Australian Government

Department of Sustainability, Environment,
Water, Population and Communities
Supervising Scientist

# ALLIGATOR RIVERS REGION ADVISORY COMMITTEE
# 33RD MEETING - 21 APRIL 2010

## SUMMARY RECORD

Supervising Scientist Division
Darwin NT

| Agenda Item | | Action |
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| **1** | **Welcome** | Chair |
| **2** | **Apologies and Observers** | Chair |
| **3** | **Draft Minutes – ARRAC32** | Chair |
| **4** | **Actions Arising – ARRAC32** | Chair |
| **5** | **ERA Developments** | ERA |
| **6** | **Supervising Scientist Report** | SSD |
| **7** | **NT Dept of Resources Report** | DoR |
| **8** | **Member Reports** | |
| 8.1 | Uranium Equities Ltd | UEL |
| 8.2 | Cameco Pty Ltd | Cameco |
| 8.3 | AREVA NC Australia Pty Ltd | AREVA |
| 8.4 | Northern Land Council | NLC |
| 8.5 | Environment Centre NT | ECNT |
| 8.6 | Australian Radiation Protection and Nuclear Safety Agency | ARPANSA |
| 8.7 | Australian Government - Department of Resources, Energy and Tourism | DRET |
| 8.8 | Parks Australia North | PAN |
| 8.9 | NT Department of Health and Families | DHF |
| 8.10 | NT Department of Natural Resources, Environment & the Arts & Sports | DNRETAS |
| 8.11 | West Arnhem Shire Council | WASC |
| 8.12 | Gundjeihmi Aboriginal Corporation | GAC |
| 8.13 | Other | |
| **9** | **Other Members Report** | |
| **10** | **Next meeting** | |

## 1 Welcome – Chair

Mr McAllister provided the OHS and evacuation procedures and the Chair opened the meeting.

## 2 Apologies and Observers – Chair

The Chair noted apologies from the following members:

**Apologies**

| Name | Organisation |
|---|---|
| Dan Janney | Energy Resources of Australia Pty Ltd – Ranger Mine |
| Cathy Waldron | NT Department of Natural Resources, Environment, the Arts and Sport |
| Stephen Baldwin | West Arnhem Shire Council |
| John Hughes | Northern Land Council |
| Justin O'Brien | Gundjeihmi Aboriginal Association |
| Stuart Blanch | Environment Centre of the Northern Territory |
| Richard O'Brien | Australian Radiation Protection and Nuclear Safety Agency |
| Xavier Schobben | NT Department of Health and Families |
| Peter Cochrane | Parks Australia |
| Phillipe Portella | AREVA NC Australia Pty Ltd |
| Gillian Jan | Office of the Administrator of Northern Territory representative |
| Michael Sheldrick | Department of Resources, Energy and Tourism |

The Chair noted the attendance of the following Members, Deputy Members and Observers:

**Members/Deputy Members**

| Name | Organisation |
|---|---|
| Prof Charles Webb | Chair |
| Alan Hughes | Supervising Scientist Division |
| Richard McAllister | Supervising Scientist Division |
| Todd Simms | Energy Resources of Australia Ltd |
| Russell Ball | NT Department of Resources |
| Gary Martin | NT Department of Resources |
| Sharon Paulka | Representative Uranium Equities Limited |
| Melanie Bradley | Environment Centre of the Northern Territory |
| Jennifer Parks | Cameco Australia Pty Ltd |
| Malcolm Kerr | Cameco Australia Pty Ltd |
| Peter Johnston | Australian Radiation Protection and Nuclear Safety Agency |
| Alister Trier | Office of the Administrator of Northern Territory representative |

| | |
|---|---|
| Nicole Hinton | Department of Resources, Energy and Tourism |
| Geoff Kyle | Gundjeihmi Aboriginal Association |
| Howard Smith | Northern Land Council |
| Russell Robinson | NT Department of Health and Families |

**Observers**

| Name | Organisation |
|---|---|
| Grant Williamson | Uranium Equities Limited |
| Jody Clark | Energy Resources of Australia Ltd |
| David Jones | Supervising Scientist Division |
| Michelle Bush | Supervising Scientist Division |
| Ewa Madon | Supervising Scientist Division |
| Alison Frostick | Supervising Scientist Division |
| Krissy Kai-Nielsen | Supervising Scientist Division |
| Keith Tayler | Supervising Scientist Division |
| Mike Welch | NT Department of Resources |
| Shamsa Syeda | NT Department of Resources |
| Alana Mackay | NT Department of Resources |
| Natalie Pilon | NT Department of Resources |
| Michelle Iles | Energy Resources of Australia Ltd |
| Alan Puhalovic | Energy Resources of Australia Ltd |

## 3 Draft Minutes – ARRAC32 - Chair

Table of contents item 8.9 should say Department of Health and Families. Page 23 should be Mr Robinson instead of Mr Ahmed who gave the report.

Nicole Hinton reporting for DRET.4 Actions Arising – ARRAC32 – should have read Michael Sheldrick.

***ARRAC33 action 1: SSD to amend ARRAC32 minutes before posting final version to the Supervising Scientist Division website.***

## 4 Actions arising

Nil.

## 5 ERA Developments – ERA

Mr Simms gave the organisation overview.

*ERA Overview*

Mr Clark explained an aerial photograph of the Ranger mine site and gave an overview of key site features.

*Safety performance*

2009 results for all injury frequency rate (AIFR) was .68 and lost time injury frequency rate (LTIFR) was .34

*Safety performance across Rio Tinto*

Mr Clark presented the Rio Tinto safety performance by managed business. This was presented as an all injury frequency rate across all Rio Tinto sites on a 12 month rolling AIFR per 200,000 hours worked. ERA fell within the limits of the AIFR target.

*Business operations; mining and production*

Mr Clark provided figures for the volume of material moved and for $U_3O_8$ production (drummed) in charts.

*Business operations*

ERA's sales contract position

Contracts are generally 3 to 5 years in duration. First delivery is usually provided 2 to 4 yrs after the agreement is finalised. Contracts contain a mixture of pricing mechanisms including fixed price/base escalated, linked to market indicators, and negotiated price. Legacy contracts containing large volume flexibilities and low ceiling prices have steadily been replaced by higher-performing contracts.

Business operations

Mr Clark showed a pie chart describing sales to North America (57%), Asia (24%), and Europe (19%) for 2009.

*Ranger 3 Deeps update*

An Order of Magnitude study is due to be completed by mid 2010. Positioning of the portal in the south east quadrant outside of final pit wall so as not to compromise current mining operations. The proposed underground drilling will focus on improving knowledge of Ranger 3 Deeps & exploring possible extension at depth. ERA anticipate submitting an application to MTC for approval before mid-2010. Decline development is targeted to commence in late-2010 with underground drilling commencing in 2011.

*Market – outlook*

Near term

ERA outlined that spot prices are expected to remain volatile due to the uncertain marke, with supply disruptions adding to volatility. The spot price does not reflect long-term fundamentals and western utilities are largely covered for next few years. Demand remains discretionary and price-senstivie in the near term.

Longer term

Financial crisis is likely to delay or impede new mining projects. Weak uranium prices and weak US dollar is making new projects uneconomic. Market will be heavily dependent on Kazakhstan expansions where significant exploration is underway. Economic crisis will slow new reactor construction in the west, but probably not in China.

*Market*

Ranger produces fuel for approximately one per cent of worlds electricity. In 2008 Australia produced 8430t of uranium, Ranger produced 5339t, 63.3% of the total. 5339t of Australian

$U_3O_8$ can fuel approximately 182TWh. 182TWh is approximately 1% of global electricity production and equal to 60% of Australia's domestic electricity production. Ranger's electricity production is equivalent to 69.5 million tonnes of thermal coal produced in 2008, equating to 60% of Australia's exports of thermal coal in 2008.

*Exploration projects*

Priorities

Priorities for exploration around Ranger are areas incorporating Ranger 1 Deeps, Anomaly 8, Anomaly 4 and Ranger 18 South. ERA are also focussing additional resources towards Ranger 3 Deeps. Ranger 3 Deeps have a prospective depth 200m to 600m and ERA are targeting key structures identified from previous Ranger 3 Deeps work & geophysical data.

North RPA

Prospects in this area include Ranger 18, Ranger 19 and Ranger 48. ERA are focussing on standalone mineable resources. Drilling will be to a prospective depth of 100m to 600m and will be targeting structures identified from historic drilling & geophysical data.

East RPA

ERA outlined that they have no existing prospects in this area. Drilling will focus on standalone mineable resources to a prospective depth of 50m to 600m. Drilling is based on conceptual targets.

*Pit #3 south wall instability*

Stability modelling

Two- and three-dimensional numerical modelling has been completed on the un-weighting of the southern wall. Modelling has demonstrated that southern wall will remain stable as long as horizontal drains continue to be drilled in conjunction with cutback.

Detailed Monitoring

Prism monitoring on the South Wall has shown no significant increase in movement other than during monsoonal rain in late December, early January and on Monday 01 Feb 2010.

*Ranger Heap Leach Project*

A feasibility study was commenced on 2 November 2009 with a project team located in Brisbane. The Guidelines from the Northern Territory and Commonwealth governments are the framework for development of an EIS. ERA outlined that a Social Impact Assessment is underway and stakeholder consultations progressing. Key dates are:

- EIS completed mid-2010 in parallel with
    - Feasibility study to be completed Q4 2010
- Project implementation anticipated 2011 – 2012
- Project completion anticipated Q1 2013

*Ranger 3 Deeps*

ERA outlined details of one possible location for the entrance to the exploration decline (provisional layout and decline design concept). ERA outlined the cut & cover portal concept by showing a photograph from another mine exploration decline (to demonstrate how the shaft will look from above ground).

*Housekeeping Improvements*

ERA outlined a number of areas where recent improvements have been made across the site. Before and after photographs were shown of the upgrade to the leach tanks and the vehicle lay-down area.

*Water Management at ERA*

Ms Iles presented information on water management at ERA to the committee.

Ranger Authorisation

There has been three recent variations to the Ranger Authorisation, with the most current version being 0108-12:

- Cutback Pit#3 wall extending beyond Shell 50
- Raise the TSF MOL in conjunction with RL54m crest
- Alter submission date for the Annual Water Management Plan

Water Management Plan 2009/10

The 09/10 Water Management Plan (WMP) was submitted for stakeholder review on 30 September 2009. An updated WMP and response to stakeholder comments was issued on 28 January 2010. The WMP was again revised to remove reference to discharge via MG001 and reissued on 5 March 2010. The WMP was approved by stakeholders on 24 March 2010.

Wet Season 2009/10

A chart was shown detailing the current wet season to date (01/10/09 – 19/04/10) rainfall total 1592mm against the average of 1584mm. April 2010 rainfall to date is 351mm and the average is 77mm.

Process Water Inventory

A chart was shown with volumes in the process water inventory. As of 31st March 2010, the TSF was holding approximately 9591ML of process water and Pit#1 was holding approximately 238ML of process water.

Pond Water Inventory

A chart was shown with details of the pond water inventory. As of 18 April 2010 RP2 was holding approximately 1042ML and Pit#3 was holding approximately 1193ML of pond water. Process water inventory management has impacted pond water inventory (such as works to reduce the Pit#1 catchment and implementing findings of the water audit). Management of RP1 water quality and level has also impacted pond water inventory.

Water Treatment Plants

The process water treatment plant was commissioned in September 2009 at ~1.1ML/d feed rate. Process water permeate reported to cell 1 of the Corridor Creek Wetland Filter (CCWLF) at rate of 0.7 ML/d beginning on 01 October 2009. Treatment plant operations ceased on 28 December 2009. The total volume of water treated was ~58ML.

Pond water treatment plants WTP1 and OWTP ceased operations on 08 April 2009. WTP1 was commissioned on 9 January 2010 and OWTP on 14 January 2010. Active discharge of permeate to cell 1 of CCWLF occurred from 18 January 2010. Total volume of pond water treated in 2010 to date: WTP1 ~530ML; OWTP ~540ML.

Tailings Management

Tailings deposition within Pit#1 ceased in November 2008. Pit #1 now functions as an active process water storage facility regulated with an internal MOL. Tailings deposition within the TSF recommenced in November 2008 and this continues to function as an active tailings and process water storage evaporation facility. The draft deposition plan and OMS manual is currently under review. A tailings surface survey was completed in March 2010 to assist development of the deposition strategy. Works to lift the TSF crest to RL54m were completed in 2009 with the MOL approved in December 2009.

Surface Water Quality

ERA presented a series of charts which showed electrical conductivity (EC) and filtered uranium for Magela, Gulungul and Swift Creeks.

The pipeline was re-installed from RP1 to MG001 for disposal (under favourable conditions) of RP1 water to Magela Creek. Disposal at MG001 will allow for greater mixing than that which is currently achieved when waters are released from Coonjimba Billabong. An MTC Notification was submitted and conditional approval was granted on 29 January 2010. A second interim approval was later granted on 12 March 2010 for a further 7 day release period. ERA utilized the RP1 to MG001 disposal option (under favourable conditions) with disposal of ~37 ML in 2010. Releases via MG001 have ceased with expiration of the conditional approval on 13 April. Water quality data from the 6-7 April release was submitted to stakeholders in April. ERA is currently interpreting the data prior to further consultation with stakeholders on utilization of RP1 to MG001 as a disposal mechanism in 2010/11 wet season. A phase 1 program is planned to reduce solute load reporting to RP1 and conceptual engineering designs are under review for implementation in 2010. A phase 2 program to mitigate existing solutes will follow.

ERA presented a chart detailing EC and flow in Magela Creek for the period of the managed release from RP1 to MG001 from 6-7 April.

Process Water Strategy 2010-2020

ERA presented a gannt chart detailing the operational activities from 2010 to 2020.

Process Water Solar Evaporator

The process water solar evaporators have a transparent rook which prevents ingress of rainwater. They operate on a principle similar to a solar cell: the cover allows solar radiation to heat the air and water thereby raising the airs water carrying capacity. Fans are then used to draw unsaturated air over the water surface disrupting the moisture barrier layer .

Solar Evaporator Pilot Facility

ERA presented diagrams detailing the process of extraction for the Solar Evaporator Pilot Facility. ERA submitted a notification to the MTC on 9 March 2010 for the construction of Stage 1 solar evaporators and has received feedback from DoR and SSD. Other details provided included:

Location: Brownfield site north of TSF

Number: 130-150 (under review)

Dimensions: 5.4 x 100 m

Construction: 2010 dry season

Commission: Q4 2010

Design: Concrete bunds on engineered base, double lined with leak protection, purpose built process water pipelines and corridors with flow leak detection, run-off collection pond for water management based on quality.

RP1 Managed Release to MG001 (6-7 April 2010)

Mr Clark explained the EC and Flow data for the Magela Creek.

Clay borrow Area SW of the TSF

ERA presented an aerial photo detailing the location of the South Western TSF runoff sump. Photos of the reconstructed sump (taken on 27 January 2010) were shown. ERA outlined the cause of the failure and remedial actions undertaken. The basin filled to overflowing and placed considerable seepage pressure on the bund. Soils on either side of the washout zone were not appropriately compacted and prone to internal erosion and piping when water levels within the basin are high. Filter materials used did not have adequate permeability for required drainage. Flow from additional catchments reported to the basin. Remedial actions undertaken included filling the eroded breach with coarse free draining rockfill of approximately 250mm. The rockfill was placed on a bed of finer granular material approximately +50/-150mm. Rockfill was compacted into the soil on either side of the breach and on the inner face of the embankment. During the dry season ERA will assess the filter drail and drainage pipe integrity. ERA are establishing engineering standards for all water management related infrastructure.

*Discussion*

Mr Robinson questioned the portal ventilation in the exploration tunnel. Mr Simms explained that the project is not yet at that level of design.

Mr Johnston asked if there will be a detailed Environmental Impact Statement (EIS) for the underground exploration project. Mr Simms and Ms Iles explained that the project will go through an Minesite Technical Committee (MTC) process. Mr McAllister stated that underground exploration had been referred under the EPBC Act and had been determined not require an EIS. Future underground mining would be reassessed under the EPBC Act and at this point may call for an EIS in that instance.

Mr Johnston expressed concern at the Radon levels in the underground exploration tunnel. Ms Paulka explained the engineering design associated with air circulation down the shaft. Mr Clark confirmed it would all be part of ERA Operations.

Mr Kyle questioned if ERA planned lift Tailings Storage Facility (TSF) to RL57. Mr Clark confirmed that it was only an option that was looked at for water inventory. Preliminary designs were drafted for a 1 metre lift. ERA are now looking at catchment diversions and evaporation plans instead of the lift.

Mr Kyle commented on the failure of the clay pit – the data demonstrated no impact, however uranium levels were high before the incident and questioned if ERA were going to invesitgate source of that. Mr Clark stated that the rock used for ring road construction may be the source of leaching uranium. The road was constructed from waste rock and therefore there may have been mixed with mineralised rock.

Ms Bradley questioned if the water management plan and process water plan where the same thing. Mr Clark confirmed that the water management plan is an annual plan that outlines different water classes, plans etc. The process water management strategy is a long term

strategic plan, highlighting elements of water management. Mr Puhalovich stated that the water management plan was available to stakeholders. It is also a requirement of the the Heap Leach EIS process that ERA place it on the internet as an accompanying document when out for public comment.

***ARRAC33 action 2: ERA to provide ECNT a copy of Water management plan***

Ms Bradley asked for a copy of the process water evaporation tunnels plans. Mr Puhalovich stated that Ms Bradley should speak to Department of Resources to acquire the plans.

Ms Bradley asked for a copy of the data from the release at MG001 of RP1 water. Mr Clark stated that the data will be released once interpreted. Mr Puhalovich stated that ERA and SSD are in the process of interpreting data from that event.

***ARRAC33 action 3: ERA to provide ECNT a copy of interpreted data from the MG001 release event.***

Ms Bradley asked where the process water tunnes would be located. Mr Clark clarified they are planning to place the evaporation tunnels on the northern side of the TSF on existing rock stockpiles. ERA is currently monitoring bores in that area. Mr Puhalovich added that the process water evaporation tunnels will include leak detection units and monitoring bores downstream of their location.

Ms Bradley asked about if feedback on the Aquaterra report was sought and if it has been collated into one document. Mr Puhalovich stated that SSD commissioned Aquaterra to review the Ranger tailings dam in performance seepage. No comments were sought. Mr Martin confirmed that SSD distributed the report to stakeholders but no feedback sought. It was not a formal review as such. Mr Kyle stated that there is a working group currently reviewing information and data on groundwater on site and particularly around the TSF. There will be a meeting in Melbourne next week. Mr Puhalovich explained the purpose of the working group. The key outcome is to advise what ERA should do to further enhance understanding of the TSF groundwater system. Mr Hughes questioned who commissioned the review of all of the reviews. Mr Puhalovich confirmed that there was a review of all the available data on the TSF. ERA commissioned that review. Mr Kyle stated that experts are reviewing the entire 30 year history of groundwater to get a better idea of what's happening. Ms Bradley asked if the review will pick up on where further monitoring needs to be conducted. Mr Puhalovich confirmed that this was correct. Ms Bradley asked if ERA and the working group plan to report yearly. Mr Puhalovich stated that it will be a compendium of historical rather than current monitoring. It's not a requirement for ERA to provide historical data. All current data is reported in the annually submitted wet season report. This report covers all bores on site, TSF, irrigation areas etc. Mr Martin stated that the wet season report is a requirement under the authorisation.

Prof Webb enquired into the significance of incident reporting. NTG reported 20 safety and 58 environmental incidents. Prof Webb noted that ERA discussed only 2 incidents and asked why are the rest of the incidents were not worthy of being brought to attention of ARRAC. Mr Martin confirmed they were minor incidents such as hydrocarbon spills. Prof Webb emphasised the point of only some incidents being brough up and others not. Ms Bush agreed that the issue of incident reporting been a concern of SSD for a while. At the next MTC stakeholders are expecting to receive an update of how incident reporting is done and conveyed to stakeholders. Mr Martin stated that incidents are followed up as part of the Routine Periodic Inspection (RPI) program.

## 6 Supervising Scientist Report - SSD

Ms Bush presented an update on audit and inspection activities to the committee.

Ms Bush advised of an update on the structure and staff of Supervision and Assessment at OSS and provided group contact email details.

*Audit and Inspection: August 2009 to April 2010*

Ranger RPIs

The supervising authority has undertaken eight routine periodic inspections (RPIs) at Ranger and two at Jabiluka during the reporting period. Stakeholders have also completed the annual audits at Nabarlek and west Arnhem exploration sites. Ms Bush outlined the purpose of the RPIs, which included review of outstanding audit findings, and outlined some examples of sites at Ranger that were inspected during recent RPIs. Such sites / issues included:

- Non return valves on potable water fittings
- Erosion plots on the trial landform
- Sed2b extension works
- Sand filters incident
- Tailings infrastructure
- MG001 discharge location
- Pilot evaporation tunnels
- Hydrocarbon bulk storage
- Process plant bunds and housekeeping.

*2009 Audit findings*

Ms Bush presented an overview of the findings of the 2009 audit of the water management plan at Ranger. One conditional finding remains outstanding relating to the introduction of micro-purging techniques on slow recharge bores. ERA have informed stakeholders that a pilot program is underway and a report on the outcomes of this program is due in June 2010.

Jabiluka RPIs

Ms Bush described some of the sites visited during the Jabiluka RPIs since the last ARRAC meeting. These included:

- Djarr Djarr
- Monitoring locations in Swift Creek
- Interim Water Management Pond
- Vent raise

*Nabarlek Audit*

Ms Bush informed the committee that stakeholders audited the Nabarlek Mine Management Plan in November 2009. The audit found 11 conditional findings which were mainly a result of internal structural changes within UEL and a lack of progress with the proposed drilling program.

*West Arnhem Exploration Audit.*

Ms Bush stated that the stakeholders audited the Mine Management Plan submitted by Cameco for their exploration operations at Myra Camp and King River. The audit found two conditional findings.

*Upcoming work*

Ms Bush outlined that the following activities were planned prior to the next committee meeting:

- Ranger and Jabiluka audits from 17-20 May 2010
- South Alligator Valley inspection in June
- Nabarlek site inspection in June
- RPIs at Ranger and Jabiluka

*Discussion*

Nil.

Ms Frostick presented an overview of the surface water monitoring program at Ranger and Jabiluka for the wet season to date.

Ms Frostick presented a mpa showing the monitoring locations in Magela, Gulungul and Swift Creeks and outlined that the surface water program at Swift Creek is by continuous monitoring only.

*Magela Creek*

A chart was presented showing the level of rainfall for the 2009/10 wet season to date against the previous thiry years and the average yearly rainfall.

Information was presented about the surface water quality programs that are undertaken by SSD in each of the creeks.

A chart was presented showing continuous monitoring traces of electrical conductivity and water level in Magela Creek over the 09/10 wet season. This chart also highlighted periods of time when ERA were actively and passively releasing water from the site.

Ms Frostick presented a chart that demonstrated a comparison between the SSD and ERA continuous monitoring results at MCDW, 009E, 009C and 009W during the high rainfall event in April.

A chart was presented showing a comparison of the electrical conductivity vs discharge in Magela Creek for the 09/10 wet season against previous wet seasons. Ms Frostick highlighted that the range shown for the current wet season is comparable with previous wet season results.

A chart was presented showing ERA grab sample data results for electrical conductivity in RP1 over the last few years. The chart shows an increase in EC levels since the 2008/09 wet season.

Ms Frostick presented a chart of EC and magnesium concentrations in Magela Creek over the last few wet seasons. This chart showed that magnesium concentrations follow similar patterns to EC and the current wet season is comparable with previous wet season results.

A similar chart was shown of EC and uranium concentrations in Magela Creek for the same period. The current wet season data is comparable with previous wet season results.

Ms Frostick presented the results for Radium-226 in Magela Creek and highlighted that only 2 monthly composite samples taken this wet season have been analysed by EnRad to date. The chart showed that the data is consistent with previous wet season results.

Results for the in-situ snail monitoring were presented to the committee. Ms Frostick stated that the results show that whilst the data for 2009/2010 lies within the bounds similar to previous years there is lower egg production upstream of the mine site during the early wet season.

Results for the field toxicity monitoring of snails were shown. The chart showed that the mean difference value had decreased during the current wet season, however, lower production of snail eggs at the upstream site had been reported on many occasions during past creekside monitoring.

Ms Frostick presented the results for the mussel bioaccumulation studies. The mussel radionuclide data showed that the concentration factor for radium uptake in mussels from Mudginberri Billabong has not changed significantly over the past 25 years.

*Gulungul Creek*

A chart was presented which showed the EC in Gulungul Creek against the discharge for the wet season to date. The chart also showed EC results from samples collected at the downstream site by ERA, DoR and SSD and upstream grab sample results collected by ERA. The chart highlights the major discharge events in the creek and the corresponding impact at EC during the same time period.

Ms Frostick presented a comparison of the current wet season EC results against previous wet seasons and stated that the majority of the continuous monitoring results are comparable with records from previous wet seasons.

A chart was shown that compared EC and magnesium concentrations for the current and past wet seasons. Ms Frostick stated that the results show the contribution of magnesium sulfate to the EC as the graph profiles are very similar.

A similar chart was shown for EC and uranium concentrations. The results indicate that uranium concentrations, with the exception of one result, were below the Magela Creek *Focus* level. The higher concentration was only slightly higher in concentration.

*Ngarradj (Swift Creek)*

A chart was presented which showed the continuous monitoring traces for EC and discharge in Ngarradj (Swift Creek). The straight lines on the graph indicate that there were periods of time when the equipment was offline.

*Radiological Monitoring*

Radon decay product (RDP) concentration results for Jabiru and Jabiru East were presented. Ms Frostick indicated the 2009 dry season average RDP concentrations measured by ERA were 2-3 times higher than those measured by SSD during the same time period (July – September). It is possible that ERA measurements in the dry season may have captured temperature inversion conditions where radon becomes 'trapped' in the lower layer of air and which were missed by the SSD sampling schedule.

Results for long lived alpha activity (LLAA) were presented and both RDP and LLAA concentrations measured by SSD and ERA show the expected seasonal trend with higher values during the dry and lower values during the wet season. Higher RDP concentrations are expected in the dry season due to dry soil allowing greater permeation of radon into the

atmosphere, and LLAA concentrations are higher due to the dustier conditions during the dry season.

Ms Frostick presented a chart showing the results for RDP and LLAA at Mudginberri Four Gates Road radon station. These results show shows the quarterly averages of RDP and LLAA concentrations measured at Four Gates Rd radon station by SSD up to March 2010. The average airborne radionuclide concentrations measured in 2009 would translate into an annual total effective dose, including natural background, of 0.35 mSv from RDP ~ 0.015 mSv from LLAA. Only a small fraction of these doses would be due to mine-derived radionuclides.

*Discussion*

Mr Johnston questioned the use of dose constraint data in relation to radiological issues and that dose constraints did not appear to have been included. Mr Hughes stated that a propsed new radiation management system for Ranger was a point of discussion at the moment.

Mr Johnston questioned the dose limit for exploration. Mr Hughes stated that those issues are not being persued. Mr Robinson noted that pg 24 on the Mining Code includes the word 'recommend' and would suggest SSD reconsider using it in relation to possible dose constraints data.

***ARRAC33 action 3: SSD to address dose constraints for next ARRAC report***

Ms Bradley questioned SSDs ongoing research of the ecotoxicology of water quality pulse events. Mr McAllister explained the water quality guidelines set for Magela are based on upstream data. Ecotoxicology reaserch is focusing on the impact the duration of water quality events have on the ecosystem. The current system of focus, action and limit guidleines is based on the ecotox. results from routine grab sampling monitoring. SSD has a major ecotox. program in place to develop a set of trigger values for focus, limit and action based on the continous monitoring program. There has been previous ARRAC material and information on that.

Mr Kyle questioned why Gulungul Creek graphs have not shown a deterioration in water quality when the raw data over the last decade has. Mr Kyle noted that this has previously been attributed to rock runoff from TSF/seepage/infiltration and that the statement of no deterioration in water quality has not been quantitatively proven. Ms Frostick stated that there has been improvement to datasets with new continuous monitoring and that SSD has interpreted higher peaks of sulphate and EC as impacts from mineralisation in the Tailings Storage Facility ring road. Mr Hughes stated that it was safe to say there are mine related influences in the Gulungul catchment. Mr Kyle stated that the point is lost in such broad statements and that traditional owners are concerned about such impacts.

Mr Johnston commented that the presentation doesn't draw out difference between upstream and downstream very well and suggested that SSD examine another format to present the data.

***ARRAC33 action 4: SSD to examine another format to present upstream and downstream Gulungul monitoring data***

## 7 NT Dept of Resources Report – DoR

Mr Ball presented a report that includes the following information:

- A summary of approvals given during the reporting period

- A summary of safety and environmental incidents which occurred during the reporting period
- Groundwater comparison for sites sampled during the reporting period for Ranger, Jabiluka and Nabarlek
- A summary of data collected around the Ranger Tailings Storage Facility.

*Minesite Technical Committee Meetings*

Mr Ball outlined that there is a minesite technical committee (MTC) for each uranium mine in the Alligator Rivers Region (ARR). Committees consist of DoR, SSD, NLC and the operator. Ranger and Jabiluka MTC meetings are now held at two month intervals or more often if there are important issues to be dealt with. There were three meetings of the Ranger and Jabiluka MTC in the reporting period and two Nabarlek MTC meetings. Mr Ball outlined that the minutes to these meetings were included as an Appendix to the DoR report.

*Variations to the Ranger Authorisation*

Mr Ball stated that mine sites in the NT are authorised under the NT Mining Management Act. Mining authorisations can only be varied with the approval of the NT Minister for Primary Industry, Fisheries and Resources (Kon Vatskalis). There have been two variations to the Ranger authorisation during the reporting period and no changes to the Jabiluka or Nabarlek authorisations.

*Environmental and Safety Incidents*

Mr Ball stated that there were 78 incidents reported at the Ranger site during the reporting period. Of these, 20 were safety incidents that were reported directly to NT WorkSafe. Details on the safety incidents and their actions have been provided to NT WorkSafe. The incidents are listed on page 7 of the DoR report. Mr Ball stated that ERA would give a summary of the incidents in their presentation.

*Operational Approvals*

There were three applications by ERA for changes at the Ranger mine approved by the MTC during the reporting period. These approvals resulted in two variations to the Authorisation. Mr Ball outlined these applications as:

1. Southern bull nose cutback in the Pit 3 wall
2. The MOL of the TSF was raised following completion of the construction of the wall raise to 54m. The MOL will be 52.5m in the dry season with a maximum of 53m in the wet season allowing a capacity to contain a 1 in 1000 year rain event. This includes allowance for a freeboard of 1.5m at 1 December each year.
3. The Water Management Plan (WMP) submission date was changed to 1 October each year (previously it was two weeks from the end of October).

*Groundwater check monitoring at Ranger Mine*

Mr Ball informed the committee that check monitoring is conducted under the Working Arrangements between the Commonwealth and NT Governments. The monitoring program was conducted in March and September 2009. Monitoring is conducted at a number of bores. The data presented here covers the two statutory bores monitored by both DoR and ERA: OB38/1 Deep and OB27. There is also some discussion on monitoring around the tailings dam. Mr Ball informed the committee that details of the monitoring and graphed data is available in Appendix C.

*Ranger Statutory Monitoring Bores*

Mr Ball stated that the DoR Environmental Monitoring Unit (EMU) monitor surface and groundwater at the Ranger sites. As previously agreed, SSD will present surface water monitoring results to the committee and DoR will present the groundwater results. There are 2 statutory bores monitored at Ranger by DoR:

- Bore 83/1 situated in the Djalkmara catchments east of Pit #3, and
- Bore OB27 in the Georgetown catchments

*Monitoring Results*

Field samples were taken by DoR and ERA at different dates and times so there is some difference in the data collected. Mr Ball stated that the data shows good conformance between DoR and ERA. The exception is in EC readings where DoR readings are higher than ERAs. Magnesium and uranium also show fluctuations between DoR and ERA data in the longer term. However, these may improve as sampling times and methods are closer aligned. Mr Ball stated that a comparison of field calibrations and sampling procedures may address this.

*83/1 Deep EC Long Term Trends*

Mr Ball presented a chart showing ERA and DoR data of the long term trends of EC in bore 83/1 Deep. Mr Ball stated that the chart showed good conformity between the datasets. The discrepancies are possibly due to the samples being taken at different times during the evapoexpiration and dilution cycle within the aquifer. Mr Ball informed the committee that complete details of the short and long term trends can be found in Appendix C.

*83/1 Deep Mg and $SO_4$ Long Term Trends*

Mr Ball presented a chart showing the long terms trends in Mg and $SO_4$ in Bore 83/1 Deep from data collected by DoR and ERA. Mr Ball stated that the chart shows good conformity between datasets and any discrepancies are expected to be due to the samples being taken at different times. Mr Ball referred the committee to Appendix C of the DoR report for complete details of the short and long term trends.

*Groundwater monitoring at Ranger TSF*

Mr Ball stated that following a decision at the April 2009 ARRAC about seepage from the TSF at Ranger, DoR undertook a study of data collected from bores located around the TSF to determine if there was evidence of seepage in these bores and if the seepage has had any effect on the environment outside the Ranger Project Area. Data from nine bores around the TSF that were being monitored by DoR were selected and reviewed. Analytes studied included pH, EC, $SO_4$, Mg, Mn, U and $^{226}Ra$.

The bores were located west, north and south of the TSF. Most of the eastern side of the TSF is under the stockpiles so no samples were available from this area. Bores were both deep and shallow and gave a good spread of data around the TSF. Mr Ball stated that the data showed that samples from the deep bores to the north, west and south of the TSF were stable and gave results that were representative of those expected from deep aquifers. These bores had a magnesium/bicarbonate signature that is typical of deep bores. Shallow bore chemistry was relatively stable although bores in the south and west indicated a possible increase in sulfate and magnesium concentration indicating a flow of solutes in groundwater recharge. Mr Ball stated that further investigation is required to show what the cause of the increase is. pH and EC were generally stable in most bores. Exceptions to the stable trends were:

- RN25368 showed an increase in Mn and $SO_4$

- RN25366 showed an increase in EC and $SO_4$

All data was compared with the ANZECC 2000 99% ecosystem protection trigger levels and all analytes assessed were well below these guidelines. Two bores (RN23556 and C3) were dry and not sampled.

*RN23568 (Mg and $SO_4$)*

Mr Ball presented a chart showing results from bore RN23568 which is a 5m deep bore approximately 400m south west of the TSF. The chart shows an increase in Mg and $SO_4$ in 2009. ICPMS was undertaken in September 2009 and these results are shown on the presented chart. 2010 results are not yet available to confirm if this is a sustained trend or an isolated passing flush.

*RN23566 (EC)*

Mr Ball presented a chart of results from bore RN23566 which is a 5.9m deep bore east of the TSF wall. The data showed a relatively stable pH however there is a marked increase in EC over the past two years. Mr Ball stated that the cause for this increase is not clear at this stage.

*RN23566 (Mg and $SO_4$)*

Mr Ball presented Mg and $SO_4$ data for bore RN23566 showing an increase over time. Mr Ball suggested the increase could be a result of possible seepage from the TSF however results are inconclusive at this stage. This may indicate seepage in the shallow aquifer but results are inconclusive and pH has returned to normal for this site.

Mr Ball stated that the data studied did not indicate any environmental effect from TSF seepage. Current data suggest that any seepage remains within the Ranger Project Area and there would be no environmental effect. Further investigation is required to accurately understand and assess the extent of any seepage. Data collected has been compared with the ANZECC 2000 99% ecosystem protection trigger level and has been found to be below these guidelines.

*Jabiluka*

Mr Ball stated that groundwater and suface water monitoring is conducted at Jabiluka and by agreement, DoR will only present the groundwater results.

Mr Ball stated that Jabiluka is under long term care and maintenance by ERA. Surface water monitoring at Jabiluka is conducted by ERA, SSD and DoR. By agreement, surface water data is presented by SSD. Groundwater monitoring is conducted by ERA and DoR and is presented in Appendix D of the DoR report.

*Jabiluka Monitoring Sites*

Mr Ball presented a map showing part of the Jabiluka lease with the interim water management pond and the access road. Three groundwater monitoring bores were highlighted on the map:

- JDGB4 Shallow
- JDGB4 Deep
- JDGB7

*Check monitoring at Jabiluka mine*

Mr Ball stated that DoR ground water sampling was conducted at Jabiluka in September 2009 and January 2010. Three bores are monitored: JDGB4S, JDGB4D and JDGB7. DoR data

generally shows good conformity with ERA in U, Mg and $SO_4$. Exceptions are EC and pH which can be attributed to different calibration and purge times in field sampling.

*JDGB4S (EC)*

Mr Ball presented a chart showing EC and the variation between ERA and DoR.

*JDGB4D (EC)*

Mr Ball presented a chart showing EC and the variation between ERA and DoR.

*JDGB7 (EC)*

Mr Ball presented a chart showing EC and the variation between ERA and DoR. Mr Ball stated that overall results are still below significant levels for EC in groundwater.

*Nabarlek*

Mr Ball stated that DoR continues to monitor groundwater at three groundwater bores and surface water at Cooper Creek and Kadjirrikamarnda Creek. UEL has also provided monitoring data for these sites.

Mr Ball stated that in April 2008, UEL purchased the Nabarlek mine site and mineral lease MLN962. Since this time UEL has conducted drilling programs, weed management and rehabilitation works on the site. DoR undertook surface water and groundwater sampling from 26-29 May 2009. No sampling has been undertaken in 2010. The DoR monitoring team are due to visit the site in June 2010. Water samples from each bore were also collected on behalf of eriss for radionuclide analysis. Groundwater samples were also collected for stable lead isotope ratio analysis to be analysed at Charles Darwin University. Results of this analysis show the lead isotope ratios are typical of background levels in the region suggesting the lithology in the groundwater bores is unmineralised. Mr Ball referred the committee to page 44 of the DoR report.

*Nabarlek Monitoring Sites*

Mr Ball presented a slide showing the Nabarlek lease with the outline of the backfilled pit shown which was filled in the early 1980s. Ground water sampling sites at Nabarlek are:

- OB25 which is a deep bore (76m) and is located approximately 270m to the east of the former pit.
- OB1D is a shallow bore (10m) located adjacent to the former ROM pad and plant area
- OB47 is a relatively shallow bore (22m) located between the former evaporation ponds and Kadji Creek in the opposite side of the mine access road.

Surface water is monitored at Kadji Creek (KC) downstream of the irrigation area and on Cooper Creek at the Murganella Road Crossing.

*OB25 (EC)*

Mr Ball presented a chart showing EC results from OB25 over recent years. Mr Ball stated that the DoR data for this bore has observed a pronounced increase in electrical conductivity between 2005 and 2007. Levels have remained stable at this higher level, with data from May 2009 recorded at 1775µS/cm. The pH at this site has remained stable at pH6.7. RN23021 / OB25 is a deep bore (76m deep) and is located approximately 270m to the east of the former pit. This bore was found to be dry in 2010 so no DoR data was updated.

*OB25 (Mg and $SO_4$)*

Mr Ball presented a chart showing Mg and $SO_4$ results from OB25 over recent years. Mr Ball stated that magnesium concentrations remain in the higher concentration range observed since 2007. Sulfate shows a significant increase in concentration, with a similar trend to EC since 2007. This bore lies in a zone of chloritised schist surrounding the orebody and background water chemistry was typically high in magnesium and hydrogencarbonate. The increased concentrations of magnesium and hydrogencarbonate together with the greatest increase observed for sulphate may indicate the influx of a suspected contaminated plume. The marked increase in sulfate together with uranium could be indicative of groundwater which has come into contact with in-pit tailings material. Stable lead isotope ratio analysis may assist in identifying the source of the contamination.

*OB1D (Mg and $SO_4$)*

Mr Ball presented a chart of Mg and $SO_4$ in OB1D over recent years. The chart showed that Mg concentrations remain stable and sulphate shows an increase in concentration since 2007. The change in the ratio of anions for this groundwater bore and the ratio of sulphate / hydrogencarbonate and chloride / hydrogencarbonate show similar declines as hydrogencarbonate concentrations have increased.

*Cooper Creek (pH)*

Mr Ball presented a chart of pH at Cooper Creek as measured over recent years. Mr Ball stated that EC in Cooper Creek remains stable. Mn concentrations remain low and uranium concentrations are close to or below detection limits. Mg and $SO_4$ remain very low in concentration.

*Kadjirrikamarnda Creek (pH)*

Mr Ball presented a chart showing pH in Kadji Creek and stated it has remained stable over the period shown. The pH at this site has shown some fluctuations, typical of ephemeral flowing NT rivers. Mn concentrations remain low and shows good conformance between DoR and UEL data. Mg and $SO_4$ show relatively stable concentrations since 2006.

*Discussion*

Dr Jones questioned why there were large discrepiances in OB25 between UEL and DoR bore monitoring data, and suggested that maybe different bores are being sampled. Data for bore TB22 is presented on pg 21 of the DoR report and shows that the results from DoR and UEL are disparate indicating that they may be sampling different bores. Mr Ball confirmed those issues would be clarified for the next ARRAC meeting

Mr Martin confirmed that DoR were still working towards getting consistent sampling across the sites. Mr Hughes noted that he observed two bores with the OB25 label last time he was onsite. Mr Tayler asked if there was a better way of labelling the bores. Ms Paulka agreed because there are sometimes 6 bores in one area with the same name and stated that this year they would be co-sampling with DoR to ensure consistency. Dr Jones made a point of doing a case study for groundwater modelling and that corrupt data makes that task difficult. Ms Paulka stated that UEL are commencing data collection to give to hydrogeologist for recommendations for review of a monitoring program for a closure situation.

Mr Robinson referred to page 40 of the DoR report and asked what process is in place to investigate radioactive dust measurement. Mr Ball stated that this was done by NT Worksafe. Some data was provided by ERA. Issues with handovers need to be directed to Worksafe.

***ARRAC33 action 5: ERA to get advice about process of what happened as result of radioactive dust guidelines.***

Mr Kyle commented on different bore water sampling techniques which provide different results. Mr Kyle outlined the dissatisfaction of the Traditional Owners with the discrepancy in results and would like to see this rectified. There has been talk on sampling technique workshops and Mr Kyle stated that Ranger doesn't follow best practice way of bore sampling.

## 8 Member Reports

### 8.1 Uranium Equities Ltd – UEL

*Nabarlek and Headwaters*

Ms Paulka outlined the structural changes to UEL and gave a brief overview of the Nabarlek, Headwaters and Nabarlek Joint Venture projects that UEL are currently working.

*Nabarlek ML – Rehabilitation*

Ms Paulka stated that the success of last years work was now visible on the ground. The weed extent was the same but the density was reduced. New spray equipment has been purchased which enables a safer and more efficient operation.

2500 seedlings have been planted in medium plots in the evaporation ponds and mortality is expected to be high even with hand watering. Spraying has completed for the year and burning has commenced.

*Nabarlek 2009 Drill Program*

Mr Williamson stated that UEL completed 37 RC holes for 5034m and complete 1808 XRF samples in the 2009 season. Mr Williamson stated that the best results to date have been in the Nabarlek south and north areas and provided further details of results in the presentation.

*Planning for 2010*

Mr Williamson stated that UEL are planning to conduct drilling in two passes this season and are aiming to complete 4000m of both RC and aircore drilling. Mr Williamson stated that there are possible extensions to the Nabarlek mineralisation control structure that remain untested beneath shallow sandstone cover to the north. Additional parallel structures are obscured by transported soil and laterite to the east. Regional geochemical anomalism requires follow up drilling. Targets are supported through a combination of geochemistry and geology. Mitsui hold a $2M option over the Nabarlek project to potentially gain around 25% of UEQ's holding in the region for a minimum purchase price of $15M.

*Headwaters*

Mr Williamson stated that UEL have 4 granted exploration licences covering 3070km². Fieldwork is planned for 2010 including reconnaissance, radon and XRF surveys and possible drilling. This project is being undertaken as a Joint Venture with Vale from South America.

*Discussion*

Ms Frostick asked for an update on works to rehabilitate the radiologically anomalous area. Ms Paulka stated that this was reported on at the last meeting. Trenches have been progressed down to 1 metre and samples collected. Analysis of the samples found anomalous results down to 1m depth. A question was asked regardingg uranium ratios. Mr Paulka explained the haul road placement and are currently waiting on results beyond that depth. Ms Paulks stated that UEL have proposed to do coring in the area this dry season however this is challenging

for dust and OHS issues. UEL propose to drill to 5m and then examine the core. UEL plan to accurately characterise the depth profiles before coming up with management plan and plan to use some kind of auger with water suppression techniques.

### 8.2 Cameco Pty Ltd – Cameco

Ms Parks gave a presentation on the Cameco operations in West Arnhemland. Ms Parks stated that all operations will be managed from the King River camp for this and future seasons and gave an overview of the infrastructure at the King River camp.

*2010 Exploration Program*

Ms Parks stated that Cameco plan to complete 35 core drilling holes for ~12000m and 6 heli-supported holes for 1600m. 25 RC holes plan to be completed for 4000m A map was shown to highlight where the drilling will be undertaken.

*Incident Summary*

A graph was presented showing the 2009 incident summary for Cameco Australia. The LTI was explained as a finger crush and two MTIs were related to heat stroke and a pulled muscle.

*Discussion*

Nil.

### 8.3 AREVA NC Australia Pty Ltd – AREVA

Nil to report.

### 8.4 Northern Land Council – NLC

Howard Smith gave a brief verbal report.

NLC have been doing rehabilitation inspecions in conjunction with Northern Territory Government and Office of the Supervising Scientist. Mr Smith stated that the NLC are working with Gundjeihmi Aboriginal Corporation, Energy Resources of Australia Ltd and anthropologists to do the groundwork for the (heap leach) EIS. Mr Smith stated that consultations will be conducted in language in the future future. Mr Smith stated that closure criteria should include cultural aspects and should be rolled out into long term management and stewardship. NLC are involved in further work with Ranger on the statutory process and EIS.

Ms Bradley asked if there was action being taken with regards to the Koongarra release. Mr Smith advised that the Traditional Owners said no to mining and the site has again been placed in moratorium.

### 8.5 Environment Centre Northern Territory - ECNT

Ms Bradley didn't provide an update for ECNT.

Ms Bradley made the point of ARRAC actions not being made in timely manner and that ECNT would appreciate a more timely response.

### 8.6 Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)

Mr Johnston gave a verbal update for ARPANSA.

Australian national radiation dose register will be live in the next few months.

International Atomic Energy Agency (IAEA) are currently considering a redraft of international basic safety standards. This is currently out for comment. ARPANSA are

running a forum in Melbourne around the 20th of May (however Mr Johnston was unsure of the exact date).

World Health Organisation (WHO) document and statement from International Commission on Radiological Protection (ICRP) has stated that risks from radon are much higher than previously known. This statement is based on the convergence of two studies; three pooled studies of residential radon, and; the long term follow up of Uranium mine workers which established excess relative risk for radon. Radon is a now recognised as a carcinogen. The ICRP has noted that all studies are converging to a common risk factor of twice what it was previously. This to be incorporated into new safety standards. New dose rates have to be calculated before it can be related into uranium mining. For example the risk to non smokers is lower for Radon exposure than for smokers with relation to lung cancer.

Ms Paulka raised a question on the timing for development and release of conversion factors. Mr Johnston indicated this process would take approximately 1-2 years. He advised operators to inform workers that there has been a change and continue using same dose factors until the new ones come out.

### 8.7 Australian Government - Department of Resources, Energy and Tourism – DRET

Ms Hinton provided an update on behalf of DRET. Ms Hinton advised that the Uranium Industry Framework (UIF) has been restructured into the Uranium Council and incorporates the transport working group with the uranium group regulations.

Best practice in-situ leach guidelines will be released soon. These have been developed in conjunction with Geosciences Australia.

The DVD for indigenous communities on uranium exploration and mining is still in the process of being finalised.

The Uranium Royalty NT Act has been passed and DRET are working on finalisation of that.

### 8.8 Parks Australia North – PAN

Nil to report.

### 8.9 NT Department of Health and Families (DHF)

Mr Robinson provided a verbal update on behalf of DHF. He advised that the Radiation Protection Act commenced on 5 October 2009.

Ms Paulka questioned who to send future radiation management plans to. Mr Robinson stated that the radiation protection plan is only for gaining a radiation license. Otherwise DHF are not involved.

Mr Martin questioned if a licence could be sought through DHF. Mr Robinson stated that sites have to be registered and have a licence.

### 8.10 NT Department of Natural Resources, Environment & the Arts & Sports – NRETAS

Nil to report.

### 8.11 West Arnhem Shire Council (WASC)

Nil to report.

### 8.12 Gundjeihmi Aboriginal Corporation (GAC)

Nil to report.

### 8.13 Other

Nil to report.

## 9 Other Members Report

Nil to report.

## 10 Next meeting

To be scheduled for August, Jabiru.