14 November 2014

PEPANZ submission to Gisborne District Council on Draft Freshwater Plan for the Gisborne Region

This document constitutes the Petroleum Exploration and Production Association of New Zealand's (PEPANZ) submission in respect of the *Draft Freshwater Plan for the Gisborne Region* ("the Freshwater Plan"), released for consultation by Gisborne District Council (GDC) in September 2014. PEPANZ represents private sector companies holding petroleum exploration and mining permits, service companies and individuals working in the industry.

This submission is in three sections:

1. Overarching comments on provisions in the Freshwater Plan
2. Specific comments on proposed policies
3. Specific comments on proposed rules

1. Overarching comments on provisions in the Freshwater Plan

Classifying oil and gas activities as a prohibited activity within Aquifer Protection Areas

Classifying the construction of oil and gas wells/bores as a prohibited activity within Aquifer Protection Areas is unnecessary to avoid adverse effects on groundwater aquifers. It would also be substantially out of step with the regulation in other jurisdictions, for example Taranaki.

Oil and gas wells (and other bores) are routinely drilled through aquifers around New Zealand and the world and the risks of contamination during the initial drilling and construction phase, and subsequently over the life of a well, are extremely low. We are not aware of evidence of groundwater contamination from well bores in New Zealand.

There are two main technical reasons why groundwater contamination is highly unlikely to occur:

- The technique for drilling the shallow section of the well (the first few hundred metres where freshwater may be present) is to use water based muds. This mud is formulated with water, clay and other common additives such as soda ash to create a blend designed to remove drilled rock cuttings from the large diameter upper hole section. The clay may enter the mud naturally from the formation that is being drilled or it may be added in the form of bentonite, which is a naturally occurring clay. The mud is designed to form a protective "cake" around aquifer formations and prevents communication between the newly drilled wellbore and any groundwater. Drilling the top section of a petroleum well (the only time during the petroleum well lifecycle when groundwater is not isolated by casing and cement) is in essence the same as drilling a water bore in that similar types of water based muds are used. Given this the effects basis for regulating these activities so differently as proposed in the Freshwater Plan is not apparent.

- Once a petroleum well is drilled through any freshwater zones these are then isolated by initially one, and later multiple, steel casing strings and cement to avoid any contamination.

The integrity of this is verified at the construction phase through pressure testing and other means (e.g. cement bond logs). The integrity of the well is then monitored over its life. This is standard industry practice and is provided for in regulation through a range of controls applying under the *Health and Safety in Employment (Petroleum Exploration and Extraction) Regulations 2013*. These include a range of requirements[1] focussed on well integrity including well examination. If any well integrity issues were to occur remedial action would be taken.

A Discretionary Activity or Restricted Discretionary Activity classification would be appropriate and consistent with other the treatment of other activities in the Freshwater Plan. GDC would retain discretion on whether to grant consent and could have regard to any or relevant prescribed matters.

Concerns with surface based activities (e.g. chemical spills) causing risks to surface or groundwater could be managed through common controls on chemical handling and storage, which are often equally relevant to other industries.

Aquifer Management Area Buffer Zones

Given that drilling within an aquifer zone itself can be done safely we question the rationale for the Aquifer Management Area Buffer Zones in terms of managing adverse effects. As discussed above any discharges resulting from drilling the top section of a well top section (through any groundwater) would be confined to the immediate vicinity of the well bore. The effects of these are in any case minor at most given the nature of the drilling muds used.

For petroleum activities that take place within a discovered petroleum reservoir (i.e. once the well is drilled beyond 1000 metres) there is little risk to overlying groundwater due to the geological seal existing above the reservoir (low permeability geological zones).

We note that a proposed distance of 3km is envisaged for these buffer zones but they have yet to be mapped accurately. This creates substantial uncertainty. We also question why they are proposed to be applied solely to petroleum related activities and are not aware of such a buffer zone approach in other jurisdictions

[1] A number of regulations in *the Health and Safety in Employment (Petroleum Exploration and Extraction) Regulations 2013* are focussed on well integrity, including:

- Regulation 13: requirement for the duty holder to take all practicable steps to prevent the uncontrolled release of hazardous liquids, vapours or gases.
- Regulation 26: requirement for the duty holder to prepare a Safety Case for an installation such as a drilling rig, which must include particulars and arrangements used to control the pressure in the wells and prevent the uncontrolled release of petroleum.
- Regulation 64: a 'primary duty' requirement for well operators to ensure a well is designed, constructed and operated so that there is no unplanned escape of fluids from the well and risks to health and safety are kept as low as reasonably practical.
- Regulation 70: requirement for well operators to ensure that suitable well control equipment and control systems are provided to protect against the uncontrolled release of petroleum.
- Regulations 71-72: requirement to prepare and implement a Well Examination Scheme (before the design of a well is commenced or adopted) including arrangements for ensuring that the well is designed, constructed, operated, maintained, modified, and abandoned so that as far as reasonably practicable there can be no unplanned escape of fluids from the well. Well examination is to be conducted by an independent and competent person, and a well operator is required to keep records of the findings of any examination, and remedial action recommended and any performed.

Grouping of various petroleum related activities

In terms of the structure of the Freshwater Plan we do not consider petroleum bores, hydraulic fracturing and deep well injection should be grouped. These are distinct activities with different features, different likely effects and different risks. It is not appropriate to group them simply because they are all petroleum related as, for example, what may be appropriate to address the potential effects of one could be completely unnecessary for another. Specific comments and examples on relevant policies and rules are included in the tables below.

Definition of hydrocarbon extraction

We note the term "hydrocarbon extraction" is defined as "Extracting hydrocarbons including oil and gas from a hydrocarbon deposit by any method." This is widely cast but potentially ambiguous as to what specific activities this is intended to cover and how this relates to for example the drilling and construction of wells/bores for different purposes (refer for example to Rule 5.2.6). More clearly defining the relevant activities involved and/or employing multiple concepts might enable a better nexus between various activities and the management of effects on freshwater.

We note also that extracting hydrocarbons per se is subject to the *Crown Minerals Act 1991* rather than the *Resource Management Act 1991* and so this terminology must be used with care to avoid any confusion.

Seismic surveying

At out meeting on 7 October it was noted that seismic surveying is a permitted activity in terms of land use, however because it is a discharge to the ground and is not provided for specifically it requires a Discretionary Consent. We submit that seismic surveying can be controlled effectively through a clearly prescribed permitted activity rule. We note that the Taranaki Regional Council is looking to adopt this approach with specific controls to prevent any surface or groundwater effects and minimise land disturbance and with rules to require the provision of detailed information on the activity to the council.

2. Specific comments on proposed policies

The following table provides comments on proposed policies provided in section 5.2 of the Freshwater Plan titled "Discharges to Groundwater and Bedrock – including from bores, oil and gas drilling".

Policies	PEPANZ Comments
Policy 5.2.2 Where hydrocarbon extraction, hydraulic fracturing, or deep well injection activities which could contaminate groundwater resources are proposed, these shall not be undertaken within the alluvial aquifers identified in Schedule 9 and should also be avoided within buffer areas.	As outlined elsewhere in this submission we submit that it is not necessary to prohibit hydrocarbon extraction, hydraulic fracturing, or deep well injection activities to prevent groundwater contamination. It would not occur in normal operations and any specific issues with a proposed activity could be considered through the consenting process on a case by case basis. Hydraulic fracturing and deep well injection activities are distinct from petroleum exploration or conventional

	extraction and they should not be grouped. The issues to be considered with these are different because they involve pressured discharges of fluids at depth whereas drilling exploration wells and conventional production extraction do not. We note hydraulic fracturing and deep well injection activities do not pose a direct risk to groundwater where the injection takes place far below any groundwater resources and with geological sealing layers in-between.[2] The indirect risk to groundwater is from a failure of wellbore integrity in a shallower freshwater zone leading to contamination from the injection activity (e.g. hydraulic fracturing) or through migration from a lower and higher pressure geological zone. Intensive monitoring is undertaken (particularly in regard to hydraulic fracturing) and in the unlikely event of any well integrity issues (likely observed by a drop in wellbore pressure) injection would be stopped.
Policy 5.2.3 Protect the quality of water and hydrological regime within Outstanding Waterbodies identified in Schedule 4 and Regionally Significant Wetlands identified in Schedule 3 from the adverse effects of bore construction and groundwater discharges.	We have no specific comments on this policy but have commented on some of the rules put in place to implement it. As outlined above, well integrity for petroleum bores is controlled by the *HSE (Petroleum Exploration and Extraction) Regulations 2013* administered by WorkSafe NZ.
Policy 5.2.4 Manage the use of bores and galleries, including decommissioned bores, so that they do not result in: a. The contamination of surface water or groundwater; or b. The mixing of groundwaters of different qualities through backflow of water; c. Surface water entering bores or galleries.	We have no specific comments on this policy but have commented on some of the rules put in place to implement it. Points (a) to (c) are sensible objectives.
Policy 5.2.5 Any bore penetrating bedrock is cased to prevent any potential contaminants leaking into groundwater, and when decommissioned, the release of contaminants from the bedrock into the overlying aquifers, and any entry of contaminants from the land surface into the well or bore is prevented.	We note that casing wells to isolate groundwater is standard industry practice and that abandonment of wells with cement plugs is specifically designed to prevent the release of any hydrocarbons remaining in the reservoir and to prevent cross flows of fluid or gas between other sub surface zones.

[2] Refer for example to Hydrogeologic Risk Assessment of Hydraulic Fracturing for Gas Recovery in the Taranaki Region (http://www.trc.govt.nz/assets/Publications/guidelines-procedures-and-publications/hydraulic-fracturing/hf-may2012-graph-p19.pdf)

Policy 5.2.6 Avoid groundwater or surface water contamination from the use of chemicals, materials or additives or the escape of hydrocarbons during the exploration for, or extraction of, or disposal of waste from, hydrocarbons in solid, liquid or gaseous form.	This policy appears to be covering a range of different activities and possible effects, some of which (e.g. solid waste disposal) don't obviously link to the title of this section of the Freshwater Plan. Suggest these ideas are separated out to make the purpose of this policy clear.
Policy 5.2.7 Where an applicant requires resource consent for multiple hydraulic fracturing and/or deep well injection activities, over a 12 month period, the bundling of consents will ensure cumulative effects are most appropriately assessed.	We recognise there could be cumulative effects from multiple activities of these types at surface (e.g. increased truck movements) and hydraulic fracturing involves using water, but what discharge to groundwater related cumulative effects from hydraulic fracturing and/or deep well injection activities are envisaged here? We note fracture operations would be in distinct subsurface zones (i.e. these would not overlap). As such we question the purpose of this policy in this section of the Freshwater Plan. Water use associated with hydraulic fracturing operations could be sourced in various ways and the use of water associated with hydraulic fracturing operations would therefore be better addressed alongside other water uses. This would likely be better addressed in Section 4 "Water Quantity and Allocation" rather than Section 5 "Discharges to Groundwater and Bedrock – including from bores, oil and gas drilling" as presently.
Policy 5.2.8 Where an application seeks resource consent for an oil and gas bore, deep well injection or hydraulic fracturing: a. Baseline groundwater and surface water monitoring will be required to be undertaken; and b. All active faults and faults within brittle rock/shear zones within the surrounding area will be required to be identified; and c. If any active faults or shear zones are identified, a seismic monitoring network will be required to be installed before well operations begin.	As noted above in our overarching comments we consider oil and gas bore, deep well injection and hydraulic fracturing should be separated out rather than bundled together. For example whilst (b) and (c) may be appropriate in some circumstances in relation to deep well injection or hydraulic fracturing they are unnecessary to manage any possible effects associated with well drilling and construction, and conventional petroleum production. Specific comments: (a) This requirement should only apply where groundwater or surface water resources are present, with conditions as appropriate to be agreed between GDC and the applicant. (b) This needs to be more clearly defined as "surrounding area" is very vague and uncertain. The consideration should be linked to the activity undertaken (i.e. where the hydraulic fracturing occurring). (c) As noted above to require this for all well operations would be without a possible effects basis and out of step with domestic and international practice. We recognise it is required in some jurisdictions for some injection related activities.

Policy 5.2.10 To consider requiring a bond, or an acceptable alternative for any bore or discharge of contaminants to groundwater or bedrock where the scale, intensity, duration or frequency of the discharge could have a high potential impact if it led to contamination of groundwater. The bond will be administered according to Section 108A of the Act.	We submit practice in this area should be consistent with existing practice around New Zealand by other territorial authorities. We note operators carry insurance for incidents involving wells. Drafting comment: we suggest the concepts in the following should be reordered "could have a high potential impact if it led to contamination of groundwater".

3. Specific comments on proposed rules

Rule and Activity	Classification	PEPANZ Comments
Rule 5.2.5 Construction, altering, installing or decommissioning any oil or gas bore and associated discharges from drilling except: a. in or within 50m of Outstanding waterbodies or Regionally Significant Wetlands identified in Schedules 3 and 4; and b. within the Aquifer Protection Areas or Aquifer Protection Buffer Zones.	Discretionary Activity	We submit that for the following reasons it would be consistent with other parts of the proposed Freshwater Plan for construction, altering, installing or decommissioning an oil or gas bore and associated discharges to be generally within the Gisborne District a Restricted Discretionary Activity: • The issues that need to be considered in relation to drilling and constructing wells are well known and so could be prescribed (as is done for example in proposed Rule 5.2.3 for the related activity of constructing water bores). • Drilling, constructing and operating petroleum wells is subject to the *Health and Safety in Employment (Petroleum Exploration and Extraction) Regulations 2013* administered by WorkSafe NZ. These regulations impose a number of measures to control well integrity (precluding any unplanned escape of fluids from the well) and include provision for independent well examination. We note the Ministry for the Environment is leading a work programme on well integrity that aims to clarify the interaction between the RMA and HSE regimes and this should provide outputs in 2015. Prescribing the matters to be considered would increase certainty for industry and stakeholders.

Rule 5.2.6 Discharges to groundwater or bedrock from hydrocarbon extraction or waste disposal activities except: a. in or within 50m of Outstanding waterbodies or Regionally Significant Wetlands identified in Schedules 3 and 4; and b. within the Aquifer Protection Areas or Aquifer Protection Buffer Zones.	Discretionary Activity	Please note our below comments on the exceptions relating to Aquifer Protection Areas and Aquifer Protection Buffer Zones as provided for in 5.2.8 and 5.2.9. Also note out comments on the definition of "hydrocarbon extraction" above. As noted above in relation to policy 5.2.6, this rule appears to be covering a range of different activities and possible effects, some of which (e.g. solid waste disposal) don't obviously link to the title of this section of the plan. Suggest these ideas are separated out to make the scope of this rule clear.
Rule 5.2.9 Making, altering or installing any oil or gas bore and associated discharges from drilling within the Aquifer Management Area Buffer Zones.	Non Complying Activity	As outlined above we question the need for Aquifer Management Area Buffer Zones and their specific application to oil and gas bores. A Discretionary Activity status would still give GDC the ability to consider relevant matters and possible effects.
Rule 5.2.10 Discharges to groundwater or bedrock from hydrocarbon extraction or waste disposal activities within the Aquifer Management Area Buffer Zones.	Non Complying Activity	As outlined above we question the rationale for the Aquifer Management Area Buffer Zones. It is not clear what specific activities or effects this rule is looking to manage, given, as we have outlined above the uncertainty associated with the extent of activities intended to be captured by the definition of "hydrocarbon extraction" and to some extent also the the definition of "groundwater". For example, hydrocarbon extraction, has no direct interaction with freshwater resources unless there is an unplanned event such as a loss of well integrity. This would suggest this rule has no effect on this activity. A Non-Complying Activity status is unnecessarily strict to unable the management of the adverse effects identified. A Discretionary Activity or Restricted Discretionary Activity classification would be sufficient because GDC would still retain discretion on whether to grant consent and could have regard to any/relevant prescribed matters, including for example the proximity of nearby water bores. Is the inclusion of "waste disposal" in this rule limited to that associated with hydrocarbon extraction or is this intended to apply to waste disposal generally? If the latter then suggest this is split out to facilitate better comprehension of the

		Freshwater Plan. If the former then we suggest specific provisions focussed on relevant activities such as landfarming would be preferable and clearer and this would enable these to be treated like similar activities, in that case other land based bioremediation.
Rule 5.2.11 Oil and gas bores within an Aquifer Management Area or within 50m of an Outstanding Waterbody or Regionally Significant Wetland identified in Schedule 3 or 4.	Prohibited Activity	The issues associated with oil and gas bores within an aquifer area and those close to a waterbody or wetland are fundamentally different. For example surface contamination is principally relevant to the latter and a minimum separation distance as proposed here is appropriate in that situation. As such separating these concepts would be appropriate. The drilling and construction of petroleum bores within aquifers is common in New Zealand and internationally and has occurred on the Poverty Bay Flats, Heretunga and Ruataniwha Plains in recent times. The interaction with the aquifer is similar to that involved with drilling and constructing water bores because the drilling method and muds used in this zone are similar. We therefore question the effects based rationale for prohibiting one of these activities within an Aquifer Management Area and not the other, especially when the effects involved may be no more than minor.
Rule 5.2.12 Discharges to groundwater or bedrock from hydrocarbon extraction or waste disposal activities within an Aquifer Management Area or within 50m of an Outstanding Waterbody or Regionally Significant Wetland identified in Schedule 3 or 4	Prohibited Activity	As noted above in relation to Rule 5.2.10 it is not totally clear what activities or effects leading to discharges this rule is looking to manage. Given this and uncertain spatial scope of the Aquifer Areas and the this rule it is difficult for us to full understand what this rule is intended to prohibit. We also submit that, as outlined elsewhere in this submission, it is not necessary to prohibit petroleum activities in the vicinity of aquifers to avoid adverse effects on them. For example, any discharges associated with hydraulic fracturing would be at a depth such that they would not pose a risk to freshwater resources at much shallower depths unless there was a failure of well integrity in a shallow zone of the well. Issues associated with the depth of injection vis-a-vis groundwater could be considered as part of a discretionary consent. As noted above in relation to Rule 5.2.10, is the

		inclusion of “waste disposal” in this rule limited to that associated with hydrocarbon extraction or is this intended to apply to waste disposal generally? If the latter then suggest this is split out to facilitate better comprehension of the Freshwater Plan. Technical point: Any control of this kind would need to be spatially limited to within a certain depth or within the freshwater zone to control the effects it is targeting. Discharges associated with directional wells underneath such zones would for example have no effect on these surface and shallow water features, for example a discharge to bedrock at 2500 metres depth would have no effect on a wetland above and so there would be no basis to prohibit it.