

Environmental Requirements of the Commonwealth of Australia for the Operation of Ranger Uranium Mine

Preamble

The Environmental Requirements for the Ranger uranium mine set out the Commonwealth's environmental protection conditions with which the company must comply. These are conditions of the Authority issued under s41 of the *Atomic Energy Act 1953* and also reflect the Commonwealth's role in the Alligator Rivers Region under the *Environment Protection (Alligator Rivers Region) Act 1978*. The operational procedures and practices, and environmental standards, guidelines, codes, regulations or limits relevant to meeting these conditions are set out in Northern Territory legislation and the Ranger General Authorisation established under the *Uranium Mining (Environment Control) Act 1979 (NT)*.

Arrangements for consultation and approval concerning operations at Ranger are set out in the "Working Arrangements" contained in the Memorandum of Understanding between the Commonwealth and Northern Territory governments, as amended from time to time. These arrangements require the Supervising Authority to consult with and have regard to the views of the Supervising Scientist and the Northern Land Council (NLC) prior to:

- (a) granting an approval or authorisation, or issuing a licence or permit, in connection with environmental aspects of operations; or
- (b) granting approval of environmental management reports; or
- (c) setting standards in connection with any permit, licence, etc relating to environmental aspects of operations; or
- (d) agreeing to the outcome of Best Practicable Technology assessments.

The Supervising Authority will notify the Minister of any action or determination in respect of these Environmental Requirements and act on or implement any subsequent advice from the Minister.

Primary Environmental Objectives

1 Environmental Protection

1.1 The company must ensure that operations at Ranger are undertaken in such a way as to be consistent with the following primary environmental objectives:

- (a) maintain the attributes for which Kakadu National Park was inscribed on the World Heritage list;

- (b) 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);
 - (c) protect the health of Aboriginals and other members of the regional community; and
 - (d) maintain the natural biological diversity of aquatic and terrestrial ecosystems of the Alligator Rivers Region, including ecological processes.
- 1.2 In particular, the company must ensure that operations at Ranger do not result in:
- (a) damage to the attributes for which Kakadu National Park was inscribed on the World Heritage list;
 - (b) 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);
 - (c) an adverse effect on the health of Aboriginals and other 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;
 - (d) change to biodiversity, or impairment of ecosystem health, outside of the Ranger Project Area. Such change is to be different and detrimental from that expected from natural biophysical or biological processes operating in the Alligator Rivers Region; and
 - (e) 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.

2 Rehabilitation

- 2.1 Subject to subclauses 2.2 and 2.3, the company must 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 Minister with the advice of the Supervising Scientist, the rehabilitated area could be incorporated into the Kakadu National Park.
- 2.2 The major objectives of rehabilitation are:
- (a) revegetation of 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;
 - (b) 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;

- (c) erosion characteristics which, as far as can reasonably be achieved, do not vary significantly from those of comparable landforms in surrounding undisturbed areas.
- 2.3 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 subclauses 2.1, 2.2 and 3.1.

Secondary Environmental Objectives

3 Water Quality

- 3.1 The company must 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.
- 3.2 The company must, to the extent necessary to achieve the primary environmental objectives, 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 to concentrate and contain contaminants within the site.
- 3.3 Background values for key variables in water quality, including values for conductivity, pH and uranium, are determined by the Supervising Scientist from time to time and communicated to the company and other major stakeholders. Should the values for these variables measured at Gauging Station GS8210009, or other key locations, show trends away from, or be abruptly divergent from, those background values, and if, in the opinion of the Minister, with the advice of the Supervising Scientist, the results may be attributable to mining operations, then the company must undertake such investigations and remedial actions as required by the Supervising Authority after consultation with the Supervising Scientist and other major stakeholders.
- 3.4 Process water must be totally contained within a closed system except for:
- (a) losses through natural or enhanced evaporation;
 - (b) seepage of a quality and quantity that will not cause detrimental environmental impact outside the Ranger Project Area; and
 - (c) subject to clauses 3.1, 3.2 and 3.3, process water which has been treated to achieve a quality which:
 - (i) conforms to a standard practice or procedure recommended by the Supervising Scientist; and
 - (ii) is not less than that of the water to which it is to be discharged.

4 Air Quality

- 4.1 Emissions of gaseous and particulate contaminants must 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.
- 4.2 Air quality must be managed in such a way that there is no physical or chemical detriment to any known sites of Aboriginal culture or heritage.

5 Radiological Protection

- 5.1 The company must 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 must 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 clause 5.3, the company must achieve the following outcomes:
 - (a) Radiation doses to company employees and contractors must be kept as low as reasonably achievable and must always remain less than the dose limit for workers.
 - (b) Radiation doses to people who are not company employees or contractors must be kept as low as reasonably achievable and must always remain less than the dose limit for members of the public.
 - (c) Ecosystems surrounding the Ranger Project Area must not suffer any significant deleterious radiological impacts.
- 5.2 The company must comply with any dose constraints established or amended by the Supervising Authority or the Minister with the advice of the Supervising Scientist to take account of other anthropogenic radiation sources such that subject to clause 5.3, the total radiation dose received by members of the public does not exceed the applicable dose limit.
- 5.3 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.

6 Storage, Use and Disposal of Hazardous Substances and Wastes

- 6.1 All hazardous substances (including chemicals, reagents, fuels and oils) must 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 or the Minister with the advice of the Supervising Scientist to minimise the risk to human health and ecosystem health.
- 6.2 The company must 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.

- 6.3 From the date of the Authority the company must 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 must 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.

7 Management of Excavated Material

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

8 Blasting

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

9 Rehabilitation Plan

- 9.1 The company must prepare a rehabilitation plan which is approved by the Supervising Authority and the Minister with the advice of the Supervising Scientist, the implementation of which will achieve the major objectives of rehabilitation as set out in subclause 2.2, and provide for progressive rehabilitation.
- 9.2 All progressive rehabilitation must be approved by the Supervising Authority or the Minister with the advice of the Supervising Scientist and subject to the NLC agreeing that the aim and objectives for rehabilitation as described in clause 2 are met.
- 9.3 The company's obligations under clause 9 will cease in respect of any part of the Ranger Project Area over which a close-out certificate is issued by the Supervising Authority subject to the Supervising Scientist and the NLC agreeing that the specific part of the Ranger Project Area has met the requirements of clause 2.
- 9.4 Where agreements under subclause 9.2 or 9.3 cannot be reached the Minister will make a determination with the advice of the Supervising Scientist.

10 Protection of Soil, Vegetation and Fauna

- 10.1 All operations should be managed to minimise, to the maximum extent practicable, and to the satisfaction of the Supervising Authority or the Minister with the advice of the Supervising Scientist:
- (a) the disturbance of soil, vegetation and fauna within the Ranger Project Area; and
 - (b) the risk to fauna as a result of drinking contaminated water.

10.2 The company must 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.

11 Management of Tailings

11.1 During mining operations and prior to final placement, covering and rehabilitation of the tailings, tailings must be securely contained in a manner approved by the Supervising Authority or the Minister with the advice of the Supervising Scientist which prevents detrimental environmental impact.

11.2 By the end of operations all tailings must be placed in the mined out pits.

11.3 Final disposal of tailings must be undertaken, to the satisfaction of the Minister with the advice of the Supervising Scientist on the basis of best available modelling, in such a way as to ensure that:

- (i) the tailings are physically isolated from the environment for at least 10,000 years;
- (ii) any contaminants arising from the tailings will not result in any detrimental environmental impacts for at least 10,000 years; and
- (iii) 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 tailings disposal.

Other Provisions

12 Best Practicable Technology

12.1 All aspects of the Ranger Environmental Requirements must be implemented in accordance with BPT.

12.2 Where there is unanimous agreement between the major stakeholders that the primary environmental objectives can be best achieved by the adoption of a proposed action which is contrary to the Environmental Requirements, and which has been determined in accordance with BPT, that proposed action should be adopted. Where agreement can not be reached the Minister will make a determination with the advice of the Supervising Scientist.

12.3 All environmental matters not covered by these Environmental Requirements must be dealt with by the application of BPT.

12.4 BPT is defined as:

That technology from time to time relevant to the Ranger Project which produces the maximum environmental benefit that can be reasonably achieved having regard to all relevant matters including:

- (a) the environmental standards achieved by uranium operations elsewhere in the world with respect to
 - (i) level of effluent control achieved; and
 - (ii) the extent to which environmental degradation is prevented;

- (b) the level of environmental protection to be achieved by the application or adoption of the technology and the resources required to apply or adopt the technology so as to achieve the maximum environmental benefit from the available resources;
 - (c) evidence of detriment, or lack of detriment, to the environment;
 - (d) the physical location of the Ranger Project;
 - (e) the age of equipment and facilities in use on the Ranger Project and their relative effectiveness in reducing environmental pollution and degradation; and
 - (f) social factors including the views of the regional community and possible adverse effects of introducing alternative technology.
- 12.5 Proposals to amend or introduce operational approaches, procedures or mechanisms must be supported by a BPT analysis. The rigour of the BPT analysis must be commensurate with the potential environmental significance of the proposal. The BPT analysis must involve consultation with and having regard to the views of the major stakeholders and copies of the BPT analysis must be provided to each of the major stakeholders.
- 12.6 A precautionary approach is to be exercised in the application of BPT in order to achieve outcomes consistent with the primary environmental objectives.

13 Environmental Monitoring

- 13.1 During operations the company must carry out a comprehensive monitoring program, as required by the Supervising Authority or the Minister with the advice of the Supervising Scientist, which:
- (a) includes monitoring stations on Magela Creek upstream and downstream of the mine at Gauging Stations GS8210028 and GS8210009 and such other sites as may be approved or required by the Supervising Authority or the Minister with the advice of the Supervising Scientist; and
 - (b) is sufficient to allow interpretive analysis of impacts from operations.
- 13.2 The company must ensure proper analysis of monitoring results to the satisfaction of the Supervising Authority or the Minister with the advice of the Supervising Scientist and:
- (a) must make data and reports available to the major stakeholders; and
 - (b) must make reports of monitoring results and analysis, other than commercial-in-confidence matters, available to members of the Advisory Committee established under the *Environment Protection (Alligator Rivers Region) Act 1978*.
- 13.3 The company must carry out a monitoring program approved by the Supervising Authority or the Minister with the advice of the Supervising Scientist following cessation of operations until such time as a relevant close-out certificate is issued under clause 9.3.

14 Staffing

- 14.1 The company must 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.

15 Research

- 15.1 The company must undertake research with a view to maximising the level of environmental protection at Ranger. Plans and results of environmental research by the company will be provided to the Technical Committee established under the *Environment Protection (Alligator Rivers Region) Act 1978* to enable the committee to effectively co-ordinate environmental research in the region.

16 Reporting Incidents

- 16.1 The company must directly and immediately notify the Supervising Authority, the Supervising Scientist, the Minister and the Northern Land Council of all breaches of any of these Environmental Requirements and any mine-related event which:
- (a) results in significant risk to ecosystem health; or
 - (b) which has the potential to cause harm to people living or working in the area; or
 - (c) which is of or could cause concern to Aboriginals or the broader public.

17 Environmental Standards

- 17.1 Nothing in these Environmental Requirements must be interpreted to prevent or discourage the company from attaining higher environmental standards than those specified.

18 Environmental Management Report

- 18.1 The company must prepare an Environmental Management Report which is approved by the Supervising Authority and the Minister with the advice of the Supervising Scientist. Approval may be given conditionally. The company must submit the Environmental Management Report to the NLC at the same time as submitting it for approval. The Environmental Management Report must be prepared in accordance with guidelines as determined by the major stakeholders. The report must provide details of:
- (a) the company's environmental management over the preceding 12 month period; and
 - (b) the company's proposals for complying with the Environmental Requirements and all applicable environmental laws over the following 12 months.
- 18.2 The report required under clause 18.1 must deal specifically with the following matters:
- (a) water management;

- (b) land management;
- (c) protection of cultural sites;
- (d) counter disaster and emergency procedures;
- (e) environmental research;
- (f) environmental monitoring, including any environmental monitoring required by the Supervising Authority;
- (g) social impact monitoring;
- (h) hazardous substances and industrial waste management;
- (i) radiation monitoring and management;
- (j) air quality management;
- (k) tailings management;
- (l) excavated material management;
- (m) environmental planning and operating systems, including employment and training programs; and
- (n) rehabilitation.

18.3 The company must ensure that the Environmental Management Report is updated and submitted at such times as are required by the Supervising Authority or the Minister with the advice of the Supervising Scientist, and no less often than annually.

18.4 The company must comply with the proposals set out in each Environmental Management Report as approved and subject to any conditions set by the Supervising Authority or the Minister with the advice of the Supervising Scientist.

19 Interpretation of the Environmental Requirements

19.1 In interpreting this document, a construction that would promote the primary environmental objectives must be preferred to a construction that would not promote those objectives.

19.2 In the interpretation of a provision in this document, consideration should be given to any relevant explanatory material agreed to by the major stakeholders and published by the Supervising Scientist.

[Note: explanatory material may include material that is in a report of the Supervising Scientist published under section 36 of the Environment Protection (Alligator Rivers Region) Act 1978].

19.3 In this document, unless the contrary intention appears, a word or phrase has the same meaning as in the Authority.

19.4 The Preamble and headings are not part of these Environmental Requirements and shall not be used in the interpretation or construction of these Environmental Requirements.

20 Definition of Terms

Alligator Rivers Region or **Region** has the same meaning as in the *Environment Protection (Alligator Rivers Region) Act 1978*.

Authority means the Authority to carry on operations granted under section 41 of the *Atomic Energy Act 1953*.

Background values are the background values for water quality determined by the Supervising Scientist on the basis of:

- (a) the extensive historical data sets that are available in the region;
- (b) using data that will ensure that the background values reflect the water quality that would exist in the absence of mining;
- (c) an assessment of the natural distribution of chemical constituents in the stream.

Biological diversity means the variety within and among living organisms and of the ecological systems they comprise.

BPT means best practicable technology as defined in subclause 12.4.

Close-out means the point at which the Supervising Authority determines that the requirements of clause 2 have been met or are assured, appropriate regulations and standards have been met, and the site is suitable for the intended future land use.

Company means the company or organisation which is the grantee of the Authority or its permitted successors or assignees.

Detrimental environmental impact means any impact arising from the mining operation, whether direct or indirect, which causes or is likely to cause a change to biodiversity, or impairment of ecosystem health. Such change is to be different and detrimental from that expected from biophysical or biological processes operating in the Alligator Rivers Region.

Dose constraint means a radiation dose target, which is less than the radiation dose limit for workers or the radiation dose limit for members of the public, as applicable, below which radiation doses should be able to be maintained in a well managed operation.

Ecosystem means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Ecosystem health means the ability to support and maintain a balanced, integrative, adaptive community of organisms having a species composition, diversity and functional organisation comparable to that of the natural habitat of the region.

Environment includes:

- (a) ecosystems and their constituent parts, including people and communities; and
- (b) natural and physical resources; and
- (c) the qualities and characteristics of locations, places and areas; and
- (d) the social, economic and cultural aspects of a thing mentioned in paragraph (a), (b) or (c).

Environmental Management Report means Environmental Management Reports prepared by the company pursuant to clause 18.

Excavated material means all rock and soil removed from its original site as part of the operations.

Minister means the Minister for the time being administering section 41 of the *Atomic Energy Act 1953*.

Major stakeholders means the primary groups directly responsible for or representing people affected by Ranger. They are the company, the Northern Territory government, the Commonwealth government, and the Northern Land Council.

Precautionary approach is an approach where decisions are guided by careful evaluation to avoid serious or irreversible damage to the environment.

Primary environmental objectives means the objectives set out in clauses 1 and 2.

Process water means water that has been used in the milling and processing of ore materials, or the transport of waste to any tailings repository, including any water held within a tailings repository.

Ranger means the mine or the operations undertaken on the Ranger Project Area.

Ranger General Authorisation means the authorisation issued by the NT Minister for Mines and Energy under the *Uranium Mining (Environment Control) Act 1979*.

Regional community means people living or working in the Alligator Rivers Region.

Rehabilitation includes decommissioning to remove plant and equipment, foundations and related infrastructure; civil works to reshape and stabilise the mine site, primarily to minimise erosion, contain contamination, and for aesthetic reasons; the final placement of tailings and all other excavated material and any hazardous substances; and revegetation.

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.

Tailings means the ground-up rock and process chemical residues after processing and extraction of the economic mineral from the ore.

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