

TAG Oil (NZ) Limited
Sidewinder Exploration Wellsite
Monitoring Programme Report
2012-2013

Technical Report 2013–96

ISSN: 0114-8184 (Print)
ISSN: 1178-1467 (Online)
Document: 1317030 (Word)
Document: 1333909 (Pdf)

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May 2014

Executive summary

TAG Oil (NZ) Limited established a hydrocarbon exploration site located on Upper Durham Road, Inglewood, New Plymouth district in the Waitara catchment. The site is called Sidewinder Wellsite. This report covers the period from June 2012 - June 2013. During this period, a wellsite was established, and a wellsite drilled and tested. The wellsite is now in production.

This report for TAG Oil (NZ) Limited describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess TAG Oil (NZ) Limited's environmental performance in relation to drilling operations at the Sidewinder wellsite during the period under review, and the results and environmental effects of TAG Oil (NZ) Limited's activities.

TAG Oil (NZ) Limited holds a total of 7 resource consents for the activities at the Sidewinder Wellsite, which include a total of 82 conditions setting out the requirements that TAG Oil (NZ) Limited must satisfy. TAG Oil (NZ) Limited holds 7600-1 to take groundwater; consent 7597-1 to take surface water; consent 7596-1 to discharge emissions to air from flaring of hydrocarbons associated with well clean up and testing; consent 7822-1 to discharge emissions to air from flaring arising from hydrocarbon production and processing operations; consent 7777-1 to discharge emissions to air associated with production activities; consent 7595-1 to discharge treated stormwater, treated produced water and hydrocarbon exploration onto and into land; and consent 9280-1 to discharge stormwater associated with earthworks and construction activities.

The Council's monitoring programme for the period under review included 13 inspections of the site and surrounding environment, at approximately fortnightly intervals. In total 6 stormwater samples were collected during the period under review.

The monitoring showed that, in general, good processes and procedures were implemented. A strong focus on the environment by all personnel ensured that the site was mostly clean and tidy.

Any spills on-site were quickly cleaned up to avoid the potential for a contaminant to travel to surface water. The site's stormwater system worked effectively.

Owing to the distance of the wellsite to the nearest stream being approximately 30 m, the stream was visually inspected by an Inspecting Officer on each occasion. Chemical analysis or a bio-monitoring survey were un-necessary as no evidence of effects on the stream environment were observed by the Inspecting Officer.

Staff on-site were cooperative with requests made by officers of the Council, with any required works being completed quickly and to a satisfactory standard.

During the monitoring period, TAG Oil (NZ) Limited demonstrated a high level of environmental performance and compliance with the resource consents. The site was generally neat, tidy, and well maintained.

This report includes recommendations for future drilling operations at this and other sites.

Table of contents

	Page
1. Introduction	1
1.1 Compliance monitoring programme reports and the Resource Management Act 1991	1
1.1.1 Introduction	1
1.1.2 Structure of this report	1
1.1.3 The Resource Management Act (1991) and monitoring	2
1.1.4 Evaluation of environmental and consent performance	2
1.2 Process description	3
Flaring from exploration activities	4
1.3 Resource consents	5
1.3.1 Background	5
1.3.2 Water abstraction permit (groundwater)	6
1.3.3 Water abstraction permit (surface water)	7
1.3.4 Water discharge permit (treated stormwater and treated produced water)	7
1.3.5 Water discharge permit (stormwater and sediment – earthworks)	8
1.3.6 Air discharge permit (exploration activities)	9
1.3.7 Air discharge permit (production activities)	10
1.3.8 Air discharge permit (production activities)	10
1.4 Monitoring programme	11
1.4.1 Introduction	11
1.4.2 Programme liaison and management	11
1.4.3 Site inspections	11
1.4.4 Chemical sampling	12
1.4.5 Solid wastes	12
1.4.6 Air quality monitoring	13
1.4.7 Ecological surveys	13
2. Results	14
2.1 Water	14
2.1.1 Inspections	14
2.1.2 Results of abstraction and discharge monitoring	16
2.1.3 Results of receiving environment monitoring	16
2.2 Air	17
2.2.1 Inspections	17
2.2.2 Results of discharge monitoring	17
2.2.3 Results of receiving environment monitoring	17
2.2.4 Other ambient monitoring	17
2.3 Land	17
2.3.1 Land status	17
2.4 Contingency plan	18
2.5 Investigations, interventions and incidents	18
3. Discussion	19

3.1	Discussion of consent exercise	19
3.2	Environmental effects of exercise of consents	19
3.3	Evaluation of performance	21
3.4	Exercise of optional review of consents	27
4.	Recommendations	29
	Glossary of common terms and abbreviations	30
	Appendix I Resource consents	

List of tables

Table 1	Results of water samples taken from the skimmer pits on six occasions during the monitoring period	16
Table 2	Summary of performance for Consent 7600-1 to take groundwater that may be encountered during exploration and production operations at Sidewinder wellsite	22
Table 3	Summary of performance for Consent 7597-1 to take water from the Piakau Stream for Sidewinder wellsite and well drilling activities during hydrocarbon exploration and production activities	22
Table 4	Summary of performance for Consent 7822-1 to discharge emissions to air associated with production activities including flaring associated with miscellaneous activities at the Sidewinder wellsite	23
Table 5	Summary of performance for Consent 7777-1 to discharge emissions to air associated with production activities including flaring associated with emergencies and maintenance and minor emissions from other miscellaneous activities at the Sidewinder wellsite	24
Table 6	Summary of performance for Consent 7596-1 to discharge emissions to air from flaring of hydrocarbon exploration activities at the Sidewinder wellsite	25
Table 7	Summary of performance for Consent 7595-1 to discharge treated stormwater, and produced water from hydrocarbon exploration and production operations at the Sidewinder wellsite onto and into land in the vicinity of the Piakau Stream	26
Table 8	Summary of performance for Consent 9280-1 to discharge stormwater and sediment from earthworks during construction of the Sidewinder wellsite onto and into land	27

List of photos

Photo 1	Aerial view showing the location of Sidewinder wellsite	5
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1. Introduction

1.1 Compliance monitoring programme reports and the Resource Management Act 1991

1.1.1 Introduction

TAG Oil (NZ) Limited operated a hydrocarbon exploration site located on Upper Durham Road, Inglewood, in the New Plymouth district in the Waitara catchment. The site is called Sidewinder Wellsite. This operation took place from June 2012 - June 2013.

This report for the Sidewinder Wellsite describes the monitoring programme implemented by the Taranaki Regional Council (the Council) to assess TAG Oil (NZ) Limited's environmental performance in relation to drilling operations at the Sidewinder Wellsite during the period under review, and the results and environmental effects of TAG Oil (NZ) Limited activities.

One of the intents of the Resource Management Act 1991 (the Act) is that environmental management should be integrated across all media, so that a consent holder's use of water, air, and land should be considered from a single comprehensive environmental perspective. Accordingly, the Council generally implements integrated environmental monitoring programmes and reports the results of the programmes jointly. This report discusses the environmental effects of TAG Oil (NZ) Limited's use of water, land, and air, and is the first report by the Council for the site.

1.1.2 Structure of this report

Section 1 of this report is a background section. It sets out general information about compliance monitoring under the Act and the Council's obligations and general approach to monitoring sites through annual programmes, the resource consent held by TAG Oil (NZ) Limited in the Waitara 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 Sidewinder wellsite during exploration activities.

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

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

Section 4 presents recommendations to be implemented during future drilling operations.

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

1.1.3 The Resource Management Act (1991) and monitoring

The Resource Management Act 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 a discharger, and may include cultural and socio-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 (eg, recreational, cultural, or aesthetic);
- (e) risks to the neighbourhood or environment.

In drafting and reviewing conditions on discharge permits, and in implementing monitoring programmes, the Taranaki Regional Council is recognising the comprehensive meaning of 'effects' inasmuch as is appropriate for each discharge source. Monitoring programmes are not only based on existing permit conditions, but also on the obligations of the Resource Management Act to assess the effects of the exercise of consents. In accordance with section 35 of the Resource Management Act 1991, the Council undertakes compliance monitoring for consents and rules in regional plans; and maintains an overview of performance of resource users against regional plans and consents. Compliance monitoring, including impact monitoring, also enables the Council to continuously assess its own performance in resource management as well as that of resource users particularly consent holders. It further enables the Council to continually re-evaluate its approach and that of consent holders to resource management, and, ultimately, through the refinement of methods, to move closer to achieving sustainable development of the region's resources.

1.1.4 Evaluation of environmental and consent performance

Besides discussing the various details of the performance and extent of compliance by the consent holder during the period under review, this report also assigns an overall rating. The categories used by the Council, and their interpretation, are as follows:

- a **high** level of environmental performance and compliance indicates that essentially there were no adverse environmental effects to be concerned about, and no, or inconsequential (such as data supplied after a deadline) non-compliance with conditions.
- a **good** level of environmental performance and compliance indicates that adverse environmental effects of activities during the monitoring period were negligible or minor at most, or, the Council did not record any verified unauthorised incidents involving significant environmental impacts and was not obliged to issue any abatement notices or infringement notices, or, there were perhaps some items noted on inspection notices for attention but these items were not urgent nor critical, and follow-up inspections showed they have been dealt with, and any inconsequential non-compliances with conditions were resolved positively, co-operatively, and quickly.

- **improvement required (environmental) or improvement required (administrative)** (as appropriate) indicates that the Council may have been obliged to record a verified unauthorised incident involving measurable environmental impacts, and/or, there were measurable environmental effects arising from activities and intervention by Council staff was required and there were matters that required urgent intervention, took some time to resolve, or remained unresolved at end of the period under review, and/or, there were on-going issues around meeting resource consent conditions even in the absence of environmental effects. Abatement notices may have been issued.
- **poor performance (environmental) or poor performance (administrative)** indicates generally that the Council was obliged to record a verified unauthorised incident involving significant environmental impacts, or there were material failings to comply with resource consent conditions that required significant intervention by the Council even in the absence of environmental effects. Typically there were grounds for either a prosecution or an infringement notice.

For reference, in the 2012-2013 year, 35% of consent holders in Taranaki monitored through tailored compliance monitoring programmes achieved a high level of environmental performance and compliance with their consents, while another 59% demonstrated a good level of environmental performance and compliance with their consents.

1.2 Process description

Site management

TAG Oil (NZ) Limited holds a 10 year Petroleum Mining Permit No. 53803 to prospect, explore, and mine for condensate, gas, LPG, oil and petroleum within an area of 2.890 Km². The Sidewinder wellsite is one of many sites within this area that have been established in order to explore, evaluate and produce hydrocarbons.

The Sidewinder wellsite is located approximately 3.5 km along Upper Durham Road, approximately 6.5 km from Inglewood.

The Sidewinder wellsite was established in 2011 and involved the removal of topsoil to create a firm level platform on which to erect a drilling rig and house associated equipment. Site establishment also involved the installation of:

- Wastewater control, treatment and disposal facilities;
- A system to collect and control stormwater and contaminants;
- A flare pit; and
- Other on-site facilities such as accommodation, parking and storage.

The nearest residence is approximately 250 m away from the wellsite. Bunding, earthworks and good site location helped minimise any potential for off-site effects for the neighbours.

Well creation

The process of drilling a well can take a few weeks to several months, depending on the depth of the well, the geology of the area, and whether the well is vertical or horizontal.

Drilling fluids, more commonly known as 'drilling muds', are required in the drilling process for a number of reasons, including:

- As a safety measure to ensure that any pressurized liquids encountered in the rock formation are contained;
- To transport drill cuttings to the surface;
- To cool and lubricate the drilling bit;
- To provide information to the drillers about what is happening down hole and the actual geology being drilled; and
- To maintain well pressure and lubricate the borehole wall to control cave-ins and wash-outs.

The well is drilled progressively using different sized drill bits. The width of the well is widest at the surface as smaller drill bits are used as the well gets deeper. Once each section of the well is drilled, a steel casing is installed. Cement is then pumped down the well to fill the annulus (the space between the steel casing and the surrounding country rock). This process is repeated until the target depth is reached, with each section of steel casing interlocked with the next.

Production tubing is then fitted within the steel casing to the target depth. A packer is fitted between the production tubing and casing to stop oil/gas/produced water from entering the annulus. The packer is pressure tested to ensure it is sealed.

The construction aspects that are most important for a leak-free well include the correct composition and quality of the cement used, the installation method, and the setting time. The aim is to ensure that the cement binds tightly to the steel casing and the rock, and leaves no cavities through which liquids and gases could travel.

Once the well is sealed and tested the casing is perforated at the target depth, allowing fluids and gas to flow freely between the formation and the well.

Flaring from exploration activities

It is possible that flaring may occur during the following activities:

- Well testing and clean-up;
- Production testing;
- Emergencies; and
- Maintenance and enhancement activities [well workovers].



Photo 1 Aerial view showing the location of Sidewinder wellsite

1.3 Resource consents

1.3.1 Background

TAG Oil (NZ) Limited holds 7 resource consents related to exploration activities at the Sidewinder wellsite site, as follows:

- Water Permit **7600-1**; granted 11 February 2010,
- Water Permit **7597-1**; granted 11 February 2010,
- Discharge Permit **7595-1**; granted 6 December 2011,
- Discharge permit **9280-1**; granted 6 June 2012,
- Discharge Permit **7596-1**; granted 16 January 2012,
- Discharge Permit **7777-1**; granted 7 February 2011 and
- Discharge Permit **7822-1**; granted 22 June 2011

Each of the consent applications were processed on a non-notified basis as TAG Oil (NZ) Limited obtained the landowner approvals as an affected party, and the Council were satisfied that the environmental effects of the activity would be minor. The consents are discussed in further detail below.

Copies of the consents and the Council reports describing the associated activities are contained within Appendix I of this report.

1.3.2 Water abstraction permit (groundwater)

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

The Council determined that the application to take groundwater fell within Rule 49 of the Regional Freshwater Plan for Taranaki (RFP) as the rate and daily volume of the groundwater abstraction might exceed that of the permitted activity (Rule 48). Rule 49 provides for groundwater abstraction as a controlled activity, subject to two conditions:

- *The abstraction shall cause not more than a 10% lowering of static water-level by interference with any adjacent bore;*
- *The abstraction shall not cause the intrusion of saltwater into any fresh water aquifer.*

TAG Oil (NZ) Limited holds water permit 7600-1 to take groundwater that may be encountered as produced water during exploration and production operations at the Sidewinder wellsite.

Any produced water will be from reserves far below that which is used for domestic or farm purposes. In addition, there are no known groundwater abstractions within a radial distance of 1100 m from the proposed wellsite. Shallow groundwater (which does not have any saltwater content) was to be protected by casing within the bore hole. Given these factors, the abstraction would not cause the above effects.

In granting the consent it was considered that the taking of groundwater was unlikely to have any adverse effect on the environment.

The Council was satisfied that the proposed activity would meet all the standards for a controlled activity. It was therefore obliged to grant the consent but imposed conditions in respect of those matters over which it reserved control. Those matters over which the Council reserved its control were:

- Volume and rate of abstraction;
- Daily timing of abstraction;
- Effects on adjacent bores, the aquifer, river levels, wetlands and sea water intrusion;
- Fitting of equipment to regulate flows and to monitor water volumes, levels, flows and pressures;
- Payment of administrative charges;
- Monitoring and report requirements;
- Duration of consent; and
- Review of the conditions of consent and the timing and purpose of the review.

This permit was issued by the Council on 11 February 2010 under Section 87(d) of the Act. It is due to expire on 1 June 2027.

Consent conditions were imposed on TAG Oil (NZ) Limited to ensure that adverse effects were avoided in the first instance. A summary of conditions can be viewed within Table 2, Section 3.3.

A copy of the permit is attached to this report in Appendix 1.

1.3.3 Water abstraction permit (surface water)

Section 14 of the Act 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.

The Council had determined that the application to take surface water fell within Rule 16 of the RFWP, which is a discretionary activity, as the rate and daily volume of the proposed surface water abstraction exceeded that of the permitted activity (Rule 15).

The water take associated with this permit was to occur during the drilling phase of the operation only, which was anticipated to be for approximately 60 days for the first well. The maximum volume applied for was 100 cubic metres per day at a maximum extraction rate of 25 litres per second for the duration of the drilling activities. The Council had determined that the mean annual low flow (MALF) at the Everett Park Station was 3,050 litres per second, so considering the temporary and intermittent nature of the activity, the effects on the river flows and the ecology were deemed as less than minor.

TAG Oil (NZ) Limited holds water permit 7597-1 to take water from the Piakau Stream for wellsite and well drilling activities during hydrocarbon exploration and production operations at the Sidewinder wellsite.

This permit was issued by the Council on 11 February 2010 under Section 87(d) of the Act. It is due to expire on 1 June 2027.

In granting the consent it was considered that the taking of surface water was unlikely to have any adverse effect on the environment.

Consent conditions were imposed on TAG Oil (NZ) Limited to ensure that adverse effects were avoided in the first instance. A summary of conditions can be viewed within Table 3, Section 3.3

A copy of the permit is attached to this report in Appendix 1.

1.3.4 Water discharge permit (treated stormwater and treated produced water)

Section 15(1)(a) of the Act 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.

The Council determined that the application to discharge treated stormwater, treated produced water and surplus drill water fell within Rule 44 of the RFWP, which provides for a discharge as a discretionary activity.

The discharge of stormwater may result in contaminants (e.g. sediment, oil) entering surface water. These contaminants have the potential to smother or detrimentally affect in-stream flora and fauna. On-site management of stormwater, as discussed in 1.2 above, is necessary to avoid/remedy any adverse effects on water quality.

TAG Oil (NZ) Limited holds water discharge permit 7595-1 to discharge treated stormwater and produced water from hydrocarbon exploration and production operations at the Sidewinder wellsite onto and into land in the vicinity of the Piakau Stream.

Consent conditions were imposed on TAG Oil (NZ) Limited to ensure that adverse effects were avoided in the first instance. A summary of conditions can be viewed in Table 7, Section 3.3.

This permit was issued by the Council on 6 December 2011 under Section 87(e) of the Act. It is due to expire on 1 June 2027.

A copy of the permit is attached to this report in Appendix I.

1.3.5 Water discharge permit (stormwater and sediment – earthworks)

Section 15(1)(a) of the Act 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.

Council considered that the application fell under Rule 27 of the RFWP as a controlled activity (which may be non-notified without written approval), subject to one standard/term/condition to be met:

- *A site erosion and sediment control management plan shall be submitted to the Taranaki Regional Council.*

TAG Oil (NZ) Limited supplied a site erosion and sediment control management plan in support of the application.

The Council was satisfied that the activity would meet all the standards for a controlled activity. It was therefore obliged to grant the consent but imposed conditions in respect of those matters over which it reserved control. Those matters over which the Council reserved its control were:

- Approval of a site erosion and sediment control management plan and the matters contained therein;
- Setting of conditions relating to adverse effects on water quality and the values of the waterbody;
- Timing of works;
- Any measures necessary to reinstate the land following the completion of the activity;
- Monitoring and information requirements;
- Duration of consent;
- Review of conditions of consent and the timing and purpose of the review; and

- Payment of administrative charges and financial contributions.

TAG Oil (NZ) Limited holds water discharge permit **9280-1** to discharge stormwater and sediment from earthworks during construction of the Sidewinder wellsite onto and into land.

This permit was issued by the Council on 6 June 2011 under Section 87(e) of the Resource Management Act. It is due to expire on 1 June 2017.

Consent conditions were imposed on TAG Oil (NZ) Limited to ensure that adverse effects are avoided in the first instance. A summary of conditions can be viewed in Table 8, Section 3.3.

A copy of the permit is attached to this report in Appendix I.

1.3.6 Air discharge permit (exploration activities)

Section 15(1)(c) of the Act 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.

The Council determined that the application to discharge emissions to air associated with the exploration activities at the Sidewinder wellsite fell within Rule 9 of the Regional Air Quality Plan (RAQP).

The standard/term/conditions associated with Rule 9 are as follows:

- *Flare or incinerator point is at least 300 metres from any dwelling house;*
- *The discharge to air from the flare must not last longer than 15 days cumulatively, including of testing, clean-up, and completion stages of well development or work-over, per zone to be appraised; and*
- *No material to be flared or incinerated, other than those derived from or entrained in the well steam.*

Provided the activities were conducted in accordance with the applications and in compliance with the recommended special conditions, then no significant effects were anticipated.

TAG Oil (NZ) Limited holds air discharge permit **7596-1** to discharge emissions to air from hydrocarbon exploration activities including flaring or incineration of petroleum or combustion of returned hydraulic fracturing fluids associated with well development or redevelopment and testing or enhancement of well heads production flows at the Sidewinder wellsite.

This permit was issued by the Council on 16 January 2012 under Section 87(e) of the Act. It is due to expire on 1 June 2027.

Consent conditions were imposed on TAG Oil (NZ) Limited to ensure that adverse effects are avoided in the first instance. A summary of conditions can be viewed in Table 6, Section 3.3.

A copy of the permit is attached to this report in Appendix I.

1.3.7 Air discharge permit (production activities)

Section 15(1)(c) of the Act 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.

The Council determined that the application to discharge emissions to air associated with the production activities at the Sidewinder production station to be established on the Sidewinder wellsite fell within Rule 12 of the RAQP, as the flare was proposed to be within 300 m of an existing dwelling house. The occupier gave their approval to the activity.

TAG Oil (NZ) Limited holds air discharge permit **7822-1** to discharge emissions to air associated with production activities at the Sidewinder production station including flaring associated with hydrocarbon production and processing operations, together with miscellaneous emissions.

This permit was issued by the Council on 22 June 2011 under Section 87(e) of the Act. It is due to expire 1 June 2027.

Consent conditions were imposed on TAG Oil (NZ) Limited to ensure that adverse effects are avoided in the first instance. A summary of conditions can be viewed in Table 4, Section 3.3.

A copy of the permit is attached to this report in Appendix I.

1.3.8 Air discharge permit (production activities)

Section 15(1)(c) of the Act 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.

The Council determined that the application to discharge emissions to air associated with the production activities at the Sidewinder wellsite fell within Rule 10 of the RAQP, which provided for consideration as a restricted discretionary activity, applications to flare within 300 m of a dwelling house.

The standard/term/condition of Rule 10 states:

- No material to be flared or incinerated, other than those derived from or entrained in the well stream.
- The occupier gave their approval to the activity.

TAG Oil (NZ) Limited holds air discharge permit **7777-1** to discharge emissions to air associated with production activities at the Sidewinder wellsite including flaring associated with emergencies and maintenance and minor emissions from other miscellaneous activities.

This permit was issued by the Council on 7 February 2011 under Section 87(e) of the Act. It is due to expire 1 June 2027.

Consent conditions were imposed on TAG Oil (NZ) Limited to ensure that adverse effects are avoided in the first instance. A summary of conditions can be viewed in Table 5, Section 3.3.

A copy of the permit is attached to this report in Appendix I.

1.4 Monitoring programme

1.4.1 Introduction

Section 35 of the Act sets out obligation/s upon the Council to gather information, monitor, and conduct research on the exercise of resource consent and the effects arising, within the Taranaki region and report upon these.

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

The monitoring programme for exploration well sites consists of seven primary components. They are:

- Programme liaison and management;
- Site inspections;
- Chemical sampling;
- Solid wastes monitoring;
- Air quality monitoring;
- Discharges to land (hydraulic fracturing and deep well injection); and
- Ecological surveys.

The monitoring programme for the Sidewinder wellsite focused primarily on programme liaison and management, site inspections, and discharges to land. However, all seven components are discussed below.

1.4.2 Programme liaison and management

There is generally a significant investment of time and resources by the Council in ongoing liaison with resource consent holders over consent conditions and their interpretation and application, in discussion over monitoring requirements, preparation for any reviews, renewals, or new consents, advice on the Council's environmental management strategies and the content of regional plans, and consultation on associated matters.

1.4.3 Site inspections

Inspection and examination of wellsites is a fundamental and effective means of monitoring and are undertaken to ensure that good environmental practices are adhered to and resource consent special conditions complied with.

The inspections are based on internationally recognised and endorsed wellsite monitoring best-practice checklists developed by the Alberta Energy Resources Conservation Board and the USEPA, adapted for local application.

The inspections also provide an opportunity for monitoring officers to liaise with staff about on-site operations, monitoring and supervision; discuss matters of concern; and resolve any issues in a quick and informal manner.

Inspections pay special attention to the ring drains, mud sumps, treatment by skimmer pits and the final discharge point from the skimmer pit on to land and then any potential receiving waters.

During each inspection the following are checked:

- Weather;
- Flow rate of surface waters in the general vicinity;
- Flow rate of water take;
- Whether pumping of water was occurring;
- General tidiness of site;
- Site layout;
- Ring drains;
- Hazardous substance bunds;
- Treatment by skimmer pits/sedimentation pits;
- Drilling mud;
- Drill cuttings;
- Mud pit capacity and quantity contained in pit;
- Sewage treatment and disposal;
- Cementing waste disposal;
- Surface works;
- Whether flaring was in progress, and if there was a likelihood of flaring, whether the Council had been advised;
- Discharges;
- Surface waters in the vicinity for effects on colour and clarity, aquatic life and odour;
- Site records;
- General observations; and
- Odour (a marker for any hydrocarbon and hazardous chemical contamination).

1.4.4 Chemical sampling

The Council may undertake sampling of discharges from site and from sites upstream and downstream of the discharge point to ensure that resource consent special conditions are complied with.

1.4.5 Solid wastes

The Council monitors any disposal of drill cuttings on-site via mix-bury-cover to ensure compliance with resource consent conditions.

In recent times consent holders have opted to remove drilling waste from the site by contractor and dispose of it at licensed disposal areas (land farming), which are monitored separately. This was the case for the Sidewinder development.

1.4.6 Air quality monitoring

Air quality monitoring is carried out in association with the well testing and clean-up phase, where flaring can occur.

Assessments are made by Inspecting Officers of the Council during site inspections to ensure that operators undertake all practicable steps to mitigate any effects from flaring gas.

Inspecting Officers check that that plant equipment is working effectively, that there is the provision of liquid and solid separation, and that staff onsite have regard to wind direction and speed at the time of flaring.

The flare pit is also inspected to ensure that solid and liquid hydrocarbons are not combusted within the flare pit.

It is also a requirement that the Council and immediate land owners are notified prior to any gas being flared. This requirement was checked to ensure compliance with the conditions.

1.4.7 Ecological surveys

Ecological surveys in any nearby streams may be carried out pre and post occupation of the well site to assess whether the activities carried out on-site, and associated discharges have had any effect on ecosystems. However, as the Sidewinder wellsite is still being occupied, and the fact that visual inspections of the receiving water didn't show any effects from the discharges, no ecological surveys have been undertaken during this monitoring period.

2. Results

2.1 Water

2.1.1 Inspections

The Sidewinder wellsite, adjacent land and streams were inspected **13** times during this monitoring period.

Below is a copy of the comments that were noted on the day of each inspection.

21 June 2012

The site inspection was carried out during a prolonged period of rainfall. The skimmer pits were very clean, a lot of ground water was flowing around the perimeter ring drain and this water was very clean. No flaring was being undertaken at time of inspection and the bunds were all effective. It was discussed with the site manager that some realignment or installation of skimmer pits at northern end of the ring drain may be necessary to improve site drainage.

23 August 2012

The site inspection was carried out after a period of prolonged rainfall although at the time of inspection it was fine. The site was neat, tidy and well managed. The skimmer pits were full of clear water and there was no evidence of any contaminants. The pilot flare was operating. The bunds and ring drains were both clear.

1 November 2012

The site inspection was carried out in fine weather and there had been no significant rain for a week. The skimmer pits were clear and not discharging. The ring drains were free of contaminants and there was a frog in residence at the top end of drain. Flaring was being undertaken, but it was very minor and no down wind effects were noted. The site was neat, tidy and well managed. The site manager was on site at the time of the inspection.

10 January 2013

It was observed that no silt containment measures were in place along the northern side of the site extension where it is adjacent to a small stream. It was highly likely that silt/sediment would enter the stream when it rained and the installation of silt cloth would reduce the effects caused by the runoff of this sediment into the stream.

Advice was given to ensure that the silt cloth was installed. A stormwater sample was taken from the second skinner pit for analysis.

22 January 2013

The site inspection was carried out in dry weather. The skimmer pits were nearly empty and were not discharging via the discharge pipe. Staff onsite advised that the pits would be lined with plastic in the very near future. A silt cloth has been placed along the length of the earth worked areas adjacent to the stream and grass seed had been applied to stabilise the banks.

7 February 2013

During the inspection a stormwater sample was collected for analysis to ensure that the resource consent conditions would be complied with should a discharge from site occur.

12 February 2013

The site was clean and tidy and the ring drain was in good condition. The skimmer pit was not discharging at the time of the inspection. Water samples were collected from the second skimmer pit to ensure that a discharge would comply with consent conditions should a discharge occur.

1 March 2013

Drilling was not taking place at the time of inspection; Staff advised the rig would be moving over the next few days to commence drilling another hole.

The site was found to be dry, clean and tidy; however a spill of drilling mud had occurred as a result of an operator error. The spill was contained to a small area and immediately cleaned up. The contaminants had been removed from the site and disposed of as per normal procedure. Fresh gravel had been put in place of the removed contaminated gravel. The spill did not reach the ring drain. It appeared that the response to the spill was well managed with the appropriate action taken in these circumstances.

The skimmer pits were not discharging at the time of the visit. A sample was collected to ensure that the discharge would comply with the resource consent conditions should a discharge occur.

15 March 2013

Drilling was being carried out during the inspection. The testing of wellheads was about to begin.

The site appeared to be clean and tidy, however there were some small spills observed including what appeared to be dried drilling mud in the ring drain. All minor spills were cleaned up with a shovel on site.

The skimmer pits were empty after contents were recently pumped out to be used in the drilling operation. No samples taken during the inspection.

In general the site appeared to be well managed and spills quickly attended to.

26 March 2013

During the inspection, the ring drain appeared to be in a good working order. Works onsite were ensuring that the ring drain was free from debris to allow the water to flow freely.

Attention was given to ensure that any spills around the mud tank area were being cleaned up straight away. The inspecting officer advised the site manager to ensure that the catchment and containment areas under tanks were empty prior to any rain. A sample was collected to ensure that the discharge would comply with the resource consent conditions should a discharge occur.

14 May 2013

The bunds and ring drains were secure and clear of any debris after high winds the previous weekend. The drilling rig was on site and undertaking well completion work; this site was also found to be neat and tidy. There was no flaring undertaken at the time of the inspection although the pilot flare was evident.

7 June 2013

The inspection found that the drilling had recently stopped on site due to noise constraints. The rig was still on site at the time of inspection but no drilling activity was taking place. The site was clean and tidy with no indication of contaminated areas around the site. The skimmer pits were not discharging at the time of the inspection, however samples were taken of the skimmer pit to ensure that the discharge would comply with consent conditions should a discharge occur.

13 June 2013

The site was neat and tidy, there was no stormwater discharging off the site, the ring drains and bunds were clear and there was no flaring or associated odour. There was no drilling activity during the inspection.

2.1.2 Results of abstraction and discharge monitoring

During the period under review, stormwater was not observed discharging. There were 6 skimmer pit stormwater samples collected during the review period for this report and chemical analysis of the stormwater was carried out. All of the stormwater samples except one were collected from the second skimmer pit at the Sidewinder wellsite. The exception was collected from the first skimmer pit.

All sewage was directed for treatment through a septic tank system and removed by contractor to a licensed disposal facility. Inspections of the stormwater discharge found it to be mostly clear. No odours were found to be associated with the discharge.

Table 1 Results of water samples taken from the skimmer pits on six occasions during the monitoring period

Parameters	Consent limit	10 January 2013	7 February 2013	12 February 2013	1 March 2013	26 March 2013	7 June 2013
Chloride (g/m ³)	50	3.6	13.6	19.3	14.8	9.2	42.8
pH	6-9	7.1	6.7	6.7	7.1	6.5	7.0
Suspended solids (g/m ³)	100	3	23	11	<2	26	34
Hydrocarbon (g/m ³)	15	<0.5	0.5	<0.5	<0.5	<0.5	<0.5

On 7 June 2013, a sample taken from the skimmer pit showed relatively elevated chloride level. However this was still within consent limits.

2.1.3 Results of receiving environment monitoring

The authorised discharges offsite were onto land from the skimmer pits. It is considered that the discharge was unlikely to reach a surface water body due to the small catchment area of the site.

The receiving surface water body was visually inspected in conjunction with site inspections. No effects were observed and the stream appeared clear with no visual change in colour or clarity. There was also no odour, oil, grease films, scum, foam or suspended solids observed in the stream during the monitoring period.

2.2 Air

2.2.1 Inspections

Air quality monitoring inspections were carried out in conjunction with general compliance monitoring inspections. See Section 2.1.1 above for comments concerning site inspections.

2.2.2 Results of discharge monitoring

Sidewinder wellsite notified the Council of its intention to test the well and flare gas intermittently between 14 May 2012 and 20 May 2012. During inspections of the site the Inspecting Officer found there were no offensive or objectionable odours, smoke or dust associated with activities at Sidewinder wellsite. There were no occasions when the Taranaki Regional Council received complaints regarding smoke from flaring at the Sidewinder wellsite.

It appeared that TAG Oil (NZ) Limited took all practicable steps to mitigate any effects of smoke, which included ensuring that plant equipment was working effectively and having regard to wind direction and speed.

The flare pit was inspected during most inspections to ensure that solid and liquid hydrocarbons were not combusted within the flare pit. There was no evidence to suggest that solid and liquid hydrocarbons were being combusted through the gas flare system.

From observations during site inspections, including the inspection of the flare log maintained by TAG Oil (NZ) Limited, it appeared that special conditions relating to the control of emissions to air from the flaring of hydrocarbons were complied with.

2.2.3 Results of receiving environment monitoring

No monitoring of the receiving environment was carried out as inspections found no offensive or objectionable odours, smoke or dust that was associated with activities at the site.

No chemical monitoring of air quality was undertaken during the testing phase of the Sidewinder wellsite as the controls implemented by TAG Oil (NZ) Limited did not give rise to any concerns with regard to air quality.

As mentioned in Section 2.2.2, visual inspections of the flare, the flare pit and surrounding area were carried out and no effects were observed.

2.2.4 Other ambient monitoring

No other ambient air sampling was undertaken, as the controls implemented by TAG Oil (NZ) Limited did not give rise to any concerns with regard to air quality.

2.3 Land

2.3.1 Land status

The well site was constructed on a flat rural dairy farming area. Relatively minor earthworks were required to construct the site. The land had not been reinstated at

the time of the last inspection on 13 June 2013 as the well was still currently producing, and the site is still in use.

2.4 Contingency plan

TAG Oil (NZ) Limited has provided a general contingency plan, as required by Condition 4 of recourse consent 7595-1 with site specific maps which cover all onshore sites that they operate. The contingency plan has been reviewed and approved by officers of the Council.

2.5 Investigations, interventions and incidents

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

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

In the period under review, there were no incidents recorded by the Inspecting Officers during inspections.

Any minor actual or potential non-compliance with consent conditions were addressed during site inspections. TAG Oil (NZ) Limited staff would quickly take steps to ensure that requests made by Council Inspecting Officers were adhered to without delay.

3. Discussion

3.1 Discussion of consent exercise

Of the 7 resource consent relating to the Sidewinder wellsite, consents **7600-1** (take groundwater), consents **7597-1** (take surface water) **7596-1** (air discharge associated with exploration), **7822-1** (air discharge associated with production), **7595-1** (to discharge treated stormwater and produced water), **9280-1** (to discharge stormwater and sediment from earthworks during construction), were exercised and actively monitored

Flaring in association with production activities was not exercised during the monitoring period as permitted by resource consent **7777-1** (air discharge associated with production).

Monitoring has shown that the management on-site ensured that no effects to the environment occurred during the monitoring period.

3.2 Environmental effects of exercise of consents

Stormwater

The discharge of stormwater from earthworks has the potential for sediment and other contaminants to enter surface water where it may detrimentally affect in-stream flora and fauna. To mitigate these effects, TAG Oil (NZ) Limited established perimeter drains during the construction of the wellsite, and care was taken to ensure runoff from disturbed areas was directed into the drains or directed through adequate silt control structures.

Once the well was constructed, attention was given to controlling stormwater that ran off the wellsite and the associated plant and equipment.

Adverse effects on surface water quality can occur if contaminated water escapes through the stormwater system. Interceptor pits are designed to trap sediment and hydrocarbons through gravity separation. Any water that is unsuitable for release via the interceptor pits was directed to the drilling sumps, or removed for off-site disposal.

TAG Oil (NZ) Limited also undertook the following mitigation measures in order to minimize off-site adverse effects:

- All stormwater was directed via perimeter drains to the skimmer pits for treatment prior to discharge;
- Additional bunding was constructed around the bulk fuel tank, chemical storage area, and other areas where runoff from areas containing contaminants could occur;
- Regular inspections of the interceptor pits occurred; and
- Maintenance and repairs were carried out if required.

Interceptor pits do not discharge directly to surface water, instead they discharge onto and into land where the discharge usually soaks into the soil before reaching

any surface water. However, if high rainfall had resulted in the discharge reaching the surface water, significant dilution would have occurred.

There are numerous on-site procedures included in drilling and health and safety documentation that are aimed at preventing spills on-site, and further procedures that address clean-up to remedy a spill situation before adverse environmental effects have the opportunity to occur (e.g. bunding of chemicals and bulk fuel).

Groundwater

Small amounts of groundwater may have been encountered as produced water during operations at the wellsite. It was anticipated that the abstraction of groundwater would not impact on any groundwater resource and that the groundwater would not be affected as it would be protected by the well casing.

Flaring

The environmental effects from flaring have been evaluated in monitoring reports prepared by the Council in relation to the flaring emissions from specific wells in the region.

The Council has previously undertaken field studies at two wells (one gas, and the other producing oil and heavier condensates); together with dispersion modelling at a third site¹. More recently two studies have focused on field investigations and modelling of emissions from flares involving fracturing fluids.²

In brief, the previous studies found that measurements of carbon monoxide, carbon dioxide, and methane concentrations to be safe at all points downwind, including within 50 m of the flare pit. Measurements of suspended particulate matter found concentrations typical of background levels, and measurements of PM₁₀ found compliance with national standards even in close proximity to the flare. Beyond 120 m from the flare pit, concentrations of polyaromatic hydrocarbons (PAH) approached background levels, as did levels of dioxins beyond 250 m from the flare.

In summary, the studies established that under combustion conditions of high volume flaring of gases with some light entrained liquids etc., atmospheric concentrations of all contaminants had reduced by a distance of 250 m downwind to become essentially typical of or less than elsewhere in the Taranaki environment (e.g. urban areas). These levels are well below any concentrations at which there is any basis for concern over potential health effects.

The measures to be undertaken by TAG Oil (NZ) Limited to avoid or mitigate actual or potential adverse environmental impacts on air quality included:

- The use of a test separator to separate solids and fluids from the gas during all well clean-ups, and workover activities where necessary, thus reducing

¹ Taranaki Regional Council, *Fletcher Challenge Energy Taranaki Ltd, Mangahewa 2 Gas Well Air Quality Monitoring Programme Report 1997 – 98*, August 1998.

² Taranaki Regional Council: *Atmospheric Dispersion Modelling of Discharges to Air from the Flaring of Fracturing Fluid*, Backshall, March 2013; and *Investigation of air quality arising from flaring of fracturing fluids -emissions and ambient air quality*, Technical Report 2012– 03, Taranaki Regional Council May 2012.

emissions to air. In particular, this would reduce the potential for heavy smoke incidents associated with elevated PAH and dioxin emissions;

- Records of flaring events are kept by TAG Oil (NZ) Limited and provided to the Council;
- Every endeavor was made by TAG Oil (NZ) Limited to minimise the total volume of gas flared while ensuring that adequate flow and pressure data was gathered to inform their investment decision; and
- Every endeavor was made by TAG Oil (NZ) Limited to minimise smoke emissions from the flare.

Odour and dust

Suppression of dust with water was to be implemented if it was apparent that dust may be travelling in such a direction to adversely affect off-site parties. Odour may stem from the product, flare, or some of the chemicals used on-site. Care was taken to minimize the potential for odour emissions (e.g. by keeping containers sealed, and ensuring the flare burnt cleanly).

Hazardous substances

The use and storage of hazardous substances on-site has the potential to contaminate surface water and soils in the event of a spill. In the unlikely event of a serious spill or fire, the storage of flammable materials could have resulted in air, soil and water contamination.

TAG Oil (NZ) Limited was required to implement the following mitigation measures:

- All potentially hazardous material were used and stored in accordance with the relevant Hazardous Substances and New Organisms regulations;
- All areas containing hazardous chemicals were bunded;
- Ignition sources were not permitted on any site;
- Sufficient separation of chemicals from the flare pit were maintained for safety reasons;
- In the unlikely event of a spill escaping from bunded areas, the site perimeter drain and interceptor pit system was implemented to provide secondary containment on-site; and
- A spill contingency plan was prepared that sets out emergency response procedures to be followed in the event of a spill.

3.3 Evaluation of performance

A tabular summary of TAG Oil (NZ) Limited's compliance record for the period under review is set out in Tables 2- 8.

Table 2 Summary of performance for Consent 7600-1 to take groundwater that may be encountered during exploration and production operations at Sidewinder wellsite

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. The abstraction must not cause more than a 10% lowering of static water level by interference with any adjacent bore	Complaints	Yes – no complaints were received
2. The abstraction does not cause the intrusion of salt water into any freshwater aquifer	Water sampling adjacent bores pre/post drilling	Yes
3. A well log to 1,000 m must be submitted to the Council	Well log to 1,000 m submitted	Yes
4. Maintain records of abstraction, including date and volume	Inspection of Company records	Yes
5. Consent shall lapse if not implemented by date specified	Notification received and confirmed by inspection	N/A
6. Notice of Council to review consent	Notice of intention /not served	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High

Table 3 Summary of performance for Consent **7597-1** to take water from the Piakau Stream for Sidewinder wellsite and well drilling activities during hydrocarbon exploration and production activities

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Volume of water taken shall not exceed 350 m ³ /day, at a rate not exceeding 5 l/s	Inspection of Company records	Yes
2. Consent Holder to maintain a record of abstractions, including date, pumping hours and daily volume and make these records available to Council	Inspection of Company records	Yes
3. Consent Holder shall take all reasonable steps to avoid, remedy or mitigate adverse effects, including efficient and conservative use of water	Visual inspection	Yes
4. The intake shall be screened to avoid entrainment of fish	Visual inspection	Yes
5. Consent shall lapse if not implemented by date specified	Notification received/not received	N/A
6. Notice of Council to review consent	Notice of intention served/not served	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High

Table 4 Summary of performance for Consent 7822-1 to discharge emissions to air associated with production activities including flaring associated with miscellaneous activities at the Sidewinder wellsite

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. 24hrs notice of flaring to the Council for initial flare of each zone	Notification received 24hrs prior to flaring	Yes
2. 24hrs notice of flaring to the Council when flaring is longer than 5 minutes in duration	Notification received 24hrs prior to flaring	Yes
3. Liquid and solid separation to occur before flaring to minimise smoke emissions	Inspection of flare pit and flare	Yes
4. Only substances originating from well stream to be combusted in flare pit	Visual inspection of site	Yes
5. Best practicable option adopted	Visually inspecting site, procedures & processes	Yes
6. No offensive odour or smoke beyond boundary	Assessment by investigating officer	Yes
7. All storage tanks to have vapour recovery systems fitted.	Visual inspection of site	Yes
8. Control of carbon monoxide	Chemical analysis of emissions	Yes
9. Control of other emissions	Chemical analysis of emissions	Yes
10. Control of other emissions	Chemical analysis of emissions	Yes
11. Analysis of typical gas and condensate stream from field to be made available to the Council	Available upon request	Yes
12. Log all flare events longer than 5 minutes (10 minutes aggregate or longer than 120 minutes) including time, duration, zone and reason for flare	Inspection of Company records	Yes
13. Consent shall lapse if not implemented by date specified	Notification of flaring received/not received	Yes
14. Notice of Council to review consent	No provision for review during period	Yes
Overall assessment of consent compliance and environmental performance in respect of this consent		Good

Table 5 Summary of performance for Consent 7777-1 to discharge emissions to air associated with production activities including flaring associated with emergencies and maintenance and minor emissions from other miscellaneous activities at the Sidewinder wellsite

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. 24hrs notice of flaring to the Council for initial flare of each zone	Notification received 24hrs prior to flaring	N/A – consent not exercised
2. 24hrs notice of flaring to the Council when flaring is longer than 5 minutes in duration	Notification received 24hrs prior to flaring	N/A – consent not exercised
3. Liquid and solid separation to occur before flaring to minimise smoke emissions	Inspection of flare pit and flare	N/A – consent not exercised
4. Only substances originating from well stream to be combusted in flare pit	Visual inspection of site	N/A – consent not exercised
5. Best practicable option adopted	Visually inspecting site, procedures & processes	N/A – consent not exercised
6. No offensive odour or smoke beyond boundary	Assessment by investigating officer	N/A – consent not exercised
7. All storage tanks to have vapour recovery systems fitted.	Visual inspection of site	N/A – consent not exercised
8. Control of carbon monoxide	Chemical analysis of emissions	N/A – consent not exercised
9. Control of other emissions	Chemical analysis of emissions	N/A – consent not exercised
10. Control of other emissions	Chemical analysis of emissions	N/A – consent not exercised
11. Analysis of typical gas and condensate stream from field to be made available to the Council	Available upon request	N/A – consent not exercised
12. Log all flare events longer than 5 minutes (10 minutes aggregate or longer than 120 minutes) including time, duration, zone and reason for flare	Inspection of Company records	N/A – consent not exercised
13. Consent shall lapse if not implemented by date specified	Notification of flaring received/not received	N/A – consent not exercised
14. Notice of Council to review consent	No provision for review during period	N/A – consent not exercised
Overall assessment of consent compliance and environmental performance in respect of this consent		N/A – consent not exercised

Table 6 Summary of performance for Consent 7596-1 to discharge emissions to air from flaring of hydrocarbon exploration activities at the Sidewinder wellsite

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Flaring shall not occur for more than 15 days per zone, for up to six zones per well, for up to 8 wells	Inspection of records	Yes
2. 24hrs notice of flaring to the Council for initial flare of each zone	Notification received 24hrs prior to flaring	Yes
3. 24hr notice of flaring to all residents within 1,000 m of the wellsite	Residents confirm 24hr notice provided	Yes
4. No alteration to equipment or processes that may alter the nature or quality of the flare	Inspection of site and equipment used	Yes
5. Regard is to be had to wind speed and direction	Inspection of off-site effects	Yes
6. Liquid and solid separation to occur before flaring to minimise smoke emissions	Inspection of flare pit and flare	Yes
7. The Council to be advised if separation cannot be maintained	Notification received/ complaint received	N/A
8. No liquid or solid hydrocarbons are to be combusted in the flare pit	Inspection of flare pit and flare	Yes
9. Gas is to be combusted to minimise smoke emissions	Inspection of flare	Yes
10. Best practicable option adopted	Visually inspecting site, procedures & processes	Yes
11. Only substances originating from well stream to be combusted in flare pit	Visual inspection of site	Yes
12. No offensive odour or smoke beyond boundary	Assessment by investigating officer	Yes
13. The opacity of smoke shall not exceed level 1 on the Ringelmann Scale	Comparing opacity of smoke with the Ringelmann Scale	Yes
14. Control of carbon monoxide	Chemical analysis of emissions	N/A – all discharges contained on-site
15. Control of nitrogen oxides	Chemical analysis of emissions	N/A – all discharges contained on-site
16. The discharge shall not be discharged at a rate/quantity so that it is toxic/noxious or hazardous	Chemical analysis of emissions	Yes
17. Control of other emissions	Chemical analysis of emissions	N/A – all discharges contained on-site

Condition requirement	Means of monitoring during period under review	Compliance achieved?
18. Analysis of typical gas and crude oil stream from field to be made available to the Council	Available upon request	N/A
19. Report to the Council the time, duration and cause of each smoke incident	Inspection of Company records	Yes
20. Log all flaring including time, duration, zone and volumes flared	Inspection of Company records	Yes
21. Consent shall lapse if not implemented by date specified	Notification of flaring received/not received	N/A
22. Notice of Council to review consent	Notice of intention served/not served	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High

Table 7 Summary of performance for Consent 7595-1 to discharge treated stormwater, and produced water from hydrocarbon exploration and production operations at the Sidewinder wellsite onto and into land in the vicinity of the Piakau Stream

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent holder to adopt best practicable option at all times	Visually inspecting site, procedures & processes	Yes
2. 7 days written notice prior to site works and drilling	Notification received	Yes
3. Max stormwater catchment area 7,500 m ²	Inspection of site and records	Yes
4. All discharges to be directed for treatment through skimmer pit. Stormwater pits to be impermeable	Visual inspection of stormwater system	Yes
5. Constituents in the discharge shall meet standards	Sampling of discharge	Yes
6. Discharge of chloride shall not exceed 50 ppm	Sampling of discharge	Yes
7. Maintain a contingency plan	Contingency plan received and approved	Yes
8. The stormwater system shall be designed, managed and maintained in accordance with information submitted	By comparing submitted & approved plans with the built site inspection	Yes
9. Consent shall lapse if not implemented by date specified	Exercise of consent confirmed by inspection	N/A – consent exercised
10. Notice of Council to review consent	No provision for review during period	N/A
Overall assessment of consent compliance and environmental performance in respect of this consent		High

Table 8 Summary of performance for Consent 9280-1 to discharge stormwater and sediment from earthworks during construction of the Sidewinder wellsite onto and into land

Condition requirement	Means of monitoring during period under review	Compliance achieved?
1. Consent holder to adopt best practicable option at all times	Visually inspecting site, procedures & processes	Yes
2. 7 days written notice prior to site earthworks	Notification received	Yes
3. 7 days written notice prior to site operations and drilling	Notification received	Yes
4. All runoff shall pass through settlement ponds or traps with a minimum capacity of 100 m ³	Site erosion and sediment control plan submitted	Yes
5. Condition 4 will not apply when site is stabilised	Visual inspection	Yes
6. All earth worked areas shall be stabilised as soon as practicable	Visual inspection	Yes
Overall assessment of consent compliance and environmental performance in respect of this consent		High

During the monitoring period, TAG Oil (NZ) Limited demonstrated a high level of environmental performance and compliance with the resource consents.

3.4 Exercise of optional review of consents

Each resource consent includes a condition which allows the Council to review the consent, for the purpose of ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of the resource consent, which were not foreseen at the time the application was considered or which it was not appropriate to deal with at the time. The next provisions for review are in June 2015.

Based on the results of monitoring during the period under review, it is considered that there are no grounds that require a review to be pursued. A recommendation to this effect is presented in section 4.

3.5 Change to any future monitoring programmes

In designing and implementing the monitoring programmes for air and water discharges and water abstractions at well sites in the region, the Council takes into account the extent of information made available by previous and other authorities, its relevance under the Act, the obligations of the Act in terms of monitoring emissions/discharges and effects, and of subsequently reporting to the regional community, the scope of assessments required at the time of renewal of permits, and the need to maintain a sound understanding of well site processes within Taranaki.

The Council has routinely monitored well site activities for more than 20 years in the region. This work has included in the order of hundreds of water samples and bio-monitoring surveys in the vicinity of well sites, and has demonstrated robustly that a monitoring regime based on frequent and comprehensive inspections is rigorous and thorough, in terms of identifying any adverse effects from well site and associated activities. Accordingly the Council had for a time not routinely required the imposition of additional targeted physicochemical and biological monitoring unless a site-specific precautionary approach indicated this would be warranted for certainty and clarity around site effects.

However, the Council has also noted a desire by some community members for a heightened level of information feedback and certainty around the results and outcomes of monitoring at well sites to occur or has occurred. Notwithstanding the long track record of a demonstrable suitability of an inspection-based monitoring programme, the Council has therefore moved to extend the previous regime, to make the sampling and extensive analysis of treated stormwater discharge and bio-monitoring of surface water ecosystems, an integral part of the basic monitoring programme for such activities.

The monitoring of future consented activities at Sidewinder wellsite shall be extended to include an ecological survey.

A recommendation to this effect is present in section 4 of this report.

4. Recommendations

1. THAT this report be forwarded to the Company, and to any interested parties upon request;
2. THAT the Company be asked to inform the Council of the intention to either drill, test or undertake reinstatement;
3. THAT the monitoring of future consented activities at Sidewinder wellsite be extended to include an ecological survey;
4. THAT, subject to the findings of monitoring of any further activities at the Sidewinder wellsite consent 7822-1, consent 7600-1, consent 7569-1, consent 7595-1, consent 7597-1, 9280-1 and consent 7777-1, shall not be reviewed in June 2015.

Glossary of common terms and abbreviations

The following abbreviations and terms may have been used within this report:

Al*	aluminium
As*	arsenic
Biomonitoring	assessing the health of the environment using aquatic organisms
BOD	biochemical oxygen demand. A measure of the presence of degradable organic matter, taking into account the biological conversion of ammonia to nitrate
BODF	biochemical oxygen demand of a filtered sample
Bund	a wall around a tank to contain its contents in the case of a leak
CBOD	carbonaceous biochemical oxygen demand. A measure of the presence of degradable organic matter, excluding the biological conversion of ammonia to nitrate
Cfu	colony forming units. A measure of the concentration of bacteria usually expressed as per 100 millilitre sample
COD	chemical oxygen demand. A measure of the oxygen required to oxidise all matter in a sample by chemical reaction.
Condy	Conductivity, an indication of the level of dissolved salts in a sample, usually measured at 20°C and expressed in mS/m
Cu*	copper
DO	dissolved oxygen
DRP	dissolved reactive phosphorus
<i>E.coli</i>	<i>Escherichia coli</i> , an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample
Ent	Enterococci, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre of sample
F	Fluoride
FC	Faecal coliforms, an indicator of the possible presence of faecal material and pathological micro-organisms. Usually expressed as colony forming units per 100 millilitre sample
Fresh g/m ³	elevated flow in a stream, such as after heavy rainfall grammes per cubic metre, and equivalent to milligrammes per litre (mg/L). In water, this is also equivalent to parts per million (ppm), but the same does not apply to gaseous mixtures
Incident	an event that is alleged or is found to have occurred that may have actual or potential environmental consequences or may involve non-compliance with a consent or rule in a regional plan. Registration of an incident by the Council does not automatically mean such an outcome had actually occurred
Intervention	action/s taken by Council to instruct or direct actions be taken to avoid or reduce the likelihood of an incident occurring
Investigation	action taken by Council to establish what were the circumstances/events surrounding an incident including any allegations of an incident

l/s	litres per second
MCI	macroinvertebrate community index; a numerical indication of the state of biological life in a stream that takes into account the sensitivity of the taxa present to organic pollution in stony habitats
mS/m	millisiemens per metre
Mixing zone	the zone below a discharge point where the discharge is not fully mixed with the receiving environment. For a stream, conventionally taken as a length equivalent to 7 times the width of the stream at the discharge point.
NH ₄	ammonium, normally expressed in terms of the mass of nitrogen (N)
NH ₃	unionised ammonia, normally expressed in terms of the mass of nitrogen (N)
NO ₃	nitrate, normally expressed in terms of the mass of nitrogen (N)
NTU	Nephelometric Turbidity Unit, a measure of the turbidity of water
O&G	oil and grease, defined as anything that will dissolve into a particular organic solvent (e.g. hexane). May include both animal material (fats) and mineral matter (hydrocarbons)
Pb*	lead
pH	a numerical system for measuring acidity in solutions, with 7 as neutral. Numbers lower than 7 are increasingly acidic and higher than 7 are increasingly alkaline. The scale is logarithmic i.e. a change of 1 represents a ten-fold change in strength. For example, a pH of 4 is ten times more acidic than a pH of 5.
Physicochemical	measurement of both physical properties(e.g. temperature, clarity, density) and chemical determinants (e.g. metals and nutrients) to characterise the state of an environment
PM ₁₀	relatively fine airborne particles (less than 10 micrometre diameter)
Resource consent	refer Section 87 of the RMA. Resource consent include land use consents (refer Sections 9 and 13 of the RMA), coastal permits (Sections 12, 14 and 15), water permits (Section 14) and discharge permits (Section 15)
RMA	Resource Management Act 1991 and subsequent amendments
SS	suspended solids,
Temp	temperature, measured in °C (degrees Celsius)
Turb	turbidity, expressed in NTU
UI	Unauthorised Incident
UIR	Unauthorised Incident Register – contains a list of events recorded by the Council on the basis that they may have the potential or actual environmental consequences that may represent a breach of a consent or provision in a Regional Plan
Zn*	zinc

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

For further information on analytical methods, contact the Council's laboratory

Appendix I

Resource consents



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

Please quote our file number
on all correspondence

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

Name of Consent Holder: TAG Oil (NZ) Limited
P O Box 402
NEW PLYMOUTH 4340



Decision Date [Change]: 6 December 2011

Commencement Date [Change]: 6 December 2011 [Granted: 11 February 2010]

Conditions of Consent

Consent Granted: To discharge treated stormwater and production water from hydrocarbon exploration and production operations at the Sidewinder wellsite onto and into land in the vicinity of Piakau Stream at or about (NZTM) 1703906E-5659287N

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: Sidewinder wellsite, 323 Upper Durham Road, Inglewood [Property owner: BFF Limited]

Legal Description: Lot 4 DP 420600 [Discharge source & site]

Catchment: Waitara

Tributary: Manganui
Ngatoro
Maketawa
Piakau

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*
www.trc.govt.nz

General condition

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

Special conditions



- 1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.
- 2. Stormwater discharged shall be collected from a catchment area of no more than 1.85 ha.
- 3. The Chief Executive, Taranaki Regional Council, shall be notified in writing at least 7 days prior to any site works commencing, and again in writing at least 7 days prior to any well drilling operation commencing. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
- 4. The consent holder shall maintain a contingency plan that, to the satisfaction of the Chief Executive, Taranaki Regional Council, details measures and procedures to be undertaken to prevent spillage or accidental discharge of contaminants not authorised by this consent and measures to avoid, remedy or mitigate the environmental effects of such a spillage or discharge.
- 5. The design, management and maintenance of the stormwater system shall be undertaken in accordance with the information submitted in support of the consent application [application 6415], in particular, section 8.1 of the Assessment of Environmental Effects.
- 6. All stormwater and produced water shall be directed for treatment through the stormwater treatment system identified in condition 5 before being discharged.
- 7. Any significant volumes of hazardous substances [e.g. bulk fuel, oil, drilling fluid] on site shall be:
 - a) contained in a double skinned tank, or
 - b) stored in a dedicated bunded area with drainage to sumps, or to other appropriate recovery systems, and not directly to the site stormwater system.

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

<u>Constituent</u>	<u>Standard</u>
pH	Within the range 6.0 to 9.0
suspended solids	Concentration not greater than 100 gm ⁻³
total recoverable hydrocarbons	Concentration not greater than 15 gm ⁻³
chloride	Concentration not greater than 50 gm ⁻³

This condition shall apply prior to the entry of the treated stormwater into the receiving waters of the Piakau Stream at a designated sampling point approved by the Chief Executive, Taranaki Regional Council.

9. After allowing for a mixing zone of 25 metres, the discharge shall not give rise to an increase in temperature of more than 2 degrees Celsius.
10. After allowing for a mixing zone of 25 metres, the discharge shall not give rise to any of the following effects in the receiving water:
- a) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
 - b) any conspicuous change in the colour or visual clarity;
 - c) any emission of objectionable odour;
 - d) the rendering of fresh water unsuitable for consumption by farm animals;
 - e) any significant adverse effects on aquatic life.
11. The consent holder shall advise the Chief Executive, Taranaki Regional Council, in writing at least 48 hours prior to the reinstatement of the site and the reinstatement shall be carried out so as to minimise adverse effects on stormwater quality. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
12. This consent shall lapse on 31 March 2015, 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.

13. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 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 6 December 2011

For and on behalf of
Taranaki Regional Council



Director-Resource Management



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

CHIEF EXECUTIVE
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Please quote our file number
on all correspondence

Name of Consent Holder: TAG Oil (NZ) Limited
P O Box 402
NEW PLYMOUTH 4340

Decision Date (Change): 16 January 2012

Commencement Date (Change): 16 January 2012 (Granted: 11 February 2010)

Conditions of Consent

Consent Granted: To discharge emissions to air from flaring of the hydrocarbons associated with well clean-up and well testing associated with exploration activities at the Sidewinder wellsite at or about (NZTM) 1703906E-5659287N

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: Sidewinder wellsite, 323 Upper Durham Road, Inglewood (Property owner: B.F.F Limited)

Legal Description: Lot 4 DP 420600 (Discharge source & site)

*For General, Standard and Special conditions
pertaining to this consent please see reverse side of this document*
www.trc.govt.nz

General condition

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

Special conditions

Exercise of consent

1. Flaring shall not occur on more than 15 days, cumulatively, per zone for each well (with a limit of 5 zone per well), for up to eight wells.
2. The total accumulative days of flaring from the wellsite shall not exceed 300 days.

Information and notification

3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, at least 24 hours before the initial flaring of each zone being commenced. Notification shall include the consent number and a brief description of the activity consented and be emailed to worknotification@trc.govt.nz.
4. At least 24 hours before any flaring, other than in emergencies, the consent holder shall provide notification to all residents within 1000 metres of the wellsite of the commencement of flaring. The consent holder shall include in the notification a 24-hour contact telephone number for a representative of the consent holder, and shall keep and make available to the Chief Executive, Taranaki Regional Council, a record of all queries and complaints received in respect of any flaring activity.
5. No alteration shall be made to plant equipment or processes which may substantially alter the nature or quantity of flare emissions or other wellsite emissions, including but not limited to the recovery of produced gas, other than as authorised by this consent, without prior consultation with the Chief Executive, Taranaki Regional Council.

Flaring

6. Other than for the maintenance of a pilot flare flame, the consent holder shall have regard to the prevailing and predicted wind speed and direction at the time of initiation of, and throughout, any episode of flaring so as to minimise offsite effects.
7. All gas that is flared during well clean-up, drill stem testing, initial testing, well workovers, or production testing, or at any other time, must first be treated by effective liquid and solid separation and recovery, to ensure that smoke emission during flaring is minimised.
8. If separation required by condition 6 cannot be implemented or maintained at any time while there is a flow from the well, whether natural or induced, then the consent holder shall immediately advise the Taranaki Regional Council by phoning the Council and advising the Compliance Manager, or his delegate; and shall in any case re-establish liquid separation and recovery within three hours.

At the grant date of this consent, the Council's phone number is 0800 736 222 (24 hr service).

9. Subject to special condition 7, no liquid or solid hydrocarbons shall be combusted through the gas flare system.
10. The gas shall be combusted so that emissions of smoke are minimised.
11. The consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or potential effect on the environment arising from any emission to air from the flare or any other emissions to air from the Beluga-1 wellsite (including use of a separator during well clean-up).
12. Only substances originating from the well stream and treated as required by conditions 6, 7, 8, 9, and 10 shall be combusted within the flare pit.
13. The discharge shall not cause any objectionable or offensive odour or smoke at or beyond the boundary of the property where the wellsite is located.
14. The opacity of any smoke emissions shall not exceed a level of 1, as measured on the Ringelmann Scale, for more than 4 minutes cumulative duration in any 60 minute period.
15. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the flare so that, whether alone or in conjunction with any other emissions from the wellsite, the maximum ground level concentration of carbon monoxide arising from the exercise of this consent measured under ambient conditions does not exceed 10 milligrams per cubic metre (mg/m^3) (eight-hour average exposure), or 30 mg/m^3 (one-hour average exposure) at or beyond the boundary of the property where the wellsite is located.
16. The consent holder shall control all emissions of nitrogen oxides to the atmosphere from the flare, so that whether alone or in conjunction with any other emissions from the wellsite, the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 100 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) (24-hour average exposure), or 200 $\mu\text{g}/\text{m}^3$ (1-hour average exposure) at or beyond the boundary of the property where the wellsite is located.
17. The consent holder shall control emissions to the atmosphere from the wellsite and flare of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, so that whether alone or in conjunction with any emissions from the flare, the maximum ground level concentration for any particular contaminant arising from the exercise of this consent measured at or beyond the boundary of the property where the wellsite is located, is not increased above background levels:
 - a) by more than 1/30th of the relevant Occupational Threshold Value-Time Weighted Average, or by more than the Short Term Exposure Limit at any time (all terms as defined in Workplace Exposure Standards, 2002, Department of Labour); or
 - b) if no Short Term Exposure Limit is set, by more than three times the Time Weighted Average at any time (all terms as defined in Workplace Exposure Standards, 2002, Department of Labour).

Recording and reporting information

18. The consent holder shall make available to the Chief Executive, Taranaki Regional Council, upon request, an analysis of a typical gas and condensate stream from the field, covering sulphur compound content and the content of carbon compounds of structure C₆ or higher number of compounds.
19. Each time there is visible smoke as a result of the exercise of this consent, the consent holder shall record the time, duration and cause. The consent holder shall make the record available to the Chief Executive, Taranaki Regional Council, upon request.
20. The consent holder shall record and make available to the Chief Executive, Taranaki Regional Council, logs of all flaring, including time, duration, zone, and volumes of substances flared.

Lapse and Review

21. This consent shall lapse on 31 March 2015, unless the consent is given effect to before the end of that period or the Taranaki Regional Council fixes a longer period pursuant to section 125(1)(b) of the Resource Management Act 1991.
22. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 and/or June 2021, for any of the following purposes:
 - a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or
 - b) requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; and/or
 - c) to alter, add or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant.

Signed at Stratford on 16 January 2012

For and on behalf of
Taranaki Regional Council



Director-Resource Management

General condition

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

Special condition

1. The volume of water taken shall not exceed 350 cubic metres over a 7 day period, at a rate not exceeding 5 litres per second.
2. The consent holder shall maintain a record of the abstraction including date, rate, pumping hours and daily volume abstracted and supply these records to the Chief Executive, Taranaki Regional Council, no later than 31 July of each year, or earlier upon request.
3. Notwithstanding the terms and conditions of this consent the consent holder shall take all reasonable steps to avoid, remedy or mitigate any adverse effect on the environment arising from the exercise of this consent, including, but not limited to, the efficient and conservative use of water.
4. The consent holder shall ensure that the intake structure is appropriately screened to avoid the entrainment of fish.
5. This consent shall lapse on 31 March 2015, 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.
6. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 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 11 February 2010

For and on behalf of
Taranaki Regional Council



Director-Resource Management



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

CHIEF EXECUTIVE
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Please quote our file number
on all correspondence

Name of Consent Holder: TAG Oil (NZ) Limited
P O Box 262
STRATFORD 4352

New Address:
P O Box 402
New Plymouth 4340

Consent Granted Date: 11 February 2010

Conditions of Consent

Consent Granted: To take groundwater that may be encountered as produced water during hydrocarbon exploration and produced operations at the Broadside-1 wellsite at or about (NZTM) 1703906E-5659287N

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: Broadside-1 wellsite, 323 Upper Durham Road, Inglewood [Property owner: B.F.F Limited]

Legal Description: Lot 4 DP 420600

Catchment: Waitara

Tributary: Manganui
Ngatoro
Maketawa
Piakau

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

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Doc# 721057-v1

General condition

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

Special conditions

1. The consent holder shall ensure the abstraction does not cause more than a 10% lowering of static water-level by interference with any adjacent bore.
2. The consent holder shall ensure the abstraction does not cause the intrusion of salt water into any freshwater aquifer.
3. The consent holder shall submit, to the written satisfaction of the Chief Executive, Taranaki Regional Council, a summary well log to a depth of 1000 metres. The report shall:
 - a) provide a log to show the true vertical depth to all geological formation tops intersected within the freshwater zone;
 - b) identify the true vertical depth to, and thickness of, any freshwater aquifers intersected by the well;
 - c) identify the true vertical depth to the freshwater- saline water interface in the well.
4. The consent holder shall maintain records of abstraction including date, volume of groundwater abstracted per day, and shall make these records available to the Chief Executive, Taranaki Regional Council, upon request.
5. This consent shall lapse on 31 March 2015, 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.
6. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 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 11 February 2010

For and on behalf of
Taranaki Regional Council



Director-Resource Management



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

CHIEF EXECUTIVE
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Please quote our file number
on all correspondence

Name of Consent Holder: TAG Oil (NZ) Limited
P O Box 262
STRATFORD 4352

New Address:
P O Box 402
New Plymouth 4340

Decision Date: 7 February 2011

Commencement Date: 7 February 2011

Conditions of Consent

Consent Granted: To discharge emissions to air associated with production activities at the Sidewinder wellsite, including flaring from well workovers, and emergency situations, and other miscellaneous activities at or about (NZTM) 1703906E-5659287N

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: Sidewinder wellsite, 323 Upper Durham Road, Inglewood
[Property owner: B.F.F Limited]

Legal Description: Lot 4 DP 420600 [Discharge source & site]

Catchment: Waitara

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

General condition

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

Special conditions

1. Other than in emergencies, the consent holder shall notify the Chief Executive, Taranaki Regional Council, whenever the continuous flaring of hydrocarbons [other than purge gas] is expected to occur for more than five minutes in duration. Notification shall be no less than 24 hours before the flaring commences. Notification shall include the consent number and be emailed to worknotification@trc.govt.nz.
2. At least 24 hours before any flaring, other than in emergencies, the consent holder shall provide notification to all residents within 300 metres of the wellsite of the commencement of flaring. The consent holder shall include in the notification a 24-hour contact telephone number for a representative of the consent holder, and shall keep and make available to the Chief Executive, Taranaki Regional Council, a record of all queries and complaints received in respect of any flaring activity.
3. To the greatest extent possible, all gas that is flared must first be treated by effective liquid and solid separation and recovery.
4. Only gaseous hydrocarbons originating from the well stream shall be combusted within the flare pit.
5. The consent holder shall adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or potential effect on the environment arising from any emission to air from the flare, including, but not limited to having regard to the prevailing and predicted wind speed and direction at the time of initiation of, and throughout, any episode of flaring so as to minimise offsite effects [other than for the maintenance of a pilot flare flame].
6. The discharge shall not cause any objectionable or offensive odour or smoke at or beyond the boundary of the property where the wellsite is located.
7. All permanent tanks used as hydrocarbon storage vessels, shall be fitted with vapour recovery systems.
8. The consent holder shall control all emissions of carbon monoxide to the atmosphere from the flare so that, whether alone or in conjunction with any other emissions from the wellsite, the maximum ground level concentration of carbon monoxide arising from the exercise of this consent measured under ambient conditions does not exceed 10 milligrams per cubic metre [mg/m³] [eight-hour average exposure], or 30 mg/m³ one-hour average exposure] at or beyond the boundary of the property where the wellsite is located.

9. The consent holder shall control all emissions of nitrogen oxides to the atmosphere from the flare so that, whether alone or in conjunction with any other emissions from the wellsite, the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 100 micrograms per cubic metre [$\mu\text{g}/\text{m}^3$] [24-hour average exposure], or 200 $\mu\text{g}/\text{m}^3$ [1-hour average exposure] at or beyond the boundary of the of the property where the wellsite is located.
10. The consent holder shall control emissions to the atmosphere from the wellsite and flare of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides so that, whether alone or in conjunction with any emissions from the flare, the maximum ground level concentration for any particular contaminant arising from the exercise of this consent measured at or beyond the boundary of the property where the wellsite is located, is not increased above background levels:
 - a) by more than 1/30th of the relevant Occupational Threshold Value-Time Weighted Average, or by more than the Short Term Exposure Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour]; or
 - b) if no Short Term Exposure Limit is set, by more than three times the Time Weighted Average at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour].
11. The consent holder shall make available to the Chief Executive, Taranaki Regional Council, upon request, an analysis of a typical gas and condensate stream from the field, covering sulphur compound content and the content of carbon compounds of structure C₆ or higher number of compounds.
12. The consent holder shall record and make available to the Chief Executive, Taranaki Regional Council, a 'flaring log' that includes:
 - a) the date, time and duration of all flaring episodes;
 - b) the zone from which flaring occurred;
 - c) the volume of substances flared;
 - d) whether there was smoke at any time during the flaring episode and if there was, the time, duration and cause of each 'smoke event'.
13. This consent shall lapse on 31 March 2016, 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.

Consent 7777-1

14. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 and/or June 2021, for any of the following purposes:
- a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or
 - b) requiring the consent holder to adopt specific practices in order to achieve the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; and/or
 - c) to alter, add or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant.

Signed at Stratford on 7 February 2011

For and on behalf of
Taranaki Regional Council



Director Resource Management



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

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Please quote our file number
on all correspondence

Name of Consent Holder: TAG Oil (NZ) Limited **New Address:**
P O Box 262 P O Box 402
STRATFORD 4352 New Plymouth 434 0

Decision Date: 22 June 2011

Commencement Date: 22 June 2011

Conditions of Consent

Consent Granted: To discharge emissions into the air from the flaring of hydrocarbons arising from hydrocarbon production and processing operations, together with miscellaneous emissions, at the Sidewinder Production Station at or about (NZTM) 1703971E-5659277N

Expiry Date: 1 June 2027

Review Date(s): June 2015, June 2021

Site Location: Sidewinder wellsite, 323 Upper Durham Road, Inglewood
[Property owner: B.F.F Limited]

Legal Description: Lot 4 DP 420600 [Discharge source & site]

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

General condition

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

Special conditions

Exercise of consent

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

Recording and submitting information

2. The consent holder shall keep and maintain a log of all continuous flaring incidents lasting longer than 5 minutes and any intermittent flaring lasting for an aggregate of 10 minutes or longer in any 60-minute period. The log shall contain the date, the start and finish times, the quantity and type of material flared, and the reason for flaring. The log shall be made available to the Chief Executive, Taranaki Regional Council, upon request, and summarised annually in the report required under condition 4. Flaring, under normal operation in the low pressure flare, of rich mono-ethylene glycol degasser vapour, condensate tank vapours, non-condensibles from tri-ethylene glycol/mono-ethylene glycol regeneration and purge gas shall be excluded from this requirement.
3. The consent holder shall supply to the Taranaki Regional Council each month a copy of flaring information comprising: the type and amount of material flared [including any gas used to maintain a pilot flame], the date this was flared, the reason why flaring was undertaken, and an indication of whether smoke was produced from such flaring events.
4. The consent holder shall provide to the Taranaki Regional Council during May of each year, for the duration of this consent, a report:
 - a) detailing gas combustion at the production station flare, including but not restricted to routine operational flaring and flaring logged in accordance with condition 2;
 - b) detailing any measures that have been undertaken by the consent holder to improve the energy efficiency of the production station;
 - c) detailing any measures to reduce smoke emissions;
 - d) detailing any measures to reduce flaring;
 - e) addressing any other issue relevant to the minimisation or mitigation of emissions from the production station flare; and
 - f) detailing any complaints received and any measures undertaken to address complaints.

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

Information and notification

6. The consent holder shall make available to the Chief Executive, Taranaki Regional Council upon request, an analysis of a typical gas and/or condensate stream from the Mt Messenger Formation, covering sulphur compound content and the content of compounds containing six or more carbon atoms in their molecular structure.
7. Prior to undertaking any alterations to the plant equipment, processes or operations, which may substantially alter the nature or quantity of flare emissions other than as described in the consent application, the consent holder shall first consult with the Chief Executive, Taranaki Regional Council, and shall obtain any necessary approvals under the Resource Management Act 1991.
8. The consent holder shall notify the Chief Executive, Taranaki Regional Council, as soon as practicable, whenever the continuous flaring of hydrocarbons [other than the flaring of rich mono-ethylene glycol degasser vapour, condensate tank vapours, non-condensibles from tri-ethylene glycol/mono-ethylene glycol regeneration and purge gas] is expected to occur for more than five minutes in duration.

Preventing and minimising emissions

9. The discharges authorised by this consent shall not, whether alone or in conjunction with any other emissions from the site arising, give rise to any levels of odour or dust or smoke that are offensive or obnoxious or objectionable at or beyond the boundary of the site as shown on attached aerial photograph [figure 1].
10. The consent holder shall not discharge any contaminant to air from the site at a rate or a quantity such that the contaminant, whether alone or in combination with other contaminants, is or is liable to be hazardous or toxic or noxious at or beyond the boundary of the site as shown on attached aerial photograph.
11. The consent holder shall control all discharges of carbon monoxide to the atmosphere from the flare, whether alone or in conjunction with any other emissions from the site, in order that the maximum ground level concentration of carbon monoxide arising from the exercise of this consent measured under ambient conditions does not exceed 10 milligrams per cubic metre [eight-hour average exposure], or 30 milligrams per cubic metre [one-hour average exposure] at or beyond the boundary of the site as shown on attached aerial photograph.

12. The consent holder shall control all discharges of nitrogen dioxide or its precursors to the atmosphere from the flare, whether alone or in conjunction with any other discharges to the atmosphere from the site, in order that the maximum ground level concentration of nitrogen dioxide arising from the exercise of this consent measured under ambient conditions does not exceed 200 micrograms per cubic metre [one hour average exposure], or 100 micrograms per cubic metre [twenty-four hour average exposure], at or beyond the boundary of the site as shown on attached aerial photograph [figure 1].
13. The consent holder shall control discharges to the atmosphere from the flare of contaminants other than carbon dioxide, carbon monoxide, and nitrogen oxides, whether alone or in conjunction with any other emissions from the site, in order that the maximum ground level concentration for any particular contaminant arising from the exercise of this consent, measured at or beyond the boundary of the site as shown on attached aerial photograph, is not increased above background levels:
 - a) by more than 1/30th of the relevant Workplace Exposure Standard-Time Weighted Average [exposure averaged over a duration as specified for the Workplace Exposure Standard-Time Weighted Average], or by more than 1/10th of the Workplace Exposure Standard-Short Term Exposure Limit over any short period of time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour]; or
 - b) if no Short Term Exposure Limit is set, by more than the General Excursion Limit at any time [all terms as defined in Workplace Exposure Standards, 2002, Department of Labour].

Lapse and Review

14. This consent shall lapse on 30 June 2016, 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.
15. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June 2015 and/or June 2021, for the purposes of:
 - a) dealing with any significant adverse effect on the environment arising from the exercise of the consent which was not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; and/or
 - b) requiring the consent holder to adopt the best practicable option to remove or reduce any adverse effect on the environment caused by the discharge; and/or

Consent 7822-1

- c) to alter, add or delete limits on mass discharge quantities or discharge or ambient concentrations of any contaminant or contaminants.

Signed at Stratford on 22 June 2011

For and on behalf of
Taranaki Regional Council



Director-Resource Management

Figure 1



Aerial photograph showing site boundary [white line]

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

Name of
Consent Holder: TAG Oil (NZ) Limited
P O Box 402
NEW PLYMOUTH 4340

Decision Date: 6 June 2012

Commencement
Date: 6 June 2012

Conditions of Consent

Consent Granted: To discharge stormwater and sediment from earthworks during construction of the Sidewinder wellsite extension onto and into land at or about (NZTM) 1703849E-5659246N

Expiry Date: 1 June 2017

Site Location: Sidewinder wellsite, 323 Upper Durham Road, Inglewood (Property owner: BBF Limited)

Legal Description: Lot 4 DP 420600 (Discharge source & site)

Catchment: Waitara

Tributary: Ngatoro
Piakau

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

General condition

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

Special conditions

1. The consent holder shall at all times adopt the best practicable option, as defined in section 2 of the Resource Management Act 1991, to prevent or minimise any actual or likely adverse effect on the environment associated with the discharge of contaminants from the site.
2. At least 7 working days before the commencement of earthworks for the purpose of wellsite construction and establishment, the consent holder shall notify the Taranaki Regional Council of the proposed start date for the earthworks. Notification shall include the consent number and a brief description of the activity consented and shall be emailed to worknotification@trc.govt.nz.
3. The consent holder shall notify the Chief Executive, Taranaki Regional Council, in writing following the completion of the construction of the Sidewinder wellsite and before commencement of any operation of the Sidewinder wellsite. Notification shall be given at least 7 working days before the commencement of the Sidewinder wellsite operation and shall include the consent number and a brief description of the activity consented and emailed to worknotification@trc.govt.nz.
4. If any area of soil is exposed, all run off from that area shall pass through settlement ponds or sediment traps with a minimum total capacity of:
 - a) 100 cubic metres for every hectare of exposed soil between 1 November to 30 April; and
 - b) 200 cubic metres for every hectare of exposed soil between 1 May to 31 October; unless other sediment control measures that achieve an equivalent standard are agreed to by the Chief Executive of the Taranaki Regional Council.
5. The obligation described in condition 4 above shall cease to apply, and accordingly the erosion and sediment control measures can be removed, in respect of any particular site or area of any site, only when the site is stabilised.

Note: For the purpose of conditions 4 and 5, "stabilised" in relation to any site or area means inherently resistant to erosion or rendered resistant, such as by using rock or by the application of basecourse, colluvium, grassing, mulch, or another method to the reasonable satisfaction of the Chief Executive, Taranaki Regional Council and as specified in the Taranaki Regional Council's Guidelines for Earthworks in the Taranaki Region, 2006. Where seeding or grassing is used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once, on reasonable visual inspection by an officer of the Taranaki Regional Council, an 80% vegetative cover has been established.

Consent 9280-1

6. All earthworked areas shall be stabilised vegetatively or otherwise as soon as is practicable and no longer than 6 months after the completion of soil disturbance activities.

Note: For the purposes of this condition "stabilised" has the same definition as that set out in condition 5.

Signed at Stratford on 6 June 2012

For and on behalf of
Taranaki Regional Council

Director-Resource Management

