Report and recommendations of the Environmental Protection Authority

Extension to the Wiluna Uranium Project

Toro Energy Limited

Report 1580
September 2016
### Public Environmental Review

#### Environmental Impact Assessment Process Timelines

<table>
<thead>
<tr>
<th>Date</th>
<th>Progress stages</th>
<th>Time (weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/04/2014</td>
<td>Level of assessment set</td>
<td></td>
</tr>
<tr>
<td>13/02/2015</td>
<td>Final Environmental Scoping Document (ESD) approved</td>
<td>45</td>
</tr>
<tr>
<td>16/11/2015</td>
<td>Public Environmental Review (PER) document released for public review</td>
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</tr>
<tr>
<td>8/02/2016</td>
<td>Public review period for PER document closed</td>
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</tr>
<tr>
<td>1/07/2016</td>
<td>Final proponent Response To Submissions report received</td>
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</tr>
<tr>
<td>21/07/2016</td>
<td>EPA meeting</td>
<td>3</td>
</tr>
<tr>
<td>1/09/2016</td>
<td>EPA report provided to the Minister for Environment</td>
<td>5</td>
</tr>
<tr>
<td>6/09/2016</td>
<td>Publication of EPA report (three working days after report provided to the Minister)</td>
<td>3 days</td>
</tr>
<tr>
<td>20/09/2016</td>
<td>Close of appeals period</td>
<td>2</td>
</tr>
</tbody>
</table>

Timelines for an assessment may vary according to the complexity of the project and are usually agreed with the proponent soon after the level of assessment is determined.

In this case, the Environmental Protection Authority met its timeline objective in the completion of the assessment and provision of a report to the Minister.

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Dr Tom Hatton  
Chairman  
1 September 2016

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8. Summary of Submissions & Proponent’s Response to Submissions
Summary and recommendations

This report provides advice and recommendations to the Minister for Environment on the Environmental Protection Authority’s environmental impact assessment of a proposal by Toro Energy Limited (Toro).

Toro proposes to extend its Wiluna Uranium Project (Approved Project), which was assessed by the EPA in May 2012 and approved for implementation subject to conditions. Toro subsequently acquired the neighbouring Millipede and Lake Maitland deposits, located 30 kilometres (km) south and 105 km south-east of Wiluna respectively. It proposes to develop the two deposits and associated infrastructure (Proposed Extension).

The Proposed Extension would result in the additional direct disturbance of approximately 1,582 hectares (ha) within an additional development envelope of approximately 3,891 ha. It would include open mine pits at Millipede and Lake Maitland, an in-pit tailings storage facility (TSF) at Millipede, an accommodation village, workshop, and run-of-mine (ROM) ore pad, and associated infrastructure. It would also include the construction of a haul road between Lake Maitland and the processing plant.

In undertaking this assessment, the EPA has assessed the impacts of the Proposed Extension in the context of the Approved Project, considering the cumulative impacts of the entire Revised Proposal where appropriate.

Background and context

The Environmental Protection Act 1986 (EP Act) requires that the EPA’s report on the outcome of its assessment sets out key environmental factors as well as the EPA’s recommendations as to whether or not the proposal may be implemented and, if so, the conditions and procedures that should apply. The EPA may also include any other information, advice and recommendations that it deems fit.

The proposed extension to the Wiluna Project was determined to be a controlled action under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) on 20 February 2015 as it may impact on the following Matters of National Environmental Significance (MNES):

- Listed threatened species and communities (section 18 & 18A); and
- Nuclear actions (section 21 & 22A).

Toro referred the extension proposal for assessment in February 2014. It is being assessed under the bilateral assessment agreement between the Commonwealth and Western Australian governments. It was advertised for a seven-day public comment period and the level of assessment was set at the highest possible level – a Public Environmental Review (PER), with a 12-week public review period. The Environmental Scoping Document (ESD) was approved by the EPA in February 2015. The PER was released for public
review on 16 November 2015, attracting eight agency, three non-government organisations (NGO), 59 individual and 2,392 pro forma submissions.

Public submissions
Key issues raised in the public submissions included:

- potential impacts to subterranean fauna and associated priority ecological communities (PECs);
- potential impacts on Priority Flora in the genus *Tecticornia*;
- potential radiological impacts to human health;
- concerns about radiological impacts to non-human biota;
- the transport of uranium and the potential for spillage;
- the potential for surface water and groundwater contamination;
- the potential for floods to spread radioactive materials;
- concerns about dealing with tailings and long term closure success;
- concerns relating to the release of solutes from the TSFs;
- the cumulative environmental impacts of uranium projects;
- concerns over the potential impacts to heritage sites; and
- the application of the *Precautionary Principle*.

In assessing the proposal and considering the response to submissions, the EPA noted that the proponent had committed to avoid, minimise, and rehabilitate associated environmental impacts. The EPA’s complex assessment included extensive public consultation, a site visit and careful review of the potential impact on key environmental factors.

Key environmental factors
The EPA’s assessment identified the following seven key environmental factors:

- **Flora and Vegetation** – direct impacts from the clearing of flora and vegetation and potential indirect impacts on vegetation from groundwater drawdown, dust and radiation;
- **Subterranean Fauna** – potential impacts from loss of habitat due to excavation of mine pits and dewatering;
- **Hydrological Processes and Inland Waters Environmental Quality** – potential impacts from groundwater drawdown and surplus water reinjection, changes to surface flow regimes, and to groundwater and surface water quality from operations and seepage;
- **Human Health** – potential impacts to health from an increase in exposure to radiation for employees and the public at nearby sensitive receptors and along the transport route;
• **Heritage** – potential impacts to Aboriginal heritage related to the physical and biological aspects of the environment;

• **Rehabilitation and Decommissioning** (integrating factor) – potential long-term impacts if rehabilitation and closure of the TSFs are unsuccessful, and potential long-term impacts to aquifer water quality from seepage from the TSFs; and

• **Offsets** (integrating factor) – to counterbalance the significant residual impacts to flora and vegetation and subterranean fauna habitat.

**Assessment and Conclusion**

All seven factors assessed in this report were likely to meet the EPA’s environmental objectives for each factor.

**Flora and Vegetation**

The EPA notes that the proponent has addressed the policy and guidance relevant for this factor, avoiding and minimising impacts through proposal design, and flora and vegetation management measures. It considers that the impacts are acceptable and that the proposal can be managed to meet the EPA’s objective for this factor provided conditions are imposed. These include implementing 50 m flora exclusion zones around the locations of conservation-significant flora and vegetation. A further condition would counterbalance the significant residual impact of the loss of up to 1,333.2 ha of *Tecticornia*-dominated vegetation.

**Subterranean Fauna**

The EPA notes that the proponent has addressed the policy and guidance relevant for this factor. It considers that the impacts to Subterranean Fauna are acceptable and the proposal can be managed to meet the EPA’s objectives for Subterranean Fauna provided conditions are imposed. These include preparation and implementation of a Subterranean Fauna Management Plan and a Groundwater Drawdown Management and Monitoring Plan (GDMMP), including the development of groundwater-drawdown trigger levels and contingency measures in case the barrier system does not fully control groundwater drawdown. Further conditions would restrict ground disturbance and groundwater drawdown within an exclusion area. An offset condition would also counterbalance the significant residual impact of the loss of potential habitat.

**Hydrological Processes and Inland Waters Environmental Quality**

The EPA considers that impacts to these factors are acceptable and that the proposed extension can be managed to meet the EPA’s objectives provided conditions are imposed. These include the implementation of a GDMMP with trigger levels for drawdown and a barrier system to control drawdown so that the trigger levels are not exceeded. Further conditions would include the implementation of a Surface Water Management Plan to prevent surface water contamination, and limits to mounding of groundwater from reinjection to less than one metre.
**Human Health**

The EPA notes that the proponent has addressed the policy and guidance considered relevant for this factor in the PER document. The nearest permanent residence to Millipede is Lake Way Station, approximately 15 km to the south-east. The Proposed Extension does not increase exposures above those estimated for the Approved Project.

The proponent estimated doses to members of the public from gamma radiation and found these would be within regulatory limits. The EPA notes that potential for public exposure from gamma radiation during the transport of uranium oxide concentrate (UOC) was previously evaluated for the Approved Project.

The EPA also notes that radiation doses to process planta and other workers would be well within regulatory dose limits and would not increase on an annual basis. The proponent demonstrated through the ‘as low as reasonably achievable’ approach that ‘best practice’ design optimisation, operational procedures and monitoring to control exposure to hazardous pollutants to the maximum extent achievable, would be implemented.

The EPA concludes that the Department of Mines and Petroleum (DMP) and the Radiological Council could regulate any potential impacts to human health. These two key agencies are satisfied with the details provided in the PER and the proponent’s response to submissions. The EPA recommends that the DMP should require updates of post-closure doses to the public (including from bush tucker) using dust deposition data in the mine closure plan, to be made publically available.

**Heritage**

The EPA considers that the proposal can be managed to meet its objective for Heritage provided a condition is imposed, that requires the implementation of a Cultural Heritage Management Plan to avoid and minimise impacts to sites and Aboriginal heritage in consultation with the Traditional Owners.

**Rehabilitation and Decommissioning**

The EPA considers that the proposal can be managed to meet its objective for Rehabilitation and Decommissioning provided that a Mine Closure Plan (MCP) is prepared and implemented. The EPA notes that an MCP prepared in accordance with the *Guidelines for preparing mine closure plans* is a statutory obligation (not a discretionary decision) under the *Mining Act 1978* and a joint document prepared by the DMP and EPA to meet both Mining Act and EP Act regulatory requirements. The DMP has confirmed that it would require a MCP as a condition of the Mining Lease under section 74 of the Mining Act. The EPA’s view is that the requirements of the condition for this proposal can be adequately regulated through the Mining Act, rather than a condition under Part IV of the EP Act.

**Offsets**

The EPA considers that the impacts to Flora and Vegetation are acceptable and the Proposed Extension can be managed to meet the EPA’s objective for
Flora and Vegetation and Offsets provided that an offset condition is imposed to counterbalance the significant residual impact on *Tecticornia*-dominated vegetation. It considers that the impacts to Subterranean Fauna are acceptable and the proposal can be managed to meet the EPA’s objective for Subterranean Fauna and Offsets provided that an offset condition is imposed to counterbalance the significant residual impact on the Hinkler Well calcrete PEC and the Barwidgee calcrete PEC.

**Recommendations**

In its assessment of this proposal, the EPA has reviewed the implementation conditions for the Approved Project and recommends revised implementation conditions be imposed should the Minister determine that the extension to the Wiluna Uranium Project may be implemented.

The EPA recommends that the Minister for Environment notes:

- that the proposal assessed is a Revised Proposal being a Proposed Extension to the Approved Wiluna Uranium Project by the development and mining of the Millipede and Lake Maitland uranium deposits and construction of associated infrastructure;
- that in undertaking this assessment, the EPA has assessed the impacts of the Proposed Extension in the context of the Approved Project, considering the cumulative impacts of the entire Revised Proposal where appropriate;
- the report on the key environmental factors of Flora and Vegetation, Subterranean Fauna, Hydrological Processes/Inland Waters Environmental Quality, Human Health, Heritage, Rehabilitation and Decommissioning (integrating factor) and Offset (integrating factor) identified by the EPA in the course of its assessment set out in Section 3; and
- the EPA has concluded that the Revised Proposal may be implemented provided this is in accordance with the recommended conditions and procedures set out in Appendix 7 and summarised in Section 5.
1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment (Minister) on the outcomes of the EPA’s environmental impact assessment for the proposed extension to the Wiluna Uranium Project. Toro Energy Limited (Toro) was nominated as the proponent responsible for the proposal.

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires that the EPA prepare a report on the outcome of its assessment of a proposal and provide this assessment report to the Minister. The report must set out:

- what the EPA considers to be the key environmental factors identified in the course of the assessment; and
- the EPA’s recommendations as to whether or not the proposal may be implemented and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation of the proposal should be subject.

The EPA may also include any other information, advice and recommendations in the assessment report as it thinks fit.

The aims of environmental impact assessment and the principles of environmental impact assessment considered by the EPA in its assessment of this proposal are set out in the *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2012*.

The Proposed Extension to the Wiluna Uranium Project (Approved Project) was referred to the EPA in February 2014. The proposal was advertised for the seven-day public comment period and the level of assessment was set as Public Environmental Review (PER), with a 12-week public review period and a proponent-prepared Environmental Scoping Document (ESD) (Toro 2015a). It was approved by the EPA on 13 February 2015.

It was determined to be a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 20 February 2015 as it may impact on the following Matters of National Environmental Significance (MNES):

- Listed threatened species and communities (section 18 & 18A); and
- Nuclear actions (section 21 & 22A).

The Proposed Extension is being assessed under the Bilateral Agreement relating to assessment between the Commonwealth and Western Australian governments.

The PER document was released for public review from 16 November 2015 to 8 February 2016. A total of eight agency, three non-governmental organisations, 59 individual and 2,392 pro forma submissions were received.
Appendix 8 contains a summary of submissions from the public review period and the proponent's response to submissions (on CD at the back of this report and at www.epa.wa.gov.au). It is included for information only and does not form part of the EPA's report and recommendations. Relevant significant environmental issues identified from this process have been taken into account by the EPA during its assessment of the proposal.

This report provides the EPA advice and recommendations in accordance with section 44 of the EP Act.
2. The proposal

2.1 Proposal summary

The Wiluna Uranium Project (Approved Project) is located approximately 30 km south and 15 km south-east of Wiluna.

It was assessed by the EPA in Report 1437, dated May 2012. The Minister approved its implementation subject to the conditions set out in Ministerial Statement 913 (Statement 913).

Since the publication of Statement 913, Toro has acquired two neighbouring deposits, Millipede and Lake Maitland, located 30 km south and 105 km south-east of Wiluna respectively (location shown in Figure 1).

Toro proposes to revise the Approved Project by developing the Millipede and Lake Maitland deposits and developing associated infrastructure (Proposed Extension) (Figure 2).

The Proposed Extension would result in the additional direct disturbance of approximately 1,582 hectares (ha) within an additional Development Envelope of approximately 3,891 ha.

The Proposed Extension would include open mine pits at Millipede and Lake Maitland, in-pit tailings storage facility (TSF) at Millipede, accommodation village, workshop, run-of-mine (ROM) ore pad and associated infrastructure (Figures 3 and 4). The Proposed Extension would also include the construction of a haul road between Lake Maitland and the processing plant which forms part of the Approved Project (Figure 5).

The Development Envelopes and conceptual layout for the Millipede and Lake Maitland deposits is provided in Figures 3 and 4.

Open-pit mining would be undertaken to a depth of approximately 15 m using a surface miner. Uranium ore would be processed through the same processing facility that was evaluated as part of the Approved Project (Figure 3). Finished ore product would be packaged at the processing plant in drums which would be weighed, labelled, sealed, stacked and braced in sea containers.

Up to five containers per month would be transported by road on the Goldfields Highway to Kalgoorlie and the Eyre Highway to South Australia for shipment from Port Adelaide or railed from there to the Port of Darwin for shipment. The transport component has previously been evaluated for the Approved Project.

Tailings and waste from mining at both Millipede and Lake Maitland would be stored in the mined-out Millipede and Centipede pit voids. The TSFs would use engineered containment systems, which include a low permeability base and cover system to limit water influx. No tailings or mineralised wastes would be placed in the Lake Maitland pit voids.
Progressive rehabilitation would occur during mining with land re-contoured to blend with local terrain and revegetated using local provenance species. All above-ground buildings and structures would be removed and any mining landforms developed would be shaped and contoured to blend in with the surrounds. Radiation levels in areas where mining has been undertaken would be returned to levels at or below pre-mining levels.

The Proposed Extension would have an operational mine life of approximately 12 years and comprise elements within four distinct Development Envelopes:

- **Millipede Development Envelope**: includes an open-cut mine pit, waste and pre-strip stockpiles, in-pit TSF, ROM pad and associated infrastructure (Figure 3);
- **Lake Maitland Development Envelope**: includes an open-cut mine pit, waste and pre-strip stockpiles, accommodation village, workshop and associated infrastructure (Figure 4);
- **Southern haul road Development Envelope**: includes haul road and borrow pits and water filling stations (Figure 5); and
- **Lake Maitland borefield Development Envelope**: includes access tracks and borefield as shown in Figure 5.

The main characteristics of the Revised Proposal (the amalgam of the Approved Project and the Proposed Extension) are summarised in Tables 1 and 2 below, consistent with Environmental Assessment Guideline (EAG) No. 1 *Defining the Key Characteristics of a Proposal*. A detailed description of the proposal is provided in Section 6 of the PER document (Toro 2015b).

In undertaking this assessment, the EPA has assessed the impacts of the Proposed Extension in the context of the Approved Project, considering the cumulative impacts of the entire Revised Proposal where appropriate.

**Table 1: Summary of the Revised Proposal**

<table>
<thead>
<tr>
<th>Revised Proposal Title</th>
<th>Revised Wiluna Uranium Proposal</th>
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<tr>
<td><strong>Short Description</strong></td>
<td>The proposal is to construct and operate a uranium mine consisting of four deposits: Centipede, Millipede, Lake Way and Lake Maitland. The proposal includes the construction and operation of a processing plant, roads, power and water source and supply facilities, in pit tailings storage facilities (TSF), accommodation and other associated infrastructure.</td>
</tr>
</tbody>
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Table 2: The key elements of the Revised Proposal

<table>
<thead>
<tr>
<th>Element</th>
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<tbody>
<tr>
<td>Lake Way open cut mine pit and associated infrastructure.</td>
</tr>
<tr>
<td>Centipede open cut mine pit and associated infrastructure.</td>
</tr>
<tr>
<td>Infrastructure (processing plant, West Creek borefield, water pipelines, haul and access roads, accommodation village).</td>
</tr>
<tr>
<td>Millipede open cut mine pit and associated infrastructure.</td>
</tr>
<tr>
<td>Lake Maitland open cut mine pit and associated infrastructure.</td>
</tr>
<tr>
<td>Lake Maitland borefield</td>
</tr>
<tr>
<td>Southern haul road, borrow pits and water filling stations.</td>
</tr>
<tr>
<td>In pit tailings disposal.</td>
</tr>
<tr>
<td>Mine dewatering at Lake Way.</td>
</tr>
<tr>
<td>Mine dewatering at Centipede/Millipede.</td>
</tr>
<tr>
<td>Mine dewatering at Lake Maitland</td>
</tr>
<tr>
<td>Lake Maitland Water reinjection</td>
</tr>
<tr>
<td>Location</td>
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<td>Figure 2</td>
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<tr>
<td>Figure 2</td>
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<tr>
<td>Figures 2 &amp; 3</td>
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<tr>
<td>Figures 2 &amp; 3</td>
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<tr>
<td>Figure 4</td>
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<td>Figures 2 &amp; 5</td>
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<td>Figure 3</td>
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<table>
<thead>
<tr>
<th>Authorised Extent</th>
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<tbody>
<tr>
<td>Clearing of no more than 704 ha of native vegetation within a Development Envelope of 733 ha.</td>
</tr>
<tr>
<td>Clearing of no more than 580 ha of native vegetation within a Development Envelope of 580 ha.</td>
</tr>
<tr>
<td>Clearing of no more than 246 ha of native vegetation within a Development Envelope of 444 ha.</td>
</tr>
<tr>
<td>Clearing of no more than 537.9 ha of native vegetation within the Millipede Development Envelope of 739 ha.</td>
</tr>
<tr>
<td>Clearing of no more than 776.4 of native vegetation within the Lake Maitland Development Envelope of 2,824 ha.</td>
</tr>
<tr>
<td>Clearing of no more than 23.6 ha of native vegetation with a Development Envelope of 23.6 ha.</td>
</tr>
<tr>
<td>Clearing of no more than 243.9 ha of native vegetation within of the Southern Haul Road Development Envelope 327.8 ha.</td>
</tr>
<tr>
<td>Disposal of no more than 2.1 million tonnes per annum (Mtpa) of tailings into engineered containment facilities within the Millipede and Centipede pit voids.</td>
</tr>
<tr>
<td>Dewatering of no more than 1.3 Gigalitres per annum (GL/a).</td>
</tr>
<tr>
<td>Dewatering of no more than 2 GL/a.</td>
</tr>
<tr>
<td>Dewatering of no more than 4 GL/a.</td>
</tr>
<tr>
<td>Downstream aquifer reinjection of excess water from pit dewatering.</td>
</tr>
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</table>
Figure 1: Proposal Location
Figure 2: The Revised Proposal (Approved Project and Extension Proposal) Area
Figure 3: Millipede Development Envelope and Conceptual Layout
Figure 4: Lake Maitland Development Envelope and Conceptual Layout
Figure 5: Southern Haul Road Development Envelope and Borefield Development Envelope

<table>
<thead>
<tr>
<th>Wiluna Uranium Project - Southern Haul Road</th>
<th>Area [Hectares]</th>
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<tbody>
<tr>
<td>Road Corridor, Borrow Pits and Water Filling Stations (3)</td>
<td>243.9</td>
</tr>
<tr>
<td>TOTAL AREA TO BE DISTURBED</td>
<td>243.9</td>
</tr>
<tr>
<td>Haul Road Development Envelope</td>
<td>304.2</td>
</tr>
<tr>
<td>Borefield Development Envelope</td>
<td>23.6</td>
</tr>
<tr>
<td>Development Envelope (Ha)</td>
<td>327.8</td>
</tr>
</tbody>
</table>

Millipede Uranium Project

Haul road

Referred Project Area

Lake Maitland Uranium Project
2.2 Consultation

Eight agency submissions, three non-government organisation submissions, 59 public submissions, and 2,392 pro forma submissions were received during the public review period. The key issues raised relate to:

- potential impacts to subterranean fauna and associated priority ecological communities (PECs);
- potential impacts on Priority Flora in the genus Tecticornia;
- potential radiological impacts to human health;
- concerns about radiological impacts to non-human biota;
- the transport of uranium and the potential for spillage;
- the potential for surface water and groundwater contamination;
- the potential for floods to spread radioactive materials;
- concerns about dealing with tailings and long term closure success;
- concerns relating to the release of solutes from the TSFs;
- the cumulative environmental impacts of uranium projects;
- concerns over the potential impacts to heritage sites; and
- the application of the Precautionary Principle.

The issues raised were addressed by the proponent in the final Response to Submissions document that was received by the EPA on 1 July 2016 (Toro 2016a, Appendix 8).

In assessing this proposal and considering the submissions, the EPA notes that the proponent has committed to avoid, minimise, and rehabilitate environmental impacts associated with the proposal by:

- avoiding unnecessary clearing and minimising habitat loss;
- using barriers around the mine pit walls to retard the ingress of water and thus reduce as much as possible the area of groundwater drawdown;
- avoiding additional ground disturbance by using mined-out pits as TSFs;
- minimising erosion of tailings and radon emissions by storing tailings below ground;
- avoiding unnecessary radiation exposure by implementing ‘as low as reasonably achievable’ (ALARA) radiation management measures;
- using dust suppression and control mechanisms designed to meet best practicable technology standards; and
- rehabilitating the site by demolishing and removing equipment and implementing a Mine Closure Plan (MCP) that includes rehabilitation objectives and completion criteria developed in consultation with key stakeholders.
2.3 Regional context

The Proposed Extension is located in the Murchison bioregion and in the Eastern Murchison subregion. Land use in the area surrounding the proposed site is typical for the Northern Goldfields area and consists predominantly of mining activities (including operational and closed sites), pastoral stations and conservation reserves.

The nearest mine site to Millipede is the closed Williamson pit (part of the Wiluna gold mine) located approximately five kilometres to the north within the lake playa and there are several other mine sites within a 20 km radius. The nearest mine site to Lake Maitland is the Bronzewing gold mine, approximately 20 km to the south-west.

The EPA notes that the cumulative impact of the Revised Proposal (the Approved Project as amended by the Proposed Extension) to the land systems intersected by the Revised Proposal are all less than 0.1 per cent, with the exception of the Darlo (0.5 per cent), Carnegie (0.2 per cent) and Mileura (0.1 per cent) land systems (Toro 2015b). Noting these percentages, the EPA considers that the contribution to regional cumulative impact from the proposal, should it be implemented, would not be significant.

3. Key environmental factors

In undertaking its assessment of the Proposed Extension and preparing its report and recommendations, the EPA has had regard to the object and principles contained in s4A of the EP Act to the extent relevant to the particular matter being considered. Appendix 3 provides a summary of the principles and how the EPA applied the relevant principles in its assessment.

The EPA notes that the principles under s4A relate to all parts of the EP Act and therefore some of the principles are more applicable to parts of the EP Act other than Part IV.

In undertaking its assessment the EPA has considered the cumulative impacts of the Proposed Extension and the Approved Project.

Having regard to:

- the proponent’s PER document;
- public and agency comments on the PER document;
- the proponent’s response to submissions;
- the EPA’s own enquiries;
- EAG No. 8 Environmental Principles, Factors and Objectives (EPA, 2015a); and
- EAG No. 9 Application of a Significance Framework in the Environmental Impact Assessment Process (EPA, 2015b),
the EPA identified the following key environmental factors during the course of its assessment:

1. **Flora and Vegetation** – direct impacts from the clearing of flora and vegetation and potential indirect impacts on vegetation from groundwater drawdown, dust and radiation;

2. **Subterranean Fauna** – potential impacts from loss of habitat due to excavation of mine pits and dewatering;

3. **Hydrological Processes and Inland Waters Environmental Quality** – potential impacts from groundwater drawdown and surplus water reinjection, changes to surface flow regimes, and to groundwater and surface water quality from operations and seepage;

4. **Human Health** – potential impacts to health from an increase in exposure to radiation for employees and the public at nearby sensitive receptors and along the transport route;

5. **Heritage** – potential impacts to Aboriginal heritage related to the physical and biological aspects of the environment;

6. **Rehabilitation and Decommissioning** (integrating factor) – potential long-term impacts if rehabilitation and closure of the TSFs are unsuccessful, and potential long-term impacts to aquifer water quality from seepage from the TSFs; and

7. **Offsets** (integrating factor) – to counterbalance the significant residual impacts to flora and vegetation and subterranean fauna habitat.

The factors of Hydrological Processes and Inland Waters Environmental Quality have been integrated in this report due to their close interdependence for this assessment.

Other environmental factors relevant to the proposal which the EPA determined not to be key environmental factors are discussed in the proponent’s PER document (Toro 2015b).

Appendix 3 contains the environmental factors identified through the course of the assessment and the EPA’s evaluation of whether an environmental factor is a key environmental factor for the proposal. This includes environmental factors that were identified as preliminary key environmental factors at the stage of setting the level of assessment, which were included in the ESD and addressed in the PER.

The EPA’s assessment of the Proposed Extension’s impacts on the key environmental factors is provided in Sections 3.1 – 3.7. These sections outline the EPA’s conclusions as to whether or not the Proposed Extension can be managed to meet the EPA’s objective for a particular factor and, if so, the recommended conditions and procedures that should apply if the proposal is implemented.
In assessing the Proposed Extension, the EPA has also considered relevant published EPA policies and guidelines. Appendix 4 lists the relevant policies and guidance documents relevant for each of the key environmental factors for this assessment and identifies the relevant matters discussed in, and principles derived from, each policy and guidance document. The EPA has discussed the application of the relevant policy and guidance for each factor in Section 3.

A number of policies referred to in the ESD were withdrawn, revoked or replaced during the assessment process. These are:

- Position Statement No.6 (PS 6) *Towards Sustainability* (EPA 2004);
- Position Statement No.8 (PS 8) *Environmental Protection in Natural Resource Management* (EPA 2005); and
- *Guidelines for preparing mine closure plans* (Department of Mines and Petroleum (DMP) & EPA 2011).

The EPA notes that the following policy and guidance relating to the key environmental factors replaced or amended guidance since the ESD was released:

- Environmental Assessment Guideline (EAG) No. 8 *Environmental Principles, Factors and Objectives* (EPA 2015a);
- EAG No. 9 *Application of a Significance Framework in the Environmental Impact Assessment Process* (EPA 2015b);
- EAG No. 17 *Preparation of Management Plans under Part IV of the Environmental Protection Act 1986* (EPA 2015c);
- EAG No. 11 – *Recommending Environmental Conditions* (EPA 2015d);
- Environmental Protection Bulletin No. 19 – *EPA involvement in mine closure* (EPA 2015e);
- Environmental Protection Bulletin No. 24 – *Greenhouse Gas Emissions and Consideration of Projected Climate Change Impacts in the EIA Process* (EPA 2015f);
- Technical Guide – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2015g); and

The proponent addressed the current policy and guidance in its public environmental review (PER) document and the EPA considered the above current policy and guidance in its assessment.

The EPA notes that other published policies and guidelines were also considered.

As the EPA is assessing the Proposed Extension on behalf of the Commonwealth Government as a controlled action under Section 45 of the EPBC Act, this report also addresses Matters of National Environmental Significance (MNES) in Section 4. As a bilateral assessment, Commonwealth
policy and guidance also applies. Appendix 4 outlines the survey guidelines, conservation advice, species-specific recovery plans, and threat abatement plans for species listed under the EPBC Act that are relevant for this assessment, consistent with the requirements of the ESD for the Proposed Extension (see also Section 4 MNES). In assessing this proposal, the EPA had regard to the relevant Commonwealth guidelines, policies and plans relating to this proposal.

The EPA has also considered how the proponent has applied the mitigation hierarchy (avoid, minimise, rehabilitate and offset) to the Proposed Extension. The extent to which the proponent has applied the mitigation hierarchy for the key environmental factors for the Proposed Extension is reflected in the recommended environmental conditions for the proposal.

3.1 Flora and Vegetation

EPA objective

The EPA’s environmental objective for this factor is to maintain representation, diversity, viability and ecological function at the species, population and community level.

Relevant EPA policy and guidance

The EPA policy and guidance applicable to Flora and Vegetation for this assessment and relevant matters discussed in the policy and guidance are outlined in Appendix 4. The EPA considers that the following policy and guidance is relevant to its assessment of the proposal in relation to this factor:

- Position Statement No. 2 (PS 2) – Environmental Protection of Native Vegetation in Western Australia (EPA 2000);
- Position Statement No. 3 (PS 3) – Terrestrial Biological Surveys as an element of Biodiversity Protection (EPA 2002);
- Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2015); and

EPA assessment

The Proposed Extension has the potential to directly impact flora and vegetation through the clearing of up to 537.9 ha of native vegetation within the 739 ha Millipede Development Envelope and clearing of up to 776.4 ha within the 2,824 ha Lake Maitland Development Envelope. Clearing of up to 267.5 ha within the 328 ha Southern Haul Road and Borefield Development Envelopes would also be required.
The direct impacts from clearing could include the loss of conservation-significant flora species, vegetation units, habitat and disruption to ecosystem function. Indirect impacts could also potentially result from the lowering of groundwater levels, dust deposition, radiation (potential uptake of radionuclides or other contaminants from dust and groundwater), altered fire patterns, the spread of weeds and feral animals.

A number of surveys of flora and vegetation at Lake Way and Lake Maitland were undertaken between 2007 and 2015.

The EPA notes that the proponent has considered in its PER the policy and guidance relevant for this factor. The EPA considers that the flora and vegetation surveys have been carried out consistent with GS 51 and the Technical Guide. The proponent conducted extra surveys beyond GS 51 requirements, but there is still some uncertainty regarding the identification of *Tecticornia* taxa.

**Flora**

Surveys identified the following significant taxa that would be impacted by the clearing required for the Proposed Extension at:

**Millipede**
- *Eremophila arachnoides* subsp. *arachnoides* (Priority 3),
- *Tecticornia aff. halocnemoides* s. l. 'large ovate seed aggregate' (new species); and
- *Tecticornia sp. aff. Burnerbinmah* 'inflated fruit' (new species).

**Lake Maitland**
- *Tecticornia cymbiformis* (Priority 3); and
- *Tecticornia aff. halocnemoides* s. l. 'large ovate seed aggregate' (new species).

**Southern Haul Road**
- *Tecticornia cymbiformis* (Priority 3); and
- *Eremophila pungens* (Priority 4).

The EPA noted that, in its assessment of the Approved Project (EPA 2012), it was considered that *Tecticornia* taxa at this location may be groundwater dependent.

To provide greater clarity on whether *Tecticornia* taxa are likely to be subjected to indirect impacts from groundwater drawdown, the proponent provided further information in its Response to Submissions, which indicates that *Tecticornia* taxa are unlikely to be groundwater dependant. The Department of Parks and Wildlife in its advice also noted that the genus at this location may not be groundwater dependent.
At the EPA’s request, the proponent commissioned a peer review of the flora and vegetation studies. The peer review supported the view that *Tecticornia* taxa are unlikely to be groundwater dependent (Actis Environmental 2016). The review noted in particular that *Tecticornia* taxa were not found to be directly dependent on groundwater but rather they utilise the vadose zone between groundwater and the surface (Actis Environmental Services 2016). The EPA considers that the evidence presented indicates that *Tecticornia* taxa are not groundwater dependent.

A total of three Priority Flora species and two new flora taxa would be impacted by the implementation of the Proposed Extension. The direct impacts of the Proposed Extension and the Revised Proposal on known individuals of these species from clearing without any mitigation are outlined in Table 3 below.

**Table 3: Direct impacts on conservation-significant flora species**

<table>
<thead>
<tr>
<th>Species</th>
<th>Total known Individuals within local Study Area</th>
<th>Approved Project</th>
<th>Proposed Extension</th>
<th>Revised Proposal (loss of individuals within local Study Area) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Tecticornia</em> sp. aff. Burnerbinmah ‘inflated fruit’ (new species)</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>100%</td>
</tr>
<tr>
<td><em>Tecticornia</em> aff. halocnemoides s. l. 'large ovate seed aggregate' (new species)</td>
<td>12</td>
<td>-</td>
<td>3</td>
<td>25%</td>
</tr>
<tr>
<td><em>Tecticornia cymbiformis</em> (P3)</td>
<td>5,578</td>
<td>-</td>
<td>60</td>
<td>1.1%</td>
</tr>
<tr>
<td><em>Eremophila arachnoides</em> subsp. arachnoides (P3)</td>
<td>32,966</td>
<td>344</td>
<td>5,440</td>
<td>17.5%</td>
</tr>
<tr>
<td><em>Eremophila pungens</em> (P4)</td>
<td>2,302</td>
<td>-</td>
<td>608</td>
<td>26.4%*</td>
</tr>
</tbody>
</table>

*Indirect impacts from dust could potentially affect another 10.9%*

**Tecticornia** sp. aff. *Burnerbinmah* (inflated fruit) (new species)

This taxon was recorded from a single collection in Abercrombie Creek, which drains into Lake Way adjacent to the Centipede and Millipede deposits. The habitat specificity of this taxon is unknown. The proponent has committed to avoiding the location of this collection until additional survey work is undertaken. The EPA notes that the peer review states that targeted surveys of similar tributaries around Lake Way may detect additional populations of this taxon (Actis Environmental 2016).

The EPA supports a requirement that prevents ground disturbance within a 50 m buffer around the location of this collection (Figure 6), until such time as further survey work identifies further populations outside impact areas.
*Tecticornia* sp. aff. *halocnemoides* s.l. 'large ovate seed aggregate' (new species)

Specimens were recorded on the edge of the main lake bed at Lake Way and Lake Maitland, and at Abercrombie Creek which drains into Lake Way adjacent to the Centipede and Millipede deposits, and the chain of salt pans extending to the south of Lake Maitland. The species complex is not restricted to any specific landform or salt lake zonation and additional suitable habitat is likely to exist outside the impact areas.

Of the 12 specimens collected, the locations of three would be directly impacted by the proposal. This is unlikely to result in a significant impact on the total population, as the taxon is recorded from several locations across Lake Maitland and Lake Way, and is not considered restricted to any specific landform or salt lake zonation, with additional suitable habitat likely to exist outside the impact areas.

The EPA notes that the peer review found that there is a high likelihood of additional habitat for this taxon outside the Development Envelope (Actis Environmental 2016). However, the EPA considers that given the low numbers recorded and taxonomic uncertainty, a requirement that prevents ground disturbance within a 50 m buffer around the collections at Lake Way shown in Figure 6, would provide greater certainty of the continued viability of the taxon until such time as further survey work identifies further populations outside impact areas.

*Tecticornia cymbiformis* (P3)

This species may be locally restricted to the western edge of the main lake bed at Lake Maitland and at one small salt pan to the west of Lake Maitland. The EPA notes that the peer review found that there is a low likelihood of finding additional habitat for this species outside the proposal area (Actis Environmental 2016), however the EPA considers that the estimated 1.1 per cent impact on this species does not represent a significant risk to this species.

*Eremophila arachnoides* subsp. *arachnoides* (P3)

This subspecies is widespread locally and regionally across the Murchison and Little Sandy Desert regions. The high percentage of impact on this subspecies is likely to be due to the intensive survey effort focused within the Development Envelope. Given that the subspecies has been found locally and regionally across a large area (for example an additional 43,255 plants were found within Yeelirrie Study Area), the EPA considers that implementation of the Proposed Extension is unlikely to have a significant impact on this subspecies.

*Eremophila pungens* (P4)

This species occurs within the Southern Haul Road Development Envelope, and appears to be locally and regionally common across the Gascoyne and Murchison regions. The direct impact is 26.4 per cent of the population in the local Study Area. Indirect impacts from dust could potentially affect an
additional 10.9 per cent of the extent of this population, bringing the cumulative impact to 37.3 per cent.

The EPA notes that dust emissions would be managed through the implementation of best practice dust suppression measures and that impacts associated with dust on flora and vegetation from the implementation of the Proposed Extension on flora and vegetation are likely to be low.

Therefore the EPA considers that the level of impact on this species is unlikely to be significant.

Vegetation

At a vegetation association level, it is noted that impacts will occur to a number of vegetation communities, but this impact would meet the requirement from PS 2 (EPA 2000) where remnant vegetation should not be cleared to less than 30 per cent of their pre-clearing populations. Cumulative direct impacts (clearing) and indirect impacts associated with groundwater drawdown will also meet the requirements of PS 2. The four vegetation units with greater than 30 per cent of their mapped distribution affected by the Proposed Extension are (Toro 2015b):

- **Vegetation unit R**: *Melaleuca xerophila* open tall shrubland, over *Muellerolimon salicorniaceum* sparse low shrubland, over *Eragrostis eriopoda* sparse tussock grassland;
- **Vegetation unit AC**: *Eucalyptus camaldulensis* subsp. *obtusa* sparse low woodland, over *Acacia aptaneura* and *Acacia tetragonophylla* sparse tall shrubland, over *Eremophila longifolia*, *Senna artemisioides* and *Scaevola spinescens* sparse mid shrubland;
- **Vegetation unit CA**: *Acacia aneura/aptaneura* sparse low woodland, over *Acacia burkittii* open tall shrubland, over *Eremophila galeata*, *Eremophila compacta*, *Senna* sp. Meekatharra (E. Bailey 1-26), *Senna artemisioides* and *Sida ectogama* sparse mid shrubland, over *Monachather paradoxus* open tussock grassland; and
- **Vegetation unit CC**: *Acacia pteraneura/macranoeura* isolated low trees, over *Eremophila galeata*, *Senna artemisioides* and *Sida ectogama* sparse mid shrubland, over *Eragrostis eriopoda* and *Monachather paradoxus* open tussock grassland.

The impact on these communities has been outlined in Table 4 below.

The EPA notes that Vegetation Unit R is not considered to be groundwater dependent (and hence subject to direct impacts only) and is associated with small bands of fringing salt lake vegetation at the Millipede, Centipede and Lake Way deposits. However it is likely to be common only in small parts of the local area. The remaining three vegetation units are likely to be well represented in the local area with vegetation units CA and CC being located along the southern haul road and outside the proposed groundwater drawdown area.
Table 4: Direct (clearing) and indirect impacts of the Revised Proposal associated with groundwater drawdown on vegetation units exceeding 30 per cent

<table>
<thead>
<tr>
<th>Vegetation Unit</th>
<th>Mapped Extent (Ha)</th>
<th>Approved Project (Ha)</th>
<th>Proposed Extension (Ha)</th>
<th>Revised Proposal Total (Ha)</th>
<th>Impact (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Direct</td>
<td>Indirect</td>
<td></td>
</tr>
<tr>
<td>R*</td>
<td>404</td>
<td>103.6</td>
<td>21.2</td>
<td>153.1</td>
<td>277.9</td>
</tr>
<tr>
<td>AC</td>
<td>6,969</td>
<td>2.5</td>
<td>-</td>
<td>2,162.4</td>
<td>2,164.9</td>
</tr>
<tr>
<td>CA</td>
<td>34.6</td>
<td>-</td>
<td>3.7</td>
<td>7.1</td>
<td>10.8</td>
</tr>
<tr>
<td>CC</td>
<td>122.2</td>
<td>-</td>
<td>13.7</td>
<td>26.1</td>
<td>39.8</td>
</tr>
</tbody>
</table>

* This vegetation unit is not considered to be groundwater dependent.

Cumulative impacts associated with the implementation of the Revised Proposal on *Tecticornia*-dominated vegetation at Lake Way and Lake Maitland would be 780.5 ha (6.8 per cent) and 552.7 ha (9.6 per cent) respectively giving a total loss of 1,333.2 ha (Ecologia 2016).

**Management**

Consistent with PS 3, the EPA expects proponents to demonstrate in their PERs that reasonable measures will be undertaken to avoid impacts on biodiversity. The proponent has committed to the following management measures to avoid, minimise and manage impacts on flora and vegetation:

- implementation of vegetation clearing procedures during construction and operation including formal land clearing permit and ground disturbance systems to prevent accidental clearing, weed hygiene procedures and dust control measures;
- progressive rehabilitation using local provenance vegetation;
- no unauthorised driving off designated tracks;
- establishment of vegetation monitoring along roads and in areas of high dust deposition to ensure that vegetation health is maintained; and
- development and implementation of a survey and research plan to conserve and improve the scientific knowledge of *Tecticornia* taxa and *Tecticornia*-dominated vegetation.

The EPA supports the preparation and implementation of a Flora and Vegetation Management Plan and the development of a survey and research plan for *Tecticornia* taxa and *Tecticornia*-dominated vegetation units, and considers a requirement for these should be imposed. While it is noted that buffers have been placed around some recorded locations of *Tecticornia* taxa, the Flora and Vegetation Management plan would need to have a suitable focus on the management of indirect impacts to the *Tecticornia* taxa until such time that surveys find them outside the impact area.
Impacts from radiation

The implementation of the Proposed Extension would have the potential to expose flora and vegetation to radiation. The proponent assessed the radiation impacts using the ERICA (Environmental Risk from Ionising Contaminants Assessment) method outlined in the Commonwealth Terms of Reference for this assessment and set out in the Assessment of potential radiation impacts on flora and vegetation using the Environmental Risk from Ionising Contaminants: Assessment and Management (ERICA) tool. The Terms of Reference required that Australia-specific data should be used where available.

The national authority on radiation matters is the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). ARPANSA considers ERICA to be an appropriate tool for undertaking an assessment of radiological impacts to the environment and this is outlined in the recent publication *Radiation Protection of the Environment Guide G-1 November 2015* (ARPANSA 2015). ARPANSA has also published Australian species-specific data that can be used in an ERICA assessment.

A Tier 2 ERICA was undertaken on all flora reference species in the ERICA database to determine the plant types most likely to be affected by radioactive dust. The assessment found that the only plant types that exceeded the default screening rate were lichens and bryophytes. Lichens in particular do not have a well-developed root system, and derive most of their nutrients from dust falling on them. Consequently, they might be expected to receive a higher dose from the fallout of mine and processing dust, than is the case for other organisms. For these plants the default screening rate was exceeded by approximately 1.6 times. However, lichens and bryophytes are extremely radioresistant, with a threshold no-effect dose rate over 10,000 times the default screening rate. Lichens and bryophytes are therefore not considered to be at significant risk from the Proposed Extension (Toro 2015b).

**Summary**

Having particular regard to:

a) relevant EPA policy and guidance pertaining to Flora and Vegetation;

b) technical advice indicating that *Tecticornia* taxa are not directly dependent on groundwater;

c) the proponent’s proposed avoidance, management and minimisation measures for *Tecticornia* taxa;

d) the proponent’s commitment to avoid and implement a 50 m buffer area around the location of the collection of *Tecticornia* sp. aff. *Burnerbinmah* (inflated fruit); and

e) the EPA’s assessment that there remains a significant residual impact resulting from the clearing of 1,333.2 ha of *Tecticornia*-dominated vegetation, which is acceptable and capable of being offset,
the EPA considers that the impacts to Flora and Vegetation are acceptable and
the Revised Proposal can be managed to meet its objectives for Flora and
Vegetation provided that:

- clearing of vegetation is limited to the authorised extent as defined within
  Table 2 of Schedule 1 of the recommended environmental conditions;
- condition 7 is imposed which requires a Flora and Vegetation
  Management Plan;
- condition 8 is imposed which requires the avoidance and implementation
  of a 50 m flora exclusion zone around the locations of Tecticornia aff.
  halocnemoides s. l. 'large ovate seed aggregate' shown in Figure 6
- condition 9 is imposed which requires the avoidance and implementation
  of a 50 m flora exclusion zone around the collection of Tecticornia sp.
  aff. Burnerbinmah (inflated fruit) shown in Figure 6; and
- offset condition 17 is imposed to counterbalance the significant residual
  impact of the loss of up to 1333.2 ha of Tecticornia-dominated
  vegetation. This offset is discussed further in Section 3.7.
Figure 6: *Tecticornia* Exclusion Areas
3.2 Subterranean Fauna

EPA objective

The EPA’s environmental objective for this factor is to maintain the representation, diversity, viability and ecological function at the species, population and assemblage level.

Relevant EPA policy and guidance

The EPA policy and guidance applicable to Subterranean Fauna for this assessment and relevant matters discussed in the policy and guidance are outlined in Appendix 4. The EPA considers that the following policy and guidance is relevant to its assessment of the proposal in relation to this factor:

- Guidance Statement No. 54a (GS 54a) – *Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia*, (EPA 2007); and
- EAG No. 12 – *Consideration of Subterranean Fauna in Environmental Impact Assessment in Western Australia* (EPA 2013b).

EPA assessment

The EPA notes that the proponent has given attention in the PER to the policy and guidance statements considered to be relevant for this factor.

Subterranean fauna include stygofauna which occur below the water table and troglofauna which occur below ground but above the water table. The Proposed Extension has the potential to directly impact subterranean fauna by the removal of habitat during mining. Subterranean fauna might also be affected by changes to groundwater levels or quality.

The EPA considers that the sampling and survey methods used for subterranean fauna for the Proposed Extension were generally conducted in accordance with the relevant requirements of GS 54a and EAG 12. The EPA also notes the evaluation of physical surrogate data used by the proponent to determine the potential for wider habitat connectivity was conducted in accordance with the relevant requirements of EAG 12. In cases where there is some variance from EAG 12, the proponent has used appropriate biological data on species distribution to demonstrate habitat connectivity.

In designing the Proposed Extension, the proponent has considered alternatives and applied the mitigation hierarchy to avoid impacts where possible. The proponent has committed to avoid, minimise and manage impacts through:

- the use of selective mining techniques to limit disturbance;
• the use of water barriers to seal the edge of the pits, and reduce the ingress of water. This would reduce the volume of water to be abstracted and reduce the area of subterranean fauna habitat lost or temporarily impacted (1);
• locating and designing the reinjection borefield to minimise impact; and
• lining the TSF walls to prevent the spread of contaminants.

The proponent has also proposed the following management measures for Subterranean Fauna:

• the implementation of a Subterranean Fauna Management Plan (SFMP);
• sampling of established subterranean fauna bores to determine if species are persisting;
• the implementation of Groundwater Drawdown Management and Monitoring Plan (GDMMP);
• ongoing groundwater chemistry monitoring to determine whether changes to groundwater composition are occurring;
• downstream monitoring (to commence after tailings cells are backfilled) to identify any leakage of contaminants, specifically uranium and other radionuclides; and
• continued monitoring of local and regional bores to determine whether groundwater chemistry is being adversely impacted by mining activities.

Stygofauna

The Millipede Development Envelope intersects the Hinkler Well calcrete system and the Lake Maitland Development Envelope intersects the Barwidgee calcrete system, both of which are listed as Priority 1 priority ecological communities (PECs). There are no threatened ecological communities (TECs) in the vicinity of the proposal.

The Proposed Extension involves the removal and dewatering of stygofauna habitat in the Hinkler Well and Barwidgee calcrete systems.

The calcrete bodies of the Yilgarn are particularly rich in stygofauna, with species in many taxonomic groups thought to be restricted to single calcrites or even small areas within a single calcrete. The diversity of the Hinkler Well and Barwidgee calcrete stygofauna assemblage is comparable to the species richness of other Lake Way and Lake Maitland calcrete systems, but considerably less than that recorded for other Yilgarn calcrete systems, which contain over 60 species.

The EPA notes that based on the proponent’s analysis and re-interpretation of bore lithologies at Millipede and Lake Maitland (from drilling programs within

1 Note - the groundwater modelling undertaken has assumed a worst case where water barriers are totally ineffective.
the Millipede and Lake Maitland Development Envelopes), there is little evidence of concretion of carbonate within the uranium mineralisation areas. The resource appears to be associated with shallow and unrestricted carbonate groundwater systems hosted by a mixture of clays, silts and sands rather than more solidified and substantial calcrete formations as found at other calcrete systems. The geological model of Lake Maitland provided in Figure 7 clearly illustrates that the system is dominated by clay and other alluvial materials rather than calcrete through the ore zone. The EPA notes that for the purposes of this report, the systems under assessment are still referred to as calcrete systems, even though the geology between these and other systems may differ. As such the EPA notes that subterranean fauna habitat is unlikely to be restricted to the mapped calcrete PEC systems.

Stygofauna - Millipede

The Millipede deposit is associated with the eastern margin of the Hinkler Well calcrete system located along the edge of the Lake Way playa. The proposed Millipede mine is adjacent to the Centipede mining area of the Approved Project.

It is estimated that the approved Centipede mine could impact approximately 15.3 per cent of stygofauna habitat from the Hinkler Well calcrete PEC through the excavation of mine pits and groundwater drawdown (MWH 2016). The proposed Millipede mine pits and associated dewatering could increase this impact by an additional 2.2 per cent bringing the potential total cumulative impact of the Revised Proposal to 17.5 per cent of the mapped Hinkler Well PEC (MWH 2016) (Table 5).

The EPA notes that this habitat loss estimate is conservative since it assumes that the groundwater drawdown mitigation barriers fail, and it does not include subterranean fauna habitat that extends beyond its mapped surface expression.

**Table 5: Impact to mapped calcrete for the Hinkler Well Calcrete PEC**

<table>
<thead>
<tr>
<th>Total Area of calcrete PEC* (Ha)</th>
<th>Approved Project</th>
<th>Revised Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area (Ha)</td>
<td>PEC area (Ha)</td>
<td>% of total PEC area</td>
</tr>
<tr>
<td>7573</td>
<td>4460</td>
<td>1160</td>
</tr>
</tbody>
</table>

*The total area excludes buffers.

The full modelled extent of the Hinkler Well calcrete systems has been provided in Figure 8.

In total, 34 stygofauna taxa were recorded from the Hinkler Well calcrete system. The EPA notes that most of these taxa are widespread in the system, suggesting that it is better connected than other Yilgarn calcrete systems (Toro 2015b). Of the species considered in this assessment, three are known only
from within the cumulative impact area (Millipede mining area and the 0.5 m groundwater drawdown contour of the approved Centipede mine and the proposed Millipede mine). These are:

- *Chiltoniidae* sp. SAM 6;
- *Schizopera* sp. TK 7; and
- *Schizopera* sp. TK 10.

The EPA notes that no species were recorded only from the additional 0.5 m drawdown contour associated with the Millipede deposit and the extension to the Approved Project.

Some of the key considerations used in determining whether there are wider habitat ranges for these stygofauna species are summarised below:

**Chiltoniidae sp. SAM 6**

Four species of stygofauna were collected from the same bore hole as *Chiltoniidae* sp. SAM 6 which all possess distributions that extend beyond the Millipede deposit into the broader Hinkler Well calcrete system (MWH 2016). The broader distributions of these co-occurring species indicates that the aquifer sampled within the Millipede deposit is connected to and forms part of the broader aquifer system associated with the Hinkler Well calcrete system (i.e. the groundwater associated with the Millipede deposit is not an isolated aquifer). This is consistent with the hydrogeological evidence (MWH 2016).

The proponent considers that, given the extent of collection of these species and the likelihood that *Chiltoniidae* sp. SAM 6 tolerates a range of groundwater salinities (as exhibited by other chiltoniid species), it is likely that a contiguous habitable saturated geology extends outside the impact area available for *Chiltoniidae* sp. SAM 6. *Chiltoniidae* sp. SAM 6 is closely related to *Chiltoniidae* sp. SAM 3, displaying 8.9 to 9.5 per cent genetic divergence (MWH 2016). Within the Hinkler Well calcrete system *Chiltoniidae* sp. SAM 3 is widely distributed outside the impact area (MWH 2016). *Chiltoniidae* sp. SAM 6 is considered likely to display similar tolerance to varying groundwater salinity levels and have a broader distribution, as is the case with other closely related chiltoniid species (MWH 2016).

The EPA notes that a peer review was commissioned to provide an additional professional opinion on the subterranean fauna assessment. The peer review concludes that the proponent’s contention that *Chiltoniidae* sp. SAM 6 is more widespread than the impact area is likely to be correct (Bennelongia 2016). The peer review also stated that although there is currently no sampling evidence that *Chiltoniidae* sp. SAM 6 extends outside the mine pit and area of groundwater drawdown, the biology of amphipods as a group suggest it probably does (Bennelongia 2016).
**Schizopera sp. TK 7**

This species was found in low numbers during the assessment of the Approved Project. At that time it was considered to have a wider distribution. Since then some specimens have been recorded in areas further west along the Hinkler Well calcrete further towards the edge of the 0.5 m groundwater drawdown contour (MWH 2016). The collection of *Schizopera* sp. TK7 more widely provides confirmation that this species is more broadly distributed within and around the Hinkler Well calcrete and would not be confined to the impact areas only (MWH 2016).

**Schizopera sp. TK 10**

This species is known from two specimens from within the 0.5 m groundwater drawdown contour (MWH 2016). The very low numbers found during sampling suggest it is rare and finding further specimens through sampling would not be practicable. EAG 12 notes that where a specimen is found in low numbers, other measures should be used to estimate whether the habitat is restricted. The EPA notes that it is unlikely that *Schizopera* sp. TK10 is restricted to the groundwater drawdown area when taking into consideration the distribution of other stygofauna species collected from the same bore location, the broader distributions and habitat preferences of other *Schizopera* species recorded from neighbouring bores, and the greater extent of adjoining habitat present (MWH 2016).

In summary, the EPA notes that the proposed Millipede mine increases the drawdown area by 168 ha (2.2 per cent) above that originally approved for the Approved Project, and that no species have been exclusively recorded from this 168 ha area. The EPA considers that there is enough evidence to suggest species whose currently known distribution is restricted, are likely to have a wider distribution.

**Stygofauna - Lake Maitland**

The Lake Maitland deposit is associated with the eastern margin of the Barwidgee calcrete system along the edge of the Lake Maitland playa in the northern section of the Carey palaeodrainage channel. It is estimated that approximately 500 ha (25.6 per cent) of stygofauna habitat from the Barwidgee calcrete PEC would be impacted through the excavation of mine pits and groundwater drawdown associated with the implementation of the Proposed Extension.

The EPA notes that this habitat loss estimate is conservative since the current PEC boundary does not include subsurface calcrete habitat that extends beyond its mapped surface expression. The full modelled extent of the Barwidgee calcrete systems is shown in Figure 9.

In total 28 stygofauna taxa were recorded from the Barwidgee calcrete system. The majority of these are widespread and most species within a taxonomic group do not appear to show any clear patterns of habitat preference (Toro
2015b). However two species are known only from within the proposed impact area (mining area and the 0.5 m groundwater drawdown contour). These are:

- *Chiltoniidae* sp. SAM 4; and
- *Schizopera* sp. TK1.

Some of the key considerations used in determining whether there are wider habitat ranges for stygofauna species which were recorded only within mining areas at Lake Maitland have been summarised below:

**Chiltoniidae** sp. SAM 4

All four species of stygofauna collected from the same bore hole as *Chiltoniidae* sp. SAM 4 have distributions beyond the Lake Maitland deposit into the broader Barwidgee calcrete system (MWH 2016). These broader distributions indicate that the habitat present at this sampling location does not represent an isolated aquifer system. Instead it is connected with contiguous habitable saturated geologies that extend beyond the Lake Maitland mining impact areas from along the margins of the northern lake playa system further westward up the Barwidgee calcrete system to beyond Little Well (MWH 2016).

The extent of collection of these species and the likelihood that *Chiltoniidae* sp. SAM 4 can tolerate a range of groundwater salinities (as exhibited by other chiltoniid species) indicates a contiguous habitable saturated geology that extends outside the impact area available for *Chiltoniidae* sp. SAM 4 (MWH 2016).

Specimens of *Chiltoniidae* sp. SAM 4 collected from the same bore holes demonstrated high genetic diversity, which indicates a relatively large and more widespread population than location records may show (MWH 2016).

The peer review noted that, based on the typically wide ranges of amphipods, the proposition that *Chiltoniidae* sp. SAM 4 is more widely distributed is likely to be correct (Benelongia 2016).

**Schizopera** sp. TK 1

This species was collected from three bore holes located approximately four kilometres apart. Seven other species of stygofauna from the same bore holes were also found outside the impact area further to the west up the Barwidgee calcrete body and within more substantial calcrete habitats (MWH 2016). This species has also been found from a sampling location where calcrete was absent, indicating that species habitat requirements are not restricted to calcrete. The broader distributions and habitat preferences of these sympatric species indicate that contiguous habitable saturated geologies do extend beyond the mining area from along the margins of the northern lake playa system from where *Schizopera* sp. TK1 was recorded (MWH 2016).
The EPA also notes that other *Schizopera* sp. within the Lake Maitland system appear to have overlapping and relatively wide ranges. This differs from other Yilgarn calcrite systems, where *Schizopera* sp. are thought to be restricted.

It is suggested by MWH (2016), that the species range may extend beyond the area of groundwater drawdown. The peer review however considers that caution should be used when considering the distribution of *Schizopera* sp. TK1 when compared to *Chiltonidae* sp. SAM 4 (Bennelongia 2016).

The EPA notes that seven individuals of *Schizopera* sp. TK1 were found from three bores (Figure 10). It notes that if a cautionary approach was taken, an exclusion area could be placed around the north-west *Schizopera* sp. TK1 record, to restrict ground disturbance and limit groundwater drawdown to less than 0.5m. This would ensure the species’ persistence beyond the impact area.

In summary, the EPA considers that a condition should be imposed to restrict ground disturbance and groundwater drawdown from exceeding 0.5 m within the *Schizopera* sp. TK1 exclusion area (Figure 10) until further surveys identify *Schizopera* sp. TK1 outside impact areas.

The operation of the West Creek borefield at a rate of up to 0.7 GL/a for seven years was assessed for the Approved Project. With the availability of the Lake Maitland borefield, less use would be made of the West Creek borefield and annual abstraction would not increase but may occur for a longer period. The EPA notes that the additional years of operation would be unlikely to change previously assessed impacts to subterranean fauna.

The EPA notes that there are no proposed changes to the mining of the Lake Way deposit and that the original assessment is still appropriate.

**Troglofauna**

Troglofauna occur widely, at moderate species richness but in low abundance, in mineralised rocks of the Yilgarn. They may be abundant in the unsaturated zone of calcrites and may also occur in lower abundance in adjacent coarse alluvium. Troglofauna like stygofauna may be restricted to calcrete islands in the Yilgarn and are also susceptible to impacts associated with habitat removal as a result of open-pit excavation.

A total of nine troglofauna species were recorded from the Barwidgee calcrite system.

No species were found in the upper tributary catchment area associated with the proposed borefield to the north of Lake Maitland. The diversity of the Barwidgee calcrite troglofauna assemblage is comparable to the species richness of the Lake Way calcrite systems but considerably less than that recorded for the Yeelirrie calcrite systems where 45 species were recorded from the broader area.

One species of trogloomorphic centipede (*Scolopendridae* sp. OES1) is known from a single specimen within the Lake Maitland mining area (Outback Ecology...
2012). This is likely to be caused by very low population numbers rather than the actual distribution being limited to one bore (Outback Ecology 2012).

Given the wider distribution of other members of the troglofauna assemblage throughout the calcrete habitats and the limited area of habitat removal associated with mining excavation, Outback Ecology (2012) concluded that proposed mining at Lake Maitland is not considered likely to pose a long-term conservation risk to *Scolopendraidae* sp. OES1. The EPA has reviewed all of the available information and data, and considers that this conclusion is likely to be correct.

Management Plans

The EPA notes that there are existing conditions requiring a Stygofauna Monitoring Plan (SFMP) and a Groundwater Drawdown Monitoring and Management Plan (GDMMMP) for the Approved Project. The EPA recommends conditions which require the expansion of these plans to the Revised Proposal.

Summary

Having particular regard to:

- a) relevant EPA policy and guidance pertaining to Subterranean Fauna;
- b) the high likelihood of the alluvium providing additional habitat for stygofauna and troglofauna outside the impact area;
- c) the proponent’s case for the potential for species currently found only within the impact area to be found elsewhere;
- d) the comment and conclusions of the peer review;
- e) approximately 82 per cent of the Hinkler Well calcrete PEC and 74 per cent of the Barwidgee calcrete PEC being retained outside the mine pit and groundwater drawdown contour;
- f) the EPA’s assessment that there remains a significant residual impact resulting from the partial removal of the PEC systems, which is acceptable and capable of being offset, and
- g) a cautious approach to the potential for *Schizopera* sp. TK1 to occur outside of impact areas at Lake Maitland,

the EPA considers that the impacts to Subterranean Fauna are acceptable and the Revised Proposal can be managed to meet the EPA’s objectives for Subterranean Fauna provided that:

- condition 10 is imposed which requires the preparation and implementation of a SFMP;
- condition 11 is imposed which requires the preparation of a GDMMMP including the development of trigger levels for groundwater drawdown and contingency measures in case the barrier system does not fully control groundwater drawdown;
• condition 13 is imposed which restricts ground disturbance and groundwater drawdown within the *Schizopera* sp. TK1 exclusion area until further surveys identify *Schizopera* sp. TK1 outside impact areas; and

• offset condition 18 is imposed to counterbalance the significant residual impact of the loss of 2.2 per cent (cumulative impact of 17.5 per cent) of the mapped Hinkler Well calcrete PEC and 25.6 per cent of the mapped Barwidgee calcrete PEC. This offset is discussed further in Section 3.7.
Figure 7: Geological Model – Lake Maitland

- Semi-cons. carbonate/silcrete
- Clay sediment
- High grade ore

2016 Geology Model – Lake Maitland

Size fraction analysis – no calcite and 61% clay, 24% silts/fine sands.
Figure 8: Mapped Modelled Calcrete Extent of Hinkler Well
Figure 9: Mapped Modelled Calcrete Extent of Barwidgee
Figure 10: *Schizopera* TK1 Exclusion Area
3.3 Hydrological Processes and Inland Waters Environmental Quality

EPA objectives

The EPA’s environmental objective for Hydrological Processes is to:

- maintain the hydrological regimes of groundwater and surface water so that existing and potential uses, including ecosystem maintenance, are protected.

The EPA’s environmental objective for Inland Waters Environmental Quality is to:

- maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected.

Relevant EPA policy and guidance

There is no specific EPA policy or guidance considered by the EPA to be relevant for this factor for this assessment.

EPA assessment

The key environmental factor of Hydrological Processes and Inland Waters Environmental Quality integrates with Rehabilitation and Decommissioning, and includes impacts such as the potential seepage from TSFs, impacts from dewatering of the pits and borefield, and from surplus water reinjection.

The Proposed Extension has the potential to impact on groundwater and surface water through impacts from drawdown and mounding of groundwater, potential changes in surface flow regimes and changes in water quality.

Millipede

The Millipede deposit lies on the Carey palaeodrainage system and is a low point in the landscape with a shallow water table. The approved Centipede mine, and to a lesser extent Millipede, are located within the floodplain of Lake Way.

Surface water flow is ephemeral and highly dependent on high rainfall events. The dominant Lake Way sub-catchments are located to the north and north-west of the lake. These larger catchments have poorly defined drainage and only flow after infrequent major rainfall events. Lake Way itself receives intermittent inflows from the surrounding catchments.

Dewatering discharges from existing and historic mining operations, such as the Apex Gold mine in the northern part of Lake Way, have resulted in continuous surface discharge of water to Lake Way. No surface water
discharge from dewatering at Millipede would occur to Lake Way. Instead, water from pit dewatering would be used for process water.

The Millipede Development Envelope is generally above the 1-in-100 year flood levels, however it could be inundated by a probable maximum flood event. Therefore to improve safety and protect infrastructure, active mining areas would be surrounded by flood protection bunds. External surface water runoff and floodwater would be bunded away from mining areas. Sufficient storage would be implemented to contain runoff should a significant rainfall event occur.

The proponent has committed to various management measures to minimise changes to surface water flow and impacts on surface water flows in the mining areas. These measures include:

- placing of engineered bunds and diversion drains around the mining areas;
- designing bunds to address inundation during flood events to prevent natural runoff due to overflows from bunded areas containing process wastes;
- intercepting natural drainage and redirecting it away from the mining area; and
- reinforcing the outside banks of the perimeter bund with riprap to minimise scouring of bund walls.

The ore body in the Millipede Development Envelope occurs in very fine to coarse grained quartz sand with minor silt, gravel and carbonaceous horizons. The material within and underlying the ore zone comprises a sequence of earthy calcrite, siltstone, sand and clay.

The depth to groundwater in Millipede Development Envelope is typically two to five metres below the surface and the depth to water generally reduces with proximity to Lake Way. Groundwater is hypersaline (greater than three times that of seawater), and flows from north-west to south-east as part of the Carey paleochannel. The pre-mining mean dissolved uranium concentration observed was 0.06 milligrams per litre (mg/L).

The Wiluna town water supply is 25 km from, and up-gradient of, the proposed mining and processing areas and is not hydraulically connected to the operational area, and would thus be unaffected by implementation of the Proposed Extension.

Groundwater abstraction for mine dewatering and aquifer reinjection of excess pit-water may potentially affect groundwater dependent ecosystems (GDEs). These impacts have been discussed in sections 3.1 and 3.2.

Millipede would require dewatering of no more than two gigalitres per annum (GL/a). The proponent undertook a hydrological assessment, including modelling to represent groundwater behaviour. This modelling predicted that:
- at the end of mining, the 0.5 m drawdown contour would extend approximately four kilometres to east north-east and three kilometres to the west south-west; and
- after dewatering stops, groundwater would recover to pre-mining levels after approximately 70 years, with 90 per cent recovery after 60 years.

The Department of Water (DoW) has reviewed the hydrological assessment conducted by the proponent and is generally satisfied with the level of investigations undertaken for the required dewatering activities associated with the Proposed Extension.

The EPA notes that groundwater drawdown associated with the implementation of the proposed Millipede open pit would not affect any beneficial use. There are no surrounding groundwater users in close proximity to the proposed Millipede open pit or the Lake Way components of the Approved Project and the groundwater is hypersaline and is not suitable for stock or human consumption.

The proponent has committed to the preparation and implementation of a GDMMP for the Revised Proposal. This plan will require the development of trigger levels for groundwater drawdown and the design and implementation of a barrier system to control cumulative groundwater drawdown so that the trigger levels are not exceeded. This will minimise potential impacts on GDEs associated with groundwater drawdown. The EPA considers that the requirement for the GDMMP should be formalised in a condition.

All mineralised waste (tailings) from both the Millipede and Lake Maitland deposits (as well as the Centipede and Lake Way deposits as part of the Approved Project) would be stored in the mined-out pit voids at Centipede and Millipede. Tailings would be managed using engineered containment systems. The containment system proposed at Millipede is the same as that previously assessed at Centipede. The design of the TSFs includes a low permeability clay liner in the base, water barriers around the sides, and a multi-layer cover to limit water influx (Figure 11). No tailings or mineralised wastes would be stored in the Lake Maitland pit void.

The proposed TSFs at Millipede and the approved TSFs at Centipede would receive no more than 2.1 million tonnes per annum (Mtpa) of tailings over the life of the proposal, which is the same rate as the Approved Project. The mine pits at Millipede would also incorporate the perimeter flood protection bunds that were a Federal requirement for Centipede in-pit TSFs under the Approved Project. These bunds and drainage measures must ensure against incursion of flood waters in a probable maximum-flood event. The EPA notes that these bunds would also prevent uncapped tailings from being discharged to the environment during a probable maximum-flood event.

The Department of Mines and Petroleum (DMP) has reviewed the proposed design of the TSF and advised the EPA that the proposed design is environmentally acceptable.
To demonstrate that in-pit TSFs are a safe and viable solution, the proponent undertook fate and transport modelling to estimate how far the contaminants could flow after 10,000 years. The modelling used conservative assumptions, including that the clay barriers proposed to prevent water ingress were totally ineffective.

The fate and transport modelling undertaken for the leachable uranium (and other solutes) from tailings material indicates that after 1,000 years, the predicted uranium concentration in groundwater would drop to less than 0.5 mg/L at distances of up to 45 m from the mine pit. Movement of other radionuclides would be considerably less. After 10,000 years, it is predicted that the groundwater uranium concentration would remain below 0.4 mg/L across all distances from the mine pit, and at distances greater than 250 m, the majority of uranium released would have been adsorbed or precipitated out of solution.

The EPA notes that the modelling predicts that radiological impacts on groundwater would be restricted to the immediate vicinity of the mine site. Section 3.6 Rehabilitation and Decommissioning further discusses landform and TSF stability over the long term.

**Lake Maitland**

The Lake Maitland deposit lies on the Carey palaeodrainage system and is a low point in the landscape with a shallow water table. The Lake Maitland deposit is located on the lake surface itself. Surface water flow is ephemeral and highly dependent on high rainfall events.

No surface water discharge from dewatering would occur at Lake Maitland. Water from pit dewatering would be used for process water and the excess would be reinjected into the aquifer.

The Lake Maitland operations area is located on the lake playa and would be flooded by a 1-in-100 year flood event, and thus require flood protection bunds. The EPA notes that these bunds are mainly for safety and infrastructure protection since no tailings would be deposited at Lake Maitland.

The proponent has committed to various management measures to minimise changes and impacts to surface water flows in the mining areas. These include:

- placement of engineered bunds and diversion drains around the mining areas;
- bunds designed to address inundation during flood events to prevent natural runoff due to overflows from bunded areas containing process wastes;
- intercepting natural drainage and redirecting it away from the mining area; and
- reinforcing the outside banks of the perimeter bund with riprap to minimise scouring of bunds walls.
The sediments of the Carey paleodrainage in which Lake Maitland lies comprise of basal sands. The overlying Cainozoic sediments consist of an interbedded sequence of dense plastic clays with occasional sand lenses overlain by alluvial sands. Shallow alluvium and colluvium occur throughout the region with calcrete occurring at the margins of present-day salt lakes, and locally in some of the tributaries of the main drainages. The Lake Maitland playa lake system functions as an evaporative discharge area.

Groundwater is saline to hypersaline, with salinities ranging from 62,800 to 250,000 mg/L (two to more than seven times that of seawater). The maximum dissolved uranium concentration observed was 0.16 mg/L.

Since the Proposed Extension would require dewatering at Lake Maitland of approximately 4 GL/a, it could require downstream aquifer reinjection of excess pit dewater into the Lake Maitland reinjection area. The proponent expects reinjection would only be necessary in two of the six year mining life and be limited to less than 1 GL/a (Toro 2015b).

The hydrological modelling conducted for mining at Lake Maitland assumed an 11-year mine life, whereas the proponent now proposes to mine a smaller area to a shallower depth. This has reduced the mine life to six years, however the proponent has retained the original modelling as it presents a conservative case for what is now proposed. The modelling predicts:

- the maximum depth of drawdown would be 3.5 m; and
- groundwater levels would recover to approximately pre-mining levels within 10 to 20 years, with 50 per cent recovery within two to three years.

The DoW has reviewed the hydrological assessment conducted by the proponent and is generally satisfied with the level of investigations undertaken for the required dewatering activities associated with the Proposed Extension.

The proponent has committed to the preparation and implementation of a GDMMP for the Revised Proposal. This plan will require the development of trigger levels for groundwater drawdown and the design and implementation of a barrier system to control groundwater drawdown so that the trigger levels are not exceeded. This will minimise any potential impacts on GDEs associated with groundwater drawdown. As noted earlier, the EPA has recommended a condition requiring the GDMMP for the Revised Proposal.

The EPA notes that groundwater drawdown associated with the implementation of the proposed Lake Maitland open pit would not affect any beneficial use. There are no surrounding groundwater users in close proximity and the groundwater is hypersaline and unsuitable for stock or human consumption.

Excess water from pit dewatering at the Lake Maitland open pit would be reinjected downstream within the Lake Maitland reinjection area (Figure 4). Reinjection has the potential to cause areas of groundwater mounding, potentially affecting ecosystems sensitive to water logging.
The reinjection borefield would be designed and operated to prevent excessive mounding of groundwater and salt water intrusion. The proponent modelled a conceptual bore field with 24 bores, which was found to be capable of injecting 1 GL/a over six years while limiting groundwater rise to less than one metre (Pennington Scott 2015).

The EPA considers that the aquifer reinjection proposed at Lake Maitland is unlikely to result in a significant impact if mounding is kept to below one metre.

Process water for Lake Maitland would be sourced from a borefield north-east of Lake Maitland. Abstraction of up to 1.5 GL/a would be required. Groundwater salinity within the proposed borefield ranges from 760 to 210,000 mg/L (near fresh to seven times that of seawater).

Summary

Having particular regard to:

a) the proponent’s groundwater modelling and the resulting predictions of groundwater drawdown;

b) advice from the DoW on the adequacy of the proponent’s modelling;

c) the proponent’s proposed measures to manage groundwater level change for both the dewatering and reinjection aspects; and

d) the proponent’s proposed measures to manage tailings and waste storage to minimise impacts on groundwater,

the EPA considers that impacts to Hydrological Processes and Inland Waters Environmental Quality are acceptable and the Revised Proposal can be managed to meet the EPA’s objectives for Hydrological Processes and Inland Waters Environmental Quality provided that:

- condition 11 is imposed requiring the implementation of a GDMMP including the development of trigger levels for drawdown and the implementation of a barrier system to control drawdown so that the trigger levels are not exceeded;

- condition 12 is imposed requiring the implementation of a Surface Water Management Plan to prevent surface water contamination; and

- condition 14 is imposed requiring the proponent to limit mounding of groundwater from reinjection to less than one metre.
Figure 11: In–pit tailings storage (Closure and Post Closure)
3.4 Human health

EPA objective

The EPA’s environmental objective for this factor is to ensure that human health is not adversely affected.

Relevant EPA policy and guidance

The EPA policy and guidance applicable to human health for this assessment and relevant matters discussed in each policy and guidance document, are outlined in Appendix 4. The EPA considers that the following policy and guidance is relevant to its assessment of the proposal in relation to this factor:


The EPA notes that a significant number of non-EPA policy and guidance is listed in the ESD for this factor. The application of these policies and guidance was considered to inform the radiological exposure assessments for the proposal. Noting advice received from the DEE, the DMP, and the Radiological Council that the radiological assessments undertaken were adequate, the EPA considers that the proponent has considered the policy and guidance considered relevant for this factor in the PER document.

EPA assessment

The EPA notes that the proponent has given attention in the PER to the policy and guidance statement considered to be relevant for this factor.

The key environmental factor of Human Health integrates with the key environmental factor of Rehabilitation and Decommissioning, and includes aspects such as the containment of radiation in the TSFs during closure as described under Rehabilitation and Decommissioning. Human health also includes the aspects of transport, public exposure to radiation and worker safety. The potential impacts to human health are from exposure to radiation.

The mining of uranium, treatment of ore to produce uranium oxide concentrate (UOC), stockpiling of ore and waste rock, storage of contaminated waste, uranium transport and mine closure activities all increase the potential for workers or the public to be exposed to radiation.

The EPA notes that natural background doses of radiation to people living in Australia are between 1.5 and 2 millisieverts per year (mSv/yr). As outlined in Schedule 1 of the Radiation Safety (General) Regulations 1983 (Government of Western Australia 1983), the regulatory public dose limit above background is 1 mSv/yr and the regulatory occupational dose limit is 20 mSv/yr above background.

Consistent with GS 55, the proponent demonstrated through the ‘as low as reasonably achievable’ (ALARA) approach that ‘best practice’ design optimisation, operational procedures and monitoring to control exposure to
hazardous pollutants to the maximum extent achievable, would be implemented.

The exposure from processing and transporting UOC has previously been assessed and approved as part of the approved Wiluna Uranium Project. The Proposed Extension would not change the annual exposure from transport (to either the public or the transport workers), or to the process plant workers, however the years of operation would increase. The EPA notes that, since the regulatory dose limits are based on annual exposure, the extra years of operation do not require the aspects of processing or transport to be revised.

Public exposure
The nearest permanent residence to Millipede is Lake Way Station, approximately 15 km south-east of the Millipede mine site, and the estimated dose to persons living at the Station is 0.005 mSv/yr. The estimated exposure to communities in and around Wiluna ranges from 0.015 to 0.047 mSv/yr. The Proposed Extension does not increase the exposures estimated for the Approved Project given that the Lake Way component of the Approved Project is the main contributor to these areas.

The nearest population group to Lake Maitland is Barwidgee Station which is approximately 17 km to the north-west. For persons living year round at Barwidgee Station, the estimated dose is less than 0.005 mSv/yr.

Following discussions with the Traditional Owners, the proponent also undertook an assessment for a scenario of persons spending 28 days per year camping at the project boundary and sourcing all of their bush tucker (meat and vegetables) from the area. The predicted total dose for this group from this scenario was less than 0.001 mSv/yr.

The EPA notes that the doses predicted from operations at Millipede and Lake Maitland are significantly below the regulatory public dose limit of 1 mSv/yr above background.

The potential for public exposure from gamma radiation during the transport of UOC was previously evaluated for the Approved Project and found to be significantly less than the regulatory public dose of 1 mSv/yr above background. The annual dose to the public would not increase with the implementation of the Proposed Extension. The EPA therefore considers the previous assessment remains valid and applies to the Revised Proposal as a whole.

Employee exposure
The proponent has proposed an ALARA approach to radiation exposure to employees. Doses to employees would be managed and monitored, and doses entered into the national dose register, so employees/contractors who work on multiple mines do not exceed the regulatory dose limit of 20 mSv/yr. Employee exposure to radiation at Millipede and Lake Maitland is estimated to be similar to other open-pit uranium mines in Australia, with the exposure of mine-site employees conservatively estimated to be up to 5.1 mSv/yr.
The processing plant and product transport components were previously evaluated as part of the Approved Project. The EPA notes that exposures were based on the annual dose and since processing volumes would not increase on an annual basis, the EPA considers the previous assessment applies to the Proposed Extension and Revised Proposal, and does not need to be revised.

Employees in the processing plant, product packing areas, and administration areas were estimated to receive less than 4 mSv/yr, less than 2 mSv/yr and less than 1 mSv/yr respectively. An assessment of transport risks for the Approved Project estimated the radiation dose to transport workers to be approximately 0.5 mSv/yr.

The EPA notes that all of the above doses are below the regulatory occupational dose limit of 20 mSv/yr.

*Regulatory and Assessment Framework: Agency comments*

The EPA notes that there is an extensive technical guidance framework for assessing radiological impacts to human health (as outlined in Appendix 4). The framework involves the development of international guidance which is then made into national and state documents relevant to that jurisdiction and environment.

The DMP is responsible for worker safety, aspects of public safety relating to the mine, and mine closure under the *Mines Safety and Inspection Act 1994* (Government of Western Australia 1994). The DMP advised that there were no issues with respect to the adequacy of radiological assessments undertaken to model radiation exposure and that the exposure risk to employees and the public is considered to be low and acceptable for a uranium mine.

The Radiological Council is responsible for regulating the radiological aspects of transport, mine closure and post closure monitoring, worker safety and public safety. The Council considers that the information in the PER is acceptable and that the proponent has addressed the key requirements for radiation under the *Radiation Safety Act 1975* (Government of Western Australia 1975) and relevant codes of practice.

The Council further notes that the risks associated with radiation are to be addressed in the Radiation Management Plan (RMP) and can be adequately monitored and managed under this plan. The transport of UOC can be adequately managed under the *Radiation Safety (Transport of Radioactive Substances) Regulations 2002* (Government of Western Australia 2002).

The EPA notes that the RMP will need to be submitted to both the DMP and the Radiological Council for approval, and during the assessment of the RMP, (worker and public safety), radiation waste management plan (management of radioactive wastes) and radiation protection program (transport) would be assessed in greater detail.

The EPA notes that the estimated dose to the public, mine site and transport workers are much lower than the respective dose limits. The EPA also notes that the two key agencies responsible for regulation of radiation, the
Radiological Council and the DMP, are satisfied with the details provided in the PER and the proponent’s response to submissions. The EPA recommends that the DMP should require updates of post-closure doses to the public (including from bush tucker) using dust deposition data in the MCP, to be made publicly available. The DMP should consult with the DEE’s Supervising Scientist Branch on the updated dose assessment for bush tucker.

Summary

Having particular regard to:

a) relevant EPA policy and guidance, and other policy pertaining to Human Health;

b) the proponent’s implementation of ‘best practice’ design optimisation, operational procedures and monitoring to control exposure to hazardous pollutants to the maximum extent achievable through the ALARA approach;

c) the proponent’s assessment of public exposure from operations at Lake Way, Centipede, Millipede and Lake Maitland which estimates a dose of less than 1 per cent of the regulatory public dose limit;

d) the proponent’s assessment of mine-site employee exposure at Millipede and Lake Maitland which estimates a dose of approximately 25 per cent of the regulatory occupation dose limit; and

e) the DMP’s advice that the radiological assessments undertaken to model radiation exposure to the public and employees are acceptable,

the EPA considers that the Revised Proposal can be managed to meet the EPA’s objective for Human Health provided that an RMP is prepared and implemented which:

- considers measures to control the exposure of employees and members of the public to radiation at or from the mine through the appropriate use of equipment, facilities, operational procedures, monitoring programs, and procedures for assessment of dose and reporting of incidents; and

- includes a waste management system for the mine which incorporates details for the handling, treatment, storage and disposal of radioactive waste, and an outline for the decommissioning and rehabilitation of the mine.

The EPA notes that an RMP that addresses the above points is a statutory obligation (not a discretionary decision) under section 16.7 of the Mines Safety and Inspection Regulations 1995. The DMP and the Radiological Council have both confirmed that they will require a RMP to be submitted for approval.

The EPA’s view is that the requirements of the condition for this proposal can be adequately regulated through the Mines Safety and Inspection Regulations 1995 and the Radiation Safety Act 1975, rather than a condition under Part IV of the EP Act.
The EPA also notes that both DER and DEE have legislation that can permit and regulate potential radiological impacts to human health.

### 3.5 Heritage

**EPA objective**

The EPA’s environmental objective for this factor is *to ensure that historical and cultural associations, and natural heritage, are not adversely affected.*

**Relevant EPA policy and guidance**

The EPA policy and guidance applicable to heritage and the relevant considerations are outlined in Appendix 4. The EPA policy and guidance considered by the EPA to be relevant for this factor for this assessment is:

- Guidance Statement No. 41 (GS 41): *Assessment of Aboriginal Heritage (2004).*

**EPA assessment**

The township of Wiluna is on Martu land. Martu are desert people and the Traditional Owners and occupiers of the surrounding lands extending from the edge of the Little Sandy Desert, east to the Gibson Desert and north into the Great Sandy Desert.

Wiluna is a major traditional Law Centre and place where Indigenous rituals are conducted. Land in the vicinity of the Millipede Development Envelope is used for traditional purposes including gathering bush tucker, medicines, hunting and other cultural business.

In July 2013, the Federal Court of Australia granted Native Title to the Wiluna People over land which includes the Millipede deposit. There is no registered Native Title claim over the mining lease at Lake Maitland.

The proponent has undertaken archaeological studies and site searches over the proposed Millipede, Lake Maitland and Southern Haul Road Development Envelopes. Surveys have also been undertaken over the area of the Approved Project and the proponent has consulted with the Wiluna Native Title Holders. This is consistent with the requirements of GS 41.

*Guidance Statement 41 – Assessment of Aboriginal Heritage,* provides advice to proponents about the minimum requirements for environmental management of the heritage impacts of a proposal that the EPA considers when undertaking an assessment. In addressing this GS 41 it is expected that a proponent undertakes a competent analysis and reports on the likelihood of the presence of matters of heritage significance to Aboriginal people. This involves a comprehensive review of all existing information, anthropological and archaeological surveys, consultation and engagement with Aboriginal people;
and clear demonstration that Aboriginal concerns relating to the heritage factor have been addressed. In considering these requirements, the EPA notes the following:

- Various surveys have been conducted within the proposed Development Envelope;
- The Aboriginal people identified by the proponent are the Wiluna Native Title claimant group; and
- The proponent has developed a Cultural Heritage Management Plan (CHMP), and has recently signed a mining agreement with the Wiluna Native Title holders which includes arrangements for protecting and managing Aboriginal cultural heritage (Toro 2016b).

Three artefacts/scatter (Lake Way Find 1, (ID 2434), Lake Way Find 2 (ID 2435) and Lake Way 6 (ID 2441)) were recorded in the vicinity of the Millipede Development Envelope. The Aboriginal Cultural Material Committee has determined that Lake Way Find 1 and 2 are not heritage sites and Lake Way 6 consists of stone artefacts distributed over an area measuring 140 m x 70 m comprising mostly quartz. No registered Aboriginal Heritage sites or other heritage places have been recorded within the Lake Maitland Development Envelope.

As a result of archaeological survey work and continuing consultation with the Wiluna Native Title Holders, the proponent has identified that mining at Millipede can be undertaken without any impact on registered heritage sites, other heritage places, or cultural heritage values identified by the Wiluna Native Title Holders.

Management measures
The proponent has committed to the following key management measures;

- implementing the existing CHMP for the Approved Project in relation to the Revised Proposal;
- creating procedures to respond to the unanticipated discovery of cultural material; and
- providing cross-cultural awareness training for employees, contractors, subcontractors and consultants.

The EPA considers the CHMP should be formally required through a condition and should apply to the Revised Proposal.

Summary
Having particular regard to:

a) relevant EPA policy and guidance pertaining to Heritage;

b) the results of archaeological studies and site searches; and

c) the mining agreement in place with the Wiluna Native Title holders,
the EPA considers that the EPA’s objective for Heritage can be met subject to recommended condition 16 which requires the implementation of the CHMP to avoid and minimise impacts to sites and Aboriginal Heritage in consultation with the Traditional Owners.

3.6 Rehabilitation and Decommissioning (integrating factor)

EPA objective

The EPA’s environmental objective for this factor is to ensure that premises are decommissioned and rehabilitated in an ecologically sustainable manner.

Relevant EPA policy and guidance

The EPA policy and guidance considered by the EPA to be relevant for Rehabilitation and Decommissioning for this assessment are:

- Guidelines for Preparing Mine Closure Plans (DMP & EPA 2015);
- Guidance Statement No. 55 (GS 55) – Implementing Best Practice in Proposals Submitted to the Environment Impact Assessment Process (EPA 2003); and
- Environmental Protection Bulletin No. 19 (EPB 19) – EPA Involvement in Mine Closure (EPA 2015).

Since the ESD was released, the EPA and DMP revised the 2013 version of the Guidelines for Preparing Mine Closure Plans. The proponent addressed the current 2015 version in its PER, and the EPA considered the 2015 version in its assessment.

EPA assessment

The relevant rehabilitation and decommissioning aspects of the Revised Proposal include clearing of vegetation; site works; water abstraction and reinjection; open pits; TSFs; alterations/diversion to surface water flows; stockpiles; and the processing plant.

The long-term performance of the in-pit TSFs is critical to successful closure, and the Millipede TSF cells will be constructed and managed to same standard as the Centipede TFS cells in the Approved Project. The base of the TSFs would be clay, and the embankments close to the pit walls would be constructed of clay-based materials sourced from the pit. The permeability of the TSFs base and cell embankments is expected to be very low.

The EPA notes that placing tailings below ground is considered a best-practice measure to minimise potential impacts.

The proposed TSF cover system design consists of a 0.5 m radiation control layer placed directly above the consolidated tailings, a one to three metre shaping layer, 0.3 m capillary break/surface water shedding layer and 0.1 m
layer of topsoil to promote vegetation growth on the final landform (Toro 2015b). The estimated radon emission rate from the closed TSFs is not expected to exceed natural background levels (Toro 2015b).

A number of closure-specific studies have been undertaken to support sustainable rehabilitation and closure of the proposal, these include:

- long-term (10,000 years) landform evolution modelling; and
- post-closure radiation assessment, including impacts on non-human biota and radon exhalation from the closed TSFs.

**Landform evolution modelling**

Landform modelling was undertaken by the proponent to assess the long-term stability of the post-closure landforms, particularly over the rehabilitated TSFs. Samples were taken of the three most common soil types found across the Development Envelope. The clay pan material was found to be hypersaline, as expected, and was only suitable for use in rehabilitating reconstructed clay-pan areas.

The two other soil types, the lake playa sand and the dune sand, were found to have indistinguishable properties and were considered to be the same material. To model the erosion potential of reformed structures, a 20 m high dune with an 18 degree batter configuration was chosen. This structure represents a reformed dune constructed with considerably steep walls. The erosion model found that material across the Revised Proposal area was not susceptible to erosion.

**Post-closure radiation assessment on non-human biota**

The most significant dispersion pathway for radionuclides resulting from the Proposed Extension is expected to be via project-generated dust, and this has potential implications for flora and fauna in the vicinity. A Tier 2 ERICA assessment was undertaken to determine potential dose rates to the surrounding environment.

The ERICA study concluded that only one of the 13 organism families assessed (lichens and bryophytes) was likely to exceed the screening dose rate of 10 micrograys per hour (µGy/h) based on conservative assumptions. Lichens in particular do not have a well-developed root system, and derive most of their nutrients from dust falling on them. Consequently, they might be expected to receive a higher dose from the fallout of mine and processing dust, than is the case for other organisms. These were estimated to exceed the screening dose rate by about 1.6 times. However, they are extremely radioresistant, with a threshold no-effect dose rate over 10,000 times the default screening rate. Lichen and bryophytes are therefore not considered to be at significant risk from the Proposed Extension.
Rehabilitation and closure

Progressive rehabilitation would be undertaken by the proponent and rehabilitation of post-mine landforms would occur following the cessation of mining. The proposed mining schedule for the Revised Proposal includes cover placement, backfilling and commencement of revegetation starting after completion of the first TSF cell, in year four of the proposal. All remaining open-pit areas that are not converted to TSF cells would be backfilled with mine waste at completion of mining.

The proponent submitted a MCP during the assessment, however the EPA considers that the MCP requires further work to fully meet the relevant considerations of the Guidelines for Preparing Mine Closure Plans (DMP/EPA 2015). The DMP has advised the EPA that rehabilitation and decommissioning of the proposal can be regulated by the DMP under the Mining Act 1978 (Mining Act).

Summary

Having particular regard to the:

a) relevant EPA policy and guidance pertaining to Rehabilitation and Decommissioning;

b) open pits being backfilled and rehabilitated;

c) long term (10,000 years) landform evolution modelling predicting that the rehabilitated and revegetated landforms should not be subject to significant erosion that would expose the tailings;

d) proposed TSF cover system which includes radiation control, capillary break, shaping, and topsoil layers; and

e) proponent committing to returning radiation levels to natural background levels.

the EPA considers that the Revised Proposal can be managed to meet the EPA’s objectives for Rehabilitation and Decommissioning, provided that a MCP is prepared and implemented in accordance with the Guidelines for Preparing Mine Closure Plans, May 2015 (or any subsequent revisions of the guidelines).

The EPA notes that a MCP prepared in accordance with the Guidelines for preparing mine closure plans is a statutory obligation (not a discretionary decision) under the Mining Act and that the Guidelines for preparing mine closure plans is a joint document prepared by the DMP and EPA to meet both Mining Act and EP Act regulatory requirements. The DMP has confirmed that it would require a MCP as a condition of the Mining Lease under section 74 of the Mining Act. The EPA’s view is that the requirements of the condition for this proposal can be adequately regulated through the Mining Act, rather than a condition under Part IV of the EP Act.
3.7 Offsets (integrating factor)

EPA objective

The EPA’s environmental objective for this factor is to counterbalance any significant residual environmental impacts or uncertainty through the application of offsets.

Relevant policy and guidance

The EPA and WA Government policy and guidance applicable to Offsets and the relevant considerations are outlined in Appendix 4. The WA Government and EPA policy and guidance considered by the EPA to be relevant for this factor for this assessment are:

- *WA Environmental Offsets Policy* (Government of Western Australia 2011);
- *WA Environmental Offset Guidelines* (Government of Western Australia 2014); and
- Environmental Protection Bulletin No.1 – *Environmental Offsets* (EPA 2014c).

EPA assessment

Principle 1 of the WA Government Offsets Policy states “environmental offsets will only be considered after avoidance and mitigation options have been pursued”. Consistent with the relevant offset policies and guidance, the proponent has applied the mitigation hierarchy by committing to measures to avoid, minimise and rehabilitate environmental impacts through actions that include:

- using barriers to minimise groundwater drawdown that dewatering causes in the area immediately surrounding the open pits;
- sampling of established subterranean fauna bores to ensure assemblages are persisting;
- ongoing periodic sampling of bores for both stygofauna and groundwater chemistry to ensure any changes are detected so that impacts can be mitigated;
- reinjecting water into the aquifer in areas where there is no connectivity between the hypersaline and fresh water systems to protect stygofauna populations;
- downstream monitoring to commence after the TSF cells are backfilled to identify any leakage of contaminants, specifically uranium and other radionuclides;
- continued monitoring of local and regional bores to determine whether groundwater chemistry is being adversely impacted by mining activities;
- developing a subterranean fauna monitoring program to include measurable habitat parameters, such as temperature and relative
humidity of the subterranean environment, as well as sampling using litter trapping and/or net haul sampling;

- developing a Flora and Vegetation Monitoring Plan including monitoring, reporting and other actions to mitigate impacts on flora and vegetation from implementation of the proposal, including on conservation-significant *Tecticornia* taxa;
- undertaking progressive rehabilitation of disturbed areas to ensure they are returned to agreed pre-mining conditions as soon as practicable; and
- preparing a MCP to rehabilitate the mine pit and wider project area.

Following the implementation of all mitigation measures, the EPA is of the view that a significant residual impact remains from:

1. the clearing for the Proposed Extension of 697.5 ha of *Tecticornia*-dominated vegetation (cumulative impact for the Revised Proposal of 1,333.2 ha); and
2. the removal of 2.2 per cent (cumulative impact for the Revised Proposal of 17.5 per cent) of the mapped Hinkler Well calcrete PEC and 25.6 per cent of the mapped Barwidgee calcrete PEC.

The EPA is of the view that offsets are required to counterbalance the significant residual impacts on Flora and Vegetation and partial removal of the calcrete PEC systems (subterranean fauna habitat) and has considered the WA *Environmental Offsets Guidelines* in determining appropriate offsets.

**Flora and Vegetation Offset**

While the proponent’s PER document concluded that there was no residual impact, the proponent proposed to supplement the *Tecticornia* Survey and Research Plan which was required as an offset under Ministerial Statement 913.

The EPA considers that while the impacts on *Tecticornia* taxa are acceptable, they represent a significant residual impact which requires an offset as there is some uncertainty regarding the identification and distribution of *Tecticornia* taxa.

In order to address uncertainty around the identification and distribution of *Tecticornia* taxa, the EPA considers that an appropriate offset would be a research plan which improves the knowledge of *Tecticornia* taxa. Research projects are appropriate as offsets where there is some degree of uncertainty regarding impacts of a proposal (Government of WA, 2014).

Research projects can add significant value to the outcomes of on-ground management and must be designed to result in positive conservation outcomes. Research should be designed to address priority knowledge gaps (with outcomes publically available) and provide information that will improve environmental assessment of future projects.
The EPA has recommended offset condition 17 to extend the *Tecticornia* Survey and Research Plan (required by Statement 913) and expand the scope of the plan to include on-ground actions which relate to the research findings. Extending the scope of the plan to include on-ground works based on research is consistent with principles 4 and 5 of the WA Offsets Policy.

The monetary value of the offset for the Approved Proposal was based on $1,500/ha, and the proposed monetary value for the Revised Proposal is based on this same metric.

### Subterranean Fauna Offset

The EPA considers that the removal of an additional 168 ha (2.2 per cent) of the mapped Hinkler Well calcrete PEC and the removal of approximately 500 ha (25.6 per cent) of the mapped Barwidgee calcrete PEC is acceptable. However, there remains a significant residual impact which is capable of being offset through research to improve knowledge on subterranean fauna conservation in the presence of mining within the Yilgarn Region.

As noted under Principle 3 of the WA Government Offsets Policy, offsets must be related to the significant residual impacts of proposed projects.

The proponent has not proposed an offset for subterranean fauna, however the EPA considers that a research offset is appropriate for the Revised Proposal. Research offsets must be designed to result in positive conservation outcomes and should address priority knowledge gaps and provide information that will improve environmental assessment of future projects. Research projects are appropriate where there is some uncertainty and new science is required to develop better mitigation measures or predictive tools.

The EPA has recommended offset condition 18 to undertake research related to the Hinkler Well calcrete PEC and Barwidgee calcrete PEC through a Subterranean Fauna Research Plan, and considers that research to address the following should be included in the plan:

- improve the knowledge of subterranean fauna taxonomy, distribution and habitat requirements;
- develop a better understanding of the impact of mining operations on subterranean fauna; and
- identify the key variables which support the ecological function of subterranean fauna.

The EPA considers that consultation with the WA Museum and the Department of Parks and Wildlife is necessary to define the research plan, and the outcomes of the research must be made publically available.

### Summary

Having particular regard to the:

a) relevant WA Government and EPA policy and guidance pertaining to Offsets;
b) the EPA’s assessment that there remains a significant residual impact on *Tecticornia*, which is acceptable and capable of being offset; and

c) the EPA’s assessment that there remains a significant residual impact to the Hinkler Well and the Barwidgee calcite subterranean fauna PECs, which is acceptable and capable of being offset,

the EPA considers that:

- the impacts to Flora and Vegetation are acceptable and the Revised Proposal can be managed to meet the EPA’s objective for Flora and Vegetation and Offsets provided that recommended offset condition 17 is imposed to counterbalance the significant residual impact on *Tecticornia*-dominated vegetation; and

- the impacts to Subterranean Fauna are acceptable and the Revised Proposal can be managed to meet the EPA’s objective for Subterranean Fauna and Offsets provided that recommended offset condition 18 is imposed to counterbalance the significant residual impact on the Hinkler Well calcite PEC and the Barwidgee calcite PEC.

### 4. Matters of National Environmental Significance

The Commonwealth Minister for the Environment has determined that the proposal is a controlled action under the EPBC Act as it is likely to have a significant impact on one or more MNES. It was determined that the proposed action is likely to have a significant impact on the following matters protected by the EPBC Act:

- Listed threatened species and communities (sections 18 & 18A); and
- Nuclear actions (sections 21 & 22A).

The Proposed Extension is being assessed as a controlled action under the bilateral agreement between the Commonwealth and State Governments in relation to environmental assessment made under section 45 of the EPBC Act (Bilateral Agreement). This allows the State of Western Australia to use the PER process to assess the action under the EPBC Act on behalf of the Commonwealth Minister for the Environment.

The proposed action has been assessed by the EPA in a manner consistent with Schedule 1 of the Bilateral Agreement and this assessment report satisfies clause 6.2 of Schedule 1. Appendix 6 provides a table of the EPA’s assessment report’s achievements of the matters in clause 6.2 Schedule 1.

The EPA has generally considered the intent of policy, guidelines and plans considered to be relevant to this factor.
The assessment report on the Proposed Extension prepared by the EPA and provided to the Western Australia Minister for Environment is provided to the Commonwealth Minister for the Environment who will then make a decision as to whether or not the Proposed Extension should be approved under the EPBC Act. This is separate from any Western Australia approval that may be required.

**Commonwealth policy and guidance**

As the Proposed Extension is being assessed under the Bilateral Agreement, relevant Commonwealth policy, guidelines and plans also apply to this assessment (see Appendix 4). Consistent with the requirements of the ESD for the Proposed Extension, the following survey guidelines, conservation advice, species-specific recovery plans, and threat abatement plans for relevant species listed under the EPBC Act are relevant for this assessment.

- Survey guidelines for Australia’s threatened birds, (Australian Government 2010);
- Survey guidelines for Australia’s threatened bats, (Australian Government 2010);
- Survey guidelines for Australia’s threatened mammals, (Australian Government 2010);
- Conservation Advice on *Pezoporus occidentalis* (Night Parrot) (Threatened Species Scientific Committee 2008);
- National Recovery Plan for Malleefowl (*Leipoa ocellata*) – Benshemesh (2007);
- *Threat Abatement Plan for Predation by the European Red Fox* (Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008);
- Threat Abatement Plan for predation by feral cats (Department of the Environment 2015);
- Threat Abatement Plan for Competition and Land Degradation by Rabbits (Department of the Environment, Water, Heritage and the Arts 2008a);
- Threat Abatement Plan for Competition and Land Degradation by Unmanaged Goats (Department of the Environment, Water, Heritage and the Arts 2008b); and
- Threat Abatement Plan for Reduction in Impacts of Tramp Ants on Biodiversity in Australia and its Territories (Department of the Environment and Heritage (DEH), 2006).

**EPA Assessment**

The EPA notes that the proponent has given attention generally in the PER to the intent of Commonwealth policy, guidelines and plans considered to be relevant for MNES.
As noted in Table 1, the Proposed Extension would result in the clearing of up to 1,582 ha of potential habitat for MNES species.

Listed threatened species and communities

The proponent conducted targeted searches for conservation-significant fauna within the survey area and suitable adjacent habitat. Conservation-significant fauna species that were recorded or had the potential to occur within the Development Envelope have been listed in Tables 10.8, 10.12 and 10.17 of the PER. There were no listed threatened species or TECs recorded within the Development Envelope.

The EPA notes that the DEE stated in its decision on the referral to be a controlled action that the Proposed Extension involves the disturbance of habitat which is likely to contain an important population of the listed vulnerable (VU) Crest-tailed Mulgara (*Dasycercus cristicauda*) or population of the unlisted Brush-tailed Mulgara (*Dasycercus blythi*) that is important in a whole-of-environment context, which has persisted over many years.

The EPA notes that fauna surveys conducted within the Development Envelope and surrounding area did not record the listed Crest-tailed Mulgara. Therefore the EPA concludes that the Proposed Extension is unlikely to have a significant impact on the Crest-tailed Mulgara.

Several records of the unlisted Brush-tailed Mulgara were recorded over a wide area within sandplain dominated habitats. The EPA notes that these habitats are well represented locally and regionally within the area and considers that this species is unlikely to rely exclusively on sandplain habitat within the Development Envelope. Therefore the EPA considers the impact of the Proposed Extension on this species is likely to be relatively low.

Nuclear actions

The EPA has assessed the potential impacts of radiation on people in Section 3.4 of this report (Human Health), on non-human biota in Section 3.6 (Rehabilitation and Decommissioning) and on flora in Section 3.1 (Flora and Vegetation).

Under the EPBC Act, the nuclear trigger means all environmental factors are applicable to the assessment. Subterranean Fauna, Hydrological Processes and Inland Waters Environmental Quality, Heritage and Offsets are assessed in sections 3.2, 3.3, 3.5 and 3.7 respectively.

In addition to listed threatened species and communities and migratory species, the EPA has also given consideration throughout the various stages of its assessment process to the other important aspects of the environment that may be affected by the Proposed Extension. An assessment of the likely impact of the proposal on *Tecticornia* is set out in Section 3.1 of this report and Section 3.2 of this report gives particular attention to subterranean fauna that may be limited to environments like those in the Development Envelope. Impacts from groundwater abstraction and reinjection are discussed in Section 3.3.
In regards to air quality, impacts from the generation of radionuclide containing dust is addressed under Section 3.4 (Human Health). The EPA notes that the Proposed Extension will utilise natural gas for power generation which would result in a significant reduction in greenhouse gas emissions compared with using diesel fuel.

The EPA notes that under the EPBC Act the environment can include social, economic and cultural aspects and that these matters are addressed in Section 19 of the PER (Toro 2015b).

Management measures

The proponent has proposed a number of procedures to mitigate impacts on native biota, including the management of surface water and groundwater as outlined in Section 3.3, the staged clearing of vegetation, progressive rehabilitation, the retention of habitat corridors to allow fauna to disperse to areas of remaining habitat. Other management measures that would be implemented to minimise impacts on terrestrial fauna have been listed in Section 10.9 of the PER.

The need for management of pests such as feral cats, rabbits, foxes, goats, cane toads and tramp ants should be subject to a risk-based assessment prior to the implementation of the Proposed Extension. There does not appear to be any component of the Proposed Extension that if implemented would lead the EPA to suspect that these animals would represent an unmanageable additional threat to listed MNES species.

Recommendations

The EPA has recommended the following environmental conditions to minimise impacts on MNES determined for the Proposed Extension:

- limit the location and authorised extent of the clearing of vegetation to 1,582 ha, as set out in Table 2 of Schedule 1;
- condition 7 is imposed which requires a Flora and Vegetation Management Plan to minimise direct and indirect impact on conservation-significant flora and vegetation;
- condition 8 is imposed which requires the avoidance and implementation of a 50 m flora exclusion zone around the locations of *Tecticornia* aff. *halocnemoides* s. l. 'large ovate seed aggregate';
- condition 9 is imposed which requires the avoidance and implementation of a 50 m flora exclusion zone around the collection of *Tecticornia* sp. aff. *Burnerbinmah* (inflated fruit);
- condition 11 is imposed which requires the implementation of a GDMMP including the development of trigger levels for drawdown and the implementation of a barrier system to control drawdown so that the trigger levels are not exceeded;
condition 12 is imposed which requires the implementation of a Surface Water Management Plan to prevent surface water contamination;

condition 13 is imposed which restricts ground disturbance and groundwater drawdown within the *Schizopera* sp. TK1 exclusion area until further surveys identify *Schizopera* sp. TK1 outside impact areas;

condition 14 is imposed which requires the proponent to limit mounding of groundwater from reinjection to less than one metre;

condition 15 is imposed which requires the implementation of a Dust Management Plan;

condition 17 is imposed which requires an offset to counterbalance the significant residual impact on *Tecticornia*;

condition 18 is imposed which requires an offset to counterbalance the significant residual impact on the Hinkler Well calcrete PEC and the Barwidgee calcrete PEC; and

requirement for a Radiation Management Plan and a Mine Closure Plan that will manage exposure of members of the public and employees.

The EPA’s view is that impacts from the Proposed Extension on listed flora and fauna species are not expected to result in an unacceptable or unsustainable impact on the conservation status of these listed species.

The EPA’s view is that impacts from the Proposed Extension associated with the nuclear action are not expected to result in an unacceptable or unsustainable impact. The EPA notes that the Commonwealth Government is likely to impose additional conditions relating to potential impacts from radiation, as it has for other uranium mines in Australia.

5. Conditions

Section 44 of the EP Act requires that this assessment report must set out:

- what the EPA considers to be the key environmental factors identified in the course of the assessment; and
- the EPA’s recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

5.1 Recommended conditions

Section 45B of the EP Act provides that if a proposal is revised (i.e. the amalgamation of the Approved Project and the Proposed Extension) after implementation conditions have been agreed, each of those implementation conditions (in this case, implementation conditions in Statement 913) continue to apply to the Revised Proposal, subject to revised conditions or procedures being applied to the Revised Proposal. In its assessment of the Proposed Extension, the EPA has also reviewed the implementation conditions for the Approved Project and recommends revised implementation conditions be
imposed on the Revised Proposal if the Minister decides that it may be implemented. Appendix 5 sets out the EPA’s review of the Ministerial Statement for the approved proposal and Appendix 7 sets out the EPA’s recommended environmental conditions for the revised proposal.

5.2 Consultation

In developing these conditions, the EPA consulted with the proponent and the Department of Parks and Wildlife, the Department of Environment Regulation, the DoW, the DEE, the DMP, the Radiological Council and the Department of Aboriginal Affairs, on matters of fact, technical feasibility and potential difficulties with implementation. Minor changes which did not change the intent or scope, were made to the conditions, these included changes to the advisory role of some of the agencies above and the correction of minor errors.

6. Recommendations

That the Minister for Environment notes:

1. that the proposal assessed is a Revised Proposal being a Proposed Extension to the Approved Wiluna Uranium Project by the development and mining of the Millipede and Lake Maitland uranium deposits and construction of associated infrastructure;
2. that in undertaking this assessment, the EPA has assessed the impacts of the Proposed Extension in the context of the Approved Project, considering the cumulative impacts of the entire Revised Proposal where appropriate;
3. the report on the key environmental factors of Flora and Vegetation, Subterranean Fauna, Hydrological Processes/Inland Waters Environmental Quality, Human Health, Heritage, Rehabilitation and Decommissioning (integrating factor) and Offset (integrating factor) identified by the EPA in the course of its assessment set out in Section 3; and
4. the EPA has concluded that the Revised Proposal may be implemented provided this is in accordance with the recommended conditions and procedures set out in Appendix 7 and summarised in Section 5.
Appendix 1

List of Submitters
Organisations:

1. Commonwealth Department of the Environment and Energy
2. Department of Aboriginal Affairs
3. Department of Environment Regulation
4. Department of Mines and Petroleum
5. Department of Parks and Wildlife
6. Department of Water
7. Main Roads WA
8. Radiological Council WA
9. Conservation Council of Western Australia
10. People for Nuclear Disarmament
11. Uniting Church in Australia

Individuals:

59 individual submissions
2392 pro forma submissions
Appendix 2

References


Australian Government 2010, Survey guidelines for Australia’s threatened birds.


Department of the Environment, Water, Heritage and the Arts (DEWHA) 2008; Threat Abatement Plan for Predation by the European red fox.


EPA 2000, Position Statement No. 2: Environmental Protection of Native Vegetation in Western Australia, Environmental Protection Authority, December 2000.


EPA 2004a, Guidance Statement No. 51: Guidance for the Assessment of Environmental Factors - Terrestrial Flora and Vegetation Surveys for
Environmental Impact in Western Australia, Environmental Protection Authority, June 2004.


EPA 2007, Guidance Statement No. 54a: Guidance for the Assessment of Environmental Factors - Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia, Environmental Protection Authority, August 2007.


EPA 2013, Environmental Assessment Guideline No. 12 – for Consideration of subterranean fauna in environmental impact assessment in Western Australia, Environmental Protection Authority, June 2013.

EPA 2014a, Cumulative environmental impacts of development in the Pilbara region – Advice of the Environmental Protection Authority to the Minister for Environment under Section 16(e) of the Environmental Protection Act 1986, Environmental Protection Authority, August 2014.

EPA 2014b, Environmental Protection Bulletin No. 1 – Environmental Offsets, Environmental Protection Authority, Revised August 2014.

EPA 2015a, Environmental Assessment Guideline No. 8: Environmental principles, factors and objectives, Revised Environmental Protection Authority, January 2015.


EPA 2015c, Environmental Protection Bulletin No. 19: EPA Involvement in Mine Closure, Environmental Protection Authority, Revised January 2015.

EPA 2015d, Environmental Assessment Guideline No. 11: for Recommending Environmental Conditions, Environmental Protection Authority, Revised August 2015.
EPA 2015e, Environmental Assessment Guideline No. 17: for Preparation of Management Plans under Part IV of the Environmental Protection Act 1986, Environmental Protection Authority, August 2015.


Government of Western Australia 1983, Radiation Safety (General) Regulations, Government of Western Australia, 1983.


Government of Western Australia 2011, WA Environmental Offsets Policy, Government of Western Australia, September 2011.

Government of Western Australia 2014, WA Environmental Offsets Guidelines, Government of Western Australia, August 2014.


Toro 2016b, Traditional Owner Mining Agreement Signed for Wiluna Project – ASX Release, 7 July 2016.
Threatened Species Scientific Committee 2008, *Approved Conservation Advice on Pezoporus occidentalis (Night Parrot).*
Appendix 3

Summary of identification of key environmental factors and principles
<table>
<thead>
<tr>
<th>Environmental factors</th>
<th>Description of the proposal’s likely impacts on the environmental factor</th>
<th>Government agency and public comments on the PER (More recent comments provided in the main document)</th>
<th>Evaluation of whether a factor is a key environmental factor</th>
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| Subterranean fauna    | The proposal would result in the direct removal of subterranean fauna habitat. Potential changes in groundwater quality due to process spills also have the potential to impact on subterranean fauna. | Department of Parks and Wildlife  
The Proposal would impact on the Priority 1 PECs ‘Hinkler Well calcrite groundwater assemblage type on Carey palaeodrainage on Lake Way Station’ and ‘Barwidgee calcrite groundwater assemblage type on Carey palaeodrainage on Barwidgee Station’.  
The highly restricted distributions of many subterranean fauna species make these communities particularly vulnerable to disturbance and the capacity of these species and communities to re-establish in disturbed or degraded habitat is unknown.  
There is a lack of detail in relation to proposed impact management frameworks and strategies that does not provide confidence that monitoring and management of potential impacts on conservation-significant biota would be effective.  
Estimates of indirect impacts do not appear to take into account changes to natural physico-chemical gradients in aquifers supporting the subterranean fauna PECs. | Having regard to the potential impacts from the removal of subterranean fauna habitat and lowering of the water table, the EPA identified Subterranean Fauna as a key environmental factor.  
Subterranean Fauna is discussed in section 3.2. |
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<td>Subterranean fauna surveys have disproportionately sampled impact areas. Conservation Council of Western Australia (CCWA) MWH note that it is possible for these species to exist outside the impact area because of suitable habitat. There is no description of what constitutes suitable habitat or what the habitat requirements are for the four species mentioned above. MWH also discussed the usefulness of surrogates to assess likely distributions – the submitter considers the use of surrogates is not sufficient in providing evidence of distribution particularly given the high diversity and levels of endemism of subterranean fauna. The diversity of the habitat features within the Hinkler Well calcrite delta has not been described. The habitat requirements and range of each of these species have not been described. The rate of change to habitat has not been described. Assumptions about the ability of these species to survive in other parts of the Hinkler Well calcrite delta have not been supported with evidence. The impacts to water quality and habitat from tailings seepage have not been effectively considered as impacts to stygofauna. In the EMP (Appendix 4) Toro suggest tailings would not have an impact on stygofauna. A link to</td>
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<td>Environmental factors</td>
<td>Description of the proposal's likely impacts on the environmental factor</td>
<td>Government agency and public comments on the PER (More recent comments provided in the main document)</td>
<td>Evaluation of whether a factor is a key environmental factor</td>
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<td>the Commonwealth Scientific and Industrial Research Organisation (CSIRO) study (Appendix 10.29) is provided as if to suggest this report considers impacts to stygofauna - in this study there is not a single mention of stygofauna. The reduction of habitat in addition to the impacts of pollution in habitat and water quality should be considered in detail and presented. There is a tendency to use surrogates to suggest a species is more widespread than what is demonstrated with evidence. The new EPA guidelines have weakened the need for evidence in this area. The high levels of diversity and endemism in subterranean fauna and particularly stygofauna amplify the threats to individual species survival. People for Nuclear Disarmament (PND) Stygofauna and troglofauna have high levels of diversity and endemism. Surveys by Boulton et al. and later Humphreys have established reliable data on species present in parts of area proposed for Toro’s mine activities. The range of habitat requirements of these unique and curious subterranean life forms needs further field study. It is possible that they might not survive tailings seepage or alterations of salinity levels due to drawdowns for mining for instance. Has Toro the right to</td>
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<td>Description of the proposal’s likely impacts on the environmental factor</td>
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<td>cause any of these unique invertebrates to become extinct?</td>
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<tr>
<td>Other Public Submitters</td>
<td>Subterranean fauna species have been found in small numbers and only within the Project Disturbance Envelope. Other projects in the region where new taxa have been found to only occur within the project footprint have undertaken large regional surveys to try to locate other individuals or populations and failing that, have committed to extensive research and translocation programs for those species in an attempt to avoid the loss of a new species. Why have Toro not undertaken the same steps to ensure the environmental impacts of their project are minimised?</td>
<td>Since the EPA cannot approve a project that will likely cause the extinction of a native species, if Toro do not include commitments to undertake further research or implement management measures to ensure the newly identified species are not lost as a result of the project, the EPA should not recommend to the Minister that the project be approved.</td>
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<tr>
<td>Flora and Vegetation</td>
<td>Department of the Environment and Energy</td>
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<td>The proposal would result in the clearing of up to 1,582 ha of native vegetation, removal of the priority flora species <em>Tecticornia</em> and potential threats to flora and vegetation from radiation, lowering of the water table and dust.</td>
<td>There appears to be limited information available on the groundwater-dependence of some of the vegetation in the area, notably <em>Tecticornia</em> species. The Environmental Management Plan (EMP) should incorporate ongoing monitoring and mitigation measures that reflect the water requirements of any identified GDEs.</td>
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<td>Department of Parks and Wildlife</td>
<td>The information presented in the PER document on <em>Tecticornia</em> is deficient in some areas. The proponent is requested to provide more in-depth and comprehensive prediction of the direct, indirect and cumulative impacts on flora and vegetation, particularly <em>Tecticornia</em> species and communities, in a format that allows assessment of the individual and cumulative impacts of all proposal elements on affected species and communities.</td>
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<td></td>
<td>Vegetation mapping has not been provided for all areas of predicted indirect impacts.</td>
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<td></td>
<td>Lack of combined direct, indirect and cumulative impact summaries for species and communities presents a significant impediment to an assessment of the full impact on these values.</td>
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<td></td>
<td>Without any survey data or other habitat related information that indicates broader distribution, there is</td>
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</table>

Flora and Vegetation is discussed in section 3.1.

Having regard to the potential impacts from clearing of native vegetation, impacts on threatened flora, potential effects of radiation, lowering of the water table, fragmentation, weeds and fire, the EPA identified Flora and Vegetation as a key environmental factor.
insufficient evidence for asserting that species are likely to be widespread and that impacts on flora or vegetation units are not considered to be environmentally significant.

High levels of uncertainty remain in relation to *Tecticornia* taxonomy and the interpretation of flora and vegetation survey results.

The assessment of impacts on vegetation focuses on depth to groundwater and the mapped extent of indirect impacts does not incorporate potential impacts associated with altered groundwater salinities or surface water flows and ponding.

There is a lack of detail in relation to proposed impact management frameworks and strategies, and this does not provide confidence that monitoring and management of potential impacts on conservation-significant biota will be effective.

**CCWA; PND (WA)**

Concern is raised that the company could not provide enough detail about the project for the consultants to make a proper assessment. This suggests that the impact of their proposal on the natural history of the area is not of high importance to the company – or that their notions of potential biological impacts of their mine development are so scanty it has been impossible to offer the consultants the data required. Clearly there are technical aspects of this project that require further detail.
and definition before any comprehensive analysis of environmental impact can be made.

Other Public Submitters
How can it be concluded that cumulative effects to these vegetation associations will not be significant if the total known extent of the association (i.e. in a regional or state-wide context) is not presented. For example, how many additional hectares of association T occurs in the region? If this information is unknown, then Toro should assume the direct impact of 70 per cent of the known mapped occurrence constitutes the loss of 70 per cent of this vegetation association as a whole and therefore is a significant impact.

If the known extent of these associations in a wider context is not presented, how can the actual significance of potential cumulative impacts be assessed?

Since the EPA cannot recommend approval of a project that will likely cause the extinction of a native species, if Toro do not include commitments to undertake further research or implement management measures to ensure the newly identified flora species are not lost as a result of the project, the EPA should not recommend to the Minister that the project be approved.

| Terrestrial fauna | The proposal would result in direct loss of 1,582 ha of potential fauna habitat by clearing. | Department of the Environment and Energy
Provide more information on the fauna deterrents to be used at the Millipede evaporation pond. | Terrestrial fauna was identified as a preliminary key environmental factor in the Environmental Scoping Document for the proposal. With consideration of: |
<table>
<thead>
<tr>
<th>There is potential for indirect impacts on Terrestrial Fauna as a result of increased dust emissions, vehicle strikes.</th>
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<tbody>
<tr>
<td>The DEE recommends more detail be provided in an appendix to the Response to Submissions document on the Northern Marsupial Mole targeted survey effort across the proposal area.</td>
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<tr>
<td>CCWA; PND (WA)</td>
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<td>Further surveys should be conducted, especially during different seasons and under different conditions (e.g. after rain) in order to better understand the landscape. This was a criticism of the original studies and one that has not been addressed by the further studies.</td>
</tr>
<tr>
<td>Surveying for possible occurrence of Night Parrot, a species of high conservation significance, was regarded as of low importance. The adequacy of the Night Parrot surveys is unclear. The likelihood of Night Parrots being in the area is slim but cannot be ruled out.</td>
</tr>
<tr>
<td>Ecologia conducted a peer review of the studies on SRE species at Lake Maitland (Appendix 10.38). Their major criticism was that: ‘The assessment includes identification of SRE habitat results. Caution should be applied when assigning SRE species to broad scale habitat preferences, and quantifying the area of potential habitat per species based on this, as has been done in this assessment. The level of assessment completed is not at sufficient scale or intensity to provide detailed habitat preference information per species.’</td>
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<tr>
<td>Environmental Assessment Guideline 9 - Application of a Significance Framework in the Environmental Impact Assessment Process (EPA, 2015b) and given:</td>
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<tr>
<td>- the availability and widespread nature of suitable habitat for terrestrial fauna found outside the impact area;</td>
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<td>- that conservation significant terrestrial fauna species recorded in the impact area are unlikely to rely exclusively on habitat within the development envelope or be restricted to this area; and</td>
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<td>- the proponent’s commitments around fauna management and monitoring; and</td>
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<tr>
<td>- the EPA notes that the Northern Marsupial Mole is not currently listed under the EPBC Act, the EPA considers that it is unlikely that the proposal would have a significant impact on terrestrial fauna and the proposal</td>
</tr>
</tbody>
</table>
### Other Public Submitters

In reference to PER Table 10.19, concern is raised that the 60.6 ha of disturbance area has not been mapped in relation to fauna habitats.

Since the EPA cannot recommend approval of a project that will likely cause the extinction of a native species, if Toro does not include commitments to undertake further research or implement management measures to ensure the newly identified SRE species are not lost as a result of the project, the EPA should not recommend to the Minister that the project be approved.

In reference to Section 10.12, the cumulative impact assessment for terrestrial fauna is incomplete. Furthermore, the assessment of potential regional cumulative impacts to conservation-significant fauna and their habitats (i.e. from surrounding existing, approved, or proposed activities) has not been assessed.

Can water be deliberately ponded to benefit migratory birds for the life of the project and beyond to reduce both environmental impact and costs of water treatment? Migratory birds may be affected positively if an attempt is made. Are censuses being done? Have potential impacts (positive and negative) been considered, and will this impact be monitored for the life of the Project?

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### Terrestrial environmental quality

- **The proposal has the potential to impact on Terrestrial Environmental Quality as a result of**

- **Department of the Environment and Energy**

  The PER document states that there is no potential for acid rock drainage (ARD) issues to occur. A reference as to what studies assessed ARD potential, as well as the

- **Terrestrial environmental quality was identified as a preliminary key environmental factor in the Environmental Scoping Document**
erosion and sedimentation; flooding of water storage facilities; spills; seepage from the TSF and Waste storage and dust deposition.

There is also the potential for mineralised material being deposited outside the project area during the hauling process.

Confidence (uncertainty) associated with this prediction should be provided. Are there any monitoring, management or remediation strategies in place should the prediction not be correct?

CCWA
No further studies following the Landloch report could be found nor any acknowledgment of this critique or proposed future studies made. There is insufficient data on sediments, erosion and the potential impact on tailings and mine closure and rehabilitation. This crucial information deficiency also applies to the stability and security of bunds and other landforms including ore stockpiles (which are not well defined or described in the PER document).

Soils as shown in PER Figure 16.4 contain sulphide which leads to acid sulphate soils when exposed to air in the presence of pyrite. What is the reason acid sulphate soils are not addressed, given the presence of the necessary precursors including iron, sulphide, and air exposure?

CCWA

Environmental Assessment Guideline 9 - Application of a Significance Framework in the Environmental Impact Assessment Process (EPA, 2015b) and given:

- no surface water discharge from dewatering would occur as part of the proposal;
- external surface water runoff and floodwater would be bunded away from mining areas;
- the permeability of the pit floor and the TSF cell embankments is expected to be very low;
- the presence of acid sulphate soils is considered low;
- erosion modelling found that material across the project area was not overly susceptible to erosion;
- the proponent’s commitments around rehabilitation and vehicle and equipment hygiene;
### WATER

| Hydrological processes | Hydrological processes may be impacted by the diversion of surface water flows from mine construction, groundwater dewatering and abstraction, and groundwater reinjection. | Department of Water
The DoW is generally satisfied with the level of investigations undertaken for the proposed abstraction borefields (West Creek Borefield and Lake Maitland Borefield) required for processing. These investigations appear compliant with an H3 Hydrogeological Assessment as required by the DoW’s Operation Policy 5.12 – Hydrogeological Reporting Associated with a Groundwater Well Licence (2009).

The DoW is generally satisfied with the level of investigations undertaken for the required dewatering

Having regard to the potential to impact surface and groundwater hydrological regimes and affect the availability of groundwater for dependent ecosystems and other groundwater users, the **EPA identified Hydrological Processes as a key environmental factor.**

Hydrological Processes are discussed in section 3.3. | the proponent's management commitments for surface water and dust suppression; and
the proponent’s commitment to developing a radiation plan.

the EPA considers that it is unlikely that the proposal would have a significant impact on terrestrial environmental quality and the proposal can meet the objectives for this factor.

Accordingly, the EPA did not identify terrestrial environmental quality as a key environmental factor at the conclusion of its assessment. |
Lake Maitland open pits. Pit dewatering of no more than 2 GL/a would be required for the Millipede deposit and approximately 4 GL/a would be needed for the Lake Maitland deposit. The proposal would also involve downstream aquifer reinjection of excess water from pit dewatering in the West Creek and Lake Maitland borefields.

activities associated with the proposal. The investigations appear compliant with an H3 Hydrogeological Assessment as required by the DoW’s Operation Policy 5.12.

Department of the Environment and Energy

A complete water balance has not been provided. The water balance is not clearly presented and does not fully integrate relevant information from other parts of the PER document. A summary of all groundwater models conducted, including links to where more information can be found in other sections of the document and in the appendices, would assist in understanding the extent of work completed.

It is not clear whether there is a maximum time period for which the drawdown limit is tolerated by flora and fauna. Following from this, how do the limits of tolerance by the flora and fauna compare to the predicted time period of drawdown by the modelling based on the operational time phase of the project?

How are quantitative and qualitative uncertainties determined from investigations or modelling demonstrated to be targeted by monitoring programs? How do modelling and monitoring complement each other?

The proponent commits to limit groundwater extraction for the extension project so that 70 per cent aquifer saturation is maintained. Appropriate monitoring and
triggers should be defined to ensure that this remains the case, particularly in a cumulative sense.

An outline of the water supply (quality and quantity) requirements of the private bores that the proponent may need should be provided. A discussion on whether this would add to the 1.3 GL/a proposed to be extracted from the Lake Maitland borefield is also required.

The model report prepared by Pennington Scott considers that the risk of reinjection sites clogging is high and would reduce the effectiveness of reinjection. It is noted that the PER does not discuss contingencies to deal with excess mine water that is unable to be reinjected. Contingencies, and the likelihood of needing to implement them, should be included and discussed as a worst-case scenario. It is noted that the proponent considers that reinjection may not be required during all six years of mining at Lake Maitland.

Discussion and comments are required on the rationale for implementing an order of magnitude anisotropy between vertical and horizontal hydraulic conductivities and the likely influences these have on calibration, modelled impacts and drawdowns. This would increase confidence of modelling outcomes of Millipede-Centipede drawdowns.

Department of Environment and Regulation
It is noted that dewatering will be required to mine the Centipede and Millipede deposits and that the predicted cone of depression of the water table will extend beneath
the surface of Lake Way. As this salt lake is likely to be underlain by sulfidic sediments, there is a risk that prolonged dewatering will lead to sulfide oxidation and the formation of acid sulfate soils on Lake Way. Subsequent reflooding of the lake after heavy rainfall could then potentially release a range of metals and metalloids from sediments into the water column in the lake that would have otherwise been immobile under the anoxic conditions in undisturbed sediments. This issue has not been considered in studies undertaken for the PER document. Although sediment samples from Lake Way have been chemically analysed for a range of chemical constituents, the sulfide content of these materials has not been determined. Additionally, no work has been carried out to determine the acid-base balance of Lake Way sediments and no incubation tests have been carried out to determine how these materials will behave on oxidation (including an assessment of the quality of the leachate that could be produced from oxidised sediments). This information gap means that the potential environmental impacts of mine dewatering in the area cannot be fully assessed.

PND (WA); CCWA
Despite the general mining interest in the Goldfields and Murchison, there is no water allocation plan. The DoW and the EPA referred to the Wiluna Water Reserve Drinking Water Source Protection Assessment that the Water Corporation had conducted in 2004. However, this gave no consideration to mining as a land use or to environmental allocations of water, nor did it look at
water recharge in the area. It did consider drinking water bores around Wiluna.

The hydrogeological and hydrological report review conducted by KCB (Appendix 10.45) identified a number of deficiencies in the study of Supply Groundwater Modelling conducted by Aquaterra in 2010.

There have been numerous occasions where there has been flooding and filling of the salina system at Lake Way, yet the company has relied on inconclusive conceptual computer models in preference to real data. The following aspects of the Proposal are described which pose a serious risk to the environment in flood conditions (Surface Hydrology Studies by Aquaterra 2015, Appendix 10). Not only are the pits at risk from flooding, so are the ore stockpiles all with radioactive chemicals and heavy metals. The bunding to protect mine infrastructure also has the potential to change water flows and cause erosion, the impacts of this are not well understood and have not been well defined or explored.

In the surface hydrology studies (Appendix 10.1) the consultant RPS has given a very brief overview of rainfall in the Wiluna area. They have not included any analysis or discussion on the well documented changes of rainfall patterns.

**Other Public Submitters**
Concerns about impacts to natural water resources:
<table>
<thead>
<tr>
<th>Inland Waters Environmental Quality</th>
<th>Where would water be sourced for the proposed mine? Is it going to be depleted or obtained from renewable sources?</th>
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</thead>
</table>
| Diversion of surface flows may affect surface water quality by increasing flow velocities and hence increasing the potential for erosion and sediment loading. Stored tailings may provide a source for elevated metals and salt in groundwater, with the potential to affect the quality of future supplies. | **Department of Mines and Petroleum**  
Appendix 10.29 identifies areas for further studies to validate the assumptions of the pollutant fate transport modelling from the TSF. DMP supports these recommendations and expects the outcomes of these studies to be included and discussed in the mining proposal and mine closure plan submission under the *Mining Act 1978*.  
**Department of the Environment and Energy**  
The proposed Lake Way, Centipede and Millipede pits encroach into the flood plains of Abercrombie, Negrara and Kukububba Creeks in the Lake Way catchment and cross the main creek channel. The risk of contaminant mobilisation caused by progressive changes to diversion bunds as the mine progresses has not been considered. This risk should be assessed.  
The Department assumes that further work is being conducted to improve analysis of impacts via changes in groundwater chemistry and that the information will be provided in future assessments.  
No work seems to have been done on potential solute release from stockpiles to the environment during mining. Stockpiles will present a large amount of readily soluble minerals (halite, gypsum, anhydrite, bassanite) which could provide a pathway for solutes to enter surface water. |
| Having regard to the potential for the proposal to have impacts on surface and groundwater quality and to affect the quality of groundwater for dependent ecosystems and other groundwater users, the EPA identified Inland Waters Environmental Quality as a key environmental factor. Inland Waters Environmental Quality is discussed in section 3.3. |
water or groundwater if there is significant rain during production and runoff is not contained within the Project site.

**Department of Environment Regulation**
The PER indicates that dewatering effluent that is in excess of mine water use requirements will be stored in large evaporation ponds. This water is likely to contain uranium, vanadium and selenium at concentrations that would be harmful to aquatic birds that may use these ponds as a source of food (insect larvae, etc.), but no information is provided to indicate how this issue would be managed during the mining operation.

**Department of Parks and Wildlife**
The disposal site for hypersaline waste water should be reviewed based on consideration of discharging/reinjecting water in areas with the lowest potential environmental impact. The PER document indicates that the Proponent intends to reinject hypersaline water as a mitigation measure to manage drawdown impacts on groundwater dependent vegetation into the Barwidgee PEC. However, *Tecticornia*-dominated assemblages and associated conservation-significant taxa may be significantly impacted by altered salinities associated with the reinjection of hypersaline waste water. Identifying the appropriate balance between maintaining groundwater depths for vegetation, and limiting disruption to salinities, haloclines and other physico-chemical gradients of importance to both vegetation and stygofauna assemblages requires further consideration.
Over two periods of flooding rains (March 2011 and March 2015), Toro failed to have surveys undertaken to better understand the impact of heavy rain in the subject area and beyond. Such rains would attract large flocks of birds which might use the opportunity to go through their rapid breeding cycle – but this could be affected by dispersal of contaminated water.

**Other Public Submitters**
The next phase of this megalithic project could involve the damming of the Fitzroy (linked to the Ord), much further to the north, but justifiable for the purpose of supplying water to feed the mines and on occasion to flush toxic accumulations from one area to another.

It is not entirely clear how the reverse osmosis brine discharge is dealt with. What are the potential effects of the chemicals used (typically membrane cleaning chemicals, antiscalant, etc.)? Could a no-chemical system be used (implying higher reverse osmosis membrane changeout rates) and the brine discharged to the already saline lakes to minimise impacts?

| AIR | The generation of radionuclide-containing dust from mining, stockpiling, and SO$_2$, NO$_2$, CO and dust emissions from haulage has the | Department of Environment Regulation | Air Quality and Atmospheric Gases was not identified as a preliminary key environmental factor in the Environmental Scoping Document for the proposal. | 
| Air Quality and Atmospheric Gases | | Mention is made of Millipede and Centipede operating at the same time, but no cumulative assessment was provided. PER Section 18 document states that dispersion modelling was used to assess the impact of emissions from the Millipede site at sensitive receptors | 

| potential to impact on the environment and human health. | including the Wiluna township. However, no technical details were given, and no mention was made of whether this included cumulative impacts from the other mine sites. The air quality impact assessment for Lake Maitland includes dispersion modelling of emissions from the mineral processing plant, as well as mining operations. It is noted that the processing plant at Lake Maitland is removed from the PER, but the modelling has not been updated. Radon emissions from the mine site and the mineral processing plant have been quantified on the basis of assumptions (page 22 of Appendix 10.66) that are not verified. The impact of emissions from the electricity generating plant running continuously has not been addressed. Emissions of NOx/SOx from power generation on mining sites can be significant. The Proponent’s assertion that such emissions are negligible in the proposed plant has not been supported by evidence. The Lake Maitland air quality assessment report does not contain sufficient information to determine the relative contributions of mining and mineral processing to the total emissions inventory. Emissions due to wind erosion are described by an equation containing two parameters; the threshold wind speed for particle lift-off, and the specific emission rate. | Having regard to Environmental Assessment Guideline 9 - Application of a Significance Framework in the Environmental Impact Assessment Process (EPA, 2015b) and given: • dust and air quality modelling has taken into account climatic factors; • the proponent would use natural gas to generate power requirements for the proposal; • air quality assessments were undertaken by a reputable and experienced air quality consultant and then peer reviewed; • the proposal does not include a processing plant; • the risk of a significant flood event occurring during the operating life of the proposal is relatively low; • the EPA’s evaluation of radionuclides in dust under the key factor Human Health in this report; and • having regard to EPA Guidance Statement 12 - Minimising |
constant. Both of these parameters can expect to depend on the nature of the material, in particular through the density and particle size, but the report (Appendix 10.66) contains no discussion of what values were assigned to either parameter and on what basis.

In Appendix 10.66, mention is made of isopleth plots that are not present in the submitted document.

The tabulated results given on pages 46–49 of Appendix 10.66 show cumulative values of ground-level particulate concentrations that are close to the criterion values, especially for the Lake Maitland accommodation village. These appear to be inconsistent with the adopted background levels listed in Table 19 (page 38).

The tabulated results given on pages 46–49 of Appendix 10.66 show cumulative values of ground-level particulate concentrations that are close to the criterion values, especially for the Lake Maitland accommodation village. These appear to be inconsistent with the adopted background levels listed in Table 19 (page 38).

**PND (WA); CCWA**

There is a high level of uncertainty relating to dust/air surveys due to flawed methodology. Baseline conditions have yet to be established to inform air monitoring and dust suppression regimes by the company. Of high concern is how ore stockpiling will be managed given its radioactive component.

Greenhouse Gas Emissions (EPA, 2002) and Environmental Protection Bulletin No. 24 - Greenhouse gas emissions and consideration of projected climate change impacts in the EIA process (EPA, 2015); and

- the EPA considers that the predicted emissions for this proposal are unlikely to significantly increase the States greenhouse gas emissions, consistent with its current policy. Therefore, the EPA did not assess greenhouse gas emissions further.

the EPA considers that it is unlikely that the proposal would have a significant impact on air quality and atmospheric gases and the proposal can meet the objectives for this factor.

Accordingly, the EPA did not identify air quality and atmospheric gases as a key environmental factor at the conclusion of its assessment.
Varying weather conditions will test the efficacy of dust and air quality control measures. Water in times of flooding could move tailings across a wide area, which once dry, would extend the distribution of radioactively contaminated dust by wind.

A number of comments in the report state that it is sufficient – however the detail of the report suggests that due to the flawed methodology and lack of data there is a high level of uncertainty. This level of uncertainty is unacceptable and inconsistent with the EPA’s obligation to apply the precautionary principle.

The PER document mentions that stockpiles would be on Run of Mine pads but there is no information on the ore content of stockpiles, the volume of stockpiles, the period of time ore will be stockpiled for, or how dust and water would be managed from those stockpiles. These assessments have not adequately addressed these issues. There is no confidence that sufficient information has been provided in this regard and no confidence that the consultants could adequately consider this risk factor on the basis of the material provided.

More complete and credible studies should be resubmitted based on the above. Dust deposition is a significant issue and one with public health implications, particularly in regards to uranium ore that has radioactive chemical content as well as heavy metal content and the close proximity to the town of Wiluna, Bondinis and Kookabubba.
Uniting Church (WA)
Reduction of carbon emissions is required to prevent climate change. Greenhouse gas emissions are a significant environmental impact that must be accompanied by effective and equivalent offsets. Greenhouse gas emissions over the life of the proposed operations do not appear to be recalculated for this expansion. What is the total predicted greenhouse gas emissions for all operations of the expansion over the full lifespan?

Other Public Submitters
It is not clear what the distances are between sensitive receptors (listed in Table 18.4 and 18.6) and the Project’s key emission sources. Is the ‘Accommodation Village’ sensitive receptor listed in the air quality tables for both Millipede and Lake Maitland the same village? If so, why haven’t impacts from the two deposits been assessed cumulatively?

Concern is raised that there are reported exceedances of airborne pollution emissions at existing uranium processing facilities, including the Ranger mine.

Uranium production will require electricity. Where will this come from, and how will it be generated? How much CO² will it generate?

### People

| Human Health | Potential impacts from increased exposure to radiation due to mining, |
| Radiological Council WA | The Proponent has addressed the key requirements for radiation under the Radiation Safety Act 1975 and |
| | Having regard to the potential impacts from the increase in exposure to radiation on human |
| **Department of Mines and Petroleum** | Predicted radiation doses for workers and members of the public based on main exposure pathways have been provided in PER Section 14 document. Dose predictions will be assessed in detail by Resources Safety Division under the *Mines Safety and Inspection Act 1994*. |
| **Department of the Environment and Energy** | Consistency in the radon measurements provided is necessary to better determine the expected doses to workers and the public. Justification is required for this assumption in order to be satisfied with a dose reduction factor of 4, which has been applied in this case. Quantitative dose reduction factors must also be provided. Establishment of appropriate dose constraints are required, including a demonstration of their application in the process of optimisation. |
| **PND (WA)** | Transporting the uranium ore is concerning. The statistics of likely accidents occurring during trucking cannot be ignored. The possibility of accidents and spillage into the surrounding environment during transportation is a serious issue. What will be the health impacts for mine workers and for the community elsewhere in the surrounding region? | health of workers, residents at nearby sensitive receptors and along the transport route, the EPA identified Human Health as a key environmental factor. Human Health is discussed in section 3.4. |
According to the World Health Organisation (WHO), radon-222 gas is the second leading cause of lung cancer globally. Toro has avoided such facts, and has directly disseminated misleading notions about the health dangers of uranium mining. It has sponsored a Canadian ‘scientist’ on speaking tours during which he maintains that low-level radiation is good for human health. He has been loudly discredited by leading international health organisations, and domestic public health and radiation experts; also by 40 medical doctors in Australia who called for government intervention.

**Other Public Submitters**
Submitters were concerned about health impacts and impacts on food produce. The recommended worker dose annual limit is 20 mSv. However, this is 20 times more than the legal dose as a member of public. How could this dose be considered safe?

<table>
<thead>
<tr>
<th>Heritage</th>
<th>Potential impacts on Aboriginal heritage sites within and surrounding the development envelope.</th>
</tr>
</thead>
</table>

**Department of Aboriginal Affairs**
Sections of the assessment areas are within the boundary of sites under the *Aboriginal Heritage Act 1972* (AHA) as currently mapped on the Register of Aboriginal Sites.

DAA advises that sites are protected whether or not they are entered on the Register. It should be noted that there may be Sites to which the AHA applies that are yet to be identified and are therefore not in DAA records, and these Sites are still afforded protection under the AHA.

Having regard to the potential for the proposal to have impacts on aboriginal values and heritage sites the EPA identified Heritage as a key environmental factor. Heritage is discussed in section 3.5.
The DAA notes that Toro has stated that where practicable they will avoid disturbance to Aboriginal heritage sites and the values associated with those sites.

**Department of the Environment and Energy**
The Cultural Heritage Management Plan is required to be finalised in conjunction with Traditional Owners post PER consultation phase, and prior to commencement of onsite work.

Evidence of ongoing consultation with Traditional Owners should be provided and continued at all stages prior to commencement of onsite work.

**Other Public Submitters**
Submitters raised the issue that Aboriginal people do not want this mine.

### Integrating Factors

<table>
<thead>
<tr>
<th>Integrating Factors</th>
<th>Department of Mines and Petroleum</th>
<th>Department of the Environment and Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehabilitation and Decommissioning</td>
<td>If decommissioning and rehabilitation are unsuccessful, contaminated equipment or tailings may be exposed to the environment. Contaminants of concern could then be transported to the wider environment, as dust or water-borne sediment, in the long term.</td>
<td>The Conceptual Mine Closure Plan requires additional work at the Mining Proposal/Mine Closure Planning stage.</td>
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<tr>
<td></td>
<td><strong>Department of Mines and Petroleum</strong></td>
<td>The tailings management strategy for this Proposal has been developed by benchmarking against industry accepted leading tailings management practices. The strategy selected, to return tailings to mined-out pit voids to ensure their isolation and to prevent any adverse Having regard to the potential impacts from exposure of contaminated plant and tailings if decommissioning and rehabilitation are not successful, and the potential for long-term impacts to aquifer water quality from seepage from the tailings storage facility, the <strong>EPA identified Rehabilitation and Decommissioning as a key integrating environmental</strong></td>
</tr>
<tr>
<td>Unsuccessful closure and rehabilitation of the TSFs in the mine-out pits could lead to potential long-term impacts on aquifer water quality downstream, from TSF seepage containing elevated levels of contaminants.</td>
<td>Impacts to the environment and human health and safety, represents best practice tailings management. A post-closure plan should include details of the assumptions used in the post-closure impact assessment. Estimates of post-closure doses should include a discussion of the peak doses that are likely to occur over the long term for the different radionuclide transport pathways. The Conceptual Mine Closure Plan does not consider the risk of climate change and how it could affect the assessment of mine impacts. Department of Environment Regulation The Proponent appears to have overestimated the extent to which uranium and vanadium would be attenuated in the sub-surface if seepage were to take place from the TSF due to limitations in the conceptual model used to guide the initial geochemical modelling of seepage from this structure. Geochemical testing to determine the leaching potential of ore and tailings materials has been carried out in an appropriate manner, but additional test work would be required to determine the extent to which contaminants could be attenuated by geochemical processes in the sub-surface environment in the area. It is not appropriate to present results of the original modelling in PER Figures 16.9 and 16.10 to argue a case for the limited mobility of uranium (in its hexavalent form). Rehabilitation and Decommissioning is discussed in section 3.6.</td>
<td></td>
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</table>
oxidation state) in groundwater in the Wiluna uranium deposits, particularly now that the limitations of the original modelling are known.

The Proponent has not indicated in the PER document whether vanadium concentrations in any seepage from the proposed sub-surface TSF would be sufficiently high to pose a risk to down-gradient environmental receptors. The Proponent also has not indicated whether the proposed mine-waste management strategies at the site will be adequate to protect environmental receptors from the potential effects of vanadium contamination caused by the processing of the carnotite ore and the disposal of processing wastes.

In some circumstances saline pore-water in the clay liner may react with sodium carbonate to create new carbonate minerals which can disrupt the structure of the liner and lead to increased seepage (Brehm and Leigh, 1989). Caustic, sodium carbonate rich pore-water is known to be causing damage to the clay liners on other project sites, and it is known that seepage will increase from these structures over time.

**CCWA**

The Project description does not offer a comprehensive vision of how the Project as a whole will operate, making it difficult to consider all of the risks and potential impacts. The information deficiencies in the current application are significant and further clarification on this is sought.
In the proponent’s tailings risk matrix (Appendix 1) it is noted that there is no clear consideration of time.

The peer review study (Appendix 10.46) on sediment and erosion clearly point out concerns about the capping of tailings using sand and the erosion over time through regular climatic events and winds.

Given the lack of understanding on how tailings would interact with the environment the proponent should be required to complete the recommended studies by the CSIRO.

Analysis of the PER document and the appendices has not found a clear explanation of this aspect of the proposal and the submitter remains concerned that there is a lack of both real data and a real plan. Without such data and planning this core part of the Project that represents the greatest long term environmental risk should not be approved.

PND (WA)
The Proponent predicts that the Centipede and Millipede pits will eventually merge into one containing 50 million tonnes of low level radioactive waste. There are many questions inadequately dealt with.

In situ uranium ore is stable and largely not bio-available. Once it is extracted, mined and milled however, tailings might retain 85 per cent of the radioactive material and this can become mobilised by wind and water, and also
by trucking accidents. Above ground, it becomes an environmental and health hazard.

After 'closure' of the mining complex, the problems of released radioactively-contaminated materials and gases will continue as rehabilitation to the pre-mined condition of the proposal area and will in all probability be beyond the capacity of Toro. There has been no adequate rehabilitation of any former uranium mine in Australia so far. At the end phase of active mining, its financial situation might be very limiting as to what measures it could take.

Other Public Submitters
The proposal does not meet the principle of intergenerational equity.

Submitters raised concerns about the financially responsibility for rehabilitation and closure.

There are no life cycle considerations for the treatment of the waste after use of the mine product, uranium. What happens to this waste? Will any end users look to return this waste to its origin, to the miner? What is the risk of this occurring?

Tailings must be considered as low-level radioactive waste, irrespective of whether the uranium is extracted or not.

Concern that the proposed radioactive waste storage is in proximity to a lake system that periodically floods.
| Offsets | The proposal will involve the clearing of native vegetation and removal of subterranean fauna habitat. If significant residual impacts remain after the proponent’s application of measures to avoid, minimise and rehabilitate impacts to any key factor then offsets are required. Significant residual impacts remain on the priority flora species *Tecticornia* and two subterranean fauna PECs. |
| CCWA | The Offset Table in the PER states that ‘Annual surveys would commence one-year post rehabilitation to assess whether species are returning to disturbed areas. Surveys would assess diversity and abundance, the presence of weeds and evidence of grazing. Ongoing monitoring would assess how the composition of the ecosystem is changing and analog sites in similar vegetation types and ecosystems would be used to gauge how rehabilitation was progressing.’ It does not go on to say what will be done in the event of species decline and who would be responsible for any action that would need to be undertaken. As a minimum, Toro should ensure that there is a net gain to the environment and the community, not only their bottom line. |
| Having regard to the proponent’s application of measures to avoid, minimise and rehabilitate impacts on the priority flora species *Tecticornia*, and the Hinkler Well and Barwidgee calcrite PECs significant residual impacts remain for these factors. Consistent with the *WA Environmental Offsets Policy* (Government of Western Australia, 2011), and the *WA Environmental Offsets Guidelines* (Government of Western Australia, 2014) significant residual impacts to potentially threatened species and ecosystems, areas of high environmental value or where the cumulative impact may reach critical levels if not managed may require an offset and hence the EPA identified Offsets as a key integrating factor. Offsets are discussed in section 3.7. |
**Summary of identification of principles**

<table>
<thead>
<tr>
<th>Principle</th>
<th>Relevant Yes/No</th>
<th>Consideration</th>
</tr>
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<tbody>
<tr>
<td><strong>Environmental principles of the EP Act</strong></td>
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</tr>
<tr>
<td>1. The precautionary principle</td>
<td>Yes</td>
<td>In considering this principle, the EPA notes that Subterranean Fauna, Flora and Vegetation, Hydrological Processes and Inland Waters Environmental Quality, Human Health and Heritage could be significantly impacted by the proposal. The assessment of impacts is provided in the report. The EPA has had regard to the precautionary principle in its assessment in assessing whether the proposal is likely to meet its objectives for the environmental factors. The EPA has assessed whether the proposal:</td>
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<td>• poses a threat of serious or irreversible damage to the environment; and</td>
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<tr>
<td></td>
<td></td>
<td>• the degree of scientific uncertainty associated with any threat of serious or irreversible environmental damage.</td>
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<td></td>
<td></td>
<td>The EPA has had particular regard to the precautionary principle in assessing the environmental factor ‘Subterranean fauna’</td>
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<td></td>
<td>The EPA considers that:</td>
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<td></td>
<td>• the proposal poses a threat of serious or irreversible damage to the environment in that there is a chance it could result in the loss of a number of species of subterranean fauna; and</td>
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<tr>
<td></td>
<td></td>
<td>• there is a lack of full scientific certainty regarding the extent of that threat.</td>
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In having regard for the precautionary principle in this case, the EPA undertook a detailed assessment of Subterranean Fauna and considered a range of evidence, on their biology and also the geology of the area. The EPA noted in this case that most of the surveyed stygofauna had potential habitat beyond the project footprint and where highly likely to occur outside the impact area. The EPA did consider there was a potential for one species to be restricted to the edge of the impact areas, however it found in this case that it was possible to protect this species through an exclusion zone.

Through its assessment the EPA has identified that the threat of the loss of subterranean fauna species could be reduced by precluding ground disturbance from a certain area, and the EPA has recommended a condition accordingly.

Further, the EPA has determined that in this case, after applying the avoidance action, the degree of environmental certainty is such that the chance the proposal may result in the loss of subterranean fauna species is sufficiently low, and that the proposal may be implemented.

The EPA has had regard to the precautionary principle in assessing the environmental factor ‘Flora and Vegetation,’ in particular impacts on *Tecticornia*.

The EPA considers that:

- the proposal poses a threat of serious or irreversible damage to the environment in that there is a chance it could result in the loss of one species of *Tecticornia*; and
- there is a lack of full scientific certainty regarding the extent of that threat.
In having regard for the precautionary principle in this case, the EPA undertook a detailed assessment of Flora and Vegetation.

Through its assessment the EPA has identified that the threat of the loss of a species of _Tecticornia_ could be reduced by precluding ground disturbance from a certain area, and the EPA has recommended a condition accordingly.

Further, the EPA has determined that in this case, after applying the avoidance action, the degree of environmental certainty is such that the chance the proposal may result in the loss of a _Tecticornia_ species is sufficiently low, and that the proposal may be implemented.

Investigations on the biological and physical environment undertaken by the proponent have provided sufficient certainty to assess risks and identify measures to avoid or minimise impacts on Hydrological Processes and Inland Waters Environmental Quality, Human Health and Heritage.

### 2. The principle of intergenerational equity

_The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations._

**Yes**

In considering this principle, the EPA notes that the proponent has taken measures to avoid, minimise, and rehabilitate impacts in accordance with the mitigation hierarchy in the _WA Environmental offsets guidelines_ (Government of Western Australia, 2014). In assessing this proposal, the EPA has recommended conditions be imposed on the proponent in relation to managing impacts.

In assessing this proposal the EPA has recommended adaptive management mechanisms (through conditions requiring environmental management plans) be implemented to maintain ecological processes for the benefit of future generations.

### 3. The principle of the conservation of biological diversity and ecological integrity

**Yes**

The EPA has had regard to the principle of the conservation of biological diversity and ecological integrity in its assessment of the proposal in assessing
Conservation of biological diversity and ecological integrity should be a fundamental consideration.

The EPA has had particular regard to the principle in assessing the environmental 'Subterranean Fauna'.

In its assessment of this factor the EPA determined that the degree of scientific certainty on how widespread species of subterranean fauna (that may be impacted by the proposal) is such that the chance that there would be a loss of one or more species is sufficiently low, and that the proposal may be implemented.

Further, the EPA notes that the proposal would result in local impacts to Flora and Vegetation. In assessing the proposal, the EPA has considered these impacts and has taken into account measures proposed by the proponent to avoid and minimise impacts to Flora and Vegetation and the recommended exclusion areas for *Tecticornia*.

The EPA has concluded that the proposal would not compromise the biological diversity or ecological integrity within this region.

<table>
<thead>
<tr>
<th>4. Principles relating to improved valuation, pricing and incentive mechanisms</th>
<th>Yes</th>
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<tbody>
<tr>
<td>Environmental factors should be included in the valuation of assets and services.</td>
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<tr>
<td>The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</td>
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<tr>
<td>The users of goods and services should pay prices based on the full life-cycle costs of</td>
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</table>

In considering this principle, the EPA notes that the proponent would bear certain costs relating to waste and pollution, including avoidance, containment, decommissioning, rehabilitation and closure. The proponent would also be responsible for the costs relating to rehabilitation and decommissioning, and offsets for significant residual impacts.
providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.

- 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.

5. The principle of waste minimisation
   
   All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.

<table>
<thead>
<tr>
<th>Environmental principles of the EPA</th>
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<tbody>
<tr>
<td>a) Best practice</td>
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<p>| | |</p>
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<th></th>
<th></th>
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<tbody>
<tr>
<td>Yes</td>
<td>In considering this principle, the EPA notes that the proponent is proposing to use best practice for the storage of tailings. The proponent will also be</td>
</tr>
</tbody>
</table>
When designing proposals and implementing environmental mitigation and management actions, the contemporary best practice measures available at the time of implementation should be applied.

<table>
<thead>
<tr>
<th>b) Continuous Improvement</th>
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<tbody>
<tr>
<td>The implementation of environmental practices should aim for continuous improvement in environmental performance.</td>
</tr>
</tbody>
</table>
Appendix 4

Relevant EPA Policies and Guidance and considerations
The EPA’s evaluation of policies and guidance documents that are applicable to the key environmental factors of this proposal are detailed below.

1. **Flora and Vegetation**

The EPA considers that the policies and guidances that are relevant for flora and vegetation for this assessment are:

1. Guidance Statement No. 51 – *Terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia* (EPA 2004a);
2. Position Statement No. 2 – *Environmental protection of native vegetation in Western Australia*, (EPA 2000);
3. Position Statement No. 3 – *Terrestrial biological surveys as an Element of Biodiversity Protection* (EPA 2002); and

**Guidance Statement No. 51 – Terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia**

Relevant matters discussed in Guidance Statement No. 51 for this assessment include the following objectives:

1. Surveys are planned and designed appropriately.
2. The analysis, interpretation and reporting is of a suitable quality and consistent methodology to enable the EPA to judge the impacts of proposals on flora and vegetation.
3. The environment, in particular significant flora and vegetation biodiversity is identified and protected.

**Position Statement No. 2 - Environmental protection of native vegetation in Western Australia**

Relevant matters discussed in Position Statement No. 2 for this assessment include the following, in relation to the EPA’s consideration of biological diversity in assessing a proposal:

1. No known species of plant or animal is caused to become extinct as a consequence of the development and the risks to threatened species are considered to be acceptable.
2. No association or community of indigenous plants or animals ceases to exist as a result of the project.
3. There would be an expectation that a proposal would demonstrate that the vegetation removal would not compromise any vegetation type by taking it below the “threshold level” of 30 per cent of the pre-clearing extent of the vegetation type.
4. Where a proposal would result in a reduction below the 30 per cent level, the EPA would expect alternative mechanisms to be put forward to address the protection of biodiversity.

5. There is comprehensive, adequate and secure representation of scarce or endangered habitats within the project area and/or in areas which are biologically comparable to the project area, protected in secure reserves.

6. The on-site and off-site impacts of the project are identified and the proponent demonstrates that these impacts can be managed.

**Position Statement No. 3 – Terrestrial biological surveys as an Element of Biodiversity Protection**

Relevant matters discussed in Position Statement No. 3 for this assessment include the following:

1. The EPA expects proponents to demonstrate in their proposals that all reasonable measures have been undertaken to avoid impacts on biodiversity. Where some impact on biodiversity cannot be avoided, it is for the proponent to demonstrate that the impact will not result in unacceptable loss.

2. The EPA expects proponents to ensure that terrestrial biological surveys provide sufficient information to address both biodiversity conservation and ecological function values within the context of the type of proposal being considered and the relevant EPA objectives for protection of the environment.

3. In the absence of information that could provide the EPA with assurance that biodiversity will be protected, the EPA will adopt the precautionary principle.

Position Statement No. 3 refers to definitions, principles and objectives in the first national biodiversity strategy *National Strategy for the Conservation of Australia’s Biological Diversity* (Commonwealth of Australia, 1996). The EPA notes that the most recent version of the strategy, *Australia’s Biodiversity Conservation Strategy 2010–2030* (Commonwealth of Australia, 2010), refers to a shortened definition of biological diversity and contains different principles. The 2010 Strategy also notes that a review of the 1996 Strategy found it difficult to objectively measure performance against the qualitative objectives in the 1996 Strategy and that there have been shifts in environmental management approaches regarding biodiversity conservation. Therefore, the EPA has not considered the matters relating to the 1996 Strategy to be relevant for this assessment.

**Technical Guide – Flora and Vegetation Surveys for Environmental Impact Assessment**

Relevant matters discussed in the Technical Guide for include:

1. The level of survey, survey effort and methods used should be appropriate to the bioregion, the local and regional context and the size of the proposal; and

2. The analysis, interpretation and reporting undertaken is of a suitable quality and of consistent methodology to enable the EPA to determine the impacts of proposals on flora and vegetation.
2. Terrestrial Fauna

EPA policy and guidance

The EPA considers that the policy and guidance relevant for Terrestrial Fauna for this assessment are:

1. Position Statement No. 3 – *Terrestrial biological surveys as an Element of Biodiversity Protection*, (EPA 2002);
2. Guidance Statement No. 56 – *Terrestrial Fauna Surveys for Environmental Impact Assessment in WA* (EPA 2004b);
3. Guidance Statement No. 20 – *Sampling of Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in WA* (EPA 2009);
4. Technical Guide on *Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment* (EPA 2010); and

**Position Statement No. 3 – Terrestrial biological surveys as an Element of Biodiversity Protection**

Relevant matter discussed in Position Statement 3 for this assessment include:

1. The EPA expects proponents to demonstrate in their proposals that all reasonable measures have been undertaken to avoid impacts on biodiversity. Where some impact on biodiversity cannot be avoided, it is for the proponent to demonstrate that the impact will not result in unacceptable loss.

2. The EPA requires that the quality of information and scope of field surveys meets the standards, requirements and protocols as determined and published by the EPA.

3. The EPA expects proponents to ensure that terrestrial biological surveys provide sufficient information to address both biodiversity conservation and ecological function values within the context of the type of proposal being considered and the relevant EPA objectives for protection of the environment.

4. In the absence of information that could provide the EPA with assurance that biodiversity will be protected, the EPA will adopt the precautionary principle.

Position Statement No. 3 refers to definitions, principles and objectives in the first national biodiversity strategy National Strategy for the Conservation of Australia’s Biological Diversity (Commonwealth of Australia, 1996). The EPA notes that the most recent version of the strategy, Australia’s Biodiversity Conservation Strategy 2010–2030 (Commonwealth of Australia, 2010), refers to a shortened definition of biological diversity and contains different principles. The 2010 Strategy also notes that a review of the 1996 Strategy found it difficult to objectively measure performance against the qualitative objectives in the 1996 Strategy and that there have been shifts in environmental management approaches regarding biodiversity conservation. Therefore, the EPA has not considered the matters relating to the 1996 Strategy to be relevant for this assessment.
**Guidance Statement No. 56 – Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia**

Relevant matters discussed in Guidance Statement No. 56 include the following:
1. The scale and methods of fauna and faunal assemblage survey is planned and designed appropriately for the region;
2. The survey, analysis, interpretation and reporting undertaken for EIA is of a suitable quality and of consistent methodology to enable the EPA to judge the impacts of proposals on fauna and faunal assemblages;
3. The environment, in particular conservation-significant fauna and significant faunal assemblages are identified and protected through best practice; and
4. Survey data is capable of underpinning long-term observation and measurement of later compliance and audit purposes.

**Guidance Statement No. 20 – Sampling of Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in WA**

Relevant matters discussed in Guidance Statement No. 20 include the following:
1. ensure the protection of key habitats for short range endemic invertebrate fauna species;
2. maintain the distribution, abundance and productivity of populations of short range endemic invertebrate taxa;
3. ensure that the conservation status of short range endemic invertebrate taxa is not adversely changed as a result of development proposals; and
4. ensure that proposals do not potentially threaten the viability of, or lead to the extinction of, any short range endemic invertebrate species.


The relevant considerations of the Technical Guide are:
1. The level of survey, survey effort, survey design and methods used should be appropriate to the province, faunal group and size of the proposal.
2. The analysis, interpretation and reporting undertaken is of a suitable quality and of consistent methodology to enable the EPA to judge the impacts of proposals on fauna and faunal assemblages.

**Commonwealth policy and guidance**

As the proposal is being assessed under the bilateral agreement between the Commonwealth and Western Australian governments, Commonwealth policy and guidance also applies to this assessment. The EPA has been advised by the Department of the Environment that the following Commonwealth resources are of specific relevance to the assessment of the Extension to the Wiluna Uranium Project.
Conservation advice

- Approved Conservation Advice for *Dasycercus cristicauda* (Crest-tailed Mulgara) – Threatened Species Scientific Committee, 2013; and

Recovery Plans


Threat abatement plans

- Threat Abatement Plan for Reduction in Impacts of Tramp Ants on Biodiversity in Australia and its Territories (Department of the Environment and Heritage (DEH), 2006); and
- Threat abatement plan for predation by feral cats (Department of the Environment, 2015);
- Threat abatement plan for competition and land degradation by rabbits (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2008);
- Threat Abatement Plan for competition and land degradation by unmanaged goats (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2008); and
- Threat Abatement Plan for Predation by the European Red Fox (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2008).

3. Subterranean Fauna

The EPA has determined that the policy and guidance that are relevant for subterranean fauna for this assessment are:

1. Guidance Statement No. 54a – *Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia*, (EPA 2007); and
2. Environmental Assessment Guidelines No. 12 – *Consideration of subterranean fauna in environmental impact assessment in Western Australia* (EPA 2013b).

**Guidance Statement No. 54a - Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia**

The relevant considerations for Guidance Statement No. 54a are:

1. The level of survey, survey timeframes, sampling planning and methods should be designed appropriately including preliminary investigations (desktop review and pilot study) for subterranean groups and habitat;
2. The use of appropriate sampling methods, effort and survey design, including both within and outside the area of impact, employing a reasonable sampling effort that will collect most species and provide sufficient information to demonstrate whether the project is likely to impact on species of conservation concern;

3. Reporting should be clearly written and contain all relevant information presented at a sufficient quality to enable the EPA to judge the impacts of proposals.

_Environmental Assessment Guideline No. 12 - Consideration of subterranean fauna in environmental impact assessment in Western Australia_

The relevant considerations for EAG 12 are:

1. Appropriate level of survey required based on the likely presence of subterranean fauna and the potential impact on its habitat.

2. Survey design, including:
   - Sufficient survey using the most contemporary techniques and standards, to ensure that the subterranean fauna is adequately understood in the context of the project footprint and surrounding areas;
   - the amount of sampling required being based on the presence of habitat supporting subterranean fauna, likely significance of impacts, and existing sampling information;
   - the use of genetics to resolve uncertainty regarding species identification and distribution; and
   - the use of surrogates based on the biological features of species or species group and/or physical characteristics of a habitat, on a local scale to infer the likely distribution of another poorly sampled species.

3. Specimen vouchering and lodgment of data and DNA sequences with State collections to improve the knowledge of subterranean fauna.

4. Adequate interpretation and reporting of the results to allow an understanding of the subterranean fauna present in the project area, and analysis to consider the significance of the predicted impact on subterranean fauna.

4. Hydrological Processes and Inland Waters Environmental Quality

There is no specific EPA policy or guidance considered by the EPA to be relevant for this factor for this assessment.

5. Human health

_EPA policy and guidance_

The EPA considers that the following policy and guidance is relevant to its assessment of the proposal in relation to this factor:
1. 


**Guidance Statement No. 55 – Implementing best practice in proposals submitted to the environment impact assessment process**

The relevant considerations for Guidance Statement No. 55 are:

1. All relevant environmental quality standards must be met.
2. Common pollutants should be controlled by proponents adopting Best Practicable Measures to protect the environment.
3. Hazardous pollutants should be controlled to the Maximum Extent Achievable, which involves the most stringent measures available. For a small number of very hazardous and toxic pollutants, costs are not taken into account.

6. **Heritage**

The EPA has determined that the policy and guidance statement that is relevant for Heritage for this assessment is:


**Guidance Statement No. 41 – Assessment of Aboriginal heritage**

Relevant considerations in Guidance Statement No. 41 include the following:

1. Consult with staff of the DIA and review any site records (desk-top review) in accordance with the AH Act.
2. Undertake an Aboriginal heritage survey (if it is noted from a desk-top review that an adequate survey has not been undertaken for an area to be developed) which should include both consultation with appropriate Aboriginal people, which may include an anthropological survey, and, if necessary, an archaeological survey.
3. Inform the relevant Aboriginal people about details of the proposed development, including potential environmental impacts.
4. Consult with relevant Aboriginal people to enable them to make known to the proponent their concerns in regard to environmental impacts as they affect heritage matters.
5. Demonstrate that any concerns raised by Aboriginal people have been adequately considered by the proponent in its management of environmental impacts, and any changes as a result of this process are made known to the relevant Aboriginal people.

7. **Rehabilitation and Decommissioning**

The EPA has determined that the policy and guidance that are relevant for Rehabilitation and Decommissioning for this assessment are:

1. Guidelines for preparing mine closure plans (DMP & EPA 2015);
2. Guidance Statement No. 6 – *Rehabilitation of terrestrial ecosystems* (EPA 2006);
3. Environmental Protection Bulletin No. 19 – *EPA involvement in mine closure* (EPA 2015);
5. Position Statement No 6 – Towards sustainability (EPA 2004); and

**Guidelines for Preparing Mine Closure Plans**

Relevant matters discussed in the *Guidelines for preparing mine closure plans* for this assessment include the following:

1. From the project approval stage throughout mine life, the Mine Closure Plan should demonstrate that ecologically sustainable mine closure can be achieved consistent with agreed post-mining outcomes and land uses, and without unacceptable liability to the State.
2. Planning for mine closure should be fully integrated in the life of mine planning. For new projects, closure planning should start in the project feasibility stage (before project approvals).
3. Mine Closure Plans must be site-specific and demonstrate that appropriate systems for closure performance monitoring and maintenance and for record keeping and management are in place.
4. Closure planning should be risk-based.
5. Consultation should take place between proponents and stakeholders.
6. Post-mining land uses should be identified and agreed upon through consultation before approval of new projects.
7. Materials characterisation needs to be carried out prior to project approval to a sufficient level of detail to develop a workable closure plan.
8. Closure planning should be based on adaptive management. Closure plans should identify relevant experience from other mine sites and research, and how lessons learned from these are to be applied.
9. Management plans are in place.

**Guidance Statement No. 6 - Rehabilitation of Terrestrial Ecosystems**

The EPA notes this guidance was prepared in 2006 to guide the preparation of documentation for the environmental impact assessment process of EPA and to help produce management plans to rehabilitate vegetation. The more recent *Guidelines for preparing mine closure plans* (2011 and revised 2015) also guides the preparation of Environmental Impact Assessment documentation and mine closure plans (which include the rehabilitation of vegetation) for mining proposals. The EPA considers that the more recent *Guidelines for preparing mine closure plans* is more relevant to its assessment than Guidance Statement No. 6.
**Environmental Protection Bulletin No. 19 – EPA Involvement in Mine Closure**

Relevant matters discussed in Environmental Protection Bulletin No. 19 for this assessment include the following:

1. The EPA will assess all mining projects that are not subject to the *Mining Act 1978*. Examples include pre-1899 title or minerals-to-owner tenure, Hampton locations or State Agreement Act projects.
2. This proposal is a State Agreement Act project, and not subject to the *Mining Act 1978*.
3. For all mining projects not subject to the *Mining Act 1978*, mine closure will be assessed and regulated by the EPA only.

**Guidance Statement No. 55 – Implementing best practice in proposals submitted to the environment impact assessment process**

Relevant matters discussed in Guidance Statement No. 55 include the following:

1. All relevant environmental quality standards must be met.
2. Common pollutants should be controlled by proponents adopting Best Practicable Measures to protect the environment.
3. There is a responsibility for proponents not only to minimise adverse impacts, but also to consider improving the environment through rehabilitation and offsets where practicable.

**Position Statement No 6 – Towards sustainability (withdrawn 2010)**

Position Statement No 6 was quite general in nature and discussed the concept of sustainability and drew attention to a range of global issues. It discussed sustainability in triple bottom line reporting as well as acknowledging requirements and education.

This position statement was identified in the ESD but was withdrawn prior to the release of the PER. It was determined that this policy is not relevant for the EPA's assessment of this factor.

**Position Statement No 8 – Environmental Protection in Natural Resource Management (withdrawn 2013)**

This position statement set out the EPA’s views on Natural Resource Management (NRM) and outlined the minimum environmental management procedures for NRM agencies for proper integrated NRM including public consultation.

This position statement was identified in the ESD but was withdrawn prior to the release of the PER. It was determined that this policy is not relevant for the EPA’s assessment of this factor.
8. Offsets

The EPA has determined that the policy and guidance that are relevant for offsets for this assessment are:

1. WA Environmental Offsets Policy (Government of Western Australia 2011)
2. WA Environmental Offset Guidelines (Government of Western Australia 2014)
3. Environmental Protection Bulletin No.1 – Environmental Offsets Policy (EPA 2014c)

**WA Environmental Offsets Policy – Government of Western Australia**

The relevant considerations for the Offsets Policy are the six principles in the Offsets Policy:

1. Environmental offsets will only be considered after avoidance and mitigation options have been pursued.
2. Environmental offsets are not appropriate for all projects (circumstances).
3. Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted.
4. Environmental offsets will be based on sound environmental information and knowledge.
5. Environmental offsets will be applied within a framework of adaptive management.
6. Environmental offsets will be focussed on longer term strategic outcomes.

**WA Environmental Offset Guidelines - Government of Western Australia**

The WA Environmental Offsets Guidelines complement the Offsets Policy by clarifying the determination and application of environmental offsets in Western Australia, with reference to the offsets principles in the Offsets Policy.

In addition to guidance on the application of the principles contained within the Offsets Policy, the relevant considerations in the offsets guidelines for this assessment are:

1. Environmental offsets will only be applied where the residual impacts of a project are determined to be significant, after avoidance, minimisation and rehabilitation have been pursued.
2. Proponents must apply the mitigation hierarchy (avoid, minimise, rehabilitate and offset) to reduce the potential impacts of a proposal on the environment.
3. The Residual Impact Significance model outlines how significance is determined and when an offset is likely to be required, or may be required, in relation to the relevant EPA environmental factors.

In determining the significance of an impact (and the requirement for an offset) it is important to consider the impacts in a regional context (cumulative impacts).
The relevant considerations in Environmental Protection Bulletin No. 1 for this assessment are:

1. The EPA adopts the *WA Offsets Policy* and *WA Environmental Offsets Guidelines* for application through the environmental impact assessment process.

2. Where the EPA is of the view that a significant residual impact remains after avoidance, minimisation and rehabilitation efforts, the EPA will ensure that any offsets are recommended as conditions of approval in the EPA’s report to the Minister for Environment, as well as including details on the rationale for the offset.

3. As part of an Environmental Review document, proponents must include a section discussing how it has applied the mitigation hierarchy to its proposal. Offsets should be addressed in a separate section of the document, after the assessment of environmental factors.

4. If it is likely that a proposal will have a significant residual impact, the proponent should provide further details on the proposed offset, as outlined in the bulletin. The final decision on the need for and appropriateness of any offsets will be determined by the EPA at the end of the assessment process.

5. If a proponent is seeking a change to, or an expansion of, a proposal under an existing approval, these changes will be subject to the current offsets practice. Consideration will be given to any offsets that were a requirement of the existing proposal.

9. Non EPA Technical Guidance

The proponent considered the following technical guidance during the radiological assessments and design of the mine site:

1. ICRP 107 - Nuclear Decay Data for Dosimetric Calculations, Ann. ICRP 38 (3);
2. ICRP 103 - The 2007 Recommendations of the International Commission on Radiological Protection, Ann. ICRP 37 (2-4);
3. ICRP 101 - The Optimisation of Radiological Protection: Broadening the Process, Ann. ICRP 36 (3);
4. ICRP 100 - Human Alimentary Tract Model for Radiological Protection;
5. ICRP 99 - Low Dose Extrapolation of Radiation Related Cancer Risk;
6. ICRP 91 - A Framework for Assessing the Impact of Ionising Radiation on Non-Human Species;
7. ICRP 89 - Basic Anatomical and Physiological Data for Use in Radiological Protection: Reference Values; ICRP 83 - Risk Estimation for Multifactorial Diseases;
8. ICRP 82 - Protection of the Public in Situations of Prolonged Radiation Exposure;
9. ICRP 78 - Individual Monitoring for Internal Exposure of Workers;
10. ICRP 77 - Radiological Protection Policy for the Disposal of Radioactive Waste;
11. ICRP 76 - Protection from Exposures: Application to Selected Radiation Sources;
12. ICRP 75 - General Principles for Radiation Protection of Workers;
13. ICRP 74 - Conversion of Coefficients for Use in Radiological Protection against External Radiation;
14. ICRP 72 - Age-dependent Doses to the Members of the Public from Intake of Radionuclides: Part 5 - Compilation of Ingestion and Inhalation Coefficients;
15. ICRP 71 - Age-dependent Doses to Members of the Public from Intake of Radionuclides;
16. Part 4 - Inhalation Dose Coefficients;
17. ICRP 70 - Basic Anatomical & Physiological Data for use in Radiological Protection;
18. ICRP 69 - Age-dependent Doses to Members of the Public from Intake of Radionuclides;
19. ICRP 68 - Dose coefficients for Intakes of Radionuclides by Workers;
20. ICRP 67 - Age-dependent doses to Members of the Public from the Intake of Radionuclides: Part 2 - Ingestion Dose Coefficients;
22. ICRP 65 - Protection Against Radon-222 at Home and at Work;
23. ICRP 64 - Protection from Potential Exposure: A Conceptual Framework; and ICRP 60 - 1990 Recommendations of the ICRP.
24. Tailings Storage Facilities in Western Australia - Code of Practice;
26. RPS 9 (Radiation Protection and Radioactive Waste Management in Mining and Mineral Processing);
27. Code of Practice for the Safe Transport of Radioactive Material (ARPANSA 2008);
28. ARPANSA Safety Guide - Methods for Monitoring, Assessing and Recording Occupational Radiation Doses in Mining and Mineral Processing (Draft 2010);
30. Classification of radioactive waste, general safety guide No CSG-1: (International Atomic Energy Agency, 2009);
31. Security in the transport of radioactive material, IAEA nuclear security series No. 9: (International Atomic Energy Agency, 2008);
32. Predisposal management of radioactive waste, general safety requirement (GSR) part 5: (International Atomic Energy Agency, 2009);
33. Management system for the safe transport of radioactive materials, safety standard series number TS-G-1.4: (International Atomic Energy Agency, 2009);
34. Regulations for the safe transport of radioactive materials, TS-R-1: (International Atomic Energy Agency, 2009);
36. 90 - The Application of the Principles for Limiting Releases of Radioactive Effluents in the case of the Mining and Milling of Radioactive Ores;
37. 95- Radiation Monitoring in the Mining and Milling of Radioactive Ores (jointly sponsored with the International Labor Organisation and the World Health Organisation);
38. 100 - Evaluating the reliability of predictions made using environmental transfer models;
39. 111 - Principles of Radioactive Waste Management Safety Fundamentals;
40. Compliance Assurance for the Safe Transport of Radioactive Material;
41. International Basic Safety Standards for Protection Against Ionizing Radiation and for the Safety of Radiation Sources;
42. International Commission on Radiological Protection (ICRP) 108 - Environmental Protection: the Concept and Use of Reference Animals and Plants, Ann, ICRP 38 (4-6);
44. NORM-2.1 Preparation of a radiation management plan - exploration;
45. NORM-2.2 Preparation of a radiation management plan - mining and processing;
46. NORM-3.1 Monitoring - pre-operational monitoring requirements;
47. NORM-3.2 Monitoring - operational monitoring requirements;
48. NORM- 3.3 Monitoring - air monitoring strategies;
49. NORM-3.4 Monitoring - airborne radioactivity sampling;
50. NORM-3.5 Monitoring - measurement of particle size;
51. NORM-4.1 Controlling - dust control strategies;
52. NORM-4.2 Controlling - management of radioactive waste;
53. NORM-4.3 Controlling - transport;
54. NORM-5 Dose assessment; and
55. NORM-6 Reporting requirements.
Appendix 5

Review of Existing Ministerial Statement
Proposed Implementation Agreement (Ministerial Statement)

The EPA recommends that the Revised Proposal may be implemented and further recommends that the implementation of the Revised Proposal be subject to the Implementation Agreement (Ministerial Statement) set out in Appendix 7. See Section 5 of this report regarding the recommended conditions.

The recommended Ministerial Statement for the Revised Proposal was developed in accordance with Environmental Assessment Guideline No. 11 Recommending Environmental Conditions (EPA 2015d) and Environmental Assessment Guideline No. 17 Preparation of management plans under Part IV of the Environmental Protection Act 1986 (EPA 2015e) and included a review of the implementation conditions in Ministerial Statement 913: Wiluna Uranium Mine, issued on 10 October 2012.

The EPA considers that the measures in the conditions in Ministerial Statement 913 are effective to manage potential significant impacts on the environment. Therefore those conditions to be carried over for the Revised Proposal do not require any material changes from Ministerial Statement 913. The conditions, and the location and authorised extent of physical and operational elements in Schedule 1 (Appendix 7) are for the Revised Proposal (i.e. the entire Wiluna Uranium Project that includes the Approved Proposal and the Extension Proposal). The main changes between the proposed new Ministerial Statement (Appendix 7) and the existing Ministerial Statement 913 relate to the:

- removal of clauses relating to standard reporting and data availability in individual conditions as these duplicate clauses in the standard Compliance Reporting and Public Availability of Data conditions;
- updating conditions to reflect contemporary conditions and the requirements of Environmental Assessment Guidelines 11 and 17;
- correction of an error (in Table 1 of Statement 913) in the authorised extent for clearing at Lake Way and Centipede;
- addition of exclusion areas to protect Tecticornia and subterranean fauna;
- adjustment of the offset for Tecticornia dominated vegetation on a pro-rata basis to account for additional clearing at Millipede and Lake Maitland. The monetary value of the offset was the same metric used in Statement 913; and
- addition of an offset for the loss of part of the Hinkler Well and Barwidgee calcrete PEC systems.

Recommended environmental conditions

The EPA notes the following:

- Condition 7-1 of Ministerial Statement 913 requires the preparation of a Groundwater Drawdown Monitoring and Management Plan. The EPA has updated this condition to reflect the EPA’s contemporary approach to conditions, and has extended its application to the Revised Proposal (the Approved Proposal and the Extension Proposal).
• Condition 8-1 of Ministerial Statement 913 requires the preparation of a *Tecticornia* Survey and Research Plan. The EPA has updated this condition to reflect the EPA's contemporary approach to conditions, and has extended its application to the Revised Proposal (the Approved Proposal and the Extension Proposal).

• Condition 9-1 of Ministerial Statement 913 requires the preparation of a Surface Water Environmental Management Plan (EMP). The EPA has updated this condition to reflect the EPA’s contemporary approach to conditions, and has extended its application to the Revised Proposal (the Approved Proposal and the Extension Proposal).

• Condition 10-1 of Ministerial Statement 913 requires the preparation of a Dust Environmental Management Plan (EMP). The EPA has updated this condition to reflect the EPA’s contemporary approach to conditions, and has extended its application to the Revised Proposal (the Approved Proposal and the Extension Proposal).

Condition 11-1 of Ministerial Statement 913 requires the preparation of a Stygofauna Monitoring Plan. The EPA has updated this condition to reflect the EPA’s contemporary approach to conditions, and has extended its application to the Revised Proposal (the Approved Proposal and the Extension Proposal).

**Recommended proposal details (Schedule 1)**

The revised proposal details contained in Schedule 1 have been amended to include an updated description which reflects the EPA’s contemporary approach to project descriptions detailed in Environmental Assessment Guideline No. 1 *Defining the Key Characteristics of a Proposal* (Appendix 7, Table 2).

• refining the title and key proposal characteristics (Table 1) to reflect the revised proposal;
• revising the authorised clearing to a total of 3,112 ha (1,582 ha for the Extension Proposal and 1,530 for the Approved Proposal in Ministerial Statement 913).
• adding in-pit tailings storage facilities (TSF) to Table 2;
• adding Development Envelope areas for the Centipede and Lake Way mining and infrastructure areas in Table 2;
• simplifying Abbreviations and adding definitions in Table 3 and removing those that are no longer relevant to the recommended conditions; and
• updating the maps in the figures.
Appendix 6

Information required by clause 6.2 in schedule 1 of the Bilateral Agreement relating to environmental impact assessment
Table of information about relevant impacts of the action as required by clause 6.2 in schedule 1 of the Bilateral Agreement relating to environmental impact assessment between the Commonwealth of Australia and the State of Western Australia.

<table>
<thead>
<tr>
<th>Clause 6.2 in schedule 1 - Information about the relevant impacts of the action</th>
<th>Relevant section(s) of the EPA Assessment Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) A description of: (i) the action; and (ii) the places affected by the action; and (iii) any matters of national environmental significance that are likely to be affected by the action; and</td>
<td>Section 2 of the Assessment Report includes a description of the proposal and places affected by the proposal. Section 4 describes the Matters of National Environmental Significance that are likely to be affected.</td>
</tr>
<tr>
<td>(b) a summary of the relevant impacts of the action; and</td>
<td>Sections 3 and 4 of the Assessment Report include a summary of the relevant impacts.</td>
</tr>
<tr>
<td>(c) a description of feasible mitigation measures, changes to the action or procedures to prevent or minimise environmental impacts on relevant matters of national environmental significance proposed by the proponent or suggested in public submissions;</td>
<td>Section 3 of the Assessment Report discusses the proponent's mitigation measures to minimise environmental impacts. Appendix 8 of the EPA Assessment Report contains the summary of public submissions which contains suggested mitigation measures to prevent or minimise environmental impacts on relevant matters of national environmental significance.</td>
</tr>
<tr>
<td>(d) to the extent practicable, a description of any feasible alternatives to the action that have been identified through the assessment process, and their likely impact on matters of national environmental significance;</td>
<td>Included in Sections 2 and 4 of the EPA Assessment Report.</td>
</tr>
<tr>
<td>(e) a statement of recommended conditions for approval of the action that may be imposed to address identified impacts on matters of national environmental significance, including consideration of any offsets; and</td>
<td>In the event the action proceeds, Section 5 and Appendix 7 of the Assessment Report recommends requirements that should be included as conditions. This includes limiting the location and authorised extent of the clearing of vegetation, and offsets.</td>
</tr>
<tr>
<td>(f) a statement WA approval requirements and conditions that apply, or are proposed to apply, to the action when the report is prepared, including a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.</td>
<td>Section 6 of the Assessment Report recommends the State Minister note the recommended conditions and procedures set out in Appendix 7 and summarised in Section 5.</td>
</tr>
</tbody>
</table>
Appendix 7

Identified Decision-making Authorities and Recommended Environmental Conditions
Identified Decision-making Authorities

Section 44(2) of EP Act specifies that the EPA’s report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This Appendix contains the EPA’s recommended conditions and procedures.

Section 45(1) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified for this consultation:

<table>
<thead>
<tr>
<th>Decision-making Authority</th>
<th>Approval</th>
</tr>
</thead>
</table>
| 1. Minister for Environment | Wildlife Conservation Act 1950  
  - Taking of flora and fauna |
| 2. Minister for Water | Rights in Water and Irrigation Act 1914 |
| 3. Minister for Aboriginal Affairs | Aboriginal Heritage Act 1972 |
  - Mining proposal |
| 5. Department of Mines and Petroleum | Mining Proposal  
  - Mining Act 1978  
  Director Environment Division  
  Dangerous Goods  
  - Dangerous Goods Safety Act 2004  
  Chief Dangerous Goods Officer  
  Mine Safety  
  - Mines Safety and Inspection Act 1994  
  - State Mining Engineer |
  - Permit to mine radioactive materials  
  - Permit to transport radioactive materials |
| 7. Director General of, Department of Environment Regulation | Environmental Protection Act 1986  
  - Works approval and licence |
| 8. Shire of Wiluna | Building Act 2011  
  - Building permit for worker accommodation |
  - Sewage treatment permit |

Note: In this instance, agreement is only required with DMAs 1 to 4 since these DMAs are Ministers.
RECOMMENDED ENVIRONMENTAL CONDITIONS

STATEMENT THAT A REVISED PROPOSAL MAY BE IMPLEMENTED
(Environmental Protection Act 1986)

REVISED WILUNA URANIUM PROPOSAL

Revised Proposal: The proposal is to construct and operate a uranium mine consisting of four deposits: Centipede, Millipede, Lake Way and Lake Maitland and includes the construction of roads, power and water source and supply facilities, accommodation and other associated infrastructure.

The proposal is a revision of the Wiluna Uranium Project, the subject of Ministerial Statement 913.

Proponent: Toro Energy Ltd
Australian Company Number 117 127 590

Proponent Address: Level 3 Richardson Street, West Perth WA 6005

Assessment Number: 2002

Report of the Environmental Protection Authority: 1580

Previous Report of the Environmental Protection Authority: 1437

Previous Statement Number: 913

Pursuant to section 45, read with section 45B of the Environmental Protection Act 1986 (EP Act), it has been agreed that:

1. The revised proposal described and documented in Schedule 1 may be implemented;
2. the implementation of the revised proposal, being the Wiluna Uranium Project as amended, is subject to the following implementation conditions; and
3. from the date of this statement each of the implementation conditions in Statement 913 no longer apply in relation to the revised proposal.

1 Proposal Implementation

1-1 When implementing the proposal, the proponent shall not exceed the authorised extent of the proposal as defined in Table 2 in Schedule 1, unless amendments to the proposal and the authorised extent of the proposal have been approved under the EP Act.
2 Contact Details

2-1 The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence within twenty eight (28) days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.

3 Time Limit for Proposal Implementation

3-1 The proponent shall not commence implementation of the proposal after five (5) years from the date on this Statement, and any commencement, prior to this date, must be substantial.

3-2 Any commencement of implementation of the proposal, on or before five (5) years from the date of this Statement, must be demonstrated as substantial by providing the CEO with written evidence, on or before the expiration of five (5) years from the date of this Statement.

4 Compliance Reporting

4-1 The proponent shall prepare, submit and maintain a Compliance Assessment Plan to the CEO at least six (6) months prior to the first Compliance Assessment Report required by condition 4-6, or prior to implementation, whichever is sooner.

4-2 The Compliance Assessment Plan shall indicate:

(1) the frequency of compliance reporting;
(2) the approach and timing of compliance assessments;
(3) the retention of compliance assessments;
(4) the method of reporting of potential non-compliances and corrective actions taken;
(5) the table of contents of Compliance Assessment Reports; and
(6) public availability of Compliance Assessment Reports.

4-3 After receiving notice in writing from the CEO that the Compliance Assessment Plan satisfies the requirements of condition 4-2 the proponent shall assess compliance with conditions in accordance with the Compliance Assessment Plan required by condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the Compliance Assessment Plan required by condition 4-1 and shall make those reports available when requested by the CEO.
4-5 The proponent shall advise the CEO of any potential non-compliance within seven (7) days of that non-compliance being known.

4-6 The proponent shall submit to the CEO Compliance Assessment Reports addressing compliance in the previous calendar year. Compliance Assessment Reports shall be submitted by the submission date defined in the Compliance Assessment Plan required by condition 4-1, or as otherwise agreed in writing by the CEO.

The Compliance Assessment Report shall:

1. be endorsed by the proponent’s Chief Executive Officer or a person delegated to sign on the Chief Executive Officer’s behalf;
2. include a statement as to whether the proponent has complied with the conditions;
3. identify all potential non-compliances and describe corrective and preventative actions taken;
4. be made publicly available in accordance with the approved Compliance Assessment Plan; and
5. indicate any proposed changes to the Compliance Assessment Plan required by condition 4-1.

5 Public Availability of Plans and Reports

5-1 Subject to condition 5-2, within a reasonable time period approved in writing by the CEO of the issue of this Statement and for the remainder of the life of the proposal, the proponent shall make publicly available, in a manner approved in writing by the CEO, all environmental plans and reports required under this Statement.

5-2 If any parts of the plans and reports referred to in condition 5-1 contain particulars of:

1. a secret formula or process; or
2. confidential commercially sensitive information;

the proponent may submit a request for approval from the CEO to not make those parts of the plans or reports publicly available. In making such a request, the proponent shall provide the CEO with an explanation and reasons why those parts of the plans or reports should not be made publicly available.
6 Management-based Condition Environmental Management Plans

6-1 The proponent shall prepare and submit Condition Environmental Management Plans:

(1) Prior to the commencement of ground disturbing activities, or as otherwise agreed in writing by the CEO, to demonstrate that the environmental objectives in conditions 7-1, 10-1, 12-1, 14-1, 15-1 and 16-1 will be met.

6-2 The Condition Environmental Management Plan(s) shall:

(2) specify the environmental objectives to be achieved, as specified in conditions 7-1,10-1, 12-1, 14-1, 15-1 and 16-1;

(3) specify risk-based management actions that will be implemented to demonstrate compliance with the environmental objectives specified in 7-1,10-1, 12-1, 14-1, 15-1 and 16-1. Failure to implement one or more of the management actions represents non-compliance with these conditions;

(4) specify measurable management target(s) to determine the effectiveness of the risk-based management actions;

(5) specify monitoring to measure the effectiveness of management actions against management targets, including but not limited to, parameters to be measured, baseline data, monitoring locations, and frequency and timing of monitoring;

(6) specify a process for revision of management actions and changes to proposal activities, in the event that the management targets are not achieved. The process shall include an investigation to determine the cause of the management target(s) being exceeded;

(7) provide the format and timing to demonstrate that 7-1,10-1, 12-1, 14-1, 15-1 and 16-1 have been met for the reporting period in the Compliance Assessment Report required by condition 4-6 including, but not limited to:

(a) verification of the implementation of management actions; and

(b) reporting on the effectiveness of management actions against management target(s).

6-3 After receiving notice in writing from the CEO that the Condition Environmental Management Plan(s) satisfies the requirements of condition 6-2 for conditions 7-1,10-1, 12-1, 14-1, 15-1 and 16-1, the proponent shall:
(1) implement the provisions of the Condition Environmental Management Plan(s); and

(2) continue to implement the Condition Environmental Management Plan(s) until the CEO has confirmed by notice in writing that the proponent has demonstrated the objectives specified in conditions 7-1, 10-1, 12-1, 14-1, 15-1 and 16-1 have been met.

6-4 In the event that monitoring, tests, surveys or investigations indicate exceedance of management target(s) specified in the Condition Environmental Management Plan(s), the proponent shall:

(1) report the exceedance in writing to the CEO within 21 days of the exceedance being identified;

(2) investigate to determine the cause of the management targets being exceeded;

(3) provide a report to the CEO within 90 days of the exceedance being reported as required by condition 6-4(1). The report shall include:

(a) cause of management targets being exceeded;

(b) the findings of the investigation required by conditions 6-4(2);

(c) details of revised and/or additional management actions to be implemented to prevent exceedance of the management target(s); and

(d) relevant changes to proposal activities.

6-5 In the event that one or more management actions specified in the Condition Environmental Management Plan(s) have not been implemented, the proponent shall:

(1) report the failure to implement management action/s in writing to the CEO within 7 days of becoming aware of the failure;

(2) investigate to determine the cause of the management action(s) not being implemented;

(3) investigate to provide information for the CEO to determine potential environmental harm or alteration of the environment that occurred due to the failure to implement management actions;

(4) provide a report to the CEO within 21 days of the reporting required by condition 6-5(1). The report shall include:

(a) cause for failure to implement management actions;
(b) the findings of the investigation required by conditions 6-5(2) and 6-5(3);
(c) relevant changes to proposal activities; and
(d) measures to prevent, control or abate the environmental harm which may have occurred.

6-6 The proponent:
(1) may review and revise the Condition Environmental Management Plan(s), or
(2) shall review and revise the Condition Environmental Management Plan(s) as and when directed by the CEO.

6-7 The proponent shall implement the latest revision of the Condition Environmental Management Plan(s), which the CEO has confirmed by notice in writing, satisfies the requirements of condition 6-2.

7 Flora and Vegetation

7-1 The proponent shall manage the implementation of the proposal to meet the following environmental objective:
(1) minimise direct and indirect impacts on conservation-significant flora and conservation-significant vegetation as far as practicable.
(2) manage the proposal in a manner that ensures there is no adverse impact to inferred groundwater dependent vegetation outside 0.5 m Relative Level (mRL) groundwater drawdown contours as shown in Figure 2.

7-2 The proponent shall consult with the Department of Parks and Wildlife and prepare a Flora and Vegetation Management Plan required by condition 6-1 that satisfies the requirements of condition 6-2, to meet the objective required by condition 7-1.

7-3 The plan required by condition 6-1 shall include provisions required by condition 6-2 to address the following:
(1) identification of potential-impact monitoring and control sites;
(2) design of a survey to acquire baseline biotic and environmental data;
(3) definition of health and abundance parameters; and
(4) a detailed survey plan for Tecticornia to identify further conservation-significant flora populations and occurrences of conservation-significant vegetation outside the Development Envelope.

7-4 The proponent shall continue to implement the version of the Plan most recently approved by the CEO until the CEO has confirmed by notice in writing that the
plan required by condition 6-1 satisfies the requirements of condition 6-2 to meet the outcomes required by condition 7-1.

8 \textit{Tecticornia} aff. \textit{Halocnemoides} s. l. ‘large ovate seed aggregate’ exclusion zone

8-1 The proponent shall not disturb \textit{Tecticornia} aff. \textit{Halocnemoides} s. l. ‘large ovate seed aggregate’ individuals located in the area shown in Figure 3 unless condition 8-3 applies.

8-2 Subject to 8-3, the proponent shall not undertake ground disturbance within a 50 m buffer around the \textit{Tecticornia} aff. \textit{Halocnemoides} s. l. ‘large ovate seed aggregate’ individuals as shown in Figure 3 and delineated by coordinates in Schedule 2.

8-3 Ground disturbance may only occur within the \textit{Tecticornia} aff. \textit{Halocnemoides} s. l. ‘large ovate seed aggregate’ buffer area as shown in Figure 3 and delineated by coordinates in Schedule 2 when:

(1) the CEO on advice of Department of Parks and Wildlife is satisfied that a viable population of \textit{Tecticornia} aff. \textit{Halocnemoides} s. l. ‘large ovate seed aggregate’ has been found outside the Development Envelope as shown on Figure 3; and

(2) the proponent has received the prior written advice of the CEO that ground disturbance may occur within the buffer area.

9 \textit{Tecticornia} sp. aff. \textit{Burnerbinmah} ‘inflated fruit’ exclusion zone

9-1 The proponent shall not disturb the \textit{Tecticornia} sp. aff. \textit{Burnerbinmah} ‘inflated fruit’ located in the area shown in Figure 3 unless condition 9-3 applies.

9-2 Subject to 9-3, the proponent shall not undertake ground disturbance within a 50 m buffer around the \textit{Tecticornia} sp. aff. \textit{Burnerbinmah} ‘inflated fruit’ individual as shown in Figure 3 and delineated by coordinates in Schedule 2.

9-3 Ground disturbance may only occur within the \textit{Tecticornia} sp. aff. \textit{Burnerbinmah} ‘inflated fruit’ buffer area as shown in Figure 3 and delineated by coordinates in Schedule 2 when:

(1) the CEO on advice of Department of Parks and Wildlife is satisfied that a viable population of \textit{Tecticornia} sp. aff. \textit{Burnerbinmah} ‘inflated fruit’ has been found outside the Development Envelope as shown on Figure 3; and

(2) the proponent has received the prior written advice of the CEO that ground disturbance may occur within the buffer area.
10 Subterranean Fauna

10-1 The proponent shall manage the implementation of the proposal to meet the following environmental objectives:

(1) minimise direct and indirect impact on conservation-significant subterranean fauna species and their habitat as far as practicable; and

(2) improve knowledge of subterranean fauna in the Wiluna region.

10-2 The proponent shall consult with the Department of Parks and Wildlife and prepare a Subterranean Fauna Management Plan required by condition 6-1 that satisfies the requirements of condition 6-2, to meet the objectives required by condition 10-1.

10-3 The plan required by condition 6-1 shall include provisions required by condition 6-2 to address the following in relation to the Hinkler Well, Uramurdah, Lake Violet and Barwidgee calcrites both within and outside the area of impact of the proposal:

(1) location of dewatering, production and monitoring bores;

(2) collection of baseline data for both water quality and absolute water levels at the monitoring bore locations;

(3) a detailed monitoring program for both water quality and groundwater levels;

(4) sampling, identification and reporting;

(5) a detailed survey plan for subterranean fauna to identify the presence of potentially restricted species outside the Development Envelope; and

(6) a detailed investigation program to define the parameters of subterranean fauna (stygofauna and troglofauna) habitat and connectivity.

10-4 The proponent shall continue to implement the version of the plan most recently approved by the CEO until the CEO has confirmed by notice in writing that the plan required by condition 6-1 satisfies the requirements of condition 6-2 to meet the objectives required by condition 10-1.

11 Groundwater Abstraction

11-1 The proponent shall manage the implementation of the proposal to meet the following environmental outcomes:

(1) avoid impacts to the hydrological regimes of surface waters and groundwater as far as practicable;

(2) avoid impacts to the quality of surface waters and groundwater as far as practicable; and

(3) through the design and implementation of a suitable groundwater barrier system around mining areas, minimise impacts of groundwater dewatering and abstraction on subterranean fauna, and inferred groundwater dependant vegetation as far as practicable.
11-2 The proponent shall consult with the Department of Water and the Department of Parks and Wildlife and prepare a Groundwater Drawdown Management and Monitoring Plan (Operating Strategy) to meet the objective of condition 11-1.

11-3 The plan required by condition 11-2 shall:

(1) specify the **environmental outcome** to be achieved, as specified in condition 11-1;
(2) specify **trigger criteria** that must provide an early warning that the threshold criteria identified in condition 11-3(3) may not be met;
(3) specify **threshold criteria** to demonstrate compliance with the environmental outcome specified in condition 11-1. Exceedance of the threshold criteria represents non-compliance with these conditions;
(4) specify **monitoring and analysis** to determine if trigger criteria and threshold criteria are exceeded;
(5) specify **trigger level actions** to be implemented in the event that trigger criteria have been exceeded;
(6) specify **threshold contingency actions** to be implemented in the event that threshold criteria are exceeded;
(7) provide the format and timing for the reporting of monitoring results against trigger criteria and threshold criteria to demonstrate that condition 11-1 has been met over the reporting period in the Compliance Assessment Report required by condition 4-6.
(8) provide the location of monitoring sites for surface water and groundwater (production and monitoring bores);
(9) detail a monitoring program for both surface/groundwater quality and levels;
(10) implement operational procedures to ensure surface water flow and quality are not impacted through creek line diversions; and
(11) detail a monitoring program for seepage of tailings into the groundwater from dewatering of pits and the reinjection of water into the aquifer on the advice of the Department of Mines and Petroleum.

11-4 After receiving notice in writing from the CEO that Groundwater Drawdown Management and Monitoring Plan (Operating Strategy) satisfies the requirements of condition 11-2, the proponent shall, prior to the commencement of ground disturbing activities:

(1) implement the provisions of the Groundwater Drawdown Management and Monitoring Plan (Operating Strategy) and
(2) continue to implement the Groundwater Drawdown Management and Monitoring Plan (Operating Strategy) until the CEO has confirmed by notice in writing that the proponent has demonstrated the outcome specified in condition 11-1 has been met.

11-5 In the event that monitoring indicates exceedance of trigger criteria and/or threshold criteria specified in the Groundwater Drawdown Management and Monitoring Plan (Operating Strategy), the proponent shall:
(1) report the exceedance in writing within seven (7) days of the exceedance being identified;

(2) immediately implement the trigger level actions and/or threshold contingency actions specified in the Condition Environmental Management Plan(s) and continue implementation of those actions until the trigger criteria and/or threshold criteria are being met and implementation of the trigger level actions and/or threshold contingency actions are no longer required;

(3) investigate to determine the cause of the trigger criteria and/or threshold criteria being exceeded;

(4) identify additional measures required to prevent the trigger and/or threshold criteria being exceeded in the future;

(5) investigate to determine potential environmental harm or alteration of the environment that occurred due to threshold criteria being exceeded; and

(6) provide a report to the CEO within ninety (90) days of the exceedance being reported. The report shall include:

(a) details of trigger level actions or threshold contingency actions implemented;

(b) the effectiveness of the trigger level actions or threshold contingency actions implemented, monitored and measured against trigger criteria and threshold criteria;

(c) the findings of the investigations required by condition 11-5(3) and 11-5(5);

(d) additional measures to prevent the trigger or threshold criteria being exceeded in the future; and

(e) measures to prevent, control or abate the environmental harm which may have occurred.

11-6 The proponent:

(1) may review and revise the Groundwater Drawdown Management and Monitoring Plan (Operating Strategy), or

(2) shall review and revise the Groundwater Drawdown Management and Monitoring Plan (Operating Strategy) as and when directed by the CEO.

11-7 The proponent shall implement the latest revision of the Groundwater Drawdown Management and Monitoring Plan (Operating Strategy), which the
CEO has confirmed by notice in writing, satisfies the requirements of condition 11-2.

12 Surface Water

12-1 The proponent shall manage the implementation of the proposal to meet the following environmental objective:

(1) prevent surface water contamination from, among other things, water contact with workings from diversion of creek lines.

12-2 The proponent shall consult with the Department of Water and the Department of Mines and Petroleum and prepare a Surface Water Management Plan required by condition 6-1 that satisfies the requirements of condition 6-2, to meet the objectives required by condition 12-1.

12-3 The plan required by condition 6-1 shall include provisions required by condition 12-2 to address the following:

(1) operational procedures that ensure water flow through creek line diversions made from previous workings does not become contaminated by contact with workings;

(2) a monitoring regime for surface water quality using ANZECC 2000 (and any subsequent approved revisions);

(3) water quality criteria or background for assessing water quality changes; and

(4) trigger values and contingency measures

12-4 The proponent shall continue to implement the version of the plan most recently approved by the CEO until the CEO has confirmed by notice in writing that the plan required by condition 6-1 satisfies the requirements of condition 6-2 to meet the objectives required by condition 12-1.

13 Schizopera sp. TK1 Exclusion Area

13-1 The proponent shall ensure that suitable habitat is maintained for Schizopera sp. TK1;

13-2 Subject to condition 13-3, the proponent shall;

(1) not undertake ground disturbance within the Schizopera sp. TK1 exclusion area as shown on Figure 4 and delineated by coordinates in Schedule 2; and

(2) ensure that groundwater drawdown from mine dewatering does not exceed 0.5 m within the Schizopera sp. TK1 exclusion area as shown
on Figure 4 and delineated by coordinates in Schedule 2, when monitored in accordance with the Groundwater Drawdown Management and Monitoring Plan required by condition 8-2.

13-3 No ground disturbance and groundwater drawdown exceeding 0.5 m may occur within the *Schizopera* sp. TK1 exclusion area as shown in Figure 4 of Schedule 1 until:

1. the CEO on advice of Department of Parks and Wildlife is satisfied that a population of *Schizopera* sp. TK1 has been found outside the impact areas as shown on Figure 4; and
2. the proponent has received the notice in writing from the CEO that ground disturbance and groundwater drawdown may occur within the *Schizopera* sp. TK1 exclusion area as shown in Figure 4 of Schedule 1.

**Dewater Reinjection**

14-1 The proponent shall manage the implementation of the proposal to meet the following **environmental objective:**

1. to ensure groundwater mounding associated with the Lake Maitland reinjection area is limited to no more than 1 m above natural levels.

14-2 The proponent shall consult with the Department of Water and prepare a Groundwater Reinjection Management Plan (Operating Strategy) required by condition 6-1 that satisfies the requirements of condition 6-2, to meet the objective required by condition 14-1.

14-3 The plan required by condition 6-1 shall include provisions required by condition 6-2 to address the following:

1. location of monitoring bores;
2. detailed monitoring program for both groundwater quality and levels; and
3. trigger values and contingency measures.

14-4 The proponent shall continue to implement the version of the Plan most recently approved by the CEO until the CEO has confirmed by notice in writing that the plan required by condition 6-1 satisfies the requirements of condition 6-2 to meet the objective required by condition 14-1.

**Dust Management**

15-1 The proponent shall manage the implementation of the proposal to meet the following **environmental objective:**

1. minimise direct and indirect impacts associated with dust.

15-2 The proponent shall consult with the Department of Mines and Petroleum and prepare a Dust Management Plan required by condition 6-1 that satisfies the
requirements of condition 6-2, to meet the objectives required by condition 15-1.

15-3 The plan required by condition 6-1 shall include provisions required by condition 15-2 to address the following:

(1) a dust monitoring plan;

(2) procedures to manage dust during periods of high winds likely to lead to dust storms; and 3 contingency plans for the management of dust should mining involve blasting.

15-4 The proponent shall continue to implement the version of the plan most recently approved by the CEO until the CEO has confirmed by notice in writing that the plan required by condition 6-1 satisfies the requirements of condition 6-2 to meet the objectives required by condition 15-1.

16 Heritage

16-1 The proponent shall manage the implementation of the revised proposal to meet the following environmental objective:

(1) minimise impacts as far as practicable to registered Aboriginal sites DAA 2676, DAA 1160, DAA 2440 and DAA 2441 and any other Aboriginal heritage places to which the Aboriginal Heritage Act 1972 (AHA) may apply.

16-2 The proponent shall consult with the Department of Aboriginal Affairs and prepare a Cultural Heritage Management Plan required by condition 6-1 that satisfies the requirements of condition 6-2, to meet the objective of condition 16-1.

16-3 The proponent shall continue to implement the version of the plan most recently approved by the CEO until the CEO has confirmed by notice in writing that the plan required by condition 6-1 satisfies the requirements of condition 6-2 to meet the objective required by condition 16-1.

17 Offset - Tecticornia

17-1 The proponent shall fund and undertake an offset as required in Condition 17-2 with the objective to counterbalance the cumulative impact on 1333.2 ha of Tecticornia-dominated vegetation as a result of implementation of the proposal.

17-2 Prior to the commencement of ground disturbing activities, the proponent shall prepare a Survey and Research Plan for approval by the CEO on the advice of the Department of Parks and Wildlife, to conserve and improve the scientific knowledge of Tecticornia taxa. The Survey and Research Plan shall include:

(1) implementation of further surveys to collect Tecticornia specimens within and outside the Development Envelope within the associated lake system and immediate adjoining areas;
(2) conducting research on *Tecticornia* specimens collected for taxonomic resolution;

(3) provision of distribution and abundance data to enable determination of the conservation status of identified *Tecticornia* taxa including relative representation within and outside the Development Envelope;

(4) storage, preservation and propagation techniques for any *Tecticornia* taxa and unidentified specimens that have not been shown to occur outside the Development Envelope or the area of groundwater drawdown greater than the 0.5 mRL;

(5) ecophysiological characterisation and assessment of habitat requirements of different *Tecticornia* taxa within and outside the Development Envelope including an assessment of potential impacts from changes in groundwater quality and quantity, and with main emphasis on those taxa identified as occurring within the Development Envelope;

(6) conducting research on requirements and techniques for re-establishing *Tecticornia* vegetation communities and conservation-significant taxa in rehabilitating the Disturbance Area;

(7) establishing soil management techniques to ensure preservation of top soils, containing the seed bank, for use in rehabilitation; and

(8) on-ground works for the establishment of self-sustaining populations of *Tecticornia* taxa considered to be at risk from this proposal.

17-3 The proponent shall continue to implement the version of the plan most recently approved by the CEO until the CEO has confirmed by notice in writing that the plan required by condition 6-1 satisfies the requirements of condition 6-2 to meet the objective required by condition 17-1.

17-4 The funding required by condition 17-1 shall be a minimum total monetary value of $2,000,000 (GST exclusive) plus CPI from the date of this Statement.

18 **Offset - Subterranean Fauna Habitat (PEC)**

18-1 The proponent shall fund and undertake an offset as required in Condition 18-2 with the objective to counterbalance the significant residual impact on approximately 168 ha of Hinkler Well Calcrete PEC (component taxa) and 500 ha of the Barwidgee PEC (component taxa) as a result of implementation of the proposal.

18-2 Prior to the commencement of ground disturbing activities, the proponent shall prepare, in consultation with the Department of Parks and Wildlife and the WA
Museum, and submit a Subterranean Fauna Research Plan to the CEO. The research questions for the plan should be the following:

1. Improve the knowledge of their taxonomy, distribution and habitat requirements;
2. Develop a better understanding of the impact on subterranean fauna from mining operations; and
3. Identify the key variables to support the ecological function of subterranean fauna.

18-3 The Subterranean Fauna Research Plan shall:

1. Identify research objectives and completion criteria;
2. Include details of project budgets and costs;
3. Identify timeframes and responsibilities for implementation; and
4. Identify reporting procedures, including the content, format, timing and frequency for the reporting of monitoring data against the research questions, in accordance with condition 18-2.

18-4 After receiving notice in writing from the CEO that the Subterranean Fauna Research Plan satisfies the requirements of condition 18-3, the proponent shall:

1. Implement the actions in accordance with the requirements of the Subterranean Fauna Research Plan; and
2. Continue to implement the actions in accordance with the requirements of the Subterranean Fauna Research Plan until the CEO has confirmed by notice in writing that the objective in condition 18-1 has been met.

18-5 The proponent shall monitor the implementation of the plan and provide a written report, including monitoring data, and provide to the CEO within three months of the finalisation of each project. The research findings are to be made publically available.

18-6 The proponent:

1. May review and revise the Subterranean Fauna Research Plan, or
2. Shall review and revise the Subterranean Fauna Research Plan as and when directed by the CEO.

18-7 The proponent shall implement the latest revision of the Subterranean Fauna Research Plan, which the CEO has confirmed by notice in writing satisfies the requirements of condition 18-2.
Schedule 1

Table 1: Summary of the extension to the Wiluna Uranium Proposal

<table>
<thead>
<tr>
<th>Revised Proposal Title</th>
<th>Revised Wiluna Uranium Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short Description</td>
<td>The proposal is to construct and operate a uranium mine consisting of four deposits: Centipede, Millipede, Lake Way and Lake Maitland. The proposal includes the construction and operation of a processing plant, roads, power and water source and supply facilities, in pit tailings storage facilities (TSF), accommodation and other associated infrastructure.</td>
</tr>
</tbody>
</table>

Table 2: The key elements of the Revised Proposal

<table>
<thead>
<tr>
<th>Element</th>
<th>Location</th>
<th>Authorised Extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake Way open cut mine pit and associated infrastructure.</td>
<td>Figure 2</td>
<td>Clearing of no more than 704 ha of native vegetation within a Development Envelope of 733 ha.</td>
</tr>
<tr>
<td>Centipede open cut mine pit and associated infrastructure.</td>
<td>Figure 2</td>
<td>Clearing of no more than 580 ha of native vegetation within a Development Envelope of 580 ha.</td>
</tr>
<tr>
<td>Infrastructure (processing plant, borefield, water pipelines, haul and access roads, accommodation village).</td>
<td>Figure 2</td>
<td>Clearing of no more than 246 ha of native vegetation within a Development Envelope of 444 ha.</td>
</tr>
<tr>
<td>Millipede open cut mine pit and associated infrastructure.</td>
<td>Figure 2</td>
<td>Clearing of no more than 537.9 ha of native vegetation within the Millipede Development Envelope of 739 ha.</td>
</tr>
<tr>
<td>Lake Maitland open cut mine pit and associated infrastructure.</td>
<td>Figure 2</td>
<td>Clearing of no more than 776.4 ha of native vegetation within the Lake Maitland Development Envelope of 2824 ha.</td>
</tr>
<tr>
<td>Lake Maitland borefield</td>
<td>Figure 2</td>
<td>Clearing of no more than 23.6 ha of native vegetation with a Development Envelope of 23.6 ha.</td>
</tr>
<tr>
<td>Southern haul road, borrow pits and water filling stations.</td>
<td>Figure 2</td>
<td>Clearing of no more than 243.9 ha of native vegetation within the Southern Haul Road Development Envelope 327.8 ha.</td>
</tr>
<tr>
<td>In pit tailings disposal.</td>
<td>Figure 2</td>
<td>Disposal of no more than 2.1 million tonnes per annum (Mtpa) of tailings into engineered containment facilities within the Millipede and Centipede pit voids.</td>
</tr>
</tbody>
</table>
Mine dewatering at Lake Way.  
Figure 2  
Dewatering of no more than 1.3 Gigalitres per annum (GL/a).

Mine dewatering at Centipede/Millipede.  
Figure 2  
Dewatering of no more than 2 GL/a.

Mine dewatering at Lake Maitland  
Figure 2  
Dewatering of no more than 4 GL/a.

Lake Maitland Water reinjection  
Figure 2  
Downstream aquifer reinjection of excess water from pit dewatering.

<table>
<thead>
<tr>
<th>Acronym or Abbreviation</th>
<th>Definition or Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEO</td>
<td>The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the Environmental Protection Act 1986, or his delegate.</td>
</tr>
<tr>
<td>Clearing</td>
<td>As defined in the Environmental Protection Act 1986</td>
</tr>
<tr>
<td>Conservation significant</td>
<td>Species that are listed under the Environment Protection and Biodiversity Conservation Act 1999 and Wildlife Conservation Act 1950, and Parks and Wildlife Priority species that are likely to have their conservation status changed by the Proposal</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Authority</td>
</tr>
<tr>
<td>EP Act</td>
<td>Environmental Protection Act 1986</td>
</tr>
<tr>
<td>Exclusion zone</td>
<td>A defined area in which mining will not occur</td>
</tr>
<tr>
<td>GL/a</td>
<td>Gigalitres per annum</td>
</tr>
<tr>
<td>Ground disturbing activities</td>
<td>Includes implementation of the proposal aspects such as clearing, grading, excavating, digging, drilling, dewatering and installation of infrastructure.</td>
</tr>
<tr>
<td>GST</td>
<td>Goods and services tax</td>
</tr>
<tr>
<td>Km</td>
<td>Kilometre</td>
</tr>
<tr>
<td>ha</td>
<td>Hectare</td>
</tr>
<tr>
<td>m</td>
<td>Metre</td>
</tr>
<tr>
<td>Mtpa</td>
<td>Million tonnes per annum</td>
</tr>
<tr>
<td>OEPA</td>
<td>Office of the Environmental Protection Authority</td>
</tr>
<tr>
<td>PEC</td>
<td>Priority Ecological Community</td>
</tr>
<tr>
<td>Self-sustaining</td>
<td>A population that is self-perpetuating (able to continue indefinitely) without external assistance.</td>
</tr>
</tbody>
</table>

Figures (attached)

Figure 1. Proposal Location
Figure 2. Revised Proposal Development Envelope
Figure 3. Tecticornia Exclusion Areas
Figure 4. Schizopera sp. TK1 Exclusion Area
Figure 1: Proposal Location
Figure 2: Revised Proposal Development Envelope
Figure 3: *Tecticornia* Exclusion Areas
Figure 4: Schizopera sp. TK1 Exclusion Area
Schedule 2

Coordinates defining the Revised Proposal are held by the Office of the Environmental Protection Authority:

- Revised Proposal Development Envelope (Document Reference Number 2016-1470712435483).
- *Tecticornia* Exclusion Areas (Document Reference Number 2016-1470712435483).
- *Schizopera* sp. TK1 Exclusion Area (Document Reference Number 2016-1470712435483).
Appendix 8

Summary of Submissions and Proponent's Response to Submissions