NORTHERN TERRITORY OF AUSTRALIA

Mining Management Act

AUTHORISATION NUMBER [0108-15]
(VARIATION OF AUTHORISATION NUMBER [0108-14])

To: Energy Resources of Australia Ltd
ACN 008 550 865
Locked Bag 1
JABIRU NT 0886

I, Willem Rudolf Westra van Holthe, Minister for Mines and Energy, under section 38(2) of the *Mining Management Act* and having regard to the matters mentioned in section 34 of the Act, vary Authorisation Number 0108-14 by omitting the Schedule to the Authorisation and substituting the Schedule to this instrument.

Dated

Minister for Mines and Energy

Schedule

"SCHEDULE
Conditions of Authorisation number 0108-15

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SCHEDULE 1 DEFINITIONS

1.1 In this Authorisation, unless a contrary intention appears:

1.1.1 "the Act" means the *Mining Management Act 2001*;

1.1.2 "the Minister" means the Minister of the Northern Territory responsible for the Act;

1.1.3 "the Director" means the Director of Mining Performance of the Northern Territory Department of Resources;

1.1.4 "the Commonwealth Minister" means the Minister administering the *Atomic Energy Act 1953*;

1.1.5 "the Authority" means the Authority issued under section 41 of the *Atomic Energy Act 1953* by the Commonwealth Minister on 14 November 1999;

1.1.6 "the Environmental Requirements" mean the requirements attached as Appendix A to the Authority;

1.1.7 "the Supervising Scientist" means the person performing the duties of Supervising Scientist under the *Environment Protection (Alligator Rivers Region) Act 1978*;

1.1.8 "the Supervising Authority" means the person having responsibility under an applicable law or if there is no applicable law the person performing the duties of Supervising Scientist under the *Environment Protection (Alligator Rivers Region) Act 1978*.

1.1.9 "Ranger project area" means the land described in Schedule 2 to the *Aboriginal Land Rights (Northern Territory) Act 1976*;

1.1.10 "owner", in relation to a mine, has the same meaning as it does under the Act, and, in relation to the mine that lies within the Ranger project area, means Energy Resources of Australia Ltd (ACN 008 550 865), and having its registered office at C/- Mallesons Stephen Jaques, 10th Floor Advance Bank Centre, 60 Marcus Clarke Street, Canberra City, ACT 2601;

1.1.11 "Mining Officer" has the same meaning as it does under the Act;

1.1.12 "mining site" has the same meaning as it does under the Act

1.1.13 "operator " has the same meaning as it does under the Act;

1.1.14 "mine site employees" means employees of the operator of the mine whose usual place of work is in the Ranger project area;

1.1.15 "the Code " means the current Code of Practice and Safety Guide on Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing;

1.1.16 "designated worker" means a worker who works in a work category where the work conditions are such that they may individually have the potential to receive an annual effective dose of more than 5 mSv;

1.1.17 "controlled area" has the same meaning as it does in the Code;

1.1.18 “supervised area” has the same meaning as it does in the Code;

1.1.19 "Radiation Safety Officer" has the same meaning as it does in the Code; and

1.1.20 "site" has the same meaning as "Ranger project area".

SCHEDULE 2 AUTHORISED OPERATIONS AT THE RANGER MINE

2.1 The operator of the mine is authorised to:

2.1.1 mine Ranger #3, to the extent of the Shell 50 design specified in the proposal submitted by Energy Resources of Australia on 12 December 2007, (ref MR2007/0355), and amended on 16 October 2009 to incorporate the extended outline of the pit as detailed in the application for push back work, (ref M2009/2341) and in general accordance with the provisions of SCHEDULE 3;

2.1.2 operate an ore treatment facility for the production of uranium oxide in general accordance with the provisions of SCHEDULE 4;

2.1.3 operate the tailings dam and Pit#1 tailings repository and to carry out such associated activities as may be required for their operation, in general accordance with SCHEDULE 5;

2.1.4 carry out ancillary works and services necessary for the conduct of mining and the continuing operation of ore treatment facilities in general accordance with SCHEDULE 6;

2.1.5 dispose of water by direct release from Retention Pond 1 and Djalkmarra Billabong in general accordance with SCHEDULE 7;

2.1.6 dispose of water from Retention Pond 2 by irrigation within areas which are approved by the Director, in general accordance with SCHEDULE 7;

2.1.7 dispose of water from pit dewatering bores by flood irrigation within areas which are approved by the Director;

2.1.8 pump water from Magela Creek to Retention Pond 2 subject to the approval of the Director and subject to the conditions of SCHEDULE 7; and

2.1.9 to construct and operate a dolomite treatment plant in accordance with the provisions of SCHEDULE 4;

2.1.10 operate a hydrogen peroxide storage facility, and operate a Caro's acid production facility, in general accordance with the document titled "Application for Approval Construction and Operation of a Hydrogen Peroxide Storage Facility Including the Production of Caro's Acid" dated October 1995; and

2.1.11 store drill core and samples from the Djarr Djarr camp in a manner approved by the supervising authority.

SCHEDULE 3 MINING OPERATIONS

Environmental Protection

3.1 The operator of the mine shall ensure that mining operations at Ranger are undertaken in such a way as to be consistent with the following Primary Environmental Objectives for Kakadu National Park.

3.1.1 maintain the attributes for which Kakadu National Park was inscribed on the World Heritage list;

3.1.2 maintain the ecosystem health of the wetlands listed under the Ramsar Convention on Wetlands (i.e. the wetlands within Stages I and II of Kakadu National Park);

3.1.3 protect the health of members of the regional community; and

3.1.4 maintain the natural biological diversity of aquatic and terrestrial ecosystems of the Alligator Rivers Region, including ecological processes.

3.2 In particular, the operator of the mine shall ensure that operations do not result in:

3.2.1 damage to the attributes for which Kakadu National Park was inscribed on the World Heritage list;

3.2.2 damage to the ecosystem health of the wetlands listed under the Ramsar Convention on Wetlands (i.e. the wetlands within Stages I and II of Kakadu National Park);

3.2.3 an adverse effect on the health of members of the regional community by ensuring that exposure to radiation and chemical pollutants is as low as reasonably achievable and conforms with relevant Australian law, and in particular, in relation to radiological exposure, complies with the most recently published and relevant Australian standards, codes of practice, and guidelines;

3.2.4 change to biodiversity, or impairment of ecosystem health, outside of the Ranger Project Area, of a nature that is different and detrimental from that expected from natural biophysical or biological processes operating in the Alligator Rivers Region; and

3.2.5 environmental impacts within the Ranger Project Area which are not as low as reasonably achievable, during mining excavation, mineral processing, and subsequently during and after rehabilitation.

Conditions

3.3 In order to meet the Primary Environmental Objectives and the primary environmental objectives for rehabilitation described in 8.1.2, the operator of the mine shall:

3.3.1 develop and update to the approval of the Director, the Ranger Mining Management Plan;

3.3.2 conduct the mining in general accordance with the latest approved revision of the Ranger Mining Management Plan insofar as that document does not conflict with the Schedules contained herein; and

3.3.3 dump and stockpile ore and waste material:

3.3.3.1 in general conformity with the Ranger Mining Management Plan; and

3.3.3.2 without passing through the discriminator if the material is from an area which has been probed or scanned and ascertained to be waste; or

3.3.3.3 according to the uranium content determined by the discriminator, which has a nominal accuracy of plus or minus 50% at the 0.02% uranium level, and which is to be calibrated in accordance with the procedure approved by the Director; and described in the Mining Management Plan.

3.3.4 minimise, to the greatest extent practical and to the satisfaction of the Director:

3.3.4.1 the disturbance of soil, vegetation and fauna within the Ranger Project Area; and

3.3.4.2 the risk to fauna as a result of drinking contaminated water.

3.3.5 ensure that the operations at Ranger will not result in any adverse impact on Kakadu National Park through the introduction of exotic fauna or flora.

3.4 All mining operations shall be implemented in accordance with Best Practicable Technology, defined as that technology from time to time relevant to the Ranger Project which produces the minimum environmental pollution and degradation that can reasonably be achieved having regard to:

- the level of effluent control achieved, and the extent to which environmental pollution and degradation are prevented, in mining and milling operations in the uranium industry anywhere in the world,
- the total cost of the application or adoption of that technology relative to the environmental protection to be achieved by its application or adoption,
- evidence of detriment, or of lack of detriment, to the environment after the commencement of the Ranger Project,
- the physical location of the Ranger Project,
- the age of equipment and facilities in use on the Ranger Project and their relative effectiveness in reducing environmental pollution and degradation, and
- social factors including possible adverse social effects of introducing new technology.

SCHEDULE 4 TREATMENT PLANT OPERATIONS

4.1 In order to protect the environment, the operator of the mine shall:

4.1.1 develop and update to the satisfaction of the Director, the Ranger Mining Management Plan; and

4.1.2 conduct ore treatment in general accordance with the latest approved revision of the Ranger Mining Management Plan insofar as that document does not conflict with the Schedules contained herein.

4.2 The operator of the mine shall ensure that:

4.2.1 sufficient appropriate equipment is available to wash down the uranium treatment plant and to collect any spilt or leaked material;

4.2.2 the interlocks in the uranium treatment plant are tested at intervals no greater than six months and the records of those tests are available for inspection by a Mining Officer;

4.2.3 the counter-disaster procedures are practised at least once annually and that reports on these practices are maintained on site for perusal by a Mining Officer;

4.2.4 where a potential exists for dust generation, such as at crushing, screening, and transfer points within the mill, dust control devices shall be installed and their functioning in accordance with specifications checked annually and after maintenance; and

4.2.5 the combined rate of emission of uranium and uranium compounds, expressed as uranium, from the uranium calciner stack and the product packaging dust control systems does not exceed 1.5 kg/day.

SCHEDULE 5 OPERATION OF TAILINGS REPOSITORIES

5.1 During mining operations and prior to final placement, covering and rehabilitation of the tailings, tailings shall be securely contained in a manner approved by the Director which prevents detrimental environmental impact.

5.2 In order to protect the environment, the operator of the mine shall:

5.2.1 to the maximum extent possible, deposit tailings in tailings repositories in such a way as to result in the maximum practicable dry density; and

5.2.2 minimise dusting from the surface of the tailings by ensuring that exposed surfaces of tailings are maintained in a coherent near-saturated condition.

5.3 At all times, the operator shall cease all inputs to the tailings dam, other than incident rainfall, where the water level in the tailings dam reaches RL 59.2 (being the certified crest height of RL 60.5m less a 6 hour Probable Maximum Precipitation ('PMP') event of 1,250mm).

5.4 Subject to 5.4.1, during the period of 1 December to 30 April, the operator shall cease all inputs to the tailings dam, other than incident rainfall, where the water level in the tailings dam reaches RL 57.9m (being the certified crest height of RL 60.5m, less a 120 hour PMP event of 2,590mm), which is referred to this Schedule as the 'Wet Season Maximum Operating Level'.

5.4.1 The Wet Season Maximum Operating Level shall be increased by an amount equivalent to the installed transfer capacity of the contingency transfer system established in accordance with 5.6 and, where applicable, varied in accordance with 5.7.

5.5 The operator of the mine shall submit a written report on proposed actions to manage the water level in the tailings dam to the Director within twenty-four hours of the levels stipulated in either 5.3 or 5.4 (as varied in accordance with 5.4.1) being reached.

5.6 Each year, in order to activate the conditions set out in 5.4.1, the operator shall conduct the necessary tests to establish, to the Director's satisfaction, the transfer capacity of the contingency transfer system.

5.7 Where there is a reduction in the transfer capacity of the contingency transfer system for a duration of longer than 24 hours:

5.7.1 the operator shall notify the Director within twenty-four hours of any such reduction; and

5.7.2 the Wet Season Maximum Operating Level will be decreased by the amount equivalent to the reduction in capacity for the duration of such reduction.

5.8 Final disposal of tailings shall be undertaken to the satisfaction of the Minister on the basis of best available modelling, in such a way to ensure that:

5.8.1 the tailings are physically isolated from the environment for at least 10,000 years;

5.8.2 any contaminants arising from the tailings will not result in any detrimental environmental impact for at least 10,000 years;

5.8.3 radiation doses to members of the public will comply with relevant Australian law and be less than limits recommended by the most recently published and

relevant Australian standards, codes of practice and guidelines effective at the time of the final disposal; and

5.8.4 by the end of operations all tailings must be placed in the mined out pits.

5.9 The operator of the mine shall submit reports on each tailings repository in accordance with the requirements of Annex C.

SCHEDULE 6 OTHER SERVICES, OPERATIONS AND REQUIREMENTS

Infringements

6.1 The operator of the mine shall notify the Minister as soon as is practicable, of any infringement of the conditions and requirements of this Authorisation or the Environmental Requirements.

Staffing and Induction

6.2 The company shall employ adequate numbers of competent, appropriately qualified and experienced staff to ensure that it can provide the required level of protection to the environment, human health, and Aboriginal culture and heritage.

6.3 All mine site employees shall attend an induction course, which shall explain the environment protection and monitoring programs, radiation protection and responsibilities, Aboriginal culture, and the plan of management of Kakadu National Park.

6.4 All mine site workers shall attend a radiation induction and shall have access to documents explaining the nature of the hazards associated with the handling of uranium ores and concentrates and the safe working procedures to be adopted.

Air Quality

6.5 Emissions of gaseous and particulate contaminants shall conform with Australian law, and, taking into account the most recently published and relevant Australian standards, codes of practice, and guidelines, be managed to minimise the effects of particulate and gaseous contaminants from the point of view of all possible radiological, physical and chemical hazards.

6.6 Air quality shall be managed in such a way that there is no physical or chemical detriment to any known sites of Aboriginal culture or heritage.

Extraction of Sand and Gravel for Ancillary Purposes

6.7 All excavated material shall be managed such that there is no detrimental environmental impact outside the Ranger Project Area, and that environmental impacts within the Ranger Project Area are as low as reasonably achievable.

6.8 The operator of the mine shall ensure that:

6.8.1 prior to the commencement of extraction operations, a plan of the proposed operations is submitted to a Mining Officer for approval. This plan shall depict the extent of the proposed borrow areas and the location of associated roads or other developments. It shall also include details of proposed rehabilitation; and

6.8.2 rehabilitation measures specified by a Mining Officer are carried out as soon as is reasonably practicable.

Explosives Manufacture and Blasting Operations

6.9 The company shall ensure that detonation of explosives cannot damage the environment outside of the Ranger Project Area, or any sites significant to Aboriginal culture and heritage.

6.10 In the conduct of blasting operations, in order to protect the environment, the operator of the mine shall ensure that no blast is fired in which the weight of explosive per millisecond delay interval exceeds the maximum weight determined from time to time by the Director and noted in the Mining Management Plan.

Storage, use and Disposal of Hazardous Substances and Waste

6.11 All hazardous substances (including chemicals, reagents, fuels and oils) shall be stored, used and disposed of in conformance with relevant Australian law and in accordance with any standards, practices or procedures advised by the Supervising Authority to minimise the risk to human health and ecosystem health.

6.12 The company shall ensure that wastes will not result in any detrimental environmental impact outside of the Ranger Project Area, and that environmental impacts within the Ranger Project Area are as low as reasonably achievable.

6.13 From the date of the Authority the company shall prepare and maintain records of the location, state and chemical characteristics of all hazardous substances and wastes contained, used and disposed of on the Ranger Project Area. The company shall take all reasonable steps to include in the record details of hazardous substances contained, used or disposed of on the Ranger Project Area before the date of the Authority.

6.14 In order to protect the environment, the operator of the mine shall, in relation to the domestic and industrial waste disposal site, ensure that:

6.14.1 all reasonable precautions are taken to prevent the breeding of flies, vermin, or other pests, and to prevent the dispersal of windblown rubbish;

6.14.2 when filled, the trench is covered and compacted with soil to above the surrounding ground level so as to compensate for anticipated subsidence.

SCHEDULE 7 WATER MANAGEMENT

7.1 The operator of the mine shall not allow either surface or ground waters arising or discharged from the Ranger Project Area during its operation, or during or following rehabilitation, to compromise the achievement of the Primary Environmental Objectives as described in 3.2 and 8.1.

7.2 In order to protect the environment, the operator of the mine shall operate a water management system in general accordance with the latest approved revision of the Mining Management Plan insofar as that document does not conflict with the Schedules contained herein.

7.3 The operator of the mine shall, to the extent necessary to achieve the Primary Environmental Objectives as described in 3.2, take steps to: minimise the volume of contaminated water that is required to be managed on site; minimise the load of contaminants within that water; and concentrate and contain contaminants within the site.

7.4 Process water shall be totally contained within a closed system except for:

7.4.1 losses through natural or enhanced evaporation;

7.4.2 seepage of a quality and quantity that will not cause detrimental environmental impact outside the Ranger Project Area; and

7.4.3 subject to 7.1 and 7.3, process water which has been treated to achieve a quality which:

7.4.3.1 conforms to a standard practice or procedure recommended by the Supervising Scientist; and

7.4.3.2 is not less than that of the water to which it is to be discharged.

7.5 The operator of the mine shall:

7.5.1 by 1 October each year submit for the approval of the Director, a revision of the Water Management Plan including:

- a complete explanation of the operation and maintenance of the water management system;
- the contingency procedures for disruptions in the operation and maintenance of the water management system; and
- the surface and ground water monitoring program.

7.5.2 maintain up-to-date versions of drawings depicting the current surface runoff drainage system; and

7.5.3 instruct all personnel involved in the operation of the water management system in the details of its operation and in the implementation of contingency procedures.

7.6 In order to protect the environment, the operator of the mine:

7.6.1 shall ensure that any discharge of waters from waterbodies other than Retention Pond 1 or Djalkmarra Billabong is made only with the approval of, and in accordance with conditions set by, the Minister;

7.6.2 shall, in relation to the disposal of Retention Pond 2 water by irrigation, ensure that flood irrigation is used as the primary irrigation option and spray irrigation is used only as a backup option during periods when demand for irrigation capacity exceeds that available through flood irrigation, subject to the following conditions:

7.6.2.1 the volume of water discharged by each section of the irrigation system, the times of commencement and of cessation of irrigation, and any observed adverse effects of irrigation, are recorded daily in a log book kept specifically for this purpose;

7.6.2.2 during irrigation, a daily inspection of the irrigation areas is made to detect any waterlogging, seepage, or other visible adverse effects.

7.7 The operator of the mine shall maintain to the satisfaction of the Minister and for examination by a Mining Officer, all records and data associated with the operation and monitoring of the water management system for the life of the mine up to and including rehabilitation.

7.8 With reference to the pumping of water from Magela Creek to Retention Pond 2, the operator of the mine shall ensure that:

7.8.1 such pumping is carried out by pumps having their intake situated just north of the confluence of the main channel of the Magela with the Georgetown Branch;

7.8.2 such water is conveyed by pipeline laid on surface from the pumping station to the north-east corner of the plant fenced area and shall have an "open" discharge to Retention Pond 2, so that water cannot syphon back from the pond into the creek;

7.8.3 the rate and cumulative quantity of water extracted is measured and reported weekly and this rate shall not exceed 25,000 m^3 per day. The rate of flow of the Magela immediately upstream of the point of extraction shall be measured and similarly reported; and

7.8.4 the pump installation shall be constructed in a manner which will prevent pollution of the surrounding environment by fuel, lubricants or other foreign matter.

7.9 The operator of the mine shall submit reports in accordance with the requirements of Annex C.

SCHEDULE 8 DECOMMISSIONING AND REHABILITATION

Rehabilitation

8.1 In order to protect the environment the operator of the mine shall plan rehabilitation in accordance with the following Primary Environmental Objectives for rehabilitation:

8.1.1 Goal

Subject to 8.1.2 and 8.1.3, the operator of the mine shall rehabilitate the Ranger project area to establish an environment similar to the adjacent areas of Kakadu National Park such that, in the opinion of the Commonwealth Minister with the advice of the Supervising Scientist, the rehabilitated area could be incorporated into Kakadu National Park.

8.1.2 Objectives

To revegetate the disturbed sites of the Ranger project area using local native plant species similar in density and abundance to those existing in adjacent areas of Kakadu National Park, to form an ecosystem the long-term viability of which would not require a maintenance regime significantly different from that appropriate to adjacent areas of the Park.

To establish stable radiological conditions on areas impacted by mining so that, the health risk to members of the public, including traditional owners, is as low as reasonably achievable; members of the public do not receive a radiation dose which exceeds applicable limits recommended by the most recently published and relevant Australian standards, codes of practice, and guidelines; and there is a minimum of restrictions on the use of the area.

To establish erosion characteristics which, as far as can reasonably be achieved, do not vary significantly from those of comparable landforms in surrounding undisturbed areas.

8.1.3 Facilities that may remain following rehabilitation

Where all the major stakeholders agree, a facility connected with Ranger may remain in the Ranger Project Area following the termination of the Authority, provided that adequate provision is made for eventual rehabilitation of the affected area consistent with principles for rehabilitation set out in 8.1.2 and 7.1.

8.2 At the end of every twelve month period, the operator of the mine shall prepare a rehabilitation plan for the approval of the Minister and the Commonwealth Minister with the advice of the Supervising Scientist, the implementation of which will achieve the major objectives of rehabilitation of the Ranger Project Area and will include:

8.2.1 a detailed specification of all progressive rehabilitation works which are proposed to be undertaken in the 12 months following the preparation of the report;

8.2.2 a conceptual specification covering decommissioning and rehabilitation for the remaining life of the project.

8.3 The work estimate to be included with the specifications to be submitted under 8.2 shall encompass forecasts of the extent of works, the resources to be applied in the execution of those works, and the likely cost and time required for completion. These aspects shall take into account:

8.3.1 removal of all plant, equipment, buildings and other structures;

8.3.2 removal of civil works and facilities that are not required for other purposes;

8.3.3 dewatering of the water management system;

8.3.4 disposal of tailings.

8.3.5 removal of all unnecessary water-retaining structures and other earthworks;

8.3.6 backfilling of the open pits;

8.3.7 revegetation of all disturbed areas; and

8.4 The obligations on the operator of the mine imposed by SCHEDULE 8 will cease in respect of any part of the Ranger project area over which a close-out certificate is issued by the Minister subject to the Supervising Scientist and the NLC agreeing that the specific part of the Ranger Project Area has met the aims and objectives for rehabilitation.

SCHEDULE 9 ENVIRONMENTAL AND RADIATION MONITORING AND REPORTING

9.1 The operator of the mine shall implement a system to control the radiological exposure of people and the environment arising from its mining and milling activities. The system and the dose limits applied shall comply, at the minimum, with relevant Australian law taking into account the most recently published and relevant Australian standards, codes of practice, and guidelines. Subject to 9.2, the company shall achieve the following outcomes:

9.1.1 Radiation doses to workers shall be kept as low as reasonably achievable and shall always remain less than the dose limit for workers.

9.1.2 Radiation doses to people who are not company employees or contractors shall be kept as low as reasonably achievable and shall always remain less than the dose limit for members of the public.

9.1.3 Ecosystems surrounding the Ranger Project Area shall not suffer any significant deleterious radiological impacts.

9.2 Radiation doses received from natural background sources or as the result of undergoing medical procedures are not subject to the system and are not to be included in the calculation of radiation doses.

9.3 In order to protect the environment, and in compliance with Environmental Requirements 13.1 and 13.2 relating to monitoring and analysis, the operator of the mine shall:

9.3.1 implement the environmental and radiation monitoring programs included in Annex A and Annex B;

9.3.2 conduct contingency monitoring in a manner approved by the Director in the event of the malfunction of monitoring equipment; and

9.3.3 submit to the Director, reports in accordance with the requirements of Annex C.

9.4 The company shall carry out a monitoring program approved by the Director following cessation of operations until such time as a relevant close-out certificate is issued under 8.4.

ANNEX A ENVIRONMENTAL MONITORING PROGRAM

A.1 Groundwater[1]	Measurement	Frequency
Gulungul Creek Catchment Bore 21030 deep (270604 East; 8597301 North)	L, pH, EC; dissolved[2] magnesium, sulphate, manganese & uranium dissolved ^{226}Ra	Quarterly Annually (May)
Coonjimba Creek Catchment Bore 23931 deep (272457 East; 8599561 North)	L, pH, EC; dissolved magnesium, sulphate, manganese & uranium dissolved ^{226}Ra	Quarterly Annually (May)
Djalkmara Creek Catchment Bore 83/1 deep (274420 East; 8598263 North)	L, pH, EC; dissolved magnesium, sulphate, manganese & uranium dissolved ^{226}Ra	Quarterly Annually (May)
Corridor Creek Catchment Bore OB 27 (275528 East; 8597063 North)	L, pH, EC; dissolved magnesium, sulphate, manganese & uranium dissolved ^{226}Ra	Quarterly Annually (May)

A.2 Potable Water	Measurement	Frequency
Mine site (Jabiru East supply)	pH, EC, turbidity; dissolved sulphate	Monthly
	Total coliform, *E. coli*; gross-α and gross-β[3]	Quarterly
	Alkalinity; total sodium, potassium, calcium, magnesium, chloride, nitrate, sulphate, copper, lead, manganese, uranium & zinc	November

[1] Grid references are provided in the GDA94 system.

[2] All references to "dissolved" mean the fraction of solution which passes through a 0.45 micron filter.

[3] The need for further radionuclide analyses is dependent on the results of gross-α and gross-β determinations undertaken on unfiltered water in accordance with recommendations contained within the Australian Drinking Water Guidelines current at the time of sampling.

A.3 Surface water	Measurement	Frequency[4]
Magela Creek (GS8210009) (MG009)	pH, EC, turbidity; dissolved magnesium, calcium, sulphate, manganese & uranium	Weekly
	total radium-226	Monthly
	pH, EC, turbidity; dissolved magnesium, calcium, sulphate, manganese & uranium	Daily during RP2 release and once just prior to release
Magela Creek (MCUS)	pH, EC, turbidity; dissolved magnesium, calcium, sulphate, manganese & uranium	Weekly
	total radium-226	Monthly
	pH, EC, turbidity; dissolved magnesium, calcium, sulphate, manganese & uranium	Daily during RP2 release and once just prior to release
RP1 Weir (RP1W)	L, pH, EC, turbidity; dissolved magnesium, sulphate, manganese & uranium; residue uranium	Weekly during RP1 weir overflow; monthly at all other times
RP1 Weir (RP1W) prior to release	pH, EC, turbidity; dissolved magnesium, sulphate, manganese, nitrate & phosphate; total uranium, radium-226 & polonium-210	At least once within one week of first release
Djalkmara Billabong (DJKPS) prior to release	pH, EC, turbidity; dissolved sulphate, magnesium, nitrate, phosphate & manganese; total uranium, radium-226 & polonium-210	At least once within one week of first release
Djalkmara Billabong (DJKPS) during release	pH, EC, turbidity; dissolved sulphate, magnesium, manganese, uranium; residue uranium	Weekly
RP2 prior to release	pH, EC, turbidity, alkalinity; dissolved magnesium, sodium, potassium, calcium, ammonium, chloride, nitrate, sulphate, phosphate, manganese, total uranium; radium-226 & polonium-210	At least once within one week of first release
RP2 during release	pH, EC, turbidity; dissolved sulphate, magnesium, manganese & uranium; residue uranium	Daily if period of release is ≤7 days
	pH, EC, turbidity, alkalinity; dissolved sulphate, magnesium & manganese; total uranium, radium-226 & polonium-210	Weekly if period of release is >7 days
Coonjimba Billabong (CB)	pH, EC, turbidity; dissolved magnesium, calcium, sulphate, manganese & uranium	The week prior to, and weekly from, RP1 weir overflow; monthly at all other times
Georgetown Creek (GC2)	pH, EC, turbidity; dissolved magnesium, calcium, sulphate, manganese & uranium	Weekly during flow
Georgetown Billabong (GTB)	pH, EC, turbidity; dissolved magnesium, calcium, sulphate, manganese & uranium	Weekly during flow at GC2; monthly at other times
Gulungul Creek Arnhem Highway (GCH)	pH, EC, turbidity; dissolved magnesium, calcium, sulphate, manganese & uranium total radium-226	Weekly Monthly
Gulungul Creek Up Stream (GCC)	pH, EC, turbidity; dissolved magnesium, calcium, sulphate, manganese & uranium	Weekly Monthly

[4] From the start of flow unless otherwise indicated.

A.3 Surface water	Measurement	Frequency[4]
	total radium-226	

A.4 Atmospheric monitoring	Measurement	Frequency
Calciner stack emissions	Uranium	Quarterly
Product packing area stack emissions	Uranium	Quarterly
Power house stack emissions	SO_2	Quarterly

A.5 Criteria for direct release of water from RP2 to Magela Creek

A.5.1 The flow rate in Magela Creek at GS8210009 shall be greater than 20 m^3/s before water may be released.

A.5.2 The water release rate shall also be restricted so that the total load of those constituents listed in Table 1 does not exceed the additional annual load limits specified in Table 1 in any twelve-month period commencing in September.

A.5.3 Results of analyses performed for the water release monitoring program are to be forwarded weekly to the Director.

A.5.4 A Wet Season Report is to be submitted to the Director in accordance with Annex C.1, detailing:

- release quantities and timing;
- monitoring results;
- calculations of loads;
- analysis of trends; and
- demonstration of compliance with the receiving water standards for Magela Creek.

A.6 Criteria for releases of water from RP1 and Djalkmarra Billabong

A.6.1 The water release rates shall also be restricted so that the total load of those constituents listed in Table 1 does not exceed the additional annual load limits specified in Table 1 in any twelve-month period commencing in September.

Table 1: Additional annual load limits for release of dissolved manganese, phosphate and nitrate and total uranium, radium-226 and polonium-210 in water to Magela Creek

Constituent	Unit	Additional Annual Load Limit
Uranium-(238+234)	GBq/y	88
Radium-226	GBq/y	13
Polonium-210	GBq/y	7
Manganese	t/y	6
Phosphate	t/y	2.8
Nitrate	t/y	4.4

ANNEX B RADIATION MONITORING PROGRAM

Dose Delivery Pathway/Sample Point	Monitoring/Reporting Frequency	Dosimetry/Comments
External Gamma		
Designated Workers	Monitors worn for up to 3 months.	Assessed via individual PRDs (Refer to B.1.1) or (if unavailable) using time-weighted average of Work Category dose.
Most exposed group of Non-Designated workers (Refer to B.1.2)	Monitors worn for up to 3 months.	Used to assess Non-Designated worker gamma
Radon Decay Products (RDP)		
Controlled areas:		
Mine Inside Mine Offices	Monthly (sampler to run 1 week per month in each fixed location).	Average levels to be used to calculate doses to Designated mine workers (annual basis for dose reporting) and to determine the effectiveness of engineering controls.
Supervised areas:		
Tailings Disposal	Monthly (sampler to run 1 week per month in each fixed location).	To determine the effectiveness of engineering controls.
Adjacent to Processing Plant	Monthly (sampler to run 1 week per month in each fixed location).	Average levels to be used to calculate doses to Designated and Non-Designated workers (annual basis for dose reporting) and to determine the effectiveness of engineering controls.
Environmental areas		
Jabiru Jabiru East	Monthly (sampler to run 1 week per month in each fixed location).	For annual report for public reassurance.
Long Lived Alpha Activity (LLAA) – Radioactive Dust		
Controlled areas		
Designated Workers	Monitoring frequency sufficient to be statistically viable (Refer to B.1.3 and B.1.4)	Annual dose assessments based on work group average and exposure time with monitoring frequency sufficient to be statistically viable.
Mine	Monthly high volume (HiVol) sampler to run1 week per month in fixed locations (Refer to B.1.5).	To determine the effectiveness of engineering controls.
Supervised areas		
Adjacent to Processing Plant	Monthly HiVol sampler, Monthly high volume (HiVol) sampler to run1 week per month in fixed locations (Refer to B.1.5).	Average levels to be used to calculate doses to Average levels to be used to calculate doses to Non-Designated workers (annual basis for dose reporting) and to determine the effectiveness of engineering controls.
Tailings disposal	Monthly high volume (HiVol) sampler to run1 week per month in fixed locations (Refer to B.1.5).	To determine effectiveness of engineering controls.
Environmental areas		
Jabiru Jabiru East	Monthly high volume (HiVol) sampler to run1	For annual report for public reassurance.

Dose Delivery Pathway/Sample Point	Monitoring/Reporting Frequency	Dosimetry/Comments
	week per month in fixed locations (Refer to B.1.5).	
Surface Contamination		
Plant including vehicles and equipment leaving site	Randomly and on demand before equipment leaves site	As per ERA surface contamination protocols and clearance procedures.
Accessible surfaces (including ore crushing areas, product packing, control rooms, crib and ablutions and sample preparation areas)	Quarterly	As per ERA surface contamination protocols and clearance procedures.
Meteorology		
Ranger Project Area	Wind speed and direction (Refer to B.1.6)	Hourly average wind direction and wind speed in 10°sectors for calculating the annual dose assessment in Jabiru.

B.1 Notes

B.1.1 Personal Radiation Dosimeters (PRDs) may be TLDs, electronic dosimeters, Optical Stimulation Dosimeters, film badges and / or pen electroscopes.

B.1.2 The most exposed Non-Designated group will be determined annually by the ERA Radiation Safety Officer (RSO) dependent on conditions expected to be encountered during the next year by representative groups. The selected group will be nominated in the Annual Radiation Protection and Atmospheric Monitoring Program Report.

B.1.3 The work groups used are groups of workers carrying out similar activities, in similar dust exposure environments. Work groups will be determined by the RSO on an annual basis, based on annual results and on Rio Tinto SEG (Similar Exposure Group) standards.

B.1.4 Monitoring frequencies to be adopted are to be sufficient to allow statistically viable quarterly results to be calculated.

B.1.5 At times atmospheric conditions may limit sampling duration. In this case, samples will be taken for the longest duration possible without jeopardising sampler operability and of a duration to ensure statistically separate results from the minimum detectable level for the sample.

B.1.6 Monitoring data provided by Bureau of Meteorology from Jabiru East Weather Station or other as approved by the Minesite Technical Committee (MTC).

ANNEX C REPORTING REQUIREMENTS

C.1 Wet season report

C.1.1 The operator of the mine will prepare annually a Wet Season Report which will be presented to the Supervising Authority.

C.1.2 The report will be submitted within 6 weeks of flow ceasing in Magela Creek at the end of each wet season. The report will consider the results of surface and groundwater site monitoring listed in Annex A and, in particular,

- whether the operator met receiving water standards at MG009;
- short and long term trends in water chemistry; and,
- operational effects on water chemistry and hydrology within sub-catchments of Magela Creek on the Ranger lease.

C.2 Annual Environment Report

C2.1 The operator of the mine will prepare annually an Environment Report which will be presented to the Supervising Authority.

C2.2 The report will cover the period 1 September to 31 August and be submitted by 16 December each year, and shall provide details of the following matters:

- water management;
- tailings management;
- excavated material management;
- land management;
- air quality management;
- hazardous substances and industrial waste management;
- radiation monitoring and management;
- environmental monitoring;
- environmental research;
- protection of cultural sites and social impact monitoring;
- environmental planning and operating systems, including employment and training programs;
- counter disaster and emergency procedures; and
- rehabilitation.

C.3 Provision of monitoring data and its interpretation

C.3.1 The operator of the mine will provide the members of the Ranger Mine Site Technical Committee with intranet access to monitoring data, or access to data by alternative arrangements, which is collected in accordance with Annex A ie the 'statutory' monitoring program.

C.3.2 In addition to meeting the statutory monitoring program, the operator of the mine will submit annually to the Ranger Minesite Technical Committee an operational monitoring program listing sites, frequency of sampling and analytes and, where appropriate, amend the plan in the light of stakeholder advice.

C.3.3 On request by the Director, the operator of the mine will make available by intranet access, or by alternative arrangements, additional monitoring data which is collected as part of operational monitoring.

C.3.4 The operator of the mine will provide the Ranger Mine Site Technical Committee with weekly updated data and graphs for key variables at the following sites: MG009, MCUS, GC2, RP1W, GCH and GCC.

C.4 Annual Radiation and atmospheric monitoring interpretative report

C.4.1 The operator of the mine shall submit, for approval by the Director, radiation and atmospheric monitoring interpretative reports as follows:

C.4.2 The interpretative report shall contain, at least, the following information:

- a statement of the results of the monitoring measurements taken over the report period;
- a comparison with data included in the corresponding preceding report period;
- where appropriate, a comparison of the average and maximum values with the derived limits and pre-mining baseline values for items in the monitoring programs;
- where appropriate, an illustration of trends through graphs or histograms showing spatial, temporal or other trends evident from the data;
- where appropriate, notes on errors in the data, including systematic, random and total, and a statement on the level of confidence to be found in the reported data;
- a statement of the conclusions drawn from the results, and an assessment of the performance of the monitoring program;
- a summary of any significant or unusual results in the operation of the monitoring program, giving the reasons and contributing factors in those results;
- a summary of any infringements in the operation of the monitoring program and of events which have impinged on the operation or results of that program; and
- an explanation of changes or proposed changes in the technology or techniques applied in carrying out the monitoring programs.

C.4.3 The interpretative report should be submitted for the period 1 January to 31 December each year, by 31 March in the following year.

C.5 Tailings dam surveillance reports

C.5.1 A report on the integrity and stability of the tailings dam embankments, written in accordance with the specifications set out in the document entitled "Ranger Uranium Mines Pty. Ltd. - Stage IV/RL 44.5 - Construction, Quality Control and Monitoring" approved by the Quality Control Committee on 13 December 1990, and amended with the approval of the Director, shall be submitted by 30 September each year."