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SESSIONAL COMMITTEE ON THE ENVIRONMENT

REPORT

August 1998

FOREWORD

On behalf of the Committee comprising Mr Ah Kit (Member for Arnhem); Mr Dunham (Member for Drysdale); Mr Mitchell (Member for Millner) and Mr Rioli (Member for Arafura), I would like to formally express my thanks and appreciation for the assistance and professionalism provided during the course of our visit by Mr Ken Lonie (Manager of Operations) Ranger; Dr Arthur Johnston (Director of ERISS), Office of the Supervising Scientist and Mr Shane Maraldo (Manager Pioneer Concrete (NT) P/L, Nabarlek.

I am particularly grateful to Mr Tony McGill (Director of Mines) and Mr Mai Wedd (Uranium Adviser) who have on this and other occasions acted as our specialist advisors. They have provided professional advice, analysed the information presented and ensured the accuracy of the Committee's report.

My thanks also go to Mr Graham Gadd, Secretary to the Committee for his input and administrative assistance.

Dr Richard Lim, MLA
Chairman

INTRODUCTION

On 26 November 1997 the Sessional Committee on the Environment was reappointed with the following membership:

Mr J L Ah Kit, MLA
Mr S Dunham, MLA
Dr R S H Lim, MLA
Mr P A Mitchell, MLA
Mr M J Rioli, MLA

At a meeting of the Committee on 1 December 1997, Dr Lim was elected Chairman.

TERMS OF REFERENCE

Your Committee has been charged to:

"inquire into and from time to time report upon and make recommendations on:

(a) all matters relating to uranium mining and processing activities and their effects on the environment within the Alligator Rivers Region; and

(b) any matter relating to mining and/or the environment within the Northern Territory which is referred to it by -

(i) the relevant Minister; or

(ii) resolution of the Legislative Assembly."

Your Committee has also been authorised to:

(a) send for persons, papers and records, to sit in public or in private session notwithstanding any adjournment of the Assembly, to adjourn from place to place and have leave to report from time to time its proceedings and the evidence taken and make such interim recommendations as it may deem fit, and to publish information pertaining to its activities from time to time;

(b) publish from day to day such papers and evidence as may be ordered by it and, unless otherwise ordered by the Committee, a daily *Hansard* be published of such proceedings as take place in public;

(c) consider, disclose and publish the Minutes of Proceedings, evidence taken and records of similar Committees appointed in previous Assemblies; and

(d) the foregoing provisions of this Resolution, so far as they are inconsistent with the Standing Orders, have effect notwithstanding anything contained in the Standing Orders.

THE COMMITTEE'S ROLE

During the year, no specific references on mining or the environment were given to the Committee. Thus the Committee's role was one of monitoring and watching over the various government and non-government agencies participating in the mining and monitoring of uranium in the Alligator Rivers Region.

The Committee, accepting that mining has been authorised to take place in this region, is concerned that it is done in an orderly and safe manner and that the mineral resources are recovered in a way which ensures, by all means possible, that mining causes no permanent deleterious effects on the environment.

FIELD INSPECTION OF REHABILITATION AT NABARLEK MINE SITE, WEDNESDAY 24 JUNE 1998

The Committee comprising of:

Dr Richard Lim, MLA (Chairman)
Mr John Ah Kit, MLA
Mr Stephen Dunham, MLA
Mr Maurice Rioli, MLA
Mr Graham Gadd (Secretary)

and accompanied by:

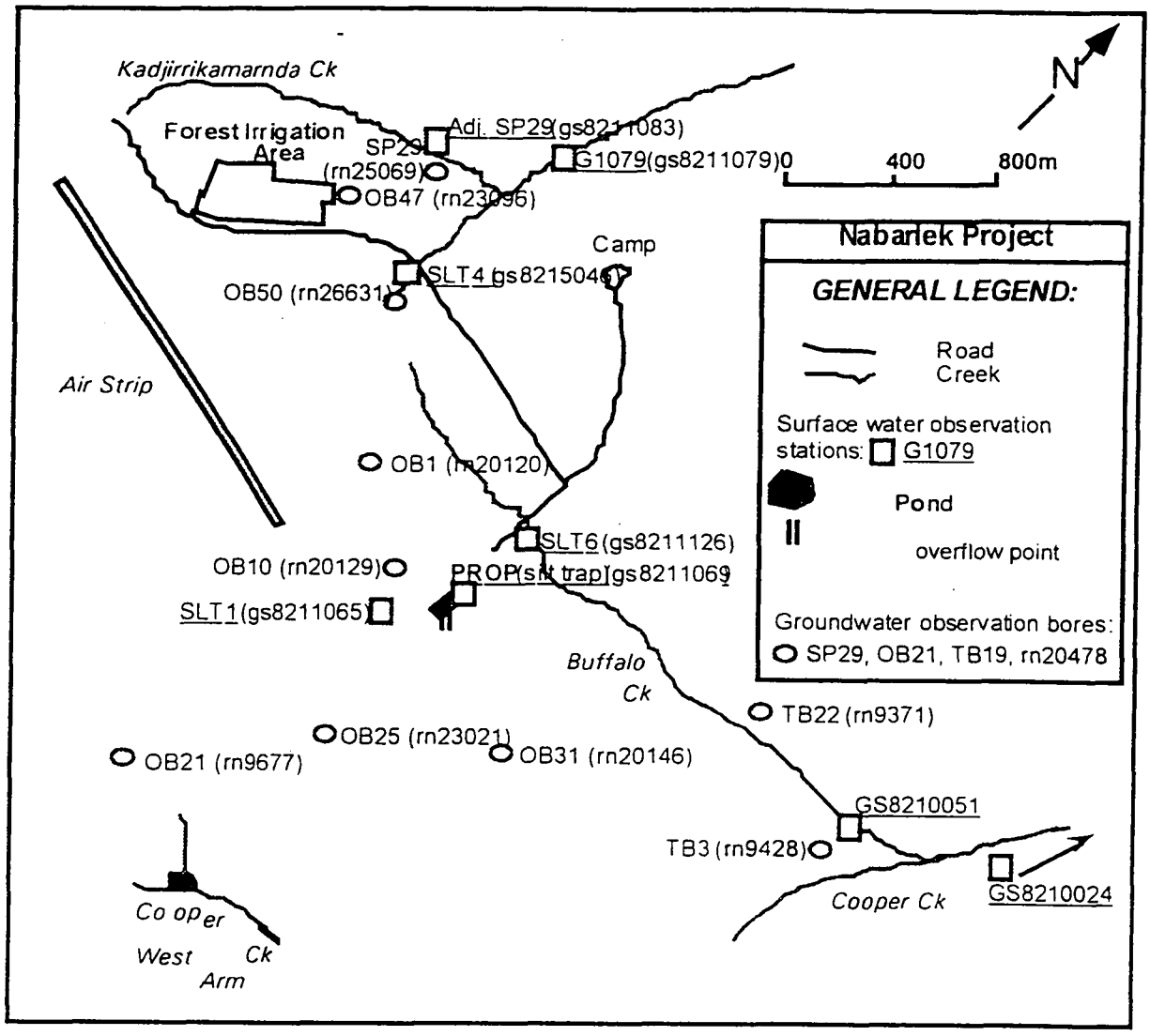
Mr Tony McGill (Director of Mines)
Mr Mal Wedd (Uranium Advisor)
Mr Shane Maraldo (Pioneer Concrete (NT) Pty Ltd)

The Committee departed from Parliament House at 0600 on 24 June 1998 to visit the Nabarlek mine site. The Committee had made an aerial inspection of the rehabilitated mine site in April 1996. At that time, Committee members were encouraged by the apparent rehabilitation of the mine site from what could be seen from the air. The aim of the visit, by road, was to give the Committee on the ground inspection of the progress of the rehabilitation and revegetation of the mine site.

Background

The Nabarlek uranium orebody was discovered in 1970 by Queensland Mines Ltd (QML). Mining was undertaken in the dry season (May to October) of 1979. The ore was stockpiled and the milling of the stockpile was completed in 1988.

The Nabarlek uranium mine is now owned by Pioneer International Limited (PIL). The general layout of the site and locations of water monitoring points under its current decommissioned status are shown below. During 1995, the mill and associated infrastructure were sold and rehabilitation earthworks were completed. PIL has provided a company guarantee of $10 million to ensure that environmental responsibilities will be met. The whole site has been revegetated.



Not shown: gs8210064 Billabong 3A, Cooper Creek at the Gove Road Crossing
Not shown: gs8210038 Billabong on Cooper Creek at the Murgenella Road Crossing

Layout of Nabarlek Minesite showing location of Monitoring Bores

Pit Tailings Disposal

Nabarlek was the first open cut mine in the Northern Territory to have its tailing placed directly in the mined pit. This occurred in response to a recommendation of the Fox Inquiry which recommended below ground storage of tailings. The natural advantages of this system of tailings disposal are:

- tailings become almost as secure physically as the original orebody;
- there is less prospect for pollutants to leach from the pit due to the position of tailings below ground; and
- a greater depth of cover over the tailings is achieved ensuring a high level of radiological safety.

Contaminated mill equipment and material were also disposed of in the pit prior to the pit being filled.

Below grade ore was added to the pit and topped with layers of waste rock. The mine was placed on a care and maintenance program. Tailings water was expressed through wicks as a requirement to compact tailings in the pit. The new surface of the pit was seeded in December 1995. In the past two and a half years, only minor subsidence has occurred.

Since 28 October 1997 environmental monitoring of the Nabarlek site is solely carried out by the Department of Mines and Energy (DME). The following areas are monitored by DME:

- surface and groundwater near Kadjirrikamarnda Creek;
- surface and groundwater below Buffalo Creek; and
- the monitoring of silt traps.

Site Inspection

The Committee inspected the former mill site and administration area of the mine. The mill has been completely removed but the administration block has been partly dismantled and remains. Roof trusses and building materials lie scattered around the site in varying states of order, are still to be reclaimed. Two large empty tanks, formerly fuel and water storage, are also waiting to be removed. A number of large concrete pads remain and, at this stage, it is proposed that they will remain in place.

At the former administration site, erosion of a significant nature was observed. This erosion appeared to have occurred as a result of the construction of a truck loading bay. This loading bay was in all probability constructed to facilitate removal of building materials.

The Committee inspected the former waste rock dump site. There were a number of tree species, mainly acacias growing on the site. However, a fire which went through the area has restricted the tree cover somewhat and grasses have taken over.

On arrival at the area of the former pit, the Committee observed a thick cover of trees, mainly Acacias together with Grevilleas, eucalypts and Melaleuca. Acacias, being fast growing, provide initial revegetation cover but are unlikely to sustain. The other species are more fire resistant and will become dominant.

Despite the substantial tree cover, the Committee managed to find the central marker signifying the centre of the pit. A substantial amount of leaf litter has accumulated in the area. Evidence of insect colonisation, especially ants and grasshoppers, was observed. There was no visible areas of subsidence or erosion of the former pit site.

The Committee is of the opinion that rehabilitation is progressing well at Narbarlek. However, the Committee noted with concern that a number of bushfires in the area have hampered the early success of the revegetation

program. Parts of the burnt out areas have consequently been reseeded by the company.

A very strong vegetative growth together with a good coverage of Acacia, Eucalyptus and Melaleuca species is now occurring on all pit and waste rock areas.

Predominantly grass species were noted in the vicinity of the old evaporation pond and mill areas with eucalypts gradually appearing above the grasses. This expanse is now developing into a plant community similar to the open low woodland in proximity to the Nabarlek site.

Summary

In the Committee's view, revegetation of the site can be considered successful. Appendix A provides an aerial record of this success to date, depicting the Nabarlek mine pit circa 1980 and in 1996 after some 12 months rehabilitation. Appendix B indicates the good progress being made to date since early 1996 when rehabilitative works were commenced. The Committee was informed that an independent expert has been appointed to determine, in agreement with all parties, when the revegetation program can be declared to be self perpetuating and the Company relieved of any further responsibility. To ensure the finalisation of this program, a rehabilitation guarantee of $10 million is held by the Northern Territory Government to cover future liability should the rehabilitation works fail.

As a result of minimal effects to date, monitoring frequency is to be reduced to twice per year for surface waters and once per year for groundwater. Current monitoring by DME indicates a general decreasing trend for aluminium, manganese and uranium levels. A full and detailed report of monitoring points and data results are contained in the Northern Territory Supervising Authorities Alligator Rivers Region □ Environmental Surveillance Monitoring Report No. 35 for the six month period ending 31 March 1998.

JABILUKA MINE

On Thursday 25 June 1998, the Committee met with Mr Ken Lonie (Manager Operations) and Mr Andrew Jackson (Environment Superintendent).

Mr Lonie informed the Committee that all approvals for development of the Jabiluka mine were now in place. He gave the following brief on the status of the project to date.

Background to The Project

Jabiluka is a uranium and gold deposit owned by Energy Resources of Australia Ltd (ERA). An Environmental Impact Study (EIS) for the project was submitted in July 1979 by the then owners, Pancontinental and Getty Oil. In 1982, an agreement was reached with the NLC pursuant to Section 43 of the *Aboriginal Land Rights Act* (ALRA).

A mineral lease (MLN1) was granted under the Northern Territory *Mining Act* on 12 August 1982, for the purpose of mining uranium including transporting, treatment, processing, impounding and retaining waste and storage, etc., subject to compliance with the Environmental Requirements which arose from the EIS and are attached as a schedule. The lease is for 42 years and is subject to an extension for a further term not exceeding ten years. The lease was transferred to ERA in 1991.

In June 1992, a feasibility study was commenced by ERA. This study lead to a change of scope for the project. On 15 March 1996, ERA announced that it was seeking approval to develop the revised project and, in October 1996, released a draft EIS for public comment. The period for public comment closed on 9 January 1997. Then in June 1997, ERA submitted the supplement to the draft EIS.

On 22 August 1997, the Commonwealth Minister for the Environment advised the Commonwealth Minister for Resources and Energy that subject to 75 recommendations, the preferred option (Ranger mill) was environmentally acceptable. On 8 October 1997, the Minister for Resources and Energy advised ERA that he agreed with the thrust of the Minister for the Environment's recommendations and subsequently established the requirements of the proponent.

Under the existing Aboriginal Agreement, there are provisions which allow ERA to reach agreement with NLC Northern Land Council (representing the Traditional Owners) on a change of concept for the project. On 25 August 1997, ERA commenced negotiations with the NLC for changes to the Agreement which would allow both the Ranger and Jabiluka Mill alternatives.

The Committee was informed that ERA's preferred proposal was to transport and process the Jabiluka ore at the existing Ranger mill, 22 km south of Jabiluka. This proposal has now received all the appropriate Government approvals. However, ERA in recognition of opposition by some Aboriginal landowners. the Jabiluka mill alternative was put forward as an option, though not as the preferred option.

This alternative to construct a mill to process ore on site at Jabiluka, as proposed in the 1996 EIS, is now the subject of a Public Environment Report (PER). On 9 June 1998, ERA submitted a PER to the Minister for the Environment. The PER will be subject to public scrutiny for the period extending from 9 June to 6 July 1998, when public comments are returned to the Minister for Environment for assessment.

Following negotiations for the new proposals, in addition to royalties of approximately $210M, other benefits announced were:

- employment and training opportunities for local Aboriginal people with approximately 20% of people working on the Jabiluka project to be Aboriginal;
- provision of new housing for approximately 65 Aboriginal families;
- assistance for Aboriginal business;
- funding of a Women's Resource Centre;
- funding for a bridging education unit for local Aboriginal children;
- traineeships and university scholarships for Aboriginal students; and
- funding for adult education.

These programs were negotiated in conjunction with the recommendations of the 1997 Kakadu Regional Social Impact Study and was in keeping with the major thrust of this report - for assistance and support to be provided to Aboriginal people in order to develop their ability to control their economic development and future.

On 27 March 1998, Authorisation A98/1 was approved allowing road upgrade and maintenance as well as the construction of fences at Jabiluka. On 2 June 1998, Authorization A98/2 was granted allowing the construction of a portal, access decline and associated infrastructure.

Site Visit

On its return to Jabiru, following the inspection of the Nabarlek site. the Committee proceeded to the Jabiluka site. Access to the site is by a 4WD track. At the time of the visit a fence had been constructed around the perimeter of the working mine and clearing works were underway on the mine portal and on the run-off water retention pond areas.

The Committee was advised that the orebody commenced 150 metres underground and extended approximately 500 metres down and 800 metres horizontally. Appendix C gives an indication of the Jabiluka mine portal and cleared area required for waste rock stockpiles and water retention pond. Once the mine decline was completed, further core drilling would be carried out to more accurately determine the full extend of the ore body reserves.

It was reported to the Committee that the mine site area, inclusive of the incline, ore and waste material stockpile and a retention pond to contain all contaminated water run-off within the site, would comprise an area of 19 hectares. The haul road to Ranger would occupy 44 hectares.

On completion of the mining operations, estimated to extend over a period of 28 years, the mine site will be rehabilitated. In time, it was asserted, evidence of mining would be difficult to detect, and based on our Nabarlek experience, it is likely to be proven so.

A comparison of the two milling proposals, an on site process or transport to and process at Ranger mill, on purely environmental and land disturbance criteria, the Ranger option seems to be the most environmental sensitive option. This option would disturb 63 hectares of land compared to some 140 hectare required to mine, store tailings and operate the mill at Jabiluka.

ERA advised that tailings from the processing of Jabiluka ore at the Ranger mill are currently required to be placed in the pits at Ranger. These pits will be rehabilitated at the end of the mine's life and revegetated in a manner similar to the Nabarlek rehabilitation operation.

In any event, the Committee was advised that if this milling operation option is not granted or significantly delayed, the alternative option of treating ore at Jabiluka would be taken up. Non-approval of or further delays to the preferred Ranger mill option has occurred to date due to opposition of Aboriginal Traditional Owners to any uranium mining.

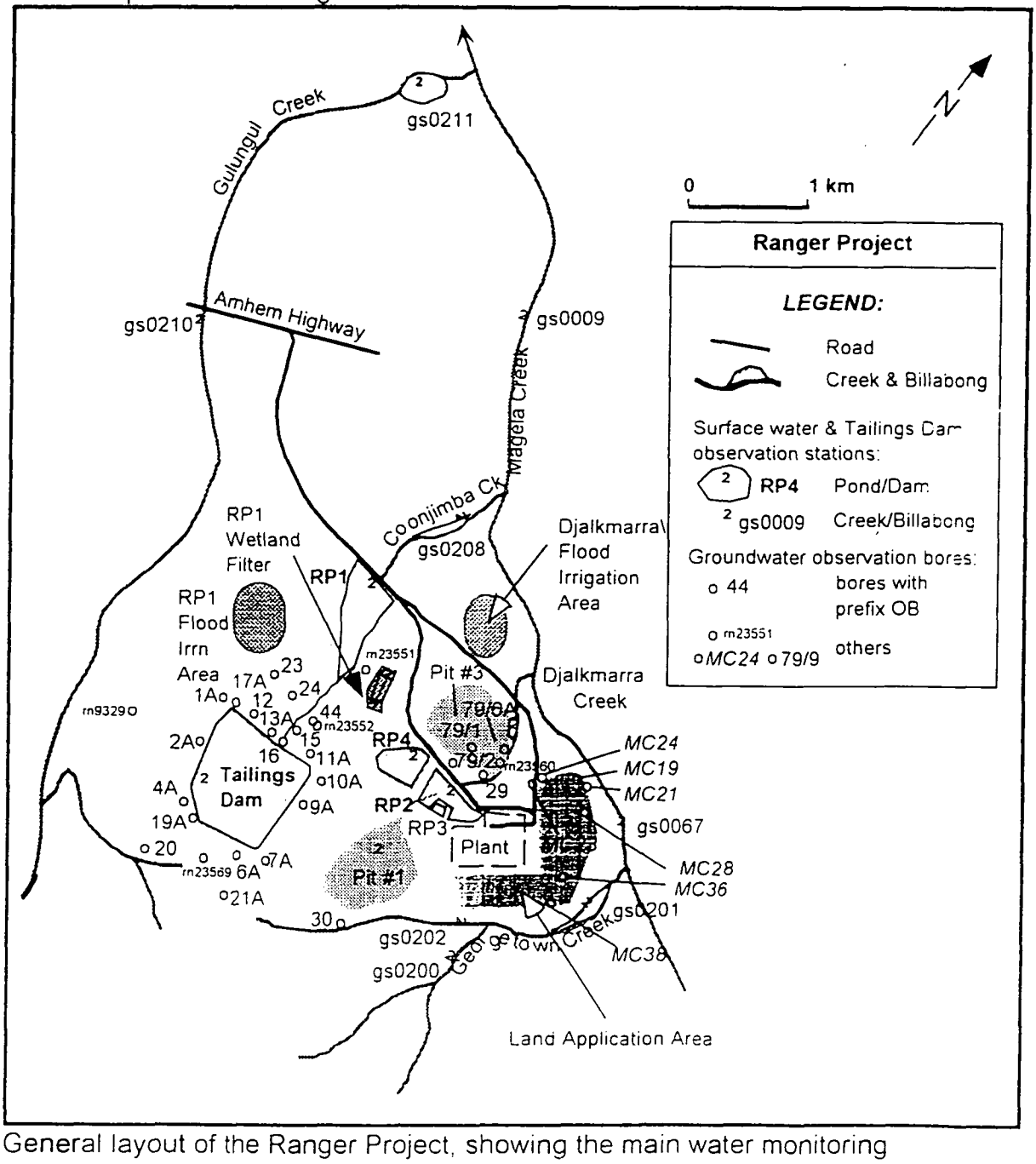
Summary

The Committee recognises the inevitability of the mine proceeding and would endorse as its preferred option, on environmental grounds, the milling of Jabiluka ore at Ranger.

RANGER MINE

Background

The Ranger Project currently comprises two open pits (Pit #1 is being filled with tailings, while Pit #3 is being mined), a mill, waste rock dump, tailings dam and water management system (see Figure 3.1). The mining of Orebody #1 was completed on 8 December 1994. Besides being used as a tailings repository, Pit #1 is also used for excess RRZ water storage as the need arises. Dredging of the Ranger Tailings Dam beaches has been completed, and the Tailings Dam is now also used as an 'evaporator' for excess RRZ water, and there is no longer active deposition of tailings in this dam.



General layout of the Ranger Project, showing the main water monitoring locations.

The Ranger Mill

The Committee was introduced to the site by Mr Ken Lonie. Mr Lonie informed the Committee of a reduction in Ranger mill production due to chemical problems occurring in the extraction process circuits. Investigation of the causes of these problems has taken place and steps have now been undertaken to gradually bring mill production back to normal levels.

This problem caused total production of U308 to fall from 5 000 to 4 000 tonnes during 1997/98.

Wetland Filtration

Mr Lonie informed the Committee that the RP1 wetland filter, which was converted to a full scale artificial wetland in May-June 1994 from a former borrow area, continued to perform exceptionally well in the 1997 operational period. The residence time of RP2 water through this biological filter is one week.

During the 1997 period of operation of the wetland filter, 90-94% of uranium and manganese were extracted from the water. In the last six months the wetland filter has not been required.

Water Management System

The Water Management System at Ranger comprises two retention ponds for water storage and sediment control, Pond No. 1 (RP1) and RP4, and several other water retaining structures within the Restricted Release Zone (RRZ), together with associated water circulation and recovery facilities. These structures contain potential environmental contaminants, the tailing dam, a water retention pond for the plant area (RP2), a water supply holding pond for the mill (RP3), and the pits.

The Committee was informed that there was approximately 2M cubic metres of water in the closed system in excess of operational requirements.

To reduce the excess water and assist with compaction of tailings in the No. 1 pit, tailings have been dredged from the tailings dam beaches were pumped into the pit. Water from the pit was then pumped to the tailings dam. The tailings dam now has a full evaporative surface.

Another method being evaluated to reduce water storage is the proposed use of Multiple Effect Evaporation which effectively produces distilled water by evaporation. This process is in the early stages of assessment and the Committee will be kept informed of the outcomes.

Rehabilitation

The Committee was informed that Ranger had commenced its program for progressive rehabilitation of the mine site in accordance with the approved planned rehabilitation landform. Revegetation had commenced in December 1997 on rehabilitation work adjacent to the tailings dam. Approximately 8,700 seedlings were produced by Ranger and a further 6,000 bought from the Jabiluka Association for planting as part of the rehabilitation program.

Ranger Nos 1 and 3 pits will be rehabilitated at the end of the mine's life and revegetated in like manner to the Nabarlek rehabilitation operation.

ENVIRONMENTAL RESEARCH INSTITUTE OF THE SUPERVISING SCIENTIST — JABIRU.

The Committee met with:

Dr Arthur Johnston, (Director of ERISS);

Dr Max Finlayson (ERISS Wetlands Protection and Management Group);

Mr Peter Wellings (ERISS Communications Program/Kakadu Region Social Impact Study);

Mr Peter Waggitt (Uranium Mining Audit and Review Branch—Supervising Scientist Group);

Mr Mike Gilbert (Corporate Services - Supervising Scientist Group);

Mr Kevin McAlpine (Review of Australian Water Quality Guidelines).

RESEARCH ASSOCIATED WITH JABILUKA

A base line water quality program will be set up for Swift Creek and streams from the Jabiluka lease which will include monitoring of its chemistry, aquatic, macro invertebrate programs.

Dr Johnstone's opinion was that there was little threat to Swift Creek if the Ranger mill alternative is used.

However, water coming off stock-piles needs careful management as Swift Creek does not have a water flow rate of Magella Creek and as a result possible dilution rates are less than those achievable in the Magella system.

Dr Johnston reported that Supervising Scientist Act was amended in 1993. Supervising Scientist is allowed to give advice to the Commonwealth Minister on environmental issues if the Minister directs.

The Office is now conducting broader based environmental research on a commercial basis.

1. Environmental Radiation

ERISS has commenced a project to better document naturally occurring levels of radon in the Alligator Rivers Region (ARR). This study will lead to a better understanding of naturally occurring levels of radon in the region and better enable distinction between levels of naturally occurring radon and any increase in radon attributable to mining activity. This new information will complement existing monitoring data from Nabarlek, Jabiru and Jabiru East.

The study is focusing on the measuring of levels of radon near the Jabiluka mine and at other places of interest in the region. Sampling is currently taking place at Djarr Djarr and the East Alligator Ranger Station. Discussions are continuing with traditional owners regarding radon monitoring near Oenpelli and the Mikinj Valley near Oenpelli. It is also proposed to sample radon levels at Mudginberri and near the proposed Koongarra mine.

The Committee requested information about expected increases in radon as a consequence of the operations at Jabiluka and the potential risks of this to human health. It was noted that worker exposure to radiation at Jabiluka was an issue of interest because Jabiluka would be an underground mining operation. Plans for Jabiluka included a comprehensive ventilation system that would extract radon-bearing air from the mine through ventilation shafts. It is not anticipated that radiation doses to workers would approach or exceed current safety limits ie. no more than 20 mSv per annum averaged over a 5-year period or up to 50 mSv in any one year. With regard to the public it was not anticipated that there would be any risk to nearby populations. The annual public dose limit is currently 1 mSv per annum and it is anticipated that these kinds of levels would only be experienced in the immediate vicinity of ore stockpiles and mine workings on the Jabiluka lease. It was noted that radon levels at Jabiru were currently in the order of 1/20th of the public dose limit of 1 mSv in any one year.

2. Biological Monitoring

The second major research effort is directed at baseline information collection regarding the ecological character of creeks and streams on the Jabiluka lease that could be affected by mine operations, particularly Swift Creek. A biological monitoring program, modelled on the biological monitoring program successfully employed in relation to the Ranger mine, would then be established.

Research programs have also included baseline information collection of surface water and ground water chemistry in streams that could be affected by mine operations.

Dr Johnston noted that potential impacts to Swift Creek and the local environment would be minimised if the environmentally preferable Ranger Mill Alternative went ahead. If the Jabiluka Mill Alternative went ahead water coming off both ore and waste rock stockpiles would need careful management.
It was noted that there would be relatively low dilution rates available in Swift Creek (compared to those in the Magela Creek adjacent to the Ranger mine) and so it would be important to minimise the potential for the movement of mine contaminants into that creek.

3. Erosion and Hydrology

Dr Johnston noted that the third major research effort was directed at the physical characterisation of the streams and creeks on the Jabiluka lease and the potential effects of erosion of materials such as earth and rock material from the mine project area into these creeks and streams.

Dr Johnston noted that amendments to the *Environment Protection (Alligator Rivers Region) Act* 1978 (in 1973) allowed for the Supervising Scientist to provide technical advice to the Commonwealth Minister for the Environment on environmental management issues other than uranium mining if the Minister so directs. As an example research staff from ERISS had been involved in research work relating to mine remediation works at Mt Lyell in Tasmania. Dr Johnston also noted that the amendments also allow ERISS to undertake broader environmental research on a commercial basis.

A question was asked about the proposed relocation of ERISS to Darwin and the impact this could have on the Supervising Scientist's work in the ARR.

RELOCATION OF ERISS TO DARWIN

Mr Gilbert briefed the Committee on the results of a report commissioned to examine the possible relocation of the majority of ERISS research and technical staff from Jabiru to the NTU campus in Darwin. It was expected that such a move would provide a number of advantages. These included:

- improved ability to recruit and retain high calibre research staff
- expected advantages for the families of existing staff
- more cost effective and efficient research work
- better scientific work through collaboration with other research staff at the NTU and other locations in Darwin
- the opportunity to develop research partnerships with the Northern Territory University, particularly in the areas of wetlands research
- increased opportunity to market research capabilities

It was noted that arrangements would have to be made to ensure public confidence that the relocation of ERISS to Darwin would not lead to any lessening of the Supervising Scientist's role in ensuring best practice environmental protection from uranium mining in the ARR It was also acknowledged that special arrangements would have to be made to ensure that strong communications links were developed and maintained with Aboriginal people in the ARR Some Aboriginal people were concerned that their interests could be affected by the relocation of ERISS to Darwin.

There would be a need to continue to have some staff located in Jabiru. These staff would provide field assistance and data collection support to Darwin based staff and build/maintain communication links with Aboriginal people and other local residents.

ACTIVITIES OF THE URANIUM MINING AUDIT AND REVIEW BRANCH

Mr Waggitt outlined the activities of the Uranium Mining Audit and Review branch of the Supervising Scientist Group. This branch is involved in working with the Northern Territory Department of Mines and Energy (NTDME), the NLC and the mine operators to ensure compliance with the environmental requirements for the operation of uranium mines in the ARR. Mr Waggitt outlined the current working arrangements agreed with the NTDME that set out the respective roles of the staff of the Supervising Scientist and the Northern Territory supervising authorities for coordinating the supervision and regulation of uranium mines in the ARR.

Mr Waggitt noted that the working arrangement provided for the establishment of Minesite Technical Committees for each mine. These committees provide a forum for discussion of technical issues relating to best practice management of the mines, the regulatory function of the NTDME and the supervisory and assessment function of the Supervising Scientist.

The current arrangements provide for mine operators to carry out on site monitoring with regulation of this by the NTDME and on going assessment of the adequacy of these arrangements and the results of monitoring work by the Supervising Scientist.

Mr Ah Kit asked how the Supervising Scientist's role might be affected by the relocation of staff to Darwin. Mr Waggitt replied that there should be no negative effect on this role but it would be important to reassure the public that there was no lessening of the oversight role. This was especially important in relation to the traditional owners of the mine leases and land potentially affected by mining.

Dr Johnston noted that there was a perception that the Supervising Scientist Group had done a poor job of communicating with Aboriginal people in the past about research priorities and the results of research work. Some Aboriginal people still felt some anxiety about the effect of uranium mining on ecosystems downstream of the mine sites. It was important that the Supervising Scientist Group develops a better relationship with local Aboriginal people that would lead to a better understanding of the results of ERISS research work and more trust in these research results and the environmental protection arrangements.

It was also clear that there was widespread misunderstanding in the community about the research and overseeing role of the Supervising Scientist and the regulatory role of the NTDME. Dr Johnston acknowledged that it was important to develop more understanding about these different roles in the community to allay peoples concerns about the possible relocation of ERISS to Darwin.

Dr Johnston noted that the NTDME and the NTG support the ERISS move to the Darwin. A final decision now rested with the Commonwealth Minister for the Environment.

THE MANAGEMENT OF TAILINGS AT RANGER MINE

It was noted that at the December 1997 meeting of the Alligator Rivers Region Advisory Committee ERA advised that they would deposit tailings back to the empty mine pits at Ranger as per Environmental Requirement 29(a). Some tailings are now being transferred from the tailings dam at Ranger to the No 1 pit as part of ERA's water management strategy for the Ranger mine. New tailings being produced as part of the ore production process are now also being deposited in the No 1 pit. Special attention is being given to achieving the maximum possible density of tailings deposition in the pit. It was noted that No. 1 pit would receive process tailings for another 5-6 years through to the end of mining of Ranger orebody No.3. Orebody 3 will then be available for receiving tailings. It was the view of the Supervising Scientist that this tailings management system is working well.

The Committee asked about the management of excess water in No. 1 pit. It was noted that Ranger had been removing excess water to the tailings dam and using the tailings dam as a evaporation 'pond' to assist with water management. These arrangements had been agreed to by a technical working group examining this problem. This was also working well.

There was discussion about the movement of radium from the deposited tailings via groundwater movement. It was noted that ground water in the region moves at around one metre per year and that any movement of radium would be very slow.

It was also noted that radium was relatively immobile and any material moving out of the tailings dam would be likely to be absorbed by the rock as the ground water slowly moved through.

Officers from the NTDME noted that the possibility of water seepage from the No. 1 pit is extremely unlikely given the permeability and density of the surrounding rock structure. It was also noted that some of the tailings are located below sea level and this in itself also reduces the likelihood of egress from the pits.

ERISS WETLANDS RESEARCH PROGRAM

Dr Finlayson briefed the Committee on current activities relating to the ERISS wetlands protection and management program. He noted that the 1993 amendments to the *Environment Protection (Alligator Rivers Region) Act* 1978 allowed for ERISS to undertake a broader range of research work on a commercial basis. ERISS had reviewed its research skills and capacities and determined that there was an opportunity to market their research capabilities in wetlands research and management. Some of this work was of national and international significance. As well as developing commercial opportunities in this area it is hoped that this research effort will contribute to better management and wise use of wetlands, both in the Top End of Australia and overseas.

Dr Finlayson noted that ERISS was already doing some 'outside' research work that would facilitate the expansion of effort in this area of research. This had included ERISS conducting an overview of the conservation status of wetlands in the Northern Territory for the NT Parks and Wildlife Commission. Other recent work included a trial study into the implications of global warming on Top End wetlands (including those in Kakadu), work on the ecological characterisation of wetlands, research into methods of monitoring change in wetlands, developing risk assessment methodologies and work in the area of community involvement in wetlands management.

ERISS was also working co-operatively with the NTU on a number of wetlands research projects and the training of students in wetlands protection and management.

KAKADU REGION SOCIAL IMPACT STUDY

Mr Wellings briefed the Committee on the Kakadu Region Social Impact Study (KRSIS) and its results. The KRSIS study was a co-operative study supported by the Commonwealth and Northern Territory governments, the NLC and Energy Resources of Australia (ERA). Two reports were completed in July 1997.

- A statement by Aboriginal people about the impacts of regional development on them and how they would like to see these issues addressed; and
- A Community Action Plan, supported by the KRSIS partners, to respond to these concerns

The Community Action Plan was proposed as a way to maximise the opportunities for Aboriginal people from further regional development, including the Jabiluka mine, while at the same time developing measures to mitigate against negative social impacts of development in the Kakadu region.
A major recommendation of the KRSIS was that there should be a KRSIS Implementation Team established to oversee the implementation of government endorsed recommendations from the action plan.

A Commonwealth response to the KRSIS has been developed and the Commonwealth Minister for the Environment is liasing with the Northern Territory government about developing a coordinated response to the KRSIS. The NT and Commonwealth governments are also considering the appointment of a suitable person, possibly Hon. Bob Collins, to be Chair of the Implementation Team.

ERISS is coordinating local Commonwealth action to progress the KRSIS and is expected to have a role in developing and supporting the KRSIS Implementation Team.

It is also possible that ERISS could have some on-going social impact monitoring role in the region through other alternatives have to be further considered by the KRSIS Implementation Team. Staff at ERISS have been liasing with the NT office of Aboriginal Development regarding the NT response to the to the KRSIS.

REVIEW OF THE AUSTRALIAN WATER QUALITY GUIDLELINES FOR FRESH AND MARINE WATERS

The Australian Water Quality Guidelines were originally released in 1992 as part of the National Water Quality Management Strategy. The Guidelines are not statutory but promote a consistent approach for the management of water resources across Australia.

ERISS is now coordinating a review of these guidelines on behalf of the Australian and New Zealand Environment and Conservation Council (ANZECC). A draft of the revised Guidelines is about to be completed and referred to the relevant ANZECC and ARMCANZ (Agriculture and Resource Management Council of Australian and New Zealand) committees to be released for public comment.

The document was aimed at facilitating the ecologically sustainable management of Australia's water resources and aquatic ecosystems. It provided a comprehensive set of water quality guidelines designed to protect and sustain the range of values that Australian waters support, and recommended a management framework for applying the water quality guidelines.

Although the focus is on aquatic ecosystem protection, six environmental values (or uses) of water resources have been recognised in the revised document: aquatic ecosystems; aquaculture; agricultural use; drinking water; recreational use; and industrial use. Aquaculture is an additional value that was not recognised in the original Guidelines.

The guidelines for agriculture are divided into three types of water quality: water for irrigation; stock drinking water; and general uses (ie. corrosion and fouling). For drinking water quality, the document refers the reader to the NHMRC Drinking water Guidelines. The revised recreational water quality guidelines will also replace the earlier NHMRC guidelines for recreational water.

The revision of the guidelines for aquatic ecosystems has been quite extensive and a new, more holistic approach has been recommended. Firstly, detailed guidance for the assessment of water quality has been provided to complement the more traditional methods using chemical and physical water quality parameters. Secondly, guidelines have been developed for other components of the environment that can impact on aquatic biota, these include sediment quality, nutrient loads and environmental flows. Thirdly, there is a greater focus on managing the water quality problems/issues rather than levels of the individual toxicants or nutrients of concern. Finally, an approach has been developed that has moved away from using single number guidelines to using hierarchical decision frameworks that take into account the natural variability of the aquatic environment and can be used to tailor the guidelines to specific sites or localities. In this way, water quality guidelines can be tailored to the tropical ecosystems of northern Australia as well as temperate Australia.

For aquatic ecosystems the previous guidelines recognised 2 levels of protection: essentially pristine where there should be no detectable change in water quality: and modified environments to which the guidelines were applied. This has been extended in the revised guidelines to recognise 3 levels, broadly based on ecosystem condition. The third condition recognises that there are very real situations where degraded aquatic environments are unlikely or unable to be returned to a health consistent with the above two conditions, but which the community still considers to have ecological values that should be maintained. The draft revised guidelines should be released for a 3 month public comment period early in 1999 and the final version completed toward the end of 1999.

UNESCO WORLD HERITAGE MISSION

Dr Johnston noted that at the July 1997 meeting of the Bureau of the World Heritage Committee the Bureau heard representations that Kakadu National Park, a World Heritage site, was at risk from uranium mining at Jabiluka. The World Heritage Committee (through the Bureau) has been asked to place Kakadu on the list of 'World Heritage sites in danger'

The World Heritage Bureau has decided to send a fact-finding mission to investigate the potential impact of the Jabiluka mine on the World Heritage values of Kakadu National Park.

It is expected that this visit will take place in October 1998 with the intention that the fact-finding mission would then report back to the World Heritage Committee in December 1998.

SUMMARY OF APPENDICES

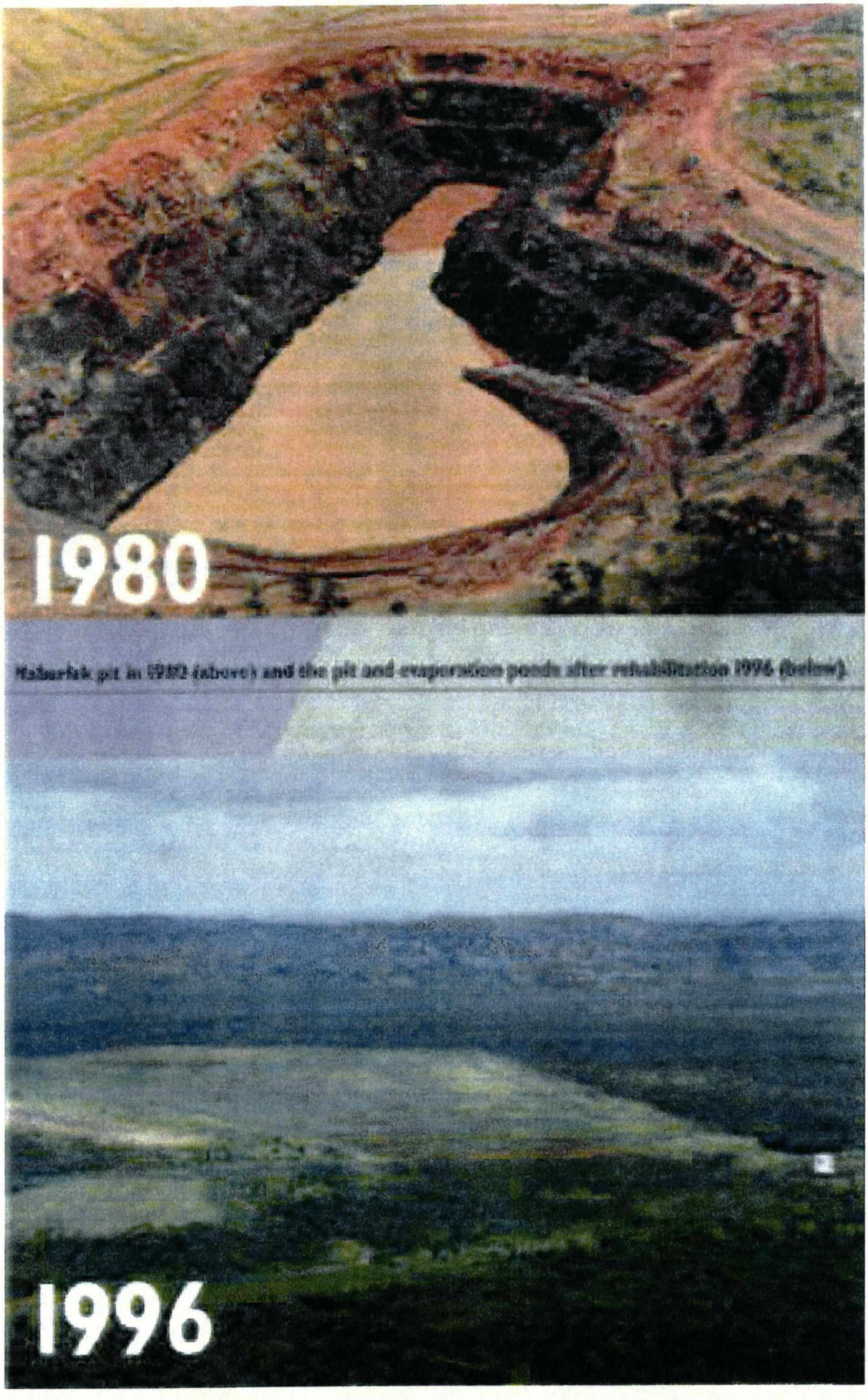
APPENDIX A	NABARLEK PIT IN 1980 AND PIT AND REHABILITATION PONDS AFTER REHABILITATION IN 1996
APPENDIX B	MARKER INDICATING CENTRE OF FORMER NABARLEK MINE PIT
APPENDIX C	MEMBERS STANDING AT THE JABILUKA MINE PORTAL
APPENDIX D	N T REGIONAL LOCATION OF URANIUM MINING OPERATION
APPENDIX E	ALLIGATOR RIVERS REGION
APPENDIX F	LOCATION OF JABILUKA AND RANGER
APPENDIX G	SITE LOCATION MAP OF JABILUKA AND RANGER MINERAL LEASES
APPENDIX H	LAND AREAS OF ALLIGATOR RIVERS REGION, ASSOCIATED MINERAL LEASES AND MINING OPERATIONS

APPENDIX A

NABARLEK PIT IN 1980 AND

PIT AND REHABILITATION PONDS AFTER REHABILITATION

IN 1996



Yaburlak pit in 1982 (above) and the pit and evaporation ponds after rehabilitation 1996 (below).

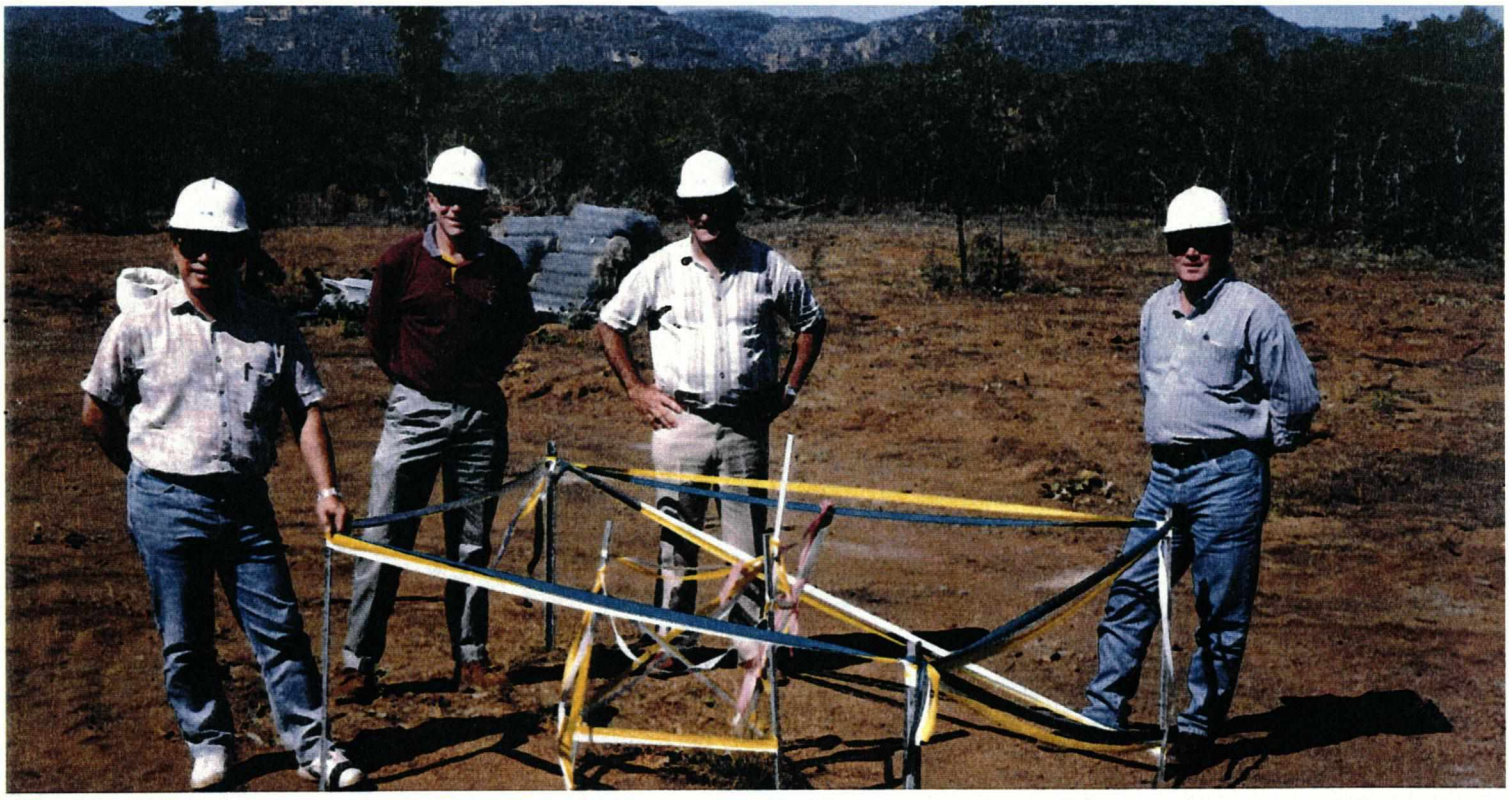
APPENDIX B

MARKER INDICATING CENTRE OF FORMER

NABARLEK MINE PIT

APPENDIX C

MEMBERS STANDING AT THE JABILUKA MINE PORTAL



APPENDIX D

N T REGIONAL LOCATION OF URANIUM MINING OPERATION

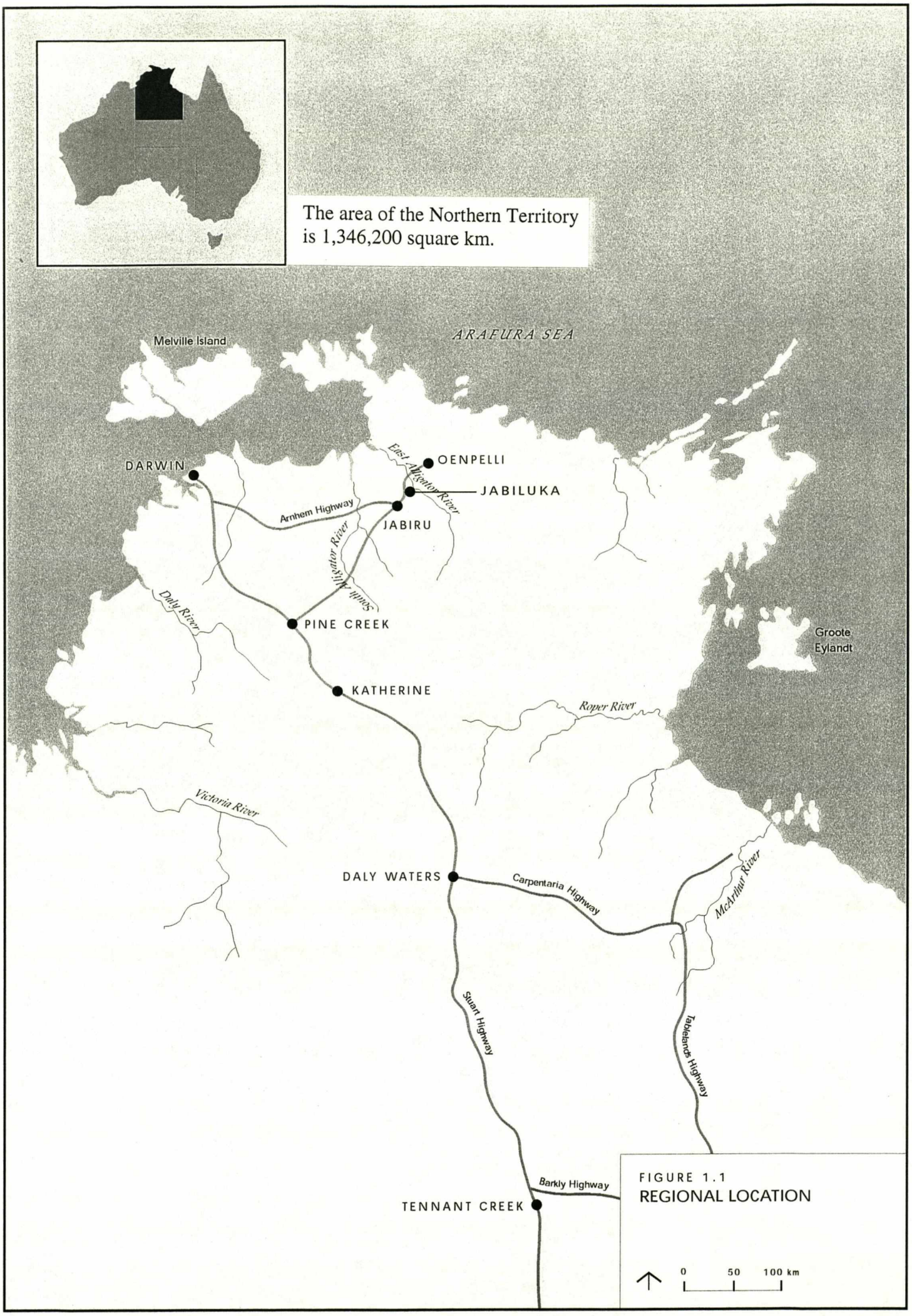
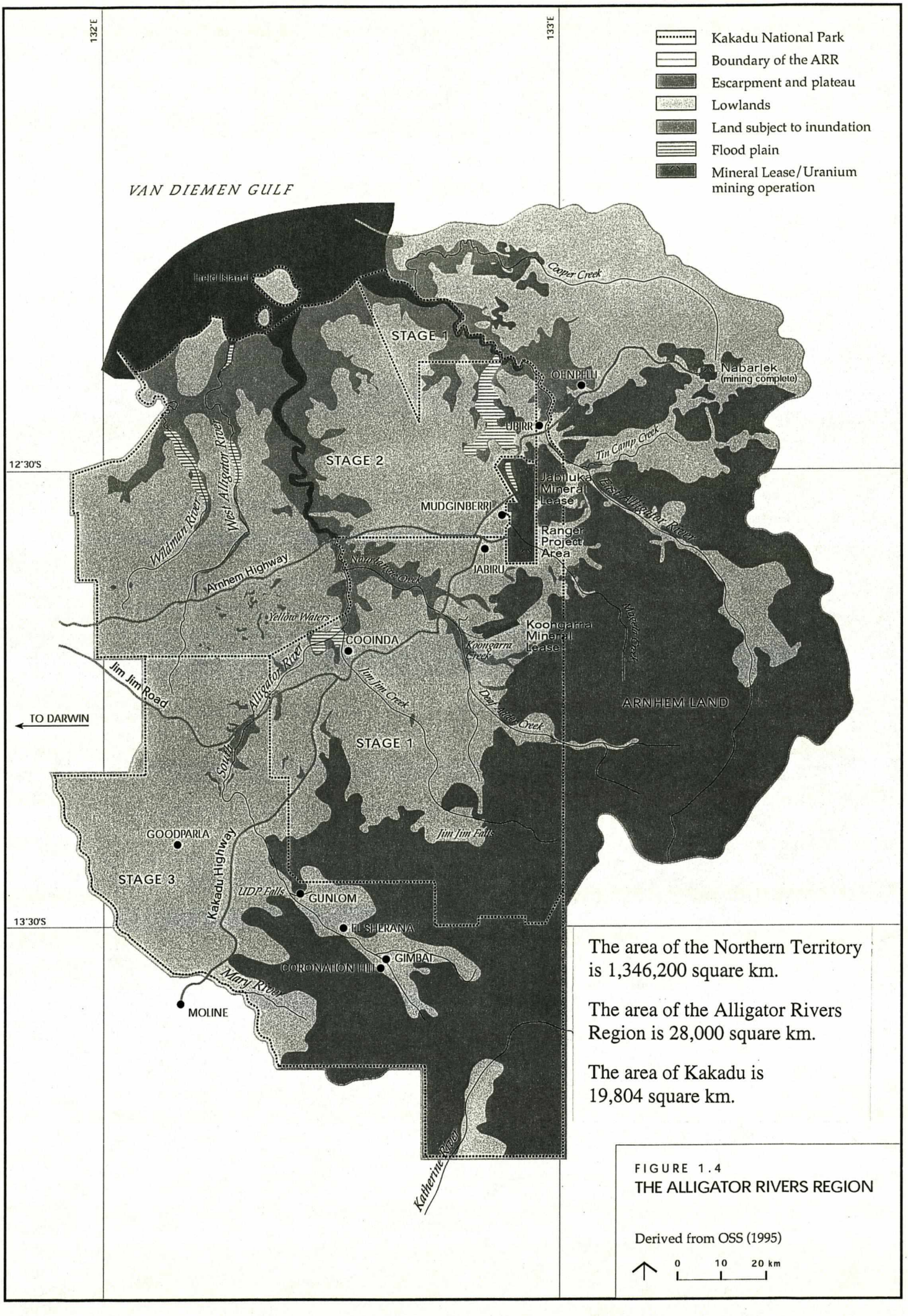


FIGURE 1.1
REGIONAL LOCATION

APPENDIX E

ALLIGATOR RIVERS REGION


Kakadu National Park
Boundary of the ARR
Escarpment and plateau
Lowlands
Land subject to inundation
Flood plain
Mineral Lease/Uranium mining operation
132°E
133°E
VAN DIEMEN GULF
Field Island
Cooper Creek
STAGE 1
OENPELLI
Nabarlek
(mining complete)
UBIRR
Tin Camp Creek
12°30'S
STAGE 2
Jabiluka Mineral Lease
East Alligator River
West Alligator River
Wildman River
MUDGINBERRI
Ranger Project Area
Arnhem Highway
Nourlangie Creek
JABIRU
Yellow Waters
COOINDA
Koongarra Mineral Lease
Koongarra Creek
Nanguluwurr Creek
Jim Jim Road
South Alligator River
Jim Jim Creek
Deaf Adder Creek
ARNHEM LAND
TO DARWIN
STAGE 1
Jim Jim Falls
GOODPARLA
Kakadu Highway
STAGE 3
UDP Falls
GUNLOM
13°30'S
EL SHERANA
GIMBAT
CORONATION HILL
Mary River
MOLINE
Katherine River
The area of the Northern Territory is 1,346,200 square km.
The area of the Alligator Rivers Region is 28,000 square km.
The area of Kakadu is 19,804 square km.
FIGURE 1.4
THE ALLIGATOR RIVERS REGION
Derived from OSS (1995)
0 10 20 km

APPENDIX F

LOCATION OF JABILUKA AND RANGER MINE

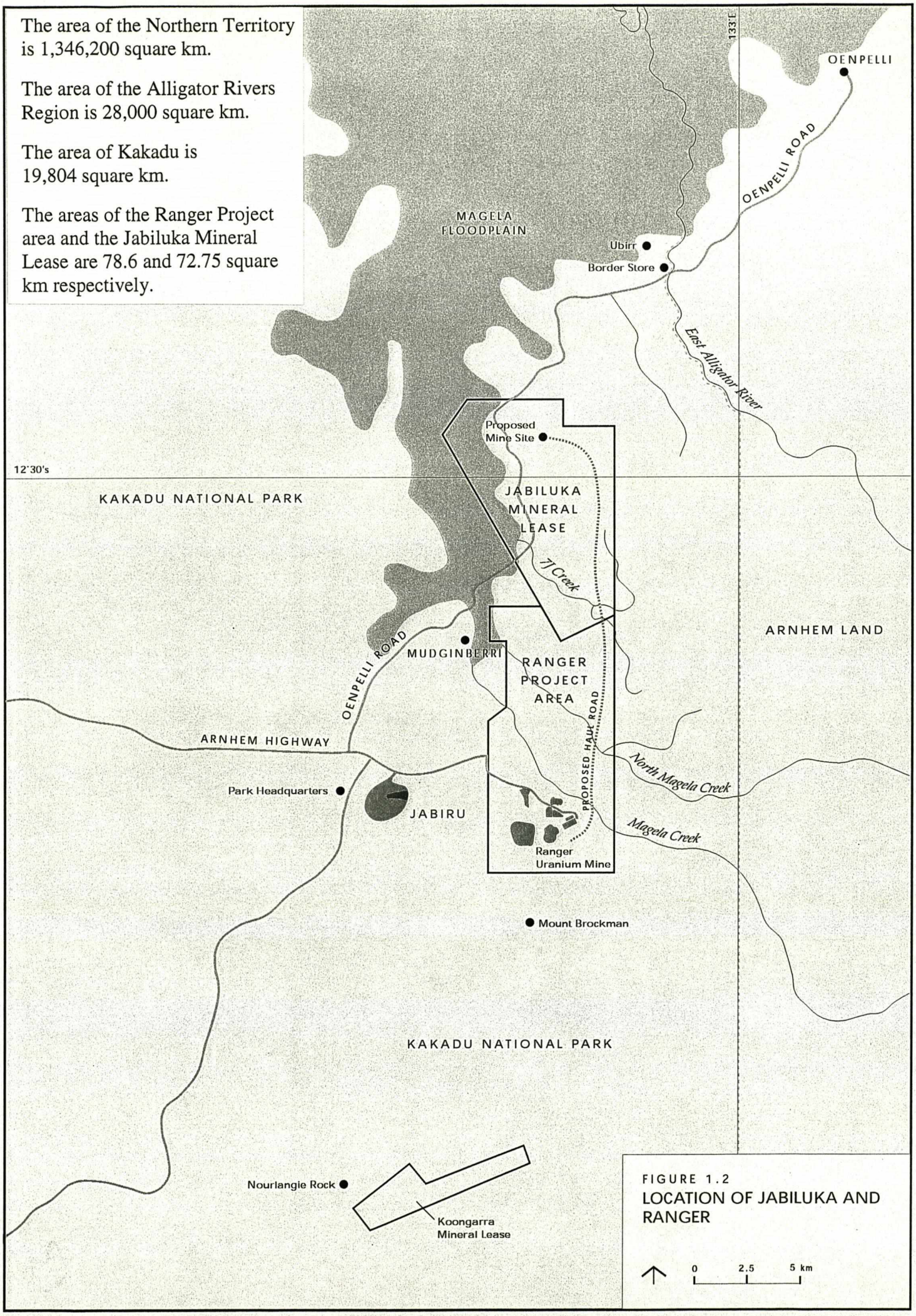
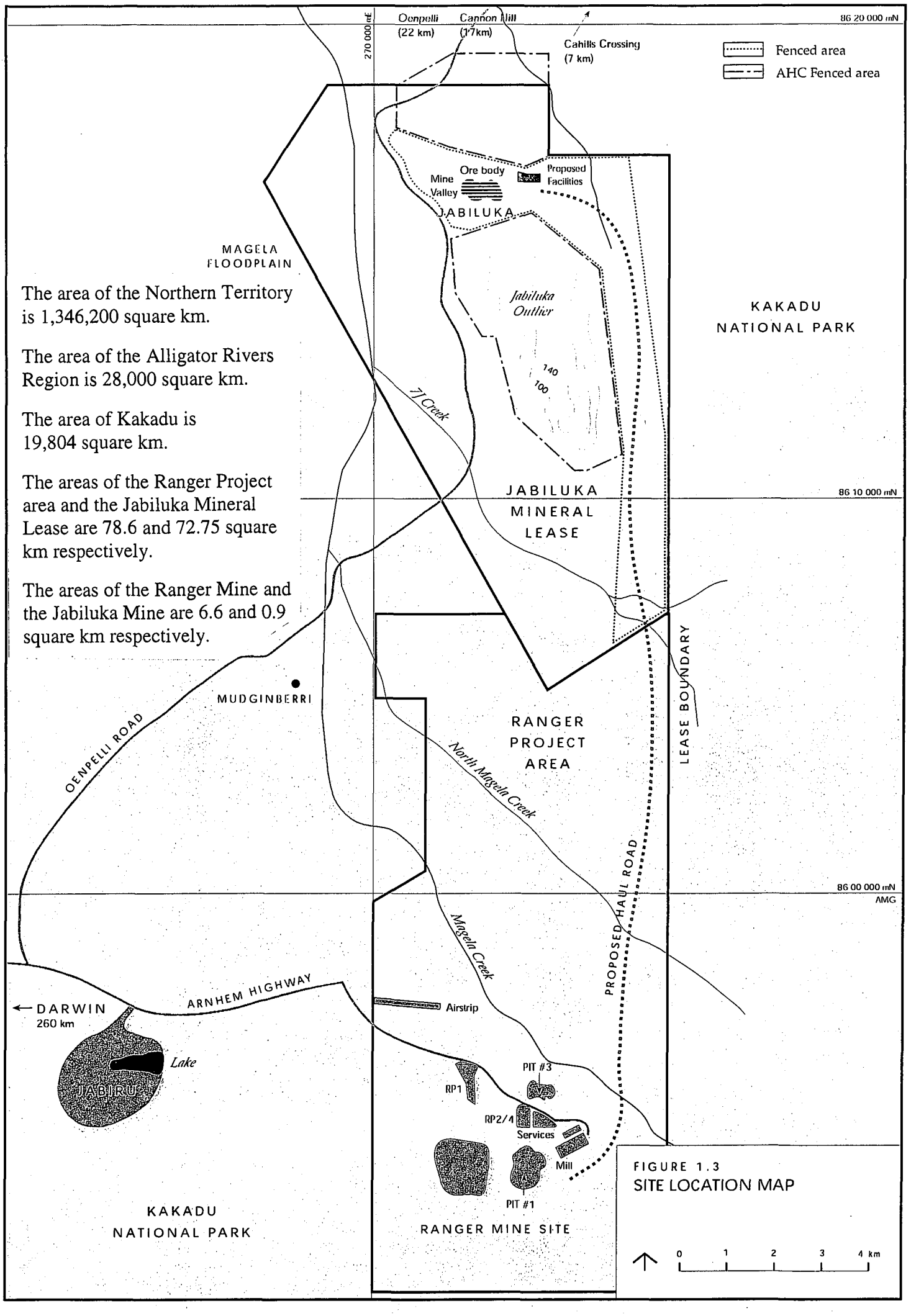


FIGURE 1.2
LOCATION OF JABILUKA AND RANGER

APPENDIX G

SITE LOCATION MAP OF JABILUKA AND RANGER

MINERAL LEASES



The area of the Northern Territory is 1,346,200 square km.

The area of the Alligator Rivers Region is 28,000 square km.

The area of Kakadu is 19,804 square km.

The areas of the Ranger Project area and the Jabiluka Mineral Lease are 78.6 and 72.75 square km respectively.

The areas of the Ranger Mine and the Jabiluka Mine are 6.6 and 0.9 square km respectively.

FIGURE 1.3
SITE LOCATION MAP

APPENDIX H

LAND AREAS OF ALLIGATOR RIVERS REGION,

ASSOCIATED MINERAL LEASES

AND MINING OPERATIONS

Region		Area		RMA as a percentage
		Square kms	Hectares	
Northern Territory		1,346,200.00	134,620,000	0.00007%
Alligator Rivers Region		28,000.00	2,800,000	0.00321%
Kakadu National Park		19,804.00	1,980,400	0.0045%
Ranger Project Area		78.60	7,860	
	Ranger Mine	6.60	660	
Jabiluka Lease		72.75	7,275	1.2%
	Pancon Proposal	8.19	819	11.0%
	Ranger Mill Alternative	**0.90**	**90**	
	Jabiluka Mill Alternative	1.35	135	
Nabarlek Lease		12.79	1,279	
	Nabarlek Mine	2	200	