

Alligator Rivers Region Technical Committee

12th Meeting

Darwin - 15-17 September 2003

Summary Record of Meeting

Members Present

Prof Barry Hart – Chair, Independent Member
Mr Ray Evans - Independent Member
Ms Jill Fitch – Independent Member
Mr Mark Foy – Northern Land Council
Dr Carl Grant - Independent Member
Dr Terry Hillman - Independent Member
Prof Doug Holdway - Independent Member
Dr Arthur Johnston – Supervising Scientist
Mr Tony McGill - Department of Business, Industry and Resource Development
Dr Tony Milnes – Energy Resources of Australia Ltd
Prof Gerald Nanson - Independent Member

Apologies

Mr Shane Maraldo – Pioneer International Ltd
Mr Peter Wellings – Parks Australia

Observers and Advisors Present for Part or All of the Meeting

Mr Julian Barry – Parks Australia
Dr Peter Bayliss - Environmental Research Institute of the Supervising Scientist
Dr Ken Evans - Environmental Research Institute of the Supervising Scientist
Dr Max Finlayson - Environmental Research Institute of the Supervising Scientist
Ms Kate Higgins - Office of the Supervising Scientist
Dr Ian Hollingsworth - Earth Water Life Sciences Ltd
Mr Alan Hughes - Department of Business, Industry and Resource Development
Ms Michelle Isles - Office of the Supervising Scientist
Dr David Jones - Earth Water Life Sciences Ltd
Dr Rod Kennett – Parks Australia North
Mr Ian Loftus – ARRTC Secretariat
Mr Richard McAllister - Office of the Supervising Scientist
Mr Alex Zapantis – Office of the Supervising Scientist

Part 1 – Introductory Session

1.1 Welcome and Overview

1.1.1 The meeting opened at 0900 on Monday 15 September 2003 with Barry Hart welcoming members, observers and advisors. The meeting then extended congratulations to Jill Fitch on being awarded the Public Service Medal (PSM) in the Queen’s Birthday honours in June 2003 and to Arthur Johnston for his earlier award of the PSM in January 2003

1.2 Apologies and Observers

1.2.1 The apologies of Mr Shane Maraldo and Mr Peter Wellings were noted.

1.3 Declaration of any conflicts of interest with agenda items

1.3.1 No conflicts of interest with any agenda items were declared by members.

2 – Draft Summary Record of 11th Meeting – February 2003

2.1 Discussion of Draft Summary Record

2.1.1 Members discussed the draft Summary Record of the 11th meeting of ARRTC, which was held in February 2003.

2.1.2 Arthur Johnston noted that a lot of the material dealt with under the Business Arising section would be better included under the relevant agenda item.

2.1.3 Ray Evans noted that most comments/actions had been picked up well but he noted some suggested changes, in particular, that one of the outcomes listed on page 3 of the draft Summary Record should be deleted:

Outcome/Action: Members need enough information to be informed that the science is sound.

2.1.4 Members agreed.

2.1.5 Ray then suggested that the section on Remote Sensing and GIS on page 3 of the draft Summary Record needs a conclusion. He noted that there needs to be an action/outcome against each paper including remote sensing.

2.1.6 Members discussed possible outcomes and agreed that the text “there was discussion on” should be replaced with “ARRTC noted that”.

2.1.7 Ray then suggested that one of the actions/outcomes on page 4 of the draft Summary Record should be strengthened. The action/outcome relates to conceptual models, and is:

ARRTC would like to see a conceptual model of the system developed, with transport pathways clearly shown and best estimates of the loads/fluxes of contaminants shown.

2.1.8 Ray suggested that it be strengthened with the addition of the text “as project planning and implementation occurs”. Members agreed.

2.1.9 Carl Grant suggested that some of the text on page 15 in relation to the conduct of meetings did not reflect what was discussed. He suggested that the wording be revised to reflect “non members” rather than “outsiders” and adding “presence for the entire meeting”. Members agreed.

2.1.10 Jill Fitch noted a typographical error in the fourth paragraph on page 7. She noted that it should say “but noted” rather than “not noted”. Jill also suggested that paragraphs and

sections of the Summary Record should be numbered to make referencing easier. Ian Loftus undertook to do this.

2.1.11 Barry Hart expressed a desire that papers be made available earlier – by a week or so – in order to give members the time to read them properly. Gerald Nanson noted the workloads issues, and suggested that ARRTC would get more value by having papers available up to a month ahead. This would give them the chance to consult with colleagues in order to allow them to get better prepared.

2.1.12 Max Finlayson noted the issues are broader than simply the availability of papers to ARRTC members. He noted that the Environmental Research Institute of the Supervising Scientist needs time to prepare papers. He suggested that requests for papers should be tightened, and asked members to explicitly outline what ARRTC's expectations were, and to review and possibly prioritise requests, noting the likely workload impacts for staff involved.

2.1.13 Carl Grant commented on his reviewing of papers, and suggested that there might be scope for independent members to review papers between sessions, thus allowing meeting papers to be tighter.

2.1.14 Barry Hart talked about the modus operandi of ARRTC, and suggested that broad requests should disappear and be replaced by more focussed requests.

2.1.15 Doug Holdway suggested that the documents requested during each meeting be listed to assess the workload impacts on organisations such as the Environmental Research Institute of the Supervising Scientist and Earth Water Life Sciences. This suggestion was welcomed by Max Finlayson.

2.1.16 Barry Hart then spoke to the list of actions arising from the previous meeting, noting that some items would be dealt with in other parts of this meeting's agenda.

2.1.17 He noted that the Business Plan had not been done as it will be deferred until the strategic issues are considered. Terry Hillman asked Barry who the Business Plan's target would be, and Barry advised that it would probably be the Environmental Research Institute of the Supervising Scientist. Barry Hart advised that the Business Plan would not replace the Environmental Research Institute of the Supervising Scientist Business Plan but rather focus on ARRTC itself. Barry also advised that no letter had been sent to the Minister after the last meeting because of his bicycle accident.

Action/Outcome No.1:

ARRTC:

- Endorsed the draft Summary Record of the 11th Meeting subject to the following amendments:
 - Page 3 – delete “Outcome/Action: Members need enough information to be informed that the science is sound”;
 - Page 3 – replace “there was discussion” with “ARRTC noted that”;
 - Page 3 – insert “as project planning and implementation occurs” immediately after “... conceptual model of the system developed”;
 - Page 15 – replace the term “outsiders” with “non-members” and replace “at ARRTC meetings” with “at entire ARRTC meetings” after; and
 - Correction of typographical errors.

- Asked that future Summary Records be numbered in accordance with the numbering used for Agendas.

2a - Addendum to Summary Record of 10th Meeting

2a.1 Summary Record of 10th Meeting

2a.1.1 Barry Hart advised members that the summary record of the 10th ARRTC meeting, which was held in September 2002, had omitted some of the important points that were contained in his own summary notes. Excerpts of both the formal summary record and Barry's notes were provided to members.

2a.1.2 Arthur Johnston noted that some of the conclusions that appeared in Barry's notes were used in evidence given to the Senate inquiry, and that these conclusions were mistakenly omitted from the formal summary record that was endorsed by ARRTC.

Action/Outcome No.2:

ARRTC resolved to include Barry Hart's summary notes (as shown at Attachment A) of the 10th ARRTC meeting as an addendum to the Summary Record of that meeting which were endorsed by ARRTC members at the 11th meeting.

3 – Research Activities and Key Knowledge Needs

3.1 Key Knowledge Needs

3.1.1 Barry Hart spoke about the process used to develop the Key Knowledge Needs at the February 2003 ARRTC meeting, noting that the development was done by the seven independent members in a separate session.

3.1.2 A paper detailing the expanded Key Knowledge Needs, as seen by independent members, was tabled.

3.1.3 Arthur Johnston commented that he had some concerns about the document, suggesting that it was not yet a working document but simply a first draft outcome of a discussion by independent members. He noted some inconsistencies and gaps.

3.1.4 Jill Fitch apologised for not providing input to the document, and agreed with Arthur that the document was not as well organised as it could be. She agreed that it should be considered "draft".

3.1.5 Ray Evans queried the document's purpose and target audience.

3.1.6 Barry Hart noted that the Key Knowledge Needs had been aimed at ERISS and EWLS to provide guidance and direction to their research programs. He added that ERISS had already incorporated the Key Knowledge Needs into its own work program, and that EWLS was also looking at doing this with a focus on rehabilitation.

3.1.7 Max Finlayson advised that he saw the Key Knowledge Needs document as an information paper to guide activities between sessions of the 11th and 12th ARRTC meetings, and he felt that ERISS had moved forward and significantly adjusted its programs to both accommodate the Key Knowledge Needs and to illustrate that it was responding to the directions and advice provided by ARRTC. Whilst recognising gaps in the subject matter, he had considered it a statement of ARRTC's priority information needs and sought clarification if it was being considered a draft or did not reflect the views of ARRTC members.

3.1.8 Arthur Johnston noted the need to compare the Key Knowledge Needs document with the research summary collated and edited by himself and Tony Milnes. He added that the Key Knowledge Needs should be “owned” by all of ARRTC rather than just the independent scientific members. He noted that some of the issues included in the Key Knowledge Needs had been the subject of significant research in the past and may not actually be knowledge needs.

3.1.9 Tony McGill advised that DBIRD would be seeking to incorporate the Key Knowledge Needs into the regulatory framework. He noted that DBIRD’s regulatory processes were subject to Ministerial control and the science was simply one of a number of issues feeding into this process. He added that ARRTC allowed scientific information to be fed into the overall process.

3.1.10 Carl Grant commented that he felt positive about the document, and that it represented a good first attempt to capture and consolidate thoughts, and in guiding and assisting EWLS and ERISS.

3.1.11 Arthur Johnston reiterated that he felt that ownership by all of ARRTC was important and that he felt uncomfortable about perceptions of “independent members” versus “other members”.

3.1.12 Terry Hillman added that he also felt positive about the document, but noted that it still required some fine tuning. He regards the document as being a statement of where the independent scientific members stood at the 11th meeting in February 2003.

3.1.13 Barry Hart asked the meeting whether the document should be “owned” by all of ARRTC or by the independent members only. He regarded the document as being important.

3.1.14 Jill Fitch agreed that the document was important and could be renewed annually.

3.1.15 Carl Grant suggested that other members of ARRTC could provide comments on the existing document.

3.1.16 Ray Evans noted that the importance of the document as a tool means that it should be “owned” by all of ARRTC. It could provide the focus for future actions and directions.

3.1.17 Tony Milnes noted that the document provided a good start, although the headings and issues within it do not necessarily address what the other ARRTC members felt was important. He suggested that the document could be better focussed.

3.1.18 Barry Hart noted that the purpose of the document is to assist with the prioritisation of research and activities. He added that he felt it should be owned by all of ARRTC.

3.1.19 Jill Fitch noted that she would like to see the comments to be provided by Arthur Johnston and Tony Milnes before the document was provided to Barry Hart. Barry noted that this arrangement was reasonable.

3.1.20 Carl Grant added that the Key Knowledge Needs should be regarded as a gap-analysis, and that omission from the list does not indicate that any particular issue is not regarded as being important.

Action/Outcome No.3:

Tony Milnes and Arthur Johnston will work to finalise the Key Knowledge Needs document and then provide it to Barry Hart with the aim being to circulate to ARRTC members by Christmas 2003 with discussion to occur at the March 2004 ARRTC meeting.

3.2 Presentation by the Environmental Research Institute of the Supervising Scientist

3.2.1 Max Finlayson reiterated that ERISS had considered the Key Knowledge Needs document as a statement of priority areas, not a gap analysis, and had responded on this basis. ERISS had not been informed otherwise.

3.2.2 Max Finlayson then gave a presentation and briefing on the ways in which ERISS had responded to the Key Knowledge Needs document since the 11th ARRTC meeting of February 2003. He briefed members on how ERISS had considered and dealt with each of the initial Key Knowledge Needs, including the rationale for combining some of the issues raised.

3.2.3 He noted that ERISS has expertise in many of the areas included within the scope of the Key Knowledge Needs but added that skills are limited in some of the areas.

3.2.4 Max Finlayson noted cuts to the research program in 1994 which resulted in ERISS withdrawing from revegetation research which was deemed to be the responsibility of the mining company. He also advised that these changes were made in response to pressure from ERA and others and were not necessarily supported by ERISS at that time.

3.2.5 He then talked about the demands on time and resources presented by ARRTC's requests. He also noted some omissions (for example, wetland filters and surface water pathways) from the document.

3.2.6 Max then talked about the ERISS work plan and the Supervising Scientist's strategic work plan, noting the need to wind down some projects during the transition to the new strategic direction.

3.2.7 Max added that ERISS had not considered all the topics listed in the Key Knowledge Needs document, but that it had prioritised the list of topics based on both needs and the competencies of staff. This was done through a series of seminars and discussions that fed into the internal ERISS work planning and prioritisation procedures. He felt, personally, that it had been a positive process and congratulated ERISS (and OSS) staff on their responsiveness to considering the issues.

3.2.8 Barry Hart and members commented that they were impressed with the rigorous process that ERISS had gone through, and that they could now focus on the work plan.

3.2.9 Ray Evans noted that ARRTC is not a board of management for ERISS and that it has no role, other than at a strategic level, in managing day-to-day operational activities. He added that the Key Knowledge Needs document articulates the knowledge gaps identified by ARRTC. He suggested that the Key Knowledge Needs process should identify deficiencies in scientific research activity, leading to an analysis of where and by whom that research activity should be carried out.

3.2.10 Tony McGill indicated that he was not so sure. He talked about regulatory issues, and that some gaps (for example, health and safety) existed. He also noted the variable context of the broader environment, with social, economic and environmental issues all forming part of the bigger picture.

3.2.11 Barry Hart noted the role of DBIRD in relation to the regulation of mining. He added that ARRTC had an environmental focus, but noted that the closure criteria should look at broader issues including economic and social issues.

3.2.12 Terry Hillman felt that ARRTC needed to get back to first principles, whilst Ray Evans noted that it was critical to incorporate strategic issues into the Key Knowledge Needs.

3.2.13 Terry Hillman agreed with Tony McGill but noted that knowledge gaps are not fully addressed and that this issue needs to be considered and the Key Knowledge Needs should be more focussed.

3.2.14 Tony Milnes noted that the Environmental Requirements provided the overall drivers for where ERA is heading in terms of rehabilitation.

3.2.15 Jill Fitch asked whether Tony McGill was able to provide an overview of Northern Territory legislation and how it impacted upon mining activities. She noted that it was important that ARRTC members understood the context within which they operated.

3.2.16 Tony McGill noted the picture was actually far broader than the Environmental Requirements. He indicated that he could provide the briefing Jill sought later during the meeting. He also noted that he felt that ARRTC's role in the regulatory process existed through Section 34 of the *Mining Management Act 2001*, which requires consultation with the Commonwealth in relation to uranium activities.

3.2.17 Members then discussed the ERISS strategic work plan. Arthur Johnston advised that the SSD strategic review was underway, and that it was looking at the whole reason for SSD's existence and whether programs meet those reasons. The aim was to move forwards in a direction that allowed programs delivered to meet stakeholder expectations.

3.2.18 Max Finlayson asked ARRTC members whether they felt that the priority activities identified by ERISS were appropriate and whether any changes should be made to them. Max then talked about rehabilitation. Carl Grant asked whether the 1994 decision to cease onsite revegetation research was being reviewed. Max advised that this was the case, and it was now a matter of determining how onsite activities could be included in ERISS research activities. Max noted that onsite versus offsite issues is a grey area and clear-cut delineations do not exist, partly due to changing attitudes towards the issue.

3.2.19 Tony Milnes noted that several years ago both ERISS and the mining company were engaged in parallel research and that this had now changed significantly with both organisations having difficulty keeping up with the research demands. Arthur Johnston noted that some research activities could easily be allocated to either of the two organisations, adding that this is what had occurred in 1994.

3.2.20 Gerald Nanson questioned the list of projects, and asked whether thought had been given to prioritisation. Max advised that it had, and that this was addressed in the workplan document, taking into account the dual need to complete existing projects and respond to new ARRTC requests.

3.2.21 Doug Holdway advised that he thought that Max Finlayson and the staff of ERISS had done a good job

3.2.22 Jill Fitch asked about the radiological monitoring review, and Tony Milnes advised that a paper on ERA's radiological monitoring has been written by Ian Marshman. Jill also asked if the proposed Radiological Audit mentioned at the last ARRTC meeting had been done. Alex Zapantis advised that the radiological monitoring review was still underway, and that the review team is still waiting on further information from ERA. He advised that the audit was completed.

Action/Outcome No.4:

Tony McGill will provide the Radiological Audit report to Jill Fitch.

3.2.23 Max Finlayson advised that individual project approval documents exist, and that these gave high levels of detail on each project. These documents can be made available if necessary to members, but cautioned about the level of detail they contained.

3.2.24 Barry Hart talked about the need for a broad strategic picture that would allow ARRTC to have sufficient awareness of what is happening.

3.2.25 Terry Hillman queried whether ARRTC had a role in assisting to reach consensus in issues such as final landform, rather than simply providing technical and scientific input.

3.2.26 Arthur Johnston referred to Best Practicable Technology (BPT), and noted that the same applied to rehabilitation of mine sites. Ray Evans queried whether the BPT assessment process used prior to events could be used post-event. Barry Hart noted that Nabarlek is an example of post-event action.

3.2.27 Jill Fitch queried BPT for the management of ore and tailings in the post-mining context, and Alex Zapantis advised that this refers to low-grade ores of uneconomic value. Mark Foy advised that some ore could be milled in the end stages but leaving some low-grade ore on the surface.

3.2.28 Barry Hart noted that he had difficulty separating monitoring from research in the ERISS work plan. Max Finlayson responded and talked about the monitoring process, noting that unless labelled as monitoring, any task should be considered to be research. He expected that some research activities would eventually result in ongoing monitoring.

3.2.29 Arthur Johnston noted that monitoring was expensive and resource-intensive, and that the person/weeks table is useful.

3.2.30 Barry Hart commented that, in terms of broad strategic directions, ERISS appears to be heading in the right direction. He noted that a “why” column would be useful in relation to the prioritisation projects.

3.2.31 Max Finlayson then noted that many projects result in the production of Internal Reports (IRs). He then described what an IR was, and how they could be obtained. The key endpoint, however, was the publication, where possible, of refereed external papers.

3.2.32 Arthur Johnston advised that a bibliography of publications is available on the Supervising Scientist’s website.

3.2.33 Gerald Nanson asked whether there are plans to have Pit 3 mining activities move closer to Magela Creek. Tony Milnes advised that the last extension to Pit 3 in the direction of Magela Creek, which would remove Djalkmarra Billabong, would occur within a year or so but that he was not aware of any plans to extend Pit 3 beyond this.

3.3.34 Gerald Nanson asked Tony Milnes if an update on final landform planning for Ranger could be provided to the next ARRTC meeting, and Tony Milnes advised that this could be done.

Action/Outcome No.5:

ARRTC:

- Noted the information provided by Dr Max Finlayson, and that ERISS has picked up the essence of the Key Knowledge Needs and is heading in the right direction;
- Acknowledged the efforts of the Director and staff of ERISS in producing the work plan and responding to the Key Knowledge Needs;

- Noted that the ERISS work plan was in a state of transition as realignment of projects continued;
- Noted that ERISS publications could be made available upon request;
- Noted the explicit identification of performance indicators, and looks forward to seeing progress; and
- Noted that Tony Milnes will provide an update on Ranger final landform planning at the next ARRTC meeting.

Arthur Johnston undertook to provide a copy of the SSD bibliography to ARRTC members.

3.3 Presentation by EWLS

3.3.1 Tony Milnes then gave a presentation and tabled a paper on the ERA research and development program for 2003 and 2004 being conducted by EWLS. He advised members that the paper was being made available on the basis that it remain confidential as it had not yet been approved by ERA. He noted that research and development directions are currently focussed on Ranger closure planning and Jabiluka long term care and maintenance.

3.3.2 Doug Holdway queried ERA's relations with the Northern Land Council and the Mirrar people. Tony Milnes responded that ERA was currently speaking with all stakeholders on several levels, including talking to GAC. Mark Foy commented that the company should be talking to the Traditional Owners and not GAC.

3.3.3 Doug asked why not all traditional knowledge acquired from Traditional Owners during consultation related to research would be retained. Tony Milnes advised that for cultural reasons Traditional Owners are sometimes hesitant to have their knowledge being retained due to concerns about possible exploitation.

3.3.4 Carl Grant asked about process used to prioritise the projects. Tony Milnes advised that a combination of various approaches are used, and that ERA operational needs have significant input to the research and development programs and that projects are driven on a needs-basis. He advised that the ARRTC comments would be taken on board.

3.3.5 Gerald Nanson suggested that the lessons learned from Nabarlek could assist with the identification of potential problems at Ranger.

3.3.6 Tony Milnes commented that the Key Knowledge Needs alone are not complete enough to give a full picture of the science needed.

3.3.7 Carl Grant indicated that he was concerned that ERA/EWLS do not appear to have taken onboard his comments in relation to revegetation research. Tony Milnes responded that EWLS staff have considered his comments but that they might disagree with them. He suggested that the debate needs to focus on the science.

3.3.8 Barry Hart asked what ARRTC could do to facilitate the exchange of information between players, and Tony Milnes advised that he is seeking a critique of his projects in relation to the science.

3.3.9 Barry Hart noted the need for ARRTC to agree on process and make recommendations but not enter into operational micro-management of mining operations or research activities.

3.3.10 Barry Hart noted that would like to see the Key Knowledge Needs acknowledged in the research and development plan.

3.3.11 Jill Fitch asked whether a strategic plan for the post-2004 period is available, and Tony Milnes advised that ERA has a closure plan and exit plan that sets out long term care and maintenance strategies. Annual research and development plans follow on in greater detail.

3.3.12 Barry Hart noted that the research and development plan did not fully align with the Key Knowledge Needs. He also noted that longer term research plans would assist ARRTC consider the full picture.

Action/Outcome No.6:

ARRTC noted the paper and thanked Dr Tony Milnes for his presentation.

ARRTC looks forward to a more detailed reseach plan, reflecting the Key Knowledge Needs, from ERA at the next meeting.

3.4 Sediment Modelling

3.4.1 Max Finlayson gave an overview and tabled a paper on sediment modelling, and noted that a sensitivity analysis still needs to be done

3.4.2 Carl Grant queried the methodology used and there was then some general discussion on the paper.

3.4.3 Doug Holdway raised concerns in relation to the figures used in the power analysis, and Barry Hart noted that a different definition of “power” might be required.

3.4.4 Ken Evans then answered specific questions on the paper. Barry Hart asked him how “power” was calculated and Ken responded. Barry Hart noted that it was unlikely that the power could be correct, although the sediment model could be useful.

3.4.5 Tony McGill noted that the increase in erosion from a catchment after a fire could have a big impact upon sediment modelling, and that this would increase the variability.

3.4.6 Ken Evans advised that they had tried to exclude fire effects from the model. Ken Evans advised that model focussed on “normal” flow. Ken explained the effects of fire on first-flush effects. Tony McGill noted that he thought the size of first flush statistics swamps the rest of season’s data.

3.4.7 There was general discussion on load versus concentrations. Ray Evans asked whether it could be used as post-closure predictive tool, and Ken responded that baseline data could assist in post-closure rehabilitation activities such as the removal of infrastructure.

3.4.8 Peter Bayliss then advised that it appears that a mistake may have been made in reading a table and determining the figures used in the power analysis, and this needed corroboration.

3.4.9 Gerald Nanson commented on whether it would be a reasonable assumption that all mud reached the sea, and Ken Evans advised that they have used a conservative, broad brush approach.

Action/Outcome No.7:

ARRTC:

- Noted the paper on sediment modelling and thanked ERISS staff for their work; and
- Noted that more work needed to be done in relation to sensitivity.

3.5 Hydrological Gauging Network

3.5.1 Richard McAllister talked to a paper on the hydrological gauging network. He noted that some gauging stations required upgrading and that the Northern Territory Government has prioritised its stations for financial reasons.

3.5.2 Richard then talked about the Northern Territory-Commonwealth funding arrangement that existed in previous years, and advised that the Commonwealth needs to pick up funding as the Northern Territory is unable/unwilling to do it.

3.5.3 Doug Holdway asked if the Supervising Scientist had a budget for the maintenance of hydrological gauging, and Arthur Johnston responded that he did not.

3.5.4 There was then a general discussion about the network of gauging stations. Ray Evans noted that the original intent of ARRTC's request for the paper was related to the adequacy of the network to supply data for future research and monitoring needs. His view was that the paper did not address this question. Richard McAllister agreed that the issue had not been dealt with.

3.5.5 Barry Hart queried the Northern Territory Government's role. Tony McGill advised that DBIRD pays the Department of Infrastructure, Planning and Environment (DIPE) the same costs as other network users. Tony added that ERA had its own gauging network. Carl Grant noted the possible duplication of stations with those managed by ERA.

3.5.6 Doug Holdway raised the issue of extreme events, noting that these events are now more common because of climate change, and that this strengthened the need for gauging stations.

3.5.7 Gerald Nanson queried the reason for three separate gauging stations on Magela Creek, and Arthur Johnston answered that there is a huge variance in catchments requiring several separate stations.

3.5.8 Ray Evans noted that two separate issues existed. First is the operational issue, with funding required for the maintenance/upgrade of the network. Second is the strategic issue, with a need to assess the overall data requirements.

3.5.9 Doug Holdway queried whether ERA should make financial contributions because of closure monitoring issues, and Mark Foy queried the role and interest of Parks Australia North, and whether they had relevant needs/wants.

3.5.10 Members discussed the costs of upgrading/maintaining stations, and Ray Evans agreed with the ~\$30 000 costs in the tabled paper. Ray offered to talk out of session with the Environmental Research Institute of the Supervising Scientist and the Office of the Supervising Scientist in relation to progressing the issue.

Action/Outcome No.8:

ARRTC:

- Noted the paper on hydrological gauging and commented that the rationale is being worked on;

- Noted the potential for rationalisation of gauging stations;
- Asked Ray Evans and Gerald Nanson to talk with ERISS and the OSS in relation to progressing the issue; and
- Noted that Parks Australia should contribute to discussions on hydrological gauging.

3.6 Mine Closure Criteria

3.6.1 Ian Hollingsworth gave a presentation on mine closure criteria and paper. The presentation provided information on mine closure goals, the primary Environmental Requirements, the closure philosophy, closure planning and the draft final landform. He then responded to members' questions on various issues associated with revegetation including the types of vegetation and methodologies used.

3.6.2 Gerald Nanson asked how analogous systems take on the new landform, rather than the long term landform, and Ian responded, noting that Ranger waste rock trials have indicated general success. Ian indicated that drainage and water supply are main issues.

3.6.3 Members then discussed drainage, particularly in relation to the relationship between plant type and drainage and waterlogging issues.

3.6.4 Jill Fitch queried the natural background radiation at the Ranger site. Alex Zapantis and Arthur Johnston then talked about background radiological issues, and this was followed by general discussion on the issue of natural background levels at the Ranger site after mining and milling ceases.

3.6.5 Gerald Nanson noted that rejuvenation of the landscape will be very severe, due in part to changes in factors such as soil composition. He queried whether the post-mining goals are realistic. Ian Hollingsworth then advised that ERA was attempting to meet the externally-imposed goals.

3.6.6 Doug Holdway then asked about the role of fire, and Ian advised that the fire survival of flora is a key closure criteria. Doug then asked about termites, and Ian responded that they are looking at investigation into macrofauna

3.6.7 Max Finlayson noted that the Supervising Scientist's satisfaction and management as if the minesite was part of Kakadu National Park formed part of the closure criteria, but World Heritage values did not form part of the closure criteria. He then queried the place of the social values of the landscape as well as the biophysical values. Ian Hollingsworth responded, noting that ERA is talking with Traditional Owners via the Northern Land Council to determine traditional land uses.

3.6.8 Mark Foy explained that very few old people had lived a traditional lifestyle on the Ranger country as most had been shifted to reserves prior to the commencement of mining.

3.6.9 Carl Grant noted that he saw the document and presentation as steps forward, but that issues with the selection of habitat types still existed. Carl then talked about the problems of rebuilding an ecosystem. He noted that he is still not convinced that there is a demonstrated capacity to rebuild the ecosystem. Carl Grant noted caution in relation to revegetation and closure criteria discussions with Traditional Owners, citing the Groote Eylandt example where there had been little progress in five years of discussions.

Action/Outcome No.9:

ARRTC:

- Noted Ian Hollingsworth's presentation on mine closure criteria; and
- Endorsed the approach, but expressed concern about whether a functional ecosystem could be reinstated, and the need to effectively canvass social values.

3.7 Wetlands

3.7.1 David Jones then talked about the issue of wetland filters and tabled a paper. He focussed on the RP1 constructed wetland filter. He described processes and history of the wetland filter, and then talked about the success of wetland filters in managing water. He then responded to several queries on specific issues. David then talked about the rehabilitation of wetland filters, and noted that land application areas would also be considered in the context of rehabilitation. He noted that EWLS would soon be examining the quality of material concentrated in the soil of land application areas.

3.7.2 Members then discussed the effects of the wetland filters on the biota, and noted that fauna such as magpie geese provide a possible pathway for transport of contaminants off site.

3.7.3 Arthur Johnston talked about work being undertaken by ERISS on effects on the human population of eating birds taken from wetlands. Max Finlayson suggested that EWLS should identify which plants are being used in the wetlands to determine whether or not that it is a species that magpie geese eat. He added that different plants also affect wetlands performance and whether or not the best choice had been made.

3.7.4 Ray Evans then asked about water management in the context of decommissioning. Tony Milnes responded. Ray added that water management is critical during the decommissioning phase

3.7.5 Arthur Johnston noted two issues: the *now* (operational) and the *then* (sentinel). He noted some confidence in wetland filter performance. Arthur Johnston also noted the need to consider effects if the filters dried out.

3.7.6 Gerald Nanson noted that ecologically sustainable communities could be developed, bypassing succession/progression. He wants to see literature/evidence that ecologically sustainable communities could be established. Tony Milnes advised that this was provided in earlier literature to ARRTC members. David Jones noted that revegetation was still successional rather than instantaneous. Gerald Nanson noted Reddell *et al.*

Action/Outcome No.10:

ARRTC:

- Noted the presentation on wetland filters, and noted their role in both operational and post-mining phases;
- Requested that the identity of the *Elocharis* species be confirmed and that this be taken into account in future work;
- Indicated that the information provided gave them a lot of confidence in performance of the wetlands filters;

- Expressed support for the risk-based approach used in the EWLS report; and
- Thanked David Jones for his presentation and paper.

3.7.7 Ray Evans then queried the Supervising Scientist's ARRAC six-monthly report in relation to differences in signal strengths at downstream and upstream monitoring points. David Jones advised that differences were due to differences in landform at both locations. Ray asked Tony Milnes who in EWLS he could contact in relation to this. Tony Milnes advised Ray to make contact with David Jones and David Klessa. Ray Evans will follow-up discussions with the relevant people between meetings.

4 – Nabarlek Site Visit

4.1 Ecosystem Functional Analysis

4.1.1 Carl Grant gave an overview of his role in critiquing Tongway's Ecosystem Functional Analysis paper. He gave an overview of the EFA process, and how it operates. He noted that the approach has been criticized by parts of the mining industry on several grounds.

4.1.2 Carl Grant then talked about his response to the Tongway document, noting that the EFA technique does not relate back to the rehabilitation objective. For example, weed species get the same value to native.

4.1.3 Carl then went through the list of concerns in his paper. He then summarised that he did not see EFA as a useful tool for Nabarlek, adding that other tools are available. He noted that composition and structure are more useful.

4.1.4 Max Finlayson noted that his comments in relation to EFA were similar to Carl Grant's comments.

4.1.5 Arthur Johnston talked about previous Nabarlek studies, which had resulted in the Nabarlek workshop held in Darwin several years ago, and which led to the identification of a need for alternative tools due to the failure of scientists to agree on the assessment of Nabarlek using more contemporary composition and structure type measures.

4.1.6 Carl Grant noted that he was only asked to comment on EFA. He noted that his February 2003 presentation gave some direction as to where he felt that things should progress in relation to a rehabilitation trajectory.

4.1.7 Carl also noted that a weed management plan was needed, and Tony McGill noted that such a plan did exist.

4.1.8 Max Finlayson advised that many weed species were now so wide-spread that control on the mining site in isolation of the surrounding environment was likely to be useless, but added that he considered that the species concerned had spread from the minesite to the wider environment.

4.1.9 Alex Zapantis noted Carl's comments but advised that the objectives of study were not to use EFA to assess Nabarlek, but to verify the technique against more contemporary measures. Alex noted that Tongway had agreed that EFA was only one tool and that the contemporary measures would still be required. Alex said that the advantage of EFA was that it provided additional time series data at much reduced cost compared to contemporary measures, but does not replace them.

Action/Outcome No.11:

ARRTC thanked Carl Grant for his briefing and noted that it provided useful information for members.

4.2 Briefing

4.2.1 ARRTC members and several observers visited the Nabarlek site between approximately 0810-1300 on Tuesday 16 September. The group flew to/from the site and was transported around the site in vehicles provided by the Supervising Scientist's Jabiru Field Station.

4.2.2 The group visited and/or observed:

- The forest irrigation area near the airstrip;
- The former mill area and white tank;
- "island" revegetation plots on the former stockpile area;
- the former pit area (now backfilled);
- the "badlands" area adjacent to the former pit;
- the former camp site; and
- the rubbish dump.

The visit concluded with lunch under the mahogany trees near the former mill area.

4.2.3 Barry Hart thanked all concerned with making ARRTC's visit so fruitful.

4.3 Debrief

4.3.1 After the return to Darwin, Barry Hart asked those who visited Nabarlek to describe what they gained from the visit.

4.3.2 Doug Holdway commented that the trip had been useful. He noted that the inspection allowed ARRTC to see the sort of mistakes that should be avoided at Ranger. He also noted that Nabarlek was a relatively small site when compared with the broader landscape. He mentioned differences between the "expert" view of rehabilitation and the Traditional Owner view, noting that Traditional Owners felt that increasing tree growth was more important than, for example, cleaning up the rubbish dump.

4.3.3 Carl Grant advised that the site was much as he had expected, and that lots of further work is required. He noted that the very basic issues of safety and stability still had not been met. He felt that some minimum levels of environmental standards needed to be put in place. He was impressed with the "islands" of trees being planted on the site. He was also impressed with the Traditional Owner involvement in the rehabilitation process. He noted that some of the grassed sites needed further work to allow them to progress through succession. Like Doug Holdway, he noted that the Traditional Owners "want more trees".

4.3.4 Alex Zapantis noted that the trees were taller and more numerous since his last visit to Nabarlek two years earlier. He noted the badlands as an interesting feature of the site, adding that the reasons for the feature being so desolate remain a mystery. He was also impressed with the "island planting" approach and that progress is very encouraging. He acknowledged the need for further work.

4.3.5 Mark Foy advised that he was a regular visitor to Nabarlek. He noted that the revegetation through the “islands” was progressing well with trees getting stronger. He also noted the increasing presence of ants and insects on revegetated areas. He added that the Traditional Owners wanted more trees on the site, but not necessarily the same trees that would have existed in particular locations previously.

4.3.6 Jill Fitch noted that she had not visited Nabarlek for many years, and the site was now very different to how she had seen it previously. She could not comment on the radiological issues but noted the badlands as an area of concern. She noted that the opportunity to meet with female Traditional Owners was a highlight, and she added that Traditional Owners had said they had no concerns about radiological issues.

4.3.7 Ray Evans noted the local variability of the site, and that some parts looked rehabilitated whilst others had obvious evidence of disturbance (such as rock material). He noted that views on rehabilitation had changed since the mine was operational. He felt that the abandoned camp area was less important than revegetation, particularly trees. He added that the Nabarlek example provided the opportunity to monitor the way the system responded to rehabilitation, and would be useful in testing conceptual models. He also noted the settlement of waste rock on the pit area.

4.3.8 Gerald Nanson expressed disappointment with the site, noting that there was a long way to go if the site was to be rehabilitated to the standards that applied when decommissioning occurred in the 1990s. He noted the presence of significant debris at the site. He noted that he was initially encouraged by the regrowth of flora on disturbed areas but subsequently became concerned that the plants that had grown might not be the type required for long term sustainability. He concluded that the site provided the opportunity for research into what should/should not be done in the future.

4.3.9 Terry Hillman indicated that the visit was interesting. He noted that it prompted the need to consider rehabilitation endpoints and the need to break out of the grass/fire loop. He also noted the useful involvement of Traditional Owners, and their view that more trees should be planted and that a return to the original landscape might not necessarily be required. He noted the badlands as a problem, and that it is a major source of radiological contamination.

4.3.10 Arthur Johnston noted that the rehabilitation achievements at Nabarlek were far from ideal. He noted that Traditional Owner involvement (through Demed) was a highlight of the last few years; he also noted that this arrangement worked in favour of the mining company. He noted the lack of emphasis on fauna and agreed with Gerald Nanson that a lot more work was required at the site.

4.3.11 Alan Hughes advised that he had visited the site a number of times over the last two or three years. He noted that the rehabilitation seemed to have taken a different course since the involvement of Traditional Owners and Demed in developing the revegetation “islands”. He noted that the feral animal problems that had existed several years ago had been successfully removed. He also noted that the growth of eucalypts over the pit area had improved in recent years.

4.3.12 Peter Bayliss noted the revegetation sampling techniques program just started by the Environmental Research Institute of the Supervising Scientist and involving expertise from Charles Darwin University.

4.3.13 Kate Higgins noted the enormous challenges that lay ahead.

4.3.14 Carl Grant noted the cooperation between Dr Sean Bellairs of the Charles Darwin University, indicating that this was a real positive and he hoped to see Sean become more involved. He noted that Sean is working with Peter Bayliss on an ERISS project. Carl noted that one Traditional Owner had indicated no desire to have bush tucker grow on the Nabarlek site; he indicated that he would not eat bush tucker taken from the Nabarlek site if it was available. This would suggest possible concerns in relation to radiological contamination.

4.3.15 Barry Hart indicated that he is impressed by the continuing need for onsite management for rehabilitation to be successful. He commented that the pit area revegetation initially looked good but after discussion with Carl Grant was made aware of components of the vegetation that had not been reinstated. He also noted the need for well documented success criteria. He hopes that lessons of Nabarlek are being captured by the future research needs strategy.

4.3.16 Arthur noted that the pit rehabilitation was done well at the time.

4.3.17 Tony McGill then talked about the pond area, recalling being bogged in the ponds area in the 1970s when the area was a blacksoil plain prior to mining. He noted that pre-mining photography of the site did exist.

4.3.18 Tony McGill noted that Nabarlek rehabilitation had been a problem since day one, and he described the initial rehabilitation process. He noted the lack of progress in relation to the development of rehabilitation criteria prior to decommissioning. He noted that the three parties (the Commonwealth, the Northern Territory and the Northern Land Council) had not been able to agree on final outcomes, and noted that poor outcomes reflected poor process. He noted that the bottom line is that regulators and scientists have a role to determine endpoints. He added that the Northern Territory Government is still holding a bond (in the form of a guarantee) and that the process is still not over. He noted that DBIRD had recently returned \$9,500,000 to Pioneer but still held a bond of \$500,000. He added that this bond is reviewed annually when the operator submits its Mining Management Plan. Arthur Johnston asked when this happened and Tony McGill indicated that it had occurred in the previous week.

4.3.19 There was discussion by members as to the nature of the site prior to the commencement of mining. Barry Hart thanked members for their comments.

4.3.20 Kirrilly Pfitzner gave a presentation on the revegetation assessment that is being conducted at Nabarlek by the Environmental Research Institute of the Supervising Scientist. Barry Hart thanked Kirrilly.

5 – Monitoring

5.1 ERA Radiological Monitoring

5.1.1 The committee was advised that Ian Marshman, ERA's Radiation Safety Officer, who was scheduled to present a paper on ERA's radiological monitoring, had mistakenly reported to the Jabiru Field Station.

5.1.2 Tony Milnes apologised for the unexpected absence of Ian Marshman. He then suggested that Jill Fitch could read Ian Marshman's paper and provide comments back to the next ARRTC meeting.

5.1.3 Jill Fitch queried progress in relation to the review of radiological monitoring, and Tony McGill responded and described the process being used. Alex Zapantis added that the review group was still waiting for the outcome of a statistical analysis of the radiological monitoring data conducted by EWLS. That analysis was relevant to the review of the

radiological monitoring program. Alex Zapantis also added that the entire radiation management program at Ranger was under review, not just the monitoring program. He went on to describe the context of the review of ERA's radiological management and monitoring, noting that it was linked to the Mine Management Plan requirements under Northern Territory legislation.

5.1.4 Tony Milnes reported that the statistical analysis had been completed and provided to Ian Marshman some time ago. Alex Zapantis said that progress was being made although a little slower than was expected.

5.1.5 Barry Hart noted that ARRTC was interested in, and concerned about, radiological issues but did not have the information it needed to be fully informed.

5.1.6 Arthur Johnston noted some wording on the last page of Ian Marshman's report that suggested some attitudinal problems within ERA.

5.1.7 Mark Foy noted that he felt the review was heading in the right direction but that Ian Marshman was involved in many tasks and was therefore busy.

5.1.8 Jill Fitch asked if there was a Radiological Management Plan for Ranger and one for Jabiluka. Tony McGill advised that there was and that he would provide her with a copy.

5.1.9 Jill Fitch noted surprise that ERA has only one person involved in radiological issues, and that this could result in potential problems with sickness and absence. She also expressed concern that the radiological monitoring program could be based on a statistical analysis of historic data. Alex Zapantis clarified that the statistical analysis was just one input and that other issues such as good practice would be considered in reviewing the monitoring program.

5.1.10 Barry Hart asked members what they felt ARRTC should do or say.

5.1.11 Jill reiterated that she felt more information is required, particularly the statistical analysis of monitoring undertaken to date. She noted that Ian Marshman's report contained limited information of use, and that it was not presented in a risk-based framework. Barry Hart agreed that no analysis had been provided.

5.1.12 She noted that this type of information would allow ARRTC to comment on the appropriateness of the radiological monitoring program.

5.1.13 Doug Holdway noted the importance of considering extreme events in any discussion. He noted that mean figures need qualification to make allowance for extreme events.

5.1.14 Ray Evans stressed that radiological monitoring seemed to be a high priority issue, and that it needs to be given a high priority and treated in a timely manner.

5.1.15 Tony McGill noted that the current monitoring program was not linked to the Code of Practice, and that Ian Marshman felt that there was a need to get back to basic principles in order to separate the "essential" from the "optional".

Action/Outcome No.12:

ARRTC members:

- Noted that radiological monitoring is a high priority area for ARRTC;
- Welcomed the opportunity to be involved in the process;
- Noted that it could not proceed any further until further information was provided;

- Agreed that Jill Fitch would review Ian Marshman’s paper and provide feedback to ARRTC at the next meeting; and
- Sought an updated paper from ERA (with statistical analysis) for presentation to the next meeting.

6 – Operational Mining Issues

6.1 Jabiluka Long Term Care and Maintenance

6.1.1 Barry Hart talked briefly about Jabiluka issues, and asked members if they felt that the Jabiluka long term care and maintenance decision had been based on good science.

6.1.2 Tony Milnes gave a presentation on the current status of the implementation of the long term care and maintenance strategy. He described the process that had preceded the commencement of site works, giving an overview of the study by Dr Franz Kalf that was later reviewed by Dudgeon. He also talked about other studies undertaken by Rio Tinto and consultants that preceded the application to the MTC.

6.1.3 He then described the scope of the site works associated with the long term care and maintenance regime.

6.1.4 Ray Evans asked about the mass of solute out of the Interim Water Management Pond. Tony advised that he did not yet know the answer. Ray then queried whether the irrigated area would be scraped with soil being removed and placed in the decline. Tony advised that the irrigated areas would remain in situ.

6.1.5 Carl Grant asked about groundwater contamination and Tony advised that this issue was addressed in the studies by Kalf and Dudgeon.

6.1.6 Jill Fitch asked about the depth of the sludge in the Interim Water Management Pond and Tony advised that it varied between approximately 10-40 cm across the pond floor. Ray Evans asked about the depth and compaction of the sludge once it had been placed in the decline. Tony advised that the sludge would be pumped (as a slurry) into the decline where it would fill the spaces between the previously returned rock material.

6.1.7 Arthur Johnston inquired about the overflow mechanism for the Interim Water Management Pond, and Tony Milnes advised that options were still under investigation.

6.1.8 Carl Grant asked about the pond catchment in relation to contaminated run-off. Tony Milnes advised that the pond would receive only clean water.

6.1.9 Barry Hart asked why the pond was being retained and Tony Milnes advised that ERA was keeping its future options open in relation to the possibility of mining occurring at Jabiluka.

6.1.10 Arthur Johnston gave the background to the long term care and maintenance process, describing the approval process and the MTC process, including an overview of the BPT process. He outlined Kalf’s conclusions and noted that Dudgeon had supported these conclusions. He then talked about irrigation and water management and the effects of monitoring.

6.1.11 Barry Hart asked whether ARRTC should comment on the science behind the approval.

6.1.12 Tony McGill then talked about the regulatory process and BPT. He advised that the Department of Business, Industry and Resource Development had used the Supervising Scientist's advice in relation to BPT scoring. He noted that the option selected was equal best of four options that were assessed. He added that the BPT assessment did not take into account the length of time that the site would be non-operational and the cost of each option.

6.1.13 He then talked about the social criteria that are included in the BPT assessment process, noting that the Northern Territory Government felt that it (as the elected government) should comment on the social aspects whilst the Northern Land Council (as representatives of the Traditional Owners) felt that it was their role.

6.1.14 Barry Hart advised that ARRTC's role was based on scientific and technological factors. Terry Hillman noted that ARRTC had already made comment by looking at Kalf and Dudgeon. Barry Hart noted that ARRTC did not have an operational role, and that its comments should be limited to the science underpinning decisions.

Action/Outcome No.13:

ARRTC noted that:

- The method used to evaluate the approach for land application was the same as previously used, and that this analysis was appropriate within the available data and understanding; and
- There had been easy access to information regarding the proposal to return materials to the decline, specifically an analysis by Dr Franz Kalf and associated review comments by Dr Colin Dudgeon.

ARRTC endorses monitoring and evaluation activities related to the long term care and maintenance phase that will develop further the conceptual models underpinning the various decisions.

6.2 Ranger Process Water Management

6.2.1 Alex Zapantis talked to the paper on Ranger process water management. He noted that the matter has been referred to ARRTC for comment on the science used to draw the conclusions.

6.2.2 Alex gave an overview of ERA's actions in relation to process water management, giving an historical perspective of the various actions undertaken. He noted that ERA's overall aim was to reduce its process water inventory.

6.2.3 He then described the Supervising Scientist's role as assisting ERA through testing water in accordance with water quality guidelines. He advised that the technique developed by ERA had been assessed by the Supervising Scientist, and that it could protect the environment if used properly. He added that no formal application had yet been made by ERA and that many more details would be required prior to approval.

6.2.4 Barry Hart asked if the Supervising Scientist's assessments would be put into a risk management framework and Alex Zapantis advised that this would be done at the time when the formal application is made, and that the application will need to consider contingencies and monitoring etc.

6.2.5 Barry Hart asked about ammonia concentrations, and about eutrophication. Alex responded, referring them to page 5 of the paper. He noted that nitrate concentrations were being removed through the wetland filter process.

6.2.6 Barry noted the need to consider all the risk factors, noting nutrients and toxicants as being factors.

6.2.7 Doug Holdway expressed concern in relation to the volume of water that would be released, and how it would be released. He asked whether it would flow out, be pumped out, or whether it would be released through a diffuser. Alex Zapantis responded that it would be pumped through the RP1 wetland filter and then into RP1 and through the weir into the Creek. Alex confirmed that the release would be managed carefully. Alex also noted that significant diffusion that occurred in RP1 prior to release.

6.2.8 Doug Holdway then commented on the use of the term “without risk to the environment” in the paper, noting that such a statement was not appropriate as such guarantees could not be offered. Alex Zapantis agreed that the statement had slipped through and should be qualified. Doug Holdway noted that the approach was basically sound.

6.2.9 Tony Milnes noted that the project is described in greater detail at page 15 of ERA’s research and development document. He added that ERA had prepared a draft application for submission to the MTC, but that it had not yet been submitted as ERA is still looking at a range of other technologies prior to submitting application.

6.2.10 Doug Holdway noted Tony McGill’s earlier comment in relation to approval not being given for mine water release. Tony responded, noting that this applied to process water.

Action/Outcome No.14:

ARRTC members:

- Noted that preliminary assessment process was appropriate; and
- Noted that the operational requirements including contingencies and monitoring needs to be addressed in the formal application.

7 – Member Reports and Updates

7.1 Parks Australia North

7.1.1 Julian Barry gave an update on behalf of Parks Australia North.

7.1.2 Julian Barry advised members that a number of key developments in relation to the Gunlom Land Trust Rehabilitation Project had occurred since the last ARRTC meeting.

7.1.3 The final draft of Part A of the Gunlom Land Trust (GLT) Rehabilitation Plan was completed in April 2003, with inclusion of the cultural context provided by the Northern Land Council. This has been provided to ARPANSA, various Northern Territory Government departments and the Department of the Environment and Heritage’s Canberra office. Parks Australia’s consultants (EWLS and the Office of the Supervising Scientist) are liaising with ARPANSA about technical aspects of this document.

7.1.4 In relation to the few radiologically contaminated sites within the GLT area, consultants have completed a draft paper, ‘Desk Top Review – Potential Containment Sites for Radiologically Contaminated Material, Gunlom Land Trust, Kakadu’. This paper includes a desk top review of potential containment sites within the GLT area, concluding that a couple

of sites may, depending on future discussion with traditional owners, be suitable for further consideration and assessment.

7.1.5 There is ongoing implementation of the risk management actions relating to the three containments of old uranium mining residues, located within the GLT area. Whilst most issues have been addressed (one site required some physical work reported to the last meeting), we are still considering how best to monument these sites.

7.1.6 On Tuesday 8 April 2003 the Gunlom residues site and storage facility were inspected by Peter Waggitt of the OSS. In respect of the Gunlom residues site Peter Waggitt reported that 'the appearance of the rock armouring was good with no evidence of any movement as a result of the past wet season. The drainage works on the uphill table drain had been successful with no recurrence of the cross-road gulleying.' The residues containment facility was inspected internally and externally and found to be safe and secure, with only minor maintenance requirements.

7.1.7 Carl Grant commended the involvement of Traditional Owner stakeholders, and noted that there was a good level of detail in the document he reviewed.

7.1.8 Barry Hart queried the fourth point (the focus of the clean up) noting that high priority areas were not getting dealt with in the short term work. Arthur Johnston noted that this aspect was dealt with in other documents.

7.1.9 Jill Fitch queried the need to make information more widely available to the scientific community through literature and/or conferences. Arthur Johnston noted that the Alligator Rivers Region examples are very low risk when compared with some international examples. Alex Zapantis added that papers had been published and that conference presentations had been made on this project.

7.1.10 Jill Fitch noted that stakeholder consultations were very important and becoming increasingly important in the international context.

7.1.11 Julian Barry noted that the consultation with Traditional Owners had paid off, but noted that money was needed if a containment area is to be developed in the GLT area. He added that funding was being sought from government. Barry Hart offered to make comment in his letter to the Minister.

7.1.12 Julian Barry updated the meeting on relevant social impact research issues. The key issues are:

- KRSIS – Although Bob Collins' term as Chair expired in 2001, KRSIS initiatives such as education (Jabiru Area School), housing and health keep bubbling along and have taken on a life of their own. Attention is now shifting to future arrangements in relation to monitoring of social impacts and the net local social effects of policies and programs in the region. Discussions are occurring both bilaterally between Parks Australia and the Northern Land Council and in the separate context of the renegotiation of the ranger mining agreement (the Section 44 agreement).
- Ongoing discussion about economic opportunities for Traditional Owners is continuing.
- Examination of methods of raising revenue for the Park (apart from increasing the Park use ticket).
- Development of new Plan of Management for Kakadu National Park, due for release later in 2003 or early in 2004.

- Jabiru Regional Sustainability Project (JRSP). This is an initiative of the Director of National Parks, ERA, GAC, Jabiru Town Development Authority, Northern Land Council and Northern Territory Government. It is a process to ensure the survival and growth of Jabiru and neighbouring communities. It consists of four layers:
 1. Simplify, consolidate and stabilise processes related to land tenure, property development and governance.
 2. Creating a shared vision for the future.
 3. Developing effective community development programs.
 4. Developing a centre for development and cooperation to progress the above. (support Traditional Owners, develop community info including social impact, including leadership and capacity building programs, developing a youth strategy, support local and regional business initiatives etc).

Action/Outcome No.15:

ARRTC members noted Julian Barry's report and commended the stakeholders for the work being done.

7.2 Parks Australia North Research

7.2.1 Dr Rod Kennett talked to members about PAN's research program, providing members with an update to the paper he presented in February 2002. He noted that research activities fell into one of two broad categories, internal research and external research. External is conducted under permit by external parties whilst internal research is conducted by Parks Australia unilaterally or in conjunction with a partner.

7.2.2 He then explained the permit process, especially in relation to traditional aspects such as Traditional Owner involvement. Max Finlayson noted that many external researchers lacked an understanding of the need to obtain permits prior to commencing work, and that they do not understand the land ownership of Kakadu National Park.

7.2.3 Rod then noted that external projects were diverse in nature, and that not all of them matched PAN's own needs.

7.2.4 He advised that PAN has tried to develop strategic links with other organisations. Rod then noted the highly positive relationship with the Environmental Research Institute of the Supervising Scientist, which is improving, and the relationship with Charles Darwin University, especially the Key Centre for Tropical Wildlife Management, and the Cooperative Research Centre for Tropical Savannahs. He also noted the relationship with the Department of Infrastructure, Planning and Environment. Within the context of ARRTC he was particularly enthusiastic about the relationship with ARRTC and hoped to see this develop further.

7.2.5 He then described some of the key projects on the tabled lists

7.2.6 Barry Hart then asked Rod about cane toads. Rod responded that cane toads are doing very well and are now being seen in Jabiru. He noted that they impact upon quolls and goannas, as well as broader fauna studies. He added that birds appear to be doing very well but quolls are suffering heavily. He then advised that they want to be in a position to let Traditional Owners know the impact on goannas, as they are an important bush food.

7.2.7 Max Finlayson then asked about the Northern Territory legislative assembly sessional committee inquiry into cane toads. Rod is not sure whether the report has yet been released, but noted that there had been talk of a Coburg Peninsula toad fence.

7.2.8 Doug Holdway queried whether the toads could be used as a resource by Traditional Owners, and Rod responded that the scope for significant reduction of numbers is likely to be very limited as they breed easily and profusely.

7.2.9 Rod finished off by talking about the Kakadu Research Advisory Committee, which has a very broad strategic plan. He noted that they have limited budget therefore difficult to prioritise projects.

Action/Outcome No.16:

ARRTC:

- Thanked Rod Kennett for his paper and briefing; and
- Undertook to provide him with the Key Knowledge Needs document when finished.

7.3 Department of Business, Industry and Resource Development

7.3.1 Tony McGill gave a presentation on the role of the Mines Division DBIRD. He described the *Mining Management Act 2001* and the changes of focus in relation to the regulation of mining activities in the Northern Territory that have occurred since the Act commenced on 1 January 2002.

7.3.2 Jill Fitch asked about the radiation management plan, and what processes were used for changes to the radiation management plan. Tony McGill advised that delegation for uranium-related matters would lie with the Minister (that is, not delegated downwards) and that changes to a radiation management plan would constitute a change to a Mine Management Plan.

7.3.3 Tony McGill tabled the document “Strategic Framework for tailings Management” published by the Ministerial Council on Mineral and Petroleum Resources and the Minerals Council of Australia. Tony advised that he could provide copies to Ian Loftus for distribution to members.

7.4 Northern land Council

7.4.1 Mark Foy noted that it had been an interesting meeting, and that it was useful to get an external perspective on the issues.

8 –Other Business

8.1 NGO Representative

8.1.1 Arthur Johnston updated members on the status of moves to have an NGO representative included as part of ARRTC. He advised that the environment NGOs, through the National Environment Consultative Forum (NECF), had not yet acceded to the Minister’s request for several nominations and that the Minister was not prepared to make a nomination on the basis of a single nomination.

8.2 Senate Inquiry into the Environmental Regulation of Uranium Mining

8.2.1 Arthur Johnston advised members that the report of the Senate inquiry into the environmental regulation of uranium mining had been delayed again. Tabling is now expected on 14 October 2003. He advised that there is a good chance that this date will be met.

8.3 ARRTC Operations

8.3.1 Arthur Johnston advised that the issue of finance had been resolved. The Department of the Environment and Heritage will pay sitting fees for the meetings together with two days for meeting preparation. Consultancy fees are also paid when additional out of session work is undertaken.

8.3.2 Arthur noted some concerns that ARRTC was not functioning as a single committee, but as independent members versus other members. He noted that he understood why this problem occurred and noted that it resulted in a number of problems. He noted example of 10th meeting in September 2002 when the independent members met with Traditional Owners but other members did not. Barry Hart noted that TOs had expressly indicated that they only wanted to meet with the independent members.

8.3.3 Ray Evans noted that actions/outcomes were now being formalised in the summary records of meetings. He also suggested that more social interaction between ARRTC and other stakeholders would be appropriate. Jill Fitch agreed that there had been a lack of opportunity to interact with the staff of the Environmental Research Institute of the Supervising Scientist.

9 – Close

9.1 Meeting Close

9.1.1 Barry Hart concluded the meeting by extending thanks to those involved in planning and organising the meeting.

9.2 Next Meeting

9.2.1 Members discussed the dates for the next meeting and decided that it should be held on 15-16 March 2004. Barry Hart indicated that two days would be appropriate for the next meeting. Barry agreed that further interaction with stakeholders could be built into the next meeting.

9.2.2 Barry Hart advised that he felt there was a need to bed down the Key Knowledge Needs document and then align it with the two research programs

Addendum to Minutes of ARRTC Meeting of 9-10 September 2002

Detailed ARRTC Comments on Surface Water and Groundwater Monitoring Programs

Monitoring and assessment programs (focus on surface and groundwater)

- ARRTC received presentations on DBIRD, ERA and SSD programs for monitoring and assessing water quality in surface and groundwaters (and biological health in surface waters - SSD only).
- ARRTC requested a review of radiological monitoring & assessment programs at its next meeting.

DBIRD routine monitoring program

- DBIRD conducts a check monitoring program at both the Ranger and Jabiluka sites, as well as at Nabarlek.
- Revision of the DBIRD water quality monitoring program for Ranger (currently underway) appears to be sound and will continue to provide adequate assurance on the ERA results.

ERA routine monitoring program

- ERA undertakes both statutory (compliance) monitoring and operational monitoring. The latter is an integral part of the management of the mining, milling, environment, safety and health components of the minesites.
- ERA's water quality monitoring program at Ranger is currently being revised. It will be focused largely on-site, with monitoring at exit points and strategic monitoring close to major sources to provide early warning of problems.
- These revisions appear to be based on a sound assessment of the focus, relevance and flexibility and are sensible and appropriately rigorous.
- The program should provide adequate confidence on the extent to which the Magela Creek (and Kakadu environment) is receiving contaminants from the Ranger site.

SSD routine monitoring program

- SSD now undertakes a program of what could be called assurance monitoring, which consists of two components:
 - Assessing the extent to which the biological diversity of aquatic ecosystems downstream of Ranger and Jabiluka are changed,
 - Ensuring that adequate early warning systems are in place to enable management interventions prior to the results of the above being obtained.
- *Biodiversity monitoring* - occurs at sites upstream and downstream of Ranger and of Jabiluka, and at a number of control sites in other catchments using a full MBACIP design. Fish community structure measurements are made at the end of the wet season as are macroinvertebrate measurements associated with Ranger. Macroinvertebrate measurements associated with Jabiluka are made on a monthly basis during the wet season. This experimental design is appropriate.
 - ARRTC regards this program as constituting current best national and international practice.

- ARRTC recommends that SSD should keep a watching brief on national and international developments in this field and revise the program as appropriate in the light of such developments.
- *Early warning monitoring* – currently a chemical sampling and analysis program and a biological creekside testing program are undertaken
 - ARRTC is confident that together these two programs constitute an adequate and appropriate early warning system.
 - ARRTC questioned the use of a BACIP design in the creekside biological program rather than a full MBACIP design. After review we are confident that this is design is appropriate (we recognise that this has some limitations but that interpretation of results will take note of other relevant information, such as chemical monitoring data).
 - ARRTC also noted that additional assurance can be gained from the ERISS pre-release toxicity testing and bioaccumulation programs, and from the ERA on-site chemical monitoring program.
 - ARRTC considered that event-based monitoring is not necessary or justified in the context of the program designed to assess downstream environmental protection because of the use of appropriate biological monitoring techniques, but it could have a valuable role to play in the early warning and investigation of events on mine sites.
- *Community expectations* – ARRTC recognises the need for the regulation and monitoring system in place to address the expectations of the community, some parts of which are not comfortable with assurance based solely on scientific assessment. SSD has attempted to address this need by using (a) an assessment system that is based on overall assessment of environmental protection using best practice science, and (b) striving to meet the expectations of local aboriginal people by adopting a “focus” and “action” level system based on natural fluctuations.
 - ARRTC concludes that this is an appropriate way to address community expectations.
 - Our discussions with the Kakadu Board of Management suggests that more could be done to communicate in plain English the monitoring results to local aboriginal people.
- *Overall assessment* – ARRTC is impressed with the water component of the SSD monitoring program. A number of lines of evidence (“weight-of-evidence” approach) are used to make a final assessment regarding protection of the downstream aquatic ecosystems of Kakadu National Park.
 - ARRTC agrees that if the SSD routine monitoring program is effectively implemented and no statistically significant effects are observed, the community can be confident that the downstream aquatic ecosystems have been protected.

Integration of the three monitoring programs

- ARRTC noted that:
 - the three programs are sensible and appropriate and appear to be well integrated
 - There is minimal overlap and duplication between the programs (and where this does occur it is appropriate)
- ARRTC noted that the chemical analyses for the three programs are done by the same external laboratory. We consider this arrangement is acceptable provided current QC/QA

arrangements are maintained. ARRTC intends to review these arrangements in more detail at its next meeting.

Landscape monitoring program

- ARRTC noted and discussed a paper by ERISS on specific proposals for further development of a Landscape Program. We also noted that a considerable amount of discussion has taken place with a range of stakeholders in developing this program, and that the extensive baseline research of ERISS and other organisations in the later 1970s and early 1980s should provide a sound basis for many projects in this program.
- ARRTC concluded that:
 - The Landscape Monitoring program should proceed with the aim being to identify the landscape/process-based elements which contain both the Jabiluka and Ranger projects,
 - There would be benefit in further developing the linkages between the mining-driven program developed by ERISS and the larger scale issues being addressed by Parks Australia North,
 - The risk assessment basis of the program is sound, and that the conceptual framework for the program should be expanded to show linkages, pathways and interactions,
 - Cultural perspectives should be included in the analyses as proposed, and where possible PAN and NLC provide assistance/advice,
 - The development of remote sensing and GIS methods will be important for this program (see also earlier).
- ARRTC recommends that the specific projects contained in the 2002-2003 ERISS work plan proceed, and that a status report be provided at subsequent ARRTC meetings.

Summary of Actions/Outcomes

<i>Action/Outcome No.1:</i>	<p>ARRTC:</p> <ul style="list-style-type: none"> • Endorsed the draft Summary Record of the 11th Meeting subject to the following amendments: <ul style="list-style-type: none"> • Page 3 – delete “Outcome/Action: Members need enough information to be informed that the science is sound”; • Page 3 – replace “there was discussion” with “ARRTC noted that”; • Page 3 – insert “as project planning and implementation occurs” immediately after “... conceptual model of the system developed”; • Page 15 – replace the term “outsiders” with “non-members” and replace “at ARRTC meetings” with “at entire ARRTC meetings” after; and • Correction of typographical errors. • Asked that future Summary Records be numbered in accordance with the numbering used for Agendas.
<i>Action/Outcome No.2:</i>	ARRTC resolved to include Barry Hart’s summary notes (as shown at Attachment A) of the 10th ARRTC meeting as an addendum to the Summary Record of that meeting which were endorsed by ARRTC members at the 11th meeting.
<i>Action/Outcome No.3:</i>	Tony Milnes and Arthur Johnston will work to finalise the Key Knowledge Needs document and then provide it to Barry Hart with the aim being to circulate to ARRTC members by Christmas 2003 with discussion to occur at the March 2004 ARRTC meeting.
<i>Action/Outcome No.4:</i>	Tony McGill will provide the Radiological Audit report to Jill Fitch.
<i>Action/Outcome No.5:</i>	<p>ARRTC:</p> <ul style="list-style-type: none"> • Noted the information provided by Dr Max Finlayson, and that ERISS has picked up the essence of the Key Knowledge Needs and is heading in the right direction; • Acknowledged the efforts of the Director and staff of ERISS in producing the work plan and responding to the Key Knowledge Needs; • Noted that the ERISS work plan was in a state of transition as realignment of projects continued; • Noted that ERISS publications could be made available upon request; • Noted the explicit identification of performance indicators, and looks forward to seeing progress; and • Noted that Tony Milnes will provide an update on Ranger final landform planning at the next ARRTC meeting. <p>Arthur Johnston undertook to provide a copy of the SSD bibliography to ARRTC members.</p>
<i>Action/Outcome No.6:</i>	ARRTC noted the paper and thanked Dr Tony Milnes for his presentation.

	ARRTC looks forward to a more detailed research plan, reflecting the Key Knowledge Needs, from ERA at the next meeting.
Action/Outcome No.7:	ARRTC: <ul style="list-style-type: none"> • Noted the paper on sediment modelling and thanked ERISS staff for their work; and • Noted that more work needed to be done in relation to sensitivity.
Action/Outcome No.8:	ARRTC: <ul style="list-style-type: none"> • Noted the paper on hydrological gauging and commented that the rationale is being worked on; • Noted the potential for rationalisation of gauging stations; • Asked Ray Evans and Gerald Nanson to talk with ERISS and the OSS in relation to progressing the issue; and • Noted that Parks Australia should contribute to discussions on hydrological gauging.
Action/Outcome No.9:	ARRTC: <ul style="list-style-type: none"> • Noted Ian Hollingsworth's presentation on mine closure criteria; and • Endorsed the approach, but expressed concern about whether a functional ecosystem could be reinstated, and the need to effectively canvass social values.
Action/Outcome No.10:	ARRTC: <ul style="list-style-type: none"> • Noted the presentation on wetland filters, and noted their role in both operational and post-mining phases; • Requested that the identity of the <i>Elocharis</i> species be confirmed and that this be taken into account in future work; • Indicated that the information provided gave them a lot of confidence in performance of the wetlands filters; • Expressed support for the risk-based approach used in the EWLS report; and • Thanked David Jones for his presentation and paper.
Action/Outcome No.11:	ARRTC thanked Carl Grant for his briefing and noted that it provided useful information for members.
Action/Outcome No.12:	ARRTC members: <ul style="list-style-type: none"> • Noted that radiological monitoring is a high priority area for ARRTC; • Welcomed the opportunity to be involved in the process; • Noted that it could not proceed any further until further information was provided; • Agreed that Jill Fitch would review Ian Marshman's paper and provide feedback to ARRTC at the next meeting; and • Sought an updated paper from ERA (with statistical analysis) for presentation to the next meeting.
Action/Outcome No.13:	ARRTC noted that: <ul style="list-style-type: none"> • The method used to evaluate the approach for land application was the same as previously used, and that this analysis was appropriate within the available data and understanding; and • There had been easy access to information regarding the proposal to return materials to the decline, specifically an

	<p>analysis by Dr Franz Kalf and associated review comments by Dr Colin Dudgeon.</p> <p>ARRTC endorses monitoring and evaluation activities related to the long term care and maintenance phase that will develop further the conceptual models underpinning the various decisions.</p>
<i>Action/Outcome No.14:</i>	<p>ARRTC members:</p> <ul style="list-style-type: none"> • Noted that preliminary assessment process was appropriate; and • Noted that the operational requirements including contingencies and monitoring needs to be addressed in the formal application.
<i>Action/Outcome No.15:</i>	<p>ARRTC members noted Julian Barry's report and commended the stakeholders for the work being done.</p>
<i>Action/Outcome No.16:</i>	<p>ARRTC:</p> <ul style="list-style-type: none"> • Thanked Rod Kennett for his paper and briefing; and • Undertook to provide him with the Key Knowledge Needs document when finished.