

ARRTC 18 Meeting 17–18 October 2006

Members

Mr Ray Evans – Independent Scientific Member
Dr Peter Johnston – Independent Scientific Member
Dr Jenny Stauber – Independent Scientific Member
Dr Carl Grant – Independent Scientific Member
Dr Keith Hayes – Independent Scientific Member
Dr Terry Hillman – Independent Scientific Member
Mr Mark Foy – Northern Land Council
Dr Tony Milnes – EWL Sciences
Mr Shane Maraldo – Hanson
Mr Alan Hughes – Supervising Scientist

Apologies

Prof Jon Nott – Independent Scientific Member
Mr Keith Tayler – Department of Primary Industry, Fisheries and Mines

Advisers and observer (present for all or part of the meeting)

Dr David Jones – Environmental Research Institute of the Supervising Scientist
Dr Peter Bayliss – Environmental Research Institute of the Supervising Scientist
Dr Andreas Bollhöfer – Environmental Research Institute of the Supervising Scientist
Dr Ken Evans – Environmental Research Institute of the Supervising Scientist
Dr Chris Humphrey – Environmental Research Institute of the Supervising Scientist
Dr Rick van Dam - Environmental Research Institute of the Supervising Scientist
Dr Greg Calvert – Environmental Research Institute of the Supervising Scientist
Mr Marcus Sandford – Parks Australia North
Mr Steve Winderlich – Parks Australia North
Mr Mike Fawcett – Fawcett Mine Rehabilitation Services Pty Ltd
Ms Suzanne Davis-Hall – Office of the Supervising Scientist
Ms Michelle Iles – Office of the Supervising Scientist
Dr David Klessa – EWL Sciences Pty Ltd
Richard Mercer – EWL Sciences Pty Ltd
Jane Addison – EWL Sciences Pty Ltd
Mr Dayle Kenny – ERA
Dr Louise Frick – EWL Sciences
Mr Geoff Kyle – Gundjeihmi Aboriginal Corporation
Ms Ann Webb – Office of the Supervising Scientist
Mr Howard Smith – Northern Land Council (until 11:30 day 2)
Ms Gabrielle Willhelm – Northern Land Council
Ms Eileen McGovern – Department of Primary Industry, Fisheries and Mines
Ms Christine Fawcett – Department of Primary Industry, Fisheries and Mines
Other *eriss* staff

1 Introduction

1.1 Welcome and overview

1.1.1 Alan Hughes outlined fire safety information for & amenities of the DEH building and discussed options for dinner Tuesday evening.

1.1.2 The chair, Ray Evans, noted changes to the committee since last meeting and asked everyone to introduce themselves.

ACTION/OUTCOME 1A

Record appreciation of Jill Fitch's role on the committee since its new formation.

1.1.3 Jill has been replaced by Dr Peter Johnston.

ACTION/OUTCOME 1B

Record thanks to Ian Loftus for his contribution and role on ARRTC for last 4 years.

1.1.4 Minutes are to be more concise. Chair will summarise at end of each item and clarify the action item.

1.1.5 Ray Evans noted the minutes of previous meetings are posted to publicly available part of ARRTC web site.

1.1.6 Committee introduced themselves.

1.1.7 New members: Dr Peter Johnston is head of physics at RMIT, worked in Australian Radiation Lab in 1980s, worked on Maralinga project & consultant to Maralinga Aboriginal community, member of Radiation Health and Safety Advisory Committee, and Nuclear Safety Comm, member of current government Uranium (UMPNER) taskforce.

1.2 Apologies

1.2.1 From Keith Tayler (DPIFM) and Jon Nott (independent member).

1.3 Conflicts of interest

1.3.1 None

2 Minutes of the previous (17th) meeting

2.1 Discussion

2.1.1 Minutes of the 17th meeting were confirmed as a true record and were approved for posting on web site. (Jenny Stauber asked if typos could be given to Secretariat.)

ACTION/OUTCOME 2A

Draft summary record of the 17th meeting approved for posting on web site subject to any typos identified by committee.

2.1.2 The Actions/Outcomes table was confirmed as acceptable in format to the committee.

2.1.3 The agenda is flexible and will be adapted on an as needs basis as meeting progresses.

2.1.4 Item 3A: Water treatment data gets circulated to MTC with weekly monitoring reports. Andrew Speechly (from ERA) gave a presentation during the previous day's Ranger visit on results of pondwater treatment. Data could be compiled into the ARRTC documentation but it was agreed that raw data is more than needed for the committee and control charts were preferred. Agreed that this action item has been dealt with. Jenny Stauber noted the water treatment plant not operating consistently, but is OK when it works. David Jones said plant operates under conditions to be met downstream in the wetland filter system, the only parameters continuously measured at the plant are EC and pH. MTC stakeholders wished to review the first year of operations data before considering movement of the compliance point to the plant output. Control charts for key analytes in the process water were provided by ERA/EWLS for discussion purposes.

2.1.5 Item 3B: Peter Johnston requested a copy of ERA's radiation management system and will talk to Andreas Bollhöfer (*eriss*) and get more background while in Darwin.

2.1.6 Alan Hughes explained situation at the mine re radiation management on site. A subset of MTC looked at proposed changes to the radiation management plan eg way of reporting, comment back to ERA, ERA may choose to change/adapt. ERA is considering some changes suggested by SSD (Andreas Bollhöfer) and from NTG (Russell Robinson from Health and Community Services).

ACTION/OUTCOME 2B

Peter Johnston will familiarise himself with the Ranger radiation management system in his role on ARRTC.

2.1.7 Noted the gap analysis will be discussed on Wednesday am.

2.1.8 Traditional environment knowledge: Started by Elaine Glen (NLC) and being further developed by Howard Smith – Northern Land Council. No new information. Howard Smith wants to see where closure of Nabarlek is heading. Some more work on cultural management is going to be done by ERA and GAC. Howard Smith will be reviewing other activities that are taking place over next few months.

ACTION/OUTCOME 2C

Ray Evans noted opportunity for NLC to present information on this at a future meeting.

2.1.9 Item 4G: Tony Milnes closure modelling – briefing will be presented at this meeting.

2.1.10 Ranger site visit successful. Thanks recorded to organisers of visit.

2.1.11 NGO paper (Item 5A):

- A background paper for Item 5A was provided on ARRTC web site
- It was noted that the organisation (NECF) that wanted to nominate the NGO rep no longer exists. Geoff Kyle advised that he believed that Green Groups would like a NGO rep on the committee and asked that members did not consider GAC to be the NGO rep.
- The committee was advised that there is no legislative requirement to have a NGO rep.
- Terry Hillman suggested that the Parliamentary Secretary be advised of the situation and that the view of the committee is that the status quo is OK.

- Members reiterated their preference for maintaining the 7/6 balance of independent scientific and stakeholder members and believed that environmental science expertise is well covered by current independent science members. There was general agreement that ARRAC may be a more appropriate forum for a NGO member (and there already is such representation) but there would be no objection to a NGO representative attending ARRTC as an observer. If there was to be an expansion of the committee there may be a need for a core skill set of social/cultural expertise. This could be revisited as part of the KKN gap analysis.
- Noted that ARRTC has always replaced vacating independent science members with a scientist from a similar discipline and that the committee's role is, by definition, technical.
- There are financial implications for adding another independent member

ACTION/OUTCOME 2D

Chair to develop words out of session for inclusion in a letter to the Parliamentary Secretary on this issue & bring to meeting for approval

2.1.12 The resulting agreed words regarding the representation by a NGO were:

It was noted that the issue has been previously considered by ARRTC and its advice was conveyed to the then Minister by the chair of ARRTC in the meeting highlights correspondence for ARRTC 10 (February, 2002).

ARRTC has again considered the issue of a conservation NGO representative on ARRTC and sees no particular reason to change our advice. Reiterating that advice, we have no objection to a conservation NGO representative attending ARRTC meetings as an observer, and note that this process appears to be working effectively with an observer on behalf of GAC attending on a permanent observer basis. This process has afforded GAC the opportunity to be intimately involved in ARRTC meetings.

2.1.13 Noted that approved version of minutes of previous meetings are on publicly available part of web site. Chair asked committee if comfortable with this. Committee said yes.

2.1.14 Concern about availability of password for members only part of web site.

ACTION/OUTCOME 2 E

Review security procedures for members web site.

2.1.15 Committee and certain observers expressed appreciation for papers posted on ARRTC web site but noted some papers could have been posted earlier.

2.2 Business arising

2.2.1 General discussion amongst members with respect to availability of meeting minutes on the website – general agreement that complete minutes are published on web rather than an 'edited' version.

2.2.2 GAC Submission on Ranger Closure Model.

- Geoff Kyle briefly summarised the document, stating that it sets out the expectation of the Traditional Owners and will be progressed after the next consultation – Mula II on 15 November 2006.

General discussion on GAC submission followed – topics included:

- Date of 09/01/2026 in report – is the end of the lease for the Ranger Project Area (RPA), GAC has suggested 25 years of monitoring following this date, 5 years not considered long enough.
- Ray Evans – ARRTC should consider what is appropriate length of time for monitoring to continue after closure on a scientific basis.
- Incorporation of RPA into KNP – ideal outcome.
- Change vs impact

General comment from several members that the GAC submission was very valuable and informative and particularly useful for opening discussion with respect to TO expectations. Recognised that more discussion is required on what's possible and what's wanted for the closure of Ranger.

The committee chair thanked Geoff Kyle for providing the document and that the issues raised should be considered again at future meetings.

Carl Grant raised 3 points from the GAC document:

1. The document mentions a single raised area over the pits and comments on relief, this is different from the current model proposed.

Geoff Kyle's response – it is not yet known definitively what the relief will be.

2. Laterite capping – how laterite might be mixed with waste rock in the onsite rehabilitation trials.
3. Were the radiological queries by GAC responded to by SSD.

Alan Hughes advised that they were.

General discussion on the recognition of change vs impact. GAC document highlights that TOs want the groundwater to be returned to pre-mining beneficial uses – this has implications for closure criteria.

ACTION/OUTCOME 2F
All stakeholder comments on Ranger Closure Model to be made available to ARRTC

General agreement that ARRTC's role in development of closure criteria is that of examining the science behind the criteria developed – no role in closure planning.

3 Current operations

3.1 Contextual statements by stakeholders

Energy Resources of Australia (Ranger and Jabiluka)

3.1.1 (Wednesday) Tony Milnes advised the committee about ERA announcement to ASX and media release, 'Review of 3rd quarter operations'.

3.1.2 Tony Milnes informed the meeting that the updates for Ranger and Jabiluka were presented on site the previous day.

3.1.3 General discussion on the operational aspects of water management and how useful predictive modelling is in this case. Comments were made that Ranger should be able to predict more accurately how to manage water and develop more scenarios rather than be reactive as seems to be in the past.

3.1.4 Alan Hughes made the comment that the Water Treatment Plant and the Tailings Dam lift are proactive rather than reactive.

3.1.5 Ray Evans stated that decisions seem to be made on the fly (particularly wrt the LAAs) and could there have been a better way.

3.1.6 Tony Milnes advised that a new water balance model for the site sees an increased capacity for risk prediction and allows for a greater level of proactivity.

3.1.7 General discussion on irrigation and water management in general.

3.1.8 General discussion on the Jabiru East Land Application Area (JELAA) – extent of footprint, impact on billabong of irrigation at JELAA.

3.1.9 David Jones – are 2 bores in the JELAA sufficient due to the fact that the area was once a township and preferential pathways no doubt exist.

3.1.10 General discussion on the most beneficial number of bores in area – how many is enough?

3.1.11 Carl Grant – BPT has inherent risk assessment – every application has different numbers in BPT analysis – so how robust is this technique. Doesn't provide comfort to stakeholders.

3.1.12 General discussion on the use of BPT assessments. It was noted that ERs compel ERA to use BPTs.

3.1.13 Keith Hayes – BPT assessments are not risk assessments. General agreement on this point by ARRTC members.

ACTION/OUTCOME 3A

What risk assessment techniques could be useful in a planning context. For future discussion in Gap Analysis

3.1.14 General discussion on JELAA. Whether considered as rehabilitated or not and implications for using a site that has not had a contaminated site assessment. Tony Milnes stated that previous wet season's rainfall would have mobilised pre-existing soluble contaminants in any case and irrigation in the area will not increase mobilisation of any pre-existing contaminants.

3.1.15 David Jones pointed out that untreated water is irrigated at JELAA rather than treated and speculated about whether this could be considered best practice or not.

3.1.16 Eileen McGovern – asked about the stability of the RP2 structure given the increase in MOL.

3.1.17 General discussion on the stability of the RP2 structure and whether the seepage from RP2 could jeopardise the integrity of the Pit 3 walls.

ACTION/OUTCOME 3B

ERA to provide advice on works being undertaken to ensure integrity of RP2 and Pit 3 walls.

3.1.18 Tony Milnes – Stability of Pit no.3 detailed in the report provided to ARRTC in response to question from Eileen McGovern above.

Hanson Pty Ltd (Nabarlek)

3.1.19 Shane Maraldo introduced himself and mentioned that all the relevant information is contained in the ARRAC report supplied to ARRTC members.

3.1.20 There were two significant events at Nabarlek this year – Cyclone Monica and a large fire.

3.1.21 Development of closure criteria has thus been halted and a rehabilitation plan has been prepared in consultation with the NLC and will shortly be sent to stakeholders for review.

Department of Primary Industry, Fisheries and Mines

3.1.22 Eileen McGovern introduced herself and Christine Fawcett.

3.1.23 There are changes to the compliance division of DPIFM. The management of safety will be undertaken by NT Worksafe, which will impact on the *Mining Management Act* and regulation at Ranger in the future.

Northern Land Council

3.1.24 Mark Foy – nothing to update.

Supervising Scientist (including Monitoring)

3.1.25 Michelle Iles presented a Powerpoint presentation on surface water quality monitoring at Ranger and Jabiluka.

3.1.26 Ray Evans mentioned that he thought receiving the ARRAC report was good and contained information useful to ARRTC.

Parks Australia North (South Alligator Valley)

3.1.27 Powerpoint Presentation ‘Rehabilitation of abandoned Uranium Mines in Gunlom Land Trust’ – Presentation commenced by Mike Fawcett (MF) on behalf of PAN and continued by Marcus Sanford (PAN).

3.1.28 Key achievements since June 06:

- \$7.3M over 4 years for rehabilitation
- Staff engaged
- Part A rehabilitation plans revised
- Project plan reviewed every 3 months
- Information and records management systems in place
- Stakeholder briefings underway and ongoing.

3.1.29 General questions and discussion from members on the proposed rehabilitation plan and progress. Discussion was also held on the impact of ARD from the abandoned Rock Hole Mine. David Jones – SSD has been undertaking annual sampling of the adit and creek over the past three years to further assess the situation. Data will be reviewed in 2nd half of 2007 and recommendation made for any further action..

3.1.30 Ray Evans – Thanked MF/MS for presentation and indicated PAN could continue updates to ARRTC

ACTION/OUTCOME 3C

Update by Parks Australia North on South Alligator Valley requested at next ARRTC meeting

3.2 Minesite Technical Committee (MTC) informed regulatory decisions

3.2.1 Powerpoint presentation by Richard McAllister on behalf of the MTC.

3.2.2 General discussion on quality of RP2 water and its effect on the LAAs. Tony Milnes informed the meeting that solute modelling is currently being undertaken – OPSIM.

3.2.3 Jenny Stauber – Will polished water ever be able to be irrigated to Jabiru East Land Application Area (JELAA)?

3.2.4 Tony Milnes – There is no capacity in the wetlands currently to provide polished water to the JELAA.

3.2.5 General discussion on the appropriateness of starting a project prior to approval being given, ie laying pipes to JELAA prior to approval to irrigate.

4 KKN research and activities

4.1 Supervising Scientist (2005–06 work)

Presentation summarising ERISS research on the KKNs (David Jones)

4.1.1 This presentation also included a summary of work undertaken and proposed on the impacts of Cyclone Monica.

4.1.2 Ray Evans asked whether it was possible to identify past occurrences of Category 5 cyclones from damage after seeing the damage caused by Cyclone Monica? General discussion was then held on past cyclones and extreme events. It was agreed that the identification of past events is very difficult due to the rapid “turnover” in the landscape as a result of termite activity and the frequency of fires. It was noted that CSIRO are currently undertaking a study on the frequency and duration of storm surges.

Presentation on KKN 1.2.1 and 1.2.2 (Rick Van Dam – Ecotoxicology)

4.1.3 Rick presented on the toxicity of MgSO₄ to local freshwater species.

4.1.4 General discussion on Mg in surface waters and predictive modelling.

4.1.5 Further discussion on how this information was incorporated into the decision made by MTC on extension to the LAAs.

4.1.6 Ray Evans asked whether Conceptual contaminant pathways for closure and rehabilitation was in the forthcoming eriss program. Rick agreed that this research needed doing in the future but was not yet in the program owing to higher priority work at this time.

4.1.7 General discussion on Bayesian approach and whether it is required or not.

Presentation on KKNs 1.3.1, 2.1.6, 2.2.4, 2.5.1, 4.2.1 (Andreas Bollhöfer – Environmental Radioactivity)

4.1.8 General discussion on the difference in reference sites and impacted sites and is a better reference site available. The current reference site is in a different catchment with coarser sediments than in Mudginberri billabong.

Uranium in Gulungul Catchment

4.1.9 General discussion on source of U in black soils in study area – most likely from tailings dam embankment itself as some 2's material was used in the construction of the wall.

4.1.10 Radiological characteristics of final landform at Nabarlek. Successful ARC project.

4.1.11 General discussion on mine-derived Ra and natural Ra and use of Koongarra as an analogue/pre mining baseline. Is it possible to use Koongarra for this purpose – particularly with respect to background groundwater information.

4.1.12 Geoff Kyle – U in Gulungul creek. In 2004 Peter Burgess recommended monitoring cease in v-notch weir to South of tailings dam (TD) and posed the question as to whether monitoring should continue? Tony Milnes – this v-notch has been consumed by TD lift.

4.1.13 David Klessa – 3 v-notch weirs are monitored operationally weekly during the wet season.

4.1.14 General discussion on transport mechanisms for radio and lead isotopes in Nabarlek and dating of material. The dating is not accurate – so can't tell the difference between pre-mining and post-mining erosion. More discussion on validity of data of Ra in Nabarlek groundwater from 2004 and 2005. Anomaly thought to be from irrigation however, not shown in 2005 data.

Presentation on 4 topics: landform design project; extreme events project; stream bedload characterisation of Ngarradj; fine suspended sediment and turbidity impact (Ken Evans – Hydrological & Geomorphic Processes)

4.1.15 Landform design project: Involves Siberia upgrade, assess landform proposals (with EWLS), evaluate CAESAR model in collaboration with Hull Uni (UK) staff and Greg Hancock from Newcastle Uni. Discussed running the model (Siberia) in reverse using known/stable parameter sets of landform properties. Ken reported model has been run for the mine using RUSLE and a Monte Carlo simulation for Jabiluka. Both studies published. No excessive impact was evident. Extreme events will be incorporated when the upgraded Siberia model is running so sediment budgets could be predicted. Proposed landform design parameters (erosion rate, slope, etc) provided by ERA. Not focussed on other parameters at this stage. Discussion and questions on big difference between best and worst case predictions and the model's usefulness; how to model for subsidence over time (suggestion of combining sensitivity analysis and 50 y initial time period modelling data. Noted issue of subsidence and change in shape needs to be picked up in gap analysis.; how the information from the model could be used.

4.1.16 Discussion and questions re fine suspended sediment and turbidity impact: Sediment loads in streams found to be a sensitive way to assess minor disturbances. Baseline conditions can be established for Gulungul Ck. Expect to see elevated loads during the period of construction of the final landform, and then during the period of settling in of the landform, followed by a return to normal levels. Need Post-rehabilitation monitoring technique to assess system performance. At Jabiluka, there has been a fire upstream of the downstream station and downstream of the upstream station so could see change in the results. Look at results using different parameters – vegetated, ripped, capped, fire, natural and 50 y mine site gullying and sheet flow.

Presentation on work by the Ecological Risk Assessment Program (Peter Bayliss)

4.1.17 Peter Bayliss provided updates on the following areas:

- Eco system establishment
- Vegetation analogue studies
- Seed biology research
- Constructed Wetlands

- Ranger rehabilitation
- Disturbance – Fire and weeds
- Nabarlek – Rehabilitation success
- Landscape scale analysis of impacts
- Spread of Para grass on Magela
- Decision flow chart

4.1.18 General discussion held on all topics as they were presented. Specific discussion points were raised as follows:

Disturbance – Fire

4.1.19 Ray Evans asked whether the remote sensing imagery presented enabled the determination of how the areas were burnt. Peter Bayliss indicated that the imagery only provided a guide as to when it was burnt and not how. Most burns in the park were initiated by PAN staff via chopper. There are only a small number of fires that are lit by TO's. Peter stated that Fire workshops are to be held in 2007 by PAN, and indicated that ARRTC members were welcome to attend.

Disturbance – Weeds

4.1.20 Questions were raised as to the source of data from the broader Parks area and whether or not the data could be biased by the locations of the areas in which the surveys had been conducted (ie were survey areas selected by availability of staff resources rather than by technical design). Peter Bayliss indicated that this could be the case and perhaps an audit of survey effort was required.

4.1.21 Terry Hillman asked whether the satellite-based vegetation survey technique used at Nabarlek was sufficient to undertake comprehensive weed surveys of KNP. Peter indicated that the work currently being undertaken by Kirrilly Pfitzner still required some considerable ground validation work before it could be applied successfully elsewhere. The spectral library acquisition project was specifically addressing this issue.

Nabarlek – Rehabilitation success

4.1.22 Howard Smith indicated that the current intention with the revegetation of the site is to do away with the concept of a tree-covered landscape and plant native grasses.. The idea being that if a native grass body is established across site then it should be easier to produce over storey.

4.1.23 The idea had some backing as an 'out of left field solution', but there were concerns that native grasses may exclude the growth of an over storey as well.

4.1.24 Ray Evans thanked Peter Bayliss for his presentations

4.1.25 A general discussion by members on how these projects related to the KKN. Peter Bayliss indicated that the conceptual Model was originally designed for Jabiluka and is now applied to Ranger. This is something that should have been done 20 years ago for the mine. *eriss* will now look to apply the model during rehabilitation of the Ranger site.

4.1.26 Ray Evans indicated that ARRTC still see this as key work but was concerned that at an operational level it may not be going fast enough. Peter indicated that the Rehabilitation components were on track, but the Demonstration plots were yet to be progressed.

4.1.27 Tony Milnes and Peter Bayliss provided information on the status of the scoping document for revegetation. Tony suggested that TOs were currently not satisfied with the land form at Nabarlek so this needed to be resolved prior to resolving revegetation issues and the same was likely to apply at Ranger. Alan Hughes and Howard Smith disputed this and indicated that the landform issues at Nabarlek (viz size distribution and colour of surface rock) were only at the micro level and the overall landform was acceptable.

4.1.28 Ray Evans stated that the ARRTC view is that the science is a priority and they support it and will continue to oversee.

4.1.29 David Jones indicated that there is a need for good planning and there are key milestones eg seed collection, plant nursery etc. that will require extensive lead time for a successful rehabilitation.

4.1.30 All agreed that the revegetation planning committee should be reconvened and to be lead by ERA. ARRTC preferred that the operational detail be left to ERA and that updates be given at the next meeting or ARRTC.

ACTION/OUTCOME 4A

ARRTC request operational detail for the development of vegetation demonstration plots be left up to ERA and an update given at the next ARRTC meeting.

Presentation on Ecosystem Protection Program (Chris Humphrey)

Surface water – biological and monitoring

4.1.31 Chris presented the continuous monitoring program currently being trialled by *eriss* at both 009 and MCUS. Discussions were held about the usefulness of such data and the public assurance time series data provided. Ray Evans queried how systematic analysis of such data was going to be undertaken. David Jones indicated that the project was currently at a trial stage and a review of the data at the end of the trial would also include an assessment of its usefulness and how it would be applied in both a research and regulatory context. Ray Evans commented that the data looked fantastic and provided a picture that to date has not been available but indicated that resourcing the analysis would be critical for this style of monitoring to work.

4.1.32 Geoff Kyle indicated that one of the continuous monitoring was one of the recommendations from the recent Senate enquiry. Traditional Owners see the data Sondes installed in Magela Creek as meeting this recommendation. Alan Hughes also agreed that this was a good community assurance tool.

Creekside insitu monitoring

4.1.32 A summary of the creekside in situ monitoring program involving snails was provided. Jenny Stauber asked whether the reproducibility of the tests were the same between the different feeding methods/regimes. Chris indicated that this appeared to be the case over the 4 days period of testing.

Bio accumulation in mussels and fish

4.1.33 A presentation was provided on the current status of the Bioaccumulation work at Sandy and Mudginberri Billabongs. Discussion focussed on the differences between the two billabongs and whether this impacted on the use of Sandy Billabong as a control

Fish community studies

4.1.34 The results highlighted a decline in the dissimilatory index between the Magela and Nourlangie catchments since studies commenced. A number of hypotheses, all non-mining

related, were advanced to explain this trend. Keith Hayes suggested that this area needed some thought as there could be many things influencing the decline. David Jones indicated that a recent review of the work had indicated that since the effect was non-mine related then a substantial additional investment to further investigate it was not justified. A general discussion was then held on the meteorological influences in the decline given the changes in rainfall over the past two decades.

Presentations – David Jones (Director, *eriss*)

Water Quality closure criteria for Impacted Natural Water bodies on the Ranger lease

4.1.35 David Jones provided a presentation of suggested directions for water quality closure criteria for impacted natural water bodies on the Ranger lease. Terry Hillman questioned the use of EC. David and Chris indicated that in a Ranger context EC was a surrogate for MgSO₄. Further general discussion was held on mine water impacts.

GTB wet season

4.1.36 Ray Evans commented that there is a three fold increase in EC between the wet and the dry seasons, but this is not mirrored by the value presented for provisional Mg guidelines- where the wet season value is slightly higher than the dry season one. They should be coupled if MgSO₄ is a surrogate for EC. David Jones responded that the reason for this needs to be further investigated- with one possibility being that the ionic composition of the water column changes through the dry.

4.1.37 Alan Hughes indicated that he would have a concern using Dry season values when the billabong essentially evaporates and values could potentially go higher than the guideline value in an especially dry year. Further discussion around where dry season values should apply. Are we protecting “a brown muddy puddle?” It may not be so much a question of ecosystem protection at this time but rather of providing an indicator of a groundwater plume entering the billabong – in which case it could provide an early warning of a problem with the rehabilitated landform.

4.1.38 Terry Hillman noted that biodiversity is dominated by macro invertebrates in these billabongs. Billabongs are highly heterogeneous components of the landscape and the composition of their macro-invertebrates communities may naturally differ substantially at any point in time – though over time most taxa will be represented in most billabongs in a similar ecological condition. The needs to be borne in mind when ascribing causes to observed differences in macro-invertebrate communities. The billabongs are effectively billabongs in the late dry. Jenny Stauber questioned whether *eriss* was confident that algae, lemna and duckweed were the appropriate organisms to use. Chris Humphrey indicated that work has been done on the appropriateness of these organisms. Ray Evans noted that previous work had indicated a response to EC. However, the fact that the organisms have recovered indicated a resilience. He then questioned how can you pick up a long-term influence if this occurs? David Jones indicated that this can be done by using a reference billabong and noting that if the billabong recovers on can reasonably assume there is no impact. Tony Milnes indicated that Djalkmara/Coonjimba have shown impact before. David Jones/Chris Humphrey indicated that these too have recovered.

4.1.39 Ray Evans concluded and thanked all *eriss* participants

4.2 Supervising Scientist research (other)

4.2.1 There were no reports or discussion on Supervising Scientist research (other).

4.3 ERA Research

4.3.1 David Klessa presented the wet season report for Ranger and Jabiluka. There were questions and discussion about: pH of groundwater and its influence on toxicity of water, effect of unseasonal rain in July, sulfate and magnesium discharge signatures and whether they are coming from surface or groundwater, high end of wet season manganese readings, performance of wetland filters and land application areas. (conclusions slides for Ranger and Jabiluka)

4.3.2 Dayle Kenny presented paper on long-term closure planning at Ranger including background, outline, objectives and key stages of closure process. Questions and discussion included ARRTC's role/input in this planning process and GAC's input into process.

4.3.3 Louise Frick presented paper on OPSIM. Discussion and questions on: dealing with water loss, errors in data; production of detailed water budgets; calibration and validation of model; rainfall and climate drivers; sensitivity analysis issues.

4.3.4 Ray Evans asked about progress of whole of minesite hydrogeology review. Tony indicated that this had been put on the back burner. Ray also asked there are airborne EM survey data available for use for hydro geological investigations. Tony Milnes indicated yes, and that aerial survey data could potentially be reprocessed to give information about shallower depths. Ray further added that this could be assessed in conjunction with the just completed ground EM31 survey run by ERISS to investigate groundwater in the Magela Creek alluvials.

4.3.5 JS asked about progress on uranium in water body sediments. David Klessa is writing a report on this now. Tony Milnes will find out status.

General ERA research discussion presentation was provided by Tony Milnes. Terry Hillman requested access to the reports referred to in the presentation from Tony.

ACTION/OUTCOME 4B

ERA to provide details on the 'Uranium in sediments' work for the next meeting of ARRTC

4.4 Other stakeholder research activities

4.4.1 No other stakeholder research activities were reported on.

5 Gap analysis

5.1.1 Ray Evans – Agenda has been changed. KKN gap analysis has been dropped. ERA will present additional information.

6 Next meeting

6.1.1 More time to be allocated for Supervising Scientist (4 h) and ERA (3 h) reporting. Committee agreed that next meeting be full 2 days.

ACTION/OUTCOME 6A

Next ARRTC meeting be 2 days

6.1.2 Items for inclusion on agenda and updates sought: demonstration area including a scoping doc (ERA); GAC report on 2nd rd discussions with Mirrar (note: need senior TOs to attend); gap analysis; landform modelling, especially under severe uncertainty; control site

problems and other approaches; BPT discussion; good datasets (what's been collected & how it has been analysed); sediments; using and analysing Siberia and Caesar models; traditional knowledge.

6.1.3 Explore possibility of meeting with Traditional Owners. NLC suggested small group and semi-social context rather than formal meeting. Scientific members prefer business meeting. Possibly just chair (Ray Evans) meet with small group of TOs to discuss business. Geoff Kyle to ask Graham Dewar (Manager, Gundjeihmi Aboriginal Corporation) to contact Ray Evans re meeting.

ACTION/OUTCOME 6B

ARRTC asked Geoff Kyle to ask Graham Dewar (Manager, Gundjeihmi Aboriginal Corporation) to contact Ray Evans re a business meeting with Traditional Owners.

6.1.4 Field visit discussed including a future Wet season visit to Ranger (recent previous visits have been in Dry). Steve Winderlich (PAN) invited ARRTC to attend PAN landscape symposium in Kakadu National Park on 6–7 March 2007. Date of next meeting was set to fit in with the symposium.

ACTION/OUTCOME 6C

Date of next ARRTC meeting to be 8–9 March 2007 with possible visit to symposium beforehand.

6.1.5 Next agenda: Ray Evans recommended:

- 4 hour block for *eriss*
- 3 hour block for ERA
- Looking at two day meeting for next meeting finishing at 5:00pm

6.1.6 An agenda was proposed for next meeting and that it should include the following:

- Report on *eriss* proposed program and highlights
- Similar update from ERA as to this meeting with perhaps EWLS presenters other than David Klessa contributing.
- An update on the demonstration areas was requested by Carl Grant.
- An update on Mula II from GAC

6.1.7 ARRTC to exchange emails on further discussions held out of session that should be included in the remarks as an addition.

6.1.8 Items for follow up/consideration at the next meeting:

- Land form modelling
 - Long term issues with how models are used
 - Strategic approval as to how they are used/ applied
- Modelling with severe uncertainty
 - Interim models should be considered
- Control site issues
 - Can we approach this differently?

- BPT Concerns
- Review of data in a statistical fashion to pick up trends
 - Good data sets collected to date. Now may be the time to review all data
- Sediments and the bioavailability of Ra and U.
 - Traditional Knowledge model
 - Firming up conceptual models

6.1.9 ARRTC indicated that it would find it useful to contact Traditional Owners to discuss their views on issues. Geoff Kyle agreed to have GAC contact Ray Evans to discuss options for an appropriate meeting.

6.1.10 ARRTC members indicated that a wet season visit to Ranger would be preferable for any future site visits.

6.1.11 Date for meeting set at: 2nd week of March, 8–9 March 2007.

6.1.12 Ray Evans commented that the KNN gap analysis will need to be progressed. Alan Hughes committed SSD to providing a resource and progressing prior to the next meeting or ARRTC.

ACTION/OUTCOME 6D

SSD to progress the KKN gap analysis prior to the next meeting of ARRTC. The analysis should include:

- Identification of what has been achieved against KKNs
- KKNs reviewed
- Meeting paper to be produced
- ARRTC to provide input
- Identification of any obvious KKN gaps

6.1.13 Ray Evans then thanked all for their input.

6.1.14 Meeting closed 12:25pm

Appendix 1 Tabulated actions and outcomes list

<u>ACTION/OUTCOME 1A – ARRTC Secretariat</u>
Record appreciation of Jill Fitch’s role on the committee since its new formation.
ACTION: Recorded in minutes. Former Parliamentary Secretary Greg Hunt has written to Jill Fitch to thank her for her services to ARRTC.
<u>ACTION/OUTCOME 1B – ARRTC Secretariat</u>
Record thanks to Ian Loftus for his contribution and role on ARRTC for last 4 years.
ACTION: Recorded in minutes.
<u>ACTION/OUTCOME 2A – ARRTC Secretariat</u>
Draft summary record of the 17 th meeting approved for posting on web site subject to any typos identified by committee.
ACTION: Posted on public part of web site (http://www.environment.gov.au/ssd/communication/committees/arrtc/meeting.html)
<u>ACTION/OUTCOME 2B – Peter Johnston</u>
Peter Johnston will continue to familiarise himself with the Ranger radiation management system in his role on ARRTC.
ACTION:
<u>ACTION/OUTCOME 2C – NLC</u>
Ray Evans noted opportunity for NLC to present information on this at a future meeting.
ACTION:
<u>ACTION/OUTCOME 2D – Chair ARRTC</u>
Chair to develop words out of session for inclusion in a letter to the Parliamentary Secretary on this issue & bring to meeting for approval
ACTION: ‘Words’ developed and discussed post-meeting and provided in this draft summary record.
<u>ACTION/OUTCOME 2 E – ARRTC Secretariat</u>
Review security procedures for members web site.
ACTION: New password established and notified to ARRTC members
<u>ACTION/OUTCOME 2F – ARRTC Secretariat</u>
All stakeholder comments on Ranger Closure Model to be made available to ARRTC
ACTION: No new iteration between ARRTC meetings
<u>ACTION/OUTCOME 3A – Committee members</u>
What risk assessment techniques could be useful in a planning context. For future discussion in Gap Analysis.
ACTION:
<u>ACTION/OUTCOME 3B – ERA</u>

ERA to provide advice on works being undertaken to ensure integrity of RP2 and Pit 3 walls.
ACTION: Tony Milnes subsequently provided a report during the meeting on stability of Pit no.3 in the vicinity of RP2 in response to question from Eileen McGovern above (Minutes 3.1.18)
<u>ACTION/OUTCOME 3C – Parks Australia North</u>
Update by Parks Australia North on South Alligator Valley requested at next ARRTC meeting
ACTION:
<u>ACTION/OUTCOME 4A – ERA</u>
ARRTC request operational detail for the development of vegetation demonstration plots be left up to ERA and an update given at the next ARRTC meeting.
ACTION:
<u>ACTION/OUTCOME 4B – ERA</u>
ERA to provide details on the ‘Uranium in sediments’ work for the next meeting of ARRTC
ACTION:
<u>ACTION/OUTCOME 6A</u>
Next ARRTC meeting be 2 days
ACTION: Meeting scheduled for 2 days (9am to 5.30pm), members notified and travel/accommodation arrangements made to reflect 2 full days.
<u>ACTION/OUTCOME 6B – Geoff Kyle (GAC)</u>
ARRTC asked Geoff Kyle to ask Graham Dewar (Manager, Gundjeihmi Aboriginal Corporation) to contact Ray Evans re a business meeting with Traditional Owners.
ACTION:
<u>ACTION/OUTCOME 6C</u>
Date of next ARRTC meeting to be 8–9 March 2007 with possible visit to symposium beforehand.
ACTION: Meeting being held on 8/9 March. Decision made not to include visit to Symposium as part of ARRTC meeting.
<u>ACTION/OUTCOME 6D – SSD</u>
SSD to progress the KKN gap analysis prior to the next meeting of ARRTC. The analysis should include: <ul style="list-style-type: none"> ▪ Identification of what has been achieved against KKNs ▪ KKNs reviewed ▪ Meeting paper to be produced ▪ ARRTC to provide input ▪ Identification of any obvious KKN gaps

ACTION: Compilation of resource materials in progress