Executive Summary

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Cameco Australia Pty Ltd (Cameco) a wholly owned subsidiary of Cameco Corporation, one of the world's largest uranium producers, is proposing to develop the Kintyre Uranium Project (the Project) located approximately 1,200 km north northeast of Perth in the Shire of East Pilbara of Western Australia (WA).

This Environmental Review and Management Programme (ERMP) has been prepared as part of the process to seek State and Federal Government approval for the Project under the State *Environmental Protection Act 1986* and the Commonwealth *Environment Protection and Biodiversity Act 1999*. This ERMP is the key document for joint environmental assessment of the Project by the:

- Western Australian Environmental Protection Authority (EPA) and Minister for Environment; and
- Commonwealth Department of the Environment (DoE) and Minister of the Environment.

Project Overview

Cameco proposes to develop the Kintyre Uranium Project that includes a uranium mine and associated treatment facilities. Ore would be mined by open cut techniques, from a single pit and sorted to separate uranium-bearing ore from barren material. The ore would be processed by a leach and precipitation treatment plant to produce up to 4,400 tonnes of U_3O_8 uranium oxide concentrate (UOC) per annum for export. The resource estimate (JORC Code and NI 43-101 compliant estimate[1]) is 5.26 Mt of ore at a 1,500 ppm U_3O_8 cut-off grade. The anticipated life of the Project is 12 years with the potential to increase this through continuing exploration. The UOC would be transported by road from the mine site for export from Adelaide Port, South Australia, via the Great Northern Highway, Goldfields Highway, and the Eyre Highway.

Cameco referred the Project to the EPA on 3 September 2010. The EPA determined that the Project required assessment as an ERMP. This level of assessment was advertised by the EPA on 20 September 2010. An ERMP level of assessment requires preparation of an Environmental Scoping Document (ESD) setting out the environmental factors raised by the proposal and the Proponent's intended studies. Cameco released its ESD on 28 March 2011 for two weeks and presented the revised ESD to the EPA in June 2011. The ESD was approved on 26 July 2011 subject to changes requested by the EPA. These changes were made and the document finalised in August 2011. The final ESD has been made available on Cameco's website (www.cameco.com/australia/kintyre/community_information/).

The ERMP is available on Cameco's website (www.cameco.com/australia/kintyre/community_information/. Hard copies can also be ordered from Cameco's Perth office on +61 (8) 9318 6600 or by email at au_exp_reception@cameco.com.

The Proponent

The Kintyre Uranium Project is a joint venture between Cameco Corporation (70%) and MDP Uranium Pty Ltd (Mitsubishi Development) (30%). Mitsubishi Development is a wholly owned subsidiary of Mitsubishi Corporation, a global integrated business enterprise that develops and operates businesses across virtually every industry including environmental and infrastructure business, industrial finance, energy, metals, machinery, chemicals, foods.

Cameco Australia Pty Ltd will be the operator and is the proponent for the Project. Cameco is one of the world's largest uranium producers with uranium assets on three continents, including Australia. Cameco's head office is located in Saskatoon, Saskatchewan, Canada.

Cameco Corporation measures its safety, environmental, social and financial performance using key performance indicators based around the following four measures of success:

- a safe, healthy and rewarding workplace;
- a clean environment;
- supportive communities; and
- outstanding financial performance.

The overall governance of safety, health, environment and quality at Cameco begins with the Safety Health Environment and Quality (SHEQ) policy. Also operating within the governance

[1] JORC Code: Joint Ore Reserves Committee Australasian Code for Reporting of Identified Mineral Resources and Ore Reserves.

NI 43-101: National Instrument 43-101 is a Canadian mineral resource classification scheme used for the public disclosure of information relating to mineral properties.

of the SHEQ policy, the corporate Radiation Protection Programme (RPP) defines the minimum requirements for a radiation protection at Cameco's sites and explains corporate management and oversight of the RPP. Cameco has elected to base the corporate RPP on the general principals of the British standards, BSI OHSAS 18001:1999 and BSI OHSAS 18002:2002 and subsequent BSI updates to these standards.

Cameco has a strong commitment to radiation protection. As a minimum, the status of the RPP across the company is reported to senior management annually, and company-wide dose statistics are provided to senior management and the Board of Directors quarterly.

Cameco has significant experience with the transport of UOC. The Cameco Canadian mills alone truck approximately 600 loads of UOC by road annually with a total distance travelled at just under two million kilometres. Using experience gained from many thousands of transport movements and many years of operation, Cameco has put into place a number of controls and initiatives to improve both the safety of transport as well as emergency preparedness and response to transport incidents.

Stakeholder Consultation

Cameco has undertaken, and continues to undertake, a comprehensive stakeholder and local community consultation process as part of the Project's ERMP. Cameco has consulted with a broad range of stakeholders to provide information about the proposed Project and to establish an open dialogue to address public interest, risks and regulator concerns in relation to mining uranium.

A summary of consultation with stakeholder groups is presented below:

- **Government consultation:** Cameco has met extensively with both State and Federal government members of Parliament and members of Opposition parties, departments and agencies involved in assessing the Project.
- **Non-government organisations:** Cameco has met with the representative of the Conservation Council of Western Australia, the Australian Conservation Foundation, the Wilderness Society and the Anti-Nuclear Alliance of Western Australia. Consultation has included a number of meetings discussing the concerns of the anti-nuclear movement as well as specific environmental and public health issues.
- **Native Title consultation:** The Martu of the East Pilbara region are the original inhabitants of the land where the Project is located. On September 27, 2002 the Martu connection to country and attachment to the land was recognised through determination of the Martu Native Title claim. The Western Desert lands Aboriginal Corporation (Jamukurnu-Yapalikunu) (WDLAC) is the prescribed body corporate for the Martu. Through WDLAC, Cameco has undertaken consultation about the Project as required by the "Agreement to Talk" inherited by Cameco through the acquisition of Kintyre from Rio Tinto. This has included community visits; the establishment of the Kintyre Consultative Committee and the Kintyre Project Negotiation Committee; and attendance at Special General and Annual General Community Meetings. In November 2011, the parties signed a Memorandum of Understanding setting out a framework for a "Comprehensive Agreement" and a process and timeline to achieve the Agreement and in September 2012 the final Mining Development Agreement was signed
- **Local Government:** The communities along the transport route make up a key group of stakeholders with a special interest in the transport of UOC through their towns. In September 2010, Cameco wrote to Local Government Authorities and other special interest groups along the transport route seeking an opportunity to discuss the transport proposal. Cameco subsequently met with Local Council and community representatives in most towns along the route north of Kalgoorlie. A further visit is planned while the ERMP is in the public review period.
- **Community consultation:** Cameco has held a number of formal community consultation programmes since 2010, including presentations to all Martu communities in 2010 and 2012. Consultation has also been undertaken by consultants. Between January and August 2011 a comprehensive community consultation process was undertaken. This consultation involved two independent consultants visiting and engaging with community members and service providers of nine near-neighbour communities and towns. The communities included: Jigalong, Parnngurr, Punmu, Kunawarritji, Nullagine/Irrungadji, Marble Bar/

Goodabinya, Warralong, South Hedland, and Newman.

- **Kintyre Education Project:** During May to June 2011, visits were made to 11 communities to present the Kintyre Education DVD, a joint project between WDLAC and Cameco. The key objective of the project was to provide information on environmental and social aspects of the proposed mine to enable Martu to make well-informed decisions regarding the proposed Kintyre development.

Project Justification

As a result of the high capital costs and low operating costs of nuclear electricity generation, it is cost-effective to keep existing nuclear power stations operating at high capacities, with changes in load to meet local electricity demand largely being met by the fossil fuel electricity generators. Therefore, the demand for uranium is largely isolated from economic variations, and more dependent on installed capacity. In the short-term, uranium demand is expected to increase by around 30% in the period 2010-2020, then 16% between 2020-2030.

In addition to meeting a growing market need for uranium as fuel for electricity generation, the Project would provide economic, employment-related, infrastructure-related and broader environmental benefits locally, nationally and globally.

The Project

The proposed Kintyre Uranium Project would produce up to approximately 4,400 tonnes of UOC as U_3O_8 per annum (peak annual rate). The single open pit mine would encompass a number of discrete ore zones. The open pit would ultimately extend approximately 1,000 m north-to-south, 1,500 m east-to-west and would be excavated to a

Table E-1: Key characteristics of the proposed development

Summary of the Proposal

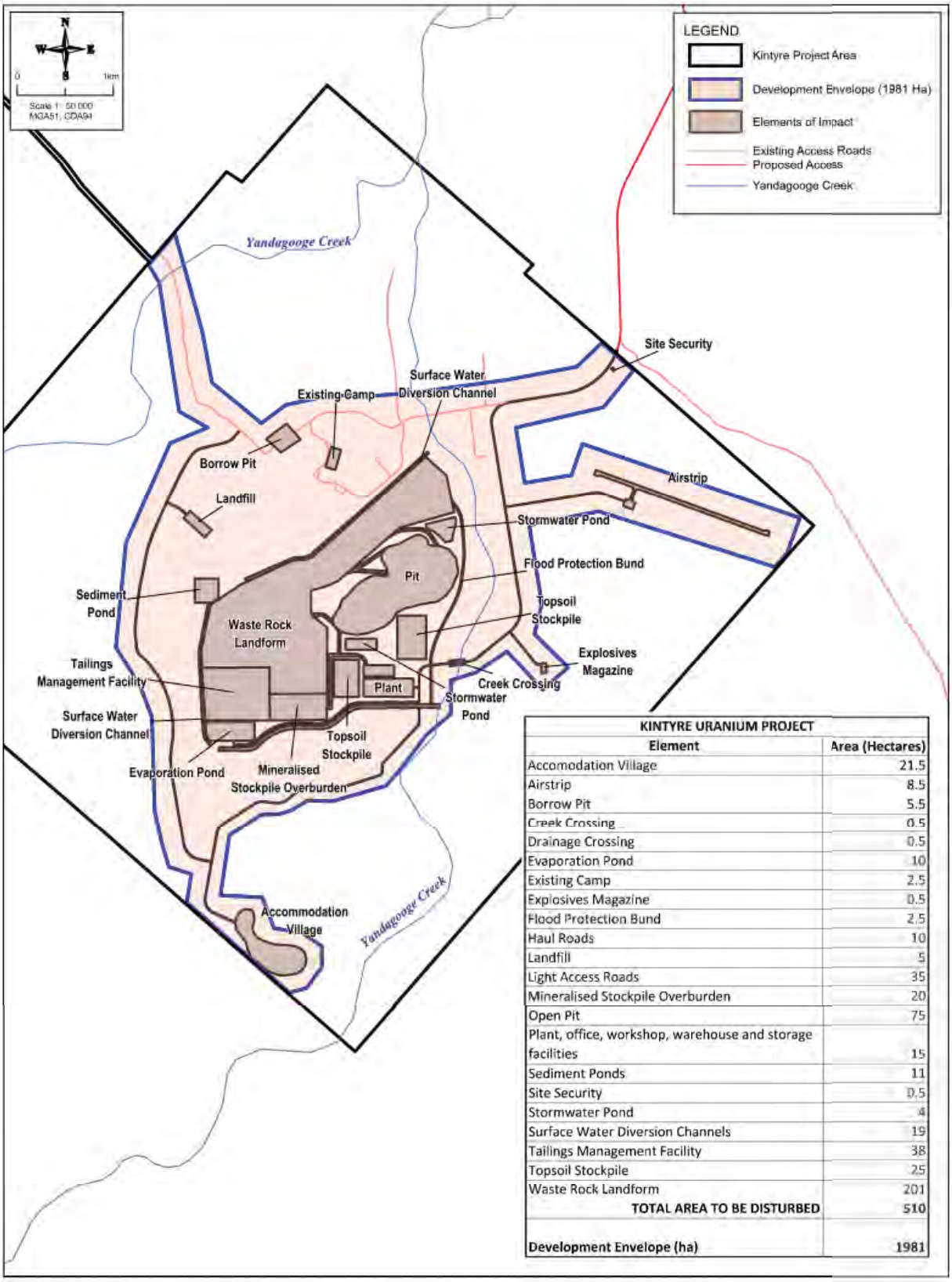
Proposal Title:	Kintyre Uranium Project
Proponent Name:	Cameco Australia Ltd
Short Description:	The proposal is to mine ore from the Kintyre uranium deposit, located approximately 260 kms north east of the town of Newman WA. The proposal includes the construction of associated mine infrastructure, including mineral processing facilities, offices, accommodation and the discharge of waste to a Tailings Management Facility. The proposal also includes the upgrade and construction of 90 kms of access road and the transport of uranium oxide concentrate to the Western Australian/South Australian border on route to the Port of Adelaide.

Physical Elements

Element	Location	Proposed Extent Authorised
Open Pit Mine	Figure 1	Clearing no more than 75 ha within a 1981 ha development envelope; pit to be mined below the water table
Integrated waste management facility, including, waste rock landform, mineralised overburden stockpile and tailings management facility	Figure 1	Clearing no more than 259 ha within a 1981 ha development envelope
Processing plant and mine infrastructure	Figure 1	Clearing no more than 176 ha within a 1981 ha development envelope
Access Road and Borrow Pits	Figure 2	Clearing no more than 280 ha within a 1180 ha development envelope

Operational Elements

Element	Location	Proposed Extent Authorised
Tailings	Integrated waste management facility	7 Mt over the life of mine
Groundwater Extraction	Dewatering and production bores	3.1MLpd



KINTYRE URANIUM PROJECT	
Element	**Area (Hectares)**
Accomodation Village	21.5
Airstrip	8.5
Borrow Pit	5.5
Creek Crossing	0.5
Drainage Crossing	0.5
Evaporation Pond	10
Existing Camp	2.5
Explosives Magazine	0.5
Flood Protection Bund	2.5
Haul Roads	10
Landfill	5
Light Access Roads	35
Mineralised Stockpile Overburden	20
Open Pit	75
Plant, office, workshop, warehouse and storage facilities	15
Sediment Ponds	11
Site Security	0.5
Stormwater Pond	4
Surface Water Diversion Channels	19
Tailings Management Facility	38
Topsoil Stockpile	25
Waste Rock Landform	201
TOTAL AREA TO BE DISTURBED	**510**
Development Envelope (ha)	**1981**

Figure E-1: Development envelope of the Kintyre Project area

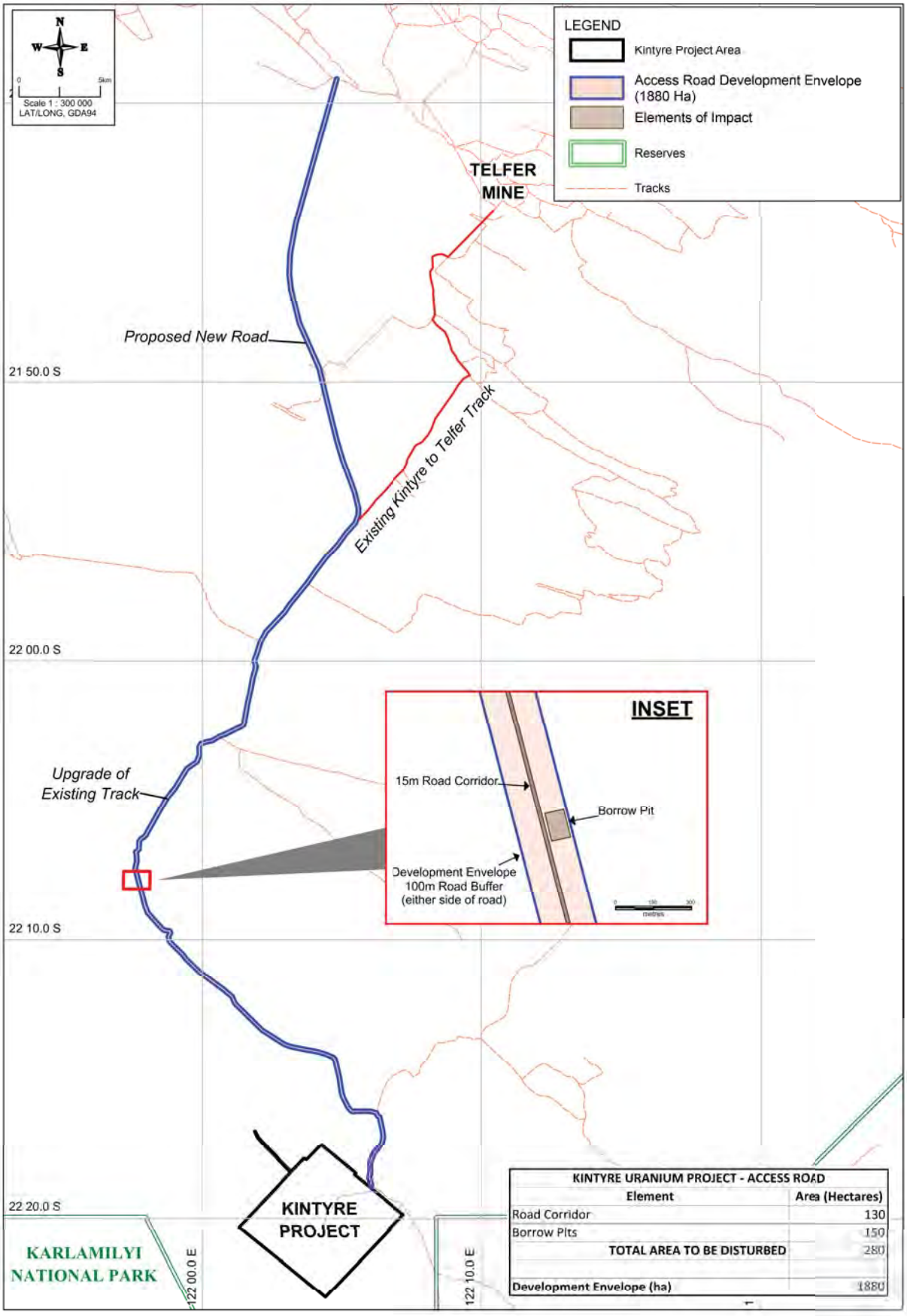


Figure E-2: Development envelope of the Kintyre access road

depth of around 220 m. The key characteristics of the Project are summarised in Table E–1.

Mining

The Kintyre ore would be mined via a single open pit mine that would encompass the ore zones. Production bores around the pit would be used to dewater the pit area prior to, and during the initial stages of mining. In-pit sumps and horizontal drains would be established as the mine develops to capture any remaining groundwater in-flows and stormwater.

All mined material generated from the open pit would be classified into one of three categories (ore, mineralised overburden or non-mineralised overburden) depending on the U_3O_8 content.

Various infrastructure would be established during the initial mining and processing phases of the Project. Infrastructure required for the mining operations includes:

- mine maintenance facilities;
- explosives magazine;
- mining fleet refuelling facilities;
- mining administration, laundry and change room facilities;
- mine pit dewatering facilities;
- pit flood protection bund; and
- dust suppression equipment.

Ore Processing

A metallurgical plant suitable for the production of up to 4,400 tpa of UOC as U_3O_8 would be established to treat ore extracted from the open pit using a conventional acid leaching process followed by conventional uranium extraction processes to produce a final UOC product for export. The key features of the proposed metallurgical plant are detailed in Table E-2.

Infrastructure required to be constructed prior to the operation of the metallurgical plant would include:

- access roads including a crossing over the Yandagooge Creek;
- warehouse and reagent storage facilities;
- maintenance workshops;
- sand-blasting and painting facilities for the removal of surface contamination prior to the removal of plant and equipment from site;
- emergency response facilities;
- a vehicle wash down facility;
- metallurgical administration, change room and laundry facilities;
- diesel power plant and distribution network;
- water treatment plant;
- borefield and water distribution network; and
- airstrip.

The process waste that remains following the extraction of uranium from the mined ore is

Table E-2: Indicative characteristics of proposed metallurgical operation

Element	Description
Processing method	Acid leaching followed by solid-liquid separation, solvent extraction, precipitation and calcination
ROM ore to crusher / radiometric sorter (tpa)	Up to 1,300,000
Radiometric sorter rejects (tpa)	Up to 700,000
Ore to metallurgical plant (tpa)	Up to 600,000

Table E-3: Indicative features of the proposed TMF

Element	Description
Storage method	One cell integrated with the WRL
Total tailings disposed of (Mt)	7
Annual rate of deposition (tpa)	Up to 600,000
Area of proposed TMF (ha)	38 (tailings surface area)

referred to as tailings. The tailings from the proposed development, consisting of acid leach wastes in the form of a slurry, would be deposited to an above-ground Tailings Management Facility (TMF). Cameco proposes to construct the TMF such that it is adjacent to and integrated into the waste rock landform (WRL) to create an Integrated Waste Landform (IWL). Indicative features of the proposed TMF are provided in Table E-3.

A large proportion of the water used in the process plant would be recovered and recycled. However the water associated with the tailings discharge would be recovered by the decant system and directed to the Evaporation Pond for disposal as it is not suitable for reuse in the process.

Water Demand

Water of different qualities would be required for the Project, consisting of low quality water for dust suppression during mining operations, process water for use in the metallurgical plant and potable water for use in the fire water systems, the safety shower systems, and the administration and accommodation facilities.

Water supply would be prioritised such that the process water demand would be met in the following order:

- mine dewatering from bores and sumps;
- opportunistic capture of stormwater runoff; and
- make-up water from the process water supply borefield.

Energy Supply

The power supply to the proposed Project would be provided by an on-site power station. The power station would be either an owner-operated diesel or diesel/gas hybrid power station or a contract power supply through a Build Own and Operate agreement.

Transport

The primary road access to and from the Project would be via the Telfer road between Marble Bar and Telfer, and onto the Kintyre Road.

Materials, mining fleet and associated equipment required for the Project would be sourced from within Australia and overseas. These would be delivered via road from Kalgoorlie in the case of items originating from the east coast, via Newman and/or Port Hedland in the case of items originating from Perth, and the port of Port Hedland for imported materials and pre-assembled components. Irrespective of the source, all materials would be required to be transported along the Telfer Road between Marble Bar and Telfer. Estimated traffic volumes associated with the movement of materials and mining fleet via this roadway during the construction phase of about 18 to 24 months would be around 10.5 average annual daily traffic (AADT) movements.

Transportation of the UOC is intended to be via Kalgoorlie to the Western Australian border and then onto the Port of Adelaide by road. The proposed transport route is via Telfer, Port Hedland, Newman, Meekatharra, Mount Magnet, Leinster, Leonora, Menzies, Kalgoorlie, Kambalda, Norseman and Eyre Highway to the Border Village and then on to the Port of Adelaide. It is proposed that an average of two road trains per week carrying the UOC will operate along the route. Up to five road trains carrying the UOC may travel the route during a single week but on average about 100 movements will occur in a single year.

Workforce and Accommodation

It is anticipated the Project would require a construction workforce of up to 400 employees and an operational workforce of up to 450 employees, around 200 of which would be on-site at any one time. Around 30 employees would be based in Perth. All site-based employees would work on a fly-in-fly-out (FIFO) roster. An accommodation village of around 250 rooms would be constructed for the FIFO workforce to be used during construction and operations.

Rehabilitation and Closure

Following closure, the site objective for the Project area is to be 'rehabilitated with the goal of achieving a safe and stable area that allows future utilisation of the area for traditional purposes or occasional access similar to the existing (pre-mining) land use'. A Mine Closure Plan (MCP) has been prepared to provide information to key stakeholders on Cameco's post-mining land use aspirations, proposed closure and rehabilitation measures and planned outcomes. The MCP will be reviewed and revised over the life of the Project.

Regional Setting

Landforms and Topography

The Project area is located between the Great Sandy Desert and the Little Sandy Desert in the Eastern Pilbara region of Western Australia. It lies within

a broad valley bounded by rocky flat-topped hills of the Broadhurst Ranges to the East, Watrara Ranges to the south and Throssell Ranges to the west. North of the Project area are northwest-southeast trending sand dunes characteristic of the Great Sandy Desert. The major drainage lines are Rudall River which flows towards Lake Dora and the Yandagooge and Coolbro creek systems which discharge into the sand dune system of the Great Sandy Desert.

Biogeography

The Project area lies within the Little Sandy Desert (LSD1 – Rudall Subregion) as classified by the Interim Biogeographical Regionalisation for Australia (IBRA) category (Thackway and Cresswell, 1995). The LSD1 sub region covers an area of 1,078,070 ha and comprises sparse shrub-steppe over *Triodia basedowii* on stony hills, with River Gum (*Eucalyptus camaldulensis*) communities along drainage lines and bunch grasslands on alluvial deposits associated with ranges (Kendrick, 2001).

Geology and Soils

The Project area lies in the Paterson Province between the Great Sandy Desert and the Little Sandy Desert. The Project's uranium deposits are located in the Yandagooge Supergroup of the early Proterozoic basement, the Rudall Metamorphic Complex. These metamorphics are unconformably overlain by the Coolbro Sandstone of the mid Proterozoic Yeneena Group. The Yandagooge Formation occurs between the basement gneisses and the overlying Coolbro Sandstone.

Hydrogeology

Regional and local aquifer types in the Kintyre area are the Cenozoic deposits, the Upper Paterson aquifer, the Lower Paterson aquifer, the Coolbro Sandstone aquifer and the Rudall fractured rock aquifer.

Groundwater is recharged directly by rainfall over the Cenozoic deposits, unconfined portion of the Paterson aquifer and outcropping fractured rock units (Coolbro Sandstone and Rudall Complex) by the downward infiltration from infrequent and often heavy rainfall events. Groundwater recharge rates in the Project area are influenced by the surface geology, topography, depth to watertable and vegetation cover. Elevated groundwater salinity is associated with the Rudall Complex outcrop, including the Kintyre pit area. The watertable typically reflects the existing topography, with an average north-northeast gradient of 1:300. In the upper portion of the catchment the watertable is about 12 m below ground surface, and declines to about 20 m below ground surface around the convergence of the western and southern channels. Groundwater may be lost from above the watertable through the up-take and evapotranspiration by plants where the watertable is sufficiently shallow. The watertable is too deep for direct evaporation in the Project area.

Surface Hydrology

The Project area lies within the Sandy Desert River Basin (River Basin 025) of the internal drainage division of Australia (Western Plateau Drainage Division No. 12) (AWRC, 1975). The Project area occurs within the Coolbro Creek catchment and the Yandagooge Creek sub-catchment. Yandagooge Creek has two tributaries; the West Branch and the South Branch which converge just north of the Project area. There are no groundwater discharge zones in the area. There are several ephemeral water pools in the Coolbro / Yandagooge Creek catchment, however, these are fed by rainfall and creek flow and are not connected to groundwater.

Social Setting

The Shire of East Pilbara is one of four local government areas in the Pilbara region (the others include Shire of Ashburton, Town of Port Hedland and the Shire of Roebourne). It spans an area of approximately 380,000 km². The main towns are Newman, Marble Bar and Nullagine with numerous Indigenous communities including Jigalong, Punmu and Parnngurr. The major industries in the Shire are mining, pastoral activities and tourism (Shire of East Pilbara, 2008).

In 2009 the East Pilbara population was 7,954 (PDC, 2011). One of the key characteristics of the East Pilbara and wider Pilbara population is that almost 75% of the population is of workforce age (ABS, 2007a; 2007b). Approximately 24.2% of the Shire's population is Indigenous, which is higher than the Pilbara's Indigenous average population proportion of 16.9% (PDC, 2011). In 2010 the fly-in-fly-out (FIFO) workforces accounted for approximately 15,464 additional people.

Conservation Areas

Karlamilyi National Park (previously known as Rudall River National Park) is located approximately 5 km south of the Project area. The Rudall River National Park was listed on the Register of the National

Estate in 1978. The boundary of the national park was changed in 1994. The boundary of the area identified on the Register of the National Estate followed the old Rudall River National Park boundary and included part of the Project area. The Rudall River National Park (1978 boundary) is not listed on the National Heritage List. However, the site is listed on the State Register of Heritage Places under the *Heritage of Western Australia Act 1990*. The majority of the site is also within the Karlamilyi National Park protected under the State *Conservation and Land Management Act 1984*, but this does not include the Project area.

The Rudall River, recognised as a wild river, occurs approximately 20 km south of the Project. According to the mapping provided by the Department of Water (DoW) the Project occurs within the Rudall River Wild River area. The Project occurs in the Yandagooge Creek sub-catchment which feeds the Yandagooge and Coolbro Creeks which can discharge overland into the Rudall River following very significant rainfall events. Cameco has imposed a 120 m buffer along both sides of the Yandagooge Creek and other than a planned creek crossing and some environmental monitoring activities, the creeks will remain largely physically undisturbed.

Climate

The Project area has an arid climate with hot summers and warm dry winters. Since the inception of the Project, a series of meteorological monitoring programmes have been undertaken within the region in order to define the existing environmental characteristics of the Project area. The prevailing winds originate from the southeast quadrant and dominate the autumn, winter and late-summer months. Winds during spring and early-summer exhibit a greater degree of variability and the frequency of west-north-westerly winds increases.

The annual average temperature measured at Kintyre is around 25°C. The highest maximum daily temperatures are generally recorded during the summer months and can reach over 40°C. The highest monthly rainfalls tend to occur in the summer months, indicative of the influence of cyclonic conditions in the region.

The northwest of Western Australia has experienced an increasing trend in rainfall and surface temperatures, particularly since the middle of the 20th century. Predictions of future climate change are dependent on the selected emission scenario modelled. Overall temperatures are expected to increase across Australia with greatest increases observed in inland Australia.

Natural Hazards

Fire is a natural part of the Australian landscape with many of the fires in remote areas such as the Eastern Pilbara started by lightning strikes. The Project is located in a remote arid environment which can experience severe thunderstorms and cyclonic activity. Parts of the Project area were burnt by a severe fire in 2009 which resulted in changes to the vegetation structure (Bennett Consulting, 2010).

Located between the Great Sandy Desert to the north, the Little Sandy Desert to the south and the semi-arid Pilbara to the west, the Project area could experience dust storms as a result of strong winds, following drought conditions. However, a study by Middleton (1984) which estimated the frequency of dust storms across Australia indicated the majority of Western Australia including the Project area is likely to be subject to less than one dust storm per year.

During the cyclone season (typically November to April) an average of ten tropical cyclones develop over Australian waters, of which six cross the coast mostly over the northwest of Western Australia and northeast Queensland. The Project area is located in a region which experiences an average of 0.2 to 0.4 cyclones per year when considering data from all years (i.e. one to two cyclones every five years). However, this frequency may be reduced to 0.1 to 0.2 cyclones per year in years that experience a La Niña event.

The closest seismic monitoring station to the Kintyre Project area is located in Marble Bar and was opened in 2001. A map of significant earthquakes in the north of Western Australia provided by the University of Western Australia's website indicates that several earthquakes of magnitude 5 or greater have occurred west and northwest of the Project area.

Environmental Factors, Potential Impacts and Management

The following table (Table E-4) summarises the key environmental factors relevant to the Project, their potential impacts, proposed management measures and predicted outcomes.

Table E-4: Summary of key environmental factors, potential impacts and their management for the

Kintyre Uranium Project

Environmental Factor:	Landforms and Soils
Environmental Objective:	To maintain the integrity, ecological function and environmental values of the soil and landform.
Potential Impacts:	• The Project will disturb approximately 790 ha which will result in soils being disturbed or stripped. • Soil that has been disturbed is susceptible to wind and water erosion and its structure may be damaged if handled or disturbed when wet.
Management Measures:	• Disturbed areas that are no longer required for operations will be rehabilitated progressively throughout the life of mine. • Topsoil that is suitable for rehabilitation will be stripped and temporarily stockpiled until required. • Topsoil will be stored in low stockpiles to retain seed viability and will be protected from erosion. • Topsoil will not be handled when wet to avoid damaging soil structure. • Soils that are not suitable for use in rehabilitation or construction (e.g. dispersive, saline soils) will be buried within the WRL. • The permanent waste rock dump will be designed to blend in with the landscape as far as practicable and the outer embankments will be constructed early in the mine life to allow early rehabilitation. • The TMF is designed to be partially integrated into the waste rock landform and will ensure long-term stability of the structure and ensure no exposure or release of material with elevated radiation levels. • Groundwater production and monitoring bores will be closed and rehabilitated after they are no longer required and the Project closure completion criteria have been achieved. Relevant stakeholders will be consulted prior to the closure of the bores to ensure that they are not required for any other purpose. • All plant and associated infrastructure (such as the mine camp and airport) will be demolished and removed at the conclusion of operations, subject to negotiations with key stakeholders.
Commitments:	1. Cameco will complete all geophysical and chemical analysis of topsoil, subsoil and waste rock and ascertain the availability and volumes of key materials required for rehabilitation, prior to commencement of construction and present the results of this work in an updated Mine Closure and Rehabilitation Plan to be submitted prior to the commencement of construction. 2. Cameco will meet the completion criteria and values outlined in the Mine Closure and Rehabilitation Plan.
Outcomes:	It is expected that the potential impacts on landforms and soils will be manageable and will not result in land degradation in the short or long-term. Final landforms will blend in with the natural topography as far as is practicable and these have been designed to ensure the long-term erosional stability of the structures. Cameco believes that the integrity, ecological functions and environmental values of the soil and landforms of the area will be protected.

Environmental Factor:	Surface Water
Environmental Objective:	• To maintain the integrity, ecological functions and environmental values of the watercourses. • To maintain the quantity and quality of surface water so that existing and potential environmental values, including ecosystem maintenance, are protected.
Potential Impacts:	• Flows from the South Branch of Yandagooge Creek may present a flood risk to the mine, following flood events larger than the 10 year annual recurrence interval (ARI) • For the 1,000 year ARI event and probable maximum flood (PMF) event, depths on the right bank floodplain of the South Branch are predicted to increase by approximately 0.5 m to 1.0 m for 2.5 km downstream. • Increased flow velocities around the flood protection embankment may cause localised scour and increased sediment load. • Disturbances to the natural surface water drainage systems are likely to be associated with the construction of access roads to the site.
Management Measures:	• The Project has been designed to capture all process discharges and potentially contaminated surface water runoff from within Project area for use by the Project or otherwise directed to the evaporation pond. • The proposed mining and process areas will be protected by a flood protection embankment designed for a PMF flood event with 1 m freeboard. • The TMF will be designed for an Extreme Event, 400 mm in 72 hrs, plus 1 m freeboard. • The Evaporation Pond will be designed for an Extreme Event, 400 mm in 72 hrs, plus 0.5 m. • Any structure such as a concrete flood way built across the drainage systems would be designed to have minimal disturbance to the natural flow system, allowing the surface water flows to continue on its normal flow path unimpeded. • Stormwater at the TMF will be managed via a perforated riser system designed to redirect stormwater that collects on the TMF surface, and the construction of two diversion channels to redirect TMF run off flows for evaporation • The top of the TMF will be graded to direct flows to the risers. Flows will then be combined into an overdrain pipe which will direct the captured stormwater to the evaporation pond. • Runoff from the TMF slopes will be captured in one of two diversion channels, which will direct the runoff to the evaporation pond. • The potential for leaks and spills from pipelines and process water circuits will be managed through the installation of leak detection equipment. Pipelines will be bunded where necessary.
Commitments:	3. Cameco will design and operate the Kintyre Project as outlined in Table 8-2 of this ERMP, and the Surface Water Management Plan.
Outcomes:	Cameco does not anticipate that the Project will affect the quantity or quality of surface water of the surrounding areas. With the proposed management measures, Cameco believes the Project can be constructed, operated and closed in a way which maintains the integrity, ecological functions and environmental values of the watercourses in the area.

Environmental Factor:	Groundwater
Environmental Objective:	To maintain the quantity and quality of groundwater so that existing and potential environmental values, including ecosystem maintenance, are protected.
Potential Impacts:	**Groundwater Demand** A total of 3.1 MLpd would be required for the Project made up of an estimated 1.4 MLpd for dust suppression, 1.5 MLpd in the process plant and 0.2 MLpd potable water for the accommodation village and safety systems. The estimated water demand would be met through pit dewatering and opportunistic storm water capture, with a water supply borefield to make up any shortfall. Test work and modelling conducted to date indicates the Project's water demand can be met. **Pit Dewatering** The results of the cumulative dewatering simulations suggest that pit influx would stabilise at about 1.1 MLpd after the first 1.5 years. The cone of water table depressurisation will be a maximum of approximately 220 mbgl in the centre of the pit, decreasing away from the pit, with the limits of discernible drawdown impacts (nominally the 1 m drawdown contour) at the end of mining predicted to extend about 5 km from the pit. **Pit Lake** Upon cessation of mining activities and active pit dewatering, the water table will partially rebound in the void forming a "pit lake" at the base of the void. The pit lake is predicted to become a terminal sink for groundwater flow. There will be no flow into the aquifer out of the pit, and therefore no potential for the pit lake to contaminate the aquifer. Fate and transport modelling results show that all particles are captured by the pit lake and will not leave the lease boundary. A geochemical model of the final pit lake chemistry was developed, concluding: • the quality of the pit water is predicted to be highly saline • alkalinity is predicted to be moderate over the pit lake life • the pH ranges between approximately 7.5 and 8 and is not predicted to become acidic • evaporative losses increase the concentrations of elements such as boron, fluorine, manganese, molybdenum, nickel and uranium over time • salt inputs from the pit walls dissolved by direct rainfall increases the concentrations of arsenic, chromium, copper, lead, nickel and selenium over time • as a result of the alkaline pH no iron is predicted to be in solution and aluminium concentrations are low **Borefield** The borefield will comprise a minimum of seven duty bores, plus three standby bores. Each bore will be located nominally 1.5 km apart (+/- 500 m) to minimise borefield drawdown interference. The results of model simulations of the water supply area demonstrate that there is more than sufficient borefield capacity and contingency to sustain an overall abstraction 3.1 MLpd over the mine life without causing significant drawdown or loss of bore productivity. There are no other users of the groundwater within 50 km of the Project area, and discernible drawdown impacts of the borefield and pit dewatering are not expected to extend further than about 10 km from the abstraction bores. The hydrology of the Yandagooge Creek and its catchment is dominated by seasonal rainfall and is unlikely to be affected by groundwater drawdowns. Several ephemeral water holes are present in the Yandagooge Creek system. Analysis of the hydrology of these features showed that the rockholes are surface water features hydraulically disconnected from the underlying aquifer and that there should be no impact on these pools as a result of groundwater drawdowns.

	Seepage Seepage from spills within the process plant area, or leaks from site infrastructure (such as tailings pipelines, fuel tanks etc.) may cause groundwater contamination. **Leakage** Leakage from the TMF and water storage and evaporation ponds may cause groundwater contamination.
Management Measures:	**Pit Dewatering** At the cessation of mining activities, the dewatering system will be turned off and the groundwater will be allowed to rebound to static conditions **Pit Lake** The bottom of the pit lake will be at the final pit floor level of 220 mbgl, and is predicted to become a terminal sink for groundwater flow. There will therefore be no flow into the aquifer out of the pit, and therefore no potential for the pit lake to contaminate the aquifer. **Groundwater Abstraction** The Groundwater Management Plan details a monitoring programme for which trigger levels have been set based on the groundwater monitoring and baseline testing. Contingencies will be developed should any triggers be breached. Contingencies include reconfiguring the timing or location of abstraction, developing new bores in other parts of the aquifer or other aquifers or reducing the draw from production bores near the affected feature. **Seepage** Engineered pads will be constructed to manage rainfall, runoff and seepage from the stockpiles of mineralised overburden and contaminated waste. Drainage from these areas will be directed to the evaporation pond. **Leakage** Water will be drained from the TMF through the central reclaim tower and evaporated from storage and evaporation ponds. A liner and seepage collection system has been designed to limit the migration of wastes out of the impoundment to the adjacent sub-surface soil and groundwater. The tailings cell will be lined with a double membrane liner system fitted with a leachate collection system above the liners and leak detection between the liners. Cameco will establish monitoring bores adjacent to the facility to monitor water quality around and beneath the facility to confirm the performance of the liner system.
Commitments:	4. Cameco commits to: • modelling the impact of backfilling the western zone of the open pit with waste rock and reporting the outcome in a revision of the Mine Closure and Rehabilitation Plan to be submitted to DMP for review prior to the commencement of construction; • address the risks associated with the pit lake in the Mine Closure Plan; • prepare a post-closure monitoring plan in order to confirm predicted effects; • establish a robust set of baseline water quality data based on statistically defensible concentrations for individual parameters to inform water quality objectives; • preparing and submitting a detailed Groundwater Operating Strategy as part of the application of a 5C groundwater licence; and • designing, constructing and operating the IWL-TMF using current Best Available Technology and practices. 5. Cameco also commits to ongoing development of the pit lake model, including an assessment on impacts to avian fauna from water chemistry 6. Cameco will implement the Groundwater Management Plan.
Outcomes:	The abstraction of 3.1 MLpd of groundwater from the Paterson Formation Sedimentary Aquifer is not expected to result in any unacceptable environmental impacts. Based on the drilling, testwork and modelling completed and the proposed IWL-TMF and pond management measures, Cameco believes the Project can be implemented in a manner which meets the EPA objective.

Environmental Factor:	Flora and Vegetation
Environmental Objective:	To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.
Potential Impacts:	• The clearing of approximately 790 ha of native vegetation will be required. • The Project will not have any impacts on Threatened Ecological Communities (TECs) listed under the EPBC Act or Priority Ecological Communities (PECs) listed by DPaW. • Clearing for the Project will disturb an area where the Priority 3 species *Comesperma pallidum* was recorded during the 2007 survey. • The Project has the potential to introduce weeds to, or spread weeds within the Project area. Seeds may be carried into the Project area on vehicles and machinery brought into the area, or in soil moved within the Project area. • Groundwater drawdown from pit dewatering or borefield operation could reduce water available to groundwater-dependent vegetation if there is a connection between the aquifer being targeted by pumping operations and the near-surface water table being tapped. There may be localised impacts within a vegetation community near the pit and North Bore where drawdown exceeds the rate of 1 m per year. • Vegetation condition may be affected as a result of changes to surface water flows, poor erosion control, dust deposition or saline overspray from dust suppression activities.
Management Measures:	• Cameco will implement a ground disturbance procedure that will apply to all clearing activities. • Clearing will be kept to the minimum area required for safe and efficient operation. Clearing will not be conducted during or immediately after rain to reduce the risk of erosion and damage to soil structure. • All earth moving equipment and other vehicles or machinery will be cleaned of all soil and seeds before mobilisation into new clearing areas. Weed control will be undertaken for infestations with the potential to spread. • Vegetation removed during clearing activities will be temporarily stockpiled to be used as mulch and a seed source in progressive revegetation. Topsoil that is suitable for rehabilitation will be stripped and stored in low stockpiles to retain seed viability and be protected from erosion and accidental disturbance. • Areas no longer required during operations will be progressively rehabilitated in accordance with current best practice. • A vegetation condition monitoring programme will be implemented. The programme would include monitoring control sites and potential impact sites in vegetation communities that are potentially groundwater dependent within the predicted groundwater drawdown zone. • As part of monitoring of the integrity of surface water diversion and management structures, Cameco will also monitor nearby vegetation health to determine if water ponding, water starvation or erosion is occurring that could affect vegetation condition. • Dust management and suppression measures will be undertaken.
Commitments:	7. Cameco will implement the Flora and Vegetation Management Plan. This will include ongoing monitoring of potentially ground-water dependent vegetation within the vicinity of the pit and North Bore. 8. Should Priority flora occur within areas proposed to be cleared Cameco will consult with DPaW prior to clearing. 9. Cameco will undertake progressive rehabilitation of the Project area in accordance with the Mine Closure and Rehabilitation Plan.
Outcomes:	Cameco does not anticipate that the Project will affect the conservation status of any plant species or particular ecosystem. With the proposed management measures, Cameco believes the Project can be constructed, operated and closed in a way which maintains the abundance, diversity, geographic distribution and productivity of native plant species in the area.

Environmental Factor:	Terrestrial Fauna
Environmental Objective:	To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.
Potential Impacts:	Potential impacts to the bilby (*Macrotis lagotis*), mulgara (*Dasycercus cristicauda*) and rock-wallaby (*Petrogale* sp) are of greatest interest, with the key potentially threatening processes being: • Habitat loss (leading to population decline) - the Project will involve the clearing of approximately 790 ha of native vegetation. The direct impact from clearing is likely to be minor for all three species, as their habitats are extensive and the Project area is small in the regional context. • Ongoing mortality leading to population decline - can occur as a result of road kill to which all three species, but particularly the Bilby and rock-wallaby, are susceptible. • Habitat (population) fragmentation - likely to be minor for all three species, as impact areas associated with the mine are concentrated and habitats are extensive. • Disturbance - impacts of disturbance (light, noise and vibration) are expected to be minor. • Changed fire regimes - a major factor in the decline of a large proportion of Australian mammals, with the main issue being the replacement of mosaic burning of small areas with very extensive but infrequent fires. • Interactions with other species (feral or over-abundant native species) - predation by feral species is the second major factor in the decline of Australian mammals, including Bilby and rock-wallabies.
Management Measures:	Habitat Loss Disturbance to fauna habitat will be minimised and areas known to contain conservation significant species or significant fauna habitat will be excluded from the Project footprint where practicable. Should populations of significant species be identified within the Project boundary and disturbance of the area cannot be avoided, the DPaW will be consulted prior to any disturbance. All sightings of significant species will be reported to the appropriate environmental personnel and be recorded on the site significant species register. Ongoing mortality leading to population decline. There will be no unauthorised driving off-road, night driving will be limited and vehicle speeds will be restricted around the Project site and sensitive habitats. Disturbance Process water areas will be fenced and may have other deterrents to restrict fauna entering these areas. Regular inspections of facilities such as the TMF will include checking for fauna that may have entered process or pond areas. Fire Regimes A fire ban will be in place across the Project area, with hot work permits required prior to commencing any activity that may create an ignition source. Fire extinguishers will be available in all hot work areas and personnel will be trained in their use. Interactions with Other Species Waste disposal areas around the site will be maintained to a high standard to discourage introduced fauna species. The presence of introduced fauna species and pests will be monitored and appropriate control measures implemented if necessary.

	Other Hydrocarbons and chemicals will be transported, stored and used in accordance with Australian standards and guidelines. Spill kits will be made available on site and hydrocarbon and chemical spills will be immediately cleaned up and the incident reported. Training on the identification and reporting of conservation-significant fauna species will be included in the Cameco site induction.
Commitments:	10. Cameco will implement the Fauna Management Plan which includes specific measures for conservation of significant species. 11. Cameco commits to continue working with DPaW and Martu to assist in the implementation of a landscape scale fire management programme to create a mosaic of fire ages that would favour conservation significant fauna species.
Outcomes:	Cameco does not anticipate that the Project will affect the conservation status of any fauna species. With the proposed management measures presented in this ERMP and the Fauna Management Plan, Cameco believes the Project can be constructed, operated and closed in a way which maintains the abundance, diversity, geographic distribution and productivity of native fauna species in the area.

Environmental Factor:	Subterranean Fauna
Environmental Objective:	To maintain the abundance, diversity, regional distribution and productivity of subterranean fauna at the species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.
Potential Impacts:	**Troglofauna** The conservation status of two troglofauna species, *Pauropodidae* sp. B26 and *Nocticola* sp., is possibly threatened by the mine development. Irrespective of whether the ranges of these are centred on the proposed mine pit, the threat to both will be small because the mine pit will occupy only 75 ha and the likelihood of either species having a range this small is very low. **Stygofauna** The conservation status of four stygofauna species, *Nitocrella* sp. B04 (nr obesa), *Nitocrella* sp. B05, *Parastenocaris* sp. B07, and *Atopobathynella* sp., is possibly threatened by mine development. Based on the ranges of related species, it is considered likely that the three species collected in low abundance, *Nitocrella* sp. B05, *Parastenocaris* sp. B07, and *Atopobathynella* sp., have ranges extending beyond the zone of groundwater drawdown.
Management Measures:	• Groundwater abstraction rates and groundwater levels will be monitored to confirm predicted drawdown levels. • Groundwater abstraction rates will be maintained at the minimum required for safe operation and for Project water supply. • Cameco will undertake periodic ongoing sampling for subterranean fauna in existing bores. • Ground vibrations will be minimised where practicable to reduce impacts on subterranean fauna.
Commitments:	12. Cameco will implement the Subterranean Fauna Management Plan. The Plan would include the following: • monitoring of groundwater levels to confirm predicted drawdown levels; and • ongoing periodic sampling in existing bores.

Outcomes:	Cameco does not anticipate that the Project will affect the conservation status of any subterranean fauna species. With the proposed management measures, Cameco believes the Project can be constructed, operated and closed in a way which maintains the abundance, diversity, regional distribution and productivity of subterranean fauna at the species and ecosystem levels. Cameco has also contributed to the improved understanding of subterranean fauna communities in the Pilbara region.

Environmental Factor:	Aquatic Fauna
Environmental Objective:	To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.
Potential Impacts:	• As semi-permanent pools occur predominantly upstream of the Project area direct impacts on aquatic fauna are considered unlikely. • Alteration of hydrology of pools from groundwater abstraction is highly unlikely as evidence has shown that the Pools are surface water features that are filled following significant stream-flow events.
Management Measures:	Cameco will manage access to Pinpi and Rock Pool by applying restrictions on the use of the pools by employees at the mine site.
Commitments:	13. Cameco will undertake periodic water quality monitoring of Duck Pool, Pinpi Pool and Rock Pool in accordance with the Surface Water Management Plan.
Outcomes:	Cameco expects that there will be no significant impact on aquatic fauna within the site area, due to the activities associated with the Project.

Environmental Factor:	Conservation Areas
Environmental Objective:	To protect the environmental values of areas identified as having significant environmental attributes.
Potential Impacts:	• The risk of direct impacts from the Project on Karlamilyi National Park from dust and visual impacts are considered extremely low or negligible. • The Project is not expected to have any impacts on the Rudall River catchment, a Priority 1 Wild River area. • Improved access to the area may encourage more people to visit Karlamilyi National Park and place pressure on natural resources and increase the risk of fire. Tracks within the National Park are not regularly maintained and would not support a significant increase in vehicles without damage to soil structure and vegetation. Any weeds which may be growing near the access road may also be transported into the National Park from seeds picked up by vehicles using the access road.
Management Measures:	Cameco will prepare and implement a Fire Prevention and Management Plan and weed management measures within its Flora and Vegetation Management Plan to reduce the risk of fire and weed invasion on the national park.
Commitments:	14. Cameco will work with DPaW and Indigenous stakeholders to manage any indirect impacts on the National Park such as increased access, risk of fire and risk of weeds.
Outcomes:	There are not expected to be any direct impacts on Karlamilyi National Park or the Rudall River catchment area. Any indirect impacts such as improved road access and increased risk of fire and introduction of weeds to the park are considered manageable. Cameco believes the environmental values of Karlamilyi National Park and the Rudall River catchment area will be protected with implementation of the proposed management measures for the Project.

Environmental Factor:	Air Quality
Environmental Objective:	To ensure that emissions from the Project do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.
Potential Impacts:	The results of the air dispersion modelling show that the off-site impacts of TSP, PM_{10} and $PM_{2.5}$ concentrations as a result of the Project are predicted to be below the ambient guidelines with any exceedances of these guidelines predicted to be localised to the immediate vicinity of the Project area. The incremental guideline for particulate deposition is predicted to be exceeded in the immediate vicinity of the Project area. No exceedances of the ambient air quality objectives for sulphur dioxide, nitrogen dioxide, or carbon monoxide are predicted to occur as a result of the Project's proposed power station emissions.
Management Measures:	The Kintyre Project has been designed with a strong focus on minimising dust emissions. Within the mining and WRL areas, traditional dust management techniques, including the use of water sprays, dust suppressants and progressive rehabilitation (where practicable) will be used to manage dust emissions associated with the Project. Similarly, a high level of control has been included within the plant design to minimise the particulate emissions. The Dust Management Plan includes ambient monitoring of PM_{10} concentrations and total dust deposition rates
Commitments:	15. Cameco will comply with the Ambient Air Quality NEPM which will be used as a basis for developing regulatory limits and management targets for the Project. 16. Cameco will implement the Dust Management Plan to ensure dust levels are kept as low as reasonably achievable. This will include particulate monitoring throughout operations.
Outcomes:	Cameco expects that the Project will comply with all air quality standards for particulates and dust deposition and will not adversely affect environmental values or the health, welfare and amenity of people and land uses within the vicinity of the Project.

Environmental Factor:	Radiological Environment
Environmental Objective:	To minimise potential human and ecological radiation exposure to as low as reasonably achievable (ALARA); and To limit radiation exposure to members of the public to less than 1mSv per year over and above background; and To estimate and minimise emissions and potential radiation exposures to workers and the public through design and management measures.
Potential Impacts:	**Radiation Exposure of Workers - Mine** There are three main pathways for radiation exposures of workers: external gamma exposure, inhalation of radioactive dusts and inhalation of radon decay products. Estimated maximum probable doses to miners at Kintyre are estimated to be approximately 2.8 mSv from gamma, 0.7 mSv from inhalation of radioactive dust, and 1.2 mSv from inhalation of radon decay products, resulting in a total of approximately 5 mSv/year. The assumptions used to estimate the doses at Kintyre are conservative, with no allowance for such factors as shielding of gamma radiation by heavy equipment, or reduction in airborne contaminants by cab air-conditioning. Accordingly, it is considered that the maximum probable dose to Kintyre miners will be below 5 mSv/year, similar to doses measured at other uranium mines.

Potential Impacts:	**Radiation Exposure of Workers - Processing** The maximum probable dose to mill workers is estimated to be approximately 5 mSv, based on comparison with other projects. **Exposed Groups** Assuming an exposure time of 4,000 hours/year, the doses arising as a result of inhaling dusts and radon for camp workers are <0.5 µSv/y from dusts, and 25 µSv/y from radon decay products. The nearest permanent residents are approximately 80 km from the Project. At this distance, doses from emissions from the Project are not detectable. The total dose that transient visitors to the area would receive over a period of approximately two months, including dose from dust, radon and food intake, is estimated at approximately 13 µSv, predominantly from the inhalation of radon decay products. Over the same two month period, a visitor would be expected to receive approximately 300 µSv from natural background radiation. **Radiation Exposure of Non-human Biota** The conservative dose rate derived for lichen and bryophytes is approximately three times higher than the screening level (at a deposition rate of 50 Bq/m^2/year), and is more than fifteen times higher than any other organism. Lichen and bryophytes are considered extremely radioresistant: a threshold no-effect dose rate has been estimated at approximately 125,000 µGy/h, with some diversity reduction observed at 1.1 Gy/h (UNSCEAR, 1996). These dose rates are over 10,000 times the default screening dose rate used in the ERICA model, and indicate that no effect at all would be expected from any doses that are potentially achievable in uranium mining. Lichen and bryophytes can therefore be considered not to be at any significant risk. The (expected) dose rate to the non-vertebrate groups is less than 0.6 µGy/h. Thus at the 50 Bq/m^2/year deposition rate, no effects would be expected. All vertebrate groups gave expected doses of less than 0.3 µGy/h and conservative doses of less than 0.7 µGy/h at the 50 Bq/m^2/year deposition contour, approximately one half that of the invertebrate groups, and less than one tenth of the screening level. Estimated conservative doses to raptors subsisting on prey from the Kintyre area were less than one fifth of the screening level indicating that the risk of radiological harm was negligible.
Management Measures:	**Radiation Control in Design** Initial plans of the equipment to be installed will be examined to determine where radiation protection may be required, and options for control will be developed for those areas where requirements have been identified. These will be examined for the degree of protection they afford, and the optimum option will then be identified. Further refinements of control measures will then be considered before the final design is produced. The radiation monitoring plan will collect data on radiation exposures and waste management, and as these data are accumulated, it will be examined to determine if there are ways in which further reductions in exposure can be reasonably achieved. Access to the main mining areas will be restricted to ensure that only appropriately trained and qualified personnel are able to access the work areas. The time spent in high grade mining areas by individual workers will be limited, through careful rostering and scheduling of those workers operating ore recovery equipment, backed up by detailed monitoring. For production, drill operators and charge up crews who may be required to spend extended time directly on the ore, a workplace exposure plan will be developed based on actual dose rate measurements. In addition to the traditional TLD gamma monitors, modern direct-reading personal electronic dosimeters will be issued to potentially affected workers and these will allow real-time readout and dose assessment.

All heavy equipment operating in the pit will have air-conditioned cabs with effective air filtration systems.

Continuous RnDP monitors will be installed in the pit, with direct real-time display of concentrations in the control room. Control limits will be set, in consultation with regulatory authorities, and should RnDP concentrations exceed these levels, all workers not working in air conditioned cabs with effective air filtration will be removed from the pit until levels fall to below the control limit (generally when inversions are broken up after sunrise).

Should essential work be required outside of cabs then respiratory protection will also be taken to minimise doses from inhalation of radioactive dust. These will include standard dust suppression techniques (e.g. wetting of materials before handling, wetting of roadways, provision of dust collection systems on drills etc.), and measures to reduce subsequent exposure (use of respiratory protection and air conditioned cabs).

Crushers and conveyor systems will be fitted with appropriate dust control measures, including dust extraction at dust generating sources, with cleaning of the exhaust air using scrubbers or bag houses. During start-up the area will be subject to intensive dust monitoring, to establish exposure levels and to identify any remaining dust sources.

All areas within the plant will be bunded, with facilities to collect spillage and pump it back to vessels or to the TMF. Tanks containing radioactive process slurries will be bunded to capture at least the volume of the tank in the event of a catastrophic failure. The tailings pipeline corridor will bunded, and designed so as to be able to contain spillage from tailings pipeline failures. Pressure sensors will be installed on pipelines to give early warning of failure and automatically cut-off flow to affected areas.

The technology for the safe and secure packing of final uranium product into drums consists of a totally enclosed packing booth, with an automated drum filling process, operating under negative pressure to prevent any releases of dust.

The product packing workers would change into dedicated overalls prior to entry to the area, and then be required to change when leaving, including for lunch breaks.

Access to the product drying and packing area will be by 'swipe-card', with only authorised personnel allowed access. The swipe-card system will also log entry and exit and will record names and the total amount of time each person spends in this controlled area.

General Management

Access to all operating areas will be controlled to ensure that only those who have been properly trained and are aware of any specific radiological protection measures that are necessary can be admitted.

The Project area will be divided by fencing into 'clean' and 'potentially-contaminated' areas. Access to the potentially-contaminated area will be via a security gate. Egress from the potentially contaminated area by vehicle will be via a wheel-wash to ensure that contaminated material will not be transported off-site by vehicles.

Vehicles that are likely to be regularly in contact with high grade uranium mineralisation (for example mine vehicles) will be kept within the contaminated area.

Change-room facilities will be established which will have a clean side and a dirty side. Workers will come to work through the clean side and change into work clothes and exit through the dirty side. At the end of shift workers will enter the dirty side, remove their work clothes and shower, then proceed to the clean side where they will change back into clean clothes before returning to camp. All work clothes will be laundered on site.

Sufficient appropriately qualified radiation protection personnel would be employed to implement the Radiation Management Plan (RMP) and the Radioactive Waste Management Plan (RWMP). The nominated radiation safety officer would directly report to the site general manager.

All employees will receive an induction informing them of the hazards associated with the workplace, of which radiation is one hazard.

	Managers and supervisors will receive additional training in the recognition and management of situations that have the potential to increase a person's exposure to radiation. A specific radiation safety work permit system will be implemented and before any non-routine work in a potentially high exposure situation is undertaken, such as maintenance in the product packing area, a work permit will be required, and all conditions on it must be complied with. A computer-based data management system will be used to store and manage all information relating to radiation management and monitoring. Plans will be developed for the management of any incidents or accidents that may result in exposure radiation or loss of containment of radioactive material as part of the overall site emergency response plan. An occupational and environmental radiation monitoring programme would be developed and implemented. **Radioactive Waste Management** Waste rock management - Mineralised material will undergo further analysis using a radiation scanner. Trucks exiting the mine will be scanned to determine the class of materials based on radioactivity and the truck load of ore would be directed to a stockpile for processing or to the mineralised waste stockpile for storage. Tailings management - Tailings will be pumped from the processing plant to the TMF in a slurry form and deposited in thin layers. The tailings discharge points will be rotated around the tailings area with a cycle time of several weeks, which will allow some drying but will retain the tailings in a damp state to reduce dust generation. Excess liquor will collect near the centre of the facility and will be reused in the plant when possible or pumped to lined evaporation ponds. The TMF will be designed as a permanent, zero-discharge, single-use facility with a geomembrane lining and leak detection systems, using Best Available Technology. Miscellaneous waste control - a system of separate collection of potentially contaminated wastes from operational areas will be instituted. All equipment will be tested for contamination. Where recycling is practicable, items will be decontaminated to approved radiation levels before leaving site. Items that cannot be properly decontaminated, or where recycling is impracticable, will be buried in an approved manner. **Closure and Rehabilitation** A Mine Closure and Rehabilitation Plan for the operation will be submitted to DMP for approval before commencement of operations. The tailings will be allowed to dry sufficiently to allow access for machinery and then covered with inert waste rock to a depth agreed to minimise the emanation of radon. The walls of the TMF will be armoured to reduce the potential for erosion, and appropriate structures for control of run off will be constructed. The waste rock storage areas would also be contoured to reduce the risk of erosion. The site will be monitored after rehabilitation to ensure that it meets surface contamination criteria.
Commitments:	17. Cameco will design, construct and operate the proposed Project to ensure that human and ecological radiation exposures comply with Australian Standards, Codes of Practice and Guidelines. 18. Cameco will develop a Radiation Management Plan and obtain approval to implement the Plan prior to the comencement of the Project. This will ensure compliance with the radiation dose limits for workers outlined in the Radiation Safety (General) Regulations 1983, and limit radiation exposure to members of the public to less than 1 mSv per year over and above background.

Outcomes:	Cameco will comply with all legislative requirements relating to radiation. Cameco considers the risk of adverse impacts to the environment, mine workers and the general public from radiation during exploration and construction, operation, closure and post-closure of the Project are low.

Environmental Factor:	Geochemistry
Environmental Objective:	To maintain the integrity, ecological functions and environmental values of the soil and landforms.
Potential Impacts:	Acid mine drainage (AMD) may occur if the ore or surrounding host rock contains sulphide minerals. The sulphides oxidise to sulphates (SO_4), which generates sulphuric acid (H_2SO_4) if the oxidised mineral is then dissolved in water. Low pH (<4) acidic water then has the potential to enter the surface or groundwater and affect receptors offsite. Acidic water can dissolve additional metals from the soils and rocks to higher than normal concentrations, making the water metalliferous and saline. The secondary effects of these changes in the water can result in lower oxygen concentrations, higher dissolved or suspended solids, turbidity and colour. With a uranium ore body there are the additional hazards of high radioactive metal concentrations in the natural water and increased radioactivity. Three independent investigations found that the overall assessment of the system indicates that any localised acid rock drainage will be neutralised by the relatively abundant carbonate minerals present. **Groundwater Quality** The chemistry of the groundwater is dominated by sodium and chloride with significant concentrations of sulphate, alkalinity and hardness. Radionuclide activity and concentrations show high fluctuation between lithologies and is strongly affected by the presence of the uranium mineralisation. **Pit Lake** From the hydrogeological water balance it is expected that evaporation will far exceed precipitation and any other inflows such that the water quality is predicted to become saline and alkaline with elevated concentrations of boron, chlorine, manganese, molybdenum, sodium, and uranium in both pit lakes. The pit lake is predicted to form a terminal sink with no outflows of evapoconcentrated water to the receiving environment.
Management Measures:	Cameco will prepare a waste rock dumping schedule to manage and segregate potentially acid/metalliferous minerals and prevent acid rock drainage from occurring. The potential impact from the low concentrations of potentially acid forming (PAF) minerals is considered to be low, and may be further mitigated by encapsulation within the waste rock dump, surrounded by carbonate rock types.
Commitments:	19. Cameco will: • prepare a waste rock dumping schedule to manage and segregate potentially acid/ metalliferous minerals and prevent acid rock drainage from occurring; and • advance further pit lake models to include additional backfill scenarios.
Outcomes:	Cameco anticipates that with the accurate delineation of sulphides and proposed management measures for PAF materials, that the risk to the environment from AMD will be low. Cameco believes that the long-term integrity, ecological functions and environmental values of the soil and landforms of the Project area and surrounding areas will not be affected by AMD or metalliferous drainage. The modelling undertaken predicts that the pit lake water will be of poor quality. However, as a result of high evaporation rates, the pit will remain a terminal sink with no outflows, and it is not expected to have a negative impact on the surrounding environment.

Environmental Factor:	Tailings Management
Environmental Objective:	To maintain the integrity, ecological functions and environmental values of the soil and landforms. To maintain structural integrity of the facility and limiting erosion by water. To limit fugitive dust and radon emissions from the facility. To limit seepage to groundwater.
Potential Impacts:	Gamma radiation levels from the tailings will be consistent with the equivalent amount of ore. When the tailings has been disposed, and covered, the terrestrial gamma radiation dose rates will be similar to the existing levels. Dust from the tailings surface may create a potential exposure pathway to people and non-human biota. There is not expected to be dusting of the tailings during operations as the tailings will be managed in a way that maintains moisture as it dries and consolidates into a competent mass When the tailings are wet, radon emanation is low as the radon is unable to escape from the pore space of the tailings particles. When the tailings over-dries, there is the potential for increased emanation, if consolidation has not been effective. The risk of seepage resulting in the transport of radionuclides from the TMF is very low given the integrity of the TMF liner is maintained whilst the tailings remain free draining.
Management Measures:	Control of Emissions • Liners, drainage and a leak detection system to minimise the likelihood of any seepage and hence release of tailings supernatant to groundwater. • Deposition of the tailings as a slurry to maintain pore water levels and hence limit the release of radon gas. • Subaerial deposition of tailings is a simple well understood technology that requires relatively little operational intervention thus limiting the number of people who will need to work on the facility. • Supernatant pond levels will be managed to minimise the attractiveness of the ponds to wildlife. Bird access to the TMF and the evaporation pond will be controlled using best available technology as required. Surface Water Management Stormwater collected from the TMF will be managed via provision of 1 m freeboard together with the installation of a central decant system, and the construction of two diversion channels to redirect TMF runoff flows to the evaporation pond. Runoff from the external TMF slopes will be captured in one of two diversion channels. These will direct the runoff to the evaporation pond. Ground and Surface Water Monitoring • A network of monitoring wells located down-gradient of the TMF and evaporation pond. Perimeter wells will be located within 100 m of the facility to facilitate early warning of leakage. Monitoring wells will be recorded and sampled monthly. • Sampling weirs and associated instrumentation in downstream stormwater drains. • Monitoring of the TMF leak detection system instrumentation. • Definition of Action Trigger Levels pertaining to changes in flow rates, groundwater levels and chemical composition. • Routine inspections undertaken by appropriately qualified people, of the TMF and evaporation pond. • Development of a facility surveillance programme, to be carried out by mine personnel, with the intent of making ongoing observations relating to the conditions and performance of the tailings structure and associated facilities. • Daily inspection of the surface of the TMF and evaporation pond for wildlife visitation.

	Dust Control The TMF will be operated in such a way to maintain a moist surface on the tailing beaches. Dust emissions from the TMF will be monitored by visual observations.
Commitments:	20. The TMF will be operated in accordance with an approved TMF Operating Plan which will include commitments to a monitoring programme. 21. Cameco commits to preparing a detailed design for the IWL (including the TMF and the Evaporation Pond during Definitive Feasibility Study and will report the outcome in the Mining Proposal.
Outcomes:	Cameco anticipates that, given the as planned construction, operation and closure of the TMF, the risk to the environment arising from radiological and other factors related to the TMF will be low. Cameco has considered the risk associated with the TMF in both the operations and closure of the Project.

Environmental Factor:	Fibrous Minerals
Environmental Objective:	To ensure that fibrous minerals emissions from the Project do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.
Potential Impacts:	The sampling and mapping of the ore body completed during exploration suggests that the frequency and occurrence of fibrous minerals across the orebody is low. The handling of ore and waste rock during mining creates conditions that potentially pose a higher level of risk than exploration using diamond drilling.
Management Measures:	Cameco has prepared a Fibrous Minerals Management Plan which considers risks related to mining and sets out procedures in relation to assessing risk in various work areas, establishing Designated Areas and developing Standard Work Procedures (SWPs). Exposure to fibrous minerals will be maintained at an acceptable level by implementing the following key control measures and SWPs: • Identify the location of fibrous minerals in the mining process as soon as possible. • Suppress dust and fibres at source using engineering and procedural dust-control techniques (e.g. dust suppression, enclosure or isolation of dust areas, local exhaust ventilation and water). • Immediately quarantine workplaces contaminated with fibrous minerals until the hazard has been dealt with. Access to all areas containing fibres will be strictly controlled and monitored. Designated Areas will be established around the contamination area. • Implement targeted personal occupational air monitoring programme to establish level of exposure risk during normal operation. • Implement regular surveillance of the ore mineralogy to identify the presence of fibrous minerals and ensure their disturbance is minimised. • Implement regular checking of mined ore by geologists for the presence of fibrous minerals. • Provide appropriate information (including written SWPs), instructional training, and supervision to all employees and contractors. • Ensure the use of personal protective equipment will be secondary and complementary to engineering controls. • Conduct regular audits and air monitoring to confirm the effectiveness of engineering and procedural controls. An Asbestos Air Monitoring Programme will be implemented using a Risk Based approach.
Commitments:	22. Cameco will implement the Fibrous Materials Management Plan to ensure exposure to fibrous minerals is maintained as low as reasonably practicable and levels comply with the Occupational Exposure Limit.

Outcomes:	Cameco believes that implementation of the proposed management measures will ensure that Cameco complies with all statutory requirements and standards for fibrous minerals to protect the health of people, including workers, and the environmental values within the Kintyre area.

Environmental Factor:	Greenhouse Gas Emissions
Environmental Objective:	To minimise 'greenhouse gas' emissions to levels as low as practicable on an on-going basis and consider ways to reduce emissions or apply offsets to further reduce cumulative emissions.
Potential Impacts:	Greenhouse gas emissions as a result of: • power generation for the Project; • emissions from mineral processing; • fuel usage by vehicles and machinery; • release of stored carbon in soils during clearing; and • decomposition of cleared vegetation.
Management Measures:	For management and reduction of greenhouse gas emissions two main opportunities exist within the context of mining operations. Demand-side management relates to energy usage throughout the site and supply-side management ensures that the different site requirements are met efficiently. Studies for the demand-side management would include: • optimisation of the proposed mining fleet size (number of trucks versus size of trucks) in order to best meet the targets of the mine plan and optimise diesel demand; • optimisation of mine blasting regimes to reduce the energy required to crush the resultant ore; • optimisation of the metallurgical process, including the capture and use of waste heat, to reduce the electricity and steam requirements, where possible, and thus reduce the site diesel demand; and • incorporation of energy efficiency measures for the accommodation and administration facilities. Supply-side management would include studies into the feasibility of renewable energy sources.
Commitments:	23. Cameco will implement the Greenhouse Gas Management Plan, minimise vegetation disturbance and maximise energy and fuel efficiency to reduce the carbon footprint of the Project.
Outcomes:	Cameco believes that greenhouse gas emissions from the Project are as low as reasonably practicable for a project of this scale, duration and location.

Environmental Factor:	Noise
Environmental Objective:	To protect the amenity of off-site residents from noise impacts resulting from activities associated with the Project by ensuring the noise levels meet statutory requirements and acceptable standards.
Potential Impacts:	Single point calculations and noise contour calculations were undertaken for the mining operations, to show the level of noise distribution. The only significant results were shown to be at the proposed accommodation village. Even though the accommodation village is not required to comply with the assigned noise levels, predicted noise levels at the accommodation village are well below the assigned noise levels, indicating the amenity of personnel at the camp will be protected.

Management Measures:	• Use modern, well-maintained equipment. • Comply with the Environmental Protection (Noise) Regulations 1997. • Monitor noise levels and implement noise reduction measures if required.
Commitments:	24. Cameco will implement the Noise Management Plan.
Outcomes:	Noise levels from the Project are predicted to be zero at the nearest off-site noise sensitive premises and will therefore comply with the Environmental Protection (Noise) Regulations 1997. Noise levels received at the accommodation village are also predicted to be well below the assigned noise levels to protect the amenity of personnel staying at the accommodation village.

Environmental Factor:	Recreational Use
Environmental Objective:	To ensure that the development does not impact on existing recreational activities. More specifically the objectives are to ensure: • existing and planned recreational uses are not compromised; • separation of distances between industrial and sensitive land uses to avoid conflict between these land uses; and • the principal of intergenerational equity is maintained.
Potential Impacts:	• Impacts to recreational use as a result of exclusion zones/reduced access and vegetation clearing. • Radioactive dust impacting on health through ingestion of food and water during recreational activities. • Loss of recreational value to tourists due to potential changes in landscape/aesthetics.
Management Measures:	Cameco will construct a new road between the Project and the Telfer to Marble Bar Road. During these activities no exclusion zones will be applied; a slip road will be established at the site of activity to maintain access along the existing road. Cameco may establish exclusion zones around the immediate mine site for safety purposes which restrict Martu's access to country and their ability to participate in recreational/ cultural activities. However any exclusion will be managed through a Cultural Heritage Management Plan. At each of its operating sites, Cameco develops a Radiation Protection Programme (RPP), which defines the minimum requirements and management for radiation at the site. In addition to the RPP, Cameco will manage potential radiation impacts through a Radiation Management Plan (RMP). The Project is not expected to be visible from the road or visitor areas within the Karlamilyi National Park. Furthermore, long term impacts to visual amenity will be mitigated with the Mine Closure and Rehabilitation Plan.
Commitments:	25. Cameco will continue to manage access to country for Martu through ongoing consultation and engagement with Martu and WDLAC.
Outcomes:	It is unlikely that the Project will have any significant impact on the recreational use of the area by both local community members and tourists visiting the area. The Project is expected to provide upgrades to local road infrastructure which has the potential to improve access to the area and the safety of locals and tourists travelling on the Telfer Road. The Project will also have emergency services that could assist tourists or locals in the case of an emergency.

Environmental Factor:	Indigenous Heritage
Environmental Objective:	To ensure that changes to the biophysical environment do not adversely affect historical and cultural associations and comply with relevant heritage legislation.
Potential Impacts:	Development of the Project will not significantly impact any of the archaeological or ethnographic sites located within the Project area. Only two ethnographic sites will be affected, and in both cases the impact will be limited.
Management Measures:	In relation to site 11786 (Yandagudji) Yandagooge Creek, the impact of the Project will be limited to small areas required for crossing the creek and the installation of water monitoring stations within the creek bed. To date, Section 18 consent under the *Aboriginal Heritage Act 1972* has been obtained for each impact. Prior consultation with the Traditional Owners combined with the use of on-ground Martu heritage monitors during the actual ground disturbance has provided an effective management process to date. Cameco proposes to continue to manage any future impact on (Yandagudji) Yandagooge Creek in a similar manner. The proposed impact on site 27487 has been fully discussed with the Traditional Owners and their views sought on appropriate mitigation. Cameco has conducted extensive consultation in relation to the proposed mining development and the potential impact of the development on recorded archaeological and ethnographic sites and has agreed a set of principles or "Rules" in relation to a range of protective measures for each site, including for example limits to the proximity of ground disturbance near sites, buffer zones, access to protected areas for environmental monitoring, signage inspections, visitations and reporting. Cameco has proposed to establish a Relationship Committee. The Committee will consist of representatives of Cameco and Martuand has a role to oversee the implementation of the Indigenous Land Use Agreement and the Cultural Heritage Management Rules.
Commitments:	26. Cameco will implement the Cultural Heritage Management Plan Rules. 27. Workforce and contractors will be made aware of their obligations under heritage protection legislation and the CHMP Rules and be required to comply with these requirements. 28. Cameco will continue consultation with the Martu through the Relationship Committee. 29. Cameco will develop the CHMP with the Martu at a later date and in accordance with the ILUA.
Outcomes:	The development of the Project does not pose a significant impact to the cultural heritage values of the either the Project area or the region. Limited impact on two ethnographic sites will be managed in accordance with the views of the Martu and the framework of protective measures negotiated between the Parties.

Environmental Factor:	Transport
Environmental Objective:	To minimise potential human and ecological radiation exposure to as low as reasonably achievable; and To limit radiation exposure to members of the public to less than 1 mSv per year over and above background levels.
Potential Impacts:	The Transport Risk Assessment for the transport of UOC from site to the Port of Adelaide concluded that for all the scenarios assessed the radiological risk is considered to be low or very low, and tolerable. According to the analysis under normal operating conditions, the radiological exposure to personnel and members of the public are assessed to be low during the transportation of UOC by road.

Management Measures:	The dried UOC product will be sealed in 205 L drums and loaded into twenty foot ISO shipping containers. The doors of the containers containing UOC would be sealed with bolt-type seals which are consecutively numbered and meet ASNO standards. The container would then be transported via road to the Port of Adelaide, for export from Australia. Prior to leaving the Project area, and in accordance with the Code, a Radiation Safety Officer or delegate will monitor both the container, and the exterior of the 205 L drums for surface contamination. The exterior of the containers will be measured for gamma radiation to confirm the Transport Index and the containers would be labelled accordingly. The containers remain sealed throughout the journey from the mine site at Kintyre, to the overseas point of delivery. Modelling undertaken for Cameco estimates the dose to members of the public from transport to be less than 1 µSv. These are very small doses, around half of the typical daily dose from the natural gamma background.
Commitments:	30. Cameco will implement the Transport Radiation Management Plan.
Outcomes:	Cameco considers the risk of adverse impacts to the environment and the general public associated with transport of UOC to be very low and acceptable.

Environmental Factor:	Health and Wellbeing
Environmental Objective:	To reduce as far as reasonably practicable the risk posed by the Project on the health and wellbeing of communities, employees and other users of the Kintyre area.
Potential Impacts:	• Several public health concerns associated with the Project have been identified: • location of proposal site and transport requirements; • water quality issues; • wastewater; • mosquitoes; • pest control/use of pesticides; • disaster preparedness and emergency management; • air quality; • food; and • Indigenous environmental health.
Management Measures:	Only mosquito management is assessable by the EPA under Part IV of the EP Act. The remaining issues will be assessed in consultation with the Department of Health and Cameco will develop appropriate management measures to address any key impacts identified. Potential impacts to the wellbeing of the Project workforce from mosquitoes will be managed through a Mosquito Management Plan. Cameco has undertaken a separate health assessment to confirm that the potential health impacts associated with aspects of the Project are unlikely to be a threat to the local Indigenous communities and communities along the transport route.
Commitments:	31. Cameco will implement the Mosquito Management Plan.
Outcomes:	The Project will aim to minimise the impacts from mosquitoes to as low as reasonably practicable. However, as the Project is located in a remote location mosquito populations arising from Cameco's operations are unlikely to be a threat to local communities in the region or passing travellers.