Ballance Agri-Nutrients (Kapuni) Ltd

Monitoring Programme
Annual Report
2023/24
Technical Report 2024-23

Taranaki
Regional Council

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Taranaki Regional Council
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Executive summary

Ballance Agri-Nutrients (Kapuni) Ltd (the Company) operates an ammonia urea manufacturing plant located near Kapuni, in the Kapuni Stream catchment.

This report for the period July 2023 to June 2024 describes the monitoring programme implemented by Taranaki Regional Council (the Council) to assess the Company's environmental and consent compliance performance during the period under review. The report also details the results of the monitoring undertaken and assesses the environmental effects of the Company's activities.

During the monitoring period, Ballance Agri-Nutrients Ltd demonstrated an overall high level of environmental and administrative performance.

The Company holds seven resource consents, which include a total of 74 conditions setting out the requirements that the Company must satisfy. The Company holds resource consents to allow it to take water from the Waingongoro River, the Kapuni Stream and from groundwater; to discharge to land, to the Kapuni Stream and an unnamed tributary of the Kapuni Stream; and to discharge emissions into the air.

The Company and the Council monitor the exercise of the resource consents. The monitoring programme includes site inspections, sampling of effluent, air emissions, discharge and receiving waters (both ground and surface) for physicochemical analysis, and biological surveys of streams. Particular attention is paid to the management of the irrigation disposal system, and its effects on groundwater quality.

The Council's monitoring programme included four inspections, physicochemical analysis of two stream samples, one stormwater/discharge sample, two effluent grab samples, two composite effluent samples, two groundwater samples and one air depositional gauging.

Abstraction volumes from Waingongoro River complied with the consent limit. A contribution of $300,000 ($30,000/year for 10 years) towards riparian planting and management in Waingongoro catchment was completed during the previous monitoring year however, there continue to be landowners receiving funding for riparian plants and planting.

The groundwater monitoring indicates the presence of elevated total nitrogen concentrations in shallow groundwater. This is in part a result of heavy applications of nitrogen (effluent) early in the life of the plant. Current effluent application is considerably lower than historic application rates. However, nitrate concentration in the soil profile underneath the irrigation areas and in the tributaries flowing through or adjacent to the site remain elevated.

A narrow but concentrated plume of ammonia is present in the groundwater resulting from previous leaks in a finished effluent catch basin. This basin has since been repaired. A second more recent and more concentrated ammonia plume extends from the plant area. Both plumes have pump and treatment systems operating, with the contaminated groundwater pumped back through the plant and waste treatment system. Both plumes are closely monitored and neither plume extends beyond the boundary of the Company's site. The Company recognise that a deeper understanding of the groundwater at the site is required. In order to ensure their groundwater remediation approach is still the best practicable option to prevent or minimise any actual or likely adverse effect on the environment, a revision of the conceptual model of the plume is being sought.

Monitoring of the Kapuni Stream through testing for nitrogen as well as biomonitoring involving macroinvertebrate and fish surveys has not detected any detrimental impact on the stream health caused by discharges from the Company's site.

Air monitoring of the site and the neighbourhood shows no significant impact on the surrounding environment in relation to the operation of the ammonia urea plant.

During the monitoring period, one unauthorised incident occurred, consisting of a discharge to air comprising of an accidental ammonia release. A 14-day letter was issued by the Council, the explanation was accepted and there was no further action. There were no significant impacts resulting from this incident.

Overall, during the period under review, the Company demonstrated a high level of environmental performance and a high level of administrative performance with its resource consents.

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

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

This report includes recommendations for the 2024/25 year.

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1. Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

This report is for the period July 2023 to June 2024 by Taranaki Regional Council (the Council) on the monitoring programme associated with the resource consents held by Ballance Agri-Nutrients (Kapuni) Ltd (the Company). The Company operates an ammonia urea plant (the AUP) situated on Palmer Road, Kapuni, in the Kapuni catchment.

This report covers the results and findings of the monitoring programme implemented by the Council in respect of the consents held by the Company that relate to abstractions of water in the Waingongoro and Kapuni catchments, and discharges of water and effluent within the Kapuni catchment, and the air discharge permit held by the Company to cover emissions to air from the site.

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

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

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

Section 4 presents recommendations to be implemented in the 2024/25 monitoring year.

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

1.1.3 The Resource Management Act 1991 and monitoring

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

a. the neighbourhood or the wider community around an activity, and may include cultural and social-economic effects;
b. physical effects on the locality, including landscape, amenity and visual effects;
c. ecosystems, including effects on plants, animals, or habitats, whether aquatic or terrestrial;
d. natural and physical resources having special significance (for example recreational, cultural, or aesthetic); and
e. risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Council is recognising the comprehensive meaning of 'effects' in as much as is appropriate for each activity. Monitoring programmes are not only based on existing 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 performance

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

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

1.2 Process description

The AUP was commissioned in November 1982. The plant utilises specification gas from the Taranaki Fields. This gas is supplied for both fuel and process.

The feed gas is treated in a de-sulphuriser and then mixed with superheated steam for reaction in the steam methane reformer. The synthesis gas mixture consists of hydrogen, carbon dioxide, and carbon monoxide. The reformer is heated by burning fuel gas. The waste gases from combustion are used to generate steam, before discharging to the atmosphere, to increase efficiency and reduce fuel consumption. The synthesis gas mixture is reacted with air (mainly dinitrogen gas) in a secondary reformer, a process that releases heat and requires no fuel. The heat is recovered for steam generation. A shift converter adjusts the synthesis gas mixture, before carbon dioxide is removed by absorption into an amine solution. This solution is regenerated by heating, which drives off the dissolved carbon dioxide. The carbon dioxide is sent to the urea plant for utilisation in the urea manufacturing process. Meanwhile, the synthesis gas is reacted to form ammonia. Non-utilisable by-product gases are burnt as fuel.

The ammonia and the carbon dioxide are combined in the urea formulation process. Off-gases are absorbed in scrubbers. The urea is formed into granules utilising air fluidised-bed granulation. Following this the product is screened and air-cooled.

[1] The Council has used these compliance grading criteria for more than 20 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

The normal discharges and emissions from the AUP are listed in Table 1.

Photo 1 Ballance Agri-Nutrients ammonia urea plant (viewed looking towards the north-east)

Table 1 Discharges and emissions from the ammonia urea plant

Discharge	Resource consent	Source	Constituents	Rate
Discharges to land	**0597-3**	Discharge of plant production effluent and contaminated stormwater by way of spray irrigation to pasture	Primarily ammonia, urea and nitrate. Also contains cooling water blow down	Up to 1,470m^3/day
	7751-0 (Certificate of compliance)	Domestic sewage via soakage trenches	Treated sewage effluent	Up to 28m^3/day
Discharges to water	**0598-3**	Uncontaminated stormwater, and raw water treatment effluent, to the Kapuni Stream and an unnamed tributary of the Kapuni Stream	Major cations (particularly sodium) and accumulated particulate material	Up to 1,920m^3/day to the Kapuni Stream. Up to 4,080m^3/day to an unnamed tributary of the Kapuni Stream
	1766-3	Contingency discharge of treated plant effluent and contaminated stormwater	Primarily ammonia, urea and nitrate. Also contains cooling water blow down	Up to 1,000m^3/day to the Kapuni Stream when conditions do not allow spray irrigation
Emissions to air	**4046-3**	Reformers and de-sulphuriser heater	Carbon dioxide, nitrogen oxides, water vapour	Nitrogen oxides about 300kg/hr
		Alkanolamine stripper	Carbon dioxide	16,000kg/hr for short periods
		Cooling tower	Water vapour and droplets, traces of water treatment chemicals	
		Urea granulation process	Urea dust, ammonia	Less than 5kg/hr
		Ammonia recovery process vent	Ammonia	Less than 3kg/hr
		Ammonia finishing absorber	Ammonia	Less than 3kg/hr
		Pressure relief valves	Ammonia	Infrequent (abnormal process event)

1.3 Resource consents

The Company holds seven resource consents the details of which are summarised in the table below. Summaries of the conditions attached to each permit are set out in Section 3 of this report.

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

Table 2 Resource consents for operation of ammonia urea plant

Resource consent	Purpose	Granted	Next review date	Expiry date
0596-3.1	Abstract water from Waingongoro River	15 January 2021	June 2029	1 June 2035
1213-3.1	Abstract water from Kapuni Stream during emergencies	15 January 2021	June 2029	1 June 2035
0597-3	Discharge plant production effluent and contaminated stormwater by way of irrigation onto land	31 August 2012	June 2029	1 June 2035
0598-3	Discharge uncontaminated stormwater and raw water treatment plant wastewater to Kapuni Stream or tributary of Kapuni Stream during high flows	31 August 2012	June 2029	1 June 2035
1766-3	Discharge treated effluent and stormwater to Kapuni Stream when conditions do not allow irrigation onto land	31 August 2012	June 2029	1 June 2035
4719-2	Take groundwater for site remediation purposes and process use purposes	31 August 2012	June 2029	1 June 2035
4046-3	Discharge of emissions to air from the manufacturing of ammonia and urea	10 February 2012	June 2027	1 June 2035
Certificate of compliance				
7751-0 (formerly consent 3967-1)	Discharge treated domestic wastewater to groundwater via soakage trenches	6 December 2010	N/A	N/A

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.

Monitoring at the AUP is carried out by both the Company and the Council. The components of monitoring carried out by each entity are described in further detail below.

1.4.2 Monitoring by the Company

1.4.2.1 Compliance

Compliance with resource consent conditions on abstraction and discharge rates and on discharge and receiving water compositions is determined on a regular basis. The company engages K2 Environmental Ltd to conduct testing of emissions from the dust scrubber on a biannual basis.

1.4.2.2 Irrigation system management

The irrigation system is managed through monitoring of inputs from effluent, and outputs through grass removal and drainage to groundwater. Soil and herbage analyses are performed.

1.4.2.3 Groundwater

A series of monitoring bores within and around the irrigation areas is used to monitor the effects of the irrigation system on groundwater quality. A total of 42 monitoring bores have been installed at the AUP since 1981. An electromagnetic induction survey has been conducted annually since 2002 to map the migration of contaminated plumes beneath the site.

1.4.2.4 Biological monitoring

Since 1981, biological monitoring of the Kapuni Stream and its tributaries has been carried out regularly by a consultant for the Company as part of a combined monitoring programme for the AUP and the Todd Energy (formerly Vector) gas treatment plant on an adjacent site. Monitoring is carried out quarterly to detect any changes over time, in the abundance, diversity and health of benthic macroinvertebrate communities, and biannually for fish and freshwater crayfish. During the monitoring period, Stark Environmental Ltd was engaged to perform the quarterly sampling and to report on the resultant monitoring conducted. The reports are forwarded to the Council for review.

1.4.3 Monitoring by Taranaki Regional Council

1.4.3.1 Programme liaison and management

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

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

1.4.3.2 Review of the Company's monitoring data

Monitoring data gathered by the Company are reviewed to determine compliance with resource consent conditions and to assess trends in water usage, discharge composition and groundwater quality.

1.4.3.3 Site inspections

An officer of the Council visits the AUP site quarterly. Inspections are made of streams at the site, the stormwater system, the effluent treatment system, irrigation areas and the site in general. Monitoring results, irrigation records and activities which may influence plant effluent quality are discussed. The site neighbourhood is surveyed for environmental effects and odour.

1.4.3.4 Chemical sampling

The results of monitoring reported by the Company are checked on two occasions within each year of the monitoring period. Duplicate samples of effluent, stormwater and receiving waters (the Kapuni Stream) upstream and downstream of the discharge point and mixing zone are taken concurrently for comparative laboratory analysis. The groundwater monitoring procedure is checked annually, also by duplicate sampling and associated analysis.

An annual ambient air quality survey is conducted at several locations around the site. The survey monitors concentrations of carbon monoxide, nitrogen dioxide, and particulate matter.

2. Results

2.1 Water

2.1.1 Site Inspections

The Company's site was inspected on four occasions, 24 August and 18 October 2023, 7 March and 30 May 2024. On all occasions site management was generally found to be good and no significant issues were noted. Overall, the effluent management system and irrigation areas were found to be working well. No odour was noticed beyond the boundary of the site during all site inspections except for March. During the March inspection there was a strong ammonia smell onsite and at the boundary, but not deemed objectionable, and this was explained as a result of the recent shutdown.

During August 2023 it was noted that the ammonia reformer was operating at 89% of a115% capacity, this low output causes more noise to be present on site. It was also noted that a steam valve requires replacing, which was planned for replacement during the shutdown in January 2024. A new flare had recently been installed. There had been some tree planting on the banks of the unnamed tributary.

During March 2024 a brief update was provided with regard to the shutdown in January 2024. A new high pressure stripper was installed within the reactor tower; the emergency decompression process and ammonia bullets are both now tied into the flare, when required. The reformer within the ammonia plant also needed maintenance. More maintenance is required and thus another shutdown will be necessary at some point. The raw water pond had been dug out. The finished effluent catch basin (FECB) ponds had recently been tested and no leaks were discovered.

During the March inspection the Council officer was advised that there were elevated levels of ammonia found at the discharge point of the unnamed tributary. The source of the contamination was attributed to a previously undiscovered spring occurring within the unnamed tributary close to the discharge pipe that runs along the stream bed. Further investigation by the Company is ongoing in order to determine the source. Several possibilities have been eliminated so far, and a potential source has been identified, but as yet not confirmed. Council continues to liaise with the Company on this matter.

No sampling took place at the time of the May inspection as stormwater discharge was not feasible due to a damaged discharge pipe resulting from treefall, and repairs were still occurring. Sampling took place separately on 18 June 2024.

2.1.2 Results of abstraction and discharge monitoring

2.1.2.1 Waingongoro River abstraction

Process and operation water for the site is pumped from the Waingongoro River, which is located 7.2km east from the Company site (Figure 1). Water is pumped at a rate of approximately 140m^3/h (3,360m^3/d or 39L/s). The consented daily volume limit, of 3,456m^3 at a maximum rate of 100L/s, was increased by 15% to 4,000m^3, without an instantaneous limit, under replacement consent 0596-3 in August 2012.

Figure 1 Map showing water intake structure adjacent to the Waingongoro River

Under the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010, the Company is required to take continuous measurements and keep daily records of volume taken from 10 November 2012.

The daily water abstraction record for 2023/24 is presented in Figure 2.

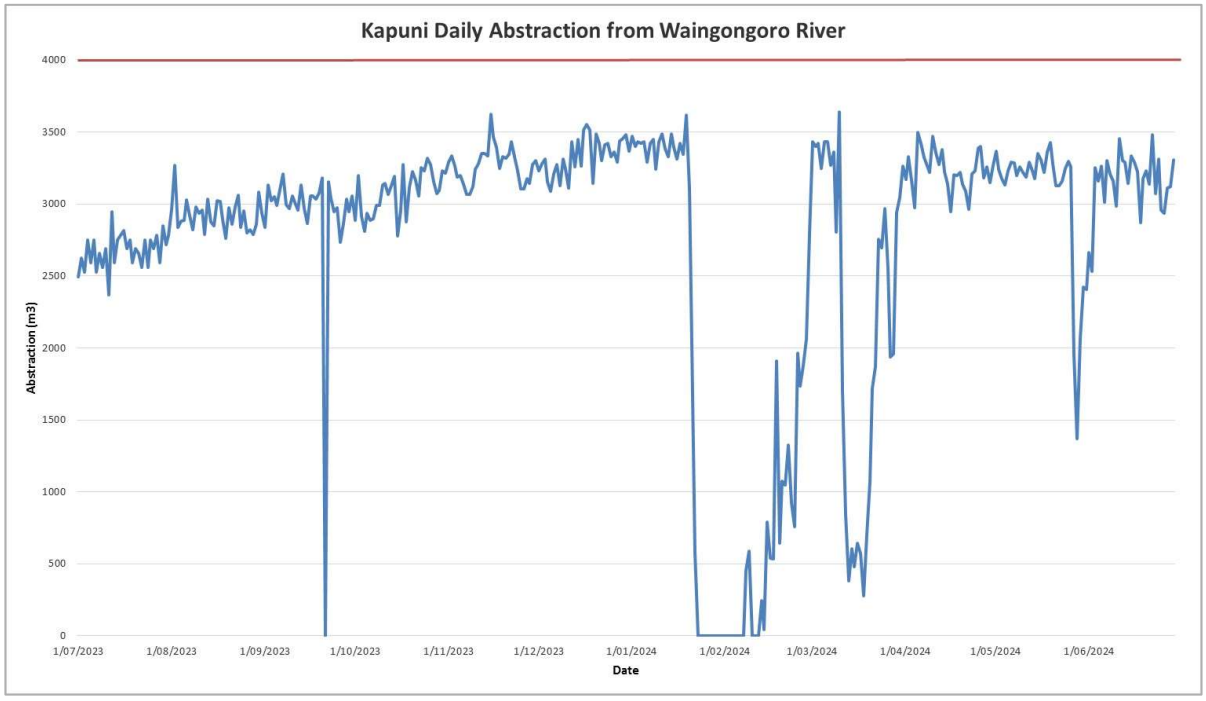

Figure 2 Daily water abstraction by the Company for July 2023 to June 2024

The record shows that the consent limit of 4,000m³/d on maximum abstraction volume (red line in Figure 2) was complied with throughout the 2023/24 review period. The minimum daily recorded volume was 0m³/d on 21 September 2023, also from 23 January 2024 through to 7 February inclusive and again on 10 February through to 12 February inclusive. The dates during January and February 2024 were related to the plant shutdown during turnover. The maximum recorded daily volume was 3,642m³/d on 10 March 2024, approximately 91% of the daily limit.

Verification of the accuracy of the measurement system is carried out regularly by an authorised independent agent, most recently performed on 23 August 2023. The equipment was found to meet the required accuracy levels (+/- 5%).

2.1.2.2 Kapuni Stream abstraction

Water permit 1213-3.1, to abstract water from the Kapuni Stream at times when the normal water supply has failed, was not exercised for the monitoring year under review.

2.1.2.3 Intake options report and monitoring programme

Special conditions (8 and 9) on consent 0596-3.1 requires the Company to produce a report on options to minimise entrainment of juvenile fish through the water intake, and to develop a monitoring programme in consultation with Iwi. Work has been completed regarding this programme and the monitoring results indicate that levels of fish mortality as a result of entrainment are not likely to have any meaningful effect on fish populations. Further details of the monitoring carried out is included in the 2017/18 monitoring report published by the Council (available on request).

2.1.2.4 Annual meeting regarding the Waingongoro River intake and environmental performance

Condition 12 on consent 0596-3.1 requires liaison with interested parties on exercise of the consent:

12. At least once every year, the consent holder shall convene a meeting with representatives of Taranaki Regional Council, Fish and Game, Department of Conservation, Ngati Ruanui and Ngaruahine. The meeting shall be for the purpose of discussing and generally informing the parties about the consent holder's monitoring data and the monitoring programme relating to the operation, monitoring and environmental effects of the consented activities.

A meeting for the Company to consult with and inform interested parties about the options and monitoring of its water intake on the Waingongoro River was held at its offices at the Kapuni site during July 2024. It was delayed slightly due to the requirement of ensuring relevant stakeholders were present.

2.1.3 Discharge monitoring

2.1.3.1 Stormwater and raw water treatment discharges

Stormwater is discharged to the Kapuni Stream from a holding pond. At times of extreme high rainfall, the stormwater is also discharged to an unnamed tributary of the Kapuni Stream which runs through the plant site. Resource consent 0598-3 allows for 1,920m^3/d of uncontaminated stormwater to be discharged to the Kapuni Stream and up to 4,080m^3/d to the unnamed tributary with a combined discharge of 6,000m^3/d.

Normally these discharges are in batches with a frequency ranging from daily to weekly, dependent on rainfall. During and after exceptionally heavy rainfall, the discharge may occur for continuous periods of up to 24 hours.

In 2023/24, the maximum daily volume of stormwater discharged from the site was 2,047m^3/d on 27 September 2024. In total there was 16,838m^3 of stormwater discharged over 27 days during the monitoring period. The volume of material discharged is in compliance with the resource consent.

A standard stormwater discharge procedure has been developed by the Company for plant operators and has been approved by the Council. The procedure involves chemical analysis and visual inspection of the collected stormwater before each discharge. The flow of the Kapuni Stream is measured by a Flo-Dar radar/ultrasonic flow measurement device installed beside the Vector gas treatment plant, which is validated against readings from the Council's hydrometric station downstream at Normanby Road. The stream pH and temperature are measured to allow the estimation of unionised ammonia concentrations. A suitably trained Company staff member must authorise each discharge.

About one hour after commencement of each discharge of the basin contents, chemical analysis of the Kapuni Stream at Skeet Road, 600m below the discharge point, is carried out to monitor effects on water quality.

Monitoring of the discharge was undertaken by the Company, and on two occasions during the monitoring year by the Council. The results of testing of the samples taken by the Company and the Council are compared as a quality control measure. The results of the compliance monitoring and inter-laboratory comparison between the Council and the Company are shown in Table 3 and Table 4.

The resource consent requires that the stormwater discharge shall maintain a pH range of 6.5-9.0 and a maximum zinc concentration below 0.5g/m^3. Monitoring by the Company in 2023/24 showed the stormwater pH ranged from 6.95-8.95 when discharging to the Kapuni Stream. Zinc in the stormwater discharge was tested twice by the Council in conjunction with the inter-laboratory comparisons (0.09g/m^3 on 19/10/23 and 0.03g/m^3 on 18/06/24) and both results were below the maximum limit.

The resource consent also has maximum limits on unionised (free) ammonia (0.025g/m^3) and sodium (40g/m^3) concentrations in the receiving waters. Concentrations for both analytes were well within these limits. The Company's data show the range for free ammonia downstream of the stormwater discharge as 0.0005-0.0077g/m^3-NH^3; and for sodium 6.66-10.53g/m^3.

The monitoring results demonstrate compliance with the conditions of resource consent 0598-3 during the review period.

The comparisons of laboratory results generally showed good agreement, and compliance with consent conditions. There were some differences in urea, which also occurred in the previous monitoring period. This is likely to be attributed to samples not being completely frozen on arrival at Hills Laboratory; urea readily changes into ammonia under acid conditions which would lead to lower concentration levels of urea due to decomposition. Council will endeavour to ensure samples are frozen prior to despatch to the laboratory, although this will involve some challenging logistics.

Table 3 Results of inter-laboratory comparison for effluent grab and composite samples between Council and the Company 2023/24

	Spray Irrigated Effluent IND002006							
	18 October 2023				30 May 2024			
	Grab		Composite		Grab		Composite	
	TRC	AUP	TRC	AUP	TRC	AUP	TRC	AUP
Temperature ˚C	29.2	-	-	-	20.0	-	-	-
Conductivity @ 25˚C mS/m	155.6	-	161.3	-	177.2	-	161.9	-
pH	7.6	-	8.1	-	7.7	-	8.1	-
Suspended solids g/m^3	16	-	-	-	40	-	-	-
Turbidity NTU	-	-	-	-	-	-	-	-
Turbidity FNU	-	-	-	-	-	-	-	-
Ammonia (as NH_3) g/m^3	10.1	7.95	7.0	7.60	4.0	3.74	7.0	7.6
Ammoniacal-N (total) g/m^3	-	-	4.6	4.65	-	-	5.4	6.26
Nitrate-N g/m^3	-	14.5	6.8	16.5	-	12.7	14.5	14.8
Nitrite-N g/m^3	-	11.49	17.1	7.0	-	11.2	11.5	12.24
Nitrite and Nitrate-N g/m^3	29	26	24	23.5	27	24	26	27.04
Total Nitrogen g/m^3	39	-	30	-	31	-	33	-
Urea-N g/m^3	-	5.30	1.38[#]	2.06	-	1.77	1.2	1.1
Potassium g/m^3	-	150	100	97	-	189	109	105.88
Sodium g/m^3	-	148.33	195	186.63	-	172	181	195.13
Calcium g/m^3	-	47	48	48	-	38.9	48	50.2
Magnesium g/m^3	-	15.3	16.8	17.5	-	11.0	17.7	17.7
Chloride g/m^3	-	-	220	-	-	-	220	-
Phosphorus, (dissolved reactive) g/m^3	-	-	1.37	-	-	-	1.30	-
Copper (acid soluble) g/m^3	0.015	-	-	-	0.022	-	-	-
Chromium (acid soluble) g/m^3	<0.010	-	-	-	0.019	-	-	-
Mercury (total) mg/m^3	0.00050	-	-	-	0.00028	-	-	-
Nickel (acid soluble) g/m^3	<0.010	-	-	-	<0.010	-	-	-
Zinc (acid soluble) g/m^3	0.44	-	-	-	0.73	-	-	-

[#]Urea sample arrived partly frozen

Table 4 Results of compliance monitoring and inter-laboratory comparison for stormwater discharge and river sampling between Council and the Company 2023/24

	D-Min and Stormwater IND002007		Kapuni u/s of AUP KPN000293		Kapuni d/s of AUP KPN000300		D-Min and Stormwater IND002007		Kapuni u/s of AUP KPN000293		Kapuni d/s of AUP KPN000300	
	19 October 2023						18 June 2024					
	TRC	AUP	TRC	AUP	TRC	AUP	TRC	AUP	TRC	AUP	TRC	AUP
Temperature ˚C	18	-	13.1	-	13.2	-	14.0	-	10.0	-	10.3	-
Conductivity @ 25˚C mS/m	24.5	24.75	11.1	10.76	11.2	10.79	130.8	136.1	9.3	10.47	11.3	118.8
pH	7.4	7.24	7.5	7.59	7.5	7.6	7.9	7.94	7.5	7.65	7.5	7.66
Suspended solids g/m^3	14	-	-	-	-	-	12	-	-	-	-	-
Turbidity NTU	9.8	-	-	-	-	-	6.1	-	-	-	-	-
Turbidity FNU	-	-	7.0	-	6.8	-	-	-	1.01	-	0.89	-
Free Ammonia-N g/m^3	0.079	-	0.0022	0.0049	0.0023	0.0053	0.40	-	0.00010	0.0002	0.00154	0.0029
Ammoniacal-N (total) g/m^3	8.3	6.73	0.30	0.54	0.33	0.56	19.6	17.38	0.017	0.02	0.25	0.34
Nitrate-N g/m^3	8.5	-	0.97		1.02	-	7.7	-	0.81	-	0.90	-
Nitrite-N g/m^3	0.49	0.45	0.012	0.01	0.016	0.01	0.35	0.35	0.002	<0.01	0.008	<0.01
Nitrite and Nitrate-N g/m^3	9.0	-	0.99	-	1.03	-	8.1	-	0.81	-	0.91	-
Total Nitrogen g/m^3	18.1	-	-	-	-	-	30	-	-	-	-	-
Urea-N g/m^3	0.62#	0.83	-	-	-	-	4.5	3.98	-	-	-	-
TKN g/m^3	9.1	8.17	-	-	-	-	22	21.11	-	-	-	-
Potassium g/m^3	2.3	-	5.2	-	5.3	-	6.0	-	3.1	-	3.1	-
Sodium g/m^3	18.0	17.58	8.0	7.74	8.1	7.80	230	207.5	7.5	7.4	10.6	10.24
Phosphorus, (dissolved reactive) g/m^3	<0.004	-	0.013	-	0.014	-	<0.04	-	0.011	-	0.013	-
Zinc (acid soluble) g/m^3	0.09	0.07	-	-	-	-	0.03	0.02	-	-	-	-

Urea sample arrived partly frozen

Copper, chromium, mercury, nickel and total hydrocarbons (C7-C36) were analysed for by the Council in IND002007, nothing was recorded above the respective detection limits.

2.1.4 Results of receiving environment biomonitoring

Biomonitoring of the Kapuni Stream and its tributaries was carried out by the Company as required by the conditions of the resource consents. All six biological surveys were undertaken by Stark Environmental Ltd carrying out the data interpretation and reporting on behalf of the Company.

The programme involved assessment of changes in the abundance and diversity of the macroinvertebrates and fish communities. Seven sites in the Kapuni catchment, five on the main stem and two in gullies that run through the irrigation area were monitored quarterly for benthic macroinvertebrates and biannually for fish by electric fishing (Figure 3). A further four sites on the main stem are sampled once per annum during spring in conjunction with the other monitoring for both macroinvertebrates and fish. Monitoring results and their interpretation are forwarded to the Council and are reviewed.

Figure 3 Biomonitoring sites in the Kapuni Catchment

Four macroinvertebrate surveys and two fish surveys were scheduled for the Kapuni Catchment for the 2023/24 monitoring period as detailed in Table 5.

Table 5 Overview of the monitoring programme for the Kapuni Catchment

Survey dates	Taxa	Number of sites	
		Kapuni Stream	Tributaries
9-Aug-23	Macroinvertebrate	7	2
11-Oct-23	Fish	11	0
11-Oct-23	Macroinvertebrate	11	2
23-Jan-24	Macroinvertebrate	7	2
1-May-24	Fish	7	0
1-May-24	Macroinvertebrate	7	2

A separate report prepared by Council summarising the findings of the individual reports as well as ensuring that the reports are accurate is attached as Appendix III. The general conclusions were that the macroinvertebrate communities in the Kapuni Stream were in good to excellent health and were not significantly affected by the Company's operations. Furthermore, there were no significant adverse impacts caused by activities associated with the Company on fish communities in the Kapuni Stream.

2.2 Land

Wastewater generated from the site, in the form of process effluent and contaminated stormwater, is disposed of, after treatment, by spray irrigation onto land adjacent to the plant (Figure 4) under consent 0597-3. The irrigation system comprises 12.8ha operated as a 'cut-and-carry' area (Areas 1-6, blue shading), from which the grass is removed and supplied to a local farm. Until June 2004, an additional area of up to 30.3ha on a neighbouring farm to the west was operated as a 'grazed' area. A new grazed area was established on another neighbouring farm, to the south (Luscombes, Area 11, green shading) in December 2004, which was increased in stages to 15.2ha by January 2008. Use of the Buckthought grazed area recommenced in February 2009, 18.7ha being irrigated (Area 7 and Area 8 adjacent to the cut-and-carry area), but ceased again in February 2011. The Luscombe grazed area was increased by 11.2ha (Area 12) to 26.4ha in October 2013 (Figure 5). Effluent is applied by travelling irrigators.

Due to the nature of activities at the Company's site, wastewater generated from it contains nitrogen, therefore, there is potential for nitrate contamination of groundwater beneath the irrigated areas as a result of discharging the wastewater. A formal plan for the management of the waste disposal system was compiled in 1990 from procedures developed during eight years of operational experience and from advice provided by the Department of Scientific and Industrial Research, Grasslands Division (DSIR), now AgResearch Limited, Grasslands Division (AgResearch). The success of the system relies on the minimisation of nitrogen output and on good soil and pasture management of the irrigation areas.

The rate of nitrogen removal by pasture uptake and through microbial transformations is governed by many factors, including the infiltration capacity of the soil, soil temperature, mineral content of the waste (particularly the cation balance), hydraulic loading (rainfall is the major factor), application method, grass removal method, and livestock management.

Plant effluent is monitored for nitrogen species, and for cations, which affect soil stability. Alkali metal ions (sodium and potassium) will deflocculate the soil when present at elevated concentrations. The concentrations of these ions are reduced through the discharge of their main source, ion exchanger regenerate, to the Kapuni Stream with stormwater under consent 0598-3.

Soil and herbage testing of the irrigation areas has been undertaken biannually, in spring and autumn, to determine the requirements for soil stability and grass health. Applications of gypsum and Epsom salts (soil conditioners) are delivered routinely according to the results of the analyses. Other nutrients, such as superphosphate, are applied as required. At times of intense or prolonged rainfall, the effluent may be

discharged to the Kapuni Stream under consent 1766-3, provided there is sufficient flow in the stream, to avoid irrigation under saturated conditions.

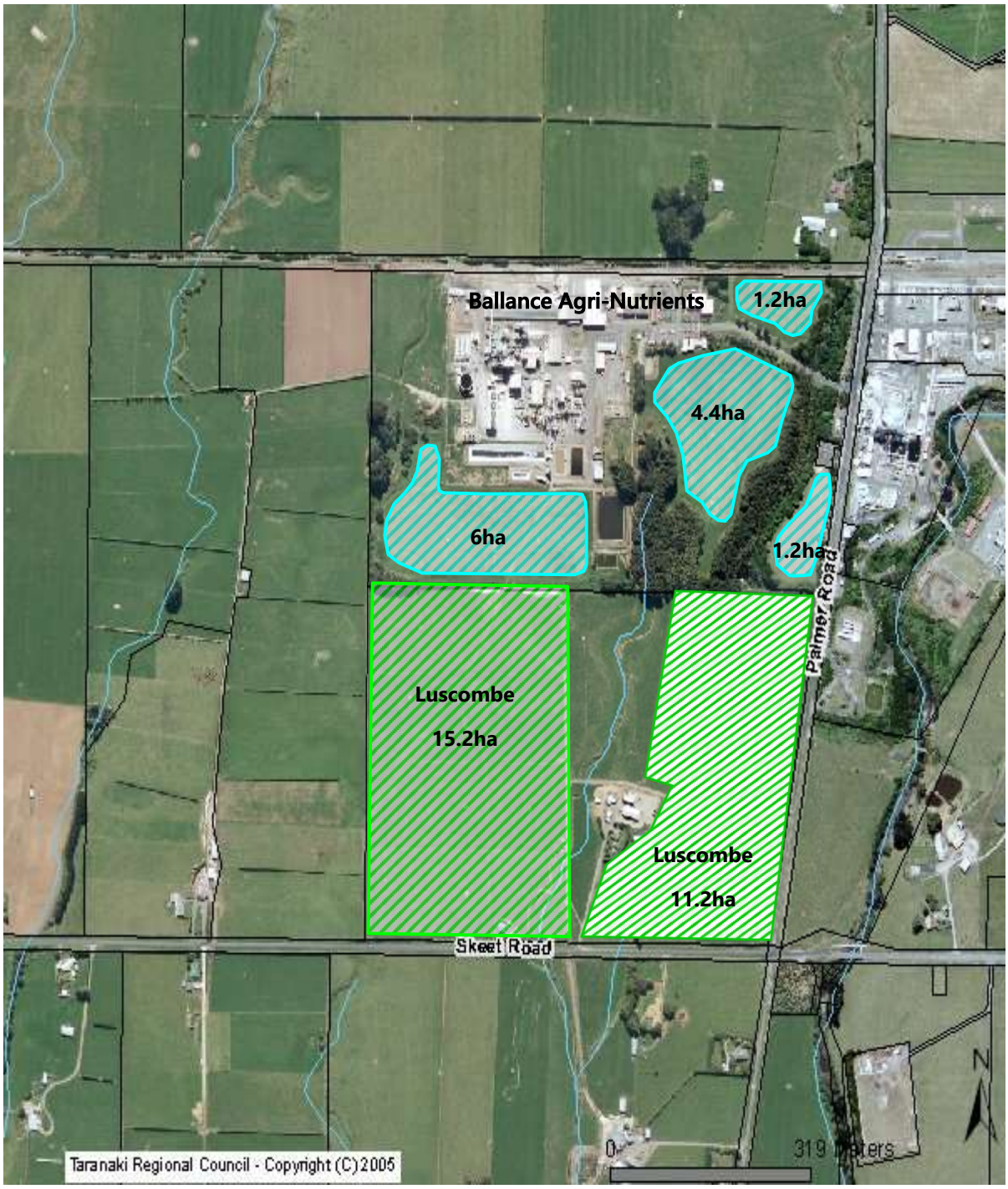

Figure 4 Irrigation areas ('cut-and-carry' areas in blue shading and grazed areas green shading)

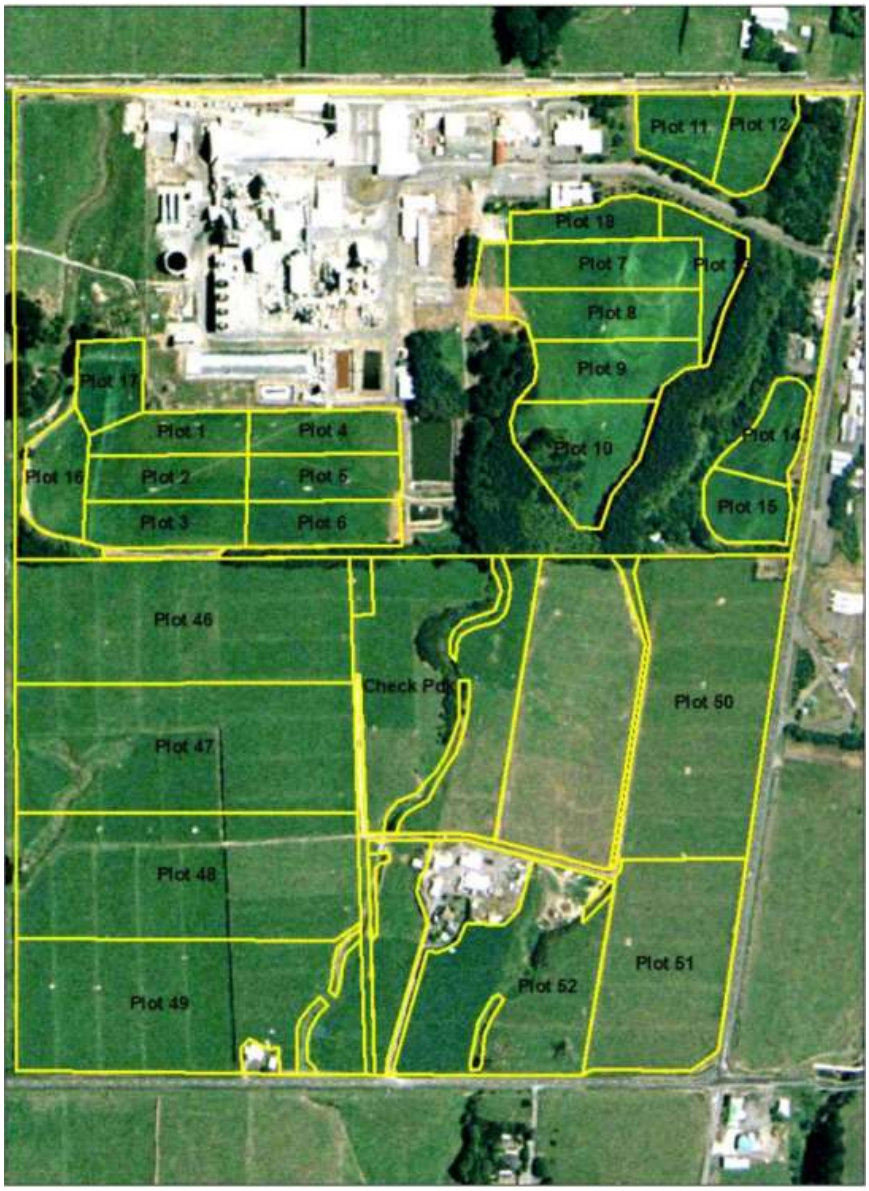

Figure 5 Aerial view of site showing plot locations (AgResearch 2024)

(Cut areas: Area 1 includes plots 1, 2, 3; Area 2 includes plots 4, 5, 6; Area 3 includes plots 8, 9, 10; Area 4 includes plots 11, 12; Area 5 includes plots 13, 18; Area 6 includes plots 14, 15. Grazed Areas: Area 11 includes paddocks 46-49; Area 12 includes paddocks 50-52).

2.2.1 Site Inspections

Throughout the year under review site management was found to be good and the effluent management system and irrigation areas were found to be working well.

2.2.2 Discharge monitoring

2.2.2.1 Effluent volume

Special Condition 2 of consent 0597-3 limits the volume discharged to 1,470m^3/d. The Company measures and records daily the effluent volume sprayed on each irrigation plot and forwards this data to the Council. By summing the daily plot volumes, compliance with the consent limit can be determined. The data

demonstrates that the daily volume limit was complied with throughout the 2023/24 review period with a peak daily volume of 872m³ recorded on the 5 October 2023.

2.2.2.2 Nitrogen application rates

Special Condition 11 of consent 0597-3 limits the application rate of total nitrogen onto the irrigation areas. The total nitrogen loadings for cut and carry and grazed pastures for each operational area are provided in Table 6. This shows compliance with the consent condition of 1,000kgN/ha/y for cut and carry areas and 300kgN/ha/y for grazed areas during the 2023/24 monitoring period.

Table 6 Nitrogen application rates (kg/ha/y) for cut-and-carry areas and grazed areas 2023/24

	Cut and Carry kgN/ha/y						Grazed kgN/ha/y	
Area	**1 (3.6ha)**	**2 (2.4ha)**	**3 (3.2ha)**	**4 (1.2ha)**	**5 (1.2ha)**	**6 (1.2ha)**	**11 (15.2ha)**	**12 (11.2ha)**
Total	422	420	327	240	298	256	54	33

The Company also has an internal target for cut and carry areas of 600kgN/ha/y to promote good pasture health which was also achieved. Long term compliance with the nitrogen loadings have always been observed though there have been periods where the internal goal has not been achieved (Figure 6).

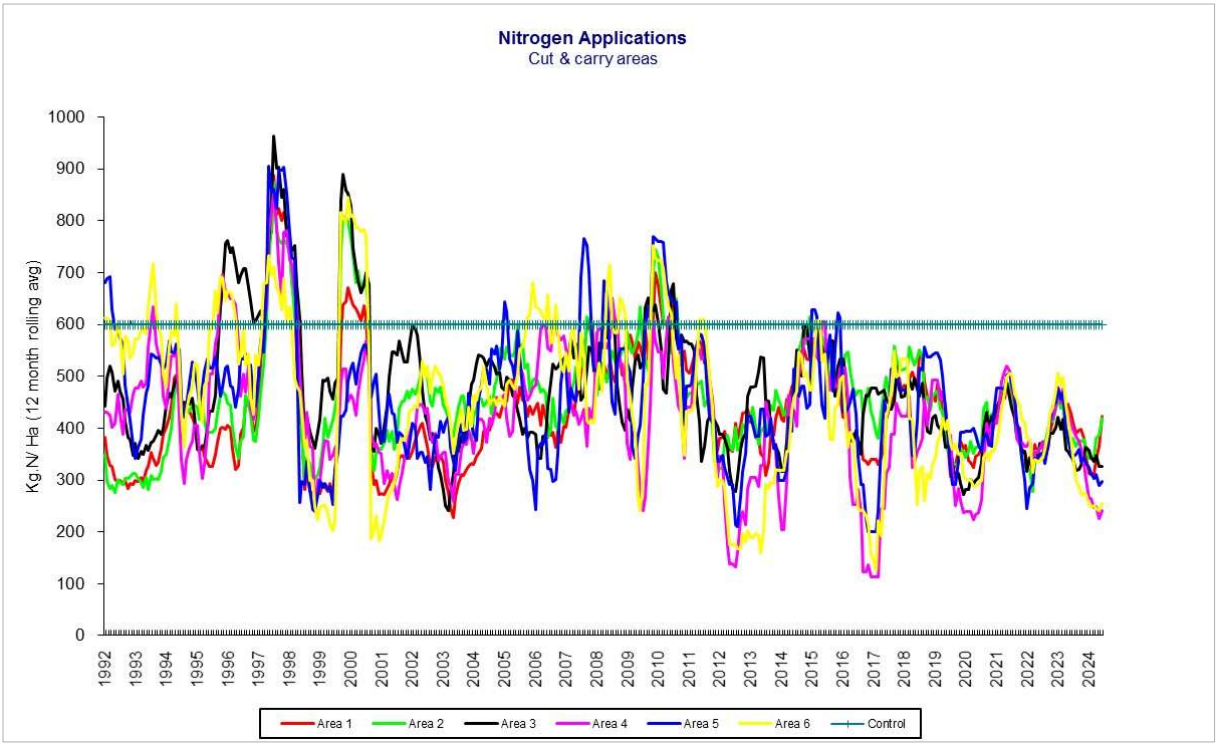

Figure 6 Nitrogen applications rates on cut and carry spray irrigation areas

Long term compliance with the nitrogen loadings have always been observed for grazed areas (Figure 7). The Company has an internal target for grazed areas of 200kgN/ha/y to promote good pasture health. It should be noted that the areas referred to as Area 7 and Area 8 have not been used since the 2010/11 monitoring year, Area 9 since 2001/02 monitoring year and Area 10 since the 2007/08 monitoring year. During this monitoring period Area 11 and Area 12 were not used from March 2024 through to June 2024.

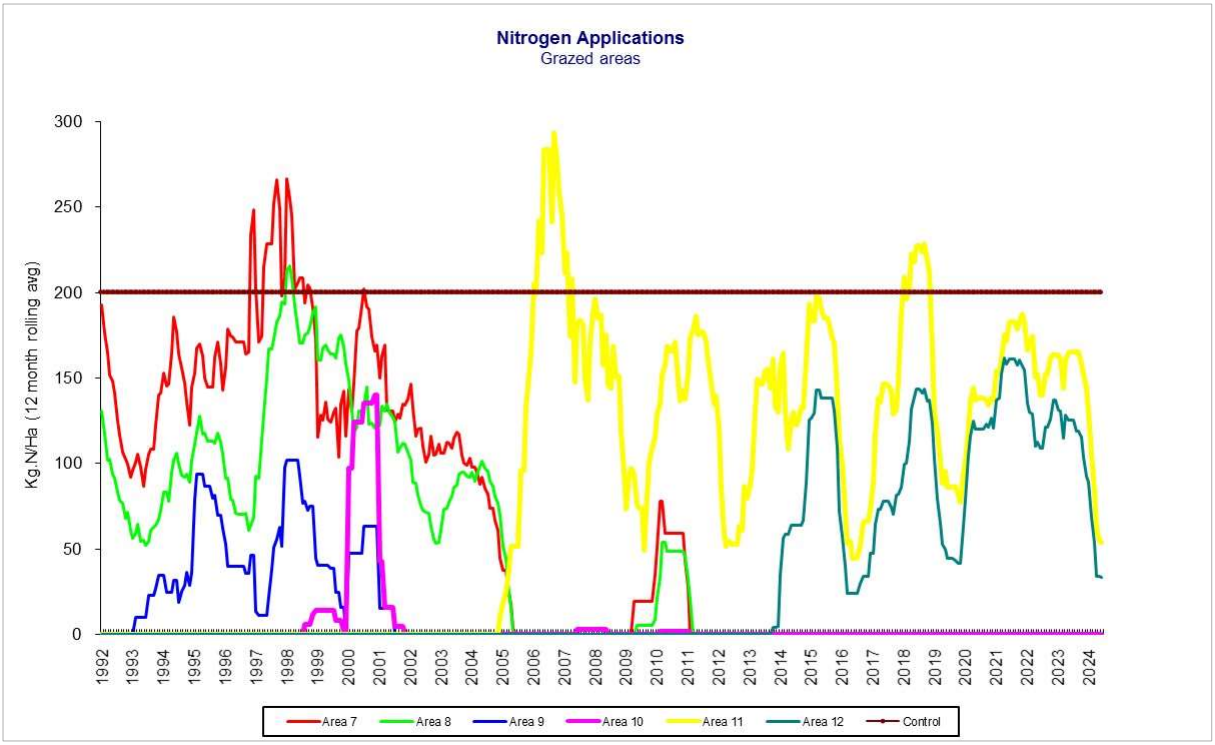

Figure 7 Nitrogen applications rates on grazed spray irrigation areas

2.2.3 Soil and herbage monitoring

The Company employs AgResearch to carry out monitoring of plants and soils of the irrigation areas. This was the 34th year that the monitoring was undertaken.

The primary objective of the programme is to provide a management plan for the effluent disposal areas. In the case of the cut-and-carry area this is aimed at maintaining conditions which maximise the uptake of nitrogen, potassium and sodium from the effluent while preventing accumulation of leachable nitrate in the soil.

This includes managing the balance of cations in the surface soil to prevent deflocculation of soil colloids and the consequent loss of its ability to infiltrate water (hydraulic conductivity).

The grazed area is managed with similar objectives. However, the total amount of nitrogen applied is limited by the capacity of the system to absorb and redistribute nitrogen rather than its removal.

A secondary objective is the monitoring of the effluent disposal areas to assess the performance and to allow modifications of the management plan.

The monitoring has two components:

1. Spring sampling which is centred on nutritional status of the areas and balance of cations in the surface soil; and
2. Autumn sampling which details the movement of nitrate through the soil profile to the saturated zone.

AgResearch undertook sampling at the Company site with the results summarised below (AgResearch 2023 and 2024).

2.2.3.1 Spring 2023 soil and herbage survey

Surface soil and plant samples were taken in mid-October 2023 from the cut and carry area; grazed areas of the Luscombe farm; and from a control area receiving no effluent on the Luscombe farm.

Sodium concentrations in all the cut areas are now the highest observed in the long-term record, and sodium absorption ratios (SAR) are now at levels well above 2.0. This represents a high risk of soil deflocculation and surface sealing for the purpose of irrigation application. In addition, the sum of SAR and potassium absorption ratios (KAR) is generally well over the upper safe threshold of 3.0. This is an indication that the dressings of calcium and magnesium salts in the cut areas are no longer effective. All this is against a background trend of a slow increase in the loading of all cations over recent years. In the grazed areas, two plots in Area 11 also have excessive SAR levels.

There was no indication of any consistent plant tissue macro- or micro-nutrient issues. Titanium levels indicated potential soil contamination of samples from the grazed areas, possibly accounting for higher cobalt and iron levels. However, herbage samples from the cut areas did show high nitrate concentrations (<0.20%) that represent a potential toxicity risk to animals.

The pasture swards in the cut areas were generally in better condition than previous years, being more ryegrass-dominated and less weedy. Attention should still be paid to increasing growth and nitrogen uptake, by avoiding very low and very high canopy covers, which will reduce bare soil and weed ingress. This may also be assisted by the addition of capital phosphate fertiliser, as soil Olsen P values remain low relative to optimum. (AgResearch 2023).

2.2.3.2 Autumn 2024 deep soil leaching profiles

The 16 April 2024 deep soil sampling survey report found that annual nitrogen application of 300kgN/ha to the cut and carry areas was 31% less than 2022/23 and well below the recommended level of 600kgN/ha. Winter N application of 112kgN/ha was lower than 2022/23 by 37%. In the grazed areas, the annual N load averaging 87kgN/ha was also lower than the previous year (146kgN/ha), remaining below the recommended level of 200kgN/ha. There was little N applied to these areas during the winter months, slightly less than last year at 13kgN/ha. It should be noted that the greater the mass applied in the wetter months, the greater the potential for leaching beyond the plant uptake zone.

The profile nitrate-N (NO^3-N) mass to 3m of the cut areas was 49% lower than the previous year (110 vs 209kgN/ha), and the lowest ever recorded and well below the mean of the previous 10 years (334kgN/ha). The contribution of ammonium-N (NH_4-N) to the profile mineral N represented 21% of the nitrate-N between 0-3m. This amount and proportion is higher than previous years. It is a substantial proportion of total mineral N in the profile.

The profile nitrate-N mass to 3m in the grazed areas was 238kgN/ha, substantially lower than 2022/23, and one of the lowest levels measured. The control plots have decreased by 80% compared to last year. This overall decrease can be attributed to the reduction in loading during 2023/24. As with the cut areas, the contribution of ammonium-N to the profile mineral N was higher than previous years, representing 17% of the nitrate-N between 0-3m.

Given the cessation of effluent application on the Luscombe farm as of March 2024, other land areas will need to be sought for the application of effluent, as well as another area for the two Control plots (where no effluent is applied). (AgResearch 2024)

2.2.4 Groundwater monitoring

There are 42 groundwater monitoring bores established at the Company's site. The monitoring bores at the plant are monitored by the Company for different purposes. The original sites were established to monitor the effects on groundwater of the application of effluent onto land under Consent 0597-3.

More recently, sites have been introduced for general site assessment and in response to specific problems. These include the monitoring of a contaminant plume resulting from leaks in the finished effluent catch basin (FECB) and from contamination detected around the urea process area. The areas that each monitoring bore corresponds with are summarised in Table 7, and their locations are given in Figure 9.

Table 7 Site areas in relation to groundwater monitoring bores and nitrogen concentrations

Site	Monitoring bore	Approximate long term range (2000- mid 2023) of Total N Concentrations (g/m^3)
Control site	22	3 - 9
Irrigation areas	3, 4, 5, 7, 10-1, 10-2, 10-3, 10-4, 10-5, W, W1, W2	<1 - 85
Skeet Road	1, 2, 8, 12-1, 12-2, 12-3	<1 - 72
FECB plume	East and West bores, 4, 13 to 21, 30	9 – 8,075
Plant site	23 to 29, 31 to 40	8 - 15,100

2.2.4.1 Electromagnetic induction survey

In June 2002, the groundwater monitoring programme was altered to include an electromagnetic induction (EM31) survey to be conducted annually which would assist in identifying any contaminated groundwater and the extent of the contamination by measuring the electrical properties of the soil. The EM31 is a near-surface electromagnetic survey system with a peak response in the 1 to 1.5m depth range and a maximum depth range of 5 to 6m in the vertical dipole mode. It is a high sensitivity system, capable of measuring and recording very small changes, of milliSiemens per metre (mS/m); in soil electrical conductivity (i.e. inverse of resistivity). It is often used to detect and delineate subtle changes in the subsurface conditions caused by contamination, underground waterways, fault lines, change in soil type, subsidence, etc. The survey highlights the movement of any conductive substances entering the ground from the main plant operations and effluent irrigation system at the Company's site.

An EM31 survey was undertaken on 8 and 9 April 2024. The EM31 surveys cover the large paddocks on the south (Site A) and east side (Site B) of the main production plant. A site map of the 2024 survey is shown in Figure 8 (Southern Geophysical 2024).

The data from 2024 identified a general trend of higher conductivity measurements throughout sites A and B. These changes could be associated with higher volumes of conductive material entering the ground, such as fertilisers or, more likely are associated with season changes affecting groundwater levels and ground saturation. No significant conductivity anomalies have been observed when comparing this year's results with all previous surveys.

The small, localised conductivity anomaly near the gate to the facility which was detected in 2023 shows no increase in size or conductivity in the 2024 results. This conductive zone likely represents increased saturation in that area, or a higher percentage of fertiliser.

An additional conductivity anomaly was identified in Site A, at the south-west corner of the facilities metal fence. This anomaly is likely due to the operators moving the EM31 closer to the fence than in previous surveys; however, this zone will be monitored for changes in subsequent surveys.

The locations which change in conductivity between the yearly surveys differ in positions, showing no consistent trends beyond that of typical seasonal changes. The conductivity changes appear to be within the normal variability of the site, which may be related to yearly variation in rainfall, site groundwater conditions, grass growth, and wastewater application all affecting conductivity. Overall, the survey shows no significant change from the previous year's ground conductivity survey.

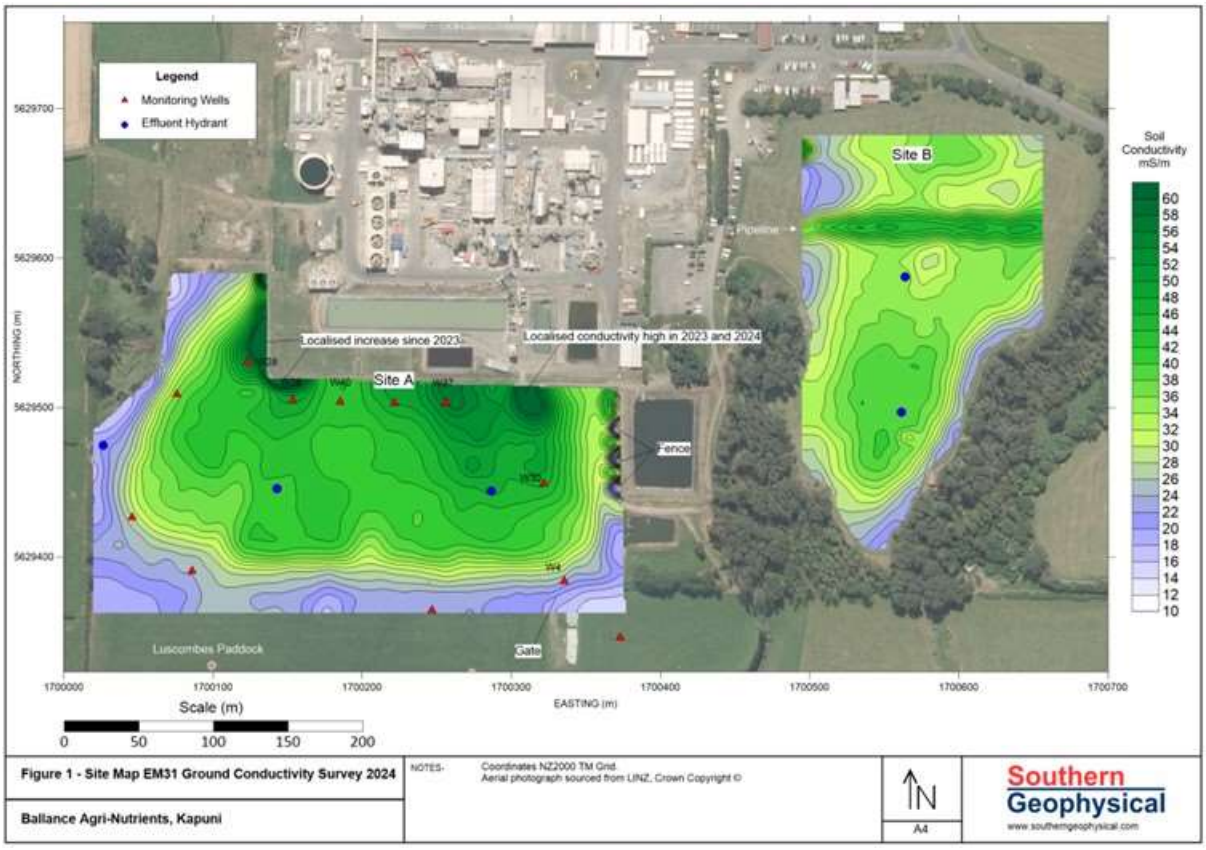

Figure 8 Site Map EM31 Ground Conductivity Survey 2024 (Southern Geophysical 2024)

2.2.4.2 Groundwater monitoring in relation to effluent irrigation

The 'irrigation' monitoring sites are sampled regularly, at frequencies ranging from monthly to annually, depending on groundwater level and composition. Groundwater levels are measured and the samples analysed for conductivity, pH, ammonia, nitrate, nitrite, urea, sodium and chloride. These monitoring bores provide the most information as they generate data on the depth of the effects of the irrigated effluent.

Three bores (Bores W, 10 and 12) are multi-piezometric (that is, a cluster of standpipes screened to allow the monitoring and collection of groundwater samples at various depths). Previously, monitoring results have indicated that groundwater is affected by effluent irrigation at a depth of 7.5-10m (Bore W1 and W), but not at a depth of 11-13m (Bore 10-4) or deeper (Bore 10-5) where total nitrogen levels have always remained low. It is not possible to update this observation, as recently sampling has not occurred in Bore 10-4 nor Bore 10-5 since 2020 and 2021 respectively. There continues to be evidence from the 2023/24 results that the groundwater is being affected by effluent irrigation at depths 7.5-1m (Bore W1 and Bore W). Bore 12 demonstrates that there is some effect on groundwater at 7m and at 8m depth, although the effect is lower at the deeper depth.

Seasonal and multi-year variations in nitrogen concentrations occur in wells which are not affected by effluent irrigation. Therefore, peaks may not be irrigation related, but due to variations in rainfall recharge,

which affect the concentration of the nitrogen plume derived from the production area. Attention needs to be paid to the timing and magnitude of effluent nitrogen loadings to avoid additional losses to groundwater which may be unsustainable.

Figure 9 Locations of groundwater monitoring bores

2.2.4.3 Groundwater monitoring in relation to the FECB ammonia plume

Groundwater is sampled at 13 monitoring bores established down slope of the FECB and on the spray irrigation area. These monitoring bores have been installed to determine the rate of movement and dispersion of ammonia that has leaked from the FECB over the past 38 years. Three of the down gradient monitoring bores (West Bore, East Bore and Bore 30) have had abstraction and treatment of groundwater under consent 4719-2. These bores are monitored on average once per annum, with the latest analysis carried out during August 2023. During this monitoring year, bore 17 and 18 could not be found and consequently were not sampled.

Monitoring of the down gradient bores shows the plume has migrated. At West Bore, which is located immediately downslope of the FECB, nitrogen levels have been relatively stable after the last effluent basin liner was installed during 1996-1997. Nitrogen levels have fluctuated between 44 and 198g/m³ since 1999, with a spike in 2013, when a value of 444g/m³ was measured. However, a rapid increase identified in the 2019/20 monitoring year when 2,038g/m³ was detected in May 2020. This increase continued in 2020, culminating in the highest result observed in August 2020 of 8,075g/m³ (Figure 10). This suggested either another leak or inadequate abstraction of the groundwater at the bore. The elevated result saw a relatively rapid decline in the follow monitoring years and the latest results recorded a further decline to 2,337g/m³ in August 2022 and a similar concentration of 2,434g/m³ in August 2023. The concentrations have declined and potentially stabilised compared with the previous results, although the results are still considerably higher (some 12 times higher) compared with pre-2020 results. Further monitoring will assess whether the decline continues to previous levels.

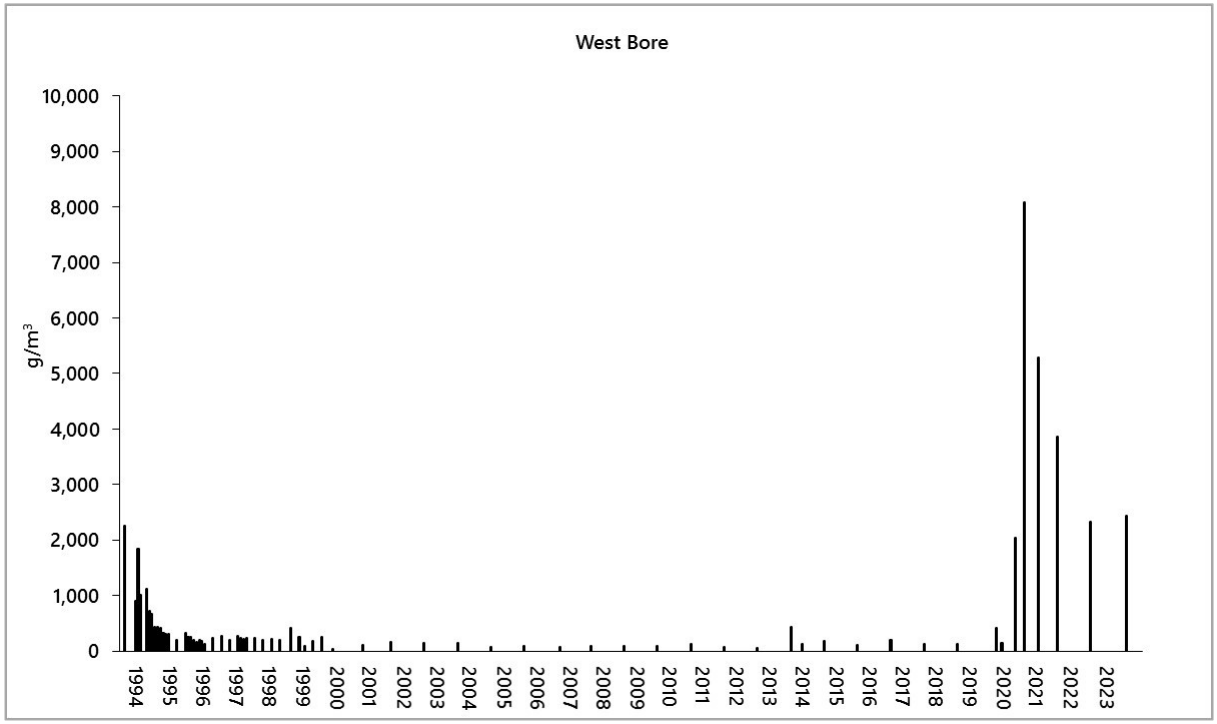

Figure 10 Total nitrogen concentration in groundwater in West Bore

At East Bore, which is located immediately downslope of the FECB and slightly to the east of West Bore, nitrogen levels have been relatively stable after the last liner was installed (Figure 11). For the current monitoring year concentrations have declined since 2021 and ranged from 46 to 131g/m³. These results are returning to similar concentrations of those prior to 2019. This further indicates that the plume migration could have been largely localised but further monitoring will assess whether the decline continues to previous levels.

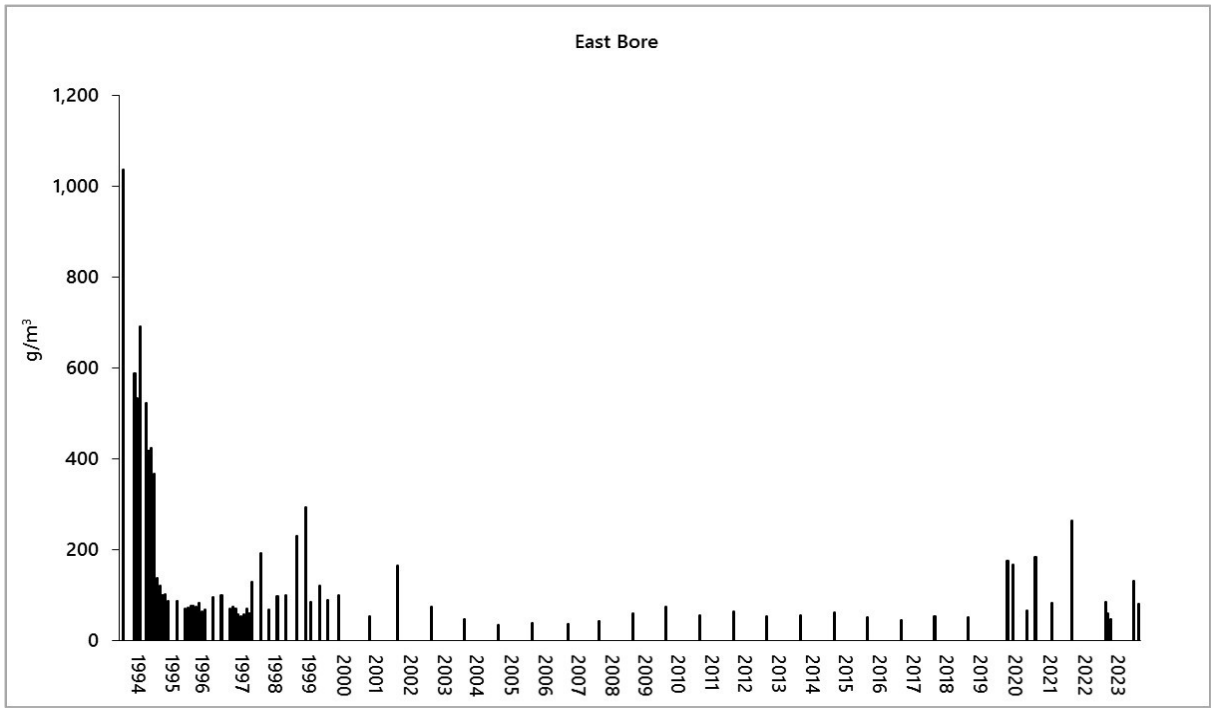

Figure 11 Total nitrogen concentration in groundwater in East Bore

Bore 30 is the other down gradient pumping bore. Nitrogen levels at this bore are potentially affected by both the ammonia plume and by irrigation of wastewater. Overall, total nitrogen concentrations have remained relatively stable since 1999 when the last FECB leak occurred. However, during the latest August 2023 analysis there has been a marginal rise in total nitrogen (Figure 12).

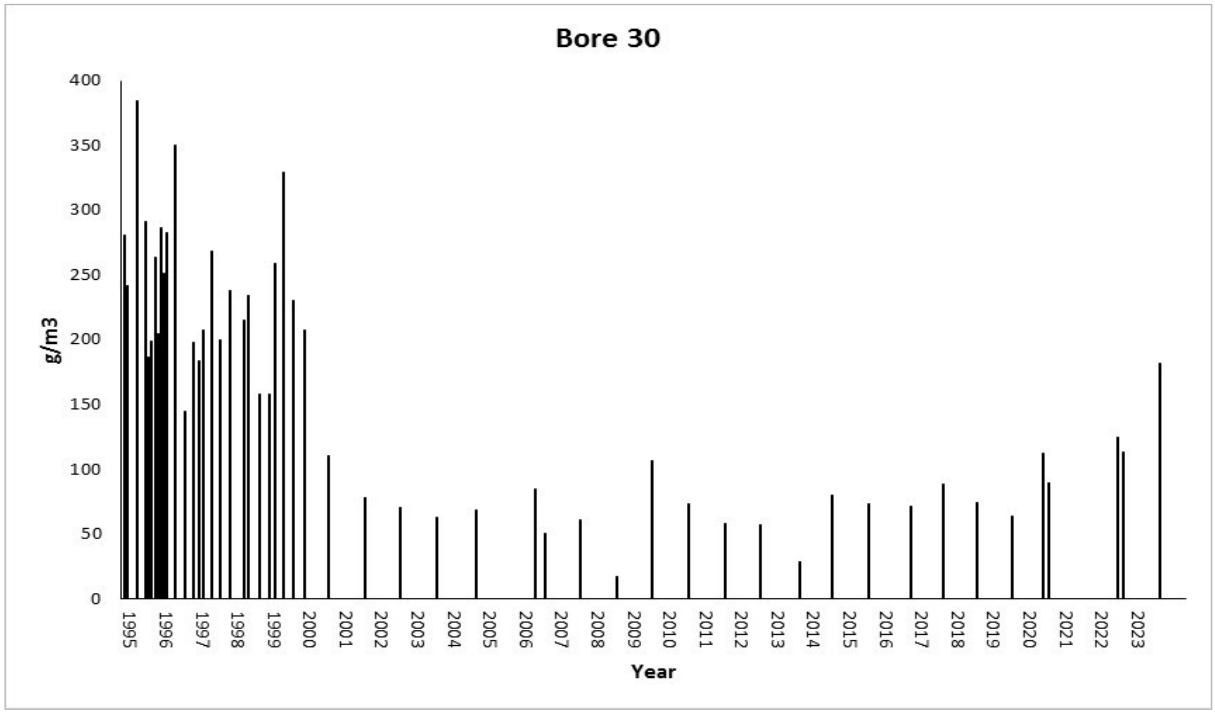

Figure 12 Total nitrogen concentration in groundwater in Bore 30

The total nitrogen concentrations in other bores located down gradient of the FECB (Bores 13 and 15) have both declined slightly since 2020. However, Bore 14 (which is more regularly monitored) has had relatively stable total nitrogen since 2000 (ranging 42-177g/m^3) until more recently during 2023 it increased

(257-340g/m^3). A further rise in concentration has occurred in the latest monitoring round during February 2024 reaching almost 580g/m^3 total nitrogen. It is unclear whether this is due to plume movement or just effluent irrigation. Bores 13, 14, 15 and 30 are all within fairly close proximity of each other, it is difficult to determine why some bores have greater concentrations of total nitrogen than others. This could potentially be linked to the movement of the plume.

Pumping from East Bore, West Bore and Bore 30 should continue along with monitoring of the other bores. If further plume movement is observed, further action may need to be taken to contain the plume onsite, such as increased pumping of groundwater. Once the recommended conceptual groundwater model of the site has been updated, there may be other measures that can be implemented for the groundwater remediation.

2.2.4.4 Groundwater monitoring in relation to the granulator plume

The Company has previously extended its groundwater monitoring programme to other areas of the plant. High total nitrogen concentrations, predominantly in the form of ammonia, had been detected in the vicinity of the granulator area of the plant. In response to these elevated nitrogen concentrations, the Company has undertaken remedial pumping at Bore 25 (Figure 13) and Bore 32 since late 1994 under consents 4719-1 and 4719-2. Pumping from, and monitoring of, these bores has continued through to the monitoring period under review.

Total nitrogen concentration in the pumped groundwater varies according to rate of pumping, increasing when abstraction ceases. Since 2000, total nitrogen concentration in the bores within the plant site has ranged from approximately 8 to over 15,000g/m^3, mainly in the form of ammonia.

During the period under review, nitrogen levels were generally similar to the previous monitoring period in Bore 25 (Figure 12). However, during August 2023 there was a spike of 7,164g/m^3; and yet either side (July and September 2023) the concentration was approximately 2,800g/m^3. Bore 25 fluctuates throughout the year, and this figure remains within the long-term range.

Bore 32 had lower concentrations during 2023/24 ranging 560-2168g/m^3 whereas during 2022/23 the range was 2252-4357g/m^3.

It is observed that concentration levels for both bores decreased in the sampling months immediately after the shutdown period.

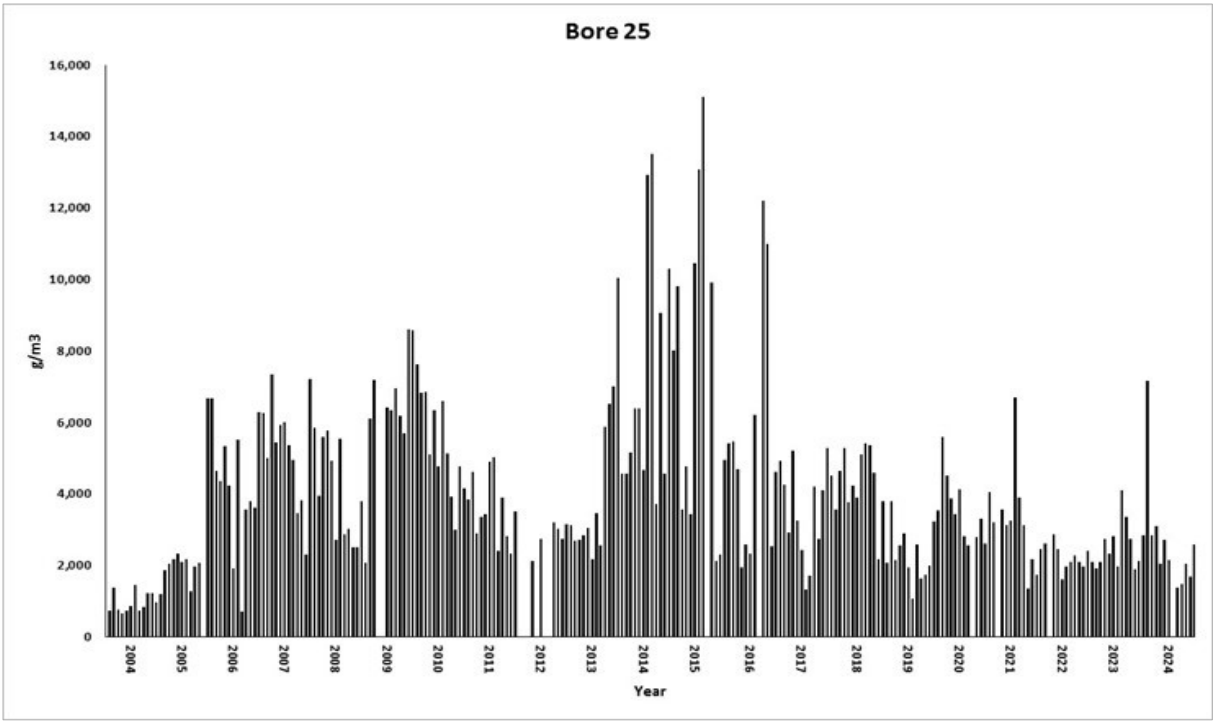

Figure 13 Total nitrogen concentration in groundwater in Bore 25 (2004-2024)

2.2.4.5 Groundwater monitoring in relation to the bulk urea storage and load-out area

Monitoring of groundwater in the vicinity of the bulk urea load out area at Bore 24 has been undertaken since November 1994. Nitrogen levels have fluctuated between approximately 30-500g/m^3, with a spike of 678g/m^3. Recent results were within the long-term range (251g/m^3).

2.2.4.6 Groundwater monitoring on Skeet Road

Monitoring of groundwater along Skeet Road is carried out using four monitoring bores (1, 2, 8 and 12). The general overall range for total nitrogen concentration is <1 to 54g/m^3. More recently bore 2 has had elevated total nitrogen levels of 71.4g/m^3 during 2021; and a spike of 471.5g/m^3 during 2023. Concentration levels in the other bores adjacent to it remain within the long-term range. Bore 2 has recently been reanalysed as part of the routine monitoring (August 2024) and concentration levels have dropped back to background levels. The spike during August 2023 has therefore been determined as an anomaly. Monitoring of this bore will continue, and if there is the reoccurrence of elevated concentration levels, it is recommended that monitoring of this bore should be increased.

2.3 Air

2.3.1 Inspections

During each scheduled inspection the dust scrubber, the plant perimeter, the cooling towers, formaldehyde storage area, and the bulk storage area were observed for emissions to air including odour and particulate. There were no significant effects observed beyond the boundary of the plant as a result of discharges to air during the inspections.

Instrumental monitoring of ambient gas, fine particulate and dust deposition was undertaken at the site during the 2023/24 monitoring period and is reported in Section 2.3.2.

2.3.2 Results of air quality monitoring

2.3.2.1 Stack emissions testing

Special Condition 3 on Resource Consent 4046-3 limits the combined ammonia emissions from the dust scrubber fan and the blow down tank vent to 295kg/hr. Special Condition 6 imposes a concentration limit for urea emissions from the dust scrubber fan (or any other source) of 125mg/m^3, and mass emission rate of 12kg/hr.

To assess compliance with special conditions on consent 4046-3, the Company undertakes regular testing of air discharges from the dust scrubber stack. This year K2 Environmental Ltd (K2 Environmental Ltd, 2024) conducted testing of the stack emissions on 19 December 2023. Three tests were conducted, each approximately 35 minutes in duration, and the results were averaged to derive the final result for comparison to the consent conditions. The results of the stack emission testing are presented in Table 8 below.

Table 8 Dust scrubber emission testing results for the monitoring period 2023/24

Date	19 December 2023	Consent limit
Ammonia (kg/hr)	230	295
Urea (kg/hr)	3.4	12
Urea (mg/m^3)	11	125

The results of the dust scrubber stack testing were less than their respective consent limits at the time of the testing. The mass emission of ammonia from the dust scrubber stack was 230kg/hr, 78.0% of the consent limit. The mass emission of urea from the stack was 3.4kg/hr, 28.3% of the consent limit, while the concentration was 11mg/m^3 which is 8.8% of the limit.

2.3.2.2 Particulate deposition gauging

The particulate deposition gauges were deployed on 7 March 2024 at five locations around the site (Figure 14) and were recovered 21 days later on 28 March 2024. During the deployment the wind was from the northwest quarter about 60% the time. Wind speeds exceeding 20km/hr were primarily from the northwest and southeast.

The content of the gauges was analysed for course particulate matter, conductivity, pH, urea and ammonia and the results are presented in Figure 14. There are no human health-related standards or guideline values for these compounds in ambient air. These are considered to have a nuisance effect only. There is no condition in consent 4046-3 which limits the particulate deposition rate beyond the boundary of the site. The Regional Air Quality Plan recommends a guideline value for nuisance effects from particulate deposition of 130mg/m^2/day over a minimum 20 day period. Consideration is given to the location of the industry and the nuisance the community is likely to suffer, when assessing results against this value.

The maximum deposition rate recorded during the deployment was 30mg/m^2/day (Table 9) and was reported from monitoring site AIR003401 on the north western boundary. The result is substantially lower than the previous year which was 1,200mg/m^2/day, but within the range reported for all previous years since 1996. All other monitoring locations reported a deposition rate of 10mg/m^2/day. These results are significantly lower than the guideline value of 130mg/m^2/day.

Table 9 Results of particulate deposition monitoring from 7 March 2024 to 28 March 2024

Parameter	Site				
	AIR003401	AIR003402	AIR003403	AIR003404	AIR003405
	North west of the plant on the northern boundary	West of the plant (north of irrigation area)	On site north of roadway	On the eastern boundary	Close to the eastern boundary south of the plant
pH	7.2	7.5	7.5	7.6	7.3
Conductivity mS/m/d	0.75	0.63	0.55	0.82	0.69
Ammonia $mgN/m^2/d$	15.71	13.95	13.65	22.81	15.92
Urea $mgN/m^2/d$	4.10	3.64	2.14	3.83	0.42
Particulate $mg/m^2/d$	30	10	10	10	10

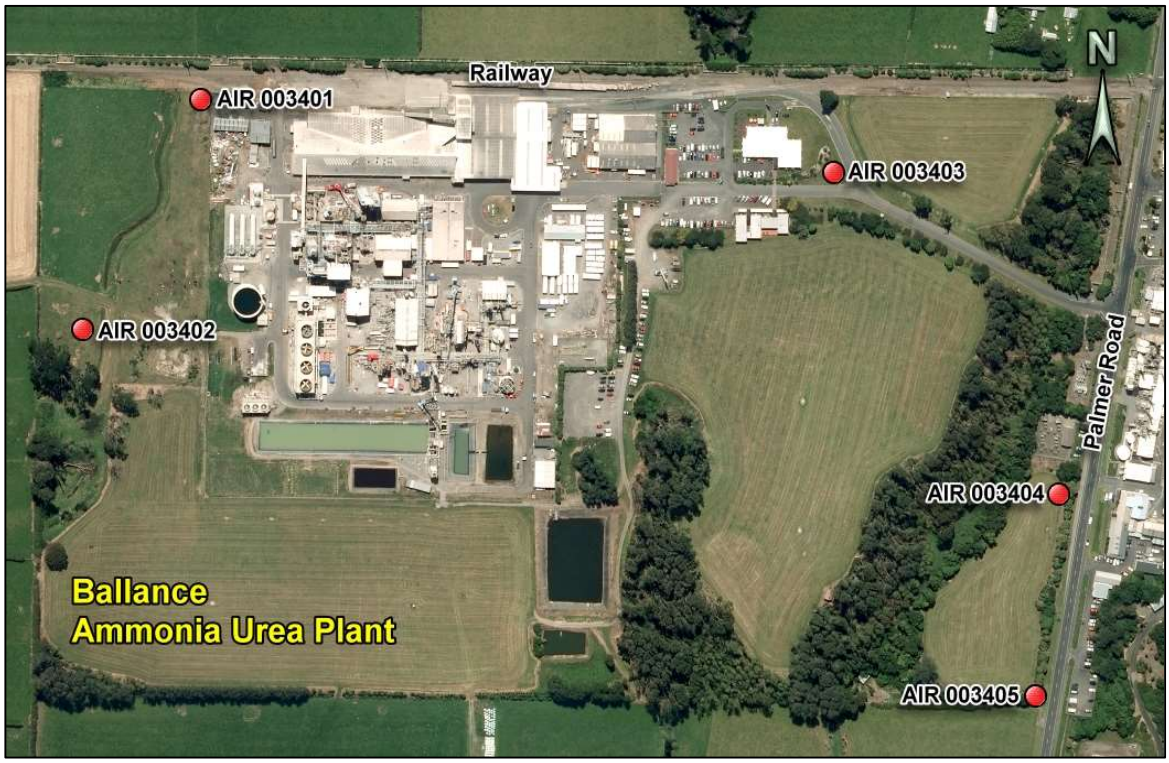

Figure 14 Location of deposition gauge monitoring sites

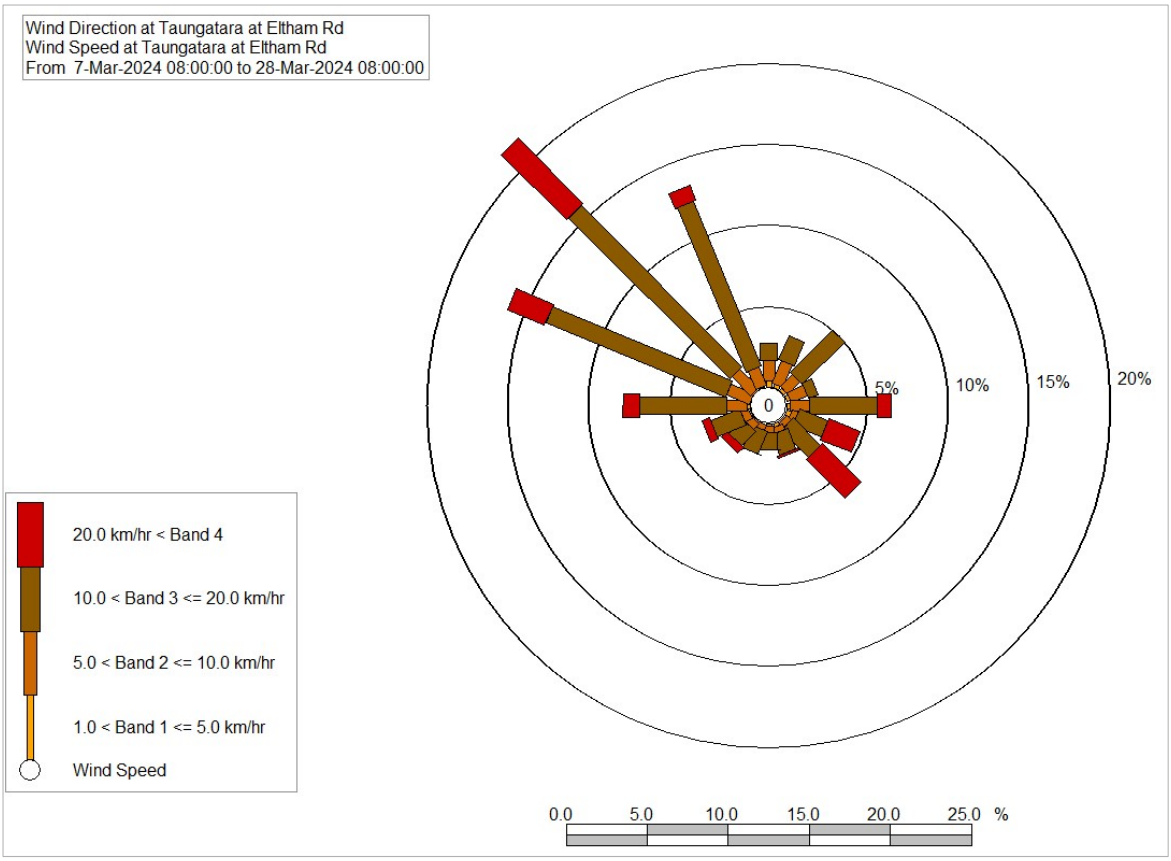

Figure 15 Wind conditions at Taungatara during deployment of deposition gauges

The filter contents were further analysed for ammonia and urea which are present in stack emissions, and for pH and conductivity. There were no significant differences in ammonia and urea levels between sampling locations. The deposition rates of ammonia ranged between 13.65mgN/m^2/d at the north-eastern monitoring site (AIR003403), and 22.81mgN/m^2/d at the easternmost site (AIR003404). Urea deposition rates at the monitoring sites fit within a narrow range of between 0.42 and 4.1mg/m^2/day. Monitoring location AIR003401 received the highest loading of urea, as well as overall particulate, which is likely due to its proximity to storage areas and unsealed surfaces. Particulate, urea and ammonia may cause a nuisance effect at sensitive receptors such as residential dwellings at high deposition rates. Given the separation distances involved nuisance effects are not likely, and deposition of these products is likely to be mildly beneficial to pasture growth on the surrounding properties. Conductivity has no effect on air quality, and the reported pH levels are neutral and not likely to cause adverse effects.

2.3.2.3 Ambient gas monitoring by Regional Council

Carbon monoxide and combustible gases

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

The CO and LEL data retrieved from the instrument this year did not exceed zero at any time during the deployment. There were two one-minute records of volatile organic compounds at 0.1 parts per million. The results could be a true measure of ambient concentrations at that location, or it may be due to equipment malfunction or unfavourable wind directions during the deployment.

CO and LEL concentration results have always been very low and given that there have not been any significant changes to activities on-site or scale of production, it is unlikely that the concentration of CO and percentage LEL in the ambient air during this monitoring year would be significantly different to previous monitoring results.

2.3.2.4 Ambient ammonia monitoring by the Company

In accordance with condition 5 of consent 4046-3 the Company are required to monitor ambient ammonia concentrations at two static locations beyond the boundary of the site. The purpose of the monitoring is to ensure compliance with condition 5 which specifies that the maximum ground-level concentration of ammonia shall not exceed 4.27ppm (volume/volume).

In September 2012, two static monitoring stations for measurement of atmospheric ammonia concentration were established on the western (Buckthoughts) and southern (Luscombes) boundaries of the cut-and-carry irrigation area. This was done in consultation with the owners of the adjacent properties who had requested such monitoring at pre-hearing meetings on the consent application to determine any long-term trends. The start of the weekly three-hour sampling window was changed from 7.00am to 1.00pm, with the approval of Council, to fit better with the Company laboratory workload. Ammonia concentration was measured using a Draegar CMS instrument. Usually, one measurement is taken, over a period of about 10 minutes, but when results above the detection limit of 0.20ppm are recorded multiple measurements may be taken to ensure compliance with the consent limit (one hour average).

The majority of results at Buckthoughts were below the level of detection (LOD) of 0.20ppm. There were eight instances where a value greater than LOD was recorded, ranging from 0.53-2.00ppm. Since monitoring began in 2012 the highest reported concentration was 4.7ppm in November 2018. At the Luscombes site the only recorded value greater than LOD was 0.23ppm. Since monitoring began in 2012 the highest reported concentration was 2.16ppm.

Based on the reported results, discharges of ammonia during the monitoring period were well below the consent limit of 4.27ppm.

2.3.2.5 Other ambient monitoring

Nitrogen oxide emissions

Since 2014 the Council has conducted a region-wide programme to monitor ambient concentrations of nitrogen oxides (NOx) at a range of locations in Taranaki, including at the Ballance AUP site. Nitrogen oxides represent a mixture of nitrogen-based gases including nitric oxide and nitrogen dioxide (NO_2), which is produced at the plant during the manufacturing of fertiliser. Adverse health impacts of NO_2 may occur as a result of short (1-hour and 24-hour) and long-term (annual) exposure durations. Short-term exposure to high concentrations can result in the inflammation of airways which may exacerbate asthma and other pre-existing respiratory problems. Long-term exposure to NO_2 may adversely impact lung development in children and may lead to the development of asthma. The risk of developing certain forms of cancer and premature death also increase with long-term exposure to NO_2.

Passive sampling devices were deployed at two monitoring locations from 18 January 2024 to 8 February 2024 to measure ambient NOx. The samplers absorb NOx over the duration of the deployment and are sent for laboratory analysis.

Condition 7 of the consent requires the emissions to be controlled so that off-site concentrations of NO_2 do not exceed the Ambient Air Quality Standard (AAQS) for NO_2 which is 200µg/m³ expressed as a 1-hour mean. Additionally, the Ambient Air Quality Guideline (AAQG) for NO_2 is 100µg/m³ expressed as a 24-hour mean. In order to compare the laboratory data against the AAQS and AAQG they have been converted to time weighted averages (TWA) and the results are presented in Table 10.

Table 10 Laboratory results and calculated time weighted averages (TWAs) for 2023/24

Monitoring Site	NOx (µg/m³)	NOx 1/hr (µg/m³) Theoretical max.	NOx 24/hr (µg/ m³) Theoretical max.
AIR003401	4.0	13.89	7.35
AIR003404	0.3	1.04	0.55
Assessment criteria		200 (AAQS)	100 (AAQG)

The results show that the ambient ground level concentration of NOx at the time of the monitoring was well below the limits set out by consent 4046-3.

2.3.3 Technical review reports

Special condition 10 of consent 4046-3 requires the Company to submit to Council a report every three years which addresses the following matters:

a. a review of any technological advances in the reduction or mitigation of discharges to air from the site, and the costs and benefits of these advances; and
b. an evaluation and review of ammonia pressure safety valve [PSV] systems, operating parameters, and vent heights to ensure that the probability of PSV discharges have been reduced as far as practicable, and to determine whether flaring or other control rather than vent height is practicable as a means to reduce ground level concentration of ammonia; and
c. details of any complaints received [external to the operation of the plant] to include date, time operating conditions, weather conditions and measures taken in response; and
d. monitoring records required by condition 5.

The most recent report was received on 14 August 2024 and addressed each of the requirements of condition 10 and of condition 5 (Appendix IV). The report outlines two equipment changes which have impacted air discharges. An emergency flare has been installed which more safely controls large releases of ammonia, as well as small fugitive emissions from pressure safety valves. Additionally, the High Pressure Stripper in the urea plant was replaced in the turnaround early 2024. The new equipment is expected to reduce fugitive emissions from that area of the plant. Overall these improvements are likely to reduce overall site emissions and slightly improve air quality in the area, and reduce risk in emergency situations.

The Company received six air quality related complaints since the last report. Most of these were from a neighbouring industrial site relating to the detection of an ammonia odour. In all but one instance the ambient air monitoring found that ammonia concentrations were less than the consent condition limit which is based on human health criteria. On 26 March 2024 ammonia monitoring following a complaint found that the ammonia concentration was 6.1ppm. The results of the monitoring related to this ammonia release are reported in the incident report provided to the Council by the Company. Further details of the incident can be found in Section 2.5 and Section 3.2 below.

2.4 Riparian management

Condition 13 on water permit 0596-3, issued in August 2012 to take from Waingongoro River, states:

The consent holder shall make ten annual payments of $30,000 (GST exclusive) to Taranaki Regional Council as a financial contribution for the purpose of providing riparian planting and management in the Waingongoro River catchment. The first payment shall be made within 60 days of the commencement of this consent, and subsequent payments shall be made by 1 September each year.

The first annual payment of $30,000 was made in September 2012. The Company had already, since 1999, been donating voluntarily to Taranaki Tree Trust $30,000 per year for the specific purpose of riparian planting and management both upstream and downstream of the intake location. A total of $300,000 has been received by the Council in 10 payments since the commencement date of the consent and therefore no further payments are required to satisfy condition 13 of this consent.

At the start of July 2023 there was an available balance of $24,494.39. During 2023/24, seven landowners received funding from the Company, for the amount $13,777.75 for riparian plants and planting. A total of 4,535 plants were purchased. There was a closing balance of $10,716.64.

2.5 Incidents, investigations, and interventions

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

For all significant compliance issues, as well as complaints from the public, the Council maintains a database record. The record includes events where the individual/organisation concerned has itself notified the Council. Details of any investigation and corrective action taken are recorded for non-compliant events.

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

Table 11 below sets out details of any incidents recorded, additional investigations, or interventions required by the Council in relation to the Company's activities during the 2023/24 period. This table presents details of all events that required further investigation or intervention regardless of whether these were found to be compliant or not.

Table 11 Incidents, investigations, and interventions summary table

Date	Details	Compliant (Y/N)	Enforcement Action Taken?	Outcome
26/3/24	Self-notification was received regarding an ammonia discharge to air. During a pressure test, the valve lifted correctly but failed to automatically reclose as expected. This resulted in a sudden flow of ammonia-rich reactor fluid into the facility's main vent system. The ammonia continued to vent off for some time after the emergency was abated, resulting in high concentrations of ammonia at the site boundary.	N	14-day letter	Having reviewed the documents provided the Council accepted that the unauthorised ammonia discharge was as a result of mechanical failure. This action could not have been reasonably foreseen and actions taken directly after the event adequately mitigated the discharge. No further action.

3. Discussion

3.1 Discussion of site performance

In general, on-site maintenance and management at the AUP was well operated. On-going liaison between staff and the Council has been indicative of the Company's commitment to development of environmental performance.

The consent to take water from the Kapuni Stream was not exercised during the current monitoring year.

For discharges to the Kapuni Stream, the procedures of the environmental management plan were followed. Control, monitoring and reporting of discharges was good throughout the period. Results from inter-laboratory comparisons generally correlated well.

For discharges to land, the irrigation system for treatment and disposal of plant effluent was well managed. Effluent monitoring, surface and groundwater monitoring, and soil and herbage analyses showed compliance with consent conditions.

For emissions to air, under normal operation, plant processes were operated and controlled so that the emissions authorised by consent were maintained at a practicable minimum.

The source of ammonia concentration at the boundary during March 2024 was concluded to be the lifting and subsequent venting of the primary reactor contents via PSV-111 during a planned in situ pressure test. The unforeseeable incident of the ammonia release was efficiently dealt with using the systems in place for such an emergency. Boundary monitoring was initiated once the site was deemed safe, and ceased once concentration levels had receded.

Overall, the plant has been operating in an environmentally sound manner.

3.2 Environmental effects of exercise of consents

Spray irrigation of effluent to land, the contingency discharge of effluent and the discharge of stormwater and water treatment effluent to the Kapuni Stream are the activities that have greatest potential to adversely affect the aquatic receiving environment.

The results of biomonitoring in the Kapuni catchment indicate that there is no significant adverse impact in the stream or its tributaries as a result of plant operations.

In relation to discharges to land, the high levels of nitrate in shallow groundwater are partly due to the heavy effluent application that occurred early in the life of the plant. Current application rates are considerably lower. Nitrate concentrations in the soil profile underneath the irrigation areas continue to decline and were the lowest on record during this monitoring year. However, the proportion of ammonium is higher than previous years and is a substantial proportion of total mineral N in the profile. Sodium concentrations in the cut areas were the highest observed on record. This increases the risk of soil deflocculation and surface sealing for the purpose of irrigation application. Management of the discharge to land continues to be critical, particularly with a reduction of available land to irrigate. The Company ensures that findings from the soil and herbage monitoring is incorporated into the management of the discharges to land.

The ground conductivity data for this monitoring year identified a general trend of lower conductivity for site locations in the immediate vicinity of the plant. This was likely associated with seasonal changes affecting groundwater levels and ground saturation.

The ground conductivity data for this monitoring year identified a general trend of higher conductivity for site locations in the immediate vicinity of the plant. This could be associated with higher volumes of

conductive material entering the ground, such as fertilisers or, more likely are associated with season changes affecting groundwater levels and ground saturation. No significant conductivity anomalies have been observed when comparing this year's results with all previous surveys. Overall, the survey showed no significant change.

Two concentrated ammonia plumes due to historical leaks from the effluent storage basin and from the urea plant are managed with pump recovery and treatment systems. The contaminated groundwater is pumped back through the plant and waste treatment systems. Both plumes currently do not extend beyond the Company's site and are monitored. They pose no short term threat to freshwater ecosystems but monitoring and active management are needed for the foreseeable future to ensure that there is no harm to freshwater ecosystems. It is important that monitoring of the bores continue.

The Company recognise that a deeper understanding of the groundwater at the site is required. In order to ensure their groundwater remediation approach is still the best practicable option to prevent or minimise any actual or likely adverse effect on the environment, a revision of the conceptual model of the plume is being sought. The Company is currently sourcing expertise to undertake this hydrogeological work in the near future.

Investigation by the Company is ongoing in order to determine the source of the elevated levels of ammonia at the discharge point of the unnamed tributary. Regular monitoring of these ammonia concentration levels by the Company is important to maintain. The Company is ensuring the Council is informed of the latest development in the investigation.

During the monitoring period, the results of monitoring from site inspections, and the measurement of dust deposition and of ambient gas levels, indicated no significant adverse effect on the neighbourhood as a result of activities at the ammonia urea plant.

Over the reporting period, one air discharge incident was self-reported to the Council. Boundary testing was initiated at the downwind eastern boundary (westerly wind) once the site was deemed safe after the initial ammonia release. The highest 1 hour average was 23.17 TWA ppm v/v; peak reading was 62ppm v/v; average recorded readings for the whole event was 6.1 TWA ppm v/v; and within 6 hours, the boundary reading had dropped to 0.26ppm v/v. There were negligible environmental impacts from this incident.

During normal operations, average 1 hour ammonia levels recorded by the Company remained low and compliant.

The results from the deposition gaugings indicate only minor amounts of deposition have been recorded close to the main plant, with no adverse effect on the surrounding environment. Overall, discharges of contaminants to air from manufacturing processes likely had little adverse effect on local air quality. The stack emission testing shows that discharges are within the parameters provided for by the resource consent, and ambient air monitoring shows that hazardous air pollutants and nuisance dust are not likely to cause significant adverse effects. In particular, the separation distance to sensitive receptors means that contaminants are well dispersed before reaching these properties.

3.3 Evaluation of performance

A tabular summary of the Company's compliance record for the year under review is set out in Table 12 to Table 18.

Table 12 Summary of performance for Consent 0596-3

Purpose: To take water from the Waingongoro River for operation of an ammonia/urea plant		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Limit on maximum abstraction rate	Metering by consent holder and review of records by Council	Yes
2. Installation and operation of monitoring equipment	Site inspection and receipt of abstraction records	Yes
3. Certification of monitoring equipment	Receipt of certificate. Installation details of existing meters/dataloggers received 20 April 2012. Latest calibration performed 23 August 2023.	Yes
4. Actions upon breakdown of monitoring equipment	Receipt of notification, and inspection. Check water take records	N/A
5. Access to monitoring equipment	Site inspection	Yes
6. Format of monitoring records	Examination of records	Yes
7. Best practicable option and efficient use	Site inspections and liaison with consent holder	Yes
8. Restrictions on intake modification	Site inspection. Report on consultant's inspection of 5 March 2013	Yes
9. Report on altering intake to minimise entrainment of juvenile fish by 31 January 2013	Receipt of report. Scoping report received 31 January 2013; final costs/benefits report received 28 March 2014	Yes
10. Development of a monitoring programme and annual review	Receipt of monitoring programme.	Yes
11. Consultation on monitoring programme to include iwi	Liaison with consent holder.	Yes
12. Annual meeting about monitoring programme	Meeting occurs as required.	Yes
13. Financial contribution to riparian planting and management	Receipt of contribution – No further payments due	Yes
14. Review of consent in respect of intake structure	N/A	N/A
15. Optional review provision	Next option for review June 2029	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

Table 13 Summary of performance for Consent 1213-3

Purpose: To take and use water from the Kapuni Stream (at times when the normal water supply has failed) for operation of an ammonia/urea plant		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Limit on maximum abstraction rate	Metering by consent holder. Consent not exercised.	N/A
2. Take only when main supply fails	Liaison with consent holder	N/A
3. Keep and provide record of take	Inspection and receipt of record	N/A
4. Best practicable option	Liaison with consent holder	N/A
5. Notify Council and report on exercise of consent	Receipt of notification/reports	N/A

Purpose: To take and use water from the Kapuni Stream (at times when the normal water supply has failed) for operation of an ammonia/urea plant		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
6. Optional review provision	Next option for review June 2029	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**N/A** **N/A**

N/A = not applicable

Table 14 Summary of performance for Consent 4719-2

Purpose: To take and use groundwater for industrial site remediation and process use purposes		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Limit on maximum abstraction rate	Metering by consent holder	Yes
2. Keep and provide record of take	Receipt of record	Yes
3. Best practicable option	Liaison with consent holder	No Elevated N levels continue in the groundwater, further investigation required
4. Optional review provision	Next option for review June 2029	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**Good** **High**

N/A = not applicable

Table 15 Summary of performance for Consent 0598-3

Purpose: To discharge stormwater from non-process areas; and raw water treatment plant wastewater, from an ammonia/urea plant to the Kapuni Stream and into an unnamed tributary of the Kapuni Stream		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Limit on discharge volume	Metering by consent holder	Yes
2. Best practicable option	Inspection and liaison with consent holder	Yes
3. Discharge concentration limits	Inspection and chemical sampling	Yes
4. Receiving water concentration limits	Inspection and chemical sampling	Yes
5. Control on effect of discharge in receiving water	Inspection, chemical sampling and bio-monitoring	Yes
6. Company shall monitor the stream	Review of Company records	Yes
7. Company shall minimise discharge of phosphate	Inspections and monitoring results	Yes
8. Discharge to be in accordance with an Effluent Disposal Management Plan	Inspections and liaison with consent holder	Yes
9. Provision of Management Plan for certification	Receipt of Management Plan. Updated Plan received July 2024.	Yes
10. Review of Management Plan by DOC and Fish & Game NZ	Forwarded 21 May 2013	N/A
11. Company to provide water treatment programme to Council for review when changes to process or chemicals proposed	Notifications from Company when changes to chemicals proposed	Yes
12. Optional review provision	Next option for review June 2029	N/A

Purpose: To discharge stormwater from non-process areas; and raw water treatment plant wastewater, from an ammonia/urea plant to the Kapuni Stream and into an unnamed tributary of the Kapuni Stream		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

Table 16 Summary of performance for Consent 1766-3

Purpose: To discharge treated plant production effluent and contaminated stormwater from an ammonia/urea plant into the Kapuni Stream when wet ground conditions do not allow spray irrigation onto and into land		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Constraint on when discharge occurs	Liaison with Company and monitoring results. Consent not exercised	N/A
2. Limit on discharge rate	Metering by Company	N/A
3. Best practicable option	Inspection and liaison with Company	N/A
4. Discharge concentration limits	Inspection and chemical sampling	N/A
5. Receiving water concentration limits	Inspection and chemical sampling	N/A
6. Control on effect of discharge in receiving water	Inspection and bio-monitoring results	N/A
7. Discharge to be in accordance with an Effluent Disposal Management Plan	Inspections and liaison with consent holder	N/A
8. Provision of Management Plan for certification	Receipt of Management Plan. Plan received 18 Dec 2012. Updated Plan received 4 May 2015	Yes
9. Review of Management Plan by DOC and Fish & Game NZ	Plan forwarded 21 May 2013	N/A
10. Optional review provision	Next option for review June 2029	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**N/A** **N/A**

N/A = not applicable

Table 17 Summary of performance for Consent 0597-3

Purpose: To discharge treated plant production effluent and contaminated stormwater from an ammonia/urea plant by spray irrigation onto and into land		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Disposal within defined area	Inspection	Yes
2. Limit on discharge rate	Metering by consent holder	Yes
3. Best practicable option	Inspection and liaison with consent holder	Yes
4. Maximisation of discharge to land, and minimisation of discharge to stream	Inspection and metering by consent holder	Yes
5. Discharge to be in accordance with an Effluent Disposal Management Plan	Inspections and liaison with consent holder	Yes
6. Provision of Management Plan for certification	Receipt of Plan. Plan received 18 Dec 2012	Yes
7. Review of Management Plan by DOC and Fish & Game NZ	Plan forwarded 21 May 2013 Latest update forwarded early 2024	Yes
8. No odour beyond boundary of the site	Site inspections and complaints register	Yes
9. No spray drift beyond boundary of the site	Site inspections and complaints register	Yes
10. Defines the edge of the spray zone	Site inspections	Yes

Purpose: To discharge treated plant production effluent and contaminated stormwater from an ammonia/urea plant by spray irrigation onto and into land		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
11. Limit on the application of total nitrogen	Site inspections and liaison with consent holder, sampling results	Yes
12. Consent holder shall provide details of water treatment programme and any proposed changes to the Council for review	Liaison with the consent holder, and information supplied to the Council by the Company	Yes
13. Consent holder shall provide details of chemical cleaning programmes and any proposed changes to the Council for review	Liaison with the consent holder, and information supplied to the Council by the Company	Yes
14. Optional review provision	Next option for review June 2029	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

Table 18 Summary of performance for Consent 4046-3

Purpose: To discharge emissions into the air from the manufacture of ammonia and urea and associated activities at an ammonia-urea manufacturing complex		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Best practicable option	Site inspections and liaison with consent holder	No*
2. Prior to changing plant processes or operations that may change nature of discharge the Company shall consult with the TRC	Liaison with consent holder	Yes
3. Limits the mass emission of ammonia from the dust scrubber and blow down tank vent	Liaison with the consent holder and monitoring of discharges by K2 Environmental for the Company	Yes
4. Limits the concentration of ammonia beyond the site boundary	Liaison with consent holder and monitoring at boundary by the Company and Council	No*
5. Consent holder to establish monitoring sites for ammonia	Due by 12 February 2013. Sites established in September 2012	Yes
6. Limits the concentration and mass of urea emissions	Liaison with consent holder and monitoring of discharges by K2 Environmental for the Company	Yes
7. Limits the concentration of carbon monoxide and nitrogen dioxide beyond the plant boundary	Liaison with consent holder. Monitoring by Council.	Yes
8. Limits the concentration of other contaminants beyond the plant boundary	Liaison with consent holder and inspection	No*
9. Discharge not to give rise to offensive or objectionable odour beyond the plant boundary	Inspections and Company records.	Yes
10. Written report required every three years detailing emissions and measure undertaken to reduce them	Received 13 August 2024	Yes
11. Consent holder to convene meeting three-yearly	Meeting held during July 2024. Next meeting before July 2027.	Yes
12. Shall maintain and operate a site contingency plan and review it annually	Site inspections and correspondence from the Company	Yes

Purpose: To discharge emissions into the air from the manufacture of ammonia and urea and associated activities at an ammonia-urea manufacturing complex		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
13. Optional review provision	Next option for review June 2027	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		**Good** **High**

Note: *Further details under Section 2.5 Table 11
N/A = not applicable

Table 19 Evaluation of environmental performance over time

Year	Consent numbers	High	Good	Improvement req	Poor	Not exercised
2019/20	0596-3, 4719-2, 0598-3, 0597-3, 4046-3, 1213-3, 1766-3	5	-	-	-	2
2020/21	0596-3, 4719-2, 0598-3, 0597-3, 4046-3, 1213-3, 1766-3	6	-	-	-	1
2021/22	0596-3, 4719-2, 0598-3, 0597-3, 4046-3, 1213-3, 1766-3	6	-	-	-	1
2022/23	0596-3, 4719-2, 0598-3, 0597-3, 4046-3, 1213-3, 1766-3	4	1	-	-	2
2023/24	0596-3, 4719-2, 0598-3, 0597-3, 4046-3, 1213-3, 1766-3	3	2	-	-	2

During the 2023/24 period under review, the Company demonstrated a high level of environmental and administrative performance and compliance with the resource consents as defined in Appendix II.

3.4 Recommendations from the 2022/23 Annual Report

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

1. THAT in the first instance, monitoring of consented activities at the Company's AUP in the 2023/24 year continue at the same level as in 2022/23.
2. THAT should there be issues with environmental or administrative performance in 2023/24, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the Company update their conceptual groundwater model of the site to ensure their groundwater remediation approach is still the best practicable option to prevent or minimise any actual or likely adverse effect on the environment.

Recommendation 1 was implemented, while it was not considered necessary to undertake additional monitoring or investigation as per recommendation 2. Recommendation 3 has been accepted by the Company and consideration of consulting proposals is underway.

3.5 Alterations to monitoring programmes for 2024/25

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

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

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

It is proposed that for 2024/25, the monitoring remain the same as undertaken in 2023/24.

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 2024/25.

4. Recommendations

1. THAT in the first instance, monitoring of consented activities at the Company's AUP in the 2024/25 year continue at the same level as in 2023/24.
2. THAT should there be issues with environmental or administrative performance in 2024/25, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.
3. THAT the Company update their conceptual groundwater model of the site to ensure their groundwater remediation approach is still the best practicable option to prevent or minimise any actual or likely adverse effect on the environment.

Glossary of common terms and abbreviations

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

AAQG	Ambient air quality guideline.
AAQS	Ambient air quality standard.
Approach velocity	The speed at which water moves towards an intake structure, expressed in m/s.
AUP	Ammonia urea plant.
Biomonitoring	Assessing the health of the environment using aquatic organisms.
Bund	A wall around a tank to contain its contents in the case of a leak.
CO	Carbon monoxide.
Condy	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in µS/cm.
Cu*	Copper.
DRP	Dissolved reactive phosphorus.
EPT	Ephemeroptera, Plecoptera and Trichoptera; species of mayflies, stoneflies and caddisflies sensitive to organic pollution.
FECB	Finished effluent catch basin.
FNU	Formazin nephelometric units, a measure of the turbidity of water.
Fresh	Elevated flow in a stream, such as after heavy rainfall.
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.
HJAP	Hazardous air pollutant.
Hg	Mercury.
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.
LEL	Lower explosive limit.
L/s	Litres per second.
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.
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.
µS/cm	MicroSiemens per centimetre.
NH_4	Ammonium, normally expressed in terms of the mass of nitrogen (N).

NH_3	Un-ionised ammonia, normally expressed in terms of the mass of ammonia (NH_3).
Ni	Nickel.
NIWA	National Institute of Water and Atmospheric Research.
NO_2	Nitrogen dioxide.
NO_3	Nitrate, normally expressed in terms of the mass of nitrogen (N).
NOx	Any mixture of nitrous oxide (N_2O), nitric oxide (NO) and nitrogen dioxide (NO_2) gases.
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
O&G	Oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons).
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of the environment.
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	Resource Management Act 1991 and subsequent amendments.
RMP	Riparian management plan.
SS	Suspended solids.
Sweep velocity	The speed at which water moves past an intake structure, expressed in m/s.
Temp	Temperature, measured in ˚C (degrees Celsius).
TRC	Taranaki Regional Council.
Turb	Turbidity, expressed in NTU or FNU.
TWA	Time weighted average.
UI	Unauthorised Incident.
UIR	Unauthorised 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.
Zn*	Zinc

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

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

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Appendix I

Resource consents held by Ballance Agri Nutrients Kapuni Ltd

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

Water abstraction permits

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

Water discharge permits

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

Air discharge permits

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

Discharges of wastes to land

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

Land use permits

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

Coastal permits

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

TARANAKI REGIONAL COUNCIL

CHIEF EXECUTIVE
PRIVATE BAG 713
47 CLOTEN ROAD
STRATFORD
NEW ZEALAND
PHONE: 06-765 7127
FAX: 06-765 5097
www.trc.govt.nz

Please quote our file number on all correspondence

Certificate of Compliance

Pursuant to section 139 of the Resource Management Act 1991 a certificate of compliance is hereby issued by the Taranaki Regional Council

Name of certificate holder

Ballance Agri-Nutrients (Kapuni) Limited
P O Box 439
HAWERA 4640

Site location

309 Palmer Road at or about GR: 1700250E-5629534N [legal description: Pt Lot 1 DP 13121 [Discharge source & site]]

Proposal/Activity

To discharge treated domestic wastewater into land via soakage trenches in the Kapuni catchment

Certification

The Taranaki Regional Council hereby certifies that:

the discharge of treated domestic wastewater into land via soakage trenches in the Kapuni catchment as outlined in the documentation supplied in support of the application is a permitted activity pursuant to Rule 22 of the Regional Freshwater Plan for Taranaki [2001] at the date of receipt of the application for this certificate, provided that it complies with and continues to comply with the following conditions:

- *The discharge shall not result in surface ponding or runoff of any contaminant into a surface water body;*
- *There shall be no direct discharge of any contaminant into a surface water body;*
- *The discharge shall not be within 25 metres of a surface water body;*
- *The discharge shall not be within 50 metres of any bore, well or spring used for water supply purposes;*

- *The discharge shall not be noxious, dangerous, offensive or objectionable to such an extent that it has or is likely to have a significant adverse effect on the environment.*

Any discharge which causes any of the above conditions to be breached is not permitted and may be the subject of enforcement action.

Signed at Stratford on 6 December 2010

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:	Ballance Agri-Nutrients [Kapuni] Limited P O Box 439 HAWERA 4640
Decision Date:	10 February 2012
Commencement Date:	10 February 2012

Conditions of Consent

Consent Granted:	To discharge emissions into the air from the manufacture of ammonia and urea and associated activities at an ammonia-urea manufacturing complex at or about (NZTM) 1700202E-5629703N
Expiry Date:	1 June 2035
Review Date(s):	June 2017, June 2022, June 2027, June 2032
Site Location:	309 Palmer Road, Kapuni
Legal Description:	Lot 20 Blk XV Kaupokonui SD (Discharge source & site)

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

General condition

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

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effects on the environment arising from discharges to air from the site. The best practicable option includes, but is not limited to:

   - the consent holder at all times operating, maintaining, supervising, monitoring and controlling all processes so that emissions authorised by this consent are maintained at a practicable minimum;
   - urea being handled in such a manner and process and conveying equipment so contained to minimise spillages outside processing, storage and packaging/dispatch buildings or areas, and to prevent transport of dust beyond the boundary of the site;
   - the storage of anhydrous ammonia being undertaken in such a manner that maximum protection is afforded to valves, pipes and other fittings to minimise risk of accidental damage; and
   - the probability of ammonia pressure safety valve [PSV] system discharges being reduced as far as practicable, to ensure that any discharge does not pose a significant risk to people living or working in the area nor to farm livestock.

2. Prior to undertaking any alterations to the plant, processes or operations which may significantly change the nature or quantity of contaminants discharged to air from the site, the consent holder shall consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals required under the Resource Management Act 1991.

3. The combined emission of ammonia [as NH3] from the following sources shall not exceed 295 kg/hour:

   a) dust scrubber fan D4-GB-1505; and
   b) blow down tank vent D5-FA-403.

4. The emission of ammonia to the atmosphere under normal operation, start-up and shut-down shall be so controlled to ensure that the maximum ground level concentrations [one-hour average] do not exceed 4.27ppm (v/v) beyond the boundary of the site.

5. Within 12 months of the issue of this consent, the consent holder shall to the satisfaction of the Chief Executive, Taranaki Regional Council, establish two static monitoring locations beyond the boundary of the site for the purpose of monitoring atmospheric ammonia on adjacent property, and to check compliance with condition 4. The consent holder shall record the ground level concentration of ammonia at the static monitoring locations, every Wednesday morning between 7.00 am and 10.00 am, or at an alternative time as agreed to by the Chief Executive, Taranaki Regional Council.

6. The emission of urea shall not exceed:

   a) 125 $mgNm^{-3}$ [as urea] or 12 kg/hour [mass emission] from the dust scrubber fan D4-GB-1505; or

   b) 125 $mgNm^{-3}$ [as urea] from any other source.

7. The consent holder shall control all emissions of carbon monoxide and nitrogen dioxide to air so 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 site boundary.

8. The consent holder shall control emissions of all contaminants to air, other than those expressly provided for in other special conditions of consent, so that they do not individually or in combination with other contaminants cause a hazardous, noxious, dangerous, offensive or objectionable effect at or beyond the boundary of the property.

9. The discharges authorised by this consent shall not give rise to an odour at or beyond the boundary of the site that is offensive or objectionable.

   Note: For the purposes of this condition:

   - The boundary of the site is as illustrated on the map attached; and
   - Assessment under this condition shall be in accordance with the Good Practice Guide for Assessing and Managing Odour in New Zealand, Air Quality Report 36, Ministry for the Environment, 2003.

10. The consent holder shall provide to the Chief Executive, Taranaki Regional Council by 1 June 2012 and every three years thereafter, a written report which includes:

    a) a review of any technological advances in the reduction or mitigation of discharges to air from the site, and the costs and benefits of these advances; and
    b) an evaluation and review of ammonia pressure safety valve [PSV] systems, operating parameters, and vent heights to ensure that the probability of PSV discharges have been reduced as far as practicable, and to determine whether flaring or other control rather than vent height is practicable as a means to reduce ground level concentrations of ammonia; and
    c) details of any complaints received [external to the operation of the plant], to include date, time, operating conditions, weather conditions and measures taken in response; and
    d) monitoring records required by condition 5.

11. At least once every three years the consent holder shall convene a meeting with representatives of the Taranaki Regional Council and adjacent residential and industrial neighbours, to enable the dissemination and discussion of information relating to this consent.

12. The consent holder shall maintain a contingency plan for the site. The contingency plan shall be adhered to in the event of a spill or emergency and shall, to the satisfaction of the Chief Executive, Taranaki Regional Council, detail measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not authorised by this consent and measures to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.

13. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2022 and/or June 2027 and/or June 2032 for the purpose of ensuring that the ammonia standard specified in condition 4 is appropriate, and 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 10 February 2012

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Appendix 1

Map showing site boundary

Discharge Permit

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

Name of Consent Holder:	Ballance Agri-Nutrients (Kapuni) Limited P O Box 439 HAWERA 4640
Decision Date:	31 August 2012
Commencement Date:	31 August 2012

Conditions of Consent

Consent Granted:	To discharge treated plant production effluent and contaminated stormwater from an ammonia/urea plant by spray irrigation onto and into land at or about (NZTM) 1699807E-5629386N, 1700174E-5629156N, 1700195E-5629448N, 1700572E-5629619N, 1700685E-5629761N, 1700700E-5629443N
Expiry Date:	1 June 2035
Review Date(s):	June 2017, June 2023, June 2029
Site Location:	309 Palmer Road, Kapuni
Legal Description:	Pt Lot 1 DP 13121 (Discharge source & site) Lots 1 & 2 DP 15057 Sec 21 Blk XV Kaupokonui SD (Discharge site)
Catchment:	Kapuni

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. This consent authorises discharges to the areas of land shown in Appendix 1 attached to this document.

2. The discharge shall not exceed 1,470 cubic metres per day.

3. 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.

4. The consent holder shall ensure that the discharge of contaminants to land in accordance with this consent is maximised and, conversely, the discharge of contaminants to the Kapuni Stream in accordance with consent 1766-3 is minimised.

5. Subject to the other conditions this consent, this consent shall be exercised in accordance with an 'Effluent Disposal Management Plan' (the 'Management Plan') that has been approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The Management Plan shall detail methods and procedures undertaken by the consent holder to ensure that the conditions of this consent are met and can be shown to be met, including but not necessarily be limited to details of:

   (a) effluent application rate (volume and components);
   (b) application method;
   (c) pasture and soil husbandry;
   (d) run-off prevention;
   (e) effluent monitoring;
   (f) soil and herbage monitoring;
   (g) groundwater monitoring;
   (h) how the discharge of contaminants to land is maximised;
   (i) surface water monitoring (chemical and biological);
   (j) management of contingency events;
   (k) reporting on the exercise of consent; and
   (l) the size and adequacy of the irrigation area.

   Note: The Management Plan required by this condition may be combined with Management Plans required by the conditions of other consents held by the consent holder for the site.

6. Within 3 months of this consent being issued, the Management Plan required by condition 5 shall be submitted by the consent holder to the Taranaki Regional Council for certification by the Chief Executive.

7. A copy of any reviewed Management Plan, in accordance with conditions 5 and 6, shall be provided to the Department of Conservation and Fish and Game New Zealand (Taranaki Region), for the Taranaki Regional Council to take into account any comments received (within a two week timeframe from when the Plan was provided).

8. The discharge authorised by this consent shall not give rise to an odour that is offensive or objectionable, at or beyond the boundary of the property or properties on which spray irrigation is occurring.

9. The exercise of this consent shall not result in any spray drift beyond the boundary of the property or properties on which this consent is being exercised.

10. The discharge shall not occur within:

    (a) 25 metres from the banks of any watercourse;
    (b) 50 metres from any bore, well or spring used for water supply purposes;
    (c) 20 metres from any public road;
    (d) 20 metres from any property boundary; or
    (e) 150 metres from any dwellinghouse unless the written approval of the occupier has been obtained to allow the discharge at a lesser distance.

11. The Total Nitrogen applied to any hectare of land shall not exceed:

    (a) 1000 kilograms in any 12-month period for 'cut and carry areas'; or
    (b) 300 kilograms in any 12-month period for any other land (including grazed pasture).

    For the purposes of this consent 'cut and carry areas' is land that is not grazed and any vegetation is routinely cut and removed.

12. The consent holder shall provide to the Chief Executive, Taranaki Regional Council for review, programmes of water treatment used at the Ammonia Urea Plant, including raw water, boiler water and cooling water. Further, the consent holder shall notify the Chief Executive, Taranaki Regional Council, of any change in water treatment chemical, or increase in maximum concentration of any water treatment chemical used, at least one month prior to change of a water treatment programme.

13. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, for review, programmes of chemical cleaning used at the Ammonia Urea Plant. Further, the consent holder shall notify the Chief Executive, Taranaki Regional Council, of any change in chemical cleaning agent, or increase in maximum concentration of any chemical cleaning agent used, at least one month prior to change of a chemical cleaning programme.

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 2017 and/or June 2023 and/or June 2029 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 August 2012

For and on behalf of
Taranaki Regional Council

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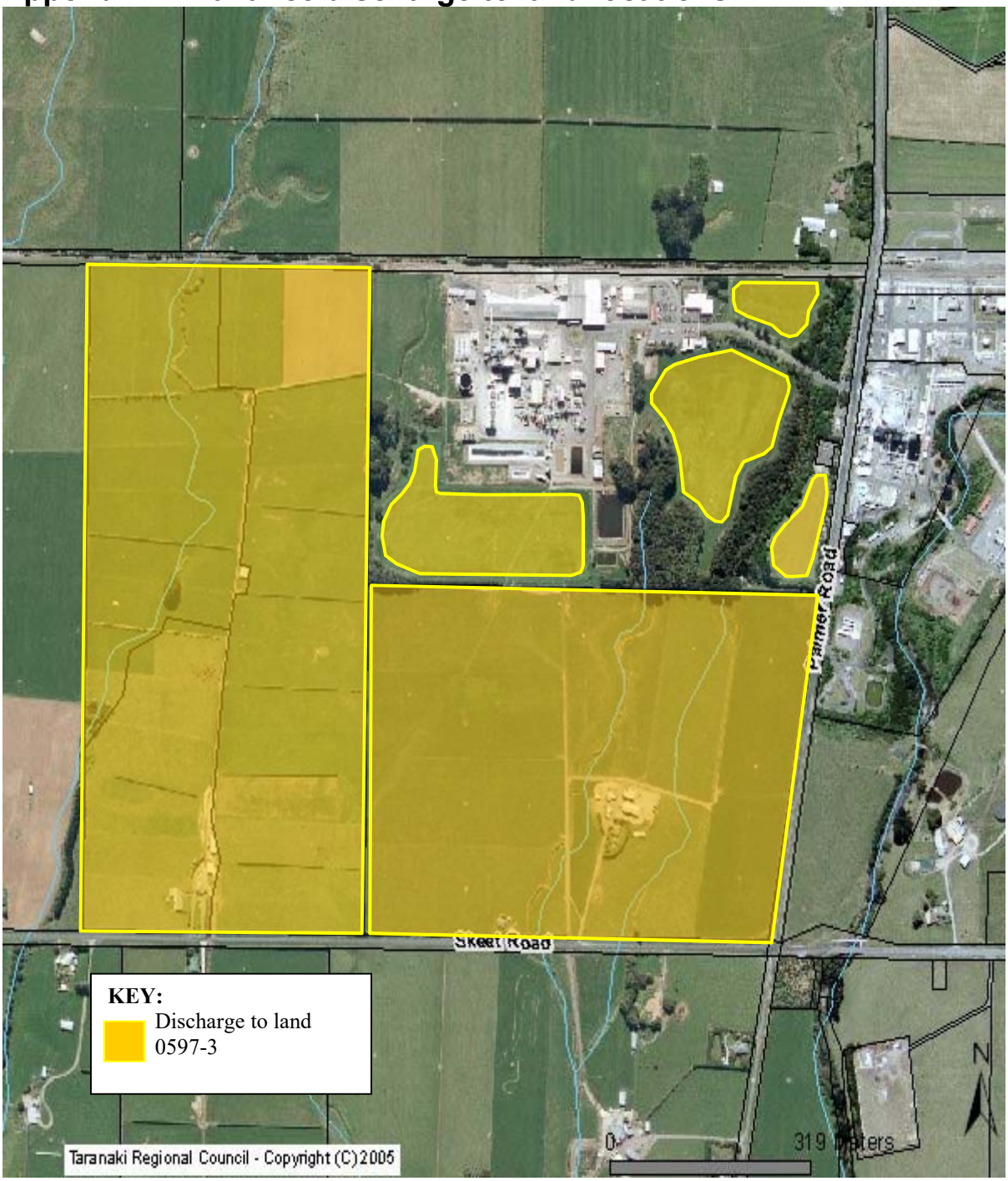
Director-Resource Management

Appendix 1- Ballance discharge to land locations



Discharge Permit

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

Name of Consent Holder:	Ballance Agri-Nutrients (Kapuni) Limited P O Box 439 HAWERA 4640
Decision Date:	31 August 2012
Commencement Date:	31 August 2012

Conditions of Consent

Consent Granted:	To discharge: • stormwater from non-process areas; and • raw water treatment plant wastewater, from an ammonia/urea plant to the Kapuni Stream and into an unnamed tributary of the Kapuni Stream at or about (NZTM) 1700851E-5629366N and 1700454E-5629380N
Expiry Date:	1 June 2035
Review Date(s):	June 2017, June 2023, June 2029
Site Location:	309 Palmer Road, Kapuni
Legal Description:	Pt Lot 1 DP 13121 & Lot 1 DP 15254 (Discharge sites)
Catchment:	Kapuni

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 discharge shall not exceed 1,920 m^3 per day to the Kapuni Stream, or 4,080 m^3 per day to an unnamed tributary of the Kapuni Stream.

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

Constituent	Standard
pH	Within the range 6.5 to 9.0
Zinc	Concentration not greater than 0.5 gm^{-3}

4. Beyond a mixing zone of 200 metres downstream from the discharge point, the discharge shall not cause constituents in the Kapuni Stream to exceed the maximum concentrations shown in the table below.

Constituent	Maximum concentration
Un-ionised ammonia	0.025 gm^{-3}
Sodium	40 gm^{-3}

5. After allowing for reasonable mixing, within a mixing zone extending 200 metres downstream of the discharge point, the discharge shall not, either by itself or in combination with other discharges, give rise to any or all of the following effects in the receiving water:

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

6. The consent holder shall monitor the Kapuni Stream for pH, unionised ammonia, and sodium, at locations and at a frequency that enables compliance with condition 4 to be determined.

7. The consent holder shall manage its stormwater disposal system in such a manner as to minimise the discharge of dissolved reactive phosphorus to the Kapuni catchment.

8. Subject to the other conditions this consent, this consent shall be exercised in accordance with an 'Effluent Disposal Management Plan' (the 'Management Plan') that has been approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The Management Plan shall detail methods and procedures undertaken by the consent holder to ensure that the conditions of this consent are met and can be shown to be met, including but necessarily limited to details of:

   (a) exclusion of contaminated stormwater;
   (b) minimisation of dissolved reactive phosphorus in the discharge;
   (c) monitoring of the discharge;
   (d) monitoring of the Kapuni Stream;
   (e) discharge to the Kapuni tributary in times of extreme rainfall; and
   (f) reporting on exercise of consent.

   Note: The Management Plan required by this condition may be combined with Management Plans required by the conditions of other consents held by the consent holder for the site.

9. Within 3 months of this consent being issued, the Management Plan required by condition 8 shall be submitted by the consent holder to the Taranaki Regional Council for certification by the Chief Executive.

10. A copy of any reviewed Management Plan, in accordance with conditions 8 and 9, shall be provided to the Department of Conservation and Fish and Game New Zealand (Taranaki Region), for the Taranaki Regional Council to take into account any comments received (within a two week timeframe from when the Plan was provided).

11. The consent holder shall provide to the Chief Executive, Taranaki Regional Council for review programmes of raw water treatment used at the Ammonia Urea Plant. Further, the consent holder shall notify the Chief Executive, Taranaki Regional Council, of any change in water treatment chemical, or increase in maximum concentration of any water treatment chemical used, at least one month prior to change of a water treatment programme.

12. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 and/or June 2029, 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 August 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:	Ballance Agri-Nutrients (Kapuni) Limited P O Box 439 HAWERA 4640
Decision Date:	31 August 2012
Commencement Date:	31 August 2012

Conditions of Consent

Consent Granted:	To discharge treated plant production effluent and contaminated stormwater from an Ammonia/Urea plant into the Kapuni Stream when wet ground conditions do not allow spray irrigation onto and into land at or about (NZTM) 1700851E-5629366N
Expiry Date:	1 June 2035
Review Date(s):	June 2017, June 2023, June 2029
Site Location:	309 Palmer Road, Kapuni
Legal Description:	Lot 1 DP 15254 (Discharge site)
Catchment:	Kapuni

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 may be exercised only when the effluent cannot be immediately assimilated into the soil and on-site effluent storage is nearing full capacity.

2. The discharge shall not exceed 1000 cubic metres per day.

3. 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.

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

Constituent	Standard
pH	Within the range 6.5 to 9.0
Zinc	Concentration not greater than 1.5 gm^{-3}

5. Beyond a mixing zone of 200 metres downstream from the discharge point, the discharge shall not cause constituents in the Kapuni Stream to exceed the maximum concentrations shown in the table below.

Constituent	Maximum concentration
Un-ionised ammonia	0.025 gm^{-3}
Nitrite	0.2 gm^{-3}

6. After allowing for reasonable mixing, within a mixing zone extending 200 metres downstream of the discharge point, the discharge shall not, either by itself or in combination with other discharges, give rise to any or all of the following effects in the receiving water:

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

7. Subject to the other conditions this consent, this consent shall be exercised in accordance with an 'Effluent Disposal Management Plan' (the 'Management Plan') that has been approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The Management Plan shall detail methods and procedures undertaken by the consent holder to ensure that the conditions of this consent are met and can be shown to be met, including but necessarily limited to details of:

   (a) conditions under which this consent may be exercised;
   (b) how compliance with condition 2 is determined;
   (c) notification to the Taranaki Regional Council about the exercising of this consent;
   (d) monitoring of the discharge;
   (e) monitoring of the Kapuni Stream; and
   (f) reporting on exercise of consent.

   Note: The Management Plan required by this condition may be combined with Management Plans required by the conditions of other consents held by the consent holder for the site.

8. Within 3 months of this consent being issued, the Management Plan required by condition 7 shall be submitted by the consent holder to the Taranaki Regional Council for certification by the Chief Executive.

9. A copy of any reviewed Management Plan, in accordance with conditions 7 and 8, shall be provided to the Department of Conservation and Fish and Game New Zealand (Taranaki Region), for the Taranaki Regional Council to take into account any comments received (within a two week timeframe from when the Plan was provided).

10. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 and/or June 2029 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 August 2012

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Water Permit

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

Name of Consent Holder:	Ballance Agri-Nutrients (Kapuni) Limited P O Box 439 HAWERA 4640
Decision Date:	31 August 2012
Commencement Date:	31 August 2012

Conditions of Consent

Consent Granted:	To take and use groundwater from the Kapuni Stream for industrial site remediation and process use purposes at or about (NZTM) 1700277E-5629526N
Expiry Date:	1 June 2035
Review Date(s):	June 2017, June 2023, June 2029
Site Location:	309 Palmer Road, Kapuni
Legal Description:	Lot 1 DP 13121 (Site of take & use)
Catchment:	Kapuni

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 volume of water taken shall not exceed 200 m^3 per day.

2. The consent holder shall maintain a record of the abstraction including date, rate, pumping hours and daily volume abstracted and supply these records to the Chief Executive, Taranaki Regional Council, no later than 31 July of each year, or earlier upon request.

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

4. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 and/or June 2029 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 August 2012

For and on behalf of
Taranaki Regional Council

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Director-Resource Management

Water Permit

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

Name of Consent Holder:	Ballance Agri-Nutrients (Kapuni) Limited PO Box 439 Hawera 4640
Decision Date (Change):	15 January 2021
Commencement Date (Change):	15 January 2021 (Granted Date: 31 August 2012)

Conditions of Consent

Consent Granted:	To take and use water from the Kapuni Stream (at times when the normal water supply has failed) for the operation of an ammonia/ urea plant, and a hydrogen plant
Expiry Date:	1 June 2035
Review Date(s):	June 2023, June 2029
Site Location:	309 Palmer Road, Hawera
Grid Reference (NZTM)	1701490E-5630830N
Catchment:	Kapuni

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

General condition

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

Special conditions

1. The rate of water taken shall not exceed 33 litres per second.

2. This consent authorises taking only at times when the consent holder's water supply from the Waingongoro River (under consent 0596-3) has failed.

3. The consent holder shall maintain a record of taking to an accuracy of ±5%, including date and daily volume taken. The record shall be provided to the Chief Executive, Taranaki Regional Council, no later than 31 July each year, or earlier upon request.

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

5. Each time the consent is exercised the consent holder shall immediately advise the Chief Executive, Taranaki Regional Council, and within five days provide a written report. The report shall detail how the normal supply failed and the work programme proposed to reinstate it as soon as practicably achievable. If the time taken to reinstate the normal supply is longer than five days the consent holder shall provide progress reports in a form and at a frequency as may be directed by the Chief Executive, Taranaki Regional Council.

6. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 and/or 2029, for the purposes of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 15 January 2021

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Water Permit

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

Name of Consent Holder:	Ballance Agri-Nutrients (Kapuni) Limited PO Box 439 Hawera 4640	
Decision Date (Change):	15 January 2021	
Commencement Date (Change):	15 January 2021	(Granted Date: 31 August 2012)

Conditions of Consent

Consent Granted:	To take water from the Waingongoro River for operation of an ammonia/urea plant, and a hydrogen plant
Expiry Date:	1 June 2035
Review Date(s):	June 2023, June 2029
Site Location:	309 Palmer Road, Hawera
Grid Reference (NZTM)	1707780E-5628870N
Catchment:	Waingongoro

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 volume of water taken shall not exceed 4,000 cubic metres per day.

2. Before exercising this consent the consent holder shall install, and thereafter maintain a water meter and a datalogger at a location that measures all water taken. The water meter and datalogger shall be tamper-proof and shall measure and record the rate (in litres per second) and volume of water (in cubic metres per day) taken to an accuracy of ± 5percent. Records of the date, the time and the rate and volume of water taken at intervals not exceeding 15 minutes, shall be made available to the Chief Executive, Taranaki Regional Council at all reasonable times.

   Note: Water meters and dataloggers must be installed, and regularly maintained, in accordance with manufacturer's specifications in order to ensure that they meet the required accuracy. Even with proper maintenance water meters and dataloggers have a limited lifespan.

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

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

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

   The documentation shall be provided:

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

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

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

4. If any measuring or recording equipment breaks down, or for any reason is not operational, the consent holder shall advise the Chief Executive, Taranaki Regional Council immediately. Any repairs or maintenance to this equipment must be undertaken by a suitably qualified person.

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

6. The records of water taken shall:

   (a) be in a format that, in the opinion of the Chief Executive, Taranaki Regional Council, is suitable for auditing; and

   (b) specifically record the water taken as 'zero' when no water is taken.

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

8. The consent holder shall ensure that no modification is made to the intake that:
   (a) increases the aperture size of any intake screen; or
   (b) increases velocity of water toward any screen (approach velocity) or across any screen (sweep velocity); or
   (c) in any other way that could increase the likelihood of juvenile fish entering the intake or being trapped against the screen.

9. By 31 January 2013 the consent holder shall provide the Chief Executive, Taranaki Regional Council with a report, including recommendations, on an investigation of the costs and benefits of altering the intake to meet design guidelines for minimising the entrainment of juvenile fish.

10. The consent holder shall ensure that a monitoring programme is developed and undertaken that determines compliance with the conditions of this consent and identifies, as far as practicable, the environmental effects resulting from its exercise. The monitoring programme shall be reviewed annually.

11. In developing the monitoring programme referred to in condition 10 the consent holder shall carry out reasonable consultation with Ngati Ruanui and Ngaruahine that includes submitting the monitoring programme to both Iwi for comment and allowing one month for a response. The consent holder shall ensure any comments received are provided to the Chief Executive, Taranaki Regional Council.

12. At least once every year, the consent holder shall convene a meeting with representatives of the Taranaki Regional Council, Fish and Game, Department of Conservation, Ngati Ruanui and Ngaruahine. The meeting shall be for the purpose of discussing and generally informing the parties about the consent holder's monitoring data and the monitoring programme relating to the operation, monitoring and environmental effects of the consented activity.

13. The consent holder shall make ten annual payments of $30,000 (GST exclusive) to the Taranaki Regional Council as a financial contribution for the purpose of providing riparian planting and management in the Waingongoro River catchment. The first payment shall be made within 60 days of the commencement of this consent, and subsequent payments shall be made by 1 September each year.

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 special condition 8 (re changes to the intake) of this resource consent during the month of June 2013, for the purpose of requiring the modification of the intake to reduce the risk of fish entrainment.

15. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2017 and/or June 2023 and/or June 2029 for the purposes of:

    (a) ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or

    (b) to require any data collected in accordance with the conditions of this consent to be transmitted directly to the Council's computer system, in a format suitable for providing a 'real time' record over the internet.

Signed at Stratford on 15 January 2021

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Appendix II

Categories used to evaluate environmental and administrative performance

Categories used to evaluate environmental and administrative performance

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

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

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

Environmental Performance

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

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

For example:

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

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

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

Administrative performance

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

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

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

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

Appendix III

Summary of macroinvertebrate biomonitoring and electric fishing in relation to Ballance Agri-Nutrients Kapuni Ltd and Todd Energy Ltd

Memorandum

To	Kate Giles and Chania Hattle, Job Managers
From	Chania Hattle, Scientist Land & Water
Document	3289219
Date	8 July 2024

Review of Stark Environmental Reports: Kapuni macroinvertebrate biomonitoring and electric fishing in relation to Ballance Agri-Nutrients Kapuni Ltd and Todd Energy Ltd – July 2023 to June 2024.

Four macroinvertebrate surveys and two fish surveys were scheduled for the Kapuni Catchment for the 2023-2024 monitoring period (Table 1). In this memo, the reports are reviewed which detail the macroinvertebrate and fish monitoring. Refer to the specific reports for further details.

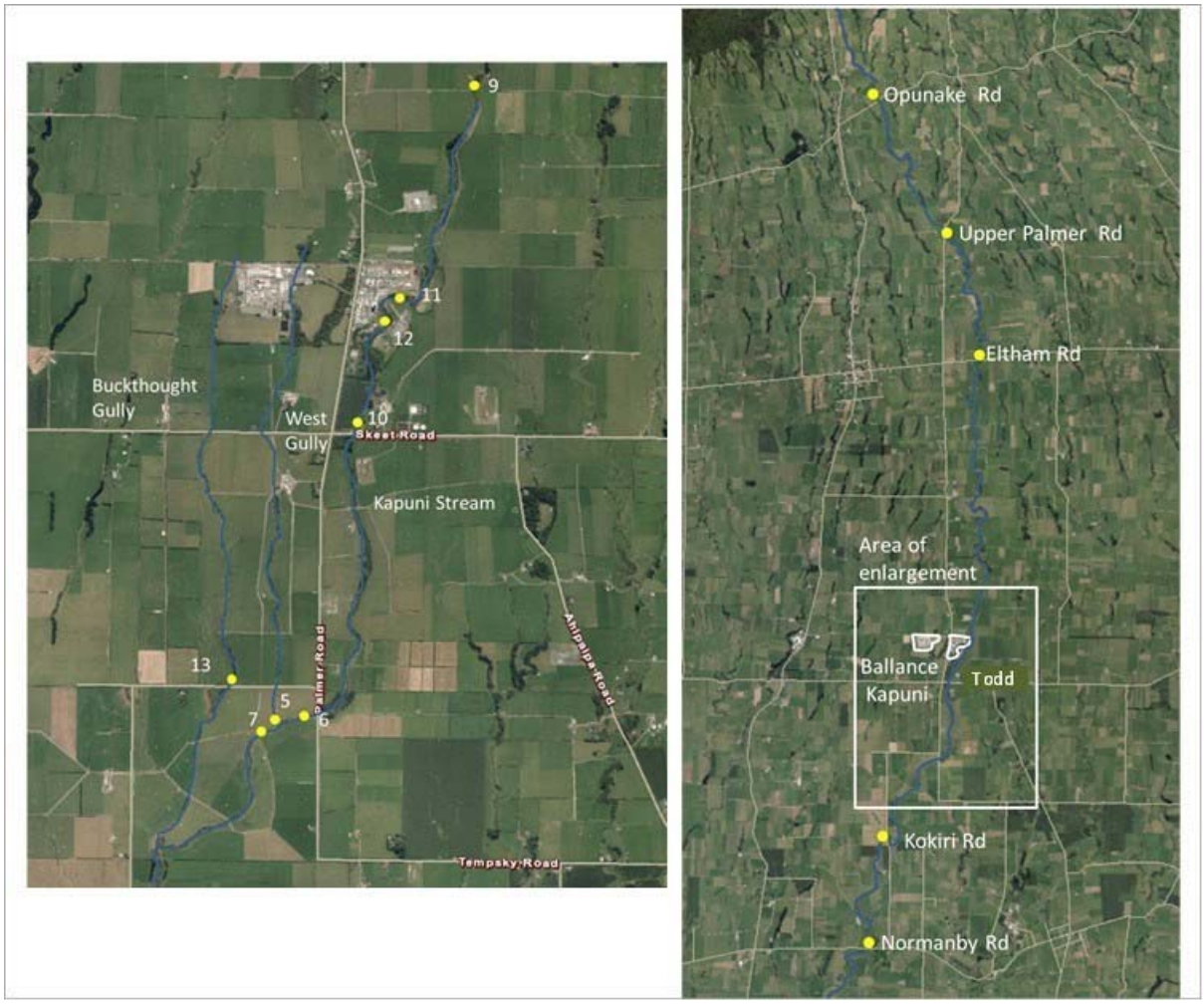

Figure 1 Biomonitoring sites in the Kapuni Catchment

Table 1 Overview of the monitoring programme for the Kapuni Catchment

Survey dates	Report number	Taxa	Number of sites	
			Kapuni Stream	Tributaries
9-Aug-23	2023-07	Macroinvertebrate	7	2
11-Oct-23	2023-08	Fish	11	0
11-Oct-23	2023-09	Macroinvertebrate	11	2
23-Jan-24	2024-01	Macroinvertebrate	7	2
1-May-24	2024-04	Fish	7	0
1-May-24	2024-05	Macroinvertebrate	7	2

Macroinvertebrate monitoring

Targets for Macroinvertebrate Community Index (MCI) values have been set for the Kapuni main stem and gully system. For the Kapuni Stream, a hard-bottom MCI (MCI-hb) target of 100 units has been obtained from historical data and the expected mild enrichment in the mid-catchment. The gully system (site 5) previously had a MCI target of 72 units using the hard-bottom score, but this has been revised to a soft-bottomed MCI (MCI-sb) of 73 units based on the 25th percentile of historical data. Site 13 has a tentative target of MCI-sb 90 units.

Taranaki Regional Council generally does not use the MCI-sb due to staff finding it unreliable in a Taranaki context, though the NPS-FM 2020 and NEMS does prescribe the use of the MCI-sb for soft-bottom streams. However, the two streams in question may be naturally hard-bottom and the current NPS-FM criteria would categorise both tributaries as hard-bottom based on their REC categories (WW/L/VA). Both have also been observed to have significant gravel substrate, especially during periods after significant freshes. NEMS proposes using actual substrate composition, with over 50% of substrate being fine sediment considered soft-bottom. Recording substrate to determine whether hard or soft-bottom tolerance values should be used, would be preferable.

It should also be noted, that from April 2021 onwards Stark Environmental Ltd have been processing samples using the fixed 200 count as per the NPS-FM 2020. This should not have a significant effect on results.

Of note in the various macroinvertebrate reports the statement "the primary aim of the biomonitoring programme is not to detect any or every instance of impact that may have occurred, but rather to monitor the health of the Kapuni Stream to ensure that it remains healthy over the longer term." However, short-term impacts, which have a significant effect are important and it is expected that analysis of the biomonitoring results would highlight such impacts. Furthermore, due to the long-term nature of the dataset, it could take a substantial amount of time for any significant impacts to alter the long-term trend results. However, it is not expected that biomonitoring would provide evidence for minor or less than minor impacts.

The fixed 200 count data could be used to calculate QMCI scores. QMCI scores would be more sensitive than MCI scores and would be a useful index to analyse and report on.

During all four surveys, the Kapuni Stream had scores above 100 MCI-hb units indicating 'good' to 'excellent' macroinvertebrate health, while the two tributary sites had MCI-sb scores between 93 to 113 units indicating 'fair' to 'good' health (Table 2).

Table 2 MCI results for the macroinvertebrate surveys in the Kapuni Stream catchment for the 2023-2024 monitoring year

Site	August 2023	October 2023	January 2024	May 2024
O	-	127	-	-
P	-	139	-	-
E	-	138	-	-
9	143	146	130	120
11	121	145	128	126
12	135	132	123	137
10	132	132	120	126
6	122	136	125	125
7	133	128	110	113
8/K	133	121	119	125
N	-	127	-	-
5	102	93	102	112
13	113	102	97	96

The Kapuni Stream was in 'good' to 'excellent' health (only three values fell in the 'good' range, the majority were classified as 'excellent'). There were several instances where there was a decrease greater than 10.8 units compared with control/s or the closest upstream site. Generally, there would be an expected decrease in MCI score in a downstream direction, due to factors other than those associated with the two petrochemical plants under review.

MCI values for Kapuni main stem monitoring sites have varied significantly over time with the lowest values generally in the mid-late 1980's coinciding with sand infilling of streambed interstices resulting from sever erosion on Mt. Taranaki in 1984. Overall, long-term trends in MCI are statistically significant and positive at Site 5 in the gully and at all Kapuni main stem sites except Ōpunake Road. The negative MCI-sb trend at Site 13 in the gully was statistically significant from August 2022 to May 2023, but higher MCI-sb values in the past year have resulted in a return to statistical non-significance. The positive trend at Ōpunake Road in the Kapuni main stem is not statistically significant.

There is a suggestion (from the MCI time-series graphs) of a levelling of the positive trends in MCI at several Kapuni main stem sites together with the emergence of negative trends since 2010 (approximately). This recent negative trend at the Ōpunake Road site is most pronounced and significant enough to warrant a reason. It could be due to bank erosion and sand influx.

Further analysis suggested that whatever is affecting river health (as measured by MCI values) is affecting the entire river, and is not a result of discharges from the petrochemical industries. At present, this is of little concern since MCI values remain indicative of (mostly) excellent stream health (MCI>120), are higher than they were 30 years ago, and similar short-term declines in MCI have been observed previously at some sites. Since 2020, the decline in MCI values at main stem sites (except for Ōpunake Road) seems to have ceased and a slight increase has occurred (although not sufficient to have much effect on the overall trends).

All four biomonitoring reports go into some detail regarding altitude predictive values, for further details refer to the individual reports. For the monitoring year 2023-2024, MCI values were generally similar (ie within the estimation error of ±10.8) to those predicted by the altitude relationship based on MCI values since the year 2000.

Overall, these results do not provide conclusive evidence that the petrochemical industries are having significant adverse effects on macroinvertebrate communities in the Kapuni catchment.

Electric fishing surveys

The two reports that detail the monitoring of fish communities were undertaken in the Kapuni Stream on 11 October 2023 (11 sites) and 1 May 2024 (7 sites). The tributaries were not fished in either survey.

All sites were surveyed for fish used the single pass electric fishing technique. The results of these surveys are presented in Table 3 and Table 4.

Table 3 Results of spring fish survey in the Kapuni Stream conducted on 11 October 2023

Site	Trout	Redfin bully	Koaro	Eels	Koura	Lamprey	Total number of species
O	-	-	-	-	-	-	0
P	2	-	-	-	-	-	1
E	4	-	-	-	-	-	1
9	10	-	-	-	-	-	1
11	3	-	-	-	-	-	1
12	7	-	-	1	-	-	2
10	16	-	-	-	-	-	1
6	2	-	-	-	1	-	2
7	1	-	-	1	-	-	2
8/K	2	1	-	-	2	-	3
N	2	-	-	-	2	5	3
Total abundance	**49**	**1**	**0**	**2**	**5**	**5**	-

Table 4 Results of autumn fish survey in the Kapuni Stream conducted on 1 May 2024

Site	Redfin bully	Eels	Koura	Torrentfish	Trout	Total number of species
9	1	-	-	-	-	1
11	-	-	1	-	-	1
12	1	1	-	-	-	2
10	-	2	-	-	-	1
6	1	1	-	-	1	3
7	-	1	-	1	-	2
8/K	3	1	5	-	-	3
Total abundance	**6**	**6**	**6**	**1**	**1**	-

A total of 62 fish (including five koura) were caught during the October 2023 survey. No fish were recorded at the Ōpunake Road site. There was a high proportion of trout recorded (79%); constituting the highest number (49) since monitoring began in 1982. All trout recorded were fingerlings (<150mm standard length) indicating that natural recruitment had occurred within the Kapuni Stream.

During the May 2024 survey 20 fish (including six koura) were caught. Fish were recorded at all seven sites in the Kapuni Stream. The October 2023 and May 2024 catch per unit effort (CPUE) were within the range per $100m^2$ (1.30 to 39.46 fish per $100m^2$); 15.66 fish per $100m^2$ during October and 7.30 fish per $100m^2$ for May. The variety recorded during both surveys were within the long-term range (2-8 taxa).

It has been noted in previous reports that sand has been a dominant feature on the streambed, due in part to the erosion on the mountain. This continues to be the case, and it is likely to have reduced the suitability of habitat for some taxa, such as koura.

Overall, these electric fishing results from the Kapuni catchment do not provide any indication that the petrochemical industries are having any significant adverse effects on fish communities in the Kapuni Stream.

References and bibliography

Stark JD 2023. Kapuni Macroinvertebrate Biomonitoring (9 August 2023). Prepared for Ballance Agri-Nutrients Kapuni Ltd and Todd Petroleum Mining Company Ltd. Stark Environmental Report No. 2023-07.

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Appendix IV

A Report Prepared for Special Conditions 5 and 10 of Air Discharge Permit 4046-3 by Ballance Agri-Nutrients [Kapuni] Ltd (June 2021- May 2024)

Ref: TM24-001

Ballance Agri-Nutrients [Kapuni] Limited

A Report Prepared for Special Conditions 5 and 10 of

Air Discharge Permit 4046-3

June 2021 – May 2024

Contents Page

1.0 INTRODUCTION

Ballance Agri-Nutrients [Kapuni] Limited (*Ballance-Kapuni*) holds Discharge Permit 4046-3, issued by the Taranaki Regional Council for the following purpose:

> *To discharge emissions into the air from the manufacture of ammonia and urea and associated activities at an ammonia-urea manufacturing complex at or about GR: Q20: 104-918.*

There are 13 special conditions associated with the discharge permit detailing various limits and/or management practices to be adhered to.

This report is specifically prepared to meet the requirements of special condition 10, including records for special condition 5, with the key measure of operational compliance being special condition 4, as described below.

Special Condition 10

> *The consent holder shall provide to the Chief Executive, Taranaki Regional Council, by 1 June 2012 and every three years thereafter a written report which includes:*
> *a) A review of any technological advances in the reduction or mitigation of discharges to air from the site, and the costs and benefits of these advances; and*
> *b) An evaluation and review of ammonia pressure safety valve [PSV] systems, operating parameters, and vent heights to ensure that the probability of PSV discharges have been reduced as far as practicable, and to determine whether flaring or other control rather than vent height is practicable as a means to reduce ground level concentrations of ammonia; and*
> *c) Details of any complaints received [external to the operation of the plant], to include date, time, operating conditions, weather conditions and measures taken in response; and*
> d) *Monitoring records required by condition 5.*

Special Condition 5

> *e) Within 12 months of the issue of this consent, the consent holder shall to the satisfaction of the Chief Executive, Taranaki Regional Council, establish two static monitoring locations beyond the boundary of the site for the purpose of monitoring atmospheric ammonia on adjacent property, and to check compliance with condition 4. The consent holder shall record the ground level concentration of ammonia at the static monitoring locations, every Wednesday morning between 7.00 am and 10.00 am, or at an alternative time as agreed by the Chief Executive, Taranaki Regional Council*

Special Condition 4

> *The emission of ammonia to atmosphere under normal operation, start up and shut down shall be so controlled to ensure that the maximum ground level concentrations [one-hour average] do not exceed 4.27 ppm (v/v) beyond the boundary of the site.*

This is the fifth review and is for the period June 2021 to May 2024.

2.0 OVERVIEW

The Ballance-Kapuni ammonia-urea plant is owned and operated by Ballance Agri-Nutrients (Kapuni) Limited. An overview of the process is provided in Appendix 1, but essentially gas, water (steam) and electricity are used in the production of ammonia, and then urea, with products sold for further industrial or agricultural use domestically.

3.0 CONDITION 10(a): TECHNOLOGICAL ADVANCES TO REDUCE EMISSIONS

3.1 Recent improvements

The most significant change to the process over the past three years has been the introduction of an emergency flare. Although this is an emergency system to handle large releases an additional benefit is that small fugitive emissions from the connected PSV's are also combusted reducing emissions around the site.

3.2 Technology advances

Although the basic process technology remains as installed in the 1980's the introduction of the emergency flare has significantly reduced fugitive emissions around the ammonia plant. However, as the core process remains the same, losses of ammonia to atmosphere are an inherent part of the 1950's/1960's/1970's design.

As mentioned in the 2018 - 2021 report a programme to replace equipment that are nearing the "end of life" is underway. The replacement of the High Pressure Stripper in the urea plant in turnaround 2024 is the most significant replacement. The equipment replacements increase asset integrity & reduce the risk of fugitive losses to atmosphere.

4.0 CONDITION 10(b): PRESSURE SAFETY VALVES AND VENT HEIGHTS

4.1 Ammonia pressure safety valves

There are 252 pressure safety valves on the ammonia plant and 118 pressure safety valves on the urea plant, giving a total of 370.

Ballance-Kapuni was designated an upper tier major hazard facility in 2016, with a requirement to submit a safety case to Worksafe. The safety case was submitted in March 2018 and accepted in April 2020 with a resubmission due for 2025. The safety case includes a detailed analysis of plant operation and identification of potential major incident hazards. Many of these involved large releases of ammonia to atmosphere. For each major incident hazard, the existing controls were identified and a level of risk determined. As part of this risk assessment process, further potential controls were identified that could reduce risk further. Many of these risk reduction initiatives have been implemented in the last two turnarounds (in September 2019 & February 2024) including the verification of any safety critical safety valves. Work is well underway for the resubmission of the safety case in Q1 2025 including the re-assessment of the major incident risks & the controls are in place.

4.2 Vent heights, flaring or other options

As mentioned earlier an emergency flare was installed during turnaround 2021 to safely manage releases from safety valves and process vents within the ammonia plant.

There are approximately 90 different point sources that feed into the flare, most containing ammonia and/or flammable gases and comprising safety valves, rupture disks and some plant vents. Although, primarily, an emergency flare rather than an operational flare, there is one operational vent connected to the flare system to eliminate process gas emissions to atmosphere during the start-up of the ammonia plant.

5.0 CONDITION 10(c): EXTERNAL COMPLAINTS

The table below summarises the eight notifications that occurred due to external complaints received during the period. 7 were received from the Todd complex on the opposite side of Palmer Road to the Ballance site with one that occurred 22/4/2024 resulting in a breach of boundary limits. There was one noise complaint based on a frequency change rather than dB which had since been rectified.

Date	Time	Operating conditions	Weather conditions	Type/Response measures	Comments
17/11/2021	0315hrs	Normal	Westerly	External air notification from TODD 2.224 TWA PPM	SV-106B suction PSV passing – No Breach
10/12/2021	14:29hrs	Normal	From N/W	External air notification from TODD. 0.62 TWA PPM	During Trevi testing of PSV-11 No Breach
02/08/2023	03:47hrs	Normal	Westerly	External air notification from TODD 0.2 TWA PPM	No venting taking place at time of notification. No Breach
26/03/2024	13:51hrs	Normal	Westerly	6.10 TWA PPM	In-situ Testing PSV 111 Breach Occurred Full investigation & report provided to TRC.
27/03/2024	1707hrs	Urea Plant start up	Westerly	Air. External air notification from TODD 0.45 TWA PPM	Source of NH3 was venting through PIC-425. No breach
22/04/2024	16:15hrs	Urea Plant start up	Westerly	External air notification from TODD 1.4 TWA PPM	Setting up the urea front end for a start.

6.0 CONDITION 10(d): Monitoring records required by Condition 5

Discussions with our residential neighbours were initiated with the aim of identifying suitable locations for the static monitoring sites. These were confirmed and the monitoring programme was initiated in September 2012. A minor modification to the requirements of Special Condition 5 was to change the timeframe for sampling from 7am-10am to 1pm-4pm on a Wednesday. This was done in agreement with TRC to suit the workload of the laboratory technicians, who are generally very busy during the morning on routine plant support work. The cumulative results of this testing is attached with the report (refer to Appendix 2). No trends or ammonia levels of any significance have been found to date.

7.0 NEIGHBOURS

Ballance-Kapuni continues to operate the Mutual Aid Agreement, which provides assistance to all three plants at Kapuni. The nearest neighbours are contacted frequently to discuss any concerns, particularly if we are starting up/shutting down or performing a non-routine activity.

On an annual basis all residential neighbours are invited to site to receive an update on Ballance-Kapuni activities from the previous year and plans for the next year. This is also an opportunity to discuss any issues collectively that they wish to raise.

A more formal meeting was convened on site in May 2024 to be compliant with special conditions of our consent, where adjacent residential and industrial neighbours and other stakeholders meet with site personnel to discuss current plant operation, future plans and compliance against our consent. Representatives of Taranaki regional Council being present also.

8.0 SUMMARY

At the beginning of March 2024 the operation completed 13 years consent breach free. On the 26th of March 2024 this record ended when PSV-111 failed to re-seat during an in-situ diagnostic test to confirm/rectify the source of a small ammonia release. The incident was reported to the Taranaki Regional Council & fully investigated with actions being taken to reduce the potential of a similar incident.

Ballance-Kapuni is an upper tier major hazard facility. The installation of an emergency flare which was one of the improvements identified in the first safety case has had the additional benefit of reducing emissions around site through the capture & combustion of small fugitive emissions from the connected PSV's. Ballance Agri-Nutrients (Kapuni) Ltd is presently working through the re-assessment of the credible risks leading to a major hazard incident & the associated controls for the resubmission of the safety case in Q1 2025.

Ref: TM24-001

Appendix 1

Ammonia production

Pre-heated and desulphurised natural gas is reacted with steam in the primary reformer. This is a gas-fired furnace containing vertical, catalyst-filled tubes through which the reacting mixture passes to produce carbon monoxide, carbon dioxide and hydrogen. A controlled quantity of air is then added to this mixture in the secondary reformer to produce synthesis gas containing the correct hydrogen to nitrogen ratio. The gas then passes to the shift converters, where carbon monoxide is converted to carbon dioxide. This is subsequently removed in an absorber-stripper unit to provide one of the feedstocks of the urea plant.

After removal of the last traces of carbon oxides in the methanator, this synthesis gas is compressed by two 3700kW- and one 4800kW- Cooper Bessemer Compressors, operating in parallel (which also provide compressed air and ammonia refrigeration compression for the plant). The compressed process gases, consisting mainly of nitrogen and hydrogen, are fed into the ammonia loop and pass through the ammonia synthesis converter. The gases are then refrigerated and ammonia condensed to be drawn off from the circulation synthesis gas as a liquid. This product is over 99.5% pure and is stored as a liquid in three tanks with a combined capacity of 450 tonnes.

Urea production

Anhydrous liquid ammonia from storage is combined with carbon dioxide (separated from the ammonia synthesis gas) in the urea synthesis reactor.

The resulting product is a mixture of urea, water and an intermediate by-product, ammonium carbamate, which is separated from the aqueous urea in a three-stage decomposition and absorption process. This purification section produces a liquid stream which is recycled to a second urea reactor. Aqueous urea is concentrated by evaporating water from the molten solution, which is then granulated in a mixed fluid-spouting bed granulator.

The granular urea is then conveyed to the bulk store ready for distribution to users. The bulk storage facility at Kapuni is capable of holding 10,000 tonnes of product.

Ballance's **n-rich** urea contains:

- 46% nitrogen
- 20% carbon
- 27% oxygen
- 7% hydrogen

Using urea

Urea is used extensively throughout the New Zealand agricultural sector. With a nitrogen concentration of 46%, and hard, free-flowing qualities, urea is the most cost-efficient source of nitrogen available to farmers.

Urea can be purchased in bagged or bulk form, and spread by hand, tractor- or bike-mounted spreaders, or by commercial spreaders. Used strategically, it offers enormous benefit to farmers, helping to promote plant growth to provide feed for animals or higher crop yields.

Urea is also used by New Zealand's industrial sector, particularly in the manufacture of urea formaldehyde resin (adhesive). This is then used for making plywood, particle board, abrasive papers and fibreboards, many of which are exported. Other industrial uses for urea include the manufacture of fibreglass, yeast making, in livestock feeds, in the pharmaceutical industry, and in the manufacture of cosmetics, cleaners and paint.

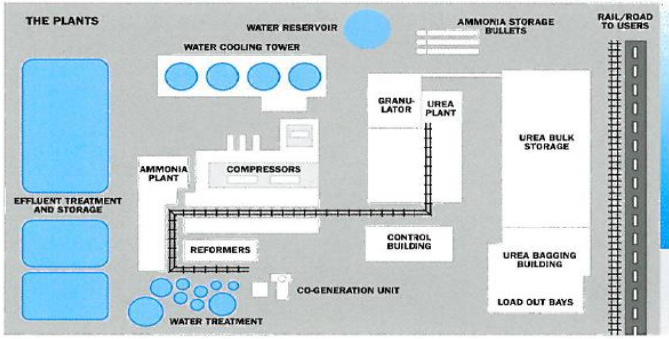
Ammonia

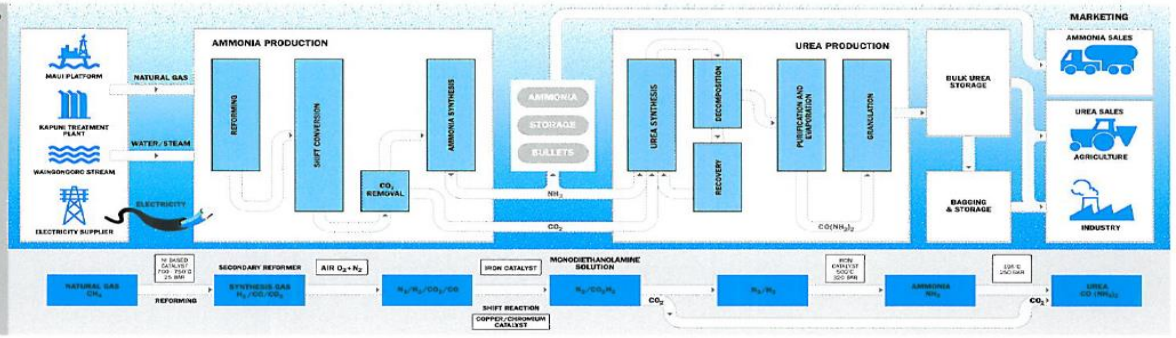
A small percentage of ammonia manufactured is sold annually on the domestic market to meet New Zealand's requirements for anhydrous ammonia. This is used primarily in refrigeration systems, with smaller amounts required for the manufacture of detergents and the treatment of industrial effluent.

The environment

The ammonia and urea complex is operated in accordance with stringent safety and environmental standards. The urea manufacturing process uses and produces water. Much of this effluent is recycled with the balance stored, treated and spray irrigated onto pastures surrounding the complex.

Continuous review and analysis is done to determine the optimum use of waste streams, thus trying to minimise the impact on the environment. This is verified with in-house and independent third party review.





Appendix 2

ABNORMAL PLANT AIR/NOISE EMISSIONS
Report Form

A. Particulars of Abnormal Release

Date of Abnormal Release	Start Time / End Time / Duration	Location	Date Reported
17 / 11 / 2021	Start Time: 03:03 End Time: Duration:	Location: Ballance Mapuna	Date Reported: 17-11-2021

Initial Notification of Incident by: Ballance staff ☐ Neighbour (specify) ☑ Vector @ 8:15am.

Abnormal Release Type : Air Emission ☑ Noise ☐

Size: (Estimated) ________ Noise Level: ________

Wind Direction: SW Wind Speed: 20KM

Was Air Discharge Consent Breached ? Yes ☐ (full report) No ☑
(Ground level ammonia limit at or beyond boundary 4.27ppm)

Measure at Boundary Fence: 2·224 ppm AV Time : Complete 0:614 hrs.

Reason for Abnormal Release : (Tick and describe area of Plant)

PSV Lifting ☐ Mechanical Failure ☑ Instrument Failure ☐ Process Upset ☑

Plant Shutdown ☐ Plant Start Up ☐ Venting/ Purging ☐ Other ☐

Describe: When changing over Recycle Uraca's the Machine tripped on high pressure. & SV-~~106~~B passing to p.ss pot → D/S.

B. Actions Taken

Alarm Sounded : Yes ☐ No ☑

People Informed : (including any follow up)

STOS ☑ Vector ☑ Security ☐ J Smith ☐
Other ☐ Technical Manager ☐ Safety Leader ☐

Actions taken to minimise effects of event:
flushed machine, Steam on Urea Main vent.
D/S = 9462 → Dropped + SOS tank → Pimister flush.
Added steam to A NH3 Refridge Packer to.

Corrective actions to prevent reoccurrence/frequency:
* Intial testing completed @ 0614h/s
* Testing resumed from 0850hsto 1139h/s as KGPT could still smell NH3.

Copy to: Site Manager / Production Superintendent / Safety Leader / Technical Manager

Signed: Joan [signature] **Shift Supervisor**

Actions Complete

Date: 25 / 11 / 21 Signed: [signature]

Formats Manual	Format Number	Version	Rev Date
PROD	SS302	11	19-12-2014

File: G:\QManuals\FORMATS\PROD\SS302 Abnormal Plant Air Noise Emissions.DOC

ABNORMAL PLANT AIR/NOISE EMISSIONS
Report Form

A. Particulars of Abnormal Release

Date of Abnormal Release	Start Time / End Time / Duration	Location	Date Reported
10/12/21	Start Time: 13.30 End Time: 15.30 Duration: 2 hrs	1st Palmerston 2nd NTH East	10-12-21

Initial Notification of Incident by: Ballance staff ☐ Neighbour (specify) ☑ TODP

Abnormal Release Type : Air Emission ☑ Noise ☐

Size: (Estimated) _____ Noise Level: _____

Wind Direction: Start North west then East ly Wind Speed: 7 Km/hr

Was Air Discharge Consent Breached ? Yes ☐ No ☑
(Ground level ammonia limit at or beyond boundary 4.27ppm) (full report)

Measure at Boundary Fence: _____ Time : _____

Reason for Abnormal Release : (Tick and describe area of Plant)

PSV Lifting ☑	Mechanical Failure ☐	Instrument Failure ☐	Process Upset ☐
Trivi test			
Plant Shutdown ☐	Plant Start Up ☐	Venting/ Purging ☐	Other ☐

Describe:
SGS/IVE into trivi test PSV-111

B. Actions Taken

Alarm Sounded : Yes ☐ No ☑

People Informed : (including any follow up)

STOS ☑	Vector ☐	Security ☐	J Smith ☐
Other ☐	Technical Manager ☐	Safety Leader ☐	

Actions taken to minimise effects of event:
Trivi test completed, refresh b/d tank.
DIS Ammonia 3291 PFP 831

Corrective actions to prevent reoccurrence/frequency:
Issues with first trivi lift with PSV sticking open,
Reminder to shift to call prior to any potential risk of an abnormal emission.

Copy to: Site Manager / Production Superintendent / Safety Leader / Technical Manager

Signed: _____ **Shift Supervisor**

Actions Complete

Date: ___/___/___ Signed: _____

ABNORMAL PLANT AIR/NOISE EMISSIONS
Report Form

A. Particulars of Abnormal Release

Date of Abnormal Release		Location:	Date Reported:
02 / 08 / 23	Start Time: 0300 End Time: 0325 Duration: 25 minutes	Todd energy	02/08/23

Initial Notification of Incident by: Ballance staff ☐ Neighbour (specify) ☑ Todd Energy

Abnormal Release Type : Air Emission ☑ Noise ☐

Size: (Estimated) NA Noise Level: —

Wind Direction: Westerly Wind Speed: 30 → 64 km/hr

Was Air Discharge Consent Breached ? Yes ☐ No ☑
(Ground level ammonia limit at or beyond boundary 4.27ppm) (full report)

Measure at Boundary Fence: >0.2 ppm Time : 0319 + 0325

Reason for Abnormal Release : (Tick and describe area of Plant)

PSV Lifting ☐	Mechanical Failure ☐	Instrument Failure ☐	Process Upset ☐
Plant Shutdown ☐	Plant Start Up ☐	Venting/ Purging ☐	Other ☑ (unkown)

Describe:
No source found

B. Actions Taken

Alarm Sounded : Yes ☐ No ☑

People Informed : (including any follow up)

STOS ☑	Vector ☐	Security ☐	J Smith ☐
Other ☐	Technical Manager ☐	Safety Leader ☐	

Actions taken to minimise effects of event:
As per GP0904 + GP0906
See A+I # 79459 for timeline + actions

Corrective actions to prevent reoccurrence/frequency:
NA

Copy to: Site Manager / Production Superintendent / Safety Leader / Technical Manager

Signed: _____ **Shift Supervisor**

Actions Complete

Date: 02 / 08 / 23 Signed: _____

Ballance agri-nutrients

A10792 **NH3 Monitoring at Boundary**

Ref: **TM24-001**

26/03/2024	Raw Data	
Time	**NH3 (ppm v/v)**	**Chip Used**
1351	>50	Hi range (2 to 50)
1351	>50	Hi range (2 to 50)
1352	>50	Hi range (2 to 50)
1353	>50	Hi range (2 to 50)
1354	17.40	Hi range (2 to 50)
1356	3.40	Hi range (2 to 50)
1356	33.00	Hi range (2 to 50)
1357	>50	Hi range (2 to 50)
1358	>50	Hi range (2 to 50)
1359	10.00	Gastec 3La (5 to 100)
1400	9.90	Hi range (2 to 50)
1401	10	Gastec 3La (5 to 100)
1403	<2.00	Hi range (2 to 50)
1404	8.1	Hi range (2 to 50)
1405	22.60	Hi range (2 to 50)
1406	>50	Hi range (2 to 50)
1406	>50	Hi range (2 to 50)
1407	62	Gastec 3La (5 to 100)
1408	8.4	Hi range (2 to 50)
1409	7.2	Hi range (2 to 50)
1410	24.1	Hi range (2 to 50)
1411	39	Hi range (2 to 50)
1412	>50	Hi range (2 to 50)
1412	>50	Hi range (2 to 50)
1413	>50	Hi range (2 to 50)
1414	62	Gastec 3La (5 to 100)
1414	48	Hi range (2 to 50)
1415	11.60	Hi range (2 to 50)
1415	35	Hi range (2 to 50)
1416	>50	Hi range (2 to 50)
1417	32	Hi range (2 to 50)
1417	25	Gastec 3La (5 to 100)
1418	58	Gastec 3La (5 to 100)
1418	>50	Hi range (2 to 50)
1419	31.2	Hi range (2 to 50)
1423	33	Hi range (2 to 50)
1424	>50	Hi range (2 to 50)
1425	18	Hi range (2 to 50)
1425	10	Gastec 3La (5 to 100)
1426	33	Hi range (2 to 50)
1427	33	Hi range (2 to 50)
1428	4	Hi range (2 to 50)
1430	3.07	Hi range (2 to 50)
1433	<2.00	Hi range (2 to 50)
1436	>5.00	Lo range (0.2 to 5)
1441	<2.00	Hi range (2 to 50)

Adjusted Data	Time started first measurement		1349	
Time	**NH3 (ppm v/v)**		**Time Interval (min)**	**ppm v/v NH3 per Interval**
1351	50.00	Hi Range UDL	2	100
1351	50.00	Hi Range UDL	0	0
1352	50.00	Hi Range UDL	1	50
1353	50.00	Hi Range UDL	1	50
1354	17.40		1	17.4
1356	3.40		0	0
1356	33.00		2	66
1357	50.00	Hi Range UDL	1	50
1358	50.00	Hi Range UDL	1	50
1359	10.00	Gastec 3La (5 to 100)	1	10
1400	9.90		1	9.9
1401	10.00	Gastec 3La (5 to 100)	1	10
1403	2.00	Hi Range LDL	2	4
1404	8.10		1	8.1
1405	22.60		1	22.6
1406	50.00	Hi Range UDL	1	50
1406	50.00	Hi Range UDL	0	0
1407	62.00	Gastec 3La (5 to 100)	1	62
1408	8.40		1	8.4
1409	7.20		1	7.2
1410	24.10		1	24.1
1411	39.00		1	39
1412	50.00	Hi Range UDL	1	50
1412	50.00	Hi Range UDL	0	0
1413	50.00	Hi Range UDL	1	50
1414	62.00	Gastec 3La (5 to 100)	1	62
1414	48.00		0	0
1415	11.60		0	0
1415	35.00		1	35
1416	50.00	Hi Range UDL	1	50
1417	32.00		1	32
1417	25.00	Gastec 3La (5 to 100)	0	0
1418	58.00	Gastec 3La (5 to 100)	1	58
1418	50.00	Hi Range UDL	0	0
1419	31.20		1	31.2
1423	33.00		4	132
1424	50.00	Hi Range UDL	1	50
1425	18.00		1	18
1425	10.00	Gastec 3La (5 to 100)	0	0
1426	33.00		1	33
1427	33.00		1	33
1428	4.00		1	4
1430	3.07		2	6.14
1433	35.00	Hi Range LDL	3	105
1436	5.00	Low Range UDL	3	15
1441	2.00	Hi Range LDL	5	10

Ballance agri-nutrients

Ref: TM24-001

1448	2.49	Hi range (2 to 50)
1449	>5.00	Lo range (0.2 to 5)
1451	27.3	Hi range (2 to 50)
1452	21.4	Hi range (2 to 50)
1454	4.5	Hi range (2 to 50)
1456	2.36	Hi range (2 to 50)
1458	5	Hi range (2 to 50)
1500	3.2	Hi range (2 to 50)
1502	3.7	Hi range (2 to 50)
1504	1.5	Gastec 3L (1 to 30)
1505	2	Gastec 3L (1 to 30)
1509	2	Gastec 3L (1 to 30)
1511	2	Gastec 3L (1 to 30)
1513	2	Gastec 3L (1 to 30)
1518	0.92	Lo range (0.2 to 5)
1524	0.76	Lo range (0.2 to 5)
1530	0.66	Lo range (0.2 to 5)
1534	0.97	Lo range (0.2 to 5)
1539	1.46	Lo range (0.2 to 5)
1544	1.63	Lo range (0.2 to 5)
1548	3.09	Lo range (0.2 to 5)
1552	2.35	Lo range (0.2 to 5)
1555	1.63	Lo range (0.2 to 5)
1600	2.39	Lo range (0.2 to 5)
1603	2.35	Lo range (0.2 to 5)
1608	1.03	Lo range (0.2 to 5)
1611	1.38	Lo range (0.2 to 5)
1614	2.25	Lo range (0.2 to 5)
1617	2.03	Lo range (0.2 to 5)
1622	0.49	Lo range (0.2 to 5)
1628	0.66	Lo range (0.2 to 5)
1635	1.35	Lo range (0.2 to 5)
1641	3.6	Lo range (0.2 to 5)
1647	2.2	Lo range (0.2 to 5)
1650	2.12	Lo range (0.2 to 5)
1655	0.98	Lo range (0.2 to 5)
1659	1.99	Lo range (0.2 to 5)
1705	4.3	Lo range (0.2 to 5)
1710	1.82	Lo range (0.2 to 5)
1717	0.33	Lo range (0.2 to 5)
1722	1.34	Lo range (0.2 to 5)
1726	1.63	Lo range (0.2 to 5)
1734	0.38	Lo range (0.2 to 5)
1744	2.19	Lo range (0.2 to 5)
1751	0.88	Lo range (0.2 to 5)
1800	0.78	Lo range (0.2 to 5)
1805	1.17	Lo range (0.2 to 5)
1811	0.98	Lo range (0.2 to 5)
1815	1.2	Lo range (0.2 to 5)
1820	1.7	Lo range (0.2 to 5)
1824	1.08	Lo range (0.2 to 5)

1448	2.49		7	17.43
1449	5.00	Low Range UDL	1	5
1451	27.30		2	54.6
1452	21.40		1	21.4
1454	4.50		2	9
1456	2.36		2	4.72
1458	5.00		2	10
1500	3.20		2	6.4
1502	3.70		2	7.4
1504	1.50	Gastec 3L (1 to 30)	2	3
1505	2.00	Gastec 3L (1 to 30)	1	2
1509	2.00	Gastec 3L (1 to 30)	4	8
1511	2.00	Gastec 3L (1 to 30)	2	4
1513	2.00	Gastec 3L (1 to 30)	2	4
1518	0.92		5	4.6
1524	0.76		6	4.56
1530	0.66		6	3.96
1534	0.97		4	3.88
1539	1.46		5	7.3
1544	1.63		5	8.15
1548	3.09		4	12.36
1552	2.35		4	9.4
1555	1.63		3	4.89
1600	2.39		5	11.95
1603	2.35		3	7.05
1608	1.03		5	5.15
1611	1.38		3	4.14
1614	2.25		3	6.75
1617	2.03		3	6.09
1622	0.49		5	2.45
1628	0.66		6	3.96
1635	1.35		7	9.45
1641	3.60		6	21.6
1647	2.20		6	13.2
1650	2.12		3	6.36
1655	0.98		5	4.9
1659	1.99		4	7.96
1705	4.30		6	25.8
1710	1.82		5	9.1
1717	0.33		7	2.31
1722	1.34		5	6.7
1726	1.63		4	6.52
1734	0.38		8	3.04
1744	2.19		10	21.9
1751	0.88		7	6.16
1800	0.78		9	7.02
1805	1.17		5	5.85
1811	0.98		6	5.88
1815	1.20		4	4.8
1820	1.70		5	8.5
1824	1.08		4	4.32

Ref: **TM24-001**

1827	2.47	Lo range (0.2 to 5)
1833	0.72	Lo range (0.2 to 5)
1847	0.45	Lo range (0.2 to 5)
1857	0.26	Lo range (0.2 to 5)

1827	2.47		3	7.41
1833	0.72		6	4.32
1847	0.45		14	6.3
1857	0.26		10	2.6

Total		308	1878.63	
				Time (min)
Overall TWA	TWA ppm v/v NH3	6.10	13:49 - 18:57	308
TWA - Highest 1 Hour	**TWA ppm v/v NH3**	23.17	13:49 - 14:51	62
TWA - 2nd Highest 1 Hour	**TWA ppm v/v NH3**	23.17	13:52 - 14:51	59
TWA - 3rd highest 1 Hour	**TWA ppm v/v NH3**	22.69	13:53 - 14:52	59
Peak Reading	**ppm v/v NH3**	62.00	14:06 - 14:07	1

A+I # 88894

ABNORMAL PLANT AIR/NOISE EMISSIONS
Report Form

A. Particulars of Abnormal Release

Date of Abnormal Release	Start Time: / End Time: / Duration:	Location:	Date Reported:
27/03/24	1545 / 1900 / 3hrs 15mins	East boundary	28/03/24

Initial Notification of Incident by: Ballance staff ☐ Neighbour (specify) ☑

Abnormal Release Type : Air Emission ☑ Noise ☐

Size: (Estimated) Small Noise Level: NA

Wind Direction: Westerly Wind Speed: 15 km/hr

Was Air Discharge Consent Breached ? Yes ☐ No ☑
(Ground level ammonia limit at or beyond boundary 4.27ppm) (full report)

Measure at Boundary Fence: Overall TWA 0.45 (See attached) Time : (See attached)

Reason for Abnormal Release : (Tick and describe area of Plant)

PSV Lifting ☐ Mechanical Failure ☐ Instrument Failure ☐ Process Upset ☑

Plant Shutdown ☑ Plant Start Up ☑ Venting/ Purging ☐ Other ☐

Describe:
- In process of starting up NH_3 in Primary Reactor
- No urea purge into Reformer
- PIC425 open approx. 51%

B. Actions Taken

Alarm Sounded : Yes ☐ No ☑

People Informed : (including any follow up)

STOS ☑ Vector ☐ Security ☐ J Smith ☐
Other ☐ Technical Manager ☐ Safety Leader ☐

Actions taken to minimise effects of event:
- Started urea purge → Reformer
- Refreshed urea ammonia recovery.
- Called Todd once PIC-425 closed @ 1640hrs.
- Cannot do vent test as steam on vent

Corrective actions to prevent reoccurrence/frequency:
- Dust scrubber NH_3 = 1019 g/m³ @ 1600hrs
- Steam already on vent
- Turned sparge on Blow down tank

Copy to: Site Manager / Production Superintendent / Safety Leader / Technical Manager

Signed: _____ **Shift Supervisor**

Actions Complete

Date: ____/____/____ Signed: _____

Ballance agri-nutrients

Ref: **TM24-001**

A10810 **NH3 Monitoring at Boundary**

	Raw Data	
22/04/2024	**NH3 (ppm v/v)**	**Chip Used**
1643	3.13	High Range (2-50ppm)
1644	10.80	High Range (2-50ppm)
1647	2.01	High Range (2-50ppm)
1649	<2.00	High Range (2-50ppm)
1653	2.74	Low Range (0.2-5ppm)
1656	1.39	Low Range (0.2-5ppm)
1700	1.25	Low Range (0.2-5ppm)
1703	1.52	Low Range (0.2-5ppm)
1711	0.44	Low Range (0.2-5ppm)
1716	0.93	Low Range (0.2-5ppm)
1720	1.44	Low Range (0.2-5ppm)
1725	1.05	Low Range (0.2-5ppm)
1731	0.44	Low Range (0.2-5ppm)
1739	0.52	Low Range (0.2-5ppm)
1748	0.38	Low Range (0.2-5ppm)
1756	0.49	Low Range (0.2-5ppm)

Adjusted Data	Time started first measurement		**1639**	
Time	**NH3 (ppm v/v)**		**Time Interval (min)**	**ppm v/v NH3 per Interval**
1643	3.13		4	12.52
1644	10.80		1	10.8
1647	2.01		3	6.03
1649	2.00	High Range LDL	2	4
1653	2.74		4	10.96
1656	1.39		3	4.17
1700	1.25		4	5
1703	1.52		3	4.56
1711	0.44		8	3.52
1716	0.93		5	4.65
1720	1.44		4	5.76
1725	1.05		5	5.25
1731	0.44		6	2.64
1739	0.52		8	4.16
1748	0.38		9	3.42
1756	0.49		8	3.92

		Total		77	91.36
					Time (min)
		Overall TWA	TWA ppm v/v NH3	1.19	16:39 - 17:56 77
K-E-240423-00001		TWA - Highest 1 Hour	**TWA ppm v/v NH3**	1.40	16:39 - 17:39 60
		TWA - 2nd Highest 1 Hour	**TWA ppm v/v NH3**	1.28	16:43 - 17:39 56
		TWA - 3rd highest 1 Hour	**TWA ppm v/v NH3**	1.15	16:43 - 17:48 65
		Peak Reading	**ppm v/v NH3**	10.80	16:43 - 16:44 1