

Australian Greens' additional comments

Cultural and heritage value

1.1 The Burrup Peninsula was assessed as meriting World Heritage listing in the 1980s. But due to industry and state government reluctance progress has stalled. Globally, smaller and arguably less significant rock art sites have been afforded the protections of World Heritage listing. As such, it is a failure that the rock art of the Burrup Peninsula has not been listed and protected accordingly.

1.2 The Greens acknowledge the concerns expressed by the Murujuga Aboriginal Corporation that it has not been consulted on World Heritage listing and that a consensus view has not been formed as to whether it would support such a listing. The Greens also note concerns that World Heritage listing may lead to changes or a reduction in the ability for the Murujuga Aboriginal Corporation to manage the area.

1.3 The Greens acknowledge the vital work that the Murujuga Rangers undertake in maintaining and protecting the Murujuga National Park from physical destruction and vandalism, and that the rangers have not been afforded appropriate legislative powers to undertake much needed enforcement activity within the park. The Greens considers this to be an oversight by the Western Australian Government.

Recommendation 1

1.4 Australian Greens Senators recommend that the Western Australian Government immediately approach the Australian Government to seek the listing of the Burrup Peninsula on Australia's Tentative World Heritage List, following appropriate consultation with the Murujuga Aboriginal Corporation.

Recommendation 2

1.5 Australian Greens Senators recommend that following listing on the Tentative World Heritage List, the Australian Government and the Western Australian Government work together to nominate the Burrup Peninsula for World Heritage listing.

Recommendation 3

1.6 Australian Greens Senators recommend that the Murujuga Indigenous Ranger program be given appropriate funding by both the Australian Government and the Western Australian Government, and the Murujuga Rangers be granted the power to undertake the same enforcement activities as state-employed rangers.

Industry and shipping

1.7 The Burrup Peninsula is the site of a number of significant industrial complexes including a major iron ore port, liquefied natural gas production, salt production, and Yara Pilbara's liquid ammonia plant and technical ammonium nitrate facility (TANPF). These industries are sources of pollutants such as sulphur dioxide, ammonium nitrate particles, nitrogen oxide, nitrous oxide, methane, ammonia, and carbon dioxide. These pollutants are known to have negative consequences for human health, create environmental changes such as algal growth, and create acid rain. Such consequences may have negative effects on the cultural and environmental values of the Burrup Peninsula.

Shipping

1.8 The Port of Dampier is one of the busiest bulk ports in the world with over 5,000 vessels per year entering and leaving the port within a few kilometres of a number of important rock art sites. Bulk vessels utilise high-sulphur content fuel and it is estimated that a single vessel releases approximately 5,200 tonnes of sulphur dioxide in a year. These emissions are highest during start-up and shut-down which occur at anchorage.

1.9 Sulphur dioxide when combined with moisture in the air forms sulphuric acid and precipitates as acid rain or fog which is known to have severe effects on stone buildings, rocks and rock art. The effects have been recognised in Australia, with the New South Wales Government introducing a legislative requirement for cruise ships to use low sulphur content fuel (or an approved means of achieving the required emissions reduction) within the boundaries of Sydney Harbour. This echoes the requirements for vessels operating in Emissions Control Areas declared under Annex VI to IMO MARPOL 73/78 Convention (Prevention of Air Pollution from Ships).

1.10 The Greens are of the view that given the known impact of sulphur dioxide on rock art, and the high volume of traffic at the Dampier Port, the rock art of the Burrup Peninsula should be afforded similar protections.

Recommendation 4

1.11 Australian Greens Senators recommend that the Western Australian Government implement measures to ensure that ships entering and leaving the Port of Dampier use low sulphur content fuel or an approved means of achieving required emissions reductions. The maximum sulphur content of fuel utilised by ships entering and leaving the port should be 0.10 per cent, as required for Emissions Control Areas declared under Annex VI to IMO MARPOL 73/78 Convention.

Existing industry and the need for baseline measurements

1.12 Evidence provided to the committee highlighted that concerns about the impact of emissions from industrial activity on the Burrup Peninsula are not new. Various researchers have identified that industry has discharged significant amounts of acid-forming pollutants into the Burrup Peninsula environment. Pollutants, including sulphur dioxide, have a deleterious effect on desert patina, and rock art.

1.13 The work of Robert G. Bednarik, who has conducted decades of study on the rock art of the Burrup Peninsula, was highlighted. In 2002, he predicted that the current rate of emissions from existing industry on the Burrup Peninsula will lead to the destruction of the petroglyphs by the second half of the 21st century.

1.14 The Australian Heritage Council which commented on the expansion of existing industry, new industrial development and associated infrastructure. It stated that it had the potential to directly impact on large areas of the Dampier Archipelago site and concluded that, given the scale of impact that continued industrial development may have, the impact rating was 'Critical'.

1.15 It is apparent that there has been evidence of damage to the Burrup Peninsula rock art for many years. This evidence has been ignored and industrial development has continued to be approved.

1.16 Further, evidence suggested that the total emission load for existing industries has not been adequately quantified and measured to determine environmental and public health impacts of current emissions.

1.17 The Greens considers this an oversight by both the Western Australian Government, and the Commonwealth Government.

Recommendation 5

1.18 Australian Greens Senators recommend that the Commonwealth Government, in conjunction with the Western Australian Government, establish measurements of existing emissions as a matter of priority.

1.19 Australian Greens Senators recommend that the Western Australian Government implement measures to ensure that the emission load on the Burrup Peninsula is reduced.

Projected emissions from the TANPF

1.20 Submitters expressed concern that the projected increase in emissions from the TANPF would contribute to the destruction of the rock art of the Burrup Peninsula within a relatively short period of time. It was argued that the expected acid load into the atmosphere from the TANPF would be at the highest category of the international scale for environments susceptible to acids.

1.21 Rock patina, or desert varnish is particularly susceptible to damage from an increase in the presence of acids in the environment which dissolve manganese and iron compounds. As desert varnish is destroyed it becomes lighter in colour, and engraved surfaces are particularly vulnerable to such damage as the desert varnish is thinner than on the non-engraved rock surface.

1.22 In addition, the TANPF is expected to emit 2.52 tonnes per year of ammonium nitrate particles which are known to stimulate the growth of plants and other organisms through the provision of nitrogen. These plants and organisms include lichen, bacteria, fungi and adventitious bacteria which grow on the surfaces of rocks. Such plants and organisms produce organic acids which increase the acidity of rock surfaces and will lead to damage to the petroglyphs. Further, the hyphae of growing fungi penetrate the soft weathering rind below the desert varnish layer and break away the edges of petroglyph engravings.

1.23 Increased nitrogen in the environment from existing industry has already led to an increase in algal growth in the region's waterways, and future emissions are also likely to lead to an increase in vegetation which would make the area more susceptible to fires from lightning strikes.

1.24 Permitting any further environmental changes as a result of emissions from the TANPF is unacceptable. The rock art, and the surrounding environment should be protected from uncontrolled vegetation growth and any increase in the acidity of the environment.

1.25 Airborne ammonium nitrate particles at PM₁₀ size or smaller are also known to have detrimental effects on the health of those who live, visit and work in the area. Submitters argued that Yara Pilbara's proposed PM₁₀ outputs exceed limits which are known to be toxic to humans. Further, the TANPF is expected to emit 41 tonnes per year of carbon monoxide and that this too poses a risk to human health, and the wellbeing of other living organisms in the area.

1.26 Yara Pilbara responded to such concerns by noting that its emissions modelling was assessed by the Western Australian Department of Environmental Regulation during the TAN Plant Works Approval application, and its PM₁₀ emissions were determined to be insignificant. Further, its carbon monoxide emissions were assessed twice by the Western Australian Department of Environmental Regulation and the Environmental Protection Authority Western Australia. It was found that the worst-case predicted ground level carbon monoxide concentrations from the operation of the TANPF were less than 0.2 per cent of the National Environmental Protection Measure and Impact Statement for Ambient Air Quality.

1.27 Professor Black recently provided the committee with a qualitative opinion on the potential human health risks associated with emissions from Yara Pilbara, which was undertaken by Adelaide University in February 2018. The opinion noted the photographic evidence of a nitrogen dioxide cloud emanating from the nitric acid plant and stated that for NO₂ to be visible, concentrations would be at least four-times

the recommended health standards. The opinion also noted records from the plant which show that the emission rates of NO₂ associated with a visible cloud were exceeded 76 times, and were frequently for more than 15 minutes.

1.28 Professor John Black and Dr Ilona Box reviewed this opinion and concluded that 'the emissions have produced gas concentrations in the vicinity of the road to Hearson's Cove up to 23 times higher than stated in the Australian health standard guidelines'.

1.29 The Greens acknowledge that relevant state authorities have assessed the TANPF emissions. However, we consider that it is not a question of whether the TANPF meets current emissions standards but whether those standards are adequate to ensure the protection of one of the most significant collections of rock art in the world, which are also central to the law and traditions of the local Indigenous people. The Greens does not consider that this is the case.

1.30 The Greens believe that urgent action should be taken to eliminate ammonium nitrate emissions. We considers that the most effective way of achieving this outcome is for the Commonwealth to vary the conditions of approval to impose a zero emissions requirement.

Recommendation 6

1.31 Australian Greens Senators recommend that given the significant impact of ammonium nitrate and other acidic emissions on both the environment and human health, the Australian Government vary the conditions of approval of the Yara Pilbara TANPF to impose a zero acidic emissions requirement.

1.32 Australian Greens Senators recommend that the Western Australian Government require all other industry and shipping on the Burrup Peninsula to comply with zero acidic emissions standards within one year.

Appropriateness of location

1.33 Successive Western Australian governments have pursued a long-term vision of transforming the Burrup Peninsula into the largest industrial precinct in the southern hemisphere, attracting foreign investment and royalties. As such, The Burrup Strategic Industrial Area (Burrup SIA) was developed to provide an area for industry in close proximity to gas, port and other key infrastructure.

1.34 However, submitters argued that an expansion of industry in the area to include the TANPF will contribute to the destruction of cultural heritage, and will contribute visual, audio and atmospheric pollution to what is an extremely sensitive environment. The Greens notes that Yara Pilbara is also exploring a number of other projects for the area such as a large scale renewable ammonia/hydrogen project and a pilot project for the production of hydrogen utilising the electrolysis of seawater and solar electricity.

1.35 The Maitland Strategic Industrial Area (Maitland SIA) located south of Karratha has also been identified as a long-term strategic industrial development capable of accommodating industries such as gas or petroleum processing, power production and other downstream process such as urea, ammonia and ammonium nitrate production.

1.36 The Greens are of the view that the TANPF would have been more appropriately located on the Maitland SIA rather than the Burrup SIA. The Greens acknowledge that there would be costs associated with relocating the TANPF to the Maitland SIA, however it is of the view that such an option should be explored given the critical importance of the protection of Aboriginal rock art from damage caused by emissions from the TANPF.

1.37 The Greens are also of the view that the expansion and development of the Burrup SIA should no longer be pursued by the Western Australian Government given the potential for significant damage to the rock art. Instead, any future industrial development should occur on the Maitland SIA.

1.38 In addition, the Western Australian Government should pursue the development and promotion of a tourism industry that would provide important long-term employment and economic activity whilst also acknowledging the natural, cultural and heritage values of the area.

Recommendation 7

1.39 Australian Greens Senators recommend that the TANPF be relocated to the Maitland SIA.

Recommendation 8

1.40 Australian Greens Senators recommend that no further industrial development be approved for the Burrup Peninsula.

Recommendation 9

1.41 Australian Greens Senators recommend that the Western Australian Government promote tourism to the Burrup Peninsula as a long-term employment and economic opportunity.

Monitoring programs

1.42 Industry on the Burrup Peninsula is subject to regulation by both state and Commonwealth legislative frameworks. As such, the TANPF was approved with a number of conditions under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). These conditions include the requirement for an air monitoring program, and a spectral mineralogy program to be implemented.

1.43 The committee received evidence which indicated major flaws in the work undertaken by CSIRO on behalf of the Western Australian Government. This work has been used to establish approval conditions for the TANPF, and by proponents who

argue that industry on the Burrup Peninsula has not resulted in damage to the rock art collections.

1.44 This evidence included that:

- the 2007 fumigation studies conducted by CSIRO suffered poor experiment design through an inadequate selection of rock samples, and inadequate replication;
- the 2008 air pollution study incorrectly used a study by Cinderby et al to conclude that the critical load for the Burrup rocks would be 200 meq/m²/year;
- the analysis of rock art monitoring conducted between 2004–2014 did not include adequate statistical analysis, and further the measurements taken were unreliable due to the equipment used.

1.45 Professor John Black raised these concerns with both CSIRO and the Western Australian Government and proposed improvements which could be made to the work of CSIRO. As a result, in 2016 the Western Australian government engaged an independent reviewer, Data Analysis Australia (DAA), to review the CSIRO monitoring reports and the work of Professor Black. DAA found that:

- the statistical methods proposed by Professor Black represented a substantial improvement in the effective monitoring of the rock art sites, and the CSIRO reports demonstrated a number of inadequacies such as a lack of statistical analysis; and
- there were significant problems with cross-calibration between measuring instruments, inconsistent error-prone data management, and clear errors in the CSIRO data. As such, the CSIRO data collected should be archived and DAA concluded that it is not appropriate for regulators to make any decisions based on that data.¹

1.46 In 2017, DAA was again engaged to review the draft *Burrup Peninsula Aboriginal Petroglyphs: Colour Change & Spectral Mineralogy 2004–2016* CSIRO monitoring report. It found that four of its 2016 recommendations to improve the monitoring program had not been implemented, one recommendation had been partially implemented and one recommendation had been largely implemented. DAA acknowledged that while the 2017 report demonstrated substantial efforts on the part of CSIRO to improve the reporting of data collection and to present better analysis, more needed to be done. It concluded that the CSIRO report was unable to dispel reasonable concerns about the impact of industry on the rock art.

1.47 As a result of the 2017 DAA review, CSIRO made a number of changes to the *Burrup Peninsula Aboriginal Petroglyphs: Colour Change & Spectral Mineralogy*

1 Data Analysis Australia, *Review of Statistical Aspects of Burrup Peninsula Rock Art Monitoring*, November 2016, Executive Summary.

2004-2016 report. CSIRO noted that this final report supersedes all previous results published by CSIRO for the monitoring program and that it implemented all the recommendations of the 2016 and 2017 DAA reviews.

1.48 The *Burrup Peninsula Aboriginal Petroglyphs: Colour Change & Spectral Mineralogy 2004–2016* concluded that there has been a small but statistically significant change to the rocks in some dimensions of colour. However, the committee received evidence that this conclusion seeks to diminish the value of these colour changes. It was argued that a colour change of approximately 13 per cent over 13 years is a major change which should be of concern in the preservation of rock art.

1.49 The Greens would particularly like to take the opportunity to thank Professor John Black and his colleagues for undertaking such comprehensive reviews of the CSIRO reports, and for continuing to raise their concerns with both CSIRO and the Western Australian Government. It appears that without the work of Professor Black, a number of issues would not have been identified.

1.50 Such work should not have to be undertaken by private citizens. There should be a legislatively required monitoring program that is fit for purpose. Professor Black's concerns should have been addressed by CSIRO when he first raised them.

1.51 The Greens note that in September 2017, the Western Australian Government released the Draft Burrup Rock Art Strategy which proposes to develop a revised method for the collection and analysis of data that incorporates the recommendations of the DAA review.

1.52 The Greens are of the view that the development and implementation of a new monitoring program should be a priority for the Western Australian Government.

1.53 The Greens also note that the Draft Strategy includes recommendations for improvements to air quality monitoring, the development of microbiology studies and pH monitoring, and new monitoring of other sources of pollutants.

Recommendation 10

1.54 Australian Greens Senators recommend that the incorrect use of the Cinderby et al report in the Gillett 2008 air pollution study, and the impact that this flawed report has had on the establishment of approval conditions be noted; and recommend that CSIRO acknowledge that it has produced fundamentally flawed assessments.

Recommendation 11

1.55 Australian Greens Senators recommend that the Western Australian Government prioritise the development and implementation of a new, fully funded independent monitoring program that meets all of the recommendations of the Data Analysis Australia reviews.

Recommendation 12

1.56 Australian Greens Senators recommend that the proposals for further monitoring included in the Draft Burrup Rock Art Strategy be implemented as soon as possible.

Compliance with approval conditions

1.57 The committee received evidence that Yara Pilbara has had a number of incidents of non-compliance with EPBC Act approval conditions. First, it failed to self-refer the TANPF proposal for assessment under the EPBC Act, and it has subsequently failed to comply with a number of its approval conditions.

1.58 The incidents of non-compliance with approval conditions include late production of annual compliance reports and rock art monitoring reports. The Department of the Environment and Energy (the department) told the committee that it is working with Yara Pilbara to improve the capacity of Yara Pilbara to comply with its approval conditions.

1.59 In September 2017, the department also issued a directed variation to the approval for the TANPF in response to non-compliance. This variation imposed new reporting requirements, new air quality monitoring and reporting requirements, and established a requirement that the approval holder must ensure that no measurable impacts from air pollution must occur within two kilometres of the site, for the life of the approval.

1.60 It is clear that there have been incidents of non-compliance and the Greens are of the view that such behaviour is unacceptable, particularly in an environment where the consequences may be catastrophic to the irreplaceable rock art collection. The Department of the Environment and Energy must ensure that Yara Pilbara's compliance is improved.

Survey

1.61 Submitters also raised concern that under its approval conditions Yara Pilbara should have engaged a heritage monitor to conduct a comprehensive survey of all rock art sites in a two kilometre radius. However, Yara Pilbara only monitors six petroglyph sites in its two kilometre radius and has not conducted a survey to identify all the sites that exist in this area. Submitters argued that this sample of sites is inadequate.

1.62 However, both Yara Pilbara and the Department of the Environment and Energy asserted that the approval conditions only required the monitoring of six sites and that there had been no instance of non-compliance in this regard.

1.63 The Greens accept the evidence that such a small sample is inadequate and contends that Yara Pilbara should be required to engage a Heritage Monitor to conduct a comprehensive survey to identify all rock art sites in the two kilometre radius which may be affected by emissions.

Recommendation 13

1.64 Australian Greens Senators recommend that the Australian Government vary the approval conditions for the TANPF to require Yara Pilbara to engage a Heritage Monitor to conduct a comprehensive survey to identify all rock art sites in a two kilometre radius from the site.

Air quality monitoring

1.65 The committee also received evidence that Yara Pilbara has failed to comply with air quality monitoring requirements as established by approval conditions granted by the Western Australian Government.

1.66 In particular, submitters argued that Yara Pilbara compliance reports demonstrate non-compliance with the requirement to measure PM₁₀ particles, NH₃, NO_x, and SO_x at five sites, including three rock art sites. There are instances in the report where 'No Data' is recorded, and measurements of negative amounts of PM₁₀ particles which are arguably impossible.

1.67 Yara Pilbara acknowledged that there have been periods of time where its air quality monitoring equipment has been unavailable due to breaking down or maintenance work. Yara Pilbara also acknowledged that it has engaged an air quality monitoring consultant to conduct a review of all its air quality monitoring data and baseline data sets.

1.68 The Greens are concerned that Yara Pilbara has failed to comply with its approval conditions to conduct adequate air quality monitoring and is especially concerned that the Western Australian Government does not appear to have taken any enforcement action to ensure such compliance.

Recommendation 14

1.69 Australian Greens Senators recommend that the Western Australian Government promptly review and assess Yara Pilbara's compliance with its approval conditions, and take any necessary enforcement action.

Cumulative effects

1.70 The committee received evidence that under the EPBC Act, the ability for the Minister or their delegate to consider cumulative effects when undertaking an approval assessment is limited.

1.71 Submitters expressed concern that the cumulative effects of existing industry on the Burrup Peninsula may not have been considered during the EPBC approval process. Further, submitters argued that without the release of the Minister's statement of reasons, it is unclear whether or to what extent the cumulative effects are considered.

1.72 The Greens notes that the Department of the Environment and Energy and Yara Pilbara provided evidence that the cumulative effects of existing industry on the Burrup Peninsula were considered during the approval process for the TANPF. The Department of the Environment and Energy also provided evidence that any future approvals for development on the Burrup would also include a consideration of the cumulative effects on matters of national significance.

1.73 Nevertheless the Greens are of the view that legislative certainty is required and that the EPBC Act should explicitly require the Minister or their delegate to consider cumulative effects when approving actions.

Recommendation 15

1.74 Australian Greens Senators recommend that the *Environment Protection and Biodiversity Conservation Act 1999* be amended to require the Minister or their delegate to consider the cumulative effects when approving decisions.

Senator Peter Whish-Wilson
Chair
Senator for Tasmania

Senator Rachel Siewert
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