and LEL monitoring at Rimu Production Station

Period		31 July to 2 August 2017 (45 hours)
Max	CO(ppm)	1.80
	LEL(%)	0.10
Mean	CO(ppm)	0.20
	LEL(%)	0.00
Min	CO(ppm)	0.00
	LEL(%)	0.00

Notes: (1) the instrument records in units of ppm. At 25°C and 1 atm, 1ppm CO = 1.145 mg/m^3
(2) because the LEL of methane is equivalent to a mixture of approximately 5% methane in air, then the actual concentration of methane in air can be obtained by dividing the percentage LEL by 20.

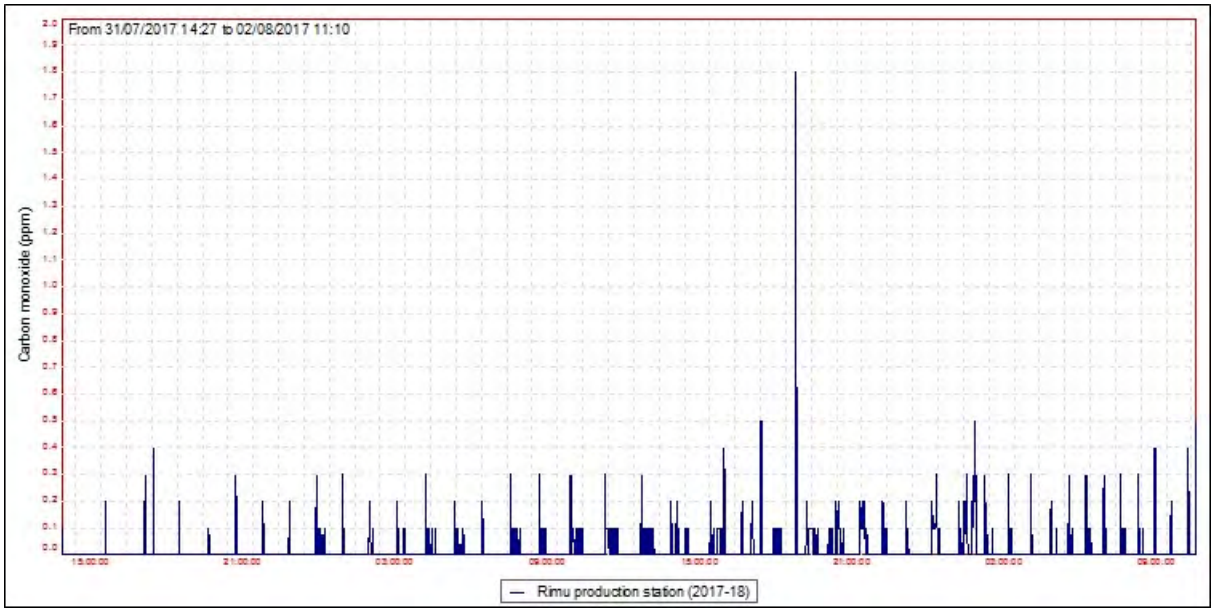

Figure 2 Ambient CO levels in the vicinity of Rimu Production Station

The consent covering air discharges from the Rimu Production Station has specific limits related to particular gases. Special condition 11 of consent 5746-2 sets limits on the carbon monoxide concentration at or beyond the production station's boundary. The limit is expressed as 10 mg/m^3 for an eight hour average. The maximum concentration of carbon monoxide found during the monitoring run was 2.1 mg/m^3 while the average concentration for the entire dataset was 0.2 mg/m^3, which comply with consent conditions.

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

2.2.2.2 PM_{10} particulates

In September 2004 the Ministry for the Environment enacted National Environmental Standards (NESs) relating to certain air pollutants. The NES for PM_{10} particulates is 50 µg/m³ (24 hour average). The same limit is imposed on consent 5746-2, in condition 11 that provides for the discharge of emissions to air from Rimu production station.

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

PM_{10} particles are linked to adverse health effects that arise primarily from the ability of particles of this size to penetrate the defences of the human body and enter deep into the lungs, significantly reducing the exchange of gases across the lung walls. Health effects from inhaling PM_{10} include increased mortality and the aggravation of existing respiratory and cardiovascular conditions such as asthma and chronic pulmonary diseases.

During the reporting period, a "DustTrak" PM_{10} monitor was deployed on one occasion in the vicinity of Rimu Production Station. The deployment lasted approximately 42 hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continual measurements of PM_{10} concentrations. The location of the "DustTrak" monitor during the sampling run is shown in Figure 1. The results of the sample run are presented in Figure 3 and Table 4.

Figure 3 PM_{10} concentrations (µg/m³) at Rimu Production Station

During the 42 hour run, from 31 July to 2 August 2017, the average recorded PM_{10} concentration was 4.3 µg/m³ for the first 24 hour period and 6.7 µg/m³ for the second 24 hour period. These daily means equate to 9% and 13%, respectively of the 50 µg/m³ value that is set by the NES and consent 5746-2. Background levels of PM_{10} in the region have been found to be typically around 11 µg/m³.

Table 4 Daily averages of PM_{10} results from monitoring at Rimu Production Station

	31 July to 2 August 2017 (42 hours)	
24 hr. set	Day 1	Day 2
Daily average	4.3 µg/m³	6.7 µg/m³
NES	50µg/m³	

2.2.2.3 Nitrogen oxides

From 2014 onwards, the Council implemented a coordinated region-wide compliance monitoring programme to measure nitrogen oxides (NOx). The programme involves deploying measuring devices at 30 NOx monitoring sites (including two sites in the vicinity of Rimu Production Station) on the same day, with retrieval three weeks later. This approach assists the Council in further evaluating the effects of local and regional emission sources and ambient air quality in the region.

The consents covering air discharges from the Sidewinder Production Station have specific limits related to particular gases. Special condition 11 of consent 5746-2 sets a limit on the nitrogen dioxide concentration at or beyond the production station's boundary. The limit is expressed as 200 µg/m³ for a one hour average exposure.

NOx passive adsorption discs were place at two locations in the vicinity of the Rimu Production Station on one occasion during the year under review. The discs were left in place for a period of 21 days. The calculated one hour theoretical maximum NOx concentrations found at Rimu Production Station during the year under review equate to 7.6 µg/m³. The results show that the ambient ground level concentration of NOx is well below the limits set out by consent 5324-2.

The air monitoring report is attached in Appendix II.

2.2.3 Summary of flaring volumes reported by the Company

WestSide provided the Council with an annual report on flaring and emissions as required by consent 5746-2. Emission data for the Rimu Production Station were provided to the Council, expressed as total gas flared and total fuel gas over a one day period. Monthly summaries of these datasets are graphically presented in Figure 4.

Flaring events at the production station occurred intermittently. However, a pilot flare was maintained at all times for safety purposes, meaning a small amount of gas was continually flared.

The quantities flared each month varied depending on activity at the site, with increases due to events such as off-spec gas, issues with equipment, and plant shut-downs and restarts. For example, most of the high volumes flared in February and March 2018 were due to compressor trips.

No complaints were received in relation to flaring or emissions to air at the Rimu Production Station during the reporting period.

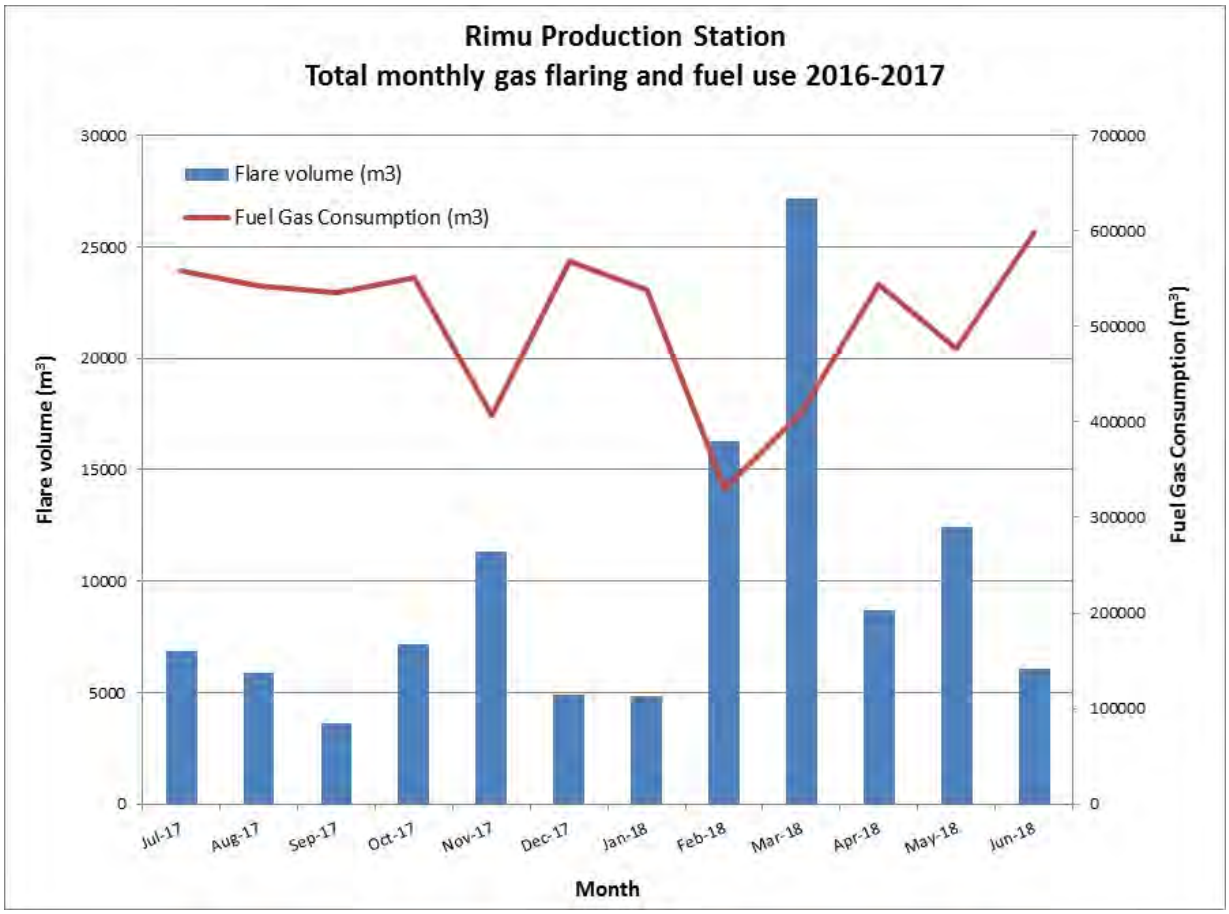

Figure 4 Monthly flare volumes for 2017-2018

2.3 Investigations, interventions, and incidents

The monitoring programme for the year was based on what was considered to be an appropriate level of monitoring, review of data, and liaison with the Company. During the year matters may arise which require additional activity by the Council, for example provision of advice and information, or investigation of potential or actual causes of non-compliance or failure to maintain good practices. A pro-active approach that in the first instance avoids issues occurring is favoured.

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

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

In the 2017-2018 period, the Council was required to undertake significant additional investigations and interventions, or record incidents, in association with the Company's conditions in resource consents or provisions in Regional Plans.

On 12 February 2018, self-notification was received from WestSide staff concerning a leak that had occurred in a high pressure pipeline conveying hydrocarbon product from the Kauri-E to Kauri-A wellsites, at Lower Manutahi Road, Manutahi. A small fire had occurred in the middle of a paddock, at approximately 8.00 am that morning, indicating that there was a leak in a pipeline which conveyed hydrocarbons to the Kauri-A wellsite. Notification was received from WestSide at 5.40pm later that day. Core Group were undertaking

works to locate the leak and repair the pipeline when Council staff arrived. Contamination was confined to soil in the immediate vicinity of the exposed pipeline.

Council staff re-visited the site on 14 February. A Core Group management team was on site and the pipeline had been uncovered. Some hydrocarbon material was observed in the vicinity of the pipeline joint weld, although the exact location of the hole had yet to be determined. Contaminated material from the excavation was being removed to a licenced land farm on Manawapou Road for remediation. There was no evidence of any ground water contamination. Iwi also inspected the site. A letter of explanation in relation to the incident was received and accepted and no further action was required.

A re-inspection of the area in the vicinity of the pipeline leak adjacent to the Kauri-E well site was carried out on 27 March 2018. Repairs and surveys had been completed and testing was underway to ensure the integrity of the pipeline prior to commencing use.

3 Discussion

3.1 Discussion of site performance

Monitoring of the Rimu Production Station in the 2017-2018 period found that the site was well managed. All consent conditions relating to site operations and management were complied with.

3.2 Environmental effects of exercise of consents

There were no adverse effects noted as a result of the exercise of the stormwater or air discharge permits at the Rimu Production Station.

3.3 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Table 5 and Table 6.

Table 5 Summary of performance for consent 5744-2.0

Purpose: ***To discharge treated stormwater from the Rimu Production Station onto and into land and into an unnamed tributary of the Manawapou River***		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adoption of best practicable option to minimise adverse effects	Site inspections	Yes
2. Limit on stormwater catchment area	Site inspections	Yes
3. Preparation of contingency plan	Up-to-date as of 24 August 2016	Yes
4. Design and maintenance of stormwater system in accordance with information supplied	Site inspections	Yes
5. All discharges to flow to perimeter drain and skimmer pit	Site inspections	Yes
6. Skimmer pit to have capacity of at least 3,600m^3 and retain hydrocarbons	Site inspections	Yes
7. Skimmer pits and retention areas to be lined	Site inspections	Yes
8. Concentration limits upon potential contaminants in discharge	Sampling not undertaken during monitoring period	N/A
9. Limits on pH levels in skimmer pits and discharge	Sampling not undertaken during monitoring period	N/A
10. Effects not to occur in receiving waters beyond the established mixing zone	Sampling not undertaken during monitoring period	N/A
11. Effects not to occur in receiving waters beyond the established mixing zone	Visual inspection	Yes
12. Notification prior to reinstatement of the site	Site in use	N/A

Purpose: *To discharge treated stormwater from the Rimu Production Station onto and into land and into an unnamed tributary of the Manawapou River*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
13. Optional review provision re environmental effects	Not scheduled for consideration during year under review. Next consideration June 2022	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 6 Summary of performance for consent 5746-2.0

Purpose: *To discharge contaminants into the air from the Rimu Production Station, including flaring and miscellaneous emissions*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adoption of best practicable option	Site inspections	Yes
2. Maintain log of all flaring incidents longer than 5 minutes	Information received	Yes
3. Provision of monthly flaring information	Information received	Yes
4. Annual report on flaring due August	Report received	Yes
5. Record of smoke emitting incidents to be provided on request	Provided in the annual air report	Yes
6. Analysis of typical gas and/or condensate stream to be provided on request	Not requested	N/A
7. Notification to Council of alterations to plant equipment, processes or operations	Liaison with consent holder	Yes
8. Notification to Council of flaring expected to last more than 5 minutes	Notifications received	Yes
9. No offensive odour, dust or smoke beyond the site boundary	Site inspections	Yes
10. No noxious or toxic levels of airborne contaminants at or beyond the site boundary	Air monitoring	Yes
11. Limit on maximum ground level concentration of carbon monoxide, nitrogen dioxide, PM_{10} and sulphur dioxide	Air monitoring	Yes
12. Limit on maximum ground level concentration of other contaminants	Not monitored during period under review	N/A
13. Optional review provision re environmental effects	Not scheduled for consideration during year under review. Next consideration June 2022	N/A

Purpose: *To discharge contaminants into the air from the Rimu Production Station, including flaring and miscellaneous emissions*		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
Overall assessment of consent compliance and environmental performance in respect of this consent		**High**
Overall assessment of administrative performance in respect of this consent		**High**

N/A = not applicable

Table 7 Evaluation of environmental performance over time

Year	Consent no	High	Good	Improvement req	Poor
2016-17	5744-2	1			
	5746-2	1			
2017-18	5744-2	1			
	5746-2	1			
Totals		4	0	0	0

During the monitoring period, WestSide demonstrated a high level of both environmental performance and administrative compliance with the resource consents as defined in Section 1.1.4. The Rimu Production Station was well managed and maintained.

3.4 Recommendations from the 2016-2017 Annual Report

In the 2016-2017 Annual Report, it was recommended:

1. THAT monitoring of consented activities at the Rimu Production Station in the 2017-2018 year is altered from 2016-2017 by including NOx, multigas, and inhalable particulates air monitoring.

This recommendation was implemented.

3.5 Alterations to monitoring programmes for 2018-2019

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

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

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

It is proposed that for 2018-2019 the programme remains the same as scheduled in 2017-2018.

It should be noted that the proposed programme represents a reasonable and risk-based level of monitoring for the site in question. The Council reserves the right to subsequently adjust the programme

from that initially prepared, should the need arise if potential or actual non-compliance is determined at any time during 2018-2019.

4 Recommendations

1. THAT in the first instance, monitoring of consented activities at the Rimu Production Station in the 2018-2019 year continue at the same level as in 2017-2018.
2. THAT should there be issues with environmental or administrative performance in 2017-2018, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Glossary of common terms and abbreviations

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

Bund	A wall around a tank to contain its contents in the case of a leak.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m.
g/m^3	Grams per cubic metre, and equivalent to milligrams per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident Register	The Incident Register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
m^2	Square Metres.
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.
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.
UI	Unauthorised Incident.

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

Bibliography and references

Taranaki Regional Council (2017): *WestSide New Zealand Limited Rimu Production Station Monitoring Programme Annual Report 2016-2017*. Technical Report 2017-49.

Taranaki Regional Council (2017): *Origin Energy Resources NZ Limited Rimu Production Station Monitoring Programme Annual Report 2016*. Technical Report 2017-48.

Taranaki Regional Council (2016): *Origin Energy Resources NZ Limited Rimu Production Station Monitoring Programme Annual Report 2015-2016*. Technical Report 2016-22.

Taranaki Regional Council (2016): *Origin Energy Resources NZ Limited Rimu Production Station Monitoring Programme Annual Report 2014-2015*. Technical Report 2015-100.

Taranaki Regional Council (2014): *Origin Energy Resources NZ Limited Rimu Production Station Monitoring Programme Annual Report 2013-2014*. Technical Report 2014-40.

Taranaki Regional Council (2013): *Origin Energy Resources NZ Limited Rimu & Waihapa Production Stations Monitoring Programmes Biennial Report 2011-2013*. Technical Report 2013-55.

Taranaki Regional Council (2011): *Origin Energy Resources NZ Ltd Rimu and Waihapa Production Stations Monitoring Programmes Annual Report 2010-2011*. Technical Report 2011-77.

Taranaki Regional Council (2011): *Origin Energy Resources NZ Ltd Rimu Pipeline Leak October 2010: Cause, Remediation and Learning Points*. Incident Report.

Taranaki Regional Council (2010): *Origin Energy Resources NZ Ltd Rimu and Waihapa Production Stations Monitoring Programmes Annual Report 2009-2010*. Technical Report 2010-94.

Taranaki Regional Council (2009): *Origin Energy Resources NZ Ltd Rimu and Waihapa Production Stations Monitoring Programmes Annual Report 2008-2009*. Technical Report 2009-29.

Taranaki Regional Council (2008): *Swift Energy NZ Ltd Monitoring Report 2007-2008*. Technical Report 08-13.

Taranaki Regional Council (2007): *Swift Energy NZ Ltd Monitoring Report 2006-2007*. Technical Report 07-108.

Taranaki Regional Council (2006): *Swift Energy NZ Ltd Monitoring Report 2005-2006*. Technical Report 06-54.

Taranaki Regional Council (2005): *Swift Energy NZ Ltd Monitoring Report 2004-2005*. Technical Report 05-58.

Taranaki Regional Council (2004): *Swift Energy NZ Ltd Monitoring Report 2003-2004*. Technical Report 04-73.

Taranaki Regional Council (2003): *Swift Energy NZ Ltd Monitoring Report 2002-2003*. Technical Report 03-79.

Taranaki Regional Council (2002): *Swift Energy NZ Ltd Monitoring Report 2001-2002*. Technical Report 02-66.

Appendix I

Resource consents held by WestSide New Zealand Limited

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

Discharge Permit

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

Name of Consent Holder:	Westside New Zealand Limited Level 17 300 Queen Street Brisbane QLD 4000 Australia
Decision Date:	1 November 2016
Commencement Date:	1 November 2016

Conditions of Consent

Consent Granted:	To discharge treated stormwater from the Rimu Production Station onto and into land and into an unnamed tributary of the Manawapou River
Expiry Date:	1 June 2034
Review Date(s):	June 2022, June 2028
Site Location:	Rimu Production Station, Mokoia Road, Mokoia (Property owner: M & PD Hawken)
Grid Reference (NZTM)	1715980E-5610439N
Catchment:	Manawapou

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

General condition

a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.

2. Stormwater discharged shall be collected from a catchment area of no more than 6 Ha.

3. The consent holder shall maintain and regularly update a 'Contingency Plan' that details measures and procedures that will be undertaken to prevent, and to avoid environmental effects from, a spillage or any discharge of contaminants not authorised by this consent. The plan and any amended versions shall be provided to the Chief Executive of the Taranaki Regional Council.

4. Subject to the other conditions of this consent the design, management and maintenance of the stormwater system shall be undertaken in accordance with the information submitted in support of the application for this consent.

5. All discharges from the site, including from any containment pit or hydrocarbon combustion facility (e.g. flare pit, thermal oxidiser), shall flow to a perimeter drain and skimmer pit. Perimeter drains shall be designed, including by having a positive grade and low permeability, to ensure that runoff flows directly to a skimmer pit without ponding.

6. The skimmer pit system shall have a combined capacity of no less than 3600 m^3 including a 'freeboard' of no less than 1000 m^3, and be designed to retain any hydrocarbons that enter them.

7. All skimmer pits and any other stormwater retention areas shall be lined with an impervious material to prevent seepage through the bed and sidewalls, and the stormwater system shall be designed to prevent any discharge of contaminants from the site.

8. Subject to condition 9 the constituents in the discharge shall meet the standards shown in the following table.

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

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

9. The pH may exceed 9.0 if the exceedance is a result photosynthetic activity within the skimmer pits, but in any case the discharge shall not result in the pH of the receiving water increasing by more than 0.5 pH units after allowing for a mixing zone of 25 metres.

10. After allowing for a mixing zone of 80 metres, the discharge shall not cause any of the following effects in the receiving water of the Manawapou River tributary:

    a) an increase in the temperature of more than 2 degrees Celsius;

    b) the filtered carbonaceous biochemical oxygen demand to exceed 2 gm^{-3}; or

    c) the chloride concentration to exceed 50 gm^{-3}.

11. After allowing for a mixing zone of 80 metres, the discharge shall not give rise to any of the following effects in the receiving water of the Manawapou River tributary:

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

12. The consent holder shall advise the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the reinstatement of the site and the reinstatement shall be carried out so as to minimise adverse effects on stormwater quality. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.

13. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2022 and/or June 2028, 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 and transferred at Stratford on 1 November 2016

For and on behalf of
Taranaki Regional Council

_____

A D McLay
Director - Resource Management

Discharge Permit

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

Name of Consent Holder:	Westside New Zealand Limited Level 17 300 Queen Street Brisbane QLD 4000 Australia
Decision Date:	1 November 2016
Commencement Date:	1 November 2016

Conditions of Consent

Consent Granted:	To discharge contaminants into the air from the Rimu Production Station, including flaring and miscellaneous emissions
Expiry Date:	1 June 2034
Review Date(s):	June 2022, June 2028
Site Location:	Rimu Production Station, Mokoia Road, Mokoia (Property owner: M & PD Hawken)
Grid Reference (NZTM)	1715953E-5610123N

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

General condition

a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of this consent, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

Exercise of consent

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

Recording and submitting information

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

3. The consent holder shall supply to the Taranaki Regional Council each month a copy of flaring information comprising: the type and amount of material flared (including any gas used to maintain a pilot flame), the date this was flared, the reason why flaring was undertaken, and an indication of whether smoke was produced from such flaring events.

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

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

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

Information and notification

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

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

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

Preventing and minimising emissions

9. The discharges authorised by this consent shall not, whether alone or in conjunction with any other emissions from the site arising, give rise to any levels of odour or dust or smoke that are offensive or obnoxious or objectionable at or beyond the boundary of the site.

10. The consent holder shall not discharge any contaminant to air from the site at a rate or a quantity such that the contaminant, whether alone or in combination with other contaminants, is or is liable to be hazardous or toxic or noxious at or beyond the boundary of the site.

11. The consent holder shall control all emissions of carbon monoxide, nitrogen dioxide, fine particles (PM10) and sulphur dioxide to the atmosphere from the site, in order that the maximum ground level concentration of any of these contaminants arising from the exercise of this consent measured under ambient conditions does not exceed the relevant ambient air quality standard as set out in the Resource Management (National Environmental Standards for Air Quality Regulations, 2004) at or beyond the boundary of the property on which the wellsite is located.

12. The consent holder shall control discharges to the atmosphere from the flare of contaminants, other than those addressed by the *Resource Management (National Environmental Standards for Air Quality) Regulations, 2004*, whether alone or in conjunction with any other emissions from the site, in order that the maximum ground level concentration for any particular contaminant arising from the exercise of this consent, measured at or beyond the boundary of the site, is not increased above background levels:

    a) by more than 1/30th of the relevant Workplace Exposure Standard-Time Weighted Average (exposure averaged over a duration as specified for the Workplace Exposure Standard-Time Weighted Average), or by more than 1/10th of the Workplace Exposure Standard-Short Term Exposure Limit over any short period of time (all terms as defined in Workplace Exposure Standards, 2002, Department of Labour); or
    b) if no Short Term Exposure Limit is set, by more than the General Excursion Limit at any time (all terms as defined in Workplace Exposure Standards, 2002, Department of Labour or any subsequent reviews).

    Advice Note:
    In exercising this consent the consent holder must also comply with any discharge standard required by Regulations. At the time of issuing this consent the 'Resource Management (National Environmental Standards for Air Quality) Regulations, 2004' set limits on discharge of carbon monoxide, nitrogen dioxide, fine particles (PM_{10}) and sulphur dioxide.

Review

13. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2022 and/or June 2028, for the purposes of:

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

Signed and transferred at Stratford on 1 November 2016

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Appendix II

Air monitoring report

To	Job Manager, Callum MacKenzie
From	Environmental Scientist - Air Quality, Brian Cheyne
File	2105328
Date	August 13, 2018

Ambient Gas (PM10, NOx, CO and LEL) Monitoring at Rimu Production Stations during 2017-2018 monitoring year

Introduction

In July 2017 and January 2018 as part of the compliance monitoring programme for the Rimu production station, a survey of ambient air quality sampling was carried out by the Taranaki Regional Council (the Council) in the vicinity of the plant. The main objectives were to measure:

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

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

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

During the monitoring year, a multi-gas meter was deployed on one occasion in the vicinity of the plant. The deployment lasted approximately 45 hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continuous measurements of gas concentrations for the gases of interest (carbon monoxide and combustible gases).

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

Figure 1 Air monitoring sites at Rimu production station (2017-2018)

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

The consents covering air discharges from the Rimu production station have specific limits related to particular gases. Special condition 11 of consent 5746-2 set limits on the carbon monoxide, nitrogen dioxide and fine particles [PM10] concentrations at or beyond the production station's boundary. The limit on the carbon monoxide is expressed as 10 mg/m^3 for an eight hour average exposure. The maximum concentration of carbon monoxide found during the monitoring run was 2.1 mg/m^3 with average concentration for the entire dataset was only 0.2 mg/m^3 which comply with consent conditions. This is in line with the pattern found in previous years.

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

Period (from-to)		31/07/2017 14:27 to 02/08/2017 11:10
Max	CO(ppm)	1.80
	LEL(%)	0.10
Mean	CO(ppm)	0.20
	LEL(%)	0.00
Min	CO(ppm)	0.00
	LEL(%)	0.00

Note: (1) the instrument records in units of ppm. At 25°C, 1 atm.

1ppm CO = 1.145 mg/m^3

(2) See text for explanation of LEL. Because the LEL of methane is equivalent to a mixture of approximately 5% methane in air, then the actual concentration of methane in air can be obtained by dividing the percentage LEL by 20.

LEL gives the percentage of the lower explosive limit, expressed as methane that is detected in the air sampled. The sensor on the instrument reacts to gases and vapours such as acetone, benzene, butane, methane, propane, carbon monoxide, ethanol, and higher alkanes and alkenes, with varying degrees of sensitivity. The Council's Regional Air Quality Plan has a typical requirement that no discharge shall result in

dangerous levels of airborne contaminants, including any risk of explosion. At no time did the level of explosive gases downwind of the Rimu production station reach any more than a trivial level.

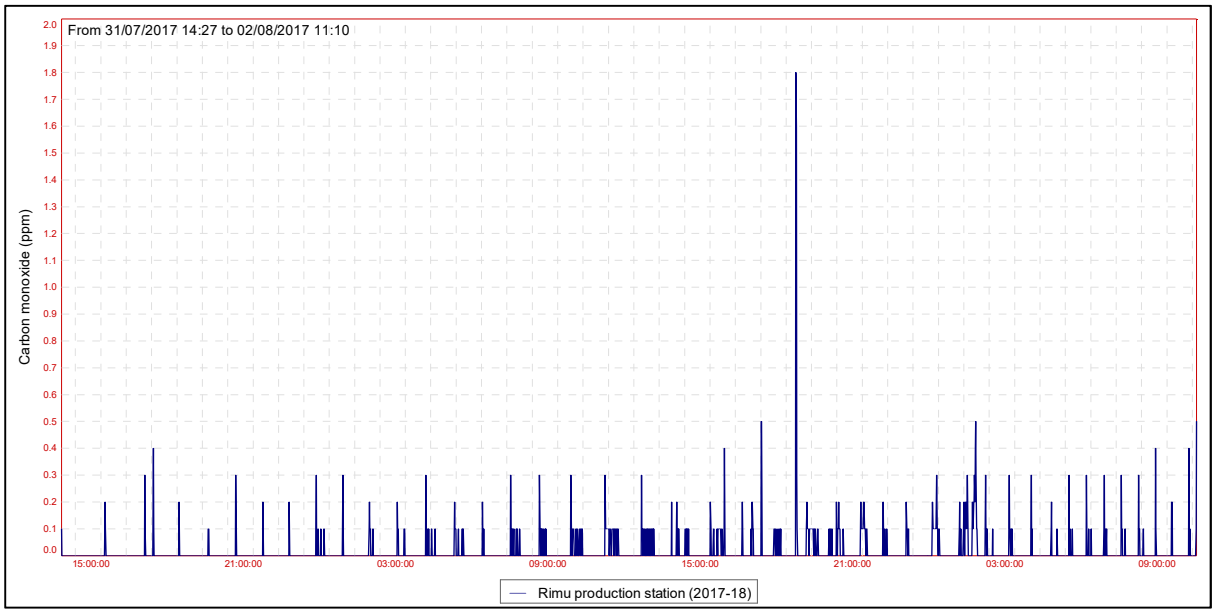

Figure 2 Graph of ambient CO levels in the vicinity of the Rimu Production Station (2017-18)

PM10

In September 2004 the Ministry for the Environment made public National Environmental Standards (NESs) relating to certain air pollutants. The NES for PM10 is 50 µg/m^3 (24-hour average). The same limit is imposed on consent 5746-2, in condition 11 that provides for the discharge of emissions to air from Rimu production station.

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

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

During the reporting period, a "DustTrak" PM10 monitor was deployed on one occasion in the vicinity of the Rimu production station. The deployment lasted approximately 42 hours, with the instrument placed in a down-wind position at the start of the deployment. Monitoring consisted of continual measurements of PM10 concentrations. The location of the "DustTrak" monitor during the sampling run is shown in Figure 1.

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

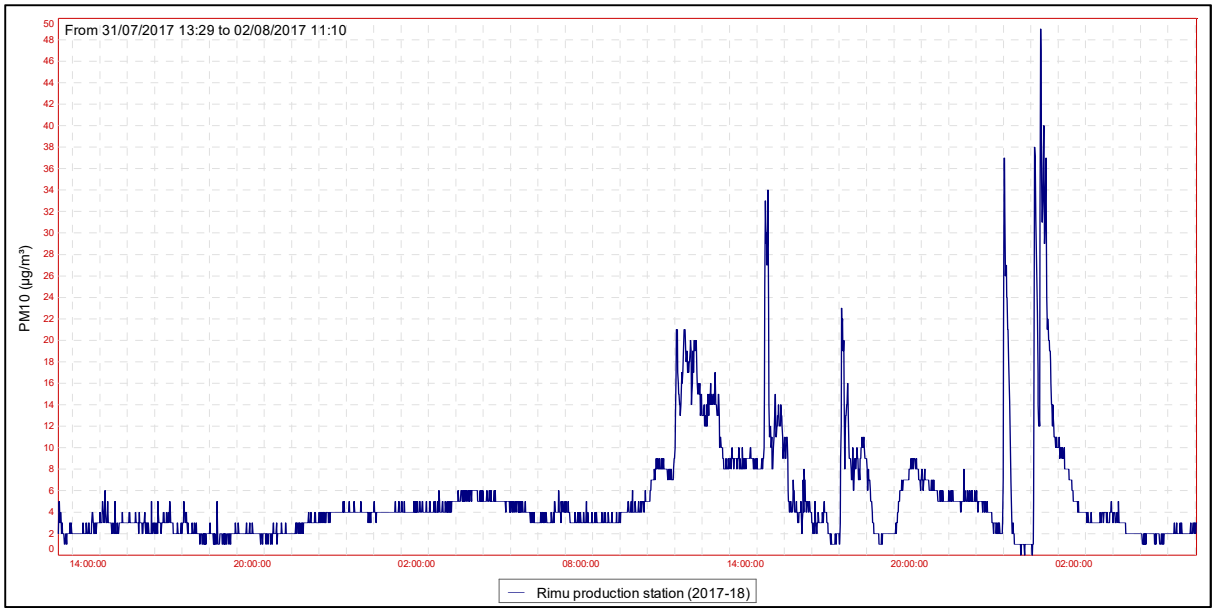

Figure 2 PM10 concentrations (µg/m³) at the Rimu production station (2017-18)

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

	(42 hours) (31/07-2/08/2017)	
24 hr. set	Day 1	Day 2
Daily average	4.3 µg/m³	6.7 µg/m³
NES	50µg/m³	

During the 42-hour run, from 31st of July to 2nd of August 2017, the average recorded PM10 concentration for the first 24 hour period was 4.3µg/m³ and 6.7µg/m³ for the second 24 hour period. These daily means equate to 9% and 13%, respectively, of the 50 µg/m³ value that is set by the National Environmental Standard and consent 5324-2.

Background levels of PM10 in the region have been found to be typically around 11 µg/m³.

Nitrogen oxides (NOx)

From 2014 onwards, the Council has implemented a coordinated region-wide compliance monitoring programme to measure NOx. The programme involves deploying all measuring devices at 30 NOx monitoring sites (including two sites in the vicinity of the Rimu production station) on the same day, with retrieval three weeks later. This approach assists the Council in further evaluating the effects of local and regional emission sources and ambient air quality in the region.

The complete report covering region-wide NOx monitoring is attached in the Appendix to this memorandum (TRC #2089257).

The consents covering air discharges from the Rimu production station have specific limits related to particular gases. Special condition 11 of consent 5746-2 set a limit on the nitrogen dioxide concentration at or beyond the production station's boundary. The limit is expressed as 200 µg/m³ for a one hour average exposure.

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

The calculated 1-hour theoretical maximum NOx concentration found at the Rimu production station during the year under review equates to 7.6µg/m³. The results show that the ambient ground level concentration of NOx is well below the limits set out by consent 5324-2.