Before the Decision-Making Committee of the Environmental Protection Authority

Application for Marine Consent for Shell Todd Oil Services Limited

IN THE MATTER OF	**the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012**
AND	**An application by Shell Todd Oil Services Limited for a marine consent for existing and planned future activities relating to the extraction, production and transport of natural gas and condensate at Maui Platform A and B, natural gas field.**

Opening Submissions of Climate Justice Taranaki Inc.

6 May 2015

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EXECUTIVE SUMMARY

1. This submission is made by Climate Justice Taranaki (CJT). CJT is a community group made up of residents and concerned citizens from in and around Taranaki who oppose the further extraction of fossil fuels. CJT advocates for a sustainable Taranaki and New Zealand and the urgent phasing out of investments and dependence on all non-renewable energy. CJT became an incorporated society on 26 February 2015.

2. CJT would like to make the following submissions on the application:

    a. The application cannot meet the purpose of the Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 (EEZ Act).

    b. The application will run contrary to New Zealand's obligations under the various international conventions relating to the marine environment, including the United Nations Convention on the Law of the Sea 1982, the Convention on Biological Diversity 1992 and the London Convention on Dumping.

    c. The proposed drilling of 22 more side-track wells, and the associated discharge of drill cuttings and produced water over the proposed consent duration will have significant adverse effects on the environment, which cannot be remedied, mitigated or avoided.

    d. The application further threatens the habitats and survival of threatened species, notably the Maui's dolphin and Blue Whales.

    e. STOS has not provided the best available information to enable comprehensive assessment of effects. The EPA should apply the precautionary principle in the case of uncertainty.

    f. The application will run contrary to the urgent need to keep fossil fuels in the ground, reduce energy use and transition onto renewable energy to reduce economic, societal and environmental impacts from ocean acidification, sea level rise and extreme weather events, not to mention climate change.

3. Following further discussion with our experts, CJT has altered its position from that originally put forward in its submission. While CJT opposes the continuance of reliance on fossil fuels for energy, in regard to this application CJT takes the following position:

    a. CJT opposes the proposed drilling of 22 side-track wells or any new wells from Maui A and B in full.

b. CJT asks that the permit be limited to FIVE years which will allow time for winding down STOS' current operations at Maui as the normal petroleum production curve declines, and time to develop an appropriate decommissioning plan. This duration is consistent with Nga Kaihautu Tikanga Taiao (NKTT) – the Maori Advisory Committee's recommendation.

c. Some of the key conditions of the permit should include:

   i. Well stimulation technologies be excluded from this consent.

   ii. A Decommission Plan of all Maui infrastructure and associated Environmental and Cultural Impact Assessment be completed and submitted to EPA before the end of the consent duration.

   iii. A bond (financial indemnity) to ensure that the integrity of all structures on site will be maintained and that there will be adequate finance for decommissioning.

   iv. A comprehensive risk assessment and financial indemnities / insurance to adequately cover costs for environmental and ecological assessment, restoration and monitoring, in the event of an unplanned incident.

4. CJT supports the submissions of Te Korowai o Ngaruahine Trust, Frack Free Kapiti, Tanea Tangaroa, Emily Bailey and others who oppose of the STOS application.

5. CJT adopts the position in relation to impact on tangata whenua as presented in the report by NKTT.

WITNESSES

6. CJT will be calling the following witnesses:

   a. Steve Goldthorpe will discuss methane leakages and the rationale for the Decision Making Committee (DMC) to consider its impact on global climate and economic implications.

   b. Sarah Roberts will discuss STOS' track record and her experience with the regulatory regime.

STATUTORY REGIME

Exclusive Economic Zone and Continental Shelf Act 2012

7. The application cannot meet the purpose of the Act in section 10. Nor will it satisfy the central legislative requirements of sections 11 and 12 of the Act.

Treaty Breach

8. This application breaches Te Tiriti o Waitangi and fails to provide active protection of Maori interests and taonga as afforded in section 12, but also negates kaitiakitanga (or stewardship) by tangata whenua over the environment.

9. In relation to treaty matters CJT supports the positions of Te Korowai o Ngaruahine Trust and NKTT and adopts their submissions.

The Precautionary Principle in International Law

10. A precautionary approach to this proposal is required to safeguard the lasting health and life-supporting capacity of the marine environment. New Zealand has repeatedly signed up to the precautionary approach in numerous international instruments and therefore has an obligation to apply it. Its widely accepted formulation is in Principle 15 of the Rio Declaration: *"In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."*

11. The precautionary approach is an essential component and an obligation because of its ability to reduce environment risk as it involves an anticipatory preventative action in response to uncertainty. STOS has not provided the 'best available information' in many areas and the IA is far from comprehensive. Where there is uncertainty around environmental effects and the long term outcome of the process, the precautionary approach must be applied to ensure that the marine environment is protected in accordance with that Act.

The London Convention and London Protocol

12. The London Convention (1972) and the London Protocol (1996) provides the legal frameworks for the prevention of marine pollution by the dumping of wastes and other matter at sea, under the broader framework of the United Nations Convention on Law of the Sea (UNCLOS 1982). New Zealand is Party to both the London Protocol and UNCLOS. According to Article 2 (Objectives) of the London Protocol:

> *"Contracting Parties shall individually and collectively protect and preserve the marine environment from all sources of pollution and take effective measures, according to their scientific, technical and economic capabilities, to prevent, reduce and where practicable eliminate pollution caused by dumping or incineration at sea of wastes or other matter".*

13. We submit that with regard to the discharges of drill cuttings including potentially harmful substances such as oil under the DMP the EEZ should be read in line with the London Protocol and London Convention and therefore the precautionary principle should also apply in this regard. The application of a precautionary approach is interpreted as the need to take appropriate preventative measures when there is reason to believe that wastes or other matter introduced into the marine environment are likely to cause harm even when there is no conclusive evidence to prove a causal relation between inputs and their effects.

THE PROPOSED ACTIVITY CANNOT MEET THE PURPOSE OF THE EEZ ACT

14. The application fails to satisfy the purpose and principles of the EEZ Act (s 10). The proposed drilling and associated discharge activities (drill cuttings and produced water from the new side-track wells) will not promote sustainable management of the natural resources in the exclusive economic zone (EEZ) and the continental shelf.

Sustaining the potential of natural resources

15. In the EPA expert evaluation report (paragraph 240), Ms Couzens points out: "*The Act specifically excludes minerals as they are a finite resource that cannot be utilised while at the same time being sustained indefinitely for future generations. … However, consideration does need to be given to safeguarding the life-supporting capacity of the environment and whether adverse effects can be avoided, remedied or mitigated.*"

16. CJT agrees that fossil fuel is a non-renewable resource and its use cannot be "*sustained indefinitely*". However, its extraction and use can and should be reduced to a much lower rate and managed in a way that meets "the reasonably foreseeable needs of future generations" (EEZ Act s 10(2a). In this scenario, fossil fuel will only be a small part of a mixed energy system dominated by responsible, renewable energy sources and supported by improved efficiency, reduction in consumption and a low carbon economy.

17. STOS admits that the Maui *"field is now in its twilight years having come off plateau production. STOS' focus has shifted from running and maintaining the asset for maximum reliable production, to finding … ways to economically unlock more difficult remaining volumes from the existing reservoirs…"* (IA 6.13). In other words, the natural resource – petroleum in the Maui field – has been extracted at such a rate that it is now running out and STOS plan to finish it off (the "*remaining volumes*"). This way of exploiting and

managing a resource is contrary to the government's energy strategy which puts emphases in diverse resource development, efficient energy use and energy security (MED, 2011[i]).

Safeguarding the life-supporting capacity of the environment

18. A new WWF International report (2015) [ii] warned: *"The ocean is changing faster than at any other point in tens of millions of years. There is a real chance that we may push many ocean systems beyond the point of no return, seriously constraining options for our children and for generations to come. In some cases, such as ocean acidification, it will take tens of thousands of years (or hundreds of generations of people) for the ocean to repair itself; in the case of species extinction, the impacts will be permanent: there is no going back.*"

19. Although the EEZ Act prevents the DMC from considering the effects of greenhouse gas emissions on climate change, it does not preclude consideration of the cumulative effects of these activities on ocean acidification. This already is putting increased pressure on ecosystems, allowing for further mining of fossil fuels is not sustainable.

Avoiding, remediating and mitigating adverse effects

20. Many of the adverse effects of the proposed activities on the environment cannot be avoided, remedied or mitigated, especially in regards to the discharge of contaminants at sea. This is clearly demonstrated by the consensus among STOS witnesses, DHI reviewer and EPA expert, that the habitats and communities surrounding Maui platforms have been changed substantially, by the last 40 years of STOS' operations.

21. The DHI report (section 5.1.3) states: "*Independent surveys commissioned by STOS reported that … sites within 250m of the platforms had relatively few species and a lower overall abundance (Dan McClary Evidence, paragraph 59). … Several taxa often used to indicate the quality of habitat … were observed in lower numbers closer to the platform (Section 5.5.4 in the STOS IA).*" Ms Couzens states: "*My assessment of effects on the environment is predicated in part on my opinion that many of resultant previous effects in the 40-year history of the Māui offshore facilities are now considered to represent the current state of the area. From my understanding of the evidence, the presence of the Māui offshore facilities has already changed the surrounding habitat for benthic and pelagic species who have likely already adapted to their presenc*e" (EPA expert evaluation report paragraph 78).

22. This is a classic example of "**shifting baseline**" in that over the years, this area has been the subject of gradual industrialisation, resulting in shifting of environmental and community norms (baselines) when

baselines should have be documented prior to the first stages of oil and gas extraction, so that effects and impacts could have been measured objectively.

23. The drilling of another 22 side-track wells is expected to generate up to 4,168 m^3 of drill cuttings at MPA and 1,505 m^3 at MPB, totalling 5,673 m^3 or 12,708 tonnes of cuttings to be discharged onto the seabed (Heys' evidence paragraphs 138 and 148). **Up to 877 tonnes of oil-on-cutting (equivalent to over 6,140 barrels of oil) may be discharged into the ocean**, **along with an unmeasured amount of other contaminants derived from a wide range of additives, some of which are ecotoxic** . The amount of contaminants to be discharged along with produced water is also unknown. To argue that the dumping of such amounts of oil and contaminants would not cause any adverse effects in the marine environment, is contradictory to the documented observations of the effects of the previous decades' operations at Maui on the local benthic and pelagic communities.

Efficient use of natural resources

24. There is no supportive evidence that the drilling of 22 side-track wells will be an efficient use of the resource, as stipulated in EEZ Act s59(g). On the contrary, the Improved Recovery Factor (IRF) drilling campaign at Maui in the past few years yielded only a small increase of natural gas and condensate production (See Figures 1 and 2).

INTEGRITY OF STRUCTURES

25. The issues of structural integrity of wells, pipelines and other structures are critical in assessing potential effects on the environment and existing interest of the activity, and NZ's ability to implement its obligations under various international conventions (e.g. MARPOL).

26. In 1988, the Taranaki United Council made this submission on the Maui Stage II development (Maui B): *"…the Maui A platform questions are posed as to the integrity of this ageing structure, particularly given its possible use in the longer term, to house the heavy compression equipment required to move Maui B gas and condensate to the Oaonui production station. These questions are not well addressed within the EIR*" (in Parliamentary Commissioner for the Environment, 1988[iii]). The submission by the NZ Geological Survey drew attention to "*the potential for rupture of the pipelines overlying the fault zone during any period of movement or severe ground movement on the fault*".

27. The Impact Assessment (IA) does not provide any thorough assessment or assurance of the integrity of existing and new structures associated with the activity, considering the age of the structures and increasing extreme weather events. These structures include topside and subsea structures, notably the 56 existing wells (including side-tracks) and proposed new side-track wells deep below the seabed.

Well casing failure

28. Industry studies have shown, *"about 5% of all oil and gas wells leak immediately because of integrity issues, with increasing rates of leakage over time"* (e.g. Watson and Bachu, 2009[iv]) and in 20 years, over half of the wells will leak (Bruffato et al. 2003[v] and Figure 3). The expansion of the industry, intensification of drilling and increasing number of wells in close proximity will all add to the risk. Professor in Engineering Anthony Ingraffea, former research investigator for Schlumberger explained, "*… this problem is neither negligible nor preventable with current technology... Pressures under the earth, temperature changes, ground movement from the drilling of nearby wells and shrinkage crack and damage the thin layer of brittle cement that is supposed to seal the wells. And getting the cement perfect as the drilling goes horizontally into shale is extremely challenging. Once the cement is damaged, repairing it thousands of feet underground is expensive and often unsuccessful. The gas and oil industries have been trying to solve this problem for decades"* (Ingrafea, 2013)[vi]. Some of STOS' side-track wells to be drilled from existing wells may be 8 km long, likely with greater risks of integrity issues and greater difficulty in maintenance or repair.

29. All the above do not take into account the high seismicity in NZ which further compromises well integrity and longevity.

30. Well casing failures have already been documented in Taranaki. In September 2009, two production wells within the then Austral operated Cheal-A facility in South Taranaki were reported to have been discharging fluids to the Urenui Formation. *"The discharge … was occurring due to* ***integrity issues with casing patch seals*** *within the wells."* The seals were installed in 2007 and were *"not successful in fully isolating the wellbore, and leakage of power fluids subsequently developed"* (TRC 1133945, 2013[vii]). The issue has not been resolved. On 23/09/2014, power fluid was reported to have been released, as listed in WorkSafe NZ's **Petroleum Dangerous Occurrence Notifications,** released under an OIA request (See Sarah Roberts' statement of evidence)[viii].

31. In October 2013, Tag Oil's Cardiff-3 well at Cheal-C wellsite encountered a ***"well integrity issue"****,* also recorded on WorkSafe's dangerous occurrence Notifications (See Sarah Roberts' statement of evidence). In May 2014, Tag Oil's own news alert[ix] reported that at Cardiff-3 well, *"the fracture stimulation [fracking] was affected by a poor cement bond over the interval, or skin damage must exist in the near wellbore area, restricting flow."* In December 2014, WorkSafe revealed that the investigation was concluded and "*did not identify any breaches of the Health and Safety in Employment (Petroleum Exploration and Extraction) Regulations 2013, and that the matter did not require a report."* There appears to be little

transparency in the investigation process and the public is left in the dark re the safety of the well and any environmental impacts the integrity issue might have caused.

32. Just last month (April 2015), Tikorangi residents were informed by Todd Energy that four of their Mangahewa-C wells were damaged and have become unstable with saline water intrusion. Two will be plugged and redrilled to different directions. A few of the Mangahewa-E wells appear to be also showing signs of integrity issues.

33. The STOS IA says, because *"all the existing well slots on both MPA and MPB have been used… future drilling and casing would have to be drilled (i.e. side-tracked) from existing wells"* (IA 3.3.3). Yet the IA provides no data or monitoring results on the structural integrity of the 56 existing wells (or side-tracks), or the extent and quantity of gas and chemical release from them. **It is not clear whether the Well Examination Scheme, under the HSE Petroleum Exploration and Extraction Regulations 2013 and mentioned in Mr Owen Hey's evidence, has begun or covers all existing motherbores and side-track wells, including producing, injection and non-producing wells**. Some of the wells have been plugged and sidetracked multiple times, notably MB-07 which was side-tracked to become MB-07A, 07B, 07C, 07D, 07E and 07F, only 07F is currently producing.

34. The IA gives no mention of the **effects and risks of re-injecting** all produced water from MPA into MA-12 well, or the capacity of MA-12 well for this purpose – how much can it hold? It is well documented in scientific literature **that deep well injection of wastes can and has caused earthquakes** and increased seismicity (Keranen, et al. 2014[x], NY Times, 23 April 2015[xi]).

35. The integrity of well casing is critical in isolating contaminants (produced water, drilling mud and additives) from the marine environment and the aquifers deep below. Tables A4-3 and A4-4 in Appendix 4 of the DMP Addendum on Maui A IRF Project 2012/2014 list numerous chemicals used in cementing, wellbore cleanout and completion. Some of the most toxic ones notably HR-25 (HSNO 8.3A and 9.1C), Super CBL (HSNO 9.1D and 6.9B) and EC6388A (HSNO 9.1B; carcinogenic) will supposedly stay "in hole permanently." The latter is only true when the well casings are robust.

36. The IA has not considered the **effects of increasing extreme weather events on the integrity of structures on site**, especially existing structures that have aged and/or weakened by natural events. The Parliamentary Commissioner for the Environment's 1988 audit of Maui Stage II Development Environmental Impact recommended that the company provide the authority with "*a systematic review of potential accidents and the consequences of … extreme weather…*" (PCE, 1988[xii]). Twenty-seven years later, we ask that EPA request STOS to provide such a review as part of the assessment of application.

37. STOS' response to EPA (21 Jan 2015) states: *"A number of the activities for which consent is sought would require an amendment to STOS' approved safety cases under clause 34, including drilling activities and modifications to topsides facilities. If these activities are authorised by a marine consent, and are to be undertaken, amendments to the safety cases will be made at the appropriate time*". **The existing Safety Cases for Maui-A and B have not been amended for the proposed activities subject of the current application.** So there is no assurance that installation standards and safety management systems, including management of major accident hazards (HSE Petroleum Exploration and Extraction Regulations 2013), will be adequate for the proposed new structures and activities.

38. According to the EEZ Act s61, EPA must make full use of its powers to request information from the application, base decisions on the **best available information**, and take into account any uncertainty or inadequacy in the information available. How can EPA make a fully informed decision on the application without such crucial information as the existing and amended Safety Cases?

39. The Parliamentary Commissioner for the Environment said, *"The bigger challenge comes once a well has been abandoned. The likelihood of an abandoned well leaking increases with its age."* (PCE, 2014: Drilling for Oil and Gas, 2014)

40. In view of the above concerns (paragraphs 28-40**), CJT calls on the EPA to limit the consent duration to FIVE years and not to allow side-tracking from existing wells**.

41. CJT asks EPA to impose conditions in the marine consent, requiring STOS to:

    i. Regularly monitor and report on all leakages (natural gas, condensate and chemicals used in the operations), their extent, quantity and environmental effects (See Steve Goldthorpe statement of evidence).

    ii. Provide a bond to ensure integrity of all structures on site will be maintained until the time of abandonment and decommissioning.

    iii. Formulate a decommission plan including environmental and cultural impact assessment.

    iv. Provide a comprehensive risk assessment and financial indemnities / insurance to adequately cover costs for environmental and ecological assessment, restoration and monitoring, in the event of an unplanned incident. This should be in addition to the indemnity requirements under Marine Protection Rules.

UNAUTHORISED DRILLING FAR FROM BEST PRACTICE

42. According to an EPA EEZ Post-inspection report date 27 June 2014, "*the inspections of the offices and two platforms have identified numerous examples of changes to the structure that have occurred after the Act entered into force on 28 June 2013. Section 20 of the Act restricts STOS from undertaking certain activities unless authorised by the Act. No rulings have been requested or obtained for these alterations under section 162 (and the alterations are not otherwise authorised) therefore* ***STOS is not complying with the Act****."* An internal EPA memo dated 20 June 2014 stated, "*STOS have been advised of the requirements to comply with section 162 of the Act on two separate occasions. …on 4 July 2013 and … January 2014. … The onus for compliance is on the operator and STOS could have been more proactive in seeking clarification or submitting applications for rulings. … It is important to consider that action taken as a result of this inspection may set precedence for the future. If EPA do not impose a penalty on non-compliant activities then it is likely that this operator will continue to be non-compliant*…." Notably, "***The drilling of the wells MA-09A and MA-08A and the structural alterations associated with the rig moves are restricted activities under the Act and were not authorised under a marine consent, a section 162 ruling or otherwise so STOS is not complying with section 20 of the Act****. In the absence of an impact assessment, environmental harm cannot be accurately assessed*."

43. STOS' Bundle of Figures Table 2 listed four wells that have been completed after 28 June 2013: MA-08A and MA-09A mentioned above as well as MA-09B completed on 20 March 2014 and MA-06A completed on 24 August 2014. **It would appear that all four wells were drilled without a marine consent**, at least one subsequent to the EPA inspection and formal warning.

44. In addition, Table 2 also listed six side-track wells on Maui B (MB-04B, 07E, 07F, 08A, 11C and 11D) that were completed in 2012. Yet the DMP Addendum refers only to the Maui A IRF drilling program. **CJT seek clarifications from EPA and STOS as to whether the discharge from the drilling and completion of these wells at Maui B had been approved by MNZ? If yes, why are there no references to these wells in the DMP?**

45. EEZ Act s59(2i) says the **EPA must take into account best practice in relation to an industry or activity**. It'd be hard to imagine such level of non-compliances could be considered best practice. CJT asks the Committee to take this serious matter into consideration and consider including a condition where breach of compliance results in an economic penalty.

EFFECTS ON ENVIRONMENT AND EXISTING INTERESTS

Lack of Best Available Information

46. DHI's final report on marine ecology (April 2015)[xiii] was highly critical on the level and quality of information provided by STOS.

47. Among other valid criticisms, the DHI review pointed out that "*there are **no data** provided to confirm the levels of heavy metals in the cuttings… **no monitoring** of bioaccumulation in fish (or benthic invertebrates)… so **no data** are available to determine the actual consequence of this effect… **No water quality monitoring** during drilling activities… no water quality data collected at other times … **No details of the volumes and concentrations of heavy metals and other contaminants** in the discharged drill cuttings … **No data** …from the ecotoxicity testing of PW… **no data** … on ambient noise within the Maui Facilities zone, or on noise levels generated by drilling or production activities… **no surveys** on seabird numbers and diversity of seabirds visiting the platforms … the complete lack of any recorded bird collisions seems unusual…*". The reviewer has "***serious concerns about the reliability** of the cuttings dispersion modelling*", found "*the reliability of the PW modelling … unclear*" and was surprised that, "*given that the Maui field has been in operation for such a long period, that ecotoxicity testing not been carried out on the actual Maui condensate to establish LC50 levels, rather than relying on extrapolating thresholds from North Sea crudes*."

48. STOS has operated at Maui for over 35 years, there is really no excuse for not having the 'best available information'.

49. Based on the information principles under EEZ Act s 61(2): "*If, in relation to making a decision under this Act, the information available is uncertain or inadequate, the **EPA must favour caution and environmental protection**."*

Inadequate assessment of effects

50. Without adequate scientific data, the impact assessment (IA) cannot be comprehensive or reliable. The IA does not provide adequate assessment of effects, especially cumulative effects, of the proposed activities on the environment and existing interests.

51. In addition to those pointed out by the DHI review on marine ecology, the IA lacks some crucial and basic information about the proposed activities and the effects that they may have. One example is the lack of any information on the kind and quantity of contaminants that will be discharged along with the produced water or adhered to the drilling mud and cuttings being deposited on the seabed. The

approved **DMP has not been amended to take into account the proposed activities**, **the chemicals that will be involved in these activities and the content, toxicity, quantities and effects of contaminants to be discharged over the next 35 years.**

52. Without an amended DMP, we can only refer to the existing DMP. Table 6-1 in the DMP Addendum on Maui A IRF Project 2012/2014 indicated that over 4,242 tonnes of drill cuttings with a total of 293 tonnes of oil would be discharged. Tables 6-2 and 6-3 showed that the six wells in the IRF project were expected to discharge to sea 2.6 tonnes of lime, 131 kg of Versawet, both being ecotoxic (HSNO classification 9.1D), 1,250 kg of Polypac and 4,500 kg of Polypac UL. All four additives are ecotoxic, with HSNO classification of either 9.1 D or 9.1 C. Assuming the drilling of the proposed 22 wells subject to the current application requires similar kinds and amounts of additives, **over 31 tonnes of ecotoxic contaminants would be discharged**. **The environmental effects of such discharges cannot possibly be assessed without such basic information as the nature and quantity of contaminants involved**.

53. It is not clear whether the five wells (MA-04A, 06A, 08A, 09A and 09B) listed in Table 2 of the Bundle of Figures that were drilled between 2012 and 2014 correspond with five of the six (MB-09 Adihi ERD well, MA-04 A IRF well, MA-06 Infield well, MA-08 Infield well, Kotimana Exploration Well and IRF C Shale Well) listed in Table 6-1 of the DMP Addendum for the Maui A IRF project because the names do not all match. It also appears that not all additives listed on the DMP Addendum Appendix 4 Tables A4-1 to A4-5 have the corresponding MSDS included in the document. CJT suggest that the Committee seek clarifications from STOS.

54. The IA revealed that **within 500m of the platforms, zinc and/or lead were found at levels exceeding ANZECC 2000 guidelines** in some samples – both metals are toxic to some marine species. Mercury and cadmium were also found. Barium level is above background levels at all sites. Total petroleum hydrocarbons in the C15-C18 were elevated at some stations (IA 5.4.4). All these contaminants impact negatively on the health and productivity of the benthic communities which could have serious implications on species higher up the food chain. The DHI review on marine ecology noted the **potential of bioaccumulation** in seabed invertebrates, epi-benthic or pelagic fauna, fish and resident seabirds that should not be dismissed without evidence.

Methane Leakage

55. Gas release and faults in the gas detection system have been reported numerous times on WorkSafe's Petroleum Dangerous Occurrence Notifications; e.g. On 29/07/2013, gas was detected in the shaker room on Maui A and the ERP was activated; MPA IR gas detect fault on 23/09/2013; Gas release activated ERP at Maui Production Station in Oaonui twice in Oct 2013; gas detected on the drill floor at

Maui A on 6/04/2014; gas detected on drill floor while drilling MAO-08 using Archer Emerald rig on 10th and 27th April 2014; gas detect fault at Maui A on 8/09/2014; Gas release at Maui production station on 21/11/2014; gas detector fault due to rain on Maui B on 9/02/2015, etc. (See Sarah Roberts' statement of evidence).

56. CJT expert witness Steve Goldthorpe has highlighted the issues of methane leakage from gas drilling and production. Actual information on the extent of methane leakage from Maui will give indications on the integrity of the wells and associated structures, and inform many other parts of the decision making under the EEZ Act.

Well stimulation and other unconventional activities

57. STOS' IA 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."* EPA's expert says: "…*many, if not all, of the activities are standard, conventional activities using established technology*…" (EPA expert evaluation report paragraph 26). **We believe STOS should disclose and explain what "*new and innovative ways*", "*evolving technology solutions*" and unconventional activities (if any) have been or are being planned for**, so that their environmental effects may be assessed.

58. STOS witness Sion Iwan Bridge stated that no hydraulic fracturing has been undertaken and there is no intention to undertake hydraulic fracturing in the future at Maui (Statement by Bridge, paragraph 73). On Day 1 of the Hearing, STOS witness Mr Hey said, "*So on Maui we currently don't do any stimulation treatment of the reservoir, so there is no fracture stimulation, there is no acid stimulation of the Maui reservoir. It's not required*."

59. **CJT submits that if well stimulation technologies are to be employed at any stage, then a separate consent should be required.**

Hydrocarbon and chemical spills

60. CJT concur with EPA's expert evaluation that **the effects from a large hydrocarbon spill from Maui are "*severe*"** on benthic communities, primary productivity, zooplankton, fish, marine mammals, seabirds and fishing (EPA expert evaluation report Table 1). We would add that a major spill of hazardous chemicals would also be severe, especially when ecotoxic substances are involved.

61. MPI and DOC, in their Maui's dolphin threat management plan review[xiv] warned: *"While the likelihood of a spill in New Zealand may not be high, the consequence of a spill on a small inshore population of*

cetaceans with a small home range could be catastrophic. The grounding of the MV Rena off the Astrolabe Reef, off Tauranga in 2011 highlighted the potential impact … it is not just the oil itself that may impact on the dolphins, but many aspects of an oil spill response will have direct or indirect effects on the population, eg, the use of dispersants to clean up the oil, increased vessel activity in the area, the use of sonar for tracking lost cargo etc."

62. Instead of conducting ecotoxicity testing with Maui condensate, STOS used a generic crude oil from the North Sea. The 'best available information' was therefore not provided to determine the effect of entrained hydrocarbons. Notably back in 1988, Taranaki Catchment Board and Regional Water Board submitted to the PCE that "*The section [in the EIR of Maui Stage II Development] on the impacts of oil/condensate spill was thought to lack substance. No estimates were provided on mortalities of the biota, effects on edible seafood resources … or the implications of hydrocarbon tainting of seafoods*" (In Parliamentary Commissioner for the Environment, 1988). It seems that there has been little improvement over the last 27 years.

63. NZ has little capacity for dealing with offshore spills (Radio NZ, 20 April 2011). Section 4.1 of the Maui field oil spill contingency plan (excerpt provided in STOS' reply to EPA, 21 Jan 2015) described some rather basic spill kits content stored in "wheelie bins" on MPA and MPB, spill response trailers for shoreline clean-up and access to helicopter and supply vessels in the event of a Tier 1 spill. The IA explains that *"MNZ is the designated combat agency for Tier 3 spills and would assume control of the incident response…"* In the unlikely event of a loss of well control, it'd take **106 days** to mobilise a drilling rig from overseas to drill a relief well (IA 7.3.1).

64. There is little doubt that **with greater number and higher density of wells, more extensive (some 8 kilometres) , multiple side-track drilling, more intensive deepwell injection and increase in activities associated with offshore production, storage, offloading and transport, the risks of major accidents, well casing failures and hydrocarbon or chemical spills will escalate.**

65. Furthermore, STOS' Maui permit area (PML 381012) is surrounded by other oil, gas and mineral permits. The EPA must consider this application in the wider context, **considering also the activities of other operators and existing interest** (EEZ s 59(2b) to provide a comprehensive assessment on the **cumulative effects** (Figure 4).

Cumulative impacts

66. Under the EEZ Act, EPA must take into account any effects on the environment or existing interests, including "*any cumulative effect that arises over time or in combination with other effects*" (EEZ s 6(1d) and s59(2a(i).

67. WWF International report (2015) explained: "*As multiple factors at local, regional and global levels have changed, so has the tendency for these factors to interact, with synergistic impacts being greater than the sum of the factors in isolation."*

68. **The IA gives no adequate assessment of the cumulative effects on marine mammals from the increase in noise levels, vessel disturbance, risks of boat strike, routine and non-routine discharge of pollutants and potential of bioaccumulation of contaminants**. These activities can cause direct physical harm as well as indirect impacts such as confusion and difficulties in foraging and finding mates. Some of these effects can last well beyond the duration of the activities and cause permanent impacts on the survival of individuals and viability of a local population.

69. With over 35 years' of operation at Maui, **STOS still has no in situ noise data**, **without which there can be no proper assessment** of noise effects to support their argument that the effects on marine mammals are negligible to minor. It'd also be impossible to assess the cumulative effects in combination with other operators.

70. The Ministry of Primary Industries (MPI) and Department of Conservation (DOC) stated in the Maui's Dolphin Risk Assessment report (2012[xv]): *"Among the non-fishing-related threats considered by the panel, **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 a 30% and 60% likelihood of exceeding the PBR [Potential Biological Removals] even in the absence of other threats, suggesting that **non-fisheries threats may be expected to delay or prevent the recovery of the population even if all fishing-related mortality was eliminated**. The different components of prospecting, exploration and active mining for petroleum and minerals have the ability to impact the Maui's dolphin population in a number of ways, both direct and indirect, through noise, increased vessel traffic, pollution, degradation of habitat and trophic interactions…"*

71. According to EEZ s59(2)(b), the EPA must take into account the effects on the environment or existing interests of other activities undertaken in the area, including effects of activities that are not regulated under the EEZ Act. **The EPA must therefore consider the effects of fishing, seismic testing, exploratory drilling and shipping on marine mammals, especially the critically endangered Maui's dolphin** (Figure 5).

72. Another important consideration is that **there is significant bias in research efforts over the species' distribution range**. The MPI/DOC Review of the Maui's dolphin Threat Management Plan (2012) explained: *"The alongshore boat surveys used to conduct biopsy analyses have been concentrated within*

1 nautical mile from shore to maximise the likelihood of encounters with groups of dolphins… The uncertainty over whether Maui's dolphins occur south of Pariokariwa Point and Oakura comes from the:

- *lack of research sightings in the area;*
- *small number of verifiable public sightings, and;*
- *limited amount of genetic sampling south of Raglan to confirm subspecies identity…*

This uncertainty is influenced by a range of factors, including:

- *the small population size;*
- *the snap shot nature of research surveys (as they are undertaken for a limited period and reliant on suitable weather/sea conditions);*
- ***the lower amount of research survey effort south of Raglan and especially south of New Plymouth (that is, more effort has been focused where observations are more likely to occur**), and;*
- *genetic evidence confirming a Hector's dolphin stranding in the Taranaki region south of Pariokariwa Point"* (Figure 6).

73. The lack of systematic survey data and bias in research efforts mean that the available information is insufficient to determine the biological importance of the area, or the potential impacts the proposed activities would have on the species. We do know however that a major hydrocarbon spill could reach inshore waters where the dolphins are known to occur.

74. The key point is that **with a population of just 55 dolphins over one year old and declining at a probable rate of 3% per annum** (Hamner et al, 2012[xvi]), **every individual, whether it's a sporadic visitor or illusive resident, is crucial to the survival of a critically endangered species**. Every effort must be put in place to minimise the threats and protect any known and potential habitat of that species.

INTERNATIONAL OBLIGATIONS

75. The EEZ Act s59(2)(d) requires EPA to consider *"the importance of protecting the biological diversity and integrity of marine species, ecosystems, and processes."* The EEZ Act s59(2)(e) requires EPA to take into account *"the importance of protecting rare and vulnerable ecosystems and the habitats of threatened species"*. The EEZ Act s11 states: *"This Act continues or enables the implementation of New Zealand's obligations under various international conventions relating to the marine environment, including— **(a) the United Nations Convention on the Law of the Sea 1982: (b) the Convention on Biological Diversity 1992**."*

76. The UN Convention Law of the Sea (UNCLOS) Article 145 requires authorities to protect the marine environment from harmful effects such as pollution, drilling, disposal of waste, construction and

operation of installations, and to protect and conserve natural resources and prevent damage to flora and fauna of the marine environment (UNCLOS, 1982).

Precautionary principle

77. Principle 15 of the Rio Declaration on Environment and Development[xvii], adopted by the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil, 1992, states that:

> *"In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation."*

78. In the preamble of the Convention on Biological Diversity[xviii] it is noted that:

> *"Where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat."*

79. It is clear that the proposed activities has the potential to further threaten the habits and survival of globally endangered Maui's dolphin. **In order to honour the government's obligations to the Convention of Biological Diversity and the Rio Declaration on Environment and Development 1992, EPA should take the precautionary principle[xix] seriously when assessing this application**.

80. Based on the precautionary principle, **CJT ask EPA not to grant consent for drilling of any side-track wells from existing wells** because of significant well integrity issues and the associated environmental effects that cannot be avoided, remedied or mitigated. **CJT also urge EPA to limit the consent duration to five** years to reduce the threats and cumulative effects on the critically endangered Maui's dolphin.

Marine dumping, well abandonment and decommissioning

81. UNCLOS Article 194 requires states to undertake all measures consistent with the Convention to prevent, reduce and control pollution of the marine environment from any source. The latter includes the release of toxic, harmful or noxious substances by dumping and pollution from installations, etc. The NZ government, being state party to UNCLOS, has the obligation to meet its statutory requirements.

82. The disposal of waste in New Zealand waters is managed under both domestic legislation and international law. Part 180 of the Maritime Rules brings obligations into New Zealand Law under the

Protocol to the London Convention. In principle this protocol requires that dumping at sea be avoided, except for materials on an approved list. The London Convention incorporates the Polluter Pays principle and the precautionary principle (Article 3.1).

83. There are nine unused exploration wells on site (IA 3.1). **STOS say they are considering options for future removal or otherwise of the 3 exploration wells with wellheads**. Based on that decision, either a consent to remove the wellheads or a dumping permit to leave them in place will be sought (IA p.51). On Day 2 of the Hearing, Mr Williamson said these 3 wells are classed suspended while the other six are classed as abandoned. CJT asks if STOS hold a dumping permit for these 6 abandoned exploratory wells, and the 7 listed abandoned wells in Table 1 of the Bundles of Figures?

84. Mr Williamson also said that the inspection campaigns of the exploratory wells "*does not include the actual well casings*" but includes "*a visual inspection of the three remaining well heads that are on the exploration wells. These wells are suspended, The other exploration wells are classed as abandoned*." Given that abandoned wells are not monitored at all, it is crucial that well integrity is maintained until abandonment and decommissioning of any structures are conducted to high standards to reduce environmental and safety issues later on.

85. There is an expectation in the New Zealand Guidelines[xx] that wellheads and platforms will be recovered. STOS IA stated: "*final decommissioning of the Maui Facilities is not included in the current consent application … Any decommissioning activities will be the subject of a separate consent application*". In STOS' reply on 17 April 2015 to EPA's request for further information, STOS estimated that decommissioning will extend over approximately 10 years from start to finish, including 5 years of planning, preferably to commence 5 years before production ends.

86. **CJT submit that it is crucial for a detailed Decommissioning Plan and its environmental and cultural effects to be assessed before any activity begins**. Decommissioning is an expensive activity which takes place at the end of a project. **A bond should be required to ensure that there will be financial resources for it and that the potential effects of dumping are avoided**.

ECONOMIC ANALYSIS

87. The economic analysis is not based on best available information. It ignores potential costs and opportunity loss.

88. The proposal will not enable people to provide for their economic well-being as required in section 10 of the EEZ/CS Act. The risks that this activity poses to the existing regional and national

economies through degradation of the marine and coastal environment and further tarnishing New Zealand's trading advantage, our clean green image, are significant.

89. STOS' economic arguments are isolated from wider economic and political issues:

- Notably, the longer it takes to transition from depleting fossil fuels to renewable energy, the higher the cost[xxi] will be in monetary terms and environmental and social effects because the problem will be that much bigger than if government and companies tackled the problem now.
- The life-support capacity of our environment is being eroded constantly because most governments don't want to tackle energy transition for fear of the political backlash they may receive. One view is that reducing energy use is unpopular and investing in sustainable energy infrastructure lacks the economic inertia that the fossil fuel industry already has.

90. The section on economic benefits in the IA provides information on incomes (royalties and taxes), jobs and GDP derived from the oil and gas industry Taranaki-wide. There is no quantitative information specific to the Maui operations, be it past years' data or future projections. STOS says *"**The economic benefits of the Maui field have not been quantified**"* is partly because each joint venture party pays its own tax and royalty (IA 6.1.31). But surely a bit of internal and cross-party communications, arithmetic and modelling would work those out! The best available information as required by the EEZ Act s 61 has not been provided to EPA for consideration.

91. Many of the profits will be exported overseas, while the environmental damage remains with New Zealand. Low royalty rate will not deliver economic gains and will not provide economic benefits relative to economic losses.

92. Maybe the use of overall (not dissimilar to 'cumulative') figures helps to boost the perceived economic and employment benefits from Maui? Perhaps because the same cannot be said re the cumulative environmental effects of the various activities proposed within the application, they were largely ignored?

93. It is interesting that the IA includes "produce fertilizers" as one of the uses of oil and gas (IA 6.13.1). Indeed a large proportion of gas is used to manufacture urea to support industrial agriculture, notably intensive dairying. Fossil fuel based urea is harmful to soil health and polluting to waterways. Our waterways are under serious threat from agriculture and mostly from fertiliser. The cost of repairing the soil and fixing the environment from fossil-based

fertilizer and industrial agriculture is of course not taken into account by the IA. This economic benefit should therefore be ignored.

94. The total tax income and royalties collected from the oil and gas industry as a whole may seem like large sums, but the IA acknowledges that just 7% of the royalties is derived from gas levies. Moreover, NZ has one of the lowest overall tax takes from the oil industry (46 %) compared with other oil producing countries and the world average of 70% (WWF, 2013[xxii]).

95. The IA also does not take into account potential economic losses from a major hydrocarbon spill including cleanup cost and losses by the fishery and tourism sectors. E.g. The Gulf of Mexico disaster "*wreaked billions of dollars' of damage to tourism and fishing businesses along the Louisiana coastline*". Yet BP was fined $13.7bn for negligence under the Clean Water Act (The Telegraph, 16 Jan 2015[xxiii]). In NZ, the relatively small Rena disaster has cost Maritime NZ $36.8 million (NZ Herald, 25 April 2013[xxiv]).

96. The list of sponsorships/donations listed in the IA represents pittance compared with the damages above or with STOS and its joint venture parties' annual budgets. It'd be naive and short-sighted to consider such sponsorships as economic or social benefits for New Zealand. These could easily be considered advertising investment for the companies and a way of buying a social license.

Market volatility and opportunity loss

97. Since 2014, there has been growing divestment initiatives across the world, from the Rockefeller Brothers Fund to churches, universities, councils and most recently the Guardian Media Group (£800 million). Already, Taranaki has seen the ripple effects of worldwide oil price drop[xxv], resulting in job losses locally. Instead of continuing to pour money into an aging industry to achieve "life extension" with uncertain returns, it would be far smarter to transition onto real innovations and energy solutions that are less polluting and more sustainable and fair.

98. The IA says *"a "do nothing" option would result in a loss of approximately 20% of New Zealand's current domestic gas supply."* But back in 1988, the Parliamentary Commissioner for the Environment already recommended: *"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…. 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."*

99. STOS' economic analysis ignores the opportunity loss for not pursuing renewable energy, low-carbon technologies and green economy (Royal Society of NZ, 2014)[xxvi]. Statistics New Zealand has valued NZ's global clean, green brand at over NZ$13 billion while Investment New Zealand estimated that we can create a NZ$150 billion high-value, low-carbon export economy by 2025 (Greenpeace, 2013[xxvii]). Green energy creates four times more jobs than the oil industry globally (Greenpeace, 2013). The mining sector overall accounts for only 3% of the region's employment. Per dollar earned, oil and gas creates fewer jobs than most other industries. Taranaki has the third-lowest share of skilled and highly skilled employment in New Zealand (MBIE, 2014[xxviii]). It ranks 14th out of the 16 regions in terms of economic diversity as measured by the Tress Index[xxix].

100. In NZ, almost half of all jobs and more than 70% of our goods and services exports rely on our clean green reputation. There is a lot to gain by building on this reputation and a lot to lose by compromising it, by allowing the fossil fuel and other heavy, polluting industries to proliferate, both at sea and on land.

RISK AND INSURANCE

101. Back in 1988, the University of Auckland submitted on the Maui stage II development: "*The prospect now is that several rigs will be established, produce and decline off the Taranaki Coast and the question of the future of obsolete structures must be addressed. … A protocol which properly assigns responsibility for rig disposal should be developed at this stage*" (In Parliamentary Commissioner for the Environment, 1988). That was nearly 30 years ago and no such protocol has yet been developed, despite the known decline of the field.

102. Given the Maui field is in the twilight years, financial security once production has ceased is uncertain. CJT argues that the requirement of a bond or some kind of insurance should be included in the consent conditions to ensure proper decommissioning of all structures and any clean up and environmental restoration will be undertaken at the companies expense.

103. Given the age of the wells and associated infrastructure and the proposed life extension, the risks of structural failure and serious incidents causing environmental harm are high and also need to be assessed comprehensively as part of risk and insurance planning.

Exclusion of Effects of Greenhouse Gas emissions

104. It is irrational and irresponsible of the NZ government to exclude climate change from the EEZ Act and preclude EPA from considering the effects on climate change reviewing applications for marine consents and submissions.

105. The latest IPCC report (2014[xxx]) pointed out the vulnerability of New Zealand and the world to catastrophic climate events, and the social and economic costs of not acting now. The urgency to transition off fossil fuels is clear.

106. The Ministry for the Environment acknowledges "*New Zealand must adapt to changes in climate and contribute to coordinated international action to reduce greenhouse gas emissions in the atmosphere*" (Royal Society of NZ, 2014). The Government has set several targets for reducing national net greenhouse gas (GHG) emissions compared with gross emissions in 1990. Yet under current policy settings, GHG emissions from the energy and transport sectors alone will exceed the 2050 target by 2030.

107. Sir Geoffrey Palmer put it well, *"New Zealand seems to have lost its mojo in looking after the environment generally, but to neglect climate change, the greatest issue of our age, is unacceptable. It is also contrary to all our traditions as a progressive country,"* (Palmer, 2015[xxxi]).

DECISION SOUGHT

108. CJT ask the DMC to decline consent for the drilling of the proposed 22 side-track wells from Maui A and B in full.

109. CJT ask that the permit be limited to 5 years, time allowed for STOS to wind down Maui operations and formulate a detailed decommissioning plan with environmental and cultural impact assessment.

110. CJT urge that the finalisation of decisions be subject to the approval of an amended Discharge Management Plan and Safety Cases which take into account the newly consented activities. In regards to proposed condition 12(1) and (2) listed in Appendix C of the EPA expert evaluation report, CJT request an amendment to ensure that the "approved marine protection documents" and "approval letters" do refer to versions containing the proposed activities consented by EPA.

CONDITIONS

111. The oil and gas sector requires a robust regulatory system to ensure the best outcomes for the environment and the people of New Zealand.

112. CJT submit that the following conditions form a part of any consent:

a. **Well stimulations:** Well stimulations are excluded from this consent and therefore require a separate application for assessment if/when such technologies are to be employed.

b. **Decommissioning:** STOS to formulate a detailed Decommission Plan with comprehensive Environmental and Cultural Impact Assessment within 5 years from the start of the consent – for approval by EPA and MNZ .This is in line with STOS' estimation of a 5 year requirement for planning and preparation for decommissioning (STOS reply to EPA on 17 April 2015). It goes further than condition 33 proposed by EPA expert.

c. **Bond:** A bond to ensure integrity of all wells and other structures are maintained until the time of decommissioning, and that sufficient finance will be available for proper decommissioning, based on the above approved Decommissioning Plan (EEZ Act s 63(2i)).

d. **Risk and insurance planning:** A comprehensive risk assessment and financial indemnities / insurance to adequately cover costs for environmental and ecological assessment, restoration and monitoring, in the event of an unplanned incident. This should be in addition to the indemnity requirements under Marine Protection Rules.

e. **Produced water discharge:** STOS to provide sufficient funds for EPA to undertake monitoring and bioaccumulation studies, and produce a report on the overall effects of produced water discharge on water quality and marine ecology for approval by EPA (adapted from DHI reviewer recommendation).

f. **Produced water injection:** STOS to conduct a detailed assessment on the capacity of MA-12 for further injection and provide sufficient funds for EPA to engage experts to establish a seismic monitoring system to detect changes in seismic activities which may result from increased injection and other activities.

g. **Hazardous chemicals discharge:** STOS to provide detailed assessment on the kinds and quantity of all hazardous chemicals/additives to be used and discharged during its operations, and provide sufficient funds for EPA to conduct environmental assessment of such discharges (routine and accidental).

h. **Biosecurity:** STOS to provide sufficient funds for EPA to engage experts to inspect the platforms for introduced species, and arrange the immediate removal of any invasive species if present.

i. **Marine mammals:** STOS to provide sufficient funds for EPA to engage experts to conduct regular monitoring and recording of marine mammals in the vicinity of the platforms. This is an expansion of EPA expert's proposed condition 25. In regards to proposed condition 26, CJT ask that an

independent investigation take place in the event of a strike, entanglement or injury involving a Maui's or Hector's dolphin, to determine the cause and identify potential breaches.

j. **Light pollution and bird strikes:** STOS to provide sufficient funds for EPA to engage seabird experts to undertake surveys at the platforms to improve the understanding of the actual effects, given the uncertainty around the information provided, and in line with industry best practice.

k. **Hydrocarbon spills:** STOS to provide sufficient funds for EPA to engage experts to undertake ecotoxicity testing of Maui condensate based on at least 3 trophic levels of local species.

l. **Monitoring of spill effects:** STOS to work with DOC and EPA on monitoring the known and unknown environmental effects of any unplanned spill of a harmful substance into the sea that triggers a Tier 2 or 3 response.

m. **Leakages:** Regularly monitor and report on all leakages (natural gas, condensate and chemicals used in the operations), their extent, quantity and environmental effects.

n. **Drilling:** CJT is strongly opposed to any further drilling. But if consented, thorough examination and certification of existing conductors and wells must be conducted before any drilling commences, and regular post drilling examination must also be conducted and reported upon.

o. **Drilling and associated discharges:** CJT is strongly opposed to any further drilling. But if consented, detailed information of the kind, characteristics and quantity of all additives to be used (including during drilling, cementing and completion) and discharged and their environment effects must be reported upon.

p. **Structural assessment and extreme weather:** If a consent longer than 5 years is granted, STOS should be required to conduct a thorough review and assessment of integrity and risks of all Maui structures considering increasing extreme weather events associated with climate change.

q. **Monitoring and reporting:** The consent holder should provide EPA with sufficient funds for independent environmental monitoring and reporting in respect of EPA expert's proposed conditions 22-30, rather than requiring the consent holder to undertake the monitoring and reporting themselves.

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