

Environment and Communications References Committee

ANSWERS TO QUESTIONS ON NOTICE

CSIRO

Protection of Aboriginal rock art of the Burrup Peninsula

17 February 2017

QUESTION: Hansard page 28 – Senator Smith

[Senator SMITH:](#) In the opening statement—about half way down the document—you talked about project reports having been reviewed by a panel of international experts. That is a project report specific to this issue?

Dr Cleugh : Yes.

[Senator SMITH:](#) Who are those international experts?

Dr Cleugh : I will actually ask the project leaders, because they would have been involved in the peer-review process.

Ms Lau : The panel of international experts was appointed by the Burrup Rock Art Technical Working Group. We can provide those names if needed.

[Senator SIEWERT:](#) Can we ask that you supply those names?

CHAIR: Could you provide those names?

Ms Lau : Yes, we can.

ANSWER

Consistent with an independent peer review process, CSIRO does not have the names of the reviewers of the CSIRO report. CSIRO provided its report to the Burrup Rock Art Technical Working Group who then managed the peer review process with the panel of international experts.

The Burrup Rock Art Technical Working Group no longer exists. If the committee wishes to obtain the names of the reviewers, the Western Australian Government, who formed the working group, would be best placed to answer this query.

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QUESTION: Hansard page 23 – Senator Whish-Wilson

CHAIR: Thank you. You have obviously been doing work for the Western Australian government. Does CSIRO have any other contractual arrangements with companies in the Burrup Peninsula?

ANSWER

CSIRO conducted a Nitrogen Deposition Study for Woodside Petroleum Limited from December 2011 to September 2014.

CSIRO also conducted two projects for Yara Pilbara Nitrates Pty Ltd:

- Nitrogen deposition fluxes from September 2013 to March 2016
- Heritage monitoring of six sites from December 2013 to April 2014.

QUESTION: Hansard page 31 – Senator Whish-Wilson

CHAIR: I asked a little bit earlier about any other contracts you may have with companies on the peninsula. I would also be interested in whether you could disclose—or take on notice—the amount of money or appropriations you get from the federal government to do your work, if that is possible.

Dr Cleugh: To do the work in the Burrup Peninsula, just to be clear?

CHAIR: That is correct; just in relation to the Burrup. Thank you. Thank you for giving your evidence today; it is much appreciated.

ANSWER

CSIRO does not receive any money or appropriations from the Federal Government to conduct this work. All of the work CSIRO has conducted in the Burrup Peninsula has been funded by the Western Australian Government, except for three industry funded projects.

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QUESTION: Hansard page 30 – Senator Smith

QUESTION:

Senator Smith: Very, very simply: you heard Professor Black's evidence in regard to why he thought the CSIRO reports were not scientifically credible. On notice, could you just provide your response to those three or four points that he identified.

Dr Cleugh : Yes, just so long as we can have clarity on those three to four points; I wrote them down, but—

CHAIR: We will get you a *Hansard* transcript.

(transcript of Senator Smith's questions to Professor Black pg 18)

Senator SMITH: What are the key features that would make something scientifically credible that are absent?

Prof. Black : The most important one is the design of the experiment that was particularly used by the department and industry, which was the 2007 fumigation experiment, where they used emissions that they suspected would be 10 times what industry—the level of emissions is below what the companies are saying that it will be, so even the concentrations were not at a high enough level. But what was particularly non-scientific about it is that they did one set of experiments with dust and another experiment without dust, and they measured before and after these 30 days of going through cycles of temperature and humidity. But, because there was no replication for the dust and there was only one replication, and the values were quite different for the two replicates, you cannot analyse it statistically, so there could be no statistical analysis of it. My big criticism was that all of the claims were made without any statistical analysis.

Senator SMITH: So it is theoretical, not based on evidence?

Prof. Black : Yes. To a scientist, the only way you can say something is different is if you can prove statistically that it is different from what it was before.

Senator SMITH: That is one feature. Is there another feature that does not make the CSIRO reports scientifically credible—or is that the feature?

Prof. Black : No. They did experiments where they looked at acid, which was concentrated acid, and other organic compounds, concentrated or in a dilute sense, and they tested those on iron ore. It is completely irrelevant to what we are talking about, which is a test on the surface, the patina, of the rock art. It is completely useless for understanding anything

about the impact on rock art because it was done on iron ore.

[Senator SMITH](#): And another feature?

Prof. Black : The other one is the one that you spoke about earlier to Johan Kuylenstierna—

[Senator SMITH](#): I am sorry.

Prof. Black : and that is that at the end of his paper, which was a good paper and scientifically well done, he misinterpreted by saying that he believed that the Burrup rock would withstand 200 milliequivalents of the highest acid load, but he had no justification for that because of the things we have talked about—because he did not measure buffering capacity.

ANSWER

In response to the comments made by Professor Black, CSIRO has the following responses:

2007 Fumigation experiment

The experiment that Professor Black is referring to as the 2007 fumigation experiment began in 2004. CSIRO designed this fumigation experiment based on the TAPM and CALPUFF dispersion models provided by the Western Australian Government in the experiment tender document 2003.

As stated in the tender document, the CALPUFF models are likely to be under-estimates and TAPM models are likely to over predict. Using this information, CSIRO tested the concentrations of the fumigant gases at 10 times the peak emission levels generated by the TAPM dispersion models.

CSIRO is unaware of any information from industry that supports Professor Black's statement '... the level of emissions are below what the companies are saying that it will be'.

Dust:

The dust experiments were performed using the accepted scientific approach of observing spectral change by difference and were designed with sufficient statistical power for the required analysis. Specifically, CSIRO's fumigation experiments included one case of dust exposure on two types of rock surfaces. On each of the eighteen samples of rock, replicate measurements were made at three different points, each separate point approximately 2mm in diameter.

In regards to Professor Black's comments on statistical analysis:

- CSIRO performed a spectral comparison on the samples. This method is in accordance with standard scientific procedures.
- The spectral comparison involved:
 - o Looking at the numerical differences between individual peaks that are normalised. (The spectra is normalised to ensure the differences measured are due differences in the sample rather than variable factors such as moisture)

- An overall spectral comparison to identify differences in peaks.

A statistical analysis of these kind of results is not a necessary approach and spectral comparison is a widely accepted methodology.

Use of iron ore:

CSIRO needed to use suitable technologies that are non-invasive or damaging to the rock art, and the projects were done with approval from the traditional owners of the land, respecting any restrictions regarding the sites or the rock art.

As we were unable to directly test the rocks in the protected area, iron ore was used as a suitable proxy to investigate discolouration as it also contains a similar mineralogical profile to the rock patina (major composition is hematite with minor goethite, quartz and kaolinite).

Acidic load:

We did not measure the acid load of the rock since this was not in the scope of work we were contracted to carry out.

As part of our contracted air monitoring work we determined the total deposition of sulfur and nitrogen from the atmosphere by measuring sulfur and nitrogen compounds in samples of gases, particles and rainwater at several locations.

As with any scientific study, when information is produced it is important that the data and the use of that data be put into a context the end user can understand.

We did this in two ways.

1. We compared the data we measured in the Burrup to other locations with similar measurements including sites in Malaysia and the Northern Territory.
2. We used the critical load framework and the level of 200 milliequivalents (as defined by Johan Kuylenstierna) and used by Gillet (2008) to provide context for our air monitoring data. The critical load framework of 200 milliequivalents cannot be used as impact assessment criteria, and this was never the intention of the comparison. The Gillet report was peer reviewed by an independent international reviewer and was the best comparison to use at the time.

Buffering capacity

CSIRO did not conduct studies on buffering capacity as it was outside the contracted scope of work.