

CLIMATE JUSTICE TARANAKI INC.

QUESTIONS IN RESPECT OF STOS MAUI MARINE CONSENT APPLICATION UNDER THE EEZ ACT 2012

14th April 2015

Preamble

Climate Justice Taranaki Inc. (CJT) has made every effort to assess the voluminous amount of material in the short time available, and we sincerely thank EPA for providing this material and the opportunity to comment under the EEZ Act.

We are acting in good faith, supported by the clear scientific evidence that fossil fuel mining is a twilight industry, and needs to be phased out and replaced by clean renewable energy as soon as is practicable if the 'life-sustaining capacity of the environment', a key purpose of the EEZ Act, is to be maintained.

As a volunteer group, we may have missed some information and responses that may already answer some of the questions listed here below. If so, please accept our apologies for the oversight.

We do, nevertheless, believe that there are significant questions that do require answers from STOS and their expert witnesses, as detailed here below.

We further contend that some of the statements by STOS' expert witnesses are opinion-based and lacking evidentiary support, with impacts typically expected to be 'low or negligible'. In some cases these conclusions are not supported by site-specific research, data or analyses. In the latter respect, these may be deemed to be verging on advocacy rather than objective assessment. Among many other aspects, we are particularly concerned with the length of the timeframe for the permit that has been requested, the cumulative effects of contaminant discharges, the threats on endangered marine mammals and the apparent lack of plans for decommissioning and remediation of the site.

Questions to Mr. Rob Jager

1. With the production of natural gas being a consequence of the search for liquid fuels rather than the main driver, to what extent does the production of oil, condensate and LPG lead the exploration for oil and gas in New Zealand?
2. To what extent does the use made of natural gas in New Zealand follow the natural gas resource availability?
3. To what extent has the natural decline in gas supplies from the Maui gas field this century affected the availability of natural gas supplies for industrial, commercial and domestic purposes? See Figures 1 – 3 at end of this submission. Figure 1 shows production of natural gas in New Zealand over the last 25 years, Figure 2 shows the applications of natural gas in New Zealand over the last 25 years, Figure 3 shows the production of oil, condensate and LPG in New Zealand over the last 25 years.
4. The Parliamentary Commissioner for the Environment's Maui Stage II Development Environmental Impact Audit (1988) made two recommendations in regards to energy transition:

- a. *“...Information on the size of reserves and depletion rates needs to be made freely available so that efficient and effective management decisions can be made on transition strategies before the Maui field is exhausted at or about 2008....”*
- b. *That the Minister of Energy encourage the market to identify and plan transition strategies through the collection and release of good quality energy resource information on an on-going basis.”* <http://www.pce.parliament.nz/assets/Uploads/Reports/pdf/Pre97-reports/Maui-Stage-II-Development-Environmental-Impact-Audit-October-1988.pdf>

Given that more than 25 years have passed since these recommendations were made, what kind of transition strategies has STOS identified or undertaken over those 27 years?

5. How does this application address the environment commissioner’s recommendations with regard to transition to more renewable energy?
6. In your opinion if the applicant were to provide information on the size of the reserves and depletion rates remaining at Maui, would this not enable more *“efficient and effective management decisions”* to be made with regard to New Zealand’s transition to more renewable energy?
7. Several expert witnesses refer to possible future rejuvenation work involving increasing levels of automation and a *‘reduction in permanent manning requirements’*. What are the implications for future employment opportunities by locals?
8. In total how many jobs will be made available to New Zealanders in comparison with international job opportunities?
9. In paragraph 49 of the statement of evidence, numbers are provided on how much money STOS contributes to the NZ government in royalties, resource levies and company tax (\$550 million between 2008 and 2013). In terms of understanding the relative contribution in respect of overall income, can Mr. Jager indicate what proportion of gross STOS income this represents, over all STOS activities and as a proportion of Maui income?
10. Mr. Jager and Mr. Fraser Colegrave have both indicated the economic benefits to New Zealand from STOS and Maui. Have either of Mr. Jager and Mr. Fraser Colegrave assessed the future economic costs and opportunity loss that may accrue to other industries, particularly shellfish aquaculture and wild fisheries, from changing ocean chemistry (ocean acidification), extreme weather and sea level rise? These are directly attributable to the cumulative activities of fossil fuel mining and combustion, and will be at particular risk in the later phases of the STOS proposal (ie. 30 years from present). Although Maui is just one operation with a small effect nationally and globally, it is, nevertheless, a direct contributor to the cause of acidification, sea level rise and extreme weather.

Questions to Mr. Sion Iwan Bridge

11. STOS’ impact assessment stated: *“STOS’ focus has shifted from running and maintaining the asset for maximum reliable production, to finding new and innovative ways to economically unlock more difficult remaining volumes from the existing reservoirs by applying evolving technology solutions.”* Can STOS disclose and explain what *“new and innovative ways”* and *“evolving technology solutions”* are being planned for so that their full environmental effects may be properly assessed?

12. In Mr. Sion Bridge's evidence: Spill Response preparedness (including 171) states they have regularly participated in combined exercises with Maritime NZ and Taranaki Regional Council (TRC). However TRC have themselves expressed serious concern in their submission to Maritime New Zealand about Taranaki's preparedness to deal with a spill if it should occur. See November 2014 TRC Policy meeting agenda/minutes and earlier media report about this very issue. MNZ have not addressed this issue and, as far as we know, it is still not resolved. Are you aware of this?
<http://www.trc.govt.nz/agendas-and-minutes-2014/>
<http://www.stuff.co.nz/taranaki-daily-news/slider/4616963/Taranaki-at-risk-of-Oil-spill>
13. Would you agree that there is some legitimate concerns with the practical capacity of the Taranaki regions preparedness if a spill where to occur?
14. How does this situation relate to the assurances provided in Dr Alison Lane's evidence (section on Spill Response Options and Issues)?
15. If this activity is permitted to occur and if the appropriate Spill Response preparedness is not in place, this would be a case of regulatory failure would it not?
16. STOS witnesses provide description of the Health and Safety capabilities and planning at Maui A and B. However they do not provide evidence-based results to show how these are 'on the ground' at the platforms, notably in respect of the dangerous occurrence notifications to the High Hazard Unit. Please explain why these were not included in the witness statements?

Question to Dr. Brian King and Dr. Brett Beamsley

17. Are Dr. King and Dr. Beamsley aware of the U. Auckland PhD thesis by Neil Wilkinson Tindale (1988) titled: 'The fate of a Maui condensate spill'?
<https://researchspace.auckland.ac.nz/handle/2292/1844>

The Abstract of that thesis states, in part: "*Literature on the movement of oil slicks suggests that with a 40 knot onshore wind, it is possible for a condensate slick originating from the Maui A platform to reach the Taranaki shoreline within 10 to 12 hours.*" This is a significantly shorter time period than that predicted by Dr. King (at least 2 days, King evidence, 16/3/15 Point 35): "*... condensate has to travel for at least 2 days as a surface slick ... during summer, or at least 5 days, .. during winter.*"

Could Dr. King please explain this discrepancy, and also why the Tindale thesis, which relates specifically to the dispersal of Maui condensate, was not included in the reports Dr. King reviewed (his Appendix 1) to form a basis for his assumptions?
18. From Dr. King's evidence (point 34), is it correct to say that in three-quarters of simulated condensate spills during summer conditions, some condensate reached shore, and that in half of winter simulations, some condensate reached shore?
19. Does this mean that in at least half of all spills, some condensate will reach shore?
20. Dr. King's evidence (point 36) notes that less than 4% of total hydrocarbon spill volume could reach a shoreline. Is it therefore correct to assume that 96% of the volume of any spill would enter the atmosphere and marine environment as contaminants?

21. Would consideration of Dr. Tindale's spill trajectory change these estimates?

Questions for Dr. Alison Lane

22. Dr. Lane's evidence (point 67) notes that: "... PNEC values as modelling thresholds would potentially show that these values were exceeded in some areas during a worst feasible spill scenario." Dr. Lane justifies using the lower LC₅₀ approach because it is 'standard practice' in Australia and United States. But is this because the lower LC₅₀ values are more lenient towards the proponent? Shouldn't the more conservative, precautionary approach of using PNEC values be the standard practice for objective assessments, or at least as a comparison with the LC₅₀ data?
23. Do you consider that you have sufficient understanding of the biology and ecology of the waters and benthic habitats around the Maui field to be highly confident that the 'most sensitive species' that could be impacted are of 'no ecological concern'?
24. What metric have you relied on to define 'ecological concern'?
25. Have you, or other researchers, investigated the potential for trophic cascades in the impacted food webs?
26. Dr. Lane's evidence (points 82-87) relies on the modelling of Dr. King in respect of the time and amount of pollution reaching the Taranaki shore and its subsequent potential impacts, or lack thereof, on biota and human uses / perceptions. Could Dr. Lane comment on the potential differences in impact if Dr. Tindale's much shorter estimate of 10-12 hours under strong onshore wind conditions is considered?
27. In respect of Dr. Lane's evidence (point 125) of finding no potential adverse effects in the 35 year consent application period, did Dr. Lane consider the potential biotic impacts of changing ocean chemistry (ocean acidification) and extreme weather events, both of which will have increasingly severe impacts towards the later period of the application (ie. 30 years from now)?
28. One example is bivalves, known to be sensitive to acidification and an important component of the impacted biota. Is the present application exempt from such considerations, despite the clear causative linkages?

Questions to Dr. Helen McConnell

29. Summary point 7. Please provide the research on which the statement that "*any associated risks will be relatively limited*" is based?
30. The Cawthron Institute studies referred to in the Maui impact assessment state that in general 1-2km radius soil sediments have been contaminated but up to 20km for barium, leading to a change in biodiversity (eg. more tolerant species dominating).
<http://www.cawthron.org.nz/publication/science-publications/discharged-drilling-waste-oil-and-gas-platforms-and-its-effects-benthic-communities/>

How does this support a conclusion that effects on marine life will actually be confined to the platform areas?

31. How does this take into account consumption and bioaccumulation in animals moving into - out of this area, or the relative levels of tolerance among different species?
32. Did Cawthron test biota directly or only sediments?
33. What actual contaminant bioaccumulation testing has been done in the area of Maui A and B on shellfish and other benthic animals such as fish, or on seals, dolphins and toothed whales feeding or possibly feeding in the area? It is not clear from the evidence provided whether any such studies have ever been undertaken, on which Dr. McConnell's conclusion could be soundly based.
34. How dangerous are the expected waxy substances from condensate or diesel spills on marine mammals? Is there any dedicated research by STOS on this?
35. Para. 125 of Dr McConnell's Statement of Evidence states: *"that as Māui dolphins typically occur in shallower coastal waters and are only sporadically present around the Māui platforms it is unlikely that Māui operations would directly contribute to the mortality of one of these dolphins. In addition, sub-lethal impacts such as habitat degradation are also unlikely as the platforms are not situated in the core habitat of this threatened species."* But according to Currey et al. (2012) A risk assessment of threats to Māui's dolphins, *"The Maui's dolphin risk assessment indicates that the current level of human-induced impact on this population cannot be sustained... Among the non-fishing-related threats ... mining and oil activities, vessel traffic, pollution and disease were all assessed as posing risk to Maui's dolphins over the next 5 years. ... impacts arising from each of these threats were identified as having between 30% and 60% likelihood of exceeding the PBR, even in the absence of other threats, suggesting that non-fisheries-related threats may be expected to delay or prevent the recovery of the population even if all fishing-related mortality was eliminated..."*
<https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CB8QFjAA&url=http%3A%2F%2Fwww.mpi.govt.nz%2Fdocument-vault%2F3738&ei=968nVe6xN-W8mAXo9QE&usg=AFQjCNEwJyj8-3fXW2E2AcBm9lbzkwaLYg&bvm=bv.90491159,d.dGY&cad=rja>

How does Dr McConnell's conclusion fit with that of Currey et al. (2012)?

36. Re summary point 2. Given the comment that *"the majority of sightings reported are from summer months; however observational bias may be somewhat responsible for this apparent seasonality"* could this not equally be a statement that sightings in other seasons should be higher than records show?
37. Could this not also relate to the higher frequency of sightings nearshore because more people are present there, and so again sightings of marine mammals could be higher offshore if there were more people out there? What other evidence is there to support the assertion that the critically endangered Maui dolphin frequents inshore habitat more than offshore areas? Could it not be argued that the paucity of information leaves population numbers and frequency inconclusive?

Questions to Dr. Daniel McClary

38. In summary statement 5, it is suggested that stationary objects could provide an extra food source for marine mammals, but might these provide a contaminated food source since they occur in the vicinity of where operational contaminants are discharged?

39. In summary statement 6 it is stated that discharges and drilling waste are *"not expected to cause significant impacts on marine mammals as discharge plumes will rapidly disperse and dilute."* Can Dr. McClary provide information on the precise chemical composition of these discharges and confirm whether such chemicals pose risks of contamination of marine mammals through bioaccumulation or other sources?
40. What level does Dr. McClary define as being a 'significant impact'?
41. In para 79a it is stated that the primary ways of uptaking contaminants are through the food chain or skin and mucous membranes. Are these risks not already well proven with PCB bioaccumulation in marine mammals?
42. Yet in Para 95 it is stated that *"toxic effects on marine mammals are unclear"* referencing Das et al. (2003). How do you justify your conclusion and this statement?
43. The Das et al. (2003) study actually concludes *"the actual toxic effects of heavy metals on marine mammals remain unclear. Are they responsible - even in part - for the decline of some marine mammal species? As quoted above, that decline is obviously multifactorial: past overfishing, present increasing human activities, accumulation of pollutants among which heavy metals cannot be neglected..."*

http://www.google.co.nz/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCIQFjAA&url=http%3A%2F%2Fwww.vliz.be%2Fimisdocs%2Fpublications%2F155168.pdf&ei=YT4nVfW5Cc_X8gXOVYHgDg&usg=AFQjCNE4lgYd604Z1sd2wIRZzIPo-iYKaQ&bvm=bv.90491159,d.dGc

Furthermore, Jakimska et al. (2011) conclude: *"The bioaccumulation of metals in an animal depends on a multitude of factors: biotic ones, like its body dimensions and mass, age, sex, diet, metabolism, and position in the trophic web; and abiotic ones, such as the distribution of metals in its environment, salinity, temperature, and pH of the water, habitat type, and interactions with other metals. But it is diet that has the greatest influence on the accumulation of metals in animal tissues. ... Most commonly, metal concentrations are higher in larger animals that are end members of a trophic chain than in the smaller organisms they feed on. ...It has been found that carnivorous species bioaccumulate far greater quantities of metals than herbivores or omnivores, and that metal levels are lower in organisms capable of detoxifying or excreting metals."*

<http://www.pjoes.com/pdf/20.5/Pol.J.Environ.Stud.Vol.20.No.5.1127-1146.pdf>

In Para. 96a, Eisler (1987) is quoted: *"Inter- and intraspecies responses to individual PAHs are quite variable, and are significantly modified by many inorganic and organic compounds, including other PAHs. Until these interaction effects are clarified, the results of single substance laboratory tests maybe extremely difficult to apply to field situations of suspected PAH contamination."*

http://www.pwrc.usgs.gov/oilinla/pdfs/chr_11_pahs.pdf

In Para. 97, Cardwell et al (2013) actually concluded *"that TTFs for the metals examined are not an inherently useful predictor of potential hazard (i.e., toxic potential) to aquatic organisms. This review identified several uncertainties or data gaps, such as the relatively limited data available for nickel, reliance upon highly structured food chains in laboratory studies compared to the unstructured food webs found in nature, and variability in TTFs between the organisms found in different habitats, and years sampled."* <http://www.ncbi.nlm.nih.gov/pubmed/23625131>

Can Dr. McClary comment on all of the above findings in respect of his conclusion that discharges and drilling waste are "*not expected to cause significant impacts on marine mammals*"?

44. Would Dr McClary agree that it is not known conclusively if these chemicals will have effects on marine mammals, and to what extent those effects would be?

Questions to Mr. Kerry Williamson and Mr. Owen Hey

45. In Para. 30 of the Statement of Evidence, Mr. Williamson quotes Mr. Hey that STOS is required to have an active Well Examination Scheme in place under the HSE Petroleum Regulations (2013) to ensure the life-cycle of the well is managed properly. As this is a new regulatory regime, since when has this scheme been implemented on the Maui field?
46. Does the examination scheme include all mother wells and side-tracked wells, whether in production (20 wells) or not (30 plugged and side-tracked wells, 4 suspended wells, 1 water-injector and 1 unknown, Table 2 STOS Bundle of Figures)?
47. How does STOS intend to deal with risks of increased seismicity associated with deep well injection, given the recent scientific evidence of significant risk? (eg. Keranen et al. July 2014 *Sharp increase in central Oklahoma seismicity since 2008 induced by massive wastewater injection*, <http://www.sciencemag.org/content/345/6195/448.abstract>).
48. Does STOS have a program in place to examine well integrity following seismic activity or extreme weather events?
49. Do the inspection campaigns referred to in Point 65 for the exploratory wells include the actual well casings of all nine wells?
50. Do the examination scheme and engineering reviews referred to in Point 84 cover all wells on location, including non-producing wells, given the US Mineral Management Service statistics that after 15 years, more than half of all wells fail (loss of well integrity) (Bruffatto et al. 2003)? https://www.slb.com/~media/Files/resources/oilfield_review/ors03/aut03/p62_76.ashx
51. Does the examination scheme take into account the age of wells and that as they get older, they are more likely to fail?
52. What has STOS put in place to prevent older wells from failing?
53. Can Mr. Williamson, Mr. Hey or another STOS' Expert Witness please provide information on the quantities of fugitive emissions, including methane, that are discharged to the ocean and atmosphere through leakage?
54. Does STOS intend to measure the discharge of methane to the ocean?
55. What consideration if any has STOS given to the effects of methane to the receiving environment?

Questions relating to EPA's second request for further information (20/2/15)

56. In respect of EPA's request for further information (20/2/15) question 11 and responses from Mr. Hey and Dr. Beamsley, why are there no observational data on drill cuttings when ROVs are used for other surveys of the area?
57. If these data are available, would you not agree that they would have assisted the EPA in assessing the environmental impacts of the application and should have been provided?
58. In respect of the various modelling done by Dr. King and Dr. Beamsley to simulate spill movements and drill cutting distributions, were allowances made in the models for the predicted increases in extreme weather events over the next several decades?
59. In respect of EPA's request for further information (20/2/15) question 13, are there any endocrine disrupting chemicals present in any of the materials used in operations or present in discharges that could potentially be released to the marine environment? If, so what are the amounts and concentrations of such endocrine-disruptors?
60. As is clear from the literature, minute amount of such chemicals can have significant biological impacts. Would STOS agree with this?
61. And also In respect of EPA's request for further information (20/2/15) question 13, how does STOS intend to remediate the site in light of the contamination by heavy metals and other pollutants present?
62. In respect of EPA's request for further information (20/2/15) question 24 re upwelling, could Dr MacDiarmid and/or Dr. Lane explain potential effects from ocean acidification, changes in ocean circulation and increased extreme weather events, on the biota, particularly in the longer-term, as these may affect or, in the case of ocean acidification, be affected by such upwelling.
63. In respect of EPA's request for further information (20/2/15) question 25, could Dr. McClary comment on the potential future effects of ocean acidification on recovery of benthic assemblages?
64. Have the cumulative effects of ocean acidification and the effects of activity been taken into account when assessing the impact on the surrounding marine communities?
65. Would STOS agree that this should have been done if it was not?
66. In respect of EPA's request for further information (20/2/15) questions 31, 49 and 50 on '*legacy oil based muds*': Mr Hey (his point 119) responds that 'STOS has not used any oil based muds on any of the wells drilled in the Maui field'. Yet Mr. Jager, in his statement of evidence (point 25a) '*... shift from oil based drilling muds, ...to ... synthetic based muds*'. And Mr Hey notes in response to EP question 50 that '*The first SBM mud system was used in 2006 on Maui A*'. Mr. F.R. Engelhardt, in his *Review of the Maui Stage II Development Environmental Impact Report* (Appendix E of Parliamentary Commission for the Environment *Maui Stage II Development Environmental Impact Audit, 1988*), was led to believe that oil based muds would be used: "*The operator should be more explicit on the type of oil-based mud to be used in the drilling program*". Can STOS explain reasons for such apparent contradictions in these various recent and historical statements?

67. In respect of EPA's request for further information (20/2/15) question 27, and given that Barium levels are elevated at all sampling stations, and clearly have a significant negative impact on benthic biota (Maui Impact Assessment, ERM 2014, P132), can Dr. McClary comment on measures STOS has implemented in response to Mr. F.R. Engelhardt's (1988) recommendations in his '*Maui Stage II Development Environmental Impact Report*' that "*There should be some mention of the heavy metal content of barite and how this is to be minimized*". Also, In respect of EPA's request for further information (20/2/15) question 27, can Dr. McClary calculate or at least comment on the expected concentrations of heavy metals and other pollutants in and around the Maui field in 35 years' time? Will these concentrations still be within ANZECC guidelines at that time, given the quantities of pollutants that will be discharged in the interim period? At what time point, if any, will heavy metals and other pollutants exceed ANZECC guidelines? How does STOS intend to remediate these impacts and/or rehabilitate the area during decommissioning?
68. In respect of EPA's request for further information (20/2/15) question 29 on 'predicted impact' of hydrocarbon and heavy metals and persistent organic pollutants, can Dr. McClary provide modelling data or other information, or even an informed opinion, on the actual predicted impacts locally at Maui field over the 35 year application period, rather than a brief literature review?
69. In respect of EPA's request for further information (20/2/15) questions 30 and 31, Dr. McClary concludes that "*leaching of contaminants will be a relatively rapid near-continuous process over a time span of months to years following cuttings deposition*". Yet TPH levels remain elevated at 5 sites, resulting from 'historical drill cuttings disposal'. How can this occur if leaching of contaminants is a "*relatively rapid near-continuous process over a time span of months to years following cuttings deposition*"? Also, if TPH levels are elevated at 5 sites and contaminants are also leached relatively rapidly to other areas, how can Dr. McClary consider risks of bioaccumulation to be "*negligible to minor*"? Can Dr. McClary clarify whether it is correct to conclude that there is both significant localized contamination, and also more widespread leaching of contaminants, the ultimate fate of which is unknown?
70. In respect of EPA's request for further information (20/2/15) question 33 on cumulative impacts on marine and littoral biota, fisheries and coastal infrastructure, has Dr. McClary made an estimate of the total amounts of pollutants being permitted for discharge to the marine environment and atmosphere from all the offshore fossil fuel operations and support and supply vessels being conducted or permitted (ie. by STOS, OMV, AWE, Origin, NZOG)?
71. In respect of EPA's request for further information (20/2/15) question 34, Mr. Bridge notes that the average monthly discharge of produced water from MPB was 8,482m³, with average oil in water content of 5.43 PwOil mg/l. Does this mean that approximately 2,200 kg of oil has been released to the marine environment in produced water in the four year period from 2011-2014, along with unknown quantities of other contaminants?
72. Does Mr. Bridge consider it acceptable that STOS is permitted to discharge unknown quantities of other, undisclosed contaminants?
73. How is this compliant with the EEZ Act?

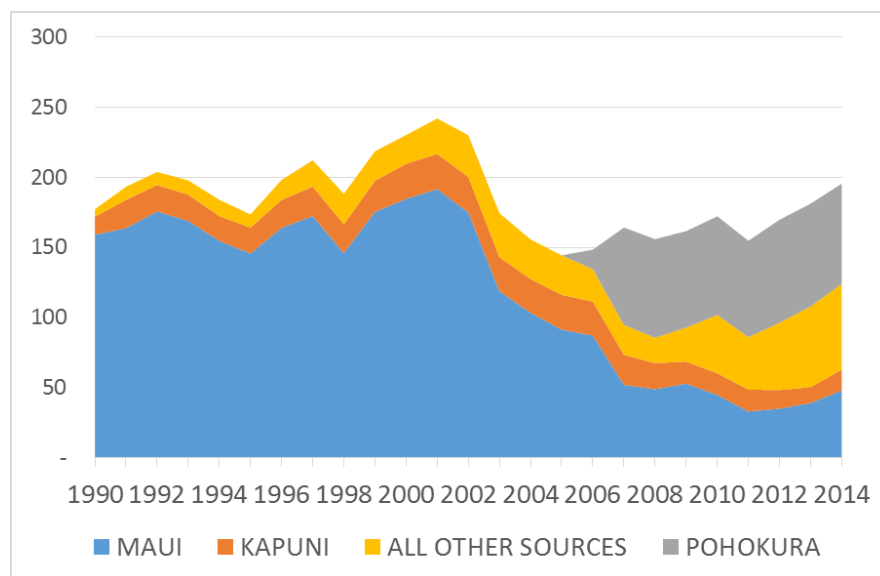
74. In addition to the average volumes cited above, does Mr. Bridge have information on the range and variance in discharge volumes and oil content?
75. Does the amount of oil discharged since 2011 represent a reasonable estimate of the continued discharge of oil over the duration of the application, or will this increase with future production?
76. What is the expected total discharge of oil to the marine environment from produced water over the 35 year duration of the proposed activities? Should this not have been assessed and set out in the application of STOS?
77. In respect of EPA's request for further information (20/2/15) question 35, Dr. McClary reports that *"direct toxicity testing of produced water ... detected significant toxicity"*. Can Mr. Bridge and/or Dr. McClary explain how these discharges may affect New Zealand's obligations under UNCLOS and the London Convention, particularly the 'Polluter Pays' approach?
78. Given the substantial quantities of marine and air pollutants released from the Maui A and B platforms, and the other fossil fuel operations, to air and sea as a normal/routine part of operations, should STOS and the other operators be required, under the London Convention or other national and international legislation / treaties, to pay to discharge such pollutants?
79. In respect of EPA's request for further information (20/2/15) question 42, can Mr. Hey explain what pilot studies were undertaken to determine the statistical power of sampling *"once or twice per 12 hour shift"* as sufficient to detect exceedances (ie. what is the range and variance in the oil-on-cuttings percentages)?
80. In Mr. Hey's statement of evidence (point 146), he referred to *"Shell's guideline for the SBMs used at Maui during recent drilling campaigns is to not exceed discharging 6.9% **average** oil-on-cuttings for the total number of wells drilled in a drilling campaign."* Can Mr. Hey provide data that show the range including maximum percentage of oil-on-cuttings that have been recorded and discharged at sea?
81. Mr. Hey, in his statement of evidence (point 160) quoted from the MNZ approved 2012/2014 Maui A IRF Project DMP Addendum, *"MNZ in its email dated 22 February 2012 conditionally approved the use of the Saraline mud, subject to further information on the volumes to be used..."* Can Mr. Hey reveal what the condition(s) are in the approved DMPA re the volumes of Saraline mud to be used?
82. Can Catherine Clarke comment on a reasonable/acceptable volume of Saraline mud to be used in the proposed drilling campaign?
83. Why is this not included as a condition for the marine consent?
84. Mr. Hey also quoted from the Addendum, *"...the previous and current Maui IRF campaigns (2009/2010 and 2011/2012), the ROC monitored has consistently been below 6.9%."* Can Mr. Hey provide information as to whether the 6.9% *"average"* oil-on-cutting has ever been exceeded prior to 2009/2010? If so, what was the quantity that has been shipped to shore for disposal and the location and procedure of such disposal?
85. In addition, how much SBM drilling mud, apart from the residual mud discharged on drilling cuttings, have been shipped ashore for disposal during the mentioned IRF campaigns? And how much SBM

from the proposed drilling programme for the 22 side-track wells may be expected for disposal ashore?

86. Based on the assumed future cuttings weight from MPA and MPB, Mr. Hey projected the oil-on-cuttings to be 638 tonnes from MPA and 239 tonnes from MPB. These are roughly equivalent to a total of 5,500 barrels of oil. Can Dr. McClary or Dr. Lane provide an assessment of the impact of such quantity of oil on the benthic community in the short to long term?
87. In respect of EPA's request for further information (20/2/15) questions 46 and 47, can Mr. Bridge, Dr. McClary or Dr. Lane explain why benthic environmental monitoring was not initiated until 2006, more than 25 years after Maui initiation? Has the probability of a significantly 'shifted baseline' been adequately considered? It is important to note that in 1988, Mr. F.R. Engelhardt, in the Parliamentary Commissioner for the Environment Maui Stage II Development Environmental Impact Audit (1988) noted: "A dedicated, properly planned Monitoring programme should be implemented". <http://www.pce.parliament.nz/assets/Uploads/Reports/pdf/Pre97-reports/Maui-Stage-II-Development-Environmental-Impact-Audit-October-1988.pdf>

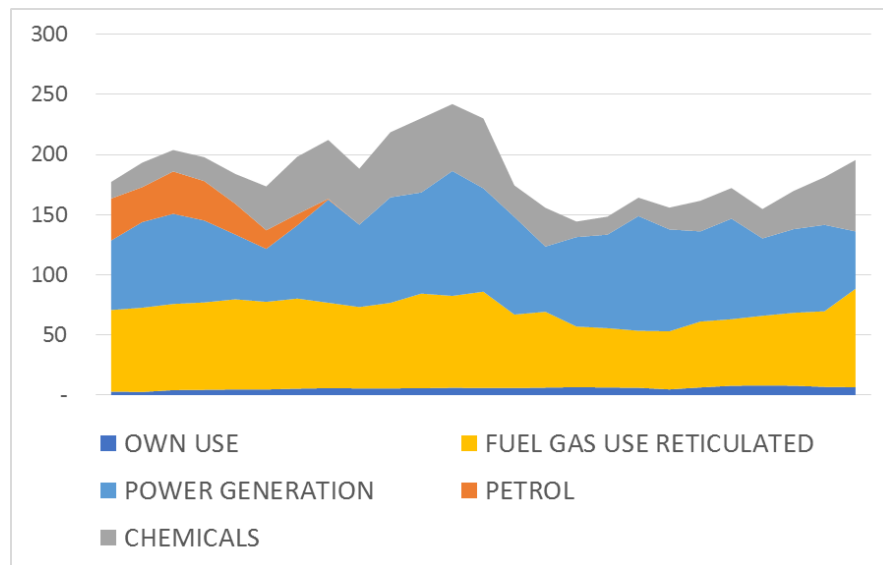
Why did it take a further 18 years for STOS to act on this clear recommendation?

Figure 1: Production of natural gas in New Zealand over the last 25 years



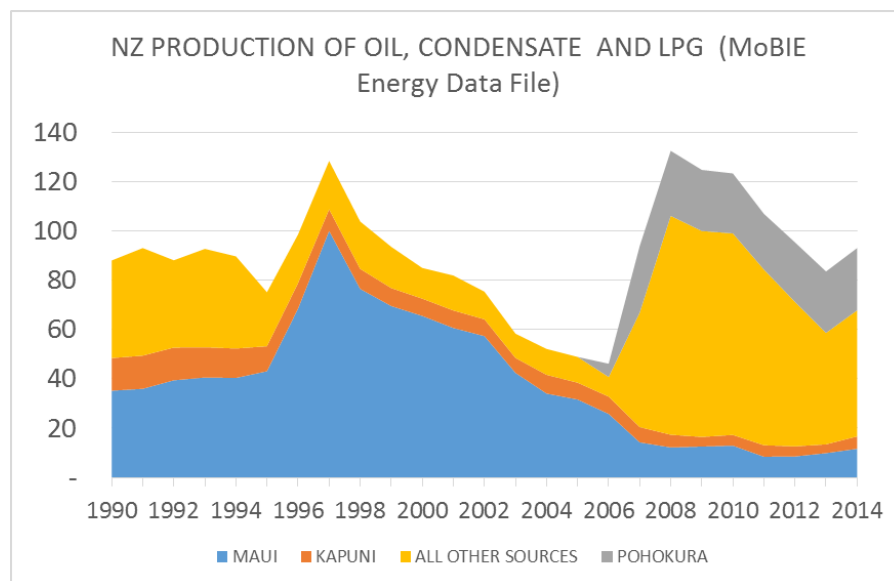
SOURCES OF NATURAL GAS IN NEW ZEALAND (PJ). Data from MoBIE Energy Data File: <http://www.med.govt.nz/sectors-industries/energy/energy-modelling/data/gas>

Figure 2: Applications of natural gas in New Zealand over the last 25 years



NATURAL GAS CONSUMPTION IN NEW ZEALAND (PJ). Data from MoBIE - Energy Data File: <http://www.med.govt.nz/sectors-industries/energy/energy-modelling/data/gas>

Figure 3: Production of oil, condensate and LPG in New Zealand over the last 25 years



NZ PRODUCTION OF OIL, CONDENSATE AND LPG (PJ) Data from MoBIE Energy Data File: <http://www.med.govt.nz/sectors-industries/energy/energy-modelling/data/oil>