BEFORE THE CANTERBURY REGIONAL COUNCIL

IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of a hearing by the Canterbury Regional Council Hearing Panel on Proposed Plan Change 4 of the Canterbury Land and Water Regional Plan

---

STATEMENT OF EVIDENCE OF KEVIN WILLIAM TEARNEY FOR Z ENERGY LTD, MOBIL OIL NZ LTD, BP OIL NZ LTD (THE OIL COMPANIES)

29 January 2015

Simpson Grierson
Barristers & Solicitors

Simpson Grierson
J G A Winchester / S J Scott
Telephone: +64-4-924 3503
Facsimile: +64-4-472 6986
Email: james.winchester@simpsongrierson.com
DX SX11174 PO Box 2402
SOLICITORS
WELLINGTON 6140

TABLE OF CONTENTS

1. INTRODUCTION

1.1 My full name is Kevin William Tearney.

1.2 I have a Bachelor of Science in Geology and a Master of Science (1st Hons) in Geology (with Geophysics) from the University of Auckland. I am a member of the New Zealand Geoscience Society.

1.3 I am currently employed as Technical Director at AECOM Consulting Services (NZ) Ltd (**AECOM**) and I have held this position and equivalent positions in URS New Zealand Limited (URS is now AECOM) since 1998.

1.4 I have over 30 years of industry and environmental consulting experience gained mainly within New Zealand, Australia and the United Kingdom. I am an experienced contaminated land professional who has provided advice and expertise in respect of groundwater resource assessment, brownfield assessment and remediation, and land bank and closed landfill management for over 25 years. I have particular experience in the petroleum retailing and marketing industry (service stations and bulk petroleum storage) and I have provided technical advice on a national basis in relation to service station new builds, rebuilds and underground storage tank removal and installation, for BP, Shell, Caltex (Chevron), Mobil and latterly Z Energy in New Zealand, for much of my career with AECOM. As such, I am very familiar with petroleum site processes, the environmental impact of petroleum losses on groundwater and environmental mitigation measures. My experience also includes providing advice in relation to the investigation and redevelopment of former railway, commercial and gasworks impacted land for residential and commercial land uses and I have practised resource management for over 30 years.

1.5 I am a co-author of the Ministry for the Environment (**MfE**) Contaminated Land Management Guideline No. 5: Site Investigation and Analysis of Soil 2004 and the update document prepared by URS for MfE in 2014. I am a working group member and peer reviewer of the User's Guide — National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health prepared by URS for MfE dated April 2012.

1.6 My evidence addresses the Oil Companies' submission in relation to proposed Rule 5.187 of Proposed Plan Change 4 of the Land and Water Regional Plan (**LWRP**) for Canterbury Regional Council (**ECan**). Ultimately, my evidence suggests amendments to Schedule 8, which provides the basis for assessment under Rule 5.187. While the Oil Companies did not specifically make a submission on Schedule 8 itself, I understand that changes to Schedule 8 give effect to the relief sought by the Oil Companies on Rule 5.187. Scope of the Oil Companies' submission will be addressed in the legal submissions for the Oil Companies.

1.7 In preparing this evidence I have reviewed relevant sections of ECan's primary s42A report prepared by Philip Maw and Matthew McCallum Clark. I have also read and rely on the evidence by David le Marquand in relation to relevant planning matters. I have also considered the following documents:

(a) the notified Plan Change 4 (Omnibus) to the LWRP;
(b) ECan's Section 32 evaluation report;
(c) the Canterbury Regional Policy Statement (2013);
(d) the Oil Companies submissions and further submissions on the Proposed Plan Change 4; and
(e) the Resource Management Act 1991 (**RMA**).

2. CODE OF CONDUCT

2.1 I have read the Environment Court's Practice Note 2014 as it relates to expert witnesses. My brief of evidence was prepared in compliance with the Code of Conduct and I agree to comply with the Code in giving my oral evidence. I am not, and will not behave as, an advocate for the Oil Companies. I am engaged by the Oil Companies as an independent expert and my Company provides environmental and other services to the Oil Companies collectively and separately along with a range of other infrastructure, corporate and public agency clients. I have no other interest in the outcome of the proceedings.

2.2 Other than when I state I am relying on the advice of another person, this evidence is entirely within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

3. SCOPE OF EVIDENCE

3.1 My evidence relates to Rule 5.187 of Proposed Plan Change 4 of the LWRP.

3.2 Rule 5.187 as proposed requires the use of limits set out in *Schedule 8 Region-wide Water Quality Limits* of the LWRP as concentration limits to determine the consent status for passive discharges in groundwater from contaminated land.

3.3 Schedule 8 limits are set at 50% of the Maximum Allowable Value (**MAV**) given in the New Zealand Drinking Water Standards 2005 (revised 2008) (**DWSNZ**) (with the exception of Nitrate-N and E coli).

3.4 The DWSNZ define MAVs as the maximum concentrations of chemicals of health significance in water that, based on current knowledge, constitute no significant risk to the health of a person who consumes 2 L of that water a day over their lifetime (usually taken as 70 years).

3.5 The Schedule 8 limits do not take account of the sensitivity of the receiving environment – for example whether or not the water source will ultimately be consumed by humans.

3.6 My evidence presents the technical basis for the amendment of Schedule 8 groundwater quality limits to contain two limits, being either the 50% MAV for 'sensitive' aquifers or MAV for 'non-sensitive' aquifers.

4. RULE 5.187 and RULE 5.188

4.1 The s42A report proposes the following changes to Rule 5.187:

> *5.187 The passive discharge of contaminants ~~onto or into land~~ from ~~a~~ contaminated ~~site~~ land onto or into land in circumstances where those contaminants may enter water is a permitted activity, provided the following conditions are met:*
>
> 1. *There has been a site investigation report provided to the CRC in accordance with Rule 5.185; and*
> 2. *~~The site investigation report identifies reasons for concluding that:~~ The discharge does not result in the concentration of contaminants*
>
> *(1) ~~The concentration of contaminants~~ in groundwater ~~meets~~ at the property boundary, or at any existing groundwater bore (excluding any monitoring bore located on the property), breaching the limits for groundwater set out in Schedule 8; ~~or~~ and*

(2) ~~The concentration of contaminants in the groundwater: at the property boundary, at the location of any existing groundwater bore (excluding monitoring bores), and~~ at any point where ~~the~~ groundwater exits to surface water ~~does not~~ breach<u>ing</u> the water quality standards in Schedule 5 for 90% of species; and

3. At any point where the groundwater exits to surface water the discharge does not produce any:
(a) Conspicuous oil or grease films, scums or foams, or floatable or suspended materials; or
(b) Conspicuous change in the colour or visual clarity~~; or~~
~~(c) Emission of objectionable odour.5.187~~

4.2 Rule 5.188 in the s42A Report is as follows:

5.188 The <u>passive</u> discharge of contaminants ~~onto or into land~~ from ~~a~~ contaminated ~~site~~ <u>land onto or into land</u> in circumstances where those contaminants may enter water that does not meet one or more of the conditions in Rule 5.187 is a discretionary activity.

4.3 The intent of Rule 5.187 is to provide a clear mechanism for determining whether a passive discharge of contaminants in groundwater is a permitted activity or requires control as a discretionary activity.

4.4 As set out in the evidence of Mr le Marquand, the Oil Companies supported some changes proposed by ECan to Rule 5.187 such as the reference to passive discharges and the structure of the rule relating to the two standards (screening levels in Schedule 5 and Schedule 8). However, the Oil Companies have also sought further changes to the rule (changes in dispute are identified in bold below) as follows:

5.187
The <u>passive</u> discharge of contaminants ~~onto or into land~~ from ~~a~~ contaminated ~~site~~ land onto or into land in circumstances where those contaminants may enter water is a permitted activity, provided the following conditions are met:

1. *There has been a site investigation report provided to the CRC in accordance with Rule 5.185; and*
2. *~~The site investigation report identifies reasons for concluding that:~~ <u>**The site investigation report identifies reasons for concluding that ~~T~~t**he discharge does not result in the concentration of contaminants:*
   *(1) ~~The concentration of contaminants~~ <u>**in** groundwater ~~meets~~ at the property boundary, **~~or at~~for** any existing groundwater bore (excluding any monitoring bore located on the property), **or where there is a community groundwater protection zone,** breaching</u> the limits for groundwater set out in Schedule 8; ~~or~~ <u>**or otherwise the New Zealand Drinking-water Standards;** and</u>*
   (2) ~~The concentration of contaminants in the groundwater: at the property boundary, at the location of any existing groundwater bore (excluding monitoring bores), and at~~ any point where ~~the~~ groundwater exits to surface water ~~does not~~ breach<u>ing</u> the water quality standards in Schedule 5 for 90% of species; and

3. *At any point where the groundwater exits to surface water the discharge does not produce any:*
   (a) Conspicuous oil or grease films, scums or foams, or floatable or suspended materials; or
   (b) Conspicuous change in the colour or visual clarity~~; or~~
   ~~(c) Emission of objectionable odour.~~

5. AMENDMENT OF SCHEDULE 8 LIMITS

5.1 I agree that it is appropriate to identify legacy passive discharges in groundwater, assess the risks they pose to the receiving environment, and apply appropriate controls.

5.2 As stated in paragraph 4.3, the intent of Rule 5.187 is to provide a clear mechanism for determining whether a passive discharge of contaminants in groundwater is a permitted activity or requires additional control as a discretionary activity.

5.3 In principle, I support the use of concentration limits to inform this process. Concentration limits (also termed trigger or guideline values) are numerical values describing the concentration of a contaminant in media such as groundwater. They are used to assess the requirement for further action, for example, further investigation or risk management. Measured values in the media are compared to the concentration limits to assess the action required.

5.4 I also support the reference to the site investigation report as the key mechanism for assessment, as suggested by the Oil Companies and as discussed in Mr le Marquand's evidence.

5.5 In relation to the Schedule 8 concentration limits, I consider these to be 'threshold' based trigger values as opposed to 'risk based' trigger values.

5.6 A threshold based trigger value is generally derived from a risk based number associated with a particular generic receptor, which is then applied generally to the receiving environment rather to the specific receptor and the exposure pathway and uptake mechanism; the risk based number is commonly multiplied by a factor to account for uncertainty. MfE publication *Contaminated Land Management Guidelines No.2 Hierarchy and Application in New Zealand of Environmental Guideline Values* also describes threshold values as values

where insufficient information on the derivation of the number is provided. The Ministry of Health *Lead Guidelines* are cited as an example.

5.7 Risk based values are derived on the basis of the calculated risk to specific receptors, which in turn is based on the nature and concentrations of the contaminants in the environment, the pyhsico/chemical properties of the migration pathway and the degree of connectivity with each receptor. An example of risk based values is the soil contaminant standards (**SCS**) referenced in the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. These SCS consider the risk to human health from contaminants in soil based on specific land uses and exposure pathways and receptors, such as the consumption of home grown produce.

5.8 Threshold values tend to be conservative compared to risk based values.

5.9 My interpretation is that the Schedule 8 limits set as 50% MAV are threshold values based on the DWSNZ MAVs, which relate to the quality of water at the tap consumed by humans over a lifetime of exposure. Humans are therefore the receptor being protected by the Schedule 8 limits. The MAVs as defined by the DWSNZ do not apply directly to some point in an aquifer such as a property boundary. Further conservatism has been added in the Schedule 8 limits by halving the MAV.

5.10 The assumption inherent in the Schedule 8 limits is that groundwater for potable use is obtained from the receiving environment subject to the discharge. That is, the Schedule 8 limits are intended to provide security to aquifers that supply or could supply potable water from groundwater. In my evidence, I refer to such aquifers as 'sensitive' aquifers.

5.11 I note that the Schedule 5 limits in Table 5b are similar threshold values derived to protect surface water bodies.

5.12 I am not aware of the basis of the conservatism used to derive the Schedule 8 limits (e.g. the use of 50% MAV as opposed to say 80% MAV).

5.13 I view the 50% MAV as conservative. If groundwater quality at the site boundary is 50% MAV, it follows that the DWSNZ MAV at a groundwater bore would be

met; it is also likely that in most cases, the actual concentrations of contaminants at the bore would be well below the 50% MAV. This would be due to attenuation processes in the aquifer between the contaminant levels measured at the site boundary and the bore as well as mixing with (dilution by) other groundwater not associated with the discharge. I note that allowance for reasonable mixing in the receiving environment is commonly considered when setting trigger values for discharges to surface water or stormwater discharges to groundwater.

5.14 It follows, therefore, that if the aquifer being protected by the 50% MAV limit is not able to produce groundwater for human consumption (i.e. the receiving environment is not suitable for use (potable use or otherwise) for groundwater abstraction), then the Schedule 8 limits could be relaxed to reflect the lower sensitivity of the receiving environment. I refer to this type of receiving environment as a 'non-sensitive' aquifer.

5.15 This differentiation between non-sensitive and sensitive aquifers is a key matter raised in the Oil Companies submission (see page 23). I support recognition of this differentiation in my evidence. The currently proposed Schedule 8 limits assume all receiving environments are sensitive aquifers and they do not take account of aquifers that are not used and do not have the potential to be used, for potable supply (i.e., non-sensitive aquifers).

5.16 I accept that there needs to be limits set in order to facilitate determination of consent status of contaminated land subject to a diffuse discharge of contaminants in groundwater.

5.17 However, in my view, for non-sensitive aquifers the limit at which the discharge should be subject to control as a discretionary activity should be less stringent than the limits for sensitive aquifers.

5.18 I therefore suggest that concentration limits relating to both sensitive and non-sensitive aquifers should be included in Schedule 8. The limits relating to sensitive aquifers should comprise DWSNZ 50% MAV; the limits relating to non-sensitive aquifers should comprise DWSNZ MAV. I note that I consider these limits to be conservative and lower limits, also protective of the environment, could be developed.

5.19 This proposed change will require an assessment of aquifer sensitivity for each passive groundwater discharge to assess the applicable Schedule 8 limit.

5.20 I accept that that there are degrees of aquifer sensitivity. I suggest that for the purposes of Rule 5.187, aquifer sensitivity is based on the actual or reasonably foreseen potential abstraction of groundwater for potable use from any aquifer within a distance downgradient of the site boundary. The presence of a 'community groundwater protection zone', for example, would classify the receiving environment as a sensitive aquifer, requiring the application of 50% MAV Schedule 8 limits. In other cases, the sensitivity should be assessed by a suitably qualified and experienced practitioner and for example, documented in the investigation report.

5.21 I believe that there is sufficient information contained in New Zealand based guidance and standards to enable this assessment of aquifer sensitivity to be undertaken. For example:

(a) the *Code of Practice for the Management of Existing Stationary Container Systems up to 60,000 litres Capacity*, issued by the Environmental Risk Management Authority (ERMA) in November 2006 (HSNOCOP 13-1). discusses 'Environmental Sensitivity Zones' in relation the storage of petroleum hydrocarbons in underground storage tanks;

(b) *DWSNZ 2005 discuss aquifer vulnerability* to assess aquifer security for drinking water abstraction; and

(c) the MfE 2011 *Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand* (Oil Industry Guidelines) also address aquifer vulnerability which is termed aquifer sensitivity.

5.22 In my opinion, adoption of two categories of Schedule 8 limits for these two categories of aquifer is unlikely to give rise to additional adverse effects and will facilitate resource allocation to those discharges that need to be further investigated and possibly controlled to mitigate risks to receiving environments.

6. CONCLUSION

6.1 The 50% MAV Schedule 8 limits to determine the consent status of contaminated land generating a diffuse discharge to groundwater are threshold values intended to be protective of aquifers used to abstract groundwater for potable use.

6.2 These limits are conservative and do not take account of receiving environments comprising non-sensitive aquifers.

6.3 Use of two categories in Schedule 8 concentration limits relating to sensitive and non-sensitive aquifers is recommended.

6.4 The limits relating to sensitive aquifers should comprise DWSNZ 50% MAV; the limits relating to non-sensitive aquifers should comprise DWSNZ MAV.

6.5 Aquifer sensitivity should be assessed by a suitably qualified and experienced practitioner and for example, documented in the investigation report.

6.6 Appropriate application of these limits is in my view unlikely to give rise to additional adverse effects and will facilitate resource allocation to those discharges that need to be further investigated and possibly controlled to mitigate risks to receiving environments.

Kevin William Tearney
29 January 2016