Boyd Drilling Waste Landfarm

Monitoring Programme

Annual Report

2022-2023

Technical Report 2023-78

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Taranaki Regional Council

Taranaki Regional Council
Private Bag 713
Stratford

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Executive summary

Colin Boyd (the consent holder), in conjunction with MI SWACO (the Company), operated a landspreading/landfarming operation and stockpiling facility at Surrey Road, Tariki. The site is in the Mangatengehu catchment, in the shared rohe of Ngāti Ruanui, Te Atiawa and Taranaki.

This report for the period July 2022 to June 2023 details final site inspections and the results of the soil sampling programme implemented by the Taranaki Regional Council (the Council) to assess the environmental impacts of the on-site activities, and compliance with the conditions of the consent during the period under review. As waste material has not been received for some time the monitoring programme had been reduced and this year included one inspection and one soil sampling survey.

During this monitoring period the consent holder held three resource consents to discharge contaminants to land and water from the storage and application of waste material to land. Two of the consent were surrendered during the monitoring period because the activities had stopped. The site primarily received drilling waste from the petroleum industry, and from 2010 also received sludge from the New Plymouth District Council and Stratford District Council water treatment plants. Drilling waste was deposited at the stockpiling facility on Surrey Road and dewatered into water treatment lagoons. The water treatment sludge was stored in a pond on the corner of Surrey Road and Derby Road.

The last delivery of drilling waste was applied to land during the 2020-2021 monitoring year, and the last application water treatment sludge was during the 2021-2022 monitoring year. Both stockpiling facilities were decommissioned during this monitoring period and accordingly these consents were surrendered. During this monitoring year a soil sampling and validation survey was completed in order to characterise the contamination remaining in the paddocks.

During the monitoring period the consent holder demonstrated a good level of environmental performance. The decommissioning of the water treatment pond was completed with minimal disturbance and the pasture strike was good, however the soil sampling showed that contaminants remain above the consent limits in several paddocks. No rating is given for the administrative performance because there were no requirements for this year. The ratings are defined in Appendix II.

For reference, in the 2022-2023 year consent holders were found to achieve a high level of environmental performance and compliance for 878 (87%) of the 1007 consents monitored through the Taranaki monitoring programmes. Another 96 (10%) of the consents achieved a good level of environmental performance and compliance. A further 27 (3%) of consents monitored required improvement in their performance, while the remaining one (<1%) achieved a poor rating.

The site was generally compliant with the conditions of the landfarming consent, although few conditions were relevant because they relate to the management and application of waste material.

An analysis of the soil samples from all paddocks was conducted for this monitoring report to assess the compliance with the consent conditions, and to determine if the consent can be surrendered. The paddocks achieved the minimum standards for most of the consent conditions, and most contaminants were less that the limits. Twenty one paddocks contained sodium at levels which did not comply with the consent limit, and two paddocks contained hydrocarbons at concentrations higher than consent limits. These contaminants pose a minimal risk to the wider environment and will decrease with time by microbial degradation or dilution. Recent site inspections reported that pasture strike is good in paddocks indicating that residual contamination is having a negligible effect on pasture health.

On the basis that waste is no longer received, the soil sampling results, and recent observations, this report recommends that the compliance monitoring programme may be reduced to only those paddocks with contaminants which exceed the relevant consent limits.

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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 2022 to June 2023 by the Taranaki Regional Council (the Council) concerning the monitoring programme for three resource consents held by Colin Boyd (the consent holder) and his subsidiary company Surrey Road Landfarms Limited. The consent holder, in conjunction with Mi SWACO (the Company), operates a landfarm located on Surrey Road, Tariki in the Mangatengehu catchment, and the shared rohe of Ngāti Ruanui, Te Atiawa and Taranaki.

During this monitoring year two of the consents were surrendered which authorised discharges from the stockpiling of drilling waste, and the storage and disposal to land of water treatment sludge and residuals. The 2020-2021 annual report stated that the last delivery of drilling waste was disposed to land during that monitoring year. The storage pits for drilling waste were decommissioned during this monitoring year. The consent holder reported that water treatment sludge has not been accepted for 5-6 years and the storage pit had been decommissioned by March 2023. The remaining consent for the disposal of drilling waste to land remains active until the soil condition in the paddocks meets certain limits set out in the consent conditions.

As there has been no new waste received onsite for some time and the drilling waste storage facility has been decommissioned, all environmental monitoring, except soil sampling and site inspections, was suspended at the start of the monitoring year. Accordingly there are no surface water, ground water or biomonitoring results to report on. This report summarises the final inspection and reports in detail on the analyses of the entire soil sampling programme to characterise the remaining contaminants in the soil, and to consider if the final consent can be surrendered.

1.1.2 Structure of this report

Section 1 of this report is an introduction and 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 compliance monitoring with annual programmes;
- summary of the location and on-site processes; and
- resource consents held by the Company.

Section 2 outlines the programme liaison and management, site inspection, the soil sampling methodology, and the monitoring required to be undertaken by the consent holder.

Section 3 presents the results of the soil sampling and summarises the compliance inspection.

Section 4 discusses the results of the soil sampling and the effects of contaminants on the soil health and pasture growth as a result of historical activities, and makes a recommendation for surrendering the consent.

Section 5 presents a recommendation for the future of the monitoring programme.

1.1.3 The Resource Management Act 1991 and monitoring

The RMA regulates activities that have 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. risk to the neighbourhood or environment.

In drafting and reviewing conditions of discharge consents, 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 consent 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 management of the region's resources.

1.1.4 Evaluation of environmental and administrative performance

In addition to discussing the environmental performance and degree of compliance by the consent holders, this report also assigns a rating to the consent holder'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 I.

For reference, in the 2022-2023 year consent holders were found to achieve a high level of environmental performance and compliance for 878 (87%) of the 1007 consents monitored through the Taranaki tailored monitoring programmes. Another 96 (10%) consents achieved a good level of environmental performance and compliance. A further 27 (3%) monitored consents required improvement in their performance, while one consent (<1%) achieved a poor rating.1

1.1.5 Location and process description

The site is located on the Taranaki ring plain bordering the Te Papakura o Taranaki/Egmont National Park to the west (Figure 1) and lies within the shared rohe of Ngāti Ruanui, Te Atiawa, and Taranaki iwi. The Mangatengehu and Mangamawhete streams, and several tributaries, flow through the site toward the east. Discharges of contaminants from the activities on the site are likely to be into these waterways. The surrounding properties are all in pasture and any activities on adjacent properties are rural in character. The nearest towns are Stratford which is 10 km to the south east and Inglewood which is 12 km to the north.

The predominant soil type has been identified as gravelly sand, and vegetation growth transitions from native forest at the edge of the national park to pasture. The average annual rainfall for the site is 1,942 mm based on the Stratford meteorological station.

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[1] The Council has used these compliance grading criteria for more than 19 years. They align closely with the 4 compliance grades in the MfE Best Practice Guidelines for Compliance, Monitoring and Enforcement, 2018

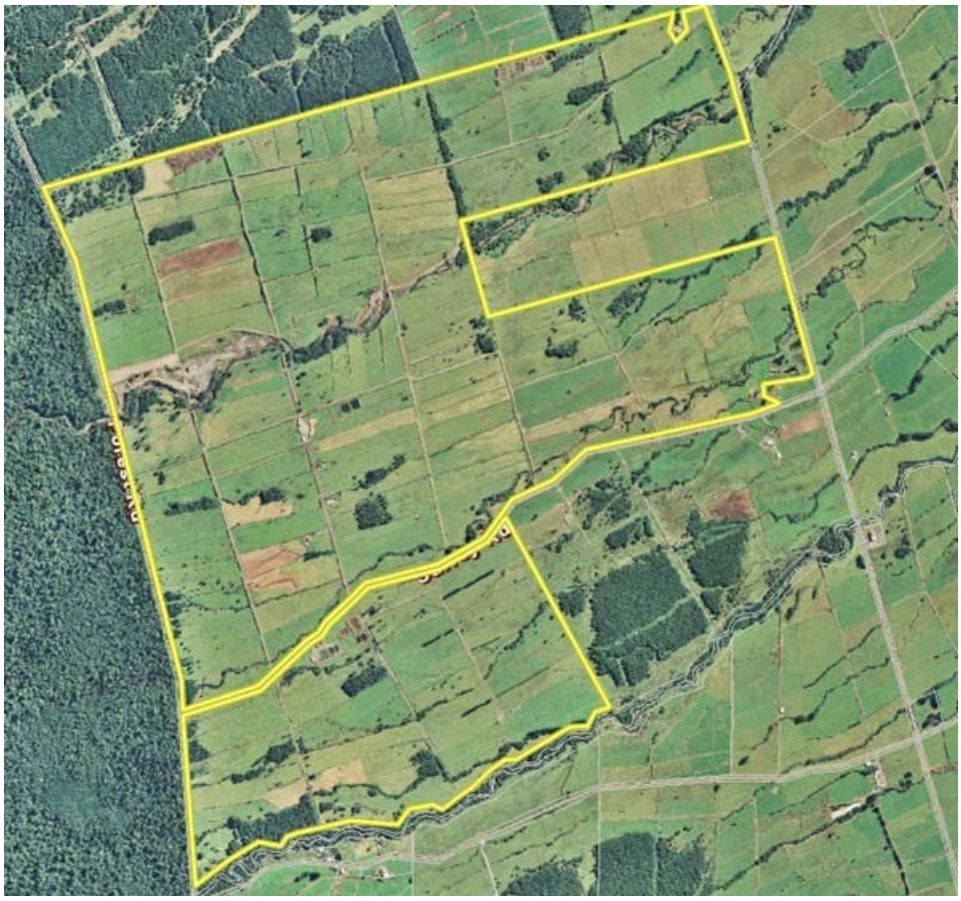

Figure 1 Location of the site and surrounding area. The property boundaries are marked in yellow

A detailed description of how drilling waste is generated in Taranaki, the contaminants associated with the waste, and the landfarming process can be found in the Review of Petroleum Waste and Land Farming (Pattle Delamore Partners, 2013) prepared for the Council. A summary can be found in section 1.1.6 below.

Exploration activities by Taranaki's petroleum industry result in drilling and production wastes. Drilling fluids are engineered to perform several functions in the drilling of a hydrocarbon well including transporting cuttings from the drill bit to the surface, controlling hydrostatic pressure in the well, supporting the sides of the hole and preventing the ingress of formation fluids, and lubricating and cooling the drill bit and drill pipe. Wells may be drilled with either synthetic based mud (SBM) or water based mud (WBM).

Common constituents of WBM and SBM include weighting agents, viscosifiers, thinners, lost circulation materials, pH control additives, dispersants, corrosion inhibitors, bactericides, filtrate reducers, flocculants and lubricants. Of these, the naturally occurring clay mineral barite (barium sulphate) is generally the most common additive.

Cuttings are brought to the surface in the drilling fluid where they pass over a shaker screen that separates the cuttings and drilling fluids. The drilling fluids are recycled for reuse but the cuttings may contain small amounts of fluid bound to the surfaces.

1.1.6 Landfarming process

Drilling waste was transported from well sites by truck (cuttings) or tanker (liquids) and discharged into a lined storage pit. Cuttings arrived at the consent holder's facilities in metal 'D' bins from the wellsite. Before leaving the well sites samples from the waste were collected and sent to a laboratory to be analysed for the presence and concentration of contaminants specified in the resource consent conditions.

The disposal area was prepared by scraping existing pasture/topsoil and stockpiling it for later use. The waste was spread over the prepared area using muck spreader (Photo 1) while the liquids were spread by tanker or spray irrigation system. After a drying period the surface or the disposal area was tilled with a tractor and discs and then levelled using chains or harrows (Photo 2).

Stockpiled or imported top soil was spread over the disposal area and then reseeded so that it returns to pasture.

Photo 1 Spreader used for dispersing drilling waste over the landfarming area.

Water treatment sludge from New Plymouth and Stratford plants was handled and discharged in a similar manner. It was received on site and either stockpiled in ponds temporarily, or spread onto paddocks to be incorporated into soil.

Photo 2 Drilling waste being tilled into the soil

1.2 Resource consents

Three consents have been held by site for discharges from storage and disposal of the waste material, the details of which are summarised in Table 1 below. Only resource consent 7591-1.2 remains active until surrender conditions are met. A copy of this can be found in Appendix 1. The remaining two consents were not exercised and were surrendered during this monitoring year once the surrender criteria were met. A list of the conditions for consent 7591-1.2 and summaries of the site's compliance with these can be found in section 4.2.

Table 1 Resource consents for discharges at the site.

Consent number	Purpose	Granted	Review	Expires
Discharges of waste to land				
7559-1.4	To discharge drilling waste (consisting of drilling cuttings and drilling fluid) from hydrocarbon exploration activities with water based muds and synthetic based muds onto and into land for the purpose of storage prior to disposal	20 Nov 2009		Surrendered 15 Dec 2022
7591-1.2	To discharge drilling waste cuttings (consisting of drilling cuttings and drilling fluids) from hydrocarbon exploration activities with water based muds and from synthetic based muds onto and into the land via landfarming, landspreading, injection spreading and irrigation	21 Jan 2010	June 2025	1 June 2027
5821-2.2	To discharge sludge and other residuals from water treatment plants in the New Plymouth and South Taranaki Districts onto and into land	14 Dec 2005		Surrendered 24 Apr 2023

2 Monitoring programme

2.1 Introduction

Section 35 of the RMA imposes obligations on 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 on 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 consent holder's operations consisted of the following four primary components.

2.2 Programme liaison and management

There can be 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 or renewals;
- advice on the Council's environmental management strategies and content of regional plans; and
- consultation on associated matters.

2.3 Site inspections

The site was inspected on two of the six scheduled inspections over the monitoring period, in October 2022 and February 2023. The remaining inspections were suspended because the site had not received any drilling or water treatment waste and all paddocks had been reinstated to pasture. A summary of the inspections can be found in section 3.2.

2.4 Soil sampling

Sampling and analyses of the soil in the paddocks used for the disposal of drilling waste has been progressively undertaken since the commencement of the consent. The samples are typically collected after the final application of waste to a paddock and the analytical results are compared against the consent limits. These limits set the minimum soil quality required at the completion of the consent and the consent may be surrendered early if the soil meets these limits.

This year soil samples were collected from 25 paddocks which completed the survey of all paddocks used for the disposal of drilling waste. Due to equipment availability the methodology differed from previous surveys, but the results remain adequately representative. Where previous surveys collected soil to a depth of 400 mm, the equipment used in this survey obtained soil to 80 mm. The method of application of the drilling waste (section 1.1.6) evenly distributes the drilling waste through the soil profile and over the surface area of the paddock. On this basis the results of the soil sampling remain broadly representative of contaminant concentration through the soil profile.

Twenty soil cores were collected from each paddock, one every 2.5 m over a 50 m transact and composited into a single sample. The samples were sent to Hill Laboratories and analysed for the suite of contaminants listed in Table 2 below. If the results indicate significant levels of contamination within individual paddocks then a high resolution sampling survey may be undertaken to identify hotspots of contamination.

Table 2 Soil sample analytes.

Soil analytes	
Calcium Chloride Magnesium Sodium Conductivity Potassium Moisture factor Sodium absorption ratio (SAR)	Ammoniacal nitrogen Nitrite-nitrate nitrogen pH Total soluble salts Total recoverable heavy metals Total petroleum hydrocarbons Polycyclic aromatic hydrocarbons Monocyclic aromatic hydrocarbons

2.5 Review of consent holder data

In accordance with consent condition 25 of consent 7591-1.2 the consent holder must prepare and submit to the Council an annual report. The annual report must contain the following information

- the location from which the drilling waste was received from;
- the composition of the waste, including the results of sample analysis;
- the location of the waste application areas on a map;
- the volume of waste applied to land;
- the commencement and completion dates of all applications;
- the areas landfarmed, including a map;
- details of the monitoring programme.

Due to the completion of landspreading, during the previous monitoring period, an annual report for this monitoring period was not submitted by the consent holder.

3 Results

3.1 Soil monitoring

Over the course of the consent the paddocks used for the waste disposal were sampled after the final application of waste material. The samples were analysed at a laboratory for the presence of a suite of contaminants, including those listed in conditions 17 and 19 of consent 7591-1.2. The limits have been adopted from several sources which are detailed in section 4.1 below.

The majority of results for concentrations of organic compounds and heavy metals were either below the relevant consent closure limits or there were no limits. These results have not been included in this report. The list of all paddocks which reported an exceedance of at least one consent limit and the relevant results are presented in Table 3 and below.

The samples of 22 paddocks listed in Table 3 reported concentrations of total recoverable sodium (TRS) which exceeded the consent limit of 460 mg/kg. The results ranged from 470 to 730 mg/kg. Elevated sodium concentrations may adversely impact soil structure and regrowth and leach into groundwater. The results indicate that sodium may persist in soil for some time after application, although data presented in Table 5 below indicates that concentrations naturally decrease over time.

The concentration of Benzo[a]pyrene (BAP) in the Paddock 88 sample was 0.07 mg/kg which is 25% higher than the consent limit of 0.027 mg/kg (Table 4). The sample from Paddock 84 also exceeded the consent limits for total petroleum hydrocarbon fractions C 10-14 and C15-36. Each result was two times higher than the consent limits. The sample was collected in 2017 and the results indicate that significant contamination levels remained in the soil after the last application in 2016.

Table 3 Paddocks with an exceedance of the total recoverable sodium consent limit

	Total Recoverable Sodium	Last application date	Sample date
Consent Limit	**460 mg/kg**	**Year**	**Year**
Paddock			
21	560	2014	2023
30	470	2014	2023
32	480	2014	2023
35	500	2010	2023
40	650	2011	2023
41	620	2010	2023
79	520	2011	2023
86	540	2021	2021
88	540	2012	2023
92	500	2011	2023
96	590	2012	2023
97	550	2012	2023
101	650	2014	2023
106	730	2011	2023
109	630	2010	2023
112	720	2010	2023
134	490	2010	2023

	Total Recoverable Sodium	Last application date	Sample date
Consent Limit	460 mg/kg	Year	Year
Paddock			
135	500	2010	2023
136	490	2010	2023
139	470	2014	2023
141	460	2014	2023

Table 4 Paddocks with an exceedance of hydrocarbon consent limits

	Benzo[a]pyrene (BAP)	C10 - C14	C15 - C36	Last Application	Sample date
Consent Limit	0.027 mg/kg	150mg/kg	1300mg/kg		Date
Paddock					
84	0.028	330	2600	2016	2018
88	0.07			2012	2023

Four paddocks have been sampled twice, between five and eight years apart, and the results are presented in Table 5. The TRS concentrations from the first survey ranged between 540 and 690 mg/kg, all of which exceeded the consent limit of 460 mg/kg and accordingly were marked for additional sampling at a later date to reassess compliance. The second round of sampling was completed in 2023 and the concentration of TRS in three of the four paddocks had decreased during the intervening period. The results of paddocks 139, 140, and 141 showed a decrease of between 180 and 230 mg/kg and all were equivalent to or less than the consent limit. The concentration in paddock 86 did not change, and remained 80 mg/kg higher than the consent limit.

Based on the rate of decrease in three of the paddocks it is likely that the TRS concentrations in the remaining paddocks which initially exceeded the consent limit will decrease over time so that concentrations will be less than the consent limit. Further, the most recent site inspections have noted that pasture strike has been good suggesting that grass has a degree of tolerance to high sodium levels.

Table 5 Total recoverable sodium concentrations in four paddocks

Paddock	Sample 1 concentration mg/kg (year sampled)	Sample 2 concentration mg/kg (year sampled)	Decrease mg/kg (%)
86	540 (2013)	540 (2021)	0 (0%)
139	650 (2018)	470 (2023)	180 (72%)
140	560 (2018)	350 (2023)	210 (63%)
141	690 (2018)	460 (2023)	230 (67%)

The same comparative analysis could not be carried out for BAP for these three paddocks because no other results in the survey were above the laboratory limit of detection. Neither could a comparative analysis be undertaken for TPH fractions because paddocks with detectable concentrations were not resampled because the results were less than the consent limits.

3.2 Inspections

The site was inspected on 20 October 2022 and again on 2 February 2023. The officer inspected both the former drilling waste and water treatment sludge storage areas. During the monitoring year both of these

were decommissioned and the land restored to pasture. Additionally, all paddocks used to dispose of drilling waste had been reseeded and were observed to have good pasture strike.

4 Discussion

4.1 Environmental effects of exercise of consents

As has been discussed in section 2.4 above Consent 7591-1.2 provides for the early surrender of the consent subject to contaminants in the soil complying with certain limits set out in condition 17. The intention of the limits is to protect the soil quality to ensure that pasture quality and growth could sustain agricultural use once the landfarming had stopped. The limits have been adopted from a range of sources including;

- Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000) (electrical conductivity, chloride, sodium and total soluble salts)
- Guidelines For The Safe Application Of Biosolids To Land In New Zealand (MfE, 2003) (hydrocarbons);
- Canada Wide Standard for Petroleum Hydrocarbons (PHC) in Soils (hydrocarbons);

The consent limit selected for sodium was taken from the ANZECC guidelines which recommends a maximum sodium concentration in irrigation water rather than soil. Elevated sodium concentrations may adversely impact soil structure and regrowth and leach into groundwater. The comparative analysis in section 3.1 indicates that sodium concentrations decrease over time. It is likely that the same will occur in paddocks which reported exceedances of the consent limit.

At high concentrations hydrocarbons can adversely affect the soil microbial community which results in poor soil quality. However, the effects of hydrocarbon contamination in soil are understood to remain localised. For example, monitoring of leaks associated with underground storage tanks are seldom detectable beyond 100 m from the source (Pattle Delamore Partners, 2013). Provided that hydrocarbon concentrations are not too high it will be degraded over time by the microbial community within the soil. On the basis that only two paddocks reported exceedances of BAP and TPH fractions, it is considered that any adverse effects arising from the presence of these contaminants at concentrations above the consent limit are likely to be negligible, localised, and will decrease over time.

It is further notable that during recent site inspections there was no visible evidence of significant effects on pasture growth. Pasture strike was reported as ‘good’ on most occasions. Additionally, ongoing ploughing of fields to re-establish pasture in paddocks will further dilute residual soil contamination.

As demonstrated above the residual contamination remaining in the 20 paddocks identified above are not likely to be having a significant adverse effect on soil health and pasture growth. However, the concentrations exceed those provided for by the resource consent and therefore monitoring of these paddocks must continue until the contaminants are less than the limits.

4.2 Compliance with consent conditions

The site was generally compliant with the conditions of the consents, although most conditions were not relevant because waste is no longer being received or applied to land.

A summary of the consent holder’s compliance with the conditions of each resource consent during the period 2022-2023 can be found in Table 6, and summary of the site’s compliance since 2013-2014 is in Table 7 below.

Table 6 Summary of performance for consent 7591-1.2

Purpose: *To discharge drilling waste from hydrocarbon exploration activities onto and into land via landspreading*		
Condition requirement	**Comments**	**Compliance achieved?**
1. Landfarming/ landspreading definition	N/A	N/A
2. Adoption of the best practicable option	No disposal to land	N/A
3. Prior to the exercise of this consent a management plan must be submitted	Plan submitted November 2009	Yes
4. Notify Council 48 hours prior to landspreading/ landfarming	No disposal to land	N/A
5. Limited to wastes generated in Taranaki including the Taranaki basin	No disposal to land	N/A
6. No hydraulic fracturing material in waste discharged	No disposal to land	N/A
7. Consent authorises landfarming/ landspreading as per appendix I of consent	No disposal to land	N/A
8. Waste application layer shall not exceed: • 100 mm for TPH content of <50,000 mg/kg • 50 mm for TPH >50,000 mg/kg • In a rate and manner where no ponded liquids remain	No disposal to land	N/A
9. The exercise of this consent shall not results in chloride exceeding 800 kg/ ha	Not calculated in year under review	N/A
10. Nitrogen loading shall not exceed 1,000 kg/ha over any five year period	Not calculated in year under review	N/A
11. Landspreading of liquid faction or the stormwater component of the storage pits shall be undertaken through a landspreader, injection spreader or irrigator	No disposal to land	N/A
12. Areas where any discharge has occurred may receive future applications if the following conditions are met: 17, 19, 20, 21	No future applications are expected	N/A

Purpose: *To discharge drilling waste from hydrocarbon exploration activities onto and into land via landspreading*		
Condition requirement	**Comments**	**Compliance achieved?**
13. Areas landfarmed must be re-sown into pasture or crop as soon as practicable. If not achieved within two months additional measure must be undertaken	All landfarmed areas have been returned to pasture	Yes
14. No waste shall be applied within: • 12 m of boundaries • 12 m of named streams • 6 m of other water courses	No disposal to land	N/A
15. Liquid wastes which may flow overland shall not be discharged within 25 m of boundaries or water courses	No disposal to land	N/A
16. Post application the material must be incorporated to a depth of 100 mm and the TPH concentration must be below 2% TPH	No disposal to land	N/A
17. After March 2027 constituents in the soil at any depth less than 500 mm shall meet the following standards • prior to areas being reused for disposal • at the time of expiry/cancellation/surrender	Soil sampling survey	No
18. The consent may not be surrendered unless the standards specified in condition 17 are met	Soil sampling survey	No
19. Concentration of metals in soil must comply with set guidelines	Soil sampling survey	Yes
20. Conductivity must be less than 400 mS/m. If background soil conductivity greater than 400 mS/m, then waste application shall not increase conductivity by more than 100 mS/m	Soil sampling survey	Yes
21. Sodium absorption ratio [SAR] must be less than 8. If background soil SAR is greater than 8, then waste application shall not increase SAR by more than 1	Soil sampling survey	Yes
22. Total dissolved salts in surface water or groundwater shall not exceed 2,500 g/m^3	One paddock exceeded limit	No

Purpose: *To discharge drilling waste from hydrocarbon exploration activities onto and into land via landspreading*		
Condition requirement	**Comments**	**Compliance achieved?**
23. No contamination of groundwater or surface water to exceed background concentrations	No sampling	Yes
24. Records to be kept by consent holder and made available to the Council	No records this year	N/A
25. Consent holder to report to Council by 31 August each year on records specified in condition 24	No disposal to land	N/A
26. Optional review provision re environmental effects	Not required	N/A
Overall assessment of environmental performance and compliance in respect of this consent Overall assessment of administrative performance in respect of this consent		**High** **High**

Table 7 Evaluation of environmental performance over time.

Year	Consent no	High	Good	Improvement required	Poor
2013-2014	6900-2	1			
	7911-1		1		
	7559-1			1	
	7591-1	N/A			
2014-2015	6900-2	1			
	7911-1	1			
	7559-1		1		
	7591-1.1	1			
2015-2016	6900-2	1			
	7911-1	1			
	7559-1.3		1		
	7591-1.1		1		
2016-2017	6900-2	1			
	7911-1		1		
	7559-1.3			1	
	7591-1.1		1		
2018-2019	6900-2	Consent surrendered			
	7911-1	Consent surrendered			
	7559-1.4			1	
	7591-1.2				1

Year	Consent no	High	Good	Improvement required	Poor
	5821-2	1			
2019-2020	7559-1.4				1
	7591-1.2				1
	5821-2	1			
2021-2022	7559-1.4			1	
	7591-1.2			1	
	5821-2		1		
2022-2023	7559-1.4	Consent surrendered			
	7591-1.2		1		
	5821-2	Consent surrendered			

Due to all consented activities ending there were no administrative matters required during this monitoring period. For the same reason there were unlikely to be any notable environmental effects beyond those provided for by the resource consent. The contaminants remaining in the soil will likely have a negligible adverse effect on soil and pasture health but as discussed above the effects will decrease over time. On the basis that the sampling showed residual contamination in the soil the monitoring programme received a 'good' rating. The ratings are defined in Appendix II.

4.3 Recommendations from the 2021-2022 Annual Report

In the 2021-2022 Annual Report, it was recommended:

1. THAT consent 7559-1.4 which authorises the stockpiling facility may be surrendered because this activity no longer occurs at the site and there are no specific surrender conditions.
2. THAT the monitoring programme for the stockpile facility will remain suspended until the consent is surrendered.
3. THAT the Consent Holder should review the water sludge consent (5821-2.2) requirements to ensure this activity can resume and comply with the conditions.
4. THAT consent 7591-1.2 may not be surrendered until the requirements of condition 17 have been met. Routine monitoring will continue.
5. THAT the consent holder should engage with Council to plan the soil validation sampling programme required by consent 7591-1.2.

Consents 7559-1.4 and 5821-2.2 were surrendered during the 2022-2023 monitoring period. The soil sampling programme was completed.

4.4 Alterations to monitoring programmes for 2023-2024

It is recommend that the compliance monitoring programme be reduced to only those paddocks which have residual contaminants which exceed the relevant consent limits, as well as the associated administration and reporting tasks. The soil sampling frequency for each paddock will be reduced to once per year.

5 Recommendations

1. THAT the compliance monitoring programme shall continue at a reduced level for the 2023-2024 monitoring year.
2. THAT should there be issues with environmental or administrative performance in 2023-2024 the monitoring may be adjusted to reflect any additional investigation or intervention as found necessary.

Bibliography and references

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Ministry of Health 2005: Drinking-water Standards for New Zealand 2005 (revised 2018).

Pattle Delamore Partners, 2013: Review of Petroleum Waste Land farming, June 2013.

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Taranaki Regional Council 2022: CD Boyd Drilling Waste and Stockpiling Landfarm and Landspreading Monitoring Programme Annual Report 2021-2022. Technical Report 2022-21.

Taranaki Regional Council 2021: CD Boyd Drilling Waste Stockpiling Landfarm/ Landspreading Monitoring Programme Annual Report 2020-2021. Technical Report 2021-87.

Taranaki Regional Council 2020: CD Boyd Drilling Waste Stockpiling Landfarm/ Landspreading Monitoring Programme Annual Report 2019-2020. Technical Report 2020-11.

Appendix I

Resource consents held by CD Boyd

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

Discharge Permit

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

Name of Consent Holder:	Colin David Boyd P O Box 44 INGLEWOOD 4347
Decision Date (Change):	5 February 2014
Commencement Date (Change):	5 February 2014 (Granted: 14 December 2005)

Conditions of Consent

Consent Granted:	To discharge sludge and other residuals from water treatment plants in the New Plymouth and South Taranaki Districts onto and into land
Expiry Date:	1 June 2026
Review Date(s):	June 2015, June 2021
Site Location:	Surrey Road, Inglewood
Legal Description:	Secs 9, 10 & Pt Sec 13 Blk XII Egmont SD Lot 2 DP 344156 Blk XII Egmont SD Secs 17 & 18 Blk XVI Egmont SD (Discharge sites)
Grid Reference (NZTM)	1701925E-5652253N
Catchment:	Waitara
Tributary:	Mangamawhete Mangatengehu

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

General conditions

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

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

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

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

Special conditions

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

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

3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing at least seven days prior to the exercise of this consent.

4. The consent holder shall notify the Taranaki Regional Council at least 48 hours prior to the transportation of the sludge to the disposal site, and again at least 48 hours prior to beginning the actual disposal operation. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.

5. The sludge shall only be spread in the areas specified in application 4067 and 6784.

6. The consent holder shall ensure that sludge stockpiles are adequately bunded to ensure that there is no stormwater or leachate runoff to any surface watercourse, including farm drains.

7. The sludge shall not be deposited within 25 metres of the Mangamawhete Stream, the Mangatengehu Stream or the Waipuku Stream, or within 10 metres of any open drain or other watercourse.

8. The exercise of the consent shall not result in a total aluminium concentration exceeding 55ug/L in the Mangamawhete Stream, the Mangatengehu Stream or the Waipuku Stream or any open drain or watercourse including farm drains.

9. The area of bare land, stripped for receipt of the residuals, exposed at any particular time shall not exceed 40 acres.

10. As soon as practicable following discharge and incorporation, the discharge area shall be contoured and sown into pasture.

11. The exercise of this consent shall not result in any adverse impacts on groundwater as a result of leaching, or on surface water including aquatic ecosystems, and/or result in a change to the suitability of use of the receiving water as determined by the Chief Executive, Taranaki Regional Council.

12. The exercise of this consent shall not result in any of the following effects on surface water:

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

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

14. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2009 and/or June 2015 and/or June 2021, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time.

Signed at Stratford on 5 February 2014

For and on behalf of
Taranaki Regional Council

_____

A D McLay
Director-Resource Management

Discharge Permit

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

Name of Consent Holder:	Colin David Boyd PO Box 44 Inglewood 4347	
Decision Date (Change):	20 December 2018	
Commencement Date (Change):	20 December 2018	(Granted Date: 20 November 2009)

Conditions of Consent

Consent Granted:	To discharge drilling wastes (consisting of drilling cuttings and drilling fluids) from hydrocarbon exploration activities with water based muds and synthetic based muds, onto and into land for the purpose of storage prior to disposal
Expiry Date:	1 June 2027
Review Date(s):	June 2019, June 2025
Site Location:	Surrey Road, Inglewood
Grid Reference (NZTM)	1701847E-5651476N & 1701850E-5651480N
Catchment:	Waitara
Tributary:	Manganui Mangamawhete Mangatengehu

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

General condition

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

Special conditions

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

2. All waste shall be stored in pits that are lined with 'fit for purpose' high-grade synthetic liner or equivalent and the consent holder shall demonstrate, that the lined pits are suitable for storing liquid without leakage through the base or side walls. The consent holder shall monitor the integrity of the pit liners and repair or replace liners as required.

Notification and sampling requirements prior to discharge

3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, (by emailing worknotification@trc.govt.nz) at least 48 hours prior to bringing wastes onto the site. Notification shall include the following information:

    a. the consent number;
    b. the name of the well(s) from which the waste was generated;
    c. the type of waste; and
    d. the volume of waste.

Discharge limits

4. Subject to condition 5, the exercise of this consent is limited to waste generated in the Taranaki region, including from outside the 12 nautical mile maritime limit within the Taranaki Basin.

5. Waste brought to the site shall not contain any hydraulic fracturing fluids.

6. The volume of material stored on the site shall not exceed 4000 m^3 at any one time.

7. All material must be spread onto land in accordance with consent 7591 as soon as practicable, but no later than 12 months after being brought onto the site.

Receiving environment limits for water

8. The exercise of this consent shall not result in any contaminant concentration, within surface water or groundwater, which after reasonable mixing, exceeds the background concentration for that particular contaminant.

Monitoring and reporting

9. The consent holder shall keep records of the wastes from each individual well, including:

    a) composition of wastes, including concentrations of Metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn), Salts (Barium, Calcium, Chloride, Magnesium, Sodium, Potassium), Hydrocarbons (Total Petroleum Hydrocarbons, Mono Cyclic Aromatic Hydrocarbons and Poly Cyclic Aromatic Hydrocarbons) and Nitrogen;
    b) dates of commencement of storage;
    c) details of monitoring, including sampling locations, sampling methods and the results of analysis;

    and shall make the records available to the Chief Executive, Taranaki Regional Council on request.

10. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, by 31 August of each year, a report on all records required to be kept in accordance with condition 9, for the period of the previous 1 July to 30 June.

Review

11. 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 2019 and/or June 2025, 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 20 December 2018

For and on behalf of
Taranaki Regional Council

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A D McLay
Director - Resource Management

Discharge Permit

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

Name of Consent Holder:	Surrey Road Landfarms Limited PO Box 44 Inglewood 4347	
Decision Date (Change):	20 December 2018	
Commencement Date (Change):	20 December 2018	(Granted Date: 21 January 2010)

Conditions of Consent

Consent Granted:	To discharge drilling waste cuttings (consisting of drilling cuttings and drilling fluids) from hydrocarbon exploration activities with water based muds and synthetic based muds onto and into the land via landfarming, landspreading, injection spreading and irrigation
Expiry Date:	1 June 2027
Review Date(s):	June 2019, June 2025
Site Location:	Surrey Road, Inglewood
Grid Reference (NZTM)	1701750E-5652370N & 1701750E-5652370N
Catchment:	Waitara
Tributary:	Manganui Mangawmawhete Mangatengehu Waipuku

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. For the purposes of this consent the following definitions shall apply:
    a. landfarming means the discharge of drilling wastes from vehicles, tanks, or other containers onto and into land, with spreading, or incorporation into the soil as soon as practicable; and
    b. landspreading means the discharge to land of the liquid fraction of drilling wastes. This includes the stormwater component of the storage cells through the use of a landspreader and/or irrigator and/or injection spreader. Throughout the application of the liquid fraction the consent holder shall maintain pasture cover at all times.

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. For the purpose of this consent, the best practicable option will include undertaking the landfarming/landspreading/injection spreading of drilling waste during extended periods of dry weather.

3. Prior to the exercise of this consent, the consent holder shall provide, to the written satisfaction of the Chief Executive, Taranaki Regional Council, a landfarming management plan to demonstrate the activity will be conducted to comply with all of the conditions of this consent. The management plan shall be reviewed annually and shall include as a minimum:
    a) control of site access;
    b) procedures for notification to Council of disposal activities;
    c) procedures for the receipt and stockpiling of drilling wastes onto the site;
    d) procedures for the management of stormwater recovered from, or discharging from, the drilling waste stockpiling area;
    e) methods used for the mixing and testing of different waste types;
    f) procedures for landfarming drilling wastes (including means of transfer from stockpiling area, means of spreading, and incorporation into the soil);
    g) contingency procedures;
    h) sampling regime and methodology; and
    i) post-landfarming management, monitoring and sites reinstatement.

4. The consent holder shall notify the Chief Executive, Taranaki Regional Council, (by emailing worknotification@trc.govt.nz) at least 48 hours prior to landfarming/landspreading/injection spreading waste from each separate storage cell. Notification shall include the following information:

   a) the consent number;
   b) the name of the well(s) from which the waste was generated;
   c) the type of waste to be applied;
   d) the volume of waste to be applied;
   e) the specific concentrations of Metals (As, Cd, Cr, Cu, Pb, Hg, Ni and Zn), Salts (Barium, Calcium, Chloride, Magnesium, Sodium, Potassium). Hydrocarbons (Total Petroleum Hydrocarbons, Mono Cyclic Aromatic Hydrocarbons and Poly Cyclic Aromatic Hydrocarbons) and Nitrogen in the waste prior application to land;
   f) the specific location and area over which the waste will be applied; and
   g) the method of application.

   In order to demonstrate compliance with conditions 8, 9, 10, 11, 16, 19, 20, and 21 of this consent.

5. Subject to condition 6, the exercise of this consent is limited to waste generated in the Taranaki Region, and from outside the 12 nautical mile maritime limit, within the Taranaki Basin.

6. Waste discharged shall not contain any hydraulic fracturing fluids.

7. This consent authorises the application of material to land only within the area indicated on the attached map (Appendix 1).

Discharge limits

8. For the purposes of landfarming, wastes shall be applied to land in a layer not exceeding:

   a) 100 mm thick for wastes with a hydrocarbon concentration less than 50,000 mg/kg dry weight; or
   b) 50 mm thick for wastes with a hydrocarbon concentration equal to or greater than 50,000 mg/kg dry weight; and
   c) in a rate and manner such that no ponded liquids remain after one hour, for all wastes.

9. The exercise of this consent shall not result in a chloride loading exceeding 800 kg/ha.

10. The nitrogen loading (including that from any application of nitrogen fertiliser) over any area where drilling wastes are applied, shall not exceed 1000 kilograms per hectare over any 5 year period.

11. Landspreading of liquid fraction of drilling wastes and or stormwater component of the storage cells shall be undertaken through the use of a landspreader or injection spreader or irrigator. Throughout the application of the liquid fraction the consent holder shall maintain pasture cover at all times.

12. The areas where any discharge has occurred may receive future applications of material only if they meet the standards defined by conditions 17, 19, 20, 21 of this consent.

13. As soon as practicable following the landfarming of wastes the discharge area shall be re-sown into pasture (or into crop). If revegetation cannot be established within two months of the discharge, the consent holder shall undertake appropriate land stabilisation measures to minimise wind and/or stormwater erosion.

14. No waste shall be discharged within:

    a) 12 metre(s) of property boundaries; or
    b) 12 metre(s) of the Mangamawhete, Mangatengehu and Waipuku Streams; or
    c) 6 metre(s) of any other surface water course (including farm drains).

15. Any liquid drilling waste which may flow over land, shall not be discharged within 25 metre(s) of property boundaries or surface water courses (including farm drains).

Receiving environment limits for soil

16. As soon as practicable following the application of drilling wastes to land, the consent holder shall incorporate the material into the soil to a depth of at least 250 mm for landfarming and 100 mm for the injection spreader, so that the hydrocarbon concentration at any point in the soil/waste mix is equal to or less than 20,000 mg/kg (2%) dry weight at any point.

17. After 1 March 2027 (three months before the consent expiry date), constituents in the soil at any depth less than 500 mm shall meet the standards shown in the following table:

Constituent	Standard
Conductivity	Not greater than 290 mS/m
Chloride	Not greater than 700 mg/kg
Sodium	Not greater than 460 mg/kg
Total Soluble Salts	Not greater than 2500 mg/kg
TPH Fraction	Guideline Value Agricultural Ecological Direct Soil Contact (Fine Sand) From table 5.2
F1 (C6-C10)	210
F2 (>C10-C16)	150
F3 (>C16-C34)	1300
F4 (>C34)	5600
Canadian Council of Ministers of the Environment (CCME), in the document Canada Wide Standard for Petroleum Hydrocarbons (PHC) in Soil: Scientific Rationale, 2008. Table 5.2	
Soil Type/ Contaminant	Depth of contamination
	Surface (<1m) (mg/kg)
SANDY Silt	
MAHs	
Benzene	1.1
Toluene	82
Ethylbenzene	59
Xylene	59
PAHs	
Naphthalene	7.2
Non-carc (Pyrene)	160
Benzo(a)pyrene	0.027
Table 4.12 SANDY SILT Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (MfE 1999)	

The requirement to meet these standards shall not apply if, before 1 March 2027, the consent holder applies for a new consent to replace this consent when it expires, and that the application is not subsequently withdrawn. These conditions also apply:

a) prior to drilling wastes being discharged onto an area that has previously been used for the disposal of drilling wastes; and
b) at the time of expiry, cancellation, or surrender of this consent.

18. This consent may not be surrendered unless the standards specified in condition 17 have been met.

19. The concentration of metals and salts in the soil layer containing discharged material shall comply with the following criteria:

Metal/ Salt	Maximum value (mg/kg)
Arsenic [1]	17
Barium – Barite [2]	10,000
Cadmium [1]	0.8
Chromium [3]	600
Copper [3]	100
Lead [1]	160
Nickel [3]	60
Mercury	1
Zinc [3]	300
[1]SCS – Rural Residential MfE 2011b; [2] Alberta Environment 2009; [3] NZWWA 2003, lowest of protection of human health and ecological receptors. (Biosolids to land)	

20. The conductivity of the soil layer containing discharged material shall be less than 400 mS/m, or alternatively, if the background soil conductivity exceeds 400 mS/m, the application of waste shall not increase the soil conductivity by more than 100 mS/m.

21. After incorporation of the waste within the soil, the sodium absorption ratio (SAR) of the waste soil mix shall not be more than 3 units higher than background soil SAR, or exceed a SAR of 8. Alternatively if the soil SAR exceeds 8, the application of the waste shall not increase the SAR by more than 1.

Receiving environment limits for water

22. The exercise of this consent shall not result in a level of total dissolved salts within any surface water or groundwater of more than 2500 g/m^3.

23. The exercise of this consent shall not result in any contaminant concentration, within surface water or groundwater, which exceeds the background concentration for that particular contaminant, as determined by the Chief Executive, Taranaki Regional Council.

Monitoring and reporting

24. For all waste discharged, the consent holder shall keep records of the following:

    a) the source i.e. the well from which it originated;
    b) composition of wastes, as analysed in condition (4 e);
    c) application areas, including a map showing individual disposal areas with GPS co-ordinates;
    d) volume of wastes applied;
    e) dates of commencement and completion of application events;
    f) details of monitoring, including sampling locations, sampling methods and the results of analysis;

    and shall make the records available to the Chief Executive, Taranaki Regional Council on request.

25. The consent holder shall provide to the Chief Executive, Taranaki Regional Council, by 31 August of each year, a report on all records required to be kept in accordance with condition 24, for the period of the previous 1 July to 30 June.

Lapse and review

26. 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 2016 and/or June 2017 and/or June 2018 and/or June 2019 and/or June 2025 for the purpose of ensuring that the conditions area 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, or to take into account any Act of Parliament, regulations, national policy statement, and national environmental standard which is relevant to this consent.

Signed at Stratford on 20 December 2018

For and on behalf of
Taranaki Regional Council

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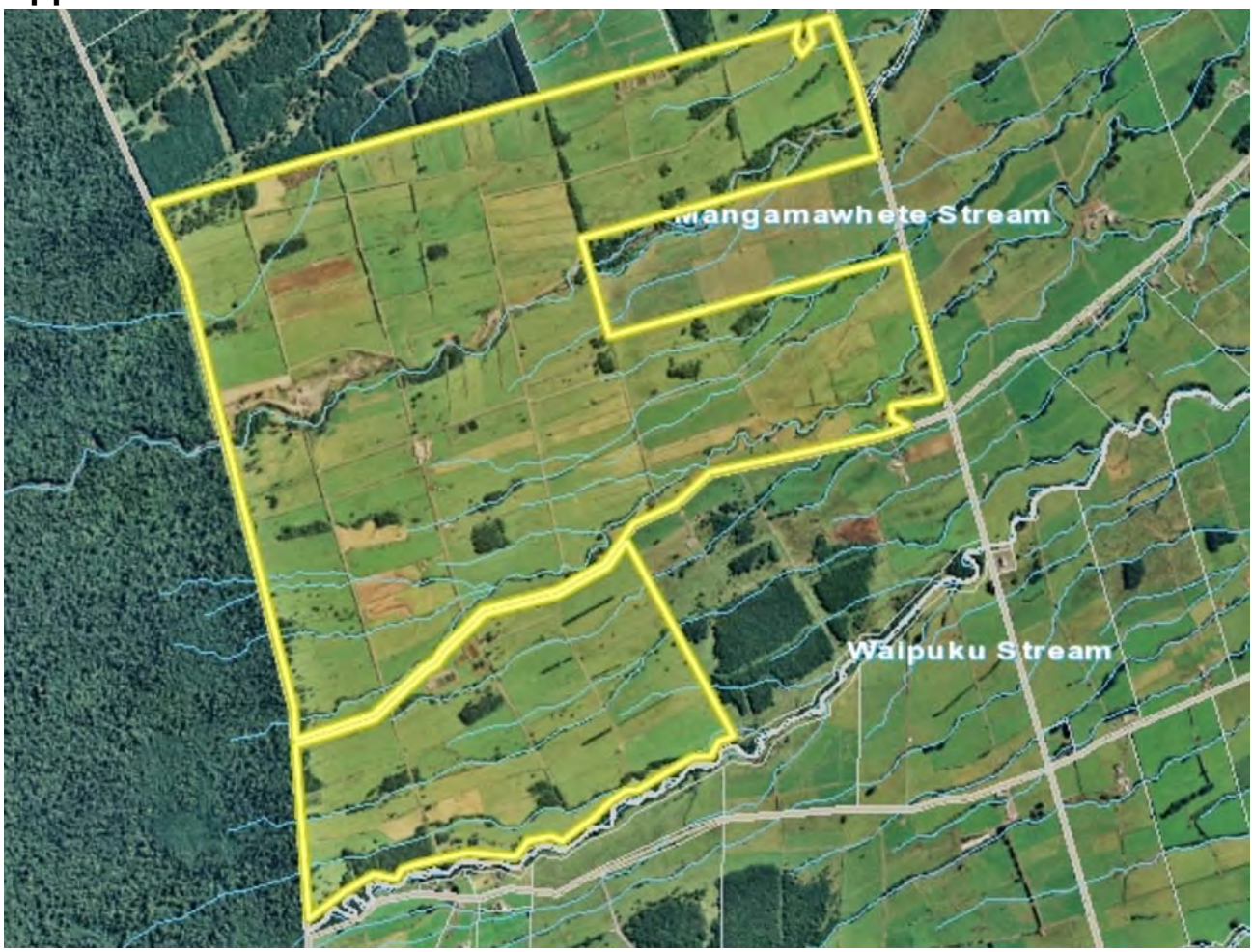
A D McLay
Director - Resource Management

Appendix 1



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 sensitive receptors 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.