

Section Ten

Management Framework



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10. Management Framework

10.1 Introduction

Cameco has a Safety, Health, Environment and Quality (SHEQ) Policy that is applicable to all of Cameco's employees, representatives, subsidiaries and joint venture projects. This policy recognises safety and health of Cameco's workers and the public, protection of the environment, and quality of Cameco's processes as the highest corporate priorities during all stages of activities, including exploration, development, operations, decommissioning and rehabilitation. Cameco strives to be a leading performer through a strong safety culture, environmental leadership, operational excellence and commitment to the following principles:

- keeping risks at levels as low as reasonably achievable;
- prevention of pollution;
- complying with and moving beyond legal and other requirements;
- ensuring quality of processes, products and services; and
- continually improving overall performance.

Cameco's management system for implementation of its SHEQ Policy for the Project will comprise the following programmes:

- Quality Management Programme;
- Safety and Health Management Programme;
- Radiation Protection Programme;
- Environment Management Programme;
- Emergency Preparedness and Response Programme;
- Contractor Management Programme; and
- Management System Audit Programme.

Cameco has also created an environmental management system (EMS) which commits each Cameco operating site to the development and implementation of a formal system which addresses the short and long term impacts of its activities on the environment. The system includes written materials such as programmes, plans and procedures, as well as the allocation of resources, the assignment of responsibilities and the training of employees.

10.2 Principles of Environmental Protection

The object and principles of the *Environmental Protection Act 1986* (EP Act) are outlined in Section 4A of the EP Act. The object of the EP Act is to protect the environment of the State having regard to the principles outlined in Table 10-1. Cameco has considered these principles in the design and proposed management of the Project.

10.3 Management Plans

A series of Management Plans within the overarching Environmental Management Programme (EMP) has been developed. These are presented with this ERMP based on the existing knowledge of the Project, its potential impacts and the significant environmental values to be protected. All plans are 'live documents' and will be reviewed on a regular basis as determined by the EMS. The following Management Plans have been developed and are presented as appendices to this ERMP:

- Radiation Management Plan incorporating radioactive waste management measures (including mineralised waste rock and tailings management);
- Transport Radiation Management Plan incorporating an Emergency Response Assistance Plan (ERAP);
- Dust Management Plan;
- Surface Water Management Plan;
- Groundwater Management Plan;
- Flora and Vegetation Management Plan;
- Fauna Management Plan;
- Subterranean Fauna Management Plan;
- Fibrous Materials Management Plan;
- Chemical and Fuel Storage Management Plan;
- Fire Prevention and Management Plan;
- Waste Management Plan;
- Greenhouse Gas Management Plan;
- Noise Management Plan;
- Cultural Heritage Management Plan;
- Mosquito Management Plan; and
- Mine Closure and Rehabilitation Plan.

Table 10-1: Principles of environmental protection

Principle	Cameco's Response
<p>1. The precautionary principle</p> <p>Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</p> <p>In the application of this precautionary principle, decisions should be guided by –</p> <p>(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</p> <p>(b) an assessment of the risk – weighted consequences of various options.</p>	<p>The environmental impact assessment has enabled Cameco to gain a better understanding of the potential impacts of the Project and develop appropriate measures to mitigate and manage these potential impacts.</p> <p>Part of the environmental impact assessment has included a risk analysis (Section 3.4) to investigate the likelihood and consequence of certain events occurring, and identify high risks areas that may require further mitigation and management.</p> <p>Where there is uncertainty, Cameco has used conservative assumptions in assessing the potential impact of the Project and developing suitable management measures.</p>
<p>2. The principle of intergenerational equity</p> <p>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</p>	<p>Cameco will ensure that the development of the Project does not affect the ability of future generations to benefit from a healthy, diverse and productive environment. One of the key issues is management of radioactive materials during all stages of the Project and beyond closure. The Mine Closure and Rehabilitation Plan outlines the measures Cameco proposes to ensure long term protection of the environment.</p>
<p>3. The principle of the conservation of biological diversity and ecological integrity</p> <p>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</p>	<p>Cameco will ensure the disturbance of flora and fauna is kept to the minimum required for safe operation of the Project. Cleared areas no longer required, will be rehabilitated with native species throughout the life of the mine, and monitored for a period of time following closure to ensure the establishment of a self-supporting ecosystem.</p> <p>All aspects of the Project from design, construction, operation and closure will take into consideration the biological diversity of the area to ensure the ecological integrity of the broader area is protected.</p>
<p>4. Principles relating to improved valuation, pricing and incentive mechanisms</p> <p>(1) Environmental factors should be included in the valuation of assets and services.</p> <p>(2) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</p> <p>(3) The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.</p> <p>(4) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximise benefits and/ or minimise costs to develop their own solution and responses to environmental problems.</p>	<p>Cameco will:</p> <p>(1) consider environmental factors in the valuation of the Project's assets;</p> <p>(2) minimise the risk of pollution and generation of waste and ensure that any pollution that may occur is cleaned up. Cameco will be required to submit bonds to the Government that will be held until such time that agreed closure criteria have been met;</p> <p>(3) consider the full life cycle of materials used and generated by the Project and ensure waste is reused or recycled where practical; and</p> <p>(4) pursue environmental goals in a cost effective manner whilst not compromising the environmental outcomes.</p>
<p>5. The principle of waste minimisation</p> <p>All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.</p>	<p>Cameco will implement the waste hierarchy of:</p> <ul style="list-style-type: none"> • Avoid; • Reduce; • Reuse; • Recycle; • Recover; • Treat; and • Dispose.

10.4 Mine Closure and Rehabilitation Plan

A Mine Closure and Rehabilitation Plan (MCRP) has been developed by Cameco with reference to EPA Guidance Statement No. 6 for Rehabilitation of Terrestrial Ecosystems (EPA, 2006), and the DMP and EPA Guidelines for Preparing Mine Closure Plans (DMP and EPA, 2011). The MCRP has been included in Appendix D17.

Following closure, the site objective for the Project area is:

“Rehabilitated with the goal of achieving a safe, stable property that allows future use of the area for traditional purposes or occasional access that is similar to the existing (pre-mining) land use”.

Rehabilitation will be undertaken on areas of disturbance to minimise the impact, based on the following concepts:

- The area of disturbance will be minimised by appropriate planning and design of the mine and associated infrastructure;
- Rehabilitation will be progressive throughout operations;
- Final landforms and surfaces will be made physically stable by controlling drainage, slopes and the nature of the final surface cover;
- Final landforms and surfaces will be established to achieve agreed post closure levels for radiation;
- The appearance, shapes and heights of the final landforms will be made compatible with the surrounding landscape as far as practicable;
- Revegetation would be carried out using local species suited to the final landforms, to produce a stable, self-sustaining ecosystem and landform; and
- Rehabilitation would be monitored and a comparison made with defined completion criteria so that remedial action can be implemented if necessary.

Some permanent changes to the landscape would remain due to the mined pit, waste rock landform and TMF. Decommissioning of the Project will be based on the following concepts:

- Most waste rock will remain as permanent above ground waste rock dumps. The permanent waste rock dumps will be designed

to blend in with the landscape as far as practicable, and will be constructed early in the mine life to allow early rehabilitation;

- The design for the final TMF 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; and
- All plant and associated infrastructure (such as mine camp and airport) will be demolished, removed or buried on site at the conclusion of operations, subject to negotiations by key stakeholders.

A post closure monitoring plan has been developed as part of the MCRP. Parameters and frequency are indicative at this stage of the plan's development and will be re-evaluated during operation of the Project. The expected monitoring period post closure is expected to be around 10 years. However, this would depend on monitoring results demonstrating baseline or acceptable values at the time of closure.

10.5 Project Constraints

From the impact assessment conducted by Cameco, a number of aspects have been identified which require permanent protection during the life of the project. These include buffer and protection areas around cultural heritage areas as agreed in the CHMP Rules negotiated with Martu, and an area where Bilby are known to be active.

Cameco has mapped these areas and they are shown on Figure 10-1.

Cameco commits to protecting the values of these areas during the life of the mining project.

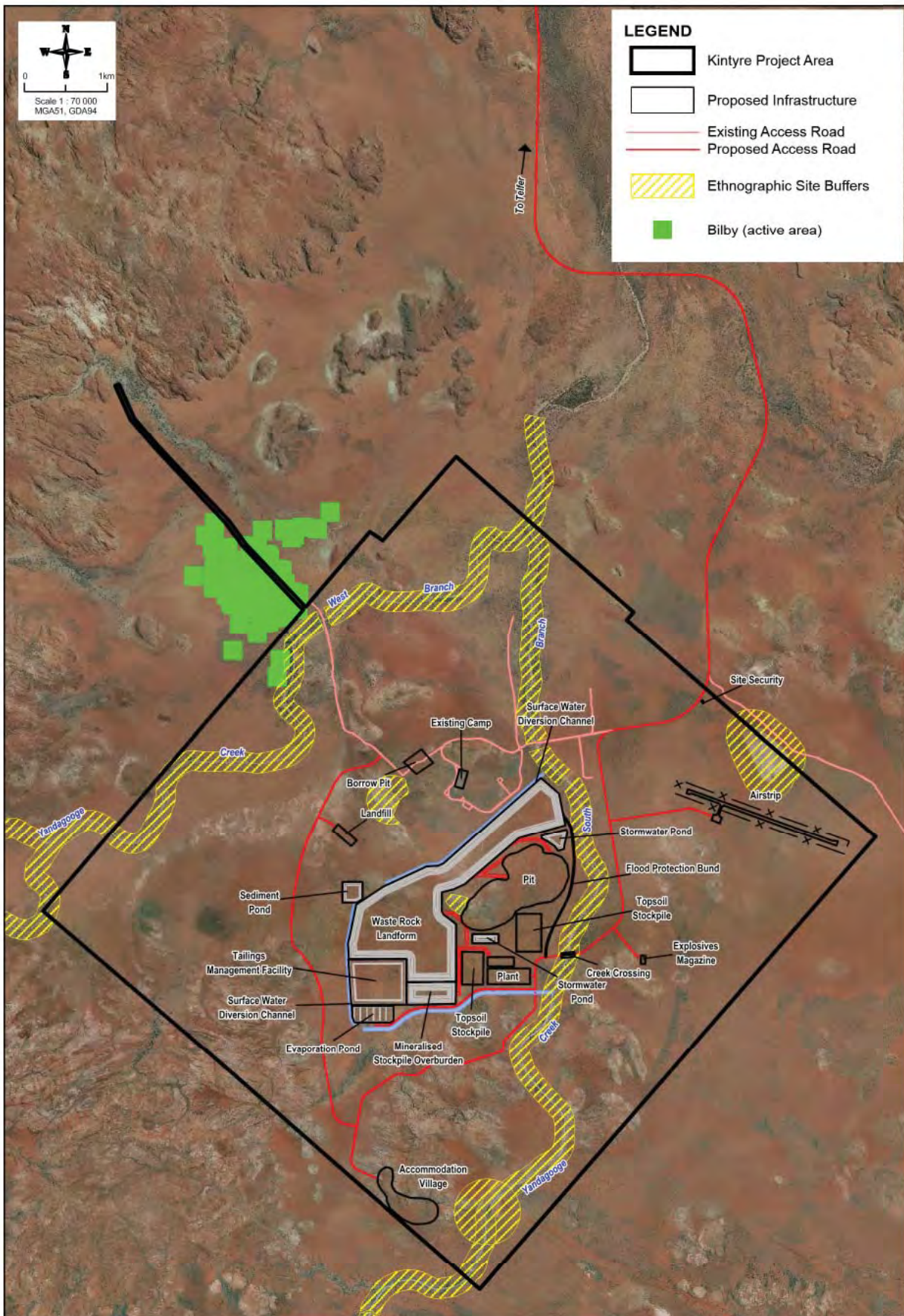


Figure 10-1: Project constraints

10.6 Summary of Commitments and Outcomes

Cameco has been operating internationally since 1988 and is one of the world’s largest uranium producers accounting for about 16% of the world’s production.

Cameco believes the Project can be constructed, operated, decommissioned and closed in an environmentally responsible manner in accordance

with the Principles of Environmental Protection outlined in the Western Australian *Environmental Protection Act 1986*.

The following table summarises Cameco’s commitments for the Project.

Table 10-2: Summary of Commitments for the Kintyre Uranium Project

Environmental Factor	Commitments	Outcomes
Landform and Soils	<p>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.</p> <p>Cameco will meet the completion criteria and values outlined in the Mine Closure and Rehabilitation Plan.</p>	<p>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.</p> <p>Cameco believes that the integrity, ecological functions and environmental values of the soil and landforms of the area will be protected.</p>
Surface Water	<p>Cameco will implement the Surface Water Management Plan.</p> <p>Cameco will design and operate the Kintyre Project as outlined in Table 8-2.</p>	<p>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 outlined in this ERMP, 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.</p>
Groundwater	<p>Cameco commits to:</p> <ul style="list-style-type: none"> • implementing the Groundwater Management Plan; • 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; • addressing the risks associated with the pit lake in the Mine Closure Plan; • preparing a post closure monitoring plan in order to confirm predicted effects; establishing a robust set of baseline water quality data based on statistically defensible concentrations for individual parameters to inform water quality objectives; 	<p>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.</p>

Environmental Factor	Commitments	Outcomes
	<ul style="list-style-type: none"> • 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. <p>Cameco also commits to ongoing development of the pit lake model, including an assessment on impacts to avian fauna from water chemistry</p> <p>Cameco will implement the Groundwater Management Plan.</p>	
Flora and Vegetation	<p>Cameco will implement the Flora and Vegetation Management Plan. This will include ongoing monitoring of potentially groundwater dependent vegetation within the vicinity of the pit and North Bore.</p> <p>Should Priority flora occur within areas proposed to be cleared Cameco will consult with DPaW prior to clearing.</p> <p>Cameco will undertake progressive rehabilitation of the Project area in accordance with the Mine Closure and Rehabilitation Plan.</p>	<p>Cameco does not anticipate that the Project will affect the conservation status of any plant species or particular ecosystem. With the proposed management measures outlined in this ERMP, 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.</p>
Terrestrial Fauna	<p>Cameco will implement the Fauna Management Plan which includes specific measures for conservation of significant species.</p> <p>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.</p>	<p>Cameco does not anticipate that the Project will affect the conservation status of any fauna species. With the proposed management measures outlined in this ERMP and presented in 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.</p>
Subterranean Fauna	<p>Cameco will implement the Subterranean Fauna Management Plan. The Plan would include the following:</p> <ul style="list-style-type: none"> • monitoring of groundwater levels to confirm predicted drawdown levels; and • ongoing periodic sampling in existing bores. 	<p>Cameco does not anticipate that the Project will significantly affect the conservation status of any subterranean fauna species.</p> <p>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.</p> <p>Cameco has also contributed to the improved understanding of subterranean fauna communities in the Pilbara region.</p>
Aquatic Fauna	<p>Cameco will undertake periodic water quality monitoring of Duck Pool, Pinpi Pool and Rock Pool in accordance with the Surface Water Management Plan.</p>	<p>Cameco expects that there will be no significant impact on aquatic fauna within the site area, due to the activities proposed associated with the Project.</p>

Environmental Factor	Commitments	Outcomes
Conservation Areas	<p>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.</p>	<p>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.</p> <p>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.</p>
Air Quality	<p>Cameco will comply with the Ambient Air Quality NEPM which will be used as the basis for developing regulatory limits and management targets for the Project.</p> <p>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.</p>	<p>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.</p>
Radiological Environment	<p>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.</p> <p>Cameco will develop a Radiation Management Plan and obtain approval to implement the Plan prior to commencement 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.</p>	<p>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 extremely low.</p>
Geochemistry	<p>Cameco is committed to ensuring best practice management and mitigation of environmental impacts. Cameco will:</p> <ul style="list-style-type: none"> • 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. 	<p>It is anticipated 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 has considered the risk of AMD in closure of the Project and final landform design is provided in more detail in the Mine Closure and Rehabilitation Plan (Appendix D17). 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.</p> <p>The modelling undertaken predicts that the pit lake water is expected to be of poor quality. However, as a result of high evaporation rates, the pit will remain a terminal sink with no outflows, and is not expected to have a negative impact on the surrounding environment.</p>

Environmental Factor	Commitments	Outcomes
Tailings Management	<p>The TMF will be operated in accordance with an approved TMF Operating Plan which will include commitments to a monitoring programme.</p> <p>The TMF will be designed, constructed, maintained and closed:</p> <ul style="list-style-type: none"> • as a fully lined zero-discharge facility; and • to ensure that the radiological exposure of people and biota, will be well below applicable limits during operations and post closure. 	<p>Cameco believes that the risk to the environment arising from radiological and other factors related to the TMF will be low.</p>
Fibrous Minerals	<p>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.</p>	<p>Cameco believes that implementation of the proposed management measures presented in this ERMP 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 Project area.</p>
Greenhouse Gas Emissions	<p>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.</p>	<p>Cameco believes that greenhouse gas emissions from the Project are as low as reasonably practicable for a Project of this scale and duration.</p>
Noise	<p>Cameco will implement the Noise Management Plan.</p>	<p>Noise levels from the proposed Project area are predicted to be 0 dB(A) at the nearest noise sensitive premises and will therefore comply with the Environmental Protection (Noise) Regulations 1997 and will not impact on nearby communities. 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.</p>
Recreational Use	<p>Cameco will continue to manage access to country for Martu through ongoing consultation and engagement with Martu and WDLAC.</p>	<p>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.</p> <p>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.</p> <p>The Project will also have emergency services that could assist tourists or locals in the case of an emergency.</p>
Indigenous Heritage	<p>Cameco will implement the Cultural Heritage Management Plan (CHMP) and the CHMP Rules.</p> <p>Workforce and contractors will be made aware of their obligations under heritage protection legislation and the CHMP and be required to comply with these requirements.</p> <p>Cameco will develop the CHMP with the Martu at a later date and in accordance with the ILUA.</p> <p>Cameco will continue consultation with the Martu and WDLAC through the Relationship Committee.</p>	<p>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.</p> <p>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.</p>

Environmental Factor	Commitments	Outcomes
Transport	Cameco will implement the Transport Radiation Management Plan.	Cameco considers the risk of adverse impacts to the environment and the general public associated with transport of UOC is considered very low and acceptable.
Health and Wellbeing	Cameco will implement the Mosquito Management Plan.	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.

10.7 Offsets

In Western Australia, most recent large developments have been approved subject to a commitment to a negotiated package of environmental offsets. These are determined by the state and/or federal regulating agency to compensate for residual environmental impacts and are largely designed to achieve long term outcomes, building upon existing conservation programmes and initiatives.

10.7.1 Regulatory Framework

10.7.1.1 State

The WA EPA has published the WA Environmental Offsets Policy (EPA, 2011) relevant to the use of environmental offsets in such approvals. This document provides a position on environmental offsets and establishes an approach for the use of environmental offsets in the context of environmental impact assessments in Western Australia.

The EPA defines environmental offsets as “environmentally beneficial activities” undertaken to “an offsite action or actions to address significant residual environmental impacts of a development or activity” to achieve a “net environmental benefit”.

Offsets can be direct offsets or indirect offsets. The policy states that environmental offsets should only be considered after all avoidance and mitigation options have been considered. The State government has an Environmental Offset Register with details of all environmental offset agreements negotiated by different agencies under different legislation.

10.7.1.2 Commonwealth

The Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) can also require the consideration of environmental offsets as part of approvals and have also prepared a number of guidance documents relevant to the use of offsets under the EPBC Act.

The Australian Government defines environmental offsets as “measures that compensate for the residual adverse impacts of an action on the environment” (DEWHA, 2012).

In the ERMP, Cameco has described the proposals designed to avoid and minimise the impact of the development of the Project on the environment. Through the application of the environmental management plans presented with the ERMP, Cameco believes the Project can be implemented with a minimal and acceptable level of environmental impact.

10.7.2 Proposed Offsets

During the exploration programme leading up to the preparation of the ERMP, Cameco has worked with the DPaW on a number of small initiatives in relation to the management of the Karlamily National Park. This has included the erection of signage, grading of tracks and reporting and repairing hazards. More recently Cameco has also been part of an industry initiative that has evolved into a broad group of land managers looking at the potential to implement a landscape scale fire management programme to create a mosaic of fire ages that would favour conservation significant fauna species in the East Pilbara region.

Cameco has also undertaken fauna monitoring programmes which if continued have the potential to add value to the programmes undertaken by DPaW and others in the Pilbara region.