

Proposed South Taranaki District Plan

Statement presented by Climate Justice Taranaki Incorporated

Hearings session 21 June 2016

Energy, Hazardous Substances and Contaminated Land

Scope of Statement

1. This statement by Climate Justice Taranaki Incorporated (CJT) primarily concerns the oil and gas industry, and the rules that need to be put in place to avoid or minimize its impacts on people and the environment.
2. This statement highlights the district council's specific responsibility in protecting human health, managing the effects of different landuse, and having regard to the effects of climate change. It reiterates the key points of our original and further submissions, and responds to the relevant S42A Officers' reports and some of the evidence tabled during the course of the hearings.

Health Impacts associated with the Oil and Gas Industry

3. Over the last few years, hundreds of scientific studies concerning unconventional oil and gas development have been conducted internationally. In 2014 alone, 192 peer-reviewed studies on the adverse impacts of the industry were published. The study citation database¹ maintained by the PSE – Physicians Scientists & Engineers revealed that **“69 percent of original research studies on water quality found potential for, or actual evidence of, water contamination; 88 percent of original research studies on air quality found elevated air pollutant emissions; and 84 percent of original research studies on human health risks found signs of harm or indication of potential harm”** (Concerned Health Professionals of NY and PSR, 2015)².
4. One such study was conducted by researchers from the Colorado School of Public Health concerning the human health risk of air emissions from unconventional natural gas development (McKenzie, et al. 2012)³. This study, involving the Garfield County Department of Public Health, used EPA guidance to estimate chronic and subchronic non-cancer hazard indices and cancer risks from exposure to hydrocarbons. Importantly, Garfield County is very similar to South Taranaki in that the two major industries are agriculture and oil and gas. This study concluded that: **“Residents living within ½ mile [800 m] from wells are at greater risk for health effects from NGD [natural gas development] than are residents living further than ½ mile. Subchronic exposures to air pollutants during well completion activities present the greatest potential for health effects. The subchronic non-cancer hazard index (HI) of 5 for residents less than ½ mile from wells was driven primarily by exposure to trimethylbenzenes, xylenes, and aliphatic hydrocarbons. Chronic HIs were 1 and 0.4 for residents less than ½ mile from wells and further than ½ mile from wells, respectively.”** Cumulative cancer risks were

nearly doubled for residents living less than 800m from wells, with benzene as the major contributor to the risk.

5. Notably in December 2014, the New York State Department of Health released a 186 paged review⁴ of the health impacts of high volume hydraulic fracturing (fracking) and led to a statewide ban on the practice. In the review, the Acting Commissioner of Health Dr Howard Zucker said:

*“As with most complex human activities in modern societies, absolute scientific certainty regarding the relative contributions of positive and negative impacts of HVHF [high volume hydraulic fracturing] on public health is unlikely to ever be attained. In this instance, however, the overall weight of the evidence from the cumulative body of information contained in this Public Health Review demonstrates that there are **significant uncertainties** about the kinds of adverse health outcomes that may be associated with HVHF, the **likelihood of the occurrence** of adverse health outcomes, and the **effectiveness of some of the mitigation measures** in reducing or preventing environmental impacts which could adversely affect public health. **Until the science provides sufficient information to determine the level of risk to public health from HVHF to all New Yorkers and whether the risks can be adequately managed, DOH [Department of Health] recommends that HVHF should not proceed in NYS.**”*

Responsibilities of Territorial Authorities

6. Part 2 of the **Health Act 1956** states: *“it shall be the **duty of every local authority to improve, promote, and protect public health within its district...**”* Section 69U of the Act gives every drinking-water supplier the duty to protect its drinking water sources from contamination.
7. **Section 31 of the Resource Management Act (RMA) 1991** gives the district council specific functions in land use:

“(1) Every territorial authority shall have the following functions for the purpose of giving effect to this Act in its district:

*(a) the establishment, implementation, and review of objectives, policies, and methods to achieve **integrated management** of the effects of the use, development, or protection of land and associated natural and physical resources of the district:*

(b) the control of any actual or potential effects of the use, development, or protection of land, including for the purpose of—

*(i) the avoidance or mitigation of **natural hazards**; and*

*(ii) the prevention or mitigation of any adverse effects of the storage, use, disposal, or transportation of **hazardous substances**; and*

*(iia) the prevention or mitigation of any adverse effects of the development, subdivision, or use of **contaminated land**:*

*(iii) the maintenance of indigenous **biological diversity**: ...*

(d) the control of the emission of noise and the mitigation of the effects of noise:

(e) the control of any actual or potential effects of activities in relation to the surface of water in rivers and lakes: ...”

8. Section 7 of the RMA states: *“In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall have particular regard to... (i) the **effects of climate change**”.*
9. Both the Health Act and the RMA therefore assign specific responsibilities to the district council that cannot be abdicated to other authorities.
10. Neither the Hazardous Substances and New Organisms (HSNO) Act nor Health and Safety at Work (Petroleum Exploration and Extraction; Major Hazard Facilities) Regulations 2016 address **locational issues** concerning petroleum or other hazardous facilities in respect to the wellbeing of the local communities or the environment. We re-emphasize that the plan presently does not properly acknowledge these responsibilities, nor addresses the consequences in respect to energy or hazardous substances and contaminated land.

Definitions

11. As noted in our original submission, the proposed plan is confusing, and in places, contradictory to itself and some of the related documents. It is prone to misinterpretation. We urge that the plan be revised thoroughly and with clarity, to ensure that the finalised plan is robust and can be implemented effectively, without confusion or misinterpretation.
12. In our original submission, we sought a clear definition on **Separation/Setback Distance** and how it is measured. We were unable to locate a response to this in the S42A Officers’ report. Mr. Hamish Wesley in the report did respond to Fonterra’s query on the same subject stating: *“This distance would be measured from the building or land the sensitive activity occupied. For example, residential activity would be measured from the dwelling..., while for a school it would be measured from the boundary of the school grounds as the definition of ‘education facility’ includes all land...”* (S42A report, para 197). **This definition ignores the risks on residents and workers working indoors (e.g. milking shed) or outdoors (e.g. farming activities), and impact on landowners’ future landuse options such as putting in new or relocating existing dwellings within the property.** We reiterate our request that the separation distance be taken from the boundary of the rural property at risk, in the same way as education facility.
13. Consequentially, we request that the definition of **‘Sensitive Activities’** be expanded to include **‘workplaces (indoor and outdoor)’**.
14. We noted the statements by Mr Wesley in the S42A Officers report: *“Major hazardous facilities’ are those facilities that pose potential risks to the environment or human health that warrant a greater level of management beyond that provided under other statutes... The additional costs of assessing hazardous substances as part of a discretionary activity application is considered to be outweighed by the benefit of managing the risks to the environment and human health”.* We welcome his recommendation to retain petroleum

exploration and production activities in the definition of ‘major hazardous facility’ (subsequently amended as ‘Significant Hazardous Facility’) and delete the exceptions for the Health and Safety regulations (para 65, 72-73 and 85). We concur with this recommendation so that **any site which involves petroleum exploration and production activities is considered a Significant Hazardous Facility, without exception.**

15. We have issue with Mr. Wesley’s view that re-injection and drilling of wells, flaring, landfarming and disposal of waste fluid are the primary responsibility of the Regional Council (S42A report, para 78, 82). While the regional council manages the contaminant discharge (to air or into land) associated with these activities, district councils have specific responsibilities in protecting public health and managing the effects of land use and more specifically, the use of contaminated land.
16. We propose that the **definitions of petroleum exploration and production in the plan be amended**, so that all **petroleum field development activities** such as hydraulic fracturing (fracking), ‘water’ injection/flooding and enhanced oil or gas recovery technologies, as well as **waste disposals by reinjection and gas storage underground**, are also included in the definitions.
17. We welcome the addition of a definition on ‘**landfarming**’ in section 1, but note that the definition proposed in the S42A report on Energy (Table 31) does not reflect accurately the nature and process of landfarming. Resource consents for landfarming cover a wide range of wastes including drilling cuttings and fluids⁵, water-based and synthetic-based muds, oily wastes, and wastes from hydrocarbon exploration, well work-over⁶, production⁷ and storage activities, carbon filter sludge⁸, etc.
18. A definition of ‘**seismic survey** (or testing)’ is also needed, considering its risks on human safety and the environment which far outweigh those from petroleum prospecting using aerial surveys or hand-held device.
19. Irrespective of whether petroleum prospecting (involving seismic surveys), exploration, production, field development, reinjection and underground storage activities are included in the definition of Significant Hazardous Facility, it would be useful to **consider restructuring the plan so that a chapter is dedicated entirely to all petroleum associated activities**, including the corresponding rules and performance standards. This would better reflect the prevalence and significant impacts of the petroleum industry in this district. It would also simplify the plan as the details concerning petroleum associated activities could be removed from the Hazardous Substances and Energy sections.

Policies

20. We have issue with the recommended amendment of Policy 2.8.8 by Mr Wesley in the S42A report regarding the location of significant hazardous facilities. The proposed changes from “near” to “within” or “adjacent to” significant areas of indigenous vegetation and habitats, significant waterbodies and sites of significance to tangata whenua, implies that significant hazardous facilities may be located within or adjacent to such sites of significance. We also

disagree with the deletion of “**sources of potable water**” because significant waterbodies (Schedule 5) do not encompass all sources of potable water (notably rural water supplies). We also object to deleting “*natural hazards*” because this would avoid the consideration of earthquakes potentially induced (Ellsworth, 2013)⁹ or triggered (van der Elst, et al. 2013)¹⁰ by fracking¹¹ or deepwell injection¹².

21. We question the rationale behind Mr Wesley’s statement: “*With respect to **activities near fault lines**, the review of the fault line information concluded it was not sufficiently robust to be relied upon in a District Plan. Given Taranaki has a lower level of seismic risk, it is considered effective and efficient not to include rules for fault lines*” (S42A report, para 151). The papers by Ellsworth and van der Elst published in *Science* mentioned above suggest the contrary.
22. If the information is not presently “*sufficiently robust*”, then (a) a precautionary approach must be adopted, given the clear international evidence of the peer-reviewed literature; and (b) independent studies must be undertaken to address the deficiency, with funding from those who propose to undertake such activities.

Rules

Permitted Activities

23. In view of the actual and potential risks of petroleum associated activities and other major hazardous facilities on the environment and human health and safety, no such activities should be Permitted without the consenting process involving quantitative risk assessment, and subsequent monitoring. Our view is in line with that of expert witness for Taranaki Energy Watch, Ms Jenny Polich, who pointed out: “*Major hazardous facilities... **should not be “permitted” in any location or any zone.** This type of facility should always require some form of formal assessment with sufficient accompanying information to demonstrate that **effects to all receptors (not just sensitive receptors)** in a particular location have been adequately assessed ...*” (Evidence by Polich, para 4.1(3)).
24. We therefore welcome the deletion of Rule 12.2.1 which granted permitted activity status to “*the use, storage or handling of hazardous substances in a Hazardous Facility provided that they comply with the relevant performance standards...*” and the amendment so that the performance standards 12.3 is for Discretionary (rather than Permitted) Activities (S42A Hazardous Substances report, Tables 24 and 25).
25. However, we object to Rule 13.1.1c(iii) which permits all petroleum prospecting, exploration and production in the Rural Industrial Zone. We also object to adding a new rule to Section 12.2.1 which makes a Significant Hazardous Facility in the Rural Industrial Zone a Permitted activity. We understand that this would also allow any existing Significant Hazardous Facility in the Rural Industrial Zone to increase the use, storage or handling of hazardous substances, without a specified amount or setback requirements. We object strongly to this because this ignores the heightened risks and cumulative impacts on adjacent and neighbouring communities and environment in the Rural Zone.

26. Although the Rural Industrial Zone “*need to recognise the presence of existing large-scale operations in the rural environment and provide for their ongoing efficient and effective functioning*” (plan 2.6.1), their “*adverse effects on the rural environment*” must also be recognised. The Rural Zone “*need to provide for productive land use and other complementary rural based activities...*” and “*Rural character, amenity values and productive use of rural land resources underpins the social, economic, and cultural wellbeing of the District*” (plan section 2, p.1). **It is therefore critical that the adverse effects of any expansion of Significant Hazardous Facilities in the Rural Industrial Zone on the neighbouring Rural Zone are avoided or minimized.**
27. The plan also states that “*as the Rural Industrial Zone applies to sites scattered throughout the rural environment there is potential for reverse sensitivity conflicts to arise between activities in the rural area and rural-industrial sites*” (plan section 2, p.23). **To avoid reverse sensitivity conflicts, any increase in the use of hazardous substances or expansion of significant hazardous facilities must therefore be assessed thoroughly** through the consenting process, rather than simply Permitted.
28. We object to 13.1.1a(iii) which classifies seismic exploration for petroleum prospecting in the Rural Zone as Permitted. **Seismic exploration, especially involving explosives and environmental contaminants, must be assessed through a consent process**, and its effects monitored. Importantly, undetonated explosives or misfires have serious landuse impacts on landowners/occupiers as the surrounding areas must be taken out from production for years while being monitored.
29. **Landfarming** is not simply a form of “*waste disposal/treatment and earthworks*” (S42A report on Energy, para 155, 156). It involves the spreading of toxic wastes on farmlands, threatens human and animal health and food safety, and has the potential to cause longterm soil and water contamination. **It should not be a Permitted activity in the Rural Zone or anywhere.** At least two landfarms are located within Coastal Protection Area (Rural maps 14 and 10). More details on the problems with oil and gas waste disposal, especially landfarming, can be found in our substantive submissions to the Parliamentary Commissioner for the Environment^{13,14}.

Setback Distances from Sensitive Activities

30. In our original submission, we proposed a minimum of 700m setback from sensitive activities, within which all petroleum associated activities and Significant Hazardous Facility would be Prohibited. We wish to amend our **minimum setback to 800m**, as the 700m was an error.
31. The proposed distance is based on the **precautionary principle** and the numerous scientific studies mentioned earlier, notably the McKenzie, et al. (2012) study which concluded that residents living within 800m from gas wells are at greater health risks than those living further away. The lead author, in her presentation, acknowledged that there were uncertainties in the study and that the “*data do not tell us how far is far enough nor how close is too close to well development sites*” because “*much is dependent on distance, local meteorology and topography*”. However, for planning purposes, we believe the **800m is a prudent, minimum figure which reflects the precautionary principle in the absence of robust local studies.**

32. The prudent setback distance is also needed to take into account, to some degree, the problem of '**consent creep**'. Companies expand their oil/gas operations over time (e.g. more wells per wellsite) or introduce new and more intrusive technologies (e.g. fracking), exacerbating their impacts on landowners/occupiers who have consented for the original operations on their properties, and/or on neighbours who often don't have a say (e.g. as affected parties) from the start. Consent revisions which enable such expansions are seldom notified and the **cumulative impacts** rarely assessed, if ever. As we pointed out in our further submission, the onus for providing setback or buffer zones should be on the oil companies; that the company must provide a safe working distance from any existing or possible dwellings or other sensitive landuse.
33. Beyond the setback, petroleum associated activities should be Discretionary, and all **landowners/occupiers within 1,600m or further (depending on the scale and intensity of the hazardous activities and the actual level of risks) be notified**. As a reference, EPA West Australia¹⁵ stipulates a separation distance of 2,000m between oil or gas extraction/production and sensitive land uses within which "*a scientific study based on site- and industry-specific information must be presented to demonstrate that a lesser distance will not result in unacceptable impacts.*"
34. As to **landfarms**, we support the proposal made by expert witness of Taranaki Energy Watch, Ms Louise Wickham, to include a **500m separation distance** (same as in Canada) between landfarms and sensitive activities. We request that landfarming be prohibited within this setback and the same rule apply to wormfarming and other composting facilities involving petroleum wastes.

Restricted Discretionary and Discretionary Activities

35. As stated in our original submission, we request **that any increase in the use of hazardous substances or expansion of hazardous facilities (significant or not) within the Rural Industrial Zone be classified Discretionary**, irrespective of the amount of increase, and any increase of more than 20% should be publicly notified. We concur with Taranaki Energy Watch expert witness Ms Jenny Polich's comment that the "*measurement basis*" for the increase would need to be defined, as is "*the minimum amount of information required to be provided to Council to allow consideration of **cumulative effects***" (Evidence by Polich, para 10.1). Consequentially, we object to the deletion of Rule 12.2.4(c).
36. We also object to the addition of a new rule to Section 12.2.4(b) which classifies Significant Hazardous Facilities in the Rural, Residential, Township, Commercial and Industrial Zones as Discretionary. **Significant Hazardous Facilities should be Prohibited in the Residential, Township and Commercial Zones**. Significant Hazardous Facilities should be Discretionary in the Rural Zone only when performance standards (notably setback distances) are met.
37. We request that the following rules be added to Section 12.2.4 for Discretionary activities:
- (a) Petroleum exploration, production, field development, reinjection and underground storage activities (Definitions as per para 16) and other Significant Hazardous Facility that are beyond a minimum setback distance of 800m from a sensitive activity.

- (b) Landfarming and wormfarming/composting (of petroleum wastes) that are beyond a minimum setback distance of 500m from a sensitive activity.
 - (c) Landfarming and wormfarming/composting (of petroleum wastes) that are outside the catchments of Significant Waterbodies and Regionally Significant Wetlands.
38. Consequential additions or amendments need to be made under 13.1.4 on Discretionary activities in the Energy section of the plan.

Prohibited Activities

39. We request that the following rules be added to Section 12.2.6 for Prohibited activities:

- (a) Petroleum exploration, production, field development, reinjection and underground storage activities (Definitions as per our para 16) and other Significant Hazardous Facility in the Residential, Township and Commercial Zones.
- (b) Petroleum exploration, production, field development, reinjection and underground storage activities (Definitions as per para 16) and other Significant Hazardous Facility in the Coastal Protection Area, Outstanding Natural Features and Landscapes, in/adjacent to Significant Waterbodies, Regionally Significant Wetlands or Significant Natural Areas.
- (c) Petroleum exploration, production, field development, reinjection and underground storage activities (Definitions as per para 16) and other Significant Hazardous Facility that are within a minimum setback distance of 800m from a sensitive activity.
- (d) Landfarming and wormfarming/composting (of petroleum wastes) that are within a minimum setback distance of 500m from a sensitive activity.
- (e) Landfarming and wormfarming/composting (of petroleum wastes) that are within the catchments of Significant Waterbodies and Regionally Significant Wetlands.
- (f) Landfarming and wormfarming/composting (of petroleum wastes) on farms that are actively producing food or crops for human or animal consumption.

40. Consequential additions or amendments need to be made under 13.1.6 on Prohibited activities in the Energy section of the plan.

Rationale behind prohibition and restriction

41. Re prohibiting or restricting oil and gas activities, Mr. Wesley in the S42A report on Energy (para 160) stated: *“The costs of this approach is the significant loss of economic, employment and social wellbeing... the costs on owners/operators who have invested in land and property, including redundant infrastructure... Overall, I consider the costs of this approach outweigh the benefits, and I recommend oil and gas activities are not prohibited or restricted, except in circumstances where the environment is particularly sensitive to the effects of these activities (e.g. coastal and urban environments)”*. We disagree.

42. What is the basis for such a conclusion when no **“cost benefit analysis including the cultural, socio-economic, health and clean-up costs to communities”**, as requested by Frack Free

Manawatu Action Group, has been conducted (Submission 98.20; S42A Energy Table 31)? The NZ Index of Deprivation 2013¹⁶ completed by the University of Otago revealed that some of the **most deprived areas**¹⁷ included Patea, Kaponga, Eltham and Waitara East where oil and gas activities are most prevalent. Why? We desperately need “**equity-focused analyses**¹⁸ of UNG (unconventional natural gas) impacts to understand how vulnerable populations may be impacted by **booms and busts** in resource development...”

43. Mr Wesley talked about the cost on the owners/operators, but what about **the costs on the local communities should something goes wrong**? The Parliamentary Commissioner for the Environment (2014)¹⁹ pointed out clearly that “*companies are not required to have any particular amount of public liability insurance for onshore wells, to cover the cost of any clean up needed if the well fails. Nor have councils required oil and gas companies to pay bonds as conditions in consents. ... Under law, once a well has been abandoned and ‘signed off’ by the High Hazards Unit and the councils, any leaks from the well become the responsibility of the owner or occupier of the land.*”
44. Last year, we challenged Shell Todd Oil Services’ (STOS) marine consent application under the EEZ and Continental Shelf Act to expand and continue its activities at the nearshore Maui gas field for another 35 years. During the hearings with the Environmental Protection Authority (EPA), we requested that a bond²⁰ be required to ensure the integrity of all Maui structures is maintained, and adequate finance for the implementation of decommissioning at the end of production. Unfortunately, the Decision Making Committee declined our request and granted the consent²¹. Mr. Wesley made this comment in the S42 Energy report: “*If consent is granted, conditions could be imposed for remediation, including bonds to cover costs if appropriate*” (S42A Energy report para 162). Based on the analysis by the PCE (See para 43 above) and our experience with STOS and EPA, Mr. Wesley’s statement appears unrealistic.
45. In terms of contaminated land, New Zealand now has some 8,000 contaminated sites, including 1500 high risk sites²² — legacy of former factories, mines, sawmills and agricultural chemical dumps. The cost for all clean-ups would be billions of dollars. The health effects on people can be debilitating, longterm and costly.
46. All the above actual and potential costs do not yet consider the **costs of protecting and repairing infrastructure and utilities that are threatened by climate change**; nor the **costs needed to address the human health effects of climate change**. The American College of Physicians warned²³, “*Climate change could have a devastating effect on human and environmental health. Potential effects of climate change on human health include higher rates of respiratory and heat-related illness, increased prevalence of vector-borne and waterborne diseases, food and water insecurity, and malnutrition.*” Prof. Peter Sainsbury of University of Notre Dame, Sydney Medical School stressed²⁴, “*Although developing countries will be most vulnerable to these impacts, developed countries such as Australia and New Zealand will also be affected.*” Critically the district council, under the Health Act and the RMA, has the duty to **protect public health** and have regard to the **effects of climate change** when managing the use of natural resources (See para 5 and 7 above).
47. If the Panel, other submitters or anyone else still consider our proposal for Prohibited Activities radical or unrealistic, consider this: **Many jurisdictions (e.g. France, Germany, Scotland, Wales, Tasmania, New York State) have a ban or moratorium on fracking.**

48. Remarkably, France, one of the first European countries that banned fracking, has now also banned all new petroleum exploration²⁵.
49. So if entire countries, states or counties can ban fracking and/or petroleum exploration, surely it is not such a big ask to prohibit or strictly limit petroleum associated activities in some areas (within Separation/Setback Distances) to protect human health and places of special environmental and cultural values.

¹ PSE – Physicians Scientists & Engineers, ongoing. PSE study citation database on shale & tight gas development. <http://www.psehealthyenergy.org/site/view/1180>

² Concerned Health Professionals of NY and PSR – Physicians for Social Responsibility, 2015. Compendium of scientific, medical, and media findings demonstrating risks and harms of fracking (unconventional gas and oil extraction). Third edition, 14 October 2015. <http://concernedhealthny.org/wp-content/uploads/2012/11/PSR-CHPNY-Compendium-3.0.pdf>

³ McKenzie, L.M., R.Z. Witter, L.S. Newman and J.L. Adgate, 2012. Human health risk assessment of air emissions from development of unconventional natural gas resources. *Science of the Total Environment*. Vol 424, 1 May 2012, pages 79-87. <http://www.sciencedirect.com/science/article/pii/S0048969712001933>

⁴ New York State Department of Health, 2014, December 17. *A public health review of high volume hydraulic fracturing for shale gas development*. http://www.health.ny.gov/press/reports/docs/high_volume_hydraulic_fracturing.pdf

⁵ Taranaki Regional Council, Oct 2015. C Boyd – Drilling Waste Disposal Monitoring Programme Annual Report 2013-2014. <http://trc.govt.nz/assets/Publications/technical-reports/oil-and-gas-compliance-monitoring-reports/1480875w2.pdf>

⁶ Taranaki Regional Council, Feb 2016. BTW Company Ltd. Wellington landfarm Monitoring Programme Annual Report 2014-2015. <http://trc.govt.nz/assets/Publications/technical-reports/oil-and-gas-compliance-monitoring-reports/1598898w2.pdf>

⁷ Taranaki Regional Council, Sep 2015. Waste Remediation Services Ltd. Symes Manawapou Landfarm Monitoring Programme Annual Report 2013-2014. <http://trc.govt.nz/assets/Publications/technical-reports/oil-and-gas-compliance-monitoring-reports/1551929w2.pdf>

⁸ Taranaki Regional Council, Nov 2014. Greymouth Petroleum Hawera Landfarm Monitoring Programme Annual Report 2013-2014. <http://trc.govt.nz/assets/Publications/technical-reports/oil-and-gas-compliance-monitoring-reports/1430543w2.pdf>

⁹ Ellsworth, W.L. 2013. Injection-induced earthquakes. *Science* 12 July 2013, Vol 341. www.sciencemag.org

¹⁰ Van der Elst, N.J., H.M. Savage, K.M. Keranen and G.A. Abers, 2013. Enhanced Remote Earthquake Triggering at Fluid-Injection Sites in the Midwestern United States. *Science* 12 July 2013, Vol 341. www.sciencemag.org

¹¹ Trumpener, B. 2015. Earthquake in Northern B.C. caused by fracking, says regulator. CBC News, 16 Dec 2015.

<http://www.cbc.ca/news/canada/british-columbia/earthquake-northeastern-b-c-progress-energy-fracking-1.3367081>

¹² USGS – United States Geological Society, 2016. Induced earthquakes raise chances of damaging shaking in 2016. USGS Science Features, 28 March 2016. https://www2.usgs.gov/blogs/features/usgs_top_story/induced-earthquakes-raise-chances-of-damaging-shaking-in-2016/

¹³ Climate Justice Taranaki, 2013. Submission to the Parliamentary Commissioner for the Environment: Investigation into Hydraulic Fracturing in New Zealand, with special attention to Drilling Waste Management in Taranaki – Landfarming. <https://climatejusticetaranaki.files.wordpress.com/2013/03/cjt-3rd-submission-to-pce-nov2013-v8-final.pdf>

¹⁴ Climate Justice Taranaki, 2015 (Draft). 5th Submission to the Parliamentary Commissioner for the Environment: Disposal of Oil and Gas Waste – a review since June 2014. <https://climatejusticetaranaki.files.wordpress.com/2013/03/cjt-5th-submission-to-pce-v3-full.pdf>

¹⁵ EPA West Australia, 2005. Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986) - Separation Distances between Industrial and Sensitive Land Uses No.3. http://www.epa.wa.gov.au/EPADocLib/1840_GS3.pdf

¹⁶ University of Otago Department of Public Health, 2014. Socioeconomic Deprivation Indexes.

<http://www.otago.ac.nz/wellington/departments/publichealth/research/hirp/otago020194.html>

¹⁷ Where are NZ's most deprived areas? (+interactive) NZ Herald, 13 May 2014.

http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11254032

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- ¹⁸ Buse, C. J. Jackson, N. Nowak, T. Fyfe and G. Halseth, 2016. A scoping review on the community impacts of unconventional natural gas development for northern BC. Prepared for Social Sciences and Humanities Research Council of Canada. Cumulative Impacts Research Consortium, University of Northern British Columbia. Submitted May 20, 2016. http://www.ideas-idees.ca/sites/default/files/sites/default/uploads/general/2016/2016-sshr-c-ksg-halseth_et_al.pdf
- ¹⁹ Parliamentary Commissioner for the Environment, 2014. Drilling for oil and gas in New Zealand: Environmental oversight and regulation. <http://www.pce.parliament.nz/publications/drilling-for-oil-and-gas-in-new-zealand-environmental-oversight-and-regulation>
- ²⁰ Climate Justice Taranaki Inc. 2015. Closing submission before the decision-making committee of the Environmental Protection Authority on the application for marine consent for Shell Todd Oil Services Ltd. <https://climatejusticetaranaki.files.wordpress.com/2013/03/cjt-closing-representation-7may2015-amended1.pdf>
- ²¹ Marine Consent EEZ000010, 4 June 2015. http://www.epa.govt.nz/EEZ/EEZ000010/EEZ000010_MOF0144_STOS_Maui_Decision_4_June_2015.pdf
- ²² The Toxic Go-Slow: Has the clean-up of New Zealand's most poisoned places stalled? Radio NZ, 19 June 2016. <http://www.radionz.co.nz/national/programmes/insight/audio/201804570/insight-nz-s-most-poisoned-places>
- ²³ Crowley, R. A., 2016. Climate change and health. A position paper of the American College of Physicians. Annals of Internal Medicine. 164(9): 608-610. <http://annals.org/article.aspx?articleid=2513976>
- ²⁴ RACP – The Royal Australasian College of Physicians media statement: Climate change presents threat to global human health. 17 May 2016. <https://www.racp.edu.au/docs/default-source/default-document-library/fr-mr--climate-change-congress.pdf?sfvrsn=2>
- ²⁵ France says 'no' to all new oil exploration permits, Inhabitat 14 Jan 2016. <http://inhabitat.com/france-says-no-to-all-new-oil-exploration-permits/>