Dow Chemical (NZ) Ltd

Monitoring Programme
Annual Report
2023/24
Technical Report 2024-30

Taranaki
Regional Council

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ISSN: 1178-1467 (Online)
Document: TRCID-1188382587-518 (Word)
Document: TRCID-1188382587-770 (Pdf)
April 2025

Executive summary

Dow Chemical (NZ) Ltd (Dow) owns a former agrichemical production and packaging site situated on Paritutu Road, New Plymouth in the Herekawe Catchment. The former operator, Corteva Agriscience New Zealand Ltd (Corteva), announced the closure of the plant in 2020. The final product was packed in February 2021 and by the end of May 2021 all chemicals had been removed and the site thoroughly cleaned in preparation for the demolition of all above ground structures. This was completed in early 2023 and ownership of the site was transferred from Corteva to Dow on 21 February 2023, along with the site's resource consents.

This report for the period July 2023 to June 2024 describes the monitoring programme implemented by Taranaki Regional Council (the Council) to assess the consent holder'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 activities at the site.

During the monitoring period, Dow demonstrated a good level of environmental performance and a high level of administrative performance.

Dow holds two resource consents, which allow it to discharge stormwater into the Herekawe Stream and to discharge emissions into the air at this site. These consents include a total of 24 conditions setting out the requirements that the Company must satisfy.

The Council's monitoring programme for the year under review included three inspections, seven water samples collected for physicochemical analysis, two biomonitoring surveys of receiving waters, and one marine ecology inspection.

The monitoring showed that activities at the Paritūtū site had no significant impact on air quality in the vicinity of the plant or on water quality in the Herekawe Stream. There was one unauthorised incident during the period under review when stormwater being irrigated to grass on the site flowed overland and discharged to the Herekawe Stream via the roadside drains. Investigations by the Council and the Company found that constituents of the stormwater complied with the limits stipulated by the consent.

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 resource consents held by Dow Chemical (NZ) Ltd (Dow) for the former agrichemical production and packaging site situated on Paritutu Road, New Plymouth in the Herekawe Catchment. Ownership of the site was transferred from Corteva Agriscience New Zealand Ltd (Corteva) to Dow on 21 February 2023.

The report includes the results and findings of the monitoring programme implemented by the Council in respect of the consents that relate to discharges of water within the Herekawe Catchment, and the air discharge permit held to cover emissions to air from the site. This report is the 32nd annual report to be prepared by the Council to cover air and water discharges from the Paritūtū 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 Herekawe Catchment;
- the nature of the monitoring programme in place for the period under review; and
- a description of the activities and operations conducted at the Company's site.

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 Site description

The 16 hectare Paritūtū site was used for production and preparation of a range of agricultural chemicals from 1960 to 2021. Corteva announced the closure of the plant in 2020. The final product was packed in February 2021 and by the end of May 2021 all chemicals had been removed and the site thoroughly cleaned in preparation for the demolition of all above ground structures. Details of the operational site are contained in previous consent compliance monitoring reports (see Bibliography).

Under Corteva's supervision, demolition works commenced in June 2022 and carried on until early 2023. Nīkau Group was the principal contractor for the works, with sampling and testing services provided by SGS NZ. All above ground structures were removed except for the hazardous substances compound and some concrete buildings which provide structural integrity to the elevated portion of the site. The tradewaste system was decommissioned and removed, and all drains and sumps leading to tradewaste were filled with concrete. The stormwater collection, storage and discharge infrastructure was retained, including all four stormwater ponds and the sump in the hazardous substances compound. The latter was fitted with a solar power system to pump stormwater to the ponds.

Upon assuming ownership on 21 February 2023, Dow engaged Tonkin & Taylor to manage the non-operational site in addition to undertaking the site investigation and remediation project. Tonkin and Taylor retained SGS for stormwater management and engaged local security contractors to monitor the site.

[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

During the previous monitoring period, most of the stormwater collected from the site was irrigated to the grassed areas to the south of the property using two large standalone pumps. This avoided the need for offsite discharges during the demolition phase when there was increased risk of entrainment of contaminants. Along with irrigation to grass, stormwater discharges to the Herekawe Stream recommenced in April 2023 from select ponds depending on the results of pre-release testing. This regime continued through the period under review.

Further details of site activities are included in the inspection notes in section 2.1.1.

Figure 1 Aerial photograph of the Paritūtū site prior to demolition in 2022

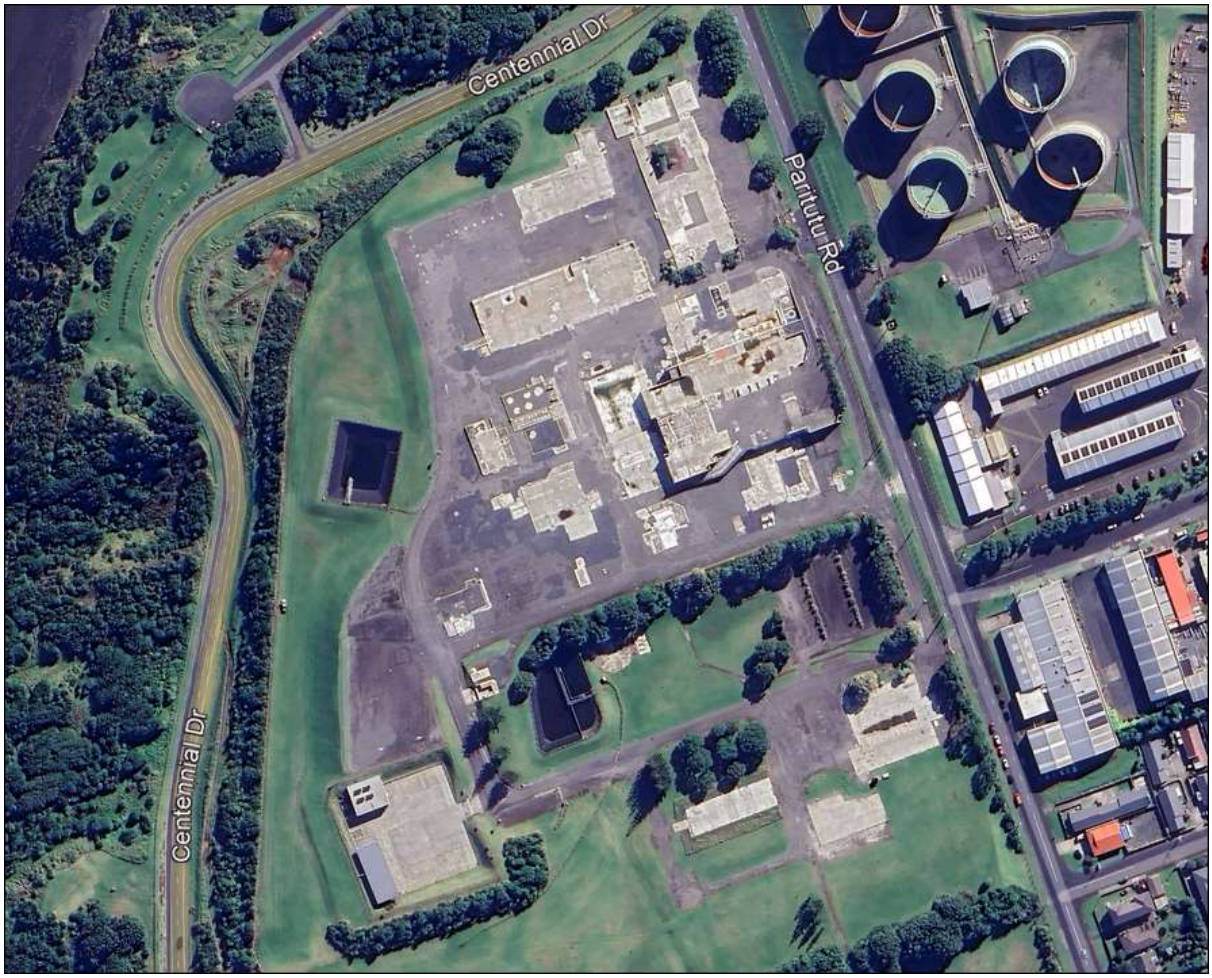

Figure 2 Aerial photograph of the Paritūtū site in 2024 after completion of the demolition works

1.3 Resource consents

The Company holds two resource consents the details of which are summarised in the table below. These were transferred from Corteva Agriscience New Zealand Ltd to Dow Chemical (NZ) Ltd on 21 February 2023. 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 1 Summary of consents held by Dow Chemical (NZ) Ltd

Consent number	Purpose	Granted	Review	Expires
Water discharge permit				
4108-2	To discharge stormwater from an industrial agrichemical manufacturing site via retention dams together with uncontaminated stormwater from landscape and no-manufacturing areas into the Herekawe Stream	September 2008	-	June 2026
Air discharge permit				
4020-4	To discharge contaminants to air from all activities associated with the current and future operation of an agrichemical formulation and packaging plant	June 2020	June 2026	June 2044

1.4 Monitoring programme

1.4.1 Introduction

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

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

The monitoring programme for the Paritūtū site consisted of six primary components.

1.4.2 Programme liaison and management

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

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

1.4.3 Site inspections

The Paritūtū site was visited three times during the monitoring period. With regard to the consent for discharge to water, the main points of interest were processes with potential or actual discharges to receiving watercourses, including contaminated stormwater. Air inspections focused on actual and potential emission sources and characteristics, including potential odour, dust, noxious or offensive emissions. The neighbourhood was surveyed for environmental effects.

1.4.4 Stormwater sampling

Stormwater from the former production plant and storage areas, dangerous goods storage compound, incinerator pad and roads in these areas is collected in two retention pond systems. It is sampled and analysed for comparison with consent limits. Stormwater which meets the release criteria may be discharged to the Herekawe Stream.

There are four stormwater retention ponds at the Paritūtū Road site: SV9000, SV9100, SV9200 and SV8000. Stormwater from former production areas and roading is collected in SV9100 after treatment in separators to remove silt. SV9000 is used as an overflow retention pond. Stormwater from around the incinerator pad and roadway is collected in SV9200, while stormwater from around the former despatch area and dangerous goods storage compound is collected in SV8000.

With the change to a non-operational legacy site, Dow's Stormwater Discharge Management Plan was revised and approved by Council in April 2024. This allowed for a move to quarterly discharge sampling if the results of pre-discharge testing showed consistently low concentrations of acid herbicides.

The Council undertook sampling of the stormwater ponds on two occasions during the monitoring year, after releases to the Herekawe Stream had recommenced.

1.4.5 Groundwater monitoring

The Company conducts an on-going groundwater monitoring and modelling program, prepared in consultation with the Council, to assess the quality of groundwater beneath the site. Results are forwarded to the Council annually, while relevant matters are discussed as they arise. Shallow groundwater under the site flows under natural gradients north and west towards the coastal marine area, including the Sugar Loaf Islands (Ngā Motu) Marine Protected Area.

To address the low-level contamination found through a past investigation, the Company developed a Site Groundwater Management Plan, which was received and agreed to by the Council during the 1996/97 period and updated in 2001. Contaminants (phenoxies and chlorophenols) were initially detected at low levels and groundwater flow suggested that the contamination evident would pose no environmental risk and over time would reduce to levels below detection.

The Company fully evaluated the site and recommended a monitoring approach to ensure that, as predicted by modelling, no adverse environmental effects occur. The current monitoring approach adopted through the Site Groundwater Management Plan requires the Council to remain fully informed of the results. The approach enables the risk of effects on the environment to be assessed fully on an on-going basis, and appropriate action to be taken. The information available at this time suggests that no adverse environmental effects are likely and that the contaminants will fully degrade before migration from the site occurs.

During the monitoring year, the Groundwater Management Plan was reviewed by the Company to focus on legacy aspects and the proposed site remediation project. The updated plan was approved by Council in March 2024.

1.4.6 Biomonitoring surveys

The Council has a programme to assess biological diversity and richness of the Herekawe Stream. Two biological surveys were conducted during the monitoring year to assess whether discharges from the Paritūtū site were having any environmental impact on the stream.

1.4.7 Foreshore marine ecology inspection

An annual marine ecology inspection of the Back Beach foreshore below the Paritūtū plant is undertaken to look for any evidence of a discharge from the site (including any groundwater seeps) and to assess any environmental impact.

2. Results

2.1 Water

2.1.1 Inspections

Officers of the Council carried out two programmed inspections during the 2023/24 monitoring period while the site was inactive. The inspections included the maintenance and housekeeping of former process areas and roadways; the stormwater collection and retention systems; stormwater sampling and inspections of the discharge point and receiving waters in the Herekawe Stream. Scheduled inspections were carried out on 6 July 2023 and 3 August 2023. Notes from these visits are summarised below.

6 July 2023

First inspection for 2023/24. On site 14:00 to 14:50 representatives from Dow, Tonkin & Taylor and SGS. 50mm of rainfall had been recorded over the previous week at the Brooklands Zoo station. Stormwater ponds SV8000 and SV9200 were sampled. Both were clean with low volumes as they had been released earlier in the week. The site was very tidy and well maintained. The draft PSI and new groundwater management plan were under review, to be finalised shortly. There had been 70 responses to the public survey so far. A letter drop had been carried out the previous week to over five hundred residential and commercial properties in the area. A meeting with iwi had been held two days prior to explain the technical work being undertaken and the purpose of the public survey. Transpower was intending to commence removal of unused high voltage pylons in Paritūtū in the coming months. Contractors would be using the Dow site to access pylons adjacent to the perimeter and as a laydown area. Works were expected to take six to nine months.

3 August 2023

Second inspection for 2023/24. On site 10:00 to 10:45 with Tonkin & Taylor and SGS. 17.4mm of rainfall had been recorded over the previous week at the Brooklands Zoo station. Stormwater ponds SV8000 and SV9200 were sampled. Both were clean with low volumes. The site was very tidy and well maintained. Samples were subsequently taken of the discharge at Back Beach during release of stormwater from the ponds, and of the Herekawe upstream and downstream of the discharge point. Four core samples of the remaining concrete slab in the area of former Building 3 had been taken by Tonkin & Taylor the day before to test for phenoxy herbicides as a potential source of the trace amounts of 2,4,5-T found in SV8000 in the prior month. The holes were refilled with new concrete. Samples had also been taken of sediments from pooled water in the area. Interviews had been carried out recently of former employees and local residents who had knowledge of the site's history. Information collected from this process was to be added to the draft Preliminary Site Investigation report.

2.1.2 Results of discharge monitoring

All stormwater collected in the four stormwater retention ponds was sampled and analysed by a local contractor on behalf of the consent holder prior to discharge by irrigation to grassed areas of the site or release to the Herekawe Stream. The samples were checked for the parameters controlled by Consent 4108: floatable and suspended materials, odour, colour and visual clarity, pH and potential chemical contaminants including phenoxy herbicides, organophosphates, triclopyr and picloram.

Two of the stormwater ponds were sampled by the Council for consent compliance. In 2023/24, two sets of samples were collected on 6 July and 3 August. These were analysed for a total of 110 pesticide residues and acid herbicide compounds.

The results of Council monitoring for 2023/24 are presented in Tables 2 and 3.

Table 2 Stormwater results for acid herbicides and pH on 6 July and 3 August 2023

Parameter	Concentration (mg/L)				
	6 July		3 August		Consent limit
	SV8000	SV9200	SV8000	SV9200	
2,4,5-T	0.039	0.0006	0.049	0.0006	
2,4-D	0.0127	< 0.0004	0.033	0.0004	
2,4-DB	< 0.0006	< 0.0006	< 0.0006	< 0.0006	
MCPA	0.0065	< 0.0004	0.0183	< 0.0004	
MCPB	< 0.0004	< 0.0004	0.0005	< 0.0004	
Total phenoxy herbicides	0.0582	0.0006	0.1008	0.0010	0.10
Picloram	0.0021	0.0005	0.0024	0.0006	0.10
Triclopyr	0.0009	0.0004	0.0014	0.0005	0.10
pH	7.1	6.7	7.2	6.9	6.0 – 9.0

Table 3 Stormwater results for pesticides on 6 July and 3 August 2023

Parameter	Concentration (mg/L)				
	6 July		3 August		Consent limit
	SV8000	SV9200	SV8000	SV9200	
Chlorpyrifos	< 0.00004	< 0.00004	< 0.00004	< 0.00004	
Chlorpyrifos-methyl	< 0.00004	< 0.00004	< 0.00004	< 0.00004	
Total organophosphates	< 0.00004	< 0.00004	< 0.00004	< 0.00004	0.0005
Oxyfluorfen	< 0.00002	< 0.00002	< 0.00004	< 0.00004	0.005

Due to the increasing levels of phenoxy herbicides present in SV8000, sampling of the discharge at the stormwater outlet, and the Herekawe Stream above and below the discharge, was also undertaken on 3 August 2023 to ascertain compliance with consent conditions and environmental guideline values for freshwater downstream of the discharge. The results of this additional sampling are presented in Table 4.

Table 4 Discharge and environmental sampling on 3 August 2023

Parameter	Concentration (mg/L)				
	Upstream	Discharge	Downstream	DGV	Consent limit
2,4-D	ND	0.029	0.0021	0.28	
MCPA	ND	0.0166	0.0012	0.0014	
MCPB	ND	0.0004	ND		
2,4,5-T	ND	0.045	0.0036	0.036	
Picloram	ND	0.0027	ND		0.10
Triclopyr	ND	0.0015	ND		0.10
Total phenoxy herbicides		0.091			0.10
pH	7.6	7.3	7.6		6.0 – 9.0
Temperature	9.3	10.6	9.9		
Turbidity	2.2	4.0	3.0		

ND = Non Detect: below laboratory reporting limits

DGV = Toxicant Default Guideline Values for 95% species protection from the Australia and New Zealand guidelines for fresh and marine water quality

Constituents of the discharge stipulated in the consent were within the prescribed limits. However, the total amount of phenoxy herbicides was at the high end of acceptability.

The impact of the discharge on the stream was further assessed by comparison of downstream contaminant concentrations with environmental guideline values for protection of species from the Australia and New Zealand guidelines for fresh and marine water quality (DGVs). The three chemicals present at elevated levels – 2,4-D, MCPA and 2,4,5-T – were within the relevant guidelines.

As a result of increasing levels in stormwater of the legacy herbicide 2,4,5-T, which has not been manufactured at the site since 1987, all discharges to the Herekawe Stream were ceased while an investigation and risk assessment was undertaken by Tonkin & Taylor on behalf of the consent holder. The results of this investigation were provided to Council in October 2023. In summary:

- No ecological impacts or human health risks were identified or expected from the stormwater discharges to the Herekawe Stream.
- The source of 2,4,5-T was traced to contaminated demolition sediments and leaching from recently exposed concrete in one of the former manufacturing areas of the site.
- Along with an immediate return to onsite irrigation of stormwater, contractors were engaged to remove sediments and clean the implicated areas of the site.

2.1.3 Groundwater monitoring

Dow undertakes groundwater monitoring annually in accordance with its Groundwater Monitoring Plan. The previous round was carried out in June 2022.

The Council received a groundwater management report from the Company covering the period between July 2023 and June 2024. The report is based on the results of the groundwater sampling round undertaken in October 2023 by consultant Tonkin & Taylor.

Groundwater sampling of the nine Groundwater Monitoring Plan wells was carried out using an in-well bladder pump in accordance with a low flow sampling methodology. In addition, static groundwater levels and total well depths were measured in all accessible monitoring wells onsite. The results of the chlorophenol and phenoxy acid analyses are listed in Table 5.

Table 5 Groundwater monitoring results October 2023

Well identification No.	Phenoxy Herbicides Concentration (µg/L)	Chlorophenol Concentration (µg/L)
Shallow perimeter wells		
1	ND	ND
21	ND	ND
Deep Perimeter wells		
20	ND	ND
32R	ND	ND
41	ND	ND
42	ND	≤ 0.22
47R	ND	ND
Additional non-perimeter wells		
39R	≤ 2.3	≤ 4.35
46A	≤ 1.5	≤ 0.36
Trigger levels	50,000	10,000

Phenoxy herbicides [2,4-D; 2,4,5-T; MCPA; MCPB]
Chlorophenols [2,4-DCP; 2,4,5-TCP; 2,4,6-TCP; PCOC]
ND = Non Detect: below laboratory reporting limits (<1.6µg/L for phenoxy acids and <0.2µg/L for chlorophenols)

No phenoxy acid or chlorophenol was detected in either of the shallow perimeter wells (1 and 21), or in four of the deep perimeter wells (20, 32R, 41 and 47R). Deep perimeter well 42 showed a detection of

chlorophenols (≤ 0.22µg/L) just above the laboratory reporting limit and far below the 10,000µg/L trigger level for remedial action.

Non-perimeter wells 39R and 46A showed low levels of phenoxy herbicides (≤ 2.3µg/L and ≤ 1.5µg/L respectively) and chlorophenols (≤ 4.3µg/L and ≤ 0.36µg/L respectively). These non-perimeter wells are sampled for interest and are not subject to the established action levels.

Total phenoxy acid herbicide and total chlorophenol concentrations have not exceeded the Groundwater Management Plan trigger levels since sampling rounds began in 1993, and if detected, concentrations typically continue to show a decreasing trend.

Monitoring well 108 could not be accessed during recent sampling rounds due to its location under a seized manhole cover. Also, MW19 was obstructed and MW14 was destroyed during the demolition works in late 2022.

All 32 accessible monitoring wells were gauged between 2 and 5 October 2023 to assess groundwater levels and total well depths. Measured water level elevations were slightly higher or lower than in 2022 depending on the monitoring location. The measurements were used to develop elevation contours and inferred flow directions for the shallow and deep aquifers in 2023, confirming consistency with historical groundwater flow evaluations.

2.1.4 Freshwater biological monitoring

Freshwater biological surveys were undertaken in the Herekawe Stream on 29 November 2023 and 13 March 2024. The surveys were undertaken using standard Council procedures and indicated that the streambed communities had not been significantly affected by stormwater discharges from the Paritūtū site or other industrial sites in the vicinity. The results were similar to those from prior years and found no significant differences between the upstream 'control' site and site downstream of the discharges.

Copies of biomonitoring reports for this site are available from the Council upon request.

2.1.5 Marine ecological inspection

A marine ecological inspection of the intertidal area at the base of Paritutu Rock was undertaken on 17 December 2023 at 08:40 NZDT (low tide at 07:35 NZDT, 0.5m). At the time of the inspection, the conditions were overcast and mild (16.5°C), with a low westerly wind. The near shore waters were slightly turbid with a blue colouration. In the days preceding the inspection, the weather had been relatively fine with no rainfall for two days.

The purpose of this inspection was to ascertain whether activities at the Dow Chemical site on Paritutu Rd were having any observable environmental effects on the intertidal communities at Back Beach. This inspection was undertaken as part of the 2023/24 monitoring programme for Dow Chemical (NZ) Ltd.

An area of intertidal reef is present at the north-eastern end of Back Beach at the base of Paritutu Rock. The landward edges of the reef are subject to fluctuating levels of sand inundation. During this inspection, sand cover appeared to have decreased from the previous year. This was most apparent in the rocks at the bottom of the access stairs, where more of the underlying boulder and rock were visible compared to the previous inspection (Photo 1).

Photo 1 Rocky intertidal reef at the northern end of Back Beach (top Apr 2023; bottom Dec 2023)

The groundwater seep was observed to be trickling down the cliffs to the southwest of Paritutu Rock (approximately 30m from the beach access). The seep trickled down the beach and around the exposed reef before entering the sea (Photo 2).

Photo 2 Groundwater seep located at Back Beach by Paritutu Rock observed on 17 December 2023

Rapid, qualitative surveys of intertidal rocky reef biota were undertaken at three locations varying in distance from the groundwater seep.

The first survey area was immediately beneath the groundwater seep, in the mid-high intertidal zone. As is typical for this intertidal zone, biomass and diversity were relatively low. Three algal species were identified, *Coralline* spp. (coralline paint), *Ralfsia* sp. and *Pyropia sp*., with the latter being the most abundant. Two species of barnacle were found in this zone, *Epopella plicata* and *Chamaesipho columna*. Six species of molluscs were identified (*Cellana ornata*, *C. radians*, *Diloma aethiops*, *Haustrum scobina*, *Sypharochiton pelliserpentis and X. pulex)* with the radiate limpet, *C. radians,* being the most abundant (Photo 3). At this site, two New Zealand fur seals (*Arctocephalus forsteri*) were also observed.

Photo 3 Species found on a boulder in the high intertidal zone, beneath the groundwater seep: radiate limpet (*Cellana radians*), two species of barnacle (*Epopella plicata* and *Chamaesipho columna*), and little black mussel (*Xenostrobus pulex*)

The second survey area was in the low intertidal zone, where the groundwater seep mixed with the sea. Here the biomass and diversity were much higher compared to the high shore site (typical for this tidal height). Nine algal species and were identified. The most abundant algal species found was *Gelidium caulacantheum*. Both species of barnacles (*C. columna* and *E. plicata)* were present in higher abundance compared to the high shore site. The little black mussel *Xenostrobus pulex* was also more abundant at this site compared to the high shore site (Photo 4), which is to be expected. Eight species of molluscs were present: these include two limpets, a chiton, two snails, a bivalve, and two species of predatory whelks (*Dicathais orbita* and *H. scobina*). Two species of sea stars (*Patiriella regularis* and *Stichaster australis*) were also found at this site.

Photo 4 Little black mussel (*Xenostrobus pulex*), barnacle (*Epopella plicata*) and ornate limpet (*Cellana ornata*) on rocks and cobbles in the low intertidal zone, below the groundwater seep

The third survey area was in the low intertidal zone, 50m west of where the groundwater seep mixed with the sea. Diversity was higher than the previous site, with some additional species observed at this site. Two anemone species (*Diadumene neozelandica* and *Oulactis muscosa*) were observed at this site, along with the molluscs, siphon limpet (*Siphonaria australis*), and leathery sea slug (*Onchidella nigricans*) (Photo 5). Additionally, an amphipod, isopod and polychaete species were observed at this site. The predatory whelk *D. orbita* was found in higher abundance compared to the previous site. Reef starfish (S. australis) was the only sea star species found at this site (Photo 6). With regards to seaweeds, this site was very similar to the previous one. However, *Laurencia thyrsifera* was present here, and *Carpophyllum maschalocarpum* was absent. All other seaweed species were present in similar coverage as in the previous site.

Photo 5 Leathery sea slug (*Onchidella nigricans*) found in the low intertidal zone, 50m from the groundwater seep

Photo 6 Reef starfish (*Stichaster australis*) found in the low intertidal zone, 50m from the groundwater seep

Comparatively, eight species were present at the site 50m west of where the groundwater seep mixed with the sea that were absent from the other two sites. Therefore, this survey found a higher diversity of species at this location compared to the other two. Nevertheless, the difference on the number of taxa present at each site could be attributed to the fluctuating sand coverage at this site (and resultant changes in habitat availability), and not necessarily due to the groundwater seep.

Based on observations made during this inspection, the groundwater seep did not appear to be causing significant effects the local reef biota. However, higher diversity of rocky shore species was found in the site further away from the seep.

2.2 Air

2.2.1 Inspections

Officers of the Council carried out regular inspections of the Paritūtū site during the 2023/24 monitoring period. Scheduled inspections were undertaken on 6 July 2023 and 3 August 2023; with an additional site visit on 7 September 2023. No issues with discharges to air were found.

2.2.2 Air emissions report

As noted in revision 13 of the Air Discharge Management and Monitoring Plan (ADMMP – 1 June 2021), from 29 May 2021 manufacturing operations at the Paritūtū site had ceased; all processes had been discontinued; and all raw materials and chemicals had been taken off site. All equipment and buildings have since been removed. Consequently, no discharges were made to air during the July 2023/24 monitoring period and no report was required.

2.3 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).

In the 2023/24 period, the Council was required to undertake an additional investigation in association with the Company's conditions in resource consents or provisions in Regional Plans.

On 7 September 2023 a complaint was received regarding the discharge of water overland and into the roadside drain at Centennial Drive, New Plymouth. Investigation found that stormwater was being applied to land at the Dow Chemical site from a stormwater retention pond. The application of stormwater was at a rate that resulted in overland flow off the property and into the roadside drain where it discharged into the Herekawe Stream. Consultants engaged by the consent holder to manage the site immediately ceased the discharge and undertook an investigation to ascertain the cause. Resource Consent 4108-2 permits the discharge of stormwater into the Herekawe Stream at a specific location, so long as special conditions of the resource consent can be complied with. Analysis of samples taken confirmed that the constituents of the

stormwater discharge were within the parameters of the resource consent. A written explanation was received, and an Infringement Notice was issued.

3. Discussion

3.1 Discussion of site performance

In general, from inspections of the site and from discussions held with staff, Council officers have concluded that Dow demonstrated a comprehensive, carefully documented, and well considered approach to all areas of environmental performance. This included documentation of activities, self-monitoring programmes, regular provision of information to the Council, and excellent stakeholder engagement.

During the period under review, stormwater continued to be collected in the pond systems and tested prior to release to the Herekawe Stream or irrigated to land at the site as precaution against discharge of contaminants to surface waters. When legacy chemicals were detected in stormwater as a result of disturbance during the demolition works, immediate action was undertaken to assess potential environmental impacts, cease offsite discharges, and identify and remove sources of the contaminants. There were no visible emissions to air or noticeable odours during inspections.

The annual groundwater management report was produced as agreed in the Site Groundwater Management Plan. All groundwater samples from the perimeter wells were found to be significantly below the contaminant action levels.

3.2 Environmental effects of exercise of consents

Environmental investigations, including biomonitoring of the Herekawe Stream and an intertidal survey, found no cause for concern over the effects of the discharge of stormwater from the site or from any emissions to air.

3.3 Environmental effects of groundwater movement

Monitoring of groundwater quality beneath the site has confirmed modelling that predicts that historical groundwater contamination at two points beneath the site would not result in any off-site effects, nor detection at the limits used for routine monitoring.

3.4 Evaluation of performance

A tabular summary of the consent holder's compliance record for the year under review is set out in Tables 6 and 7, with an evaluation of performance over time presented in Table 8.

Table 6 Summary of performance for Consent 4108-2

Purpose: To discharge stormwater from an industrial agrichemical manufacturing site via retention dams together with uncontaminated stormwater from landscape and no-manufacturing areas into the Herekawe Stream		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Adopt best practicable option	Checking that standard operating procedures to achieve compliance with consent conditions are followed	No. Offsite overland flow of stormwater occurred on one occasion
2. Stormwater catchment area not to be exceeded	Inspections of plant site	Yes
3. Provision of stormwater management plan	Plan last updated April 2024	Yes
4. Keeping of discharge records	Inspection by Council and provision of results by the consent holder	Yes
5. Controls on effect of discharge in receiving water	Inspections, chemical sampling and biomonitoring	Yes

Purpose: To discharge stormwater from an industrial agrichemical manufacturing site via retention dams together with uncontaminated stormwater from landscape and no-manufacturing areas into the Herekawe Stream		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
6. Concentration limits upon potential contaminants in discharge	Chemical sampling by consent holder and with validation by Council	Yes
7. Optional review provision re environmental effects	No further option to review prior to expiry	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 7 Summary of performance for Consent 4020-4

Purpose: To discharge contaminants to air from all activities associated with current and future operation of an agrichemical formulation and packaging plant		
Condition requirement	**Means of monitoring during period under review**	**Compliance achieved?**
1. Maintenance and operation of emission control equipment	All air emission control equipment removed from site	**N/A**
2. Prohibition of offensive odour or dust beyond boundary	Monitoring of activity as necessary by qualified Council officers	**Yes**
3. Limits on contaminants, other than from incinerator, beyond the site	Monitoring of activity as necessary by qualified Council officers	**Yes**
4. Limit on specific incinerator emission components	Incinerator decommissioned	**N/A**
5. Limit on specific incinerator emission components mass discharge rate	Incinerator decommissioned	**N/A**
6. No incineration of certain materials	Incinerator decommissioned	**N/A**
7. Incinerator monitoring record keeping	Incinerator decommissioned	**N/A**
8. Incinerator oxygen concentration	Incinerator decommissioned	**N/A**
9. Incinerator secondary chamber temperature	Incinerator decommissioned	**N/A**
10. Incinerator exhaust gas temperature	Incinerator decommissioned	**N/A**
11. Air Discharge Management and Monitoring Plan	Plan updated August 2021	**Yes**
12. Maintenance of Chemical Materials Register for current use	Chemicals removed from site	**N/A**
13. Introduction of new items to Chemical Material Register	Chemicals removed from site	**N/A**
14. Air Monitoring and triggers	No action required	**N/A**
15. Annual report on monitoring results, process change, and consultation	Report received September 2021. No further reports required	**Yes**
16. Six-yearly report on technological advances in emission reduction	Report received April 2020. No further reports required	**Yes**
17. Review of consent	Option for review in June 2026 if required	**N/A**
Overall assessment of consent compliance and environmental performance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

N/A = not applicable

Table 8 Evaluation of environmental performance over time

Year	Consent numbers	High	Good	Improvement req	Poor
2019/20	4108-2, 4020-4	2	x	x	x
2020/21	4108-2, 4020-4	2	x	x	x
2021/22	4108-2, 4020-4	2	x	x	x
2022/23	4108-2, 4020-4	2	x	x	x
2023/24	4108-2, 4020-4	1	1	x	x

During the year, the Company demonstrated an overall good level of environmental performance and high level of administrative compliance with the resource consents as defined in Appendix II.

3.5 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 Dow Paritūtū site in the 2023/24 year be amended from that undertaken in 2022/23 by increasing the number of stormwater sampling events from one to two, and increasing the time allotted to programme supervision for company and stakeholder engagement during the site investigation phase.
2. THAT should there be issues with environmental or administrative performance in 2022/23, monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

These recommendations were implemented in part. During the 2023/24 period it was agreed with the consent holder that work relating to the site investigation project would be managed separately from site monitoring. The programme was altered to accommodate this change by reducing time allotted for supervision and stakeholder engagement.

3.6 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.

Planned changes for the 2024/25 monitoring programme include increasing the frequency of stormwater sampling.

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 Dow Paritūtū site in the 2024/25 year be amended from that undertaken in 2023/24 by increasing the number of stormwater sampling events from two to four.
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.

Glossary of common terms and abbreviations

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

2,4-D	2,4 di-chloro-phenoxy-acetic acid, a herbicide.
2,4-DB	2,4 di-chloro-phenoxy-butanoic acid, a herbicide.
2,4,5-T	2,4,5 tri-chloro-phenoxy-acetic acid, a herbicide.
AEE	Assessment of environmental effects.
ADMMP	Air Discharge Management and Monitoring Plan.
Biomonitoring	Assessing the health of the environment using aquatic organisms.
Bund	A wall around a tank to contain its contents in the case of a leak.
Conductivity	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 25°C and expressed in mS/m.
DMA	Dimethylamine.
DMEA	Dimethylethanolamine.
Dioxins	See PCDD.
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.
IPA	Isopropylamine.
Incident	An event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred.
Intervention	Action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring.
Investigation	Action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident.
Incident Register	The Incident Register contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan.
L/s	Litres per second.
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.
MCPA	Methyl-chloro-phenoxy-acetic acid, a herbicide.
MCPB	Methyl-chloro-phenoxy-butanoic acid, a herbicide.
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.
ng/m^3	Nanograms per cubic metre.

NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water.
pH	A numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	Measurement of both physical properties (e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment.
Resource consent	Refer Section 87 of the RMA. Resource consents include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15).
RMA	*Resource Management Act 1991* and including all subsequent amendments.
SQMCI	Semi quantitative macroinvertebrate community index.
TCP	Trichlorophenol.
Temp	Temperature, measured in °C (degrees Celsius).
Turb	Turbidity, expressed in NTU.

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

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Appendix I

Resource consents held by Dow Chemical (NZ) 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.

Discharge Permit

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

Name of Consent Holder:	Dow Chemical (NZ) Ltd
Decision Date:	5 June 2020
Commencement Date:	5 June 2020

Conditions of Consent

Consent Granted:	To discharge contaminants to air from all activities associated with the current and future operation of an agrichemical formulation and packaging plant
Expiry Date:	1 June 2044
Review Date(s):	June 2026, June 2032, June 2038
Site Location:	89 Paritutu Road, Spotswood
Grid Reference (NZTM)	1688529E - 5675602N

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

47 Cloten Road · Private Bag 713 · Stratford 4352 · New Zealand
T: 06 765 7127 · F: 06 765 5097 · E: info@trc.govt.nz · www.trc.govt.nz
www.facebook.com/TaranakiRegionalCouncil twitter.com/TaranakiRC

General condition

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

Special conditions

1. The consent holder shall ensure that all emissions control equipment, including but not limited to that referred to in condition 16(b) is maintained and operated effectively and efficiently at all times.

2. The discharges authorised by this consent shall not give rise to any odour, or dust emissions, at or beyond the boundary of the site that is offensive or objectionable.

3. The discharge of contaminants to air, other than from the High Temperature Incinerator Stack (see conditions 4 and 5) shall be controlled to ensure that the maximum ground-level concentrations off-site do not exceed:

   (a) Subject to condition 3(b),the relevant air quality limits listed in Schedule 1 of this consent and assessed using the process set out in Schedule 3; and

   (b) In the case of emissions due to raw materials or formulations introduced to the site after this consent commences, limits developed in accordance with the approach set out in Schedule 2 and assessed using the process set out in Schedule 3.

   See Advice Notes 1 and 2.

4. The total concentration of polychlorinated dibenzodioxins and polychlorinated dibenzofurans in any discharge from the High Temperature Incinerator Stack shall not exceed 0.1 nanograms per cubic metre (adjusted to 0 degrees Celsius, dry gas basis, 101.3 kPa pressure and 11% oxygen) when calculated as total toxic equivalents using the World Health Organization 2005 toxic equivalence factors.

   See Advice Notes 1 and 3.

5. The rate of discharge of total halides from the High Temperature Incinerator stack shall not exceed 1.5 kg/hour.

   See Advice Note 1.

6. There shall be no incineration of plastics and packaging that contain brominated flame retardants.

7. The consent holder shall record, and make available to the Chief Executive, Taranaki Regional Council upon request:

   a) the carbon monoxide concentration within or at the exit from the secondary combustion chamber;
   b) the feedstock type and loading rate;
   c) operating times; and
   d) the prevailing weather conditions

   for each incinerator burn. Records shall be retained for a period of six months.

8. The oxygen concentration within the secondary combustion chamber of the incinerator shall be maintained between 6% and 9% (by volume) as far as is practicable, and shall not be less than 4.5% (by volume), for more than 60 seconds at any time during the incineration of material during any 24-hour period.

9. The temperature in the secondary chamber of the High Temperature Incinerator shall not be less than 1100 degrees Celsius at any time during the incineration of waste.

10. The temperature of the exhaust gas from the High Temperature Incinerator shall not be less than 1000 degrees Celsius at any time during the incineration of waste.

11. Within three months of the date of commencement of consent, and at intervals not exceeding three years thereafter, the consent holder shall prepare and provide to the Chief Executive, Taranaki Regional Council and the Medical Officer of Health for Taranaki, for comment, a draft Air Discharge Management and Monitoring Plan ("ADMMP") for the site. The ADMMP shall be finalised and submitted to the Chief Executive, Taranaki Regional Council within a further three months. The ADMMP shall be to the satisfaction of the Chief Executive of the Taranaki Regional Council, acting in a technical certification capacity, and shall detail the management and monitoring of air discharges on the site and procedures and methodologies to ensure consent compliance. As a minimum, the ADMMP shall include:

    (a) A summary of the on-site air discharge activities and the nature of the discharges to air from each source on-site;

    (b) A description of how compliance with the conditions of this consent will be achieved;

    (c) A description of the air quality control measures and equipment, and maintenance programme in place for each of the air treatment systems used on-site, including specifically the systems used in the:
        - Commodity Herbicides Plant;
        - Herbicides Plant;
        - Granular Herbicides Plant;
        - Insecticides Plant;
        - High Temperature Incinerator Stack and Building;
        - Raw Material Storage Warehouse;
        - Product Development Laboratory;
        - Bulk Storage Tanks;
        - Natural gas-fired boiler; and
        - Any other air discharge sources on-site.

    (d) Descriptions of the site operating requirements related to the air discharge activities on-site, including:
        - Operating procedures;
        - Monitoring and supervision procedures including any performance indicators ; and
        - Waste processing and discharge logs.

(e) A description of the High Temperature Incinerator operational record-keeping and reporting procedures and requirements including:
- Feedstock type and loading rate, operating times and the prevailing weather conditions for each incinerator burn;
- Continuous monitoring of oxygen, carbon monoxide and temperature;
- Limits on the oxygen concentration at the outlet of the secondary combustion chamber; and
- limits on the halogen content of the feedstock;

(f) A description of the management procedures for the Product Development Laboratory, including management of the air treatment system, to minimise discharges to air to the extent practicable;

(g) A description of any additional air quality limits determined in accordance with condition 3(b);

(h) The consent holder's Air Monitoring Programme including, as a minimum:
- Identification of the contaminants and compounds being monitored;
- A description of the methodology for the air monitoring programme;
- Monitoring locations and frequency; and
- A description of how compliance with consent conditions will be demonstrated.

(i) A description of the Odour Register for the site, which is used to record any observations of odour (both on-site and off-site), the findings of any investigations, and any recommendations that arise; and

(j) A 'Contingency Plan' detailing measures and procedures to be undertaken to avoid or mitigate the adverse environmental effects of any spillage or discharge of contaminants not authorised by this consent. The Contingency Plan shall include the requirement that the Medical Officer of Health for Taranaki be notified as soon as practicable following any contingency event occurring that is likely to adversely affect human health beyond the boundary of the site.

12. At all times the consent holder shall maintain:

(a) A Chemical Materials Register containing details of all of the chemicals or product formulations currently received, prepared, stored, mixed or otherwise processed on-site; and

(b) The Safety Data Sheet, toxicology information and environmental fate information for each chemical and product listed in the Chemical Materials Register; and

(c) Details of the assessments and resulting air quality limits determined in accordance with condition 3(b).

The information required by this condition shall be retained and be made available to the Chief Executive, Taranaki Regional Council upon request.

13. Before any new chemicals or product formulations are introduced to the site for purposes other than research or development, they shall be added to the Chemical Materials Register.

14. For any air monitoring undertaken, the following actions apply:

    (a) If a measured air quality parameter would result, or has resulted in air quality that is 25% or less of the relevant limit referred to in condition 3, then no action is required;

    (b) If the measured air quality parameter would result, or has resulted in air quality that is more than 25% and less than or equal to 50% of the relevant limit referred to in condition 3, the consent holder shall notify the Chief Executive, Taranaki Regional Council within three working days of receipt of the monitoring results;

    (c) If the measured air quality parameter would result, or has resulted in air quality that is more than 50% and less than or equal to 100% of the relevant limit referred to in condition 3, the consent holder shall notify the Chief Executive, Taranaki Regional Council immediately upon receipt of the monitoring results, and investigate, and where appropriate remedy, the cause of the decrease in discharge quality. The consent holder shall notify the Chief Executive, Taranaki Regional Council of the outcomes of any investigations and subsequent actions, within 10 working days of receipt of the monitoring results; and

    (d) If the measured air quality parameter would result, or has resulted in air quality that is greater than 100% of the relevant limit referred to in condition 3, the consent holder shall immediately cease the discharge activity and notify the Chief Executive, Taranaki Regional Council upon receipt of the monitoring results. The consent holder shall then investigate the cause of the decrease in discharge quality, and remedy the cause of the exceedance prior to any recommencement of the discharge activity. A summary report shall be provided to the Chief Executive, Taranaki Regional Council within 10 working days of the original notification.

15. Before 30 September each year the consent holder shall provide to the Chief Executive, Taranaki Regional Council the following information for the 12 month period ending on the previous 30 June:

    (a) The results of all air quality monitoring that the consent holder has undertaken under the Air Monitoring Programme in accordance with condition 11(h);

    (b) A description of any process changes or changes to emission control technology that have been implemented at the site; and

    (c) A description of any consultation undertaken and any views put forward by those consulted.

16. No later than 30 April 2020 and every six years thereafter, the consent holder shall provide to the Chief Executive, Taranaki Regional Council, a written report which includes:

    (a) A review of any relevant technological advances in the reduction or mitigation of discharges to air from the site activities, and the costs and benefits of these advances;

    (b) A summary concluding which air discharge and treatment methods will be operated on-site and why; and

    (c) A description of any significant changes in air quality assessment methodology since the previous reporting period (including computer modelling techniques and the associated dilution factors set out in Schedule 3) that are likely to materially affect the assessment of environmental effects of the activities authorised by this consent.

17. In accordance with section 128 and 129 of the Resource Management Act 1991, the Chief Executive, Taranaki Regional Council, may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review:

    (a) During the month of June 2020 and/or June 2026, and/or June 2032, and/or June 2038 for the purpose of ensuring that the conditions are adequate to avoid, remedy or mitigate 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 that time; and

    (b) Within three months of receiving any report provided pursuant to condition 16 to direct the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment.

Transferred at Stratford on 21 February 2023

For and on behalf of
Taranaki Regional Council

A D McLay
Director - Resource Management

Advice Notes

1. *Compliance with the limits in conditions 3, 4, and 5 shall be demonstrated by monitoring, or, as described in the ADMMP, by the use of air emission technology that has been designed to ensure any discharge meets those limits.*

2. *The methodology used for relating stack concentrations to air quality limits shall be determined in accordance with the process provided for in Schedule 3 of this consent.*

3. *If any monitoring is undertaken to assess compliance with condition 4, compliance shall be determined based on the average of not less than 3 samples, each of which shall be taken while the incinerator is fed on different waste types.*

SCHEDULE 1: Air quality limits applying beyond the boundary of the site

The air quality limits for the one hour and the 24-hour average will apply at any location beyond the site boundary. The air quality limits for the annual average will apply at any land on which any residential activity (excluding any temporary or transient residential activity) is established.

Agrichemical actives

Substance	Air quality limit (annual average)
2,4-D acid, esters and salts	2 µg/m^3
2,4-DB acid and salts	4 µg/m^3
aminopyralid acid and amine salts	10 µg/m^3
Buprofezin	2 µg/m^3
Chlorpyrifos	0.57 µg/m^3
chlorpyrifos-methyl	1.9 µg/m^3
clopyralid acid and amine salts	30 µg/m^3
cyhalofop-butyl	0.6 µg/m^3
dicamba acid and amine salts	57 µg/m^3
Fenpyroximate	2 µg/m^3
Florasulam	10 µg/m^3
fluroxypyr, methylheptyl ester	153 µg/m^3
glyphosate acid and amine salts	191 µg/m^3
haloxyfop-R methyl ester	0.06 µg/m^3
lambda cyhalothrin	3.7 µg/m^3
MCPA acid, esters and salts	10 µg/m^3
MCPB acid and salts	2 µg/m^3

(s)-methoprene	10 µg/m^3
methoxyfenozide	19 µg/m^3
myclobutanil	6 µg/m^3
Oxyfluorfen	0.6 µg/m^3
picloram acid, esters and salts	57 µg/m^3
Quinoxyfen	38 µg/m^3
Spinetoram	6 µg/m^3
Spinosad	4 µg/m^3
Sulfoxaflor	6 µg/m^3
triclopyr, ester and amine salt	6 µg/m^3

Note: most of the toxicity data makes no distinction between the individual substances and their esters, amines, or salt forms. The air quality limit specified is a total, inclusive of all forms of the active.

Other compounds

Substance	Air quality limit	Averaging period
Benzene	3.6 µg/m^3	Annual
2,4-dichlorophenol	0.6 µg/m^3	Annual
2-ethyl hexanol	160 µg/m^3	Annual
Diethanolamine	3 µg/m^3	Annual
diethylene glycol monoethyl ether	27 µg/m^3	Annual
Dimethylamine	9 µg/m^3	Annual
dimethylethanolamine	50 µg/m^3	Annual
dipropylene glycol monomethyl ether	310 µg/m^3	Annual
EDTA	5 µg/m^3 120 µg/m^3	Annual 24-hour
Ethylbenzene	570 µg/m^3 1,000 µg/m^3	Annual 24-hour
Isopropylamine	12 µg/m^3	Annual
Monoethanolamine	7.5 µg/m^3	Annual
Naphthalene	3 µg/m^3	Annual
N-methyl-2-pyrrolidone	100 µg/m^3	Annual
propylene glycol	120 µg/m^3	24-hour
sodium bicarbonate	5 µg/m^3	Annual
sodium hydroxide	2 µg/m^3	Annual
triethanolamine	5 µg/m^3	Annual

Substance	Air quality limit	Averaging period
1,2,4-trimethylbenzene	20 µg/m^3	Annual
toluene (as a component in some distillate solvents)	5000 µg/m^3	Annual
triisopropanolamine	40 µg/m^3	Annual
xylene (as a component in some distillate solvents)	870 µg/m^3	Annual

SCHEDULE 2: Process for developing air quality limits for emissions associated with new raw materials or formulations.

The air quality limit for any particular contaminant shall be determined in accordance with the hierarchy set out in the Good Practice Guide (GPG) for Assessing Discharges to Air from Industry (Ministry for the Environment, June 2008), or another hierarchy as may be specified in the ADMMP.

In the event that no recognised air quality criteria (as described in the GPG) are available, a limit will be developed by calculating the air concentration that would give rise to an exposure equivalent to one tenth of the Acceptable Daily Intake (or equivalent) set by the New Zealand Environmental Protection Agency, Joint FAO/WHO Meeting on Pesticide Residues (JMPR) or European Commission. This procedure is described in Appendices E5 and E8, Dow AgroSciences (NZ) Ltd: Technical Air Quality Assessment - Discharges to Air – Paritutu Road Site, New Plymouth, Volume 2, prepared by Graham Environmental Consulting Ltd and Tonkin & Taylor Ltd, 31 October 2013.

The air quality limits for the one hour and the 24-hour average will apply at any location beyond the site boundary. The air quality limits for the annual average will apply at land on which any residential activity (excluding any temporary or transient residential activity) is established.

SCHEDULE 3: Process for relating stack concentrations to air quality limits.

Assessment of compliance with the air quality limits in Schedule 1 and those determined in accordance with Schedule 2 can be achieved based on actual or potential stack emissions, by using the following formula:

Maximum stack concentration ($\mu g/m^3$) = air quality limit ($\mu g/m^3$) x Dilution Factor

Where:

a) The stack concentration of any particular contaminant may be measured by stack emission testing or estimated based on the measured stack concentration of another representative contaminant and corrected for differences in molecular weight and vapour pressure; and

b) The Dilution Factor is taken from:

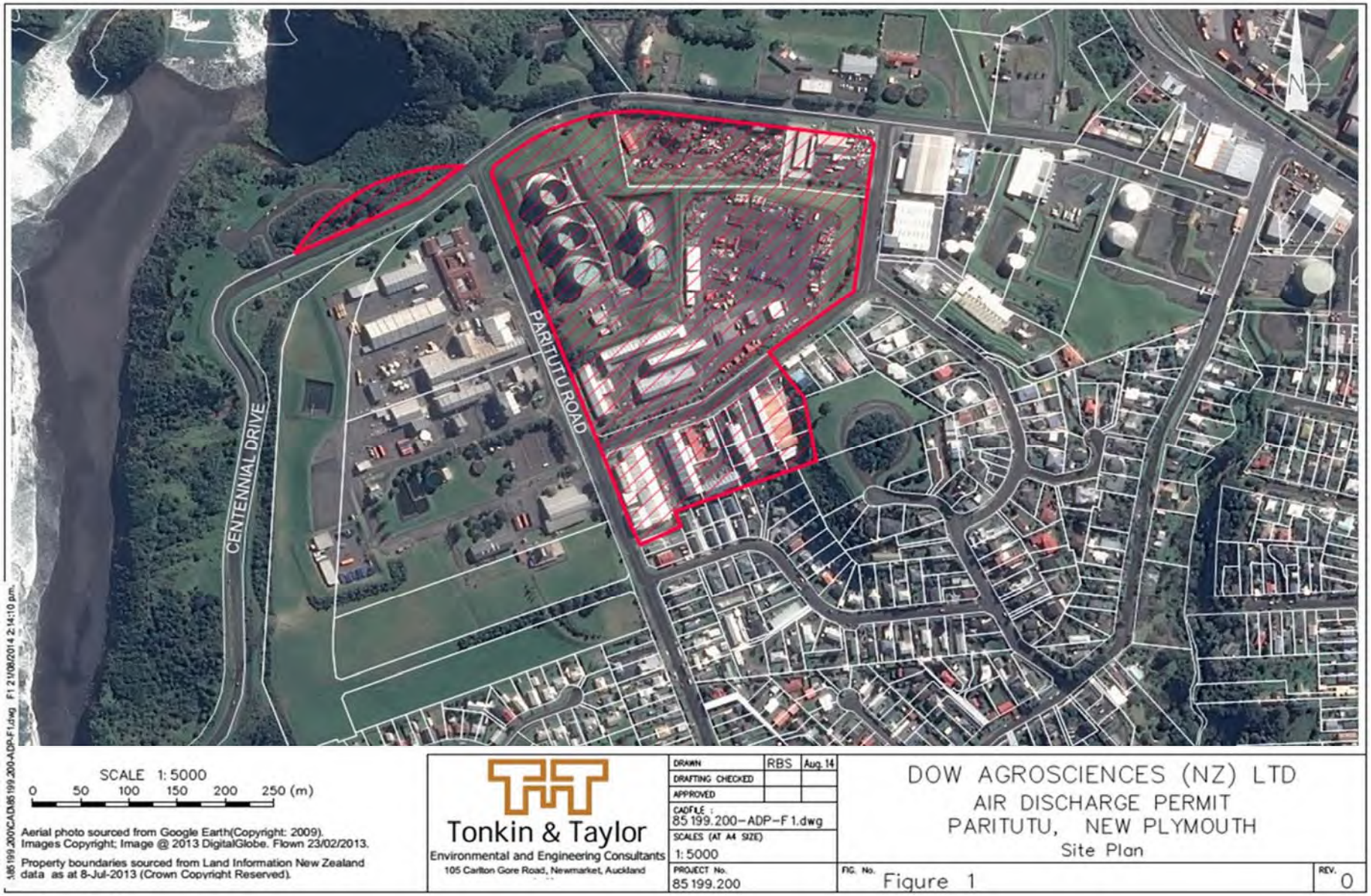
   i. the following table for the averaging period specified for the relevant air quality criterion; or

   ii. where the relevant averaging period is annual average and a residential activity (excluding any temporary or transient residential activity) has established within the hatched area shown on Figure 1 attached, the results of an atmospheric dispersion modelling study carried out to a similar standard as that provided with the application.

Where multiple sources of an individual contaminant are involved, individual stack concentrations for that contaminant will be determined to ensure that the air quality limit is complied with on a cumulative basis.

Process for relating stack concentrations to air quality limits

Plant stack	Dilution Factor		
	1-hour average	24-hour average	Annual average
Commodity Herbicides	750	1,300	29,000
Herbicides	550	1,150	107,000
Granular Herbicides	2,200	3,900	705,000
Insecticides – Emulsifiable Concentrates	700	1,250	232,000
Insecticides – Suspension Concentrates	1,500	2,750	513,000


CENTENNIAL DRIVE
PARITUTU ROAD
N
SCALE 1: 5000
0 50 100 150 200 250 (m)
Aerial photo sourced from Google Earth(Copyright: 2009). Images Copyright; Image @ 2013 DigitalGlobe. Flown 23/02/2013.
Property boundaries sourced from Land Information New Zealand data as at 8-Jul-2013 (Crown Copyright Reserved).
Tonkin & Taylor
Environmental and Engineering Consultants
105 Carlton Gore Road, Newmarket, Auckland
DRAWN RBS Aug.14
DRAFTING CHECKED
APPROVED
CADFILE : 85 199.200-ADP-F 1.dwg
SCALES (AT A4 SIZE) 1: 5000
PROJECT No. 85 199.200
DOW AGROSCIENCES (NZ) LTD
AIR DISCHARGE PERMIT
PARITUTU, NEW PLYMOUTH
Site Plan
FIG. No. Figure 1
REV. 0

Discharge Permit

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

Name of Consent Holder:	Dow AgroSciences (NZ) Limited Private Bag 2017 NEW PLYMOUTH
Consent Granted Date:	4 September 2008

Conditions of Consent

Consent Granted:	To discharge stormwater from an industrial agrichemical manufacturing site via retention dams together with uncontaminated stormwater from landscape and non-manufacturing areas into the Herekawe Stream at or about (NZTM) 1688226E-5675009N
Expiry Date:	1 June 2026
Review Date(s):	June 2014, June 2020
Site Location:	89 Paritutu Road, New Plymouth
Site Legal Description:	Lot 3 DP 8465 Lot 1 DP 9022 Lots 1 & 2 DP 9829 Lot 1 DP 10018
Catchment:	Herekawe

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

General conditions

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

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

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

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

Special conditions

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

2. The stormwater discharged shall be collected from a catchment area of no more than 16 hectares.

3. The consent holder shall maintain, and comply with at all times, a stormwater management plan, approved by the Chief Executive, Taranaki Regional Council, detailing measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not licensed by this consent, and measures to avoid, remedy or mitigate the environmental effects of such a discharge.

4. The consent holder shall keep records of the date and time that the stormwater discharges begin and end, the volume of water discharged, and the results of all physicochemical testing carried out on water discharged to the Herekawe Stream. These records shall be made available to the Chief Executive, Taranaki Regional Council, upon request.

5. After allowing for a mixing zone of 25 metres from the point of discharge, the discharge shall not give rise to any of the following effects in the Herekawe Stream:

a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
b) any conspicuous change in the colour or visual clarity;
c) any emission of objectionable odour;
d) any significant adverse effects on aquatic life.

6. Concentrations of the following components shall not be exceeded in the discharge:

Component	**Concentration**
Total phenoxy herbicides [2,4-D, MCPA and MCPB]	0.10 mg/L
Total organophosphates [chlorpyrifos and chlorpyrifos-methyl]	0.0005 mg/L
Triclopyr 0.10	mg/L
Picloram 0.10	mg/L
Glyphosate	0.10 mg/L
Oxyfluorfen	0.005 mg/L
pH [range]	6.0 – 9.0

This condition shall apply prior to the entry of the stormwater into the Herekawe Stream, at designated sampling points approved by the Chief Executive, Taranaki Regional Council.

7. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2014 and/or June 2020, 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 4 September 2008

For and on behalf of
Taranaki Regional Council

_____

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.