



10 February 2026

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To Whom it may concern,

RE: Ichthys Carbon Capture and Storage Project

1. The Environment Centre NT (ECNT) is the peak community sector environment organisation in the Northern Territory of Australia, raising awareness amongst community, government, business, and industry about environmental issues, assisting people to reduce their environmental impact, and supporting community members to participate in decision-making processes and action.
2. We refer to the Invitation for Public Comment published on 12 January 2026 with respect to the referral made by Inpex Operations Australia Pty Ltd (**Inpex**) for the “Ichthys Carbon Capture and Storage Project” (**the Proposed Action**) including:
 - a. A referral form;
 - b. The Referral Report);
 - c. EPBC Act Protected Matters search;
 - d. Likelihood of occurrence assessment;
 - e. Stakeholder engagement plan; and,
 - f. Pre-referral consultation report

(together, the **Referral**).

Summary

3. In summary, ECNT submits that, pursuant to s 55(5)(b) of the *Northern Territory Environment Act 2019* (**the Act**), the NT EPA should determine that the proposed action is unacceptable because it is likely to have significant impacts that cannot be appropriately avoided, mitigated or managed.
4. In the alternative, ECNT recommends that the Proposed Action be assessed in the form of Public Inquiry. We set out below the unprecedented nature of the proposed action and the potential for significant impacts, which demonstrate the necessity of assessment at the highest possible level.

The proposed action

4. Inpex seeks to undertake the following activities:
 - The construction, commissioning, operation and decommissioning of approximately 12 kilometres of interlinking 16-inch CO₂ pipelines and associated utilities infrastructures.
 - The hot commissioning, operation, maintenance and decommissioning of the Ichthys LNG facility AGRU and CCES components, including the cessation of operation of the currently operational acid gas incinerators.
5. The Project footprint comprises a total area of approximately 77 hectares. The Project footprint includes the following five defined areas:
 - a. the Ichthys CCS pipeline area
 - b. the Ichthys CCS pipeline tie-in station area
 - c. the Ichthys CCS (Darwin LNG link) pipeline area
 - d. the Darwin LNG pipeline tie-in station area
 - e. the supplementary power intake substation area.
8. Elsewhere, the Proponent proposes that up to 300Mt of carbon dioxide may be transported and injected as part of the Bonaparte Carbon Capture and Storage project, of which the proposed action is a component. The project is larger than any offshore carbon capture and storage project currently in operation globally and entails significant risks and impacts that have not previously been the subject of a decision under the Act, or in any other jurisdiction.

Controlling provisions

9. Pursuant to s 55 of the Act, the NTEPA must determine whether an action referred for standard assessment has the potential to have a significant impact on the environment with consideration of any applicable environmental objectives.
10. Where the NTEPA considers that the referred action has the potential to have a significant impact on the environment, the NT EPA must determine that an environmental impact assessment is required for the referred action.
11. Where the NT EPA considers that the referred action is unacceptable because it is likely to have significant impacts that cannot be appropriately avoided, mitigated or managed, it must recommend to the Minister that the Minister refuse to grant an environmental approval for the referred action.
12. The Act, at s 11, defines 'significant impact' as an impact of major consequence having regard to:
 - (a) the context and intensity of the impact; and
 - (b) the sensitivity, value and quality of the environment impacted on and the duration, magnitude and geographic extent of the impact.

13. Relevantly, given the unprecedented nature of the broader project discussed at [8], s 19 of the Act establishes that “if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.”

Significant impacts to relevant environmental factors and objectives

Human health, air quality, and atmospheric processes

22. The Proposed Activity has the potential to significantly impact human health, air quality, and atmospheric processes due to the planned and unplanned release of the CO₂ stream, which will be combined with a range of air toxics.
23. High concentrations of CO₂ are particularly hazardous because CO₂ is colourless and odourless. Its high density compared to oxygen means that that it can remain low to the ground and create risks of asphyxiation.¹ A 2020 CO₂ pipeline rupture in Mississippi, USA resulted in at least 45 people nearby being admitted to hospital.²
24. Beyond the risks and impacts of CO₂ release, the Proposed Action will also result in the planned or unplanned release of a range of air toxins, including benzene, toluene, ethylbenzene and xylene (**BTEX compounds**) as well as hydrogen sulphide (**H₂S**).
25. Inpex confirms that incineration of BTEX chemicals at the Ichthys LNG facility will cease, because the “CO₂ stream (including all contaminants) would be diverted to the CCES and transported via pipeline to an offshore storage site for sequestration.” On this basis, “the acid gas incinerators would be removed from operational service once the CCS system is performing as planned.”³
26. The purpose of the acid gas incinerators is to “oxidise trace amounts of benzene, toluene, ethylbenzene, and xylene (BTEX) and H₂S contained in the CO₂ stream received from the AGRU’s.”⁴ Inpex’s license for the Ichthys LNG facility stipulates that the venting of AGRU acid off gas will be infrequent and only when the incinerator is shut down for maintenance.¹¹

¹ Parliament of Australia, House of Representatives Committees (n.d.) Chapter 5: The environmental benefits and risks of CCS and public perception, p. 55–68. Accessed via https://www.aph.gov.au/parliamentary_business/committees/house_of_representatives_committees?url=scin/geoseq_uestration/chapter5.htm; CIEL (2024) *Deep Trouble – The Risks of Offshore Carbon Capture and Storage*. Centre for International Environmental Law. [Deep-Trouble-The-Risks-of-Offshore-Carbon-Capture-and-Storage.pdf](#).

² Simon, J. (2023) The U.S. Is Expanding CO₂ Pipelines. One Poisoned Town Wants You to Know Its Story. *National Public Radio (NPR)*, 21 May 2023. Accessed via <https://www.npr.org/2023/05/21/1172679786/carbon-capture-carbon-dioxide-pipeline>

³ Referral Report, p71

⁴ Ibid.

26. Although Inpex has failed to describe the anticipated volume of BTEX and H₂S in both planned and unplanned emissions scenarios and related risks and significant impacts, we know from other sources that the BTEX compounds and H₂S component of the CO₂ source gas is likely to be significant. In its 2024-5 Environmental Monitoring report, Inpex reported benzene levels in feed gas to the AGRU Hot Vent up to 380ppmv, toluene at up to 300ppmv, and H₂S at up to 150ppmv.⁵
27. Inpex has not demonstrated if or how it will align with the Interim National Action List⁶ for offshore carbon sequestration, which sets out maximum values for impurities in a CO₂ stream intended for sequestration.
28. ECNT is deeply concerned about the lack of information provided by Inpex about the composition of the feed CO₂ gas and the risks and impacts associated with its planned and unplanned release, particularly give plans to take acid gas incinerators (**AGIs**) offline and therefore eliminate alternative options for removal of air toxics.
29. In humans, exposure to airborne BTEX is linked to a range of negative health outcomes, including as “hemato-toxicity for benzene, hematological effects and chromosomal aberrations for ethylbenzene, renal toxicity for toluene, and respiratory symptoms for xylene exposure.”⁷ BTEX compounds are both volatile and mobile, spreading over wide areas.
30. Acute exposure to H₂S can lead to collapse, coma and death from respiratory failure within a few seconds after one or two inspirations, at high levels.⁸
31. Long-term exposure at lower concentrations has also been demonstrated to negatively impact human health, and repeated exposure may result in “headaches, anorexia, insomnia, paralysis, meningitis, psychic troubles, slowed heart rate [and] bronchitis.”⁹

Planned emissions

31. Inpex acknowledges that venting of the CO₂ stream would be required at various stages of the proposed activity and estimates total anticipated emissions from

⁵ Inpex (2025), EPL228 Annual Environmental Monitoring Report 2024-2025, accessed via https://ntepa.nt.gov.au/_data/assets/pdf_file/0009/1567278/epl228-annual-environmental-monitoring-report-2024-25.PDF

⁶ CCEEW (2024) Interim National Action List for offshore carbon dioxide sequestration, accessed via <https://www.dcceew.gov.au/sites/default/files/documents/interim-national-action-list-for-offshore-carbon-dioxide-sequestration.pdf> (National Action List)

⁷ Saeedi, M et al (2024) Interaction of benzene, toluene, ethylbenzene, and xylene with human’s body: Insights into characteristics, sources and health risks Journal of Hazardous Materials Advances, Vol 16

⁸ DCCEW (n.d.) Hydrogen sulfide Substance Fact Sheets. Accessed via <https://www.dcceew.gov.au/environment/protection/npisubstances/fact-sheets/hydrogen-sulfide>

⁹ Ibid.

several scenarios. Based on information provided in the Referral, vented emissions may be as high as 3Mtpa.¹⁰

32. A major failing in the information provided in the Referral is that key details about the nature of venting events are missing, including but not limited to the composition of the CO₂, the timing of venting events and the volume of vented emissions at each event, and the anticipated movement of the vented CO₂ plume.
33. Inpex states that as measures to manage impacts of emissions on human health that “emissions control options would be reviewed for operational venting.”¹¹ ECNT questions the very possibility of implementing meaningful emissions control options in the context of the AGIs having been taken offline as proposed, and further submits that Inpex has not presented appropriate mitigation measures to reduce the unacceptable impact of direct venting of CO₂, BTEX compounds, and H₂S.
33. Further, ECNT submits that Inpex has not substantiated the accuracy of anticipated emissions estimates presented at p 78 of the Referral, nor disclosed the assumptions behind those estimates, or identified all possible situations in which venting may be required. Inpex should account for the following potential scenarios in developing an estimate of anticipated emissions:
- a. **Technical problems with transport or injection.** Inpex has estimated venting of 150,000 Tpa due to “occasions where the CCES cannot export, which includes issues with the availability of the third-party CO₂ injection system.”¹² Inpex has not provided a basis for this estimate, which is of concern because of a history of CCS technical failures globally. Chevron’s Gorgon CCS project in Western Australia has reported declining sequestration success rates since commencing operations; in FY 2024-25 the project successfully stored only 25% of the CO₂ removed from the Gorgon and associated gas fields.¹³ Globally, the maximum capture rate of existing projects is around 83%¹⁴.
 - b. **Failure to comply with standards for CO₂ feed gas composition as set out in the National Action List (NAL).** As discussed above in, Inpex reported benzene levels in feed gas to the AGRU Hot Vent up to 380ppmv, and toluene at up to 300ppmv. Inpex has not demonstrated if or how it will align the National Action List for offshore carbon sequestration. Further, Inpex has not

¹⁰ Referral Report, p78

¹¹ Referral Report, p174

¹² Referral Report, p79

¹³ Morrison, Kevin (2025) World’s Largest CCS project hot new low on amount of carbon captured and stored. Renew Economy. Accessed via <https://reneweconomy.com.au/worlds-largest-ccs-project-hits-new-low-on-amount-of-carbon-captured-and-stored/>

¹⁴ IEEFA (n.d.) Fact Sheet: Carbon Capture and Storage (CCS) has a poor track record. Accessed via <https://ieefa.org/sites/default/files/2024-02/fact-sheet-CCS-ADR.pdf>

estimated likely venting volumes that will be required if and when the project is unable to demonstrate compliance with the NAL.

- c. **Unexpected subsurface storage behaviours that could lead to CO₂ leakage and subsurface geological failure.** Globally, even projects that have successfully met sequestration targets – like Norway’s Sleipner and Snøhvit projects (which together sequester around 1.7 to 1.8Mtpa of CO₂, a much smaller volume than Inpex’s anticipated target of 10Mtpa) – have encountered unanticipated issues with subsea storage. The Institute for Energy Economic and Financial Analysis concluded that, based on the case of the Snøhvit projects “even after steadfast study and monitoring using top-level technology and engineers, actual behavior of what has been studied can turn out to be substantially different and replacement plans may need to be implemented with speed in order to avoid catastrophe.”¹⁵
- d. **Life extension of the Ichthys LNG plant beyond the life of the Bonaparte CCS project.** The current estimated lifespan of the Ichthys LNG facility is to 2058. Inpex aims to both secure backfill gas for the existing infrastructure after the Ichthys field is exhausted, and pursue expansion of existing facilities.¹⁶ This could significantly prolong the operational life of the Ichthys LNG facility beyond the anticipated duration of the Bonaparte CCS project. The removal of the AGIs as part of the proposed activities in this referral would mean that any extension of the Ichthys facility would need to account for management of air emissions without AGI facilities.

34. Considering the above factors, ECNT submits that Inpex should, at minimum, provide as part of this referral the following information to better inform an understanding of the risks and impacts of anticipated emissions:

- a. Rationale for the vented emissions estimates presented in the Referral;
- b. Detail of the composition of vented emissions, including impurities;
- c. Detail of the estimated volume of emissions at each anticipated venting event;
- d. A substantiated description of the assumed success rate for CO₂ capture, transport, and storage;
- e. Atmospheric emissions estimates and plume modelling for a range of sequestration success scenarios;
- f. An analysis, based on reported volumes of impurities in the AGRU feed gas at the Ichthys LNG facility, of the likely composition of the CO₂ stream in comparison to maximum values set out in the NAL;

¹⁵ IEEFA (2023) Norway’s Sleipner and Snøhvit CCS: Industry models or cautionary tales? Accessed via <https://ieefa.org/sites/default/files/2023-06/Norway%E2%80%99s%20Sleipner%20and%20Sn%C3%B8hvit%20CCS%20Industry%20models%20or%20cautionary%20tales.pdf>

¹⁶ Hokawa, Itoshi (n.d) Expansion Strategy of the LNG Business – Ichthys LNG. Accessed via <https://www.inpex.com/english/ir/library/pdf/presentation/e-Presentation20240909-b.pdf>

- g. Analysis of the risks and impacts associated with venting that may be required as a result of non-compliance with the NAL; and,
- h. A description of mitigation measures adequate to prevent significant impacts to MNES as a result of venting.

37. Notwithstanding the uncertainty around the likely volume of emissions to be vented as a result of the proposed action, ECNT submits that venting of the CO₂ stream – even at volumes anticipated by Inpex in the Referral - with no measures in place to remove air toxics represents a significant and unacceptable impact to human health, air quality, and atmospheric processes.

38. ECNT questions Inpex’s assertion that air quality impacts “would be temporary and localised, and no impacts are expected on the health of the local community.”¹⁷ Temporary and localised release of the highly-toxic CO₂ stream would render unacceptable impacts for nearby workers and potentially the nearby communities of Darwin and Palmerston. Existing evidence about the impacts of the CO₂ release does not support the premise that impacts are irrelevant because of their ‘temporary’ nature.

39. In addition, ECNT notes that Inpex’s proposal that “should further air quality identify any potential issues for public health, additional control measures would be applied to ensure there are no impacts”¹⁸ is inadequate to the grave health consequences of acute or chronic exposure to the CO₂ stream.

40. ECNT submits that the proposed action represents a significant risk in relation to human health, air quality, and atmospheric processes which, due to the proposed cessation of AGI functionality, cannot be appropriately avoided, mitigated or managed. On this basis the Referral should be considered unacceptable pursuant to s 55(5)(b) of the Act.

CO₂ Release

44. A leak or loss of containment occurs along the 12 km CO₂ export pipeline or at one of two proposed tie-in stations proposed as part of the proposed action would result in significant impacts to human health, air quality, and atmospheric processes.

45. Inpex notes that “in an event of an emergency, venting of the pipelines may be required to affect a pipeline repair.”¹⁹ The estimated volume of CO₂ that could be vented in such a scenario is 890 m³ from the Ichthys CCS pipeline, and 360 m³ from the DLNG link pipeline.

45. In the absence of detail about how these numbers were calculated, we refer to the interim National Action List which establishes that in a “worst case of a

¹⁷ Referral Report, p204

¹⁸ Referral Report, p204

¹⁹ Referral Report, p79

catastrophic rupture to air however, the liquid CO₂ will immediately expand in air by an expansion ratio of 1:535 to gaseous CO₂. i.e., 1 L of liquid CO₂ will expand to 535 L of gaseous CO₂.²⁰ Applying this calculation to the anticipated release amount from the Ichthys CCS pipeline could be 476,150m³. Inpex has not accounted for the significant impacts of such an event, or appropriately identified environmental factors, including human health, that may be significantly impacted.

49. ECNT submits that Inpex has mischaracterised the likelihood of unanticipated emissions, by failing to substantiate its claim that such an incident would be “highly unlikely.” Inpex should describe the likelihood of rupture and other loss on containment events with reference to the following:
- a. Historical data on pipeline leaks and ruptures.
 - b. Composition of the CO₂ stream and impact of impurities on pipeline integrity.
 - c. Impact of changing weather patterns over the lifetime of the Proposed Activities on pipeline integrity, including sea level rise and flood levels on the Middle Arm peninsula and increased intensity of cyclonic events.
50. As discussed above at [38], Inpex’s claim that the health impacts of emissions would be temporary and localised and that unspecified additional control measures would be applied following identification of public health issues are a not an adequate response to the risks posed by the project’s air emissions.

Terrestrial ecosystems

51. The proposed action will have significant impacts on terrestrial ecosystems and habitats that support EPBC Act and TPWC Act-listed species through direct habitat disturbance, physiological impacts associated with planned and unplanned atmospheric emissions, and noise and light impacts associated with project activities.
52. The site of the proposed action constitutes habitat for terrestrial species including the Bare-rumped sheath-tailed bat (*Saccolaimus saccolaimus nudicluniatus*), Black-footed tree-rat (*Mesembriomys gouldii gouldii*), Northern brushtail possum (*Trichosurus vulpecula arnhemensis*), and Mitchell’s water monitor (*Varanus mertensi*).
53. In addition, the proposed action intersects with habitat for EPBC Act and TPWC Act-listed bird species including but not limited to the Red knot (*Calidris canutus*), Nunivak bar-tailed godwit (*Limosa lapponica baueri*), Lesser sand plover (*Charadrius mongolus*), Greater sand plover (*Charadrius leschenaultia*), and the critically endangered Far eastern curlew (*Numenius madagascariensis*) and Great knot (*Calidris tenuirostris*).

²⁰ NAL, p10

Pipeline construction

54. Inpex does not identify any critical habitat for avifauna in the Referral, and states that “Given the highly disturbed nature and limited extent of the Project area, native fauna of conservation significance are considered unlikely to depend on the habitat or be present in significant numbers.”²¹ This is not supported by evidence.
55. The proposed CO₂ pipeline will transect saltpans that meet the definition of a nationally important habitat for the critically endangered Far Eastern Curlew, with records at the site meeting the threshold for this definition.²²
56. Inpex states in its discussion of potential impacts of the proposed action on avifauna that “the saltpans (used as roost sites) surrounding Ichthys LNG facility are not used by the shorebirds and fewer shorebirds have been observed within the intertidal foraging habitat in comparison to the broader Middle Arm Peninsula.”²³ ECNT submits Inpex has not appropriately engaged with relevant data related to the significance of habitats found across the extent of the proposed action area.
57. ECNT submits that pipeline construction through this critical habitat, associated human disturbance, and release of acid sulphate soils may significantly impact the biodiversity, ecological integrity and ecological functioning of the area, with potentially unacceptable impacts for migratory shorebird species including the Far eastern curlew and other terrestrial species. Inpex has not demonstrated how these impacts will be avoided, mitigated or managed.

Planned and unplanned atmospheric emissions

58. The impacts of acute and chronic exposure to CO₂, BTEX compounds, and H₂S are discussed in relations to humans in [29]-[31]. Extant data on species and ecosystems relevant to this Referral are limited, but we note that bird species may be more likely to be impacted by reactive gases and aerosols than mammalian species because of the structure of their respiratory system.²⁴ Potential risks and impacts of chronic or acute exposure for bird species is poorly understood, but may include increased risk of respiratory infection, immunosuppression, and impacts on endocrine systems and

²¹ Referral Report, p201

²² Lilleyman, A. et al (2017) Distribution and abundance of migratory shorebirds in Darwin Harbour, Northern Territory, Australia, Northern Territory Naturalist 28. Accessed via <https://pdfs.semanticscholar.org/92c4/c8b02698d7749c31831b0afada1da61817ef.pdf>, p37

²³ Referral Reportl, p112

²⁴ Sanderfoot, Olivia V. and Holloway, Tracey (2017) Air pollution impacts on avian species via inhalation exposure and associated outcomes Environ. Res. Lett. 12

reproduction. H₂S can cause high acute toxicity to aquatic life, birds, and animals.²⁵

59. Conservation Advice for the Far Eastern Curlew establishes as a conservation and management priority that “future development projects avoid any activities that disproportionately affect the upper tidal flats and/or areas providing major foraging opportunities as identified by species experts, local studies, and site managers.”²⁶ Inpex has not demonstrated that vented emissions will not disproportionately impact this important habitat.
60. ECNT submits that the planned venting described as described in the Referral are not consistent with the Migratory Shorebird Guidelines.²⁶ Ongoing venting of CO₂ and toxic pollutants in areas of high ecological value for migratory shorebirds could result in direct mortality, disturbance, habitat loss, and degradation of habitat, if movement of the vented plumes make existing habitat unsuitable for use by migratory shorebird species.
61. While it constitutes a minor component of anticipated vented emissions, it is noteworthy that Inpex states that 3,000 tonnes of the CO₂ stream will be vented via cold vents per year.²⁷ Inpex does not describe the volume of likely emissions at any single anticipated cold vent release event, or consider the unique risks and impacts of releasing emissions via a cold vent. Cold venting of toxics can magnify their impact; ECNT notes that the Santos DLNG facility in Darwin Harbour *replaced* cold vent pipework with hot vent pipework to increase plume buoyance and mixing.²⁸ In addition, it would appear that cold venting would take place from infrastructure close to ground level, further intensifying impacts for ground-dwelling species and potentially impacting adjacent nationally-significant habitat for the Far Eastern Curlew and other fauna likely in the project area.

Conclusion

62. Section S 55(5)(b) of the Act requires the NTEPA to determine that the proposed action is unacceptable because it is likely to have significant impacts that cannot be appropriately avoided, mitigated or managed.
63. Inpex has proposed, as part of the proposed action, to remove from service key infrastructure intended (and, per the Ichthys LNG facility license, *required*) to

²⁵ DCEEW (n.d.) Hydrogen sulfide Substance Fact Sheets. Accessed via

<https://www.dceew.gov.au/environment/protection/npi/substances/fact-sheets/hydrogen-sulfide>

²⁶ Australian Government, Department of the Environment and Energy (2017) EPBC Act Policy Statement 3.21: Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species. Accessed via <https://www.dceew.gov.au/sites/default/files/documents/bio4190517-shorebirds-guidelines.pdf> (Migratory Shorebird Guidelines)

²⁷ Referral Report, p79

²⁸ Santos (2024) Darwin LNG Annual Environmental Monitoring Report 2023, p72. Accessed via https://ntepa.nt.gov.au/_media/waste-and-pollution/register/epl/gas/conoco-phillips/epl217-03-santos-dlng-annual-environmental-monitoring-report-2023.pdf

reduce impacts of emissions of air toxins on human health, air quality, and ecosystems. Instead, Inpex will rely on the functioning of a CCS project of unprecedented scale; previous attempts at implementing similar (and, notably, smaller) projects have frequently failed.

64. Given, the above, there is little if any possibility that significant impacts to key environmental factors can be avoided, mitigated, or managed.
65. ECNT urges the NTEPA to recognise the significant and unacceptable risks associated with the proposed action, and determine that it is unacceptable.
66. In summary, ECNT submits that, pursuant to s 55(5)(b) of the *Northern Territory Environment Act 2019 (the Act)*, the NT EPA should determine that the proposed action is unacceptable because it is likely to have significant impacts that cannot be appropriately avoided, mitigated or managed.
67. We are grateful to the NT EPA for considering this submission. For further information on the concerns outlined above, please contact bree.ahrens@ecnt.org

Yours sincerely,



Bree Ahrens
Senior Climate campaigner