Environment Centre NT
protecting nature | living sustainably | creating a climate for change

Northern Territory Environment Protection Authority
Level 1 Arnhemica House
16 Parap Road PARAP NT 0801

To whom it may concern,

RE: NTEPA Guidance Modelling Dispersion of Air Pollutants

Introduction

1. The Northern Territory Environment Protection Authority (**NTEPA**) has invited public comment on the proposed Guidance for Modelling Dispersion of Air Pollutants in the NT (**draft Guidance**). [1]

2. 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. As the peak community sector environment organisation in the NT, ECNT has a strong interest in the development of robust regulation of air pollution in the Territory, and welcomes the opportunity to comment on the draft Guidance.

3. Noting this consultation process is intended to inform the NTEPA in deciding whether the draft Guidance is "appropriate to ensure air quality impact assessments within the NT are undertaken at a level that protects the air quality of the territory",[2] ECNT makes this submission to assist the NTEPA to improve the effectiveness of the draft Guidance.

4. For the Guidance to be effective it must clearly identify its application, standards for compliance and the applicability of technical documents from other jurisdictions.

5. We make the following recommendations to strengthen the draft Guidance and assist in its finalisation.

Recommendations

- The draft Guidance should clearly set out the standards for air quality that apply in the Territory and the standards for monitoring compliance.

- The standards for air quality should be identified according to substance and exceedance levels and include, at a minimum:

[1] NTEPA, Guidance for Modelling Dispersion of Air Pollutants in the NT | NTEPA, (2024).
[2] NTEPA Consultation page: Guidance for Modelling Dispersion of Air Pollutants in the NT | NTEPA.

  - the standards in Schedule 2 to the *National Environment Protection (Ambient Air Quality) Measure*; and
  - monitored air toxics set out in Schedule 1 to the *National Environment Protection (Air Toxics) Measure*; and
  - Pollutants listed in Schedule A to the *National Environment Protection (National Pollutant Inventory) Measure*.

- The draft Guidance should specify what environmental impact assessment processes that may be required to be undertaken in the NT that the Guidance can be used to demonstrate compliance with.

- The draft Guidance should specify what conditions of environmental approvals it can be used to demonstrate ongoing monitoring compliance with. This should include conditions of statutory authorisations such as the *Planning Act 1999*, the *Waste Management and Pollution Control Act 1998*, and the EP Act.

- The draft Guidance should also clarify how it supports other statutory obligations or processes, such as:
  - The general duty under the *Environment Protection Act 2019*;
  - EIA requirements under Part 5 of the *Environment Protection Regulations 2020*;
  - Requirements under the National Environment Protection (Ambient Air Quality) Measure;
  - Requirements under the National Environment Protection (Air Toxics) Measure;
  - Requirements under the National Environment Protection (National Pollution Inventory) Measure.

- The draft Guidance should specify how it will be used by the NTEPA when determining referrals under the *Environment Protection Act 2019*.

- The draft Guidance should be supported by an expanded NT government air quality monitoring program that includes ambient air quality and air toxics within scope.

- The draft Guidance should refer to guidance documents from other jurisdictions in a precise manner that incorporates the requirements of those guidance documents properly into the NT framework. The draft Guidance should not list in a general manner documents that *may* be relevant, nor leave it to proponents to select when to apply guidance from Victoria EPA or NSW EPA.

- The air pollution and monitoring levels that are to be monitored using the NSW Approved Methods for Modelling: Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2022a) should be stipulated. We recommend, at a minimum, that the standards in NEPM (AAQ) and monitoring levels in NEPM (AT) be adopted.

- The draft Guidance should include definitions or clear descriptions of what are Level 1 and Level 2 assessments.

- The draft Guidance should clearly state how a Level 1 or Level 2 assessment is to be used in the NT by proponents required to undergo environmental impact assessment and identify the source of that requirement.

- The draft Guidance should set out the sensitivity receptors to be included in the modelling domain extent.

- The release of the finalised Guidance should be complemented by a renewed commitment by the NTEPA to the National Environment Protection (Air Toxics) Measure and implementing site identification.

- The draft Guidance should include standards and exceedances for the following harmful air toxics:
    - Benzene, toluene, ethylbenzene and xylene (BTEX substances);
    - n-hexane, trimethylpentane and alkanes among volatile organic compound (VOC) emissions);
    - formaldehyde, acetaldehyde and other aldehydes;
    - hydrogen sulfide; (H_2S)
    - mercaptans;
    - benzo(a)pyrene and other polycyclic aromatic hydrocarbons (PAH);
    - mercury (in inorganic and organic forms).

- A complete list of chemical species to be included in modelling dispersion of air pollutants should be included in the draft Guidance.

- For cumulative impact assessment of air quality, the draft Guidance should include background concentrations of pollutants to be included in air pollutant dispersion modelling, and the types of cumulative sources to be considered as sources of air pollution.

It is not clear how the draft Guidance will be implemented

6. The manner of implementation of the draft Guidance itself is unclear. In reading sections 1.1 to 1.3, it is not clear what gives the document force and whether any of the processes described are mandatory.

7. Although section 1.1 of the draft Guidance refers to the following sources of potential obligations, it does not state how they are implemented by use of the draft Guidance:

a. the NT EPA's environmental factor of Air Quality - "Protect air quality and minimise emissions and their impact so that environmental values are maintained";
b. objects contained in section 3 of the *Environment Protection Act 2019* (NT) (**EP Act**); and
c. the general duty under the EP Act.[3]

8. If it is the NTEPA's intention that the draft Guidance must be followed to demonstrate compliance with the above obligations, this should be clearly stated.

9. Section 1.2 of the draft Guidance states the document will "support the NT EPA advice on protection of environmental air quality in the NT" and act as technical guidance to "assist proponents [to] achieve the following objectives" and then includes a number of requirements under statutory processes in the NT.[4] This section indicates the draft Guidance is given its force by how proponents use it to achieve the objectives related to statutory processes in the NT and how the NT EPA uses it in providing advice, in accordance with its functions under the *Northern Territory Environment Protection Authority Act 2012* (NT) and other legislation (for instance, advice under the EP Act or Regulations). It is not clear if statutory processes or the advice function of NT EPA, or both, implement the draft Guidance.

10. Two of the objectives listed in section 1.2 are: preparing air quality impact assessments for environmental impact assessment (**EIA**) processes under the EP Act and demonstrating effective risk mitigation for activities proposed or operating under environment protection approvals or licenses under the *Waste Management and Pollution Control Act 1998* (NT) (**WMPC Act**).[5] The draft Guidance does not clearly explain how these objectives will be achieved. The draft Guidance should specify how its application can be used to demonstrate compliance with these statutory processes. For example, the draft Guidance could include which requirements for EIA under Part 5 of the *Environment Protection Regulations 2020* (**EP Regulations**) can be met through its adoption.

11. By way of contrast, equivalent EPA Guidelines in NSW inform proponents and the community how air quality modelling obligations can be met using the NSW Guidelines – see 74-82. The draft Guidance points to the NSW "Approved Methods for Modelling: Approved Methods for Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2022a)" (**NSW EPA Approved Methods**) and suggests it is "consistent with" those guidelines.[6] The draft Guidance should follow the approach of the NSW EPA

[3] Draft Guidance, p 5.
[4] Draft Guidance, p 5.
[5] Draft Guidance, p 5.
[6] Draft Guidance, p 6.

Approved Methods and specify (as is done in section 1.1. of the NSW EPA Approved Methods) what binding obligations the draft Guidance gives effect to.

12. In a similar vein, the "Victoria EPA publication 440.1: A guide to the sampling and analysis of air emissions and air quality" (**Victoria EPA Guide 2002**) makes clear when use of the Victoria EPA Guide 2002is mandatory. After describing a range of reasons for monitoring and "critical steps in any monitoring program (either source emission or ambient air)", the EPA says "[t]he guidelines must be followed whenever testing or monitoring is undertaken for any purposes required by the *Environment Protection Act 1970*."[7] This makes the regulatory effect of the Guidelines clear. We note, with reference to discussion at 46-59, that the EPA Victoria emphasises the importance of both source emission and ambient air monitoring in the Victoria EPA Guide 2002.

13. The draft Guidance should clarify the reporting obligations for air quality that proponents must adopt. This would provide certainty to relevant sectors, industry and projects. For example, the draft Guidance could specify how it is used to report to the NT EPA and other statutory authorities under:
    a. The general duty under the EP Act;
    b. EIA requirements under Part 5 of the EP Regulations;
    c. Conditions of existing statutory authorisations (including the *Planning Act 1999*, the WMPC Act, and the EP Act);
    d. Requirements under the National Environment Protection (Ambient Air Quality) Measure;
    e. Requirements under the National Environment Protection (Air Toxics) Measure;
    f. Requirements under the National Environment Protection (National Pollution Inventory) Measure.

14. In relation to reporting requirements, the draft Guidance states:

    "The air dispersion modelling report submitted by the proponent should demonstrate that concentrations and emission rates meet the requirements of any site licences and approvals, where available."[8]

15. However, this does not assist the proponent to understand which "concentrations and emission rates" apply to them. As pointed out at 13 above, this should be set out precisely. Section 10.1 fails to specify which emissions species are to be reported under which regulatory mechanisms. This is required to give the draft Guidance clear outcomes. At 51-55 below we suggest the concentrations and emissions rates that should apply.

[7] Victoria EPA, "Victoria EPA publication 440.1: A guide to the sampling and analysis of air emissions and air quality", (2002), accessed at: https://www.epa.vic.gov.au/about-epa/publications/440-1, p 2.
[8] Draft Guidance, p 13.

The role of NT Government air quality monitoring programs

16. It is not clear how the existing NT Government air quality monitoring program would be supported by the draft Guidance.

17. Comprehensive monitoring of air quality by the NT Government could be used to calibrate and validate the air quality modelling carried out by project operators using the draft Guidance. This would ensure the draft Guidance is used as expected.

18. The NT Government carries out air quality modelling and reporting under the National Environment Protection (Ambient Air Quality) Measure (**NEPM (AAQ)**).[9] The draft Guidance should set out how reports that jurisdictions are required to make under the NEPM (AAQ) will be used by NT EPA to verify compliance with the draft Guidance. At the same time, monitoring carried out in accordance with the draft Guidance should be used to verify compliance with the NEPM (AAQ).

19. We note that because the NT government does not independently complete other air quality reporting for the National Environment Protection (National Pollutant Inventory) Measure 1998 (**NEPM (NPI)**),[10] or the National Environment Protection (Air Toxics) Measure (**NEPM (AT)**) there is no comprehensive air monitoring program complementing the introduction of the new draft Guidance. This absence will likely limit the ability for the NTEPA to verify whether the draft Guidance is properly implemented across the NT.

Absence of reference to air quality standards

20. The draft Guidance omits any definitive set of pollutants it claims to provide monitoring guidance for. In addition to the concerns noted at 6-15, regarding a lack of clarity of how compliance is to be demonstrated by modelling air quality and pollution dispersion, the lack of clarity regarding species of chemicals to be modelled is significant.

21. We note that section 9 of the draft Guidance includes reference to "Impact assessment criteria (IACs) in the NSW Approved Methods for Modelling (NSW EPA, 2022a)" and "air pollution assessment criteria (APACs) in Vic EPA Guideline (EPA Victoria, 2022)," that are "are risk-based concentrations that help identify emissions likely to pose unacceptable risk to human health and the environment".[11] The reference to assessment criteria for chemical species set out in those guidelines is not sufficient because:
    a. The assessment criteria contained in the Victorian EPA "Publication 1961: Guideline for assessing and minimising air pollution" (**Victoria EPA Guidelines**

[9] NTEPA, 'Ambient Air Quality reports', accessed at: https://ntepa.nt.gov.au/your-environment/air-quality/ambient-air-quality-reports.
[10] We note that for the NEPM the relevant NT EPA website states:"emissions data submitted by industries are assessed by officers for NT EPA prior to lodging with the responsible Australian Government department to be published on the NPI website. Over 100 facilities based in the NT and from several industry sectors report annually to the NPI". See: National pollutant inventory | NTEPA
[11] Draft Guidance, p 12.

2022) and NSW EPA Approved Methods have different standards in some instances, so there is no regulatory certainty in which standards apply;

b. In some instances, the draft Guidance appears to intend that the NSW Approved Methods assessment criteria not to be followed, but does not identify in relation to which chemical species;[12]
c. The method of assessment is different in the Victoria EPA Guidelines 2022 and NSW EPA Approved Methods in relation to concentration limits. In the Victoria EPA Guidelines 2022 , the concentrations in the assessment criteria are not intended to be treated as levels to "pollute up to", [13] whereas the NSW EPA Approved Methods deal only with concentration limits.
d. Having two sets of criteria included in the draft Guidance, means that there is no uniform set of substances and concentrations that are modelled in dispersion of air pollutants.

22. We discuss the risk of reference to other guidelines more generally below at 29-38.

23. The draft Guidance does not specify which chemical species of air pollution or their concentration levels should be modelled for the purposes set out in the stated objectives in section 1.2. We note that section 12 incorporates some of the requirements to model the pollutant species in cited guidelines for ambient air quality (which give effect to the modelling requirements under the NEPM (AAQ)),[14] however the draft Guidance does not state anywhere that the species included in Schedule 1 to the NEPM (AAQ) are to be included in modelling. The draft Guidance fails to include the substances specified in the Schedules to the NEPM (AT) or NEPM (NPI) as chemicals to be modelled.

24. We recommend that a complete list of chemical species to be included in modelling dispersion of air pollutants be attached to the draft Guidance. This should then be included as a requirement in Section 6 of the draft Guidance for an emissions inventory. Even if the inventory shows a zero emission rate for a pollutant this can give the public comfort that emissions are monitored.

25. In addition, section 10 of the draft Guidance which addresses 'Reporting,' does not provide for exceedances to be highlighted in monitoring reports. The requirement to include an emissions inventory,[15] is not adequate and should specify the types of

[12] We refer here to the statement at p 12: "*Some IACs in Tables 13 and 14 (Chapter 7) in the NSW Approved Methods for Modelling are outdated in comparison with current global standards. These criteria should be substituted with corresponding values from Table 3 of the Vic EPA Guideline since these values have been adopted from sources which are based on more updated understanding of health impacts from exposure of pollutants".*
[13] EPA Victoria, "Publication 1961: Guideline for assessing and minimising air pollution", Environment Protection Authority Victoria, (2022), accessed at: https://www.epa.vic.gov.au/, p 26.
[14] Draft Guidance, p 16.
[15] Draft Guidance, p 14.

chemical species to be included in the inventory. We contrast this to the analysis of exceedances in section 6 of *Northern Territory Ambient Air Quality Monitoring Report 2022*.[16] This type of reporting on exceedances for each species of chemical and the relevant concentration standard should be included.

26. Section 12 of the draft Guidance appears to only incorporate the "ambient air monitoring requirements" of the NSW EPA Approved Methods. This is despite the NSW EPA Approved Methods being able to be applied to air toxics, such as those monitored under the NEPM (AT). Section 12 of the draft Guidance should be clarified as applying to more than ambient air quality as monitored under the NEPM (AAQ).

27. It is concerning that with the absence of clear air quality concentration standards for chemical species and exceedance levels in the draft Guidance, discretion will be left to proponents in selecting which air pollutants to include in their modelling and reporting. This then flows through to how the emissions inventory requirements in section 6 of the draft Guidance states that the choice of pollutants selected for dispersion modelling will also be justified, implying that the proponent has a choice over the chemical species selected. This non-specificity for the compounds that are being modelled and included in an inventory minimises the effectiveness of having guidelines at all.

28. The draft Guidance should set the modelling and reporting standards in a clear manner, incorporating each of the substances mentioned above as covered by a NEPM.

Reference to other guidance documents should be clarified

29. Throughout the document, the draft Guidance makes reference to multiple and diverse interstate and international guidance documents. There is a risk this will result in conflicting interpretations of the correct approach to modelling dispersion of air pollutants. The draft Guidance does not make clear which guidance document should apply in which setting.

30. Further, the various guidance documents referred to have different applications and relate to different standards (ie. New Zealand has different exceedance standards for pollutants than Australia). It is unclear how a reference to a guidance document should be applied.

31. We submit that any references to interstate and international guidance documents should be tied to a particular manner in which that guidance document should be used. This would assist with providing certainty.

[16] NT EPA, "Northern Territory Ambient Air Quality Monitoring Report 2022", (30 September 2023), accessed at: Northern Territory Ambient Air Quality Monitoring Report 2022, p 28 – 35.

32. As the Victoria EPA Guide 2002 points out, there can sometimes be confusion between different methods of testing organic compounds and interpreting results.[17] The Victoria EPA Guide 2002 explains this is because of different terms used incorrectly and interchangeably, the different limitations on application for any method and different reporting by individual chemical species and compounds.[18] Given this, we submit it is important to cautiously, and with precise reference to the nature of the guidance, refer to different guidelines and the methods contained within them. This would avoid risks in confusing the application of those methods.

33. Reference to multiple guidance documents as acceptable gives too much discretion to a proponent in selecting which assessment criteria and modelling is used. We note that page 7 of the draft Guidance refers to the New Zealand Ministry for the Environment guidance document from 2004. However, this document is out of date, noting the up-to-date "Good Practice Guide" is from 2009.[19] Citing selected parts of NSW EPA Approved Methods and Victoria EPA Guidelines 2022 for air pollution modelling and assessment leads to the possibility of misinterpretation that could be avoided if the draft Guidance was specific and direct in the requirements for air quality modelling. Any reference to another jurisdiction's approach should be precise in how that guidance must be used, for instance in applying a part or section of a guidance document in relation to specified circumstances for the NT.

34. While the draft Guidance refers to the NSW EPA Approved Methods, it is difficult to see how the draft Guidance is "consistent with other nationally accepted modelling guidelines" such as the NSW EPA Approved Methods.[20] The NSW EPA Approved Methods does not set limits for air pollution in NSW. That is done under the *Protection of the Environment Operations Act 1997* (NSW) which makes it an offence for emissions of air impurities to exceed 'standards of concentration' as prescribed by the Regulations.[21] The standards are:

    "in-stack emission limits are the maximum emissions permissible for an industrial source anywhere in NSW. These limits are based on levels that are achievable through the application of reasonably available technology and good environmental practices."[22]

35. What this shows is that the NSW EPA Approved Methods interlocks with existing air pollution standards in NSW (and the document makes clear where to find these). In the

[17] Victoria EPA, "Victoria EPA publication 440.1: A guide to the sampling and analysis of air emissions and air quality",(2002), accessed at: https://www.epa.vic.gov.au/about-epa/publications/440-1, p 13.
[18] Ibid, p 13.
[19] Ministry for the Environment, "Good Practice Guide for Air Quality Monitoring and Data Management 2009", (2009) Wellington: Ministry for the Environment, accessed at: Good practice guide for air quality monitoring and data management 2009 | Ministry for the Environment.
[20] Draft Guidance, p 6.
[21] *Protection of the Environment Operations Act 1997* (NSW), section 128.
[22] NSW Environment Protection Authority, "Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales" (2022), accessed at: Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, p 46.

NT there is no apparent equivalent for setting those air pollution standards. This means that the reference to the NSW EPA Approved Methods is untethered to any clear standards. It is readily apparent that the draft Guidance does not intend to incorporate those NSW standards contained in the *Protection of the Environment Operations (Clean Air) Regulation 2022*.

36. We submit that to give the NSW EPA Approved Methods meaning, the air pollution and monitoring levels that are to be monitored using the NSW EPA Approved Methods must be stipulated. We recommend, at a minimum, that the standards in NEPM (AAQ) and monitoring levels in NEPM (AT) be adopted.

37. Section 9 of the draft Guidance claims "[a]ir emissions and any control measures proposed must meet the emissions limits for the relevant premises set out in the NSW *Protection of the Environment Operations (Clean Air) Regulation* (as adopted in the NT)."[23] However as shown above, there is no mechanism that adopts these limits in the NT, making this statement meaningless.

38. We note that reliance on interstate guidance means that rules specific to the NT environment have not been developed, despite the significantly different context to NSW and Victoria and unique aspects of the NT environment relevant to air quality management (such as tropical climate and seasonal burn-off practice).

Levels of assessment and requirements are unclear

39. The purpose of the draft Guidance is to assist proponents to prepare air quality impact assessments for EIA processes under the EP Act.[24] Section 2 is titled 'Model selection'. Section 2.1 is titled '2.1. Approved models for Level 2 impact assessments' and sets out a series of atmospheric dispersion models that are "acceptable for use within the NT for a Level 2 air quality impact assessment".[25]

40. Section 2.1 is titled 'Level 1 impact assessments' and it specifies that "For low-level emissions to air, dispersion modelling screening tools such as SCREEN3 or MAXMOD can be used for screening-level assessments (Level 1)".[26] It also goes on to say that if screening-level dispersion modelling technique is selected (presumably selected for EIA), "its use must be justified, and assessment must be conducted with worst-case scenario meteorology and concentration input data".[27]

41. The headings and language in sections 2.1 and 2.2 reflects the NSW EPA Approved Methods and are not reflective of the EIA assessment process in the NT. In the absence

[23] Draft Guidance, p 13.
[24] Draft Guidance, p 5.
[25] Draft Guidance, p 6.
[26] Draft Guidance, p 8.
[27] Draft Guidance, p 8.

of definitions of level 1 and 2 assessments, it is difficult to understand how this Guidance can be adopted.

42. The closest the draft Guidance gets to defining Level 1 impact assessment is the the description of it being "a screening-level dispersion modelling technique" and the list of examples at page 8.[28]

43. Level 2 assessment is not defined at all, beyond explicitly being an assessment that is more rigorous than level 1 assessment. The term "low-level emissions to air" is ambiguous.

44. The draft Guidance should explicitly define what Levels 1 and 2 assessments apply to in the context of the NT. This could be done by reference to EIA requirements under the EP Regulations or guidance documents published by the NT EPA for the EIA process.

45. Relatedly, we note that sensitivity receptors are included in section 3 of the draft Guidance. However, the sources of data for sensitivity receptors to be included in the modelling domain extent have not been included.[29] The draft Guidance should include what spatial data is required. For example, exposed population demographics (e.g. young and elderly) as represented specifically by childcare centres, schools, retirement homes could be included.

Opportunity to require monitoring with National Environment Protection (Air Toxics) Measure

46. The NT EPA does not currently report on the NEPM (AT). The draft Guidance represents an opportunity for the NT EPA to clarify how air toxics are to be measured and reported on in the NT and the requirements for proponents to carry out modelling to implement the NEPM.

47. It is consistent with the NEPM (AT) to introduce modelling guidance that will " improve the information base regarding ambient air toxics with the Australian environment in order to facilitate the development of standards".[30]

48. Based on the absence of reporting, it appears the NT has made a determination that no Stage 1 sites warrant designation as Stage 2 sites that would involve monitoring in accordance with Schedule 2 to the NEPM and reporting in accordance with Schedule 4

[28] Draft Guidance, p 8: See list of examples as: "*temporary use of a thermal oxidiser in a hydrocarbon remediation project at a service station in a residential area and hydrocarbon emissions guidelines must not be exceeded; emissions from an air stripper used in a hydrocarbon groundwater remediation project; single vent stack used during maintenance turnarounds; estimating impacts of hydrocarbon emissions from service stations; and estimating impact of hydrocarbon emissions from storage tanks from vents or rim seals.*"
[29] Draft Guidance, p 9.
[30] National Environment Protection (Air Toxics) Measure, clause 5.

to the NEPM. In the NT EPA's "Regulatory Statement: Regulation of LNG and other emissions" there is recognition of air toxic monitoring being undertaken for a short period in relation to Inpex:

"Air toxics concentrations were monitored at three NT Government air quality monitoring stations for two years following commissioning of the Inpex plant (2019-2020). Levels of air toxics were consistently well below safe health levels in all samples and in most cases below the limit of detection."[31]

49. For the purpose of this submission, we do not comment on the basis of that determination or the findings of NT Government air quality monitoring stations in respect of commissioning of the Inpex plant, although it is concerning it is not occurring.

50. The release of the finalised Guidance should be complemented by a further assessment of sites in the NT that may be required to report under the NEPM (AT).

51. At the same time the draft Guidance could be used to provide for modelling guidance for the air toxics subject to the NEPM (AT):
    a. Benzene;
    b. Formaldehyde;
    c. Benzo(a)pyrene as a marker for Polycyclic Aromatic Hydrocarbons;
    d. Toluene;
    e. Xylenes (as total of ortho, meta and para isomers).

52. There is a clear human health need for improved monitoring of air toxics. Air toxics from stationary sources, such as the two existing LNG plants proximate to the greater Darwin region, can remain at dangerously high concentrations for a period of time before they are dispersed.[32] When compounded over the time-scale stationary sources emit air toxics, this becomes a persistent hazard, particularly for vulnerable cohorts of people. [33] Efforts are now being made to understand and quantify the numbers of premature deaths and other health impacts caused by persistent exposure to air toxics from gas production and use.[34]

---

[31] NT EPA, "Regulatory Statement: Regulation of LNG and other emissions" (18 April 2024), accessed at: Regulatory statement: Regulation of LNG and other emissions

[32] Paper: Allen L. Robinson, "Air pollution emissions from shale gas development and production", in US National Library of Medicine – Health Impact Assessment of Shale Gas Extraction: Workshop Summary. Chapter 5: Air Quality (Dec 2014), accessed at: Download: Health Impact Assessment of Shale Gas Extraction: Workshop Summary, The National Academies Press, p 42.

[33] Di Ciaula, Agostino, "Emergency visits and hospital admissions in aged people living close to a gas-fired power plant, *European Journal of Internal Medicine*, Volume 23, Issue 2, e53 - e58.

[34] See for example: annual health impact estimates at p 13-16 of Seukyoung Lee, Gyuri Cho, Gahee Han, Lauri Myllyvirta, "Bridge to Death: Air Quality And Health Impacts of Fossil Gas Power", (3 December 2021), accessed at: https://energyandcleanair.org/wp/wp-content/uploads/2021/12/SFOC-Air-Quality_Health-Impacts_Gas-Power_.pdf;

53. It is encouraging that section 12 of the draft Guidance, 'Monitoring ambient air quality' includes a reference to the Victoria EPA Guide 2002 under which VOCs, PAHs and heavy metals are included with approved methods for ambient air monitoring. [35]

54. The draft Guidance should make clear that the approach adopted in these guidelines of monitoring for these chemical species, is expected. At present these chemical species are omitted from NT ambient air quality monitoring.[36] The Victoria EPA Guide 2002 specify which technical standards are to be used for monitoring VOCs as part of ambient air quality.[37] This is the standard of precision that should be reached in the draft Guidance.

55. We submit the draft Guidance should specify additional species of air toxics to be included in modelling dispersion of air pollutants and reporting. We recommend, in particular, the inclusion of the following species of chemical that are toxic and some of which are carcinogenic:

    f. benzene, toluene, ethylbenzene and xylene (**BTEX** substances);
    g. n-hexane, trimethylpentane and alkanes among volatile organic compound (**VOC**) emissions);
    h. formaldehyde, acetaldehyde and other aldehydes;
    i. hydrogen sulfide; (H_2S)
    j. mercaptans;
    k. benzo(a)pyrene and other polycyclic aromatic hydrocarbons (**PAH**); and
    l. mercury (in inorganic and organic forms).

56. We note that the Victoria EPA Guidelines 2022 includes the air toxics listed in Schedule 1 to the NEPM (AT) while also covering a greater range of chemical species that are air toxics.[38] Victoria EPA Guidelines 2022 includes air toxics, however, its focus is on assessing the risk of exceeding "acceptable levels".[39] This is a proportionate approach that avoids omitting chemical species that can risk human health and the environment.

Vlatka Matkovic, Lauri Myllyvirta, Rosa Gierens, Sarah Brown, Frida Kieninger, "False fix: the hidden health impact of Europe's fossil has dependency" (18 May 2022), accessed at : Health and Environment Alliance | False fix: the hidden health impacts of Europe's fossil gas dependency.

[35] Victoria EPA, "Victoria EPA publication 440.1: A guide to the sampling and analysis of air emissions and air quality", (2002), accessed at: https://www.epa.vic.gov.au/about-epa/publications/440-1, p 13-16.

[36] NT EPA, "Annual Compliance Report for the NT 2022 - Ambient Air Quality NEPM" (2023), accessed at: https://ntepa.nt.gov.au/your-environment/air-quality/ambient-air-quality-reports, p 23-27.

[37] Victoria EPA, "Victoria EPA publication 440.1: A guide to the sampling and analysis of air emissions and air quality", (2002), accessed at: https://www.epa.vic.gov.au/about-epa/publications/440-1, p 21. (the Guidelines specify AS3580.11.1 as being the approved method).

[38] EPA Victoria, "Publication 1961: Guideline for assessing and minimising air pollution", Environment Protection Authority Victoria, (2022), accessed at: https://www.epa.vic.gov.au/, p 25.

[39] Ibid, p 25.

The draft Guidance underplays the importance of air toxics monitoring

57. The draft Guidance is overly focussed on ambient air quality (as defined by NEPM (AAQ)), and does not demonstrate sufficient engagement with air toxicity arising from industrial sources.

58. It is vitally important that the draft Guidance includes requirements for air toxics. Given the location of major Liquified Natural Gas (**LNG**) facilities close to Darwin and Palmerston,[40] air toxics from these sources should be a major focus. While methane is the main chemical species in LNG, the gas itself, LNG production and transmission are a source of non-methane volatile organic compounds that are toxic, carcinogenic or teratogenic, or all three.[41] Hazardous air pollutants found in natural gas include hexane, the BTEX substances of benzene, toluene, ethylbenzene and xylene, 2,2,4-trimethylpentane (**2,2,4-TMP**) and hydrogen sulfide.[42] Testing shows these chemical species are found throughout the entire production process for LNG. [43] Due to planned discharges from production facilities and pipelines and unplanned leaks, the chemicals find their way into the surrounding environment.[44] Other toxic substances contained in natural gas include mercury, lead, arsenic and cadmium.[45]

59. As paragraphs 46-52 note, the draft Guidance represents an opportunity for the NT to require comprehensive monitoring of air toxics. The draft Guidance should equally emphasise all sources of air pollution rather than introducing modelling requirements solely for ambient air quality and the sources of air pollution set out in Schedule 1 to the NEPM (AAQ).

Addressing cumulative impacts on air quality should be more detailed

60. It is encouraging that section 7 of the draft Guidance requires background concentrations [of air pollution] in dispersion modelling and the inclusion of cumulative impacts of multiple sources of air pollution in a model.[46]

61. As noted above, we are concerned that the precise chemical species to be included in modelling (and for section 7 purposes, in background concentrations of pollution) are unclear. The specific pollutants to be measured for background concentrations should be identified.

62. Notwithstanding that, it is positive the draft Guidance requires that:

---

[40] NT EPA, "Regulatory Statement: Regulation of LNG and other emissions" (18 April 2024), accessed at: Regulatory statement: Regulation of LNG and other emissions.
[41] Nordgaard, C.L., Jaeger, J.M., Goldman, J.S., Shonkoff, S.B. and Michanowicz, D.R., (2022), "Hazardous air pollutants in transmission pipeline natural gas: an analytic assessment", *Environmental Research Letters*, *17*(10), 104032, accessed at: https://iopscience.iop.org/article/10.1088/1748-9326/ac9295/pdf, p 2.
[42] Ibid, p 4.
[43] Ibid, p 2.
[44] Ibid - see figure 1 at p 3.
[45] Ibid, p 10.
[46] Draft Guidance, p 11-12.

a. "*modelling report must provide results of incremental impacts (facility emissions only) and cumulative impacts (facility plus background emissions) of emissions*."[47]
b. "*Dispersion modelling section should contain…tables with summaries of predicted and cumulative concentrations at the sensitive receptors, against corresponding IACs - highlighting all exceedances*".[48]
c. In section 10.2 on 'Presentation' is articulated as requiring modelling to "*Present separate isopleths for the predicted emissions from the proposed development and from cumulative emissions*."[49]

63. The final version of the Guidance should include specific processes and requirements for how cumulative impacts should be recognised and incorporated into models and reporting.

64. This could be achieved by better defining the background concentrations of air pollution to be identified and including the types of cumulative sources (such as dry season fires, other weather events and neighbouring industrial activities).

65. For example, in the NSW EPA Approved Methods accounting for background concentrations of pollution is necessary to enable the total impact of a new proposal to be assessed.[50] The Approved Methods document in particular recommends that the existing background concentrations of the following pollutants be included in any assessment of that pollutant:[51]
    m. sulfur dioxide (SO2);
    n. nitrogen dioxide (NO2);
    o. ozone;
    p. total suspended particulates PM2.5 and PM2.10;
    q. deposited dust;
    r. lead;
    s. carbon monoxide;
    t. hydrogen fluoride.

66. The NSW EPA Approved Methods also makes clear that occasional elevated background concentrations of pollutants should not be used to justify exceedances of pollution standards.[52] The NSW EPA Approved Methods state under heading '5.1.3. Dealing with elevated background concentrations':[53]

    "In some locations, existing ambient air pollutant concentrations may exceed the impact assessment criteria from time to time. In such circumstances, a licensee must demonstrate that no additional exceedances of the impact assessment criteria will

[47] Ibid, p 12.
[48] Ibid p 14.
[49] Ibid, p 15.
[50] NSW Environment Protection Authority, "Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales" (2022), accessed at: Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, p 18.
[51] Ibid, p 18.
[52] Ibid, p 19.
[53] Ibid, p 19.

occur as a result of the proposed activity and that best management practices will be implemented to minimise emissions of air pollutants as far as is practical…"

67. The Victoria EPA Guidelines 2022 emphasises the consideration of background concentrations as a "critical step" for understanding cumulative risks to human health and the environment.[54]

68. Rather than simply referring to these documents, the draft Guidance should set out how cumulative impacts are to be included in modelling in the NT and reflect local environmental factors.

69. Relatedly, the draft Guidance recommends that "*to maintain a reserve capacity for airsheds, no industrial activity is permitted to emit pollutants in a manner that would prejudice compliance with standards in the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM)*".[55] This requires clear standards in the draft Guidance to be incorporated into cumulative impact assessments otherwise it will be difficult to implement.

Draft Guidance does not require demonstration of suitability of air pollution models

70. The draft Guidance does not require comprehensive verification of air pollution modelling. Section 11 of the draft Guidance suggests only that a "sampling program to validate the dispersion model is likely to be required as a condition of an environmental approval".[56]

71. This contrasts with the approach taken by NSW EPA as outlined below at 79-80 where a proponent must justify and in some cases seek regulatory approval for their approach to methods of modelling.

72. The Victoria EPA Guide 2002 similarly sets out what analytical methods for emissions testing must be used and requires justification and approval for following a different approach.[57] The guidelines also provide specific reference to how an alternative approach can be validated. The guidelines state:[58]

    "For statutory testing, methods not based on any of the methods in the approved references can only be used with prior approval of EPA. When seeking approval from EPA, validation of the proposed method must be demonstrated before approval can be granted. The procedures that should be followed for method validation are available in Requirements for the Format and Content of Test Methods and Recommended

[54] EPA Victoria, "Publication 1961: Guideline for assessing and minimising air pollution", Environment Protection Authority Victoria, (2022), accessed at: https://www.epa.vic.gov.au/, p 34.
[55] Draft Guidance, p 13.
[56] Draft Guidance, p 16.
[57] Victoria EPA, "Victoria EPA publication 440.1: A guide to the sampling and analysis of air emissions and air quality", (2002), accessed at: https://www.epa.vic.gov.au/about-epa/publications/440-1, p 11.
[58] Ibid, p 11.

Procedures for the Validation of Chemical Test Methods [NATA Technical Note No.17] (NATA 1997)."

73. The draft Guidance should be given more rigor by requiring calibration by proponents and validation by the NT EPA of an air pollution model before it is adopted. This would allow for confirmation the requirements of the draft Guidance can be implemented.

Case study: NSW "Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (Approved Methods)"

74. To illustrate the gaps in the draft Guidance, we refer to the following elements of the NSW EPA Approved Methods:[59]

Clear connection to environmental standards and regulation

75. Section 1.1 of the NSW EPA Approved Methods sets out the statutory basis of the document. It identifies the source of the obligation on industry to ensure compliance with the relevant NSW regulations and how the NSW EPA Approved Methods is referenced in the regulations. It also identifies how the NSW EPA Approved Methods may be incorporated into conditions attached to statutory instruments.

76. Conversely the draft Guidance does not identify in section 1.1 the regulatory basis for the draft Guidance.

Specific methods to be followed introduced in the NSW EPA Approved Methods

77. While the draft Guidance refers to the NSW EPA Approved Methods, it fails to provide the kind of specific guidance that the NSW EPA Approved Methods gives users. For instance, section 3.6 of the NSW EPA Approved Methods requires the results of an emissions inventory for a site monitored for air emissions to include:
    d. *"all release parameters of stack and fugitive sources (e.g. temperature, exit velocity, stack dimensions, flow rate, moisture content, pressure, carbon dioxide and oxygen concentration)"*
    e. *"pollutant emission concentrations and a comparison against the relevant requirements of the [Protection of the Environment Operations (Clean Air) Regulation 2021]"*

78. This is not done for the draft Guidance, rather a number of methods are listed as potentially suitable for air quality modelling and the specific standards for air quality to be complied with are not included.

Clear approval pathway for alternative modelling approaches

79. The Approved Methods Document sets out the process for modifying the dispersion modelling used and requires use of AUSPLUME, CALPUFF or TAPM for dispersion modelling. If a proponent intends to use another model, there is a pathway to apply to use an alternative approach. Section 6.2 states "for the calculation of site specific emission limits for hydrogen sulfide and sulfur dioxide, written approval must be obtained from the EPA for the use of a dispersion model other than AUSPLUME, CALPUFF or TAPM. The application must show that the alternative dispersion model is scientifically sound for the proposed application".

[59] NSW Environment Protection Authority, "Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales" (2022), accessed at: Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales.

80. While the draft Guidance refers to the NSW EPA Approved Methods in a way that suggests it can be followed, it does not replicate this process of approval for alternative modelling arrangements. This leaves the draft Guidance silent on obtaining approval for alternative modelling arrangements. It states only that "Scientific justification must support the use of other models, such as AERMOD or industry-specific models for deviation from the preferred methods specified in this guidance" (p 7). This should be clarified.

Clear impact assessment criteria included for toxic air pollutants

81. In section 7.2.2 the NSW EPA Approved Methods sets out how the impact assessment criteria should be used for individual toxic air pollutants, which are set out in tables by impact assessment criteria of averaging period, size and concentration (e.g. in parts per million). This includes specific guidance such as applying the impact assessment "at and beyond the boundary of the facility", the reporting percentile of dispersion model predications and the methods of calculating potency equivalent factors and toxic equivalents.

82. The draft Guidance does not provide this level of guidance for air toxics monitored under the NEPM (Air Toxics) in the NT.

83. The specific guidance of the NSW EPA Approved Methods for impact assessment criteria of toxics is given regulatory force by section 7.7 which requires dispersion modelling to be "revised to include various pollution control strategies" if the impact assessment criteria are exceeded.

84. The draft Guidance does not specify what is to occur if air toxic levels subject to modelling are exceeded in the NT.

85. The NSW EPA Approved Methods identifies the distinction between Level 1 and Level 2 Assessment for methods of air pollutant modelling. It describes these in section 2.1 as:
    u. Level 1 – screening-level dispersion modelling technique using worst-case input data;
    v. Level 2 – refined dispersion modelling technique using site-specific input data.

86. The draft Guidance does not define Level 1 and 2 Assessment.

Case Study: New Zealand "Good Practice Guide for Air Quality Monitoring and Data Management"

87. To illustrate the gaps in the draft Guidance, we refer to the following elements of the New Zealand "Good Practice Guide for Air Quality Monitoring and Data Management 2009" (**New Zealand Guide**):[60]

Clarity of monitoring objectives

88. Section 2.3 of the New Zealand Guide sets out considerations to determine the intended use of data from a monitoring site, to be set before a site is established. This approach is to determine a monitoring objective, which might include any of the following:
    a. determining the level of contaminants in an airshed to compare with standards and guidelines;
    b. reporting on the state of the environment;
    c. obtaining exploratory data;
    d. conducting air quality research;
    e. obtaining data for air quality modelling;
    f. providing air quality information for policy or strategy development;
    g. assessing the effectiveness of policy based on air quality trends.

89. The New Zealand Guide's approach is also to determine which species of air emissions to monitor in advance. This is unlike the draft Guidance which fails to:
    a. set out in section 2 of the draft Guidance any statement that the objective of air quality monitoring should be determined in advance of selecting a monitoring site or include guidance on what objectives should be considered in developing an air monitoring program.
    b. Identify in section 2 of the draft Guidance how species of emissions should be targeted.

Interaction of regulatory framework and air quality monitoring procedures

90. Section 3 of the New Zealand Guide "describes the ambient air quality standards and guidelines and discusses how air quality monitoring fits into the regulatory framework". While New Zealand has a different regulatory scheme, the New Zealand Guide shows how a guidance document should set out the concentration limits for air quality. For example, section 3.1.1 sets out the National Environmental Standards for ambient air quality and the specific airborne contaminants included in the Standards. These could be considered an equivalent mechanism to the NEPM instruments in Australia.

[60] Ministry for the Environment,, "Good Practice Guide for Air Quality Monitoring and Data Management 2009", (2009), Wellington: Ministry for the Environment, accessed at: Good practice guide for air quality monitoring and data management 2009 | Ministry for the Environment.

91. This is in contrast to the draft Guidance which does not state which regulatory standards the draft Guidance is to be used to assess compliance with.

Yours sincerely,

Naish Gawen
Policy and Research Lead, ECNT

Bree Ahrens
A/Co-Executive Director, ECNT