Section 5

Project Justification and Alternatives

5. Project Justification and Alternatives

5.1 Project Rationale and Benefits

The Project is a key step in Cameco Corporation's plans to expand its global operations into Australia. The development of the Project will result in economic and social benefits for local communities and the WA and Australian economies. The Project will contribute directly through:

- royalties and taxation payments;
- capital investment in the north eastern Goldfields region;
- increased direct and indirect employment and contracting opportunities in the region and across the state;
- increased demand for goods and services, which will support local communities and economies; and
- increased opportunities in education, training, employment, contracting and business and community development in the region through implementation of Cameco's Five Pillars program.

5.1.1 Global Demand for Uranium

The fundamental driver of growth in the demand for uranium is the generation of electricity from nuclear power reactors. Other important applications include the production of radioisotopes used extensively in medical applications, industry and scientific research. The primary driver of increasing electricity demand is the continued growth in global population and improvements in the standard of living in many countries. The United States Census Bureau (www.census.gov) estimates the global population is currently around 7.2 billion; this is predicted to increase to over 9 billion by 2050 (United Nations Population Fund).

Uranium is used in nuclear reactors around the world. There are currently 437 nuclear reactors operating (primarily on the East Coast of the United States and in Western Europe, South Korea and Japan) with a combined electricity output of around 2,360 billion kWh per annum. These reactors consume around 65,600 tonnes per annum (tpa) of UOC (World Nuclear Association 2015). The US is the world's largest market, while France is the most reliant on uranium supplies, with more than 75% of its electricity generated by nuclear power.

Nuclear power has high up-front capital costs and low operating costs. It is therefore, cost-effective to keep existing nuclear power stations operating at high capacities, with changes in load to meet local electricity demand largely met by fossil fuel electricity generators. As a result, the demand for uranium is largely isolated from economic variations, and more dependent on installed capacity. There are currently 70 nuclear reactors under construction, 183 ordered or planned and 311 proposed (World Nuclear Association 2015).

Growth of global uranium consumption has slowed over the last few years with nuclear reactors in Japan being offline following the events at the Fukushima-Daiichi nuclear power plant in March 2011. However, the long term future for the industry looks positive as Japan gradually returns to nuclear power and demand for nuclear-generated electricity increases around the world. By 2024, Cameco expects over 100 gigawatts of nuclear power, or about 80 net new reactors, to be added to the world's grids, with even more growth expected outside that timeframe. Of the reactors under construction today, if startups occur as planned, 45 of those units (about 46 gigawatts) could be online over the next 3 years. The potential growth in the number of nuclear reactors is mainly concentrated in Asia.

Approximately 85% of the demand for uranium is supplied from mines, with the remainder supplied from uranium stockpiles or other secondary sources, including recycled uranium and plutonium from spent nuclear fuel, re-enriched uranium tails, and decommissioned weapons-grade uranium

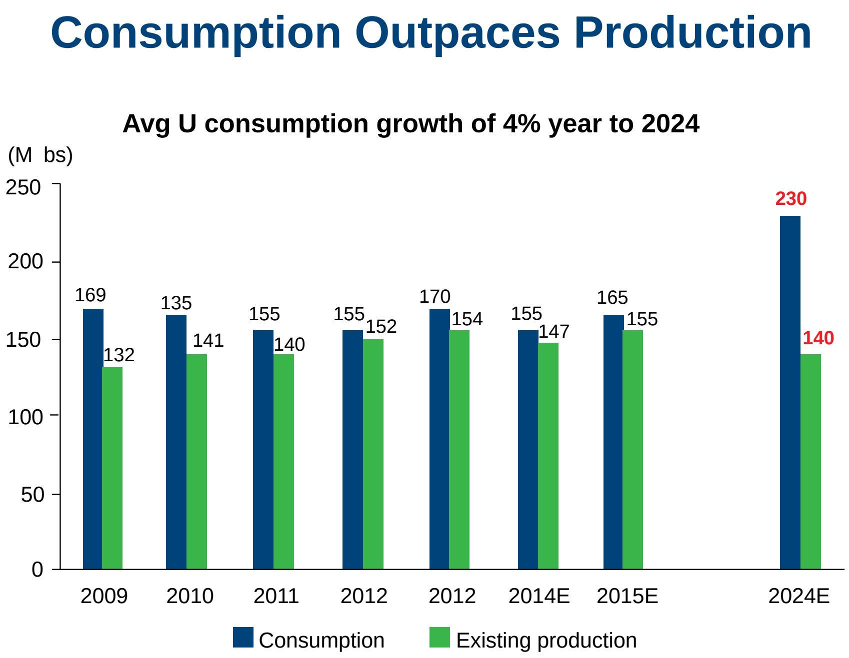

Figure 5-1: Uranium oxide demand and supply

and plutonium. These stockpiles are being drawn down and are expected to contribute less over time, which means that more primary production will be needed from uranium mines. Cameco estimates about 15% of total supply required over the next decade will need to come from new mines not yet in development.

Figure 5-1 illustrates the predicted shortfall between current uranium production and future demand to 2030. This shortfall will need to be met by current prospective and future deposits becoming operational, or by increasing production from existing operations.

5.1.2 Uranium Mining in Western Australia

Mining is an important contributor to the economic and social fabric of WA, as indicated by the following information provided by the DMP (2014): During 2013/2014, the WA mineral and petroleum industry was valued at $121.6 billion, with iron ore accounting for $73.7 billion (78%). Gold was the second most valuable mineral sector with total sales of $8.8 billion (9%). This was followed by alumina, nickel and base metals (copper, lead and zinc). As at September 2014, WA had an estimated $160 billion worth of resource projects under construction or in the committed stage of development. A further $108 billion has been identified as being allocated to planned or possible projects in coming years.

While Australia has the largest known resources of uranium in the world, it is not the largest supplier. There are currently three operating mines: Ranger in the Northern Territory, Olympic Dam and Four Mile mine in South Australia. The Beverley and Honeymoon mines (also in South Australia) were shut down in 2013/2014 due to the low uranium price. Uranium mining was banned in WA from 1983 until 2008. While Western Australia does not have a commercially productive uranium mine in operation, several projects have either obtained or are seeking environmental approval and are being advanced. As of June 2012, WA has known deposits of about 211,000 tonnes of uranium (DMP 2013). Development of the uranium sector in WA will provide further diversity to the WA mining industry.

The Yeelirrie deposit is the largest known uranium deposit in WA. The proposed Project, which proposes to produce up to 7,500 tpa UOC, is well placed to take advantage of the current and expected growth in demand.

5.2 Evaluation of Project Alternatives

Cameco has investigated numerous alternatives for the various environmental and socially significant aspects of the proposed Yeelirrie development. The design of a successful project is an iterative process, and the decision to select particular alternatives over other options took into account environmental best practice in combination with economic and social factors.

This section outlines the evaluation of the key alternatives and modifications to the Project after the evaluation of historical information gathered during previous assessments undertaken by WMC in 1978 and by BHP Billiton in 2010.

The assessment of options has also been informed by the results of stakeholder engagement and findings of environmental surveys conducted by both BHP Billiton and Cameco. Government and non-government stakeholders contributed to this process, raising a number of options considered for the Project. These considerations ensure that the proposed development is practicable and provides an appropriate level of protection for the environmental, social and cultural values of the Project Area.

The major Project alternatives investigated and discussed here include:

- mining method and equipment;
- tailings management;
- dewatering and water supply;
- processing capacity and production rate;
- energy supply;
- site services;
- transport of product to Port Adelaide; and
- consequences of not proceeding with the Project.

5.2.1 Mining Method and Equipment

The key Project value driver for mining at Yeelirrie is the availability of high grade ore to feed the mill early in the mine life and the control of smectite grades. In order to minimise ore loss and dilution, and effectively separate high smectite materials, a highly selective mining method is required. The other key characteristics affecting the mining method are the near surface location of the orebody, high value and high processing cost of the ore, vertical variability of the orebody, presence of high grade ore zones and general low strength of the material being mined, meaning relatively easy digging.

While a range of mining methods and mining equipment options were considered, the best option to achieve the value drivers and the required mining selectivity were the use of small scale hydraulic excavators and standard off-highway rear dump trucks for the prime movement of both ore and waste materials. Rehandle activities will be performed primarily by front end loaders. Due to the general low strength of the material, free digging of materials will be possible with the exception of limited areas which may require bulldozer ripping before digging. Explosives will not be required.

5.2.2 Tailings Management

The major consideration for tailings management was whether to use in-pit storage or above ground storage. The key design objectives that informed the final decision for the tailings storage facility were:

- to provide safe and economic storage of tailings to minimise environmental impacts and risks;
- to provide an erosion-resistant and non-polluting structure that is stable in the long term;

- to minimise seepage from the facility; and
- to minimise ground disturbance.

The following factors were considered when determining the preferred tailings management option:

- location and layout with particular attention to maximising operational efficiency and reducing net ground disturbance;
- hydrological and hydraulic factors;
- geotechnical, geochemical (geomorphological) and radiological factors;
- availability and properties of construction materials;
- embankment design and stability; and
- operational factors and availability of material for closure.

Above ground tailings storage was not selected because it would have required extensive additional environmental impact from ground disturbance and would not be as stable over the long term as in-pit storage.

With the design intent stated above, storage of tailings in the mine pit was selected as the preferred option.

The deposition of tailings in the pit minimises the net environmental impact of the Project as it reduces the Project disturbance area. The in-pit solution would also isolate the tailings from the groundwater because of the underlying 60 m layer of very low permeability clay/quartz and the effective encapsulation of the tailings within the pit voids using constructed clay embankments (Section 6.5). As mining progresses, additional capacity for tailings storage will be available within the pit void. The overburden removed from the developing mining operation would provide suitable material to cap the tailings storage cells for progressive decommissioning, rehabilitation and closure. This tailings management option also has the significant benefit of being able to provide a stable final landform similar to that of the pre-mining landform.

The deposition of tailings into the open pit void presents some timing issues. The pit has to be dewatered and mined before tailings can be deposited. Similarly, there has to be sufficient area mined and open to receive tailings to allow tailings deposition at a rate to allow adequate drying and consolidation. To achieve this, mine dewatering will precede mining which will also be advanced several years before the commencement of milling.

As a result of the staggered schedule, a larger ore stockpile will be established adjacent to the plant before the commencement of milling.

The proposed schedule for dewatering, mining and deposition of tailings is discussed in detail in Section 6.3.

5.2.3 Dewatering of the Open Pit

Dewatering of the mine open pit prior to the commencement of mining is required to provide safe and dry conditions for mining and tailings operations. To meet these conditions, it is expected that dewatering would commence up to one year before the commencement of mining. In the first year of dewatering, up to approximately 4.0 ML/d of groundwater would be abstracted, peaking in year four at up to approximately 13.0 ML/d for a short period. In the first few years of operation, some water from mine dewatering is likely to exceed Project requirements, and as such would require disposal. In order to 'preserve' the water for future use Cameco proposes to reinject the water upstream of the mining area, so that it can be abstracted for future use later in the mine life. The Project water balance model suggests there will be a requirement to reinject groundwater for the first four years, with maximum reinjection occurring in year three at the rate of up to approximately 6.5 ML/d.

This proposal has the environmental benefit of reducing the volume of water needed to be abstracted elsewhere.

The initial excess water would be reinjected into the groundwater aquifer within the open pit boundary and 'upstream' of the active mining area so that it can be re-abstracted for use in the coming years. After the initial years, there is a net water demand and all water abstracted from dewatering would be used on-site.

A system consisting of in-pit trenches and pumps has been selected as the best dewatering option. This system was demonstrated to be effective during work completed by WMC when a series of trial mining open pits were developed in the early 1980's. This would be a dynamic/transient system close to active mining and tailings storage facility areas. To provide safe dry mining conditions, the aquifer would be locally dewatered by trenches and sump pumping systems that would extend 1 to 3 m below the active pit floors and begin pumping up to three months before mining of the relevant area to allow enough time for dewatering to meet the scheduled rate of advance. Dewatering trenches would be maintained at the perimeter of the final pit footprint to manage the longer-term inflows from groundwater outside the pit.

The elevated salinity of the water abstracted from dewatering (about 10,000 to 50,000 mg/L) makes this water suitable for use in dust suppression and as raw process water for the metallurgical plant. This would in turn reduce the amount of Project water required from other sources (and potential impacts arising from this) and is consistent with regulatory preferences for use of mine water.

The process of dewatering and reinjection and the environmental implications are further discussed in Section 9.5.

5.2.4 Water Supply

The Project requires water of various qualities and quantities for different uses during the construction and operation phases. The biggest single demand is for raw process water in the grinding and leaching circuits. The second biggest use of water is for dust suppression. Both uses can accommodate poor water quality from saline sources. The total annualised average operational water demand is estimated at around 8.7 ML/d, with about 4.8 ML/d required for metallurgical processing and the remainder used as required for dust suppression and the reverse osmosis plant within the mining operation.

A much smaller demand for water during construction and operation is for feed water to a reverse osmosis (RO) desalination plant to produce low-salinity water (about 500 mg/L). This water will be used for steam generation and other parts of the process circuit (2.2 ML/d), as well as for producing potable water for the accommodation village and on-site workforce. This feed water supply would preferably be lower-salinity water than the expected pit dewatering discharge and therefore would be provided from higher-quality groundwater sources.

Further details of the water demand and supply source for the construction and operation of the proposed development are provided in Section 6.6.

Pit dewatering will provide a valuable water supply for the first four years of the Project. To meet the need for increasing make-up water supplies, a series of wellfields surrounding the Project has been identified and assessed to be the best option. Water supply infrastructure would be constructed to link the Project to these wellfields situated within the State Agreement area, hereafter referred to as the Yeelirrie Wellfield and bores.

In deciding an appropriate groundwater production strategy, Cameco's philosophy is to utilise poorer quality (higher salinity) groundwater where possible within the demand requirements. This reduces the demand for better quality water and potentially minimises the impact of groundwater drawdown on groundwater dependant ecosystems.

The selected wellfield option for make-up water supplies represents a combination of two aquifer types:

- The deeper palaeochannel aquifer that occurs as a largely confined strip aquifer about 40 to 70 m below the State Agreement area. This is the same aquifer from which the down-gradient Albion Downs Borefield abstracts most of its groundwater and is poorer quality than the shallower aquifers.
- The shallower aquifer intervals comprising sandy alluvium and weathered bedrock profiles, which are typically located away from the central axis of the catchment and lie within 30 km of the proposed metallurgical plant site.

The location, design pumping rates, and durations of pumping for the selected option has been determined based on many factors including:

- physical capacity of the aquifers to sustain pumping rates over the required timeframes;
- the potential impact on groundwater-dependent ecosystems from possible drawdowns of the watertable; either directly from pumping of the shallow unconfined aquifer system, or indirectly by inducing vertical leakage from the shallow aquifer through the confining layers when pumping from the deeper aquifer;
- the locations of existing groundwater users' abstraction points (bores and wells);
- land access and tenure; and
- groundwater salinity.

The 1978 WMC EIS identified six distinct wellfield areas for the Project water supplies. The 1978 requirements were for larger volumes of groundwater at much lower salinities (6.5 ML/d at less than 3,000 mg/L TDS for process water and 4 ML/d at less than 1,000 mg/L TDS for potable water) than the current proposed Project, principally because of different ore processing requirements and the fact that desalination was not a technical solution practically available in 1978.

Cameco does not consider that the plans proposed by previous proponents are viable. The water supply wellfields proposed by WMC for development in 1978 were to be located in the Lake Way catchment, at distances of about 15 to 45 km north and north east of the proposed metallurgical plant site. These areas were rejected by the current study for numerous reasons, including:

- land access and tenure;
- costs;
- likely potential environmental impacts (from pumping a shallow aquifer hosted by calcrete and likely to support groundwater-dependent ecosystems);
- located outside the Mining Areas specified in the State Agreement for water search; and
- the much-reduced reliance on low-salinity groundwater within the proposed process.

Parts of areas proposed by WMC in the 1978 study as alternative or back-up water supplies have been incorporated into the proposed Yeelirrie Wellfield, primarily for their closer proximity to the metallurgical plant (2 to 20 km) and the diminished potential for hosting groundwater-dependent ecosystems.

5.2.5 Processing Capacity and Production Rate

Uranium would be extracted from the ore in a series of agitated and heated alkali leaching tanks operating under atmospheric pressure. Pressure leaching could have been used which would have reduced the footprint of the Process Plant marginally but the high capital intensity and operating complexity of a pressure leach circuit, coupled with the requirement for enhanced skill levels to operate and maintain the production autoclaves, favoured the selection of the agitated tank leach option. To optimise uranium extraction, the feed material would be ground to reduce the particle size before leaching. The leach residue would be separated from the uranium solution (termed 'pregnant leach solution' or PLS) and washed in a counter-current decantation (CCD) circuit. The use of filtration to separate the leach residue from the PLS is less effective than CCD due to low filtration rates associated with fine clay particles in the ore. Uranium would be precipitated from the PLS as an impure sodium diuranate (SDU), and subsequently dissolved and purified before being precipitated a second time as uranium peroxide ($UO_4.2H_2O$). This would be dewatered, dried and packed as uranium oxide concentrate (UOC) with the option to calcine through to yellowcake (U_3O_8) available given the flexibility in design of the drying and packaging equipment proposed. The metallurgical plant would be commissioned about two years after mining begins, and would operate continuously thereafter.

The alkali leaching and direct precipitation process was considered optimal given the chemistry and mineralogy of the ore and the relatively poor quality of groundwater available to the Project. Acid leaching was not a viable option due to the carbonate content of the ore and the consequent high acid consumption and CO_2 emissions in the leaching stage. The alternative to direct precipitation is to use ion exchange (IX) to pre-concentrate the dissolved uranium following the leaching stage.

The efficiency of uranium transfer to a resin (IX) would not be acceptable considering the quality of water available to the Project. Specifically, the chloride ion concentration in the ground water far exceeds the minimum level required for effective IX. The option to treat the entire process water volume through a reverse osmosis facility to improve the water quality to an acceptable level would consume significant additional energy and not be cost effective. The ore contains significant quantities of inorganic salts, such as sodium and magnesium chloride that dissolve upon contact with the process water and this would reduce the quality of the process water even if the process water was purified initially via reverse osmosis prior to its contact with the ore. The dissolved salts in solution actually play an important role in assisting to settle the solid residue in the CCD circuit, so to purify the process water would negatively impact the CCD circuit. Solvent extraction (SX) was not considered as there is no commercial SX process that is effective under alkaline conditions. Given the practical constraints associated with improving the process water quality, direct precipitation of SDU using sodium hydroxide was the selected option to recover and concentrate the uranium from the PLS.

Beneficiation, a process of pre-concentrating the uranium containing minerals within the ore prior to leaching, was also tested but the mineralogy of the ore is not suited to conventional ore pre-concentration techniques. The primary uranium containing mineral (carnotite) is finely disseminated within the clay minerals but also finely disseminated within the harder calcrete and dolomite minerals (and in similar proportions). As a result, a mineralogical deportment constraint renders preliminary wet scrubbing and screening, which is the first and most important step in a potential ore beneficiation process, ineffective at recovering and concentrating the majority of the uranium bearing minerals into one process stream. A complex beneficiation process would be required to ensure acceptable uranium recovery and the beneficiation process would likely consume significantly higher quantities of water overall relative to the selected process path. The potential to apply beneficiation techniques was discounted based on poor results obtained from preliminary scrubbing, screening and attrition test work.

Vanadium recovery was evaluated and rejected due to the uneconomic nature and potential environmental impacts of the identified recovery process.

5.2.6 Energy Supply

Peak electricity demand for the proposed development is estimated at 20 MW to meet an average annual electricity consumption of 150,000 MWh. Most of this power would be required to operate the grinding mill and pump process slurries within the metallurgical plant. The power would also be used to operate the Yeelirrie Wellfield and associated water transport and treatment infrastructure.

Electricity requirements would be met by installing a series of on-site diesel (or gas fired) generators and local transmission infrastructure. Installing multiple diesel generators would provide contingency in the event of planned and unplanned generator outages and would also allow the operation of the generators to be optimised, minimising fuel consumption.

Should the option of gas-fired generators become viable, (both on economic and gas availability grounds) a new gas pipeline lateral of approximately 50 km length would be required for a connection to the Goldfields gas pipeline. The gas option remains under consideration and will be progressed during the definitive feasibility stage of Project planning. If it is determined to be a viable alternative to diesel, an environmental impact assessment of establishing the pipeline corridor will be completed and appropriate approvals sought. For the purposes of this approval, however, it is assumed that power will be generated using diesel fuel.

A diesel-fired steam generator would be installed, with sufficient capacity to provide about 25 t/h of high-grade steam at a pressure of around 1,000 kPa. A boiler would also be constructed to capture waste heat associated with the exhaust gases of both the diesel-fired electrical generators and the steam generators.

The requirement for steam generation would be minimised through the use of heat exchangers within the metallurgical process to transfer heat between process streams where the nature of the precipitation process demands significant differences in heat. Up to 70 % of the carbon dioxide (CO_2) would be captured from the power station for use in the metallurgical process.

Other than the decision between diesel and gas, there are limited options for the power supply for the Project.

5.2.7 Site Services

Workforce Accommodation

With regard to the residential alternative, the original State Agreement Act required WMC to establish a town for its estimated workforce. The town, including suitable commercial, educational, recreational, sporting, religious and medical facilities, was to have been located 13 km north of the proposed open cut mine.

Cameco has decided not to establish a town at this stage because the small size of the operation would not support it. The operational phase would employ approximately 250 people and only half of them would be in the area at any time. The proposed WMC township would have required additional land disturbance and the proposed location was close to known Aboriginal cultural heritage sites.

Cameco will establish a fly-in/fly-out (FIFO) and drive-in/drive-out (DIDO) operation and an accommodation village close to the Project.

Location of Accommodation Village

A number of options were reviewed to determine the best location for the accommodation village at Yeelirrie taking into account factors such as travel distances, dust, aesthetics and natural background radiation level. The site located approximately 20 km south east of the mine site was determined to be the most appropriate place for the accommodation village for several reasons: it is well located for road access to Mount Keith for air services and it is sufficiently distant from the mine site to eliminate any concerns regarding radiation.

Air Services

Cameco proposes to utilise the airport facilities at the nearby Mount Keith operation, coupled with a proposed bus service between Mount Keith and Yeelirrie, for the movement of a FIFO workforce as approved under the terms of the sale agreement of the Yeelirrie Project with BHP Billiton. In the event the Mount Keith option is not acceptable to either party, Cameco would construct an onsite airport adjacent to the existing Yeelirrie air field. In this case, Cameco would seek separate environmental approval for this facility.

5.2.8 Transport of Product to Port Adelaide

The proposed Yeelirrie development would produce up to 7,500 tpa uranium peroxide ($UO_4.2H_2O$), more commonly referred to as uranium oxide concentrate (UOC), with peak production in the early years of the Project. The product is proposed to be exported from Australia from the Port of Adelaide.

Packaging and transportation of UOC is regulated by Commonwealth, State and Territory government agencies in accordance with the Code of Practice for the Safe Transport of Radioactive Material published by the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). Details of regulatory controls, transportation and packaging are discussed in more detail in Section 9.6 and Appendix J1.

In developing a transport solution for UOC, numerous options based on road, rail and a combination of road and rail were identified and assessed. The assessment considered social, political and environmental factors, as well as emergency response and operational considerations.

In February 2009, BHP Billiton undertook community consultations in the Goldfields region and presented several road/rail options for the transport of UOC from the proposed Yeelirrie development to the Western Australia/South Australia border. The options proposed were (see Figure 5-2):

- road to Leonora, then rail to South Australia;
- road to Kalgoorlie-Boulder (via Kalgoorlie Research Plant), then rail to South Australia;
- road to Kalgoorlie-Boulder (via West Parkeston), then rail to South Australia; and
- road to Parkeston, then rail to South Australia (identified as an emerging opportunity).

Feedback from those community sessions, coupled with discussions with state and local governments, indicated that the proposed Parkeston road to rail intermodal facility would be the most acceptable transport solution, and BHP Billiton agreed to use such a facility if it was established and licensed by third parties for UOC transport, as part of an intermodal facility handing all cargoes at Parkeston.

Cameco was also party to the discussions on the proposed Parkeston facility and agreed to use such a facility if it were established.

In the event that the facility is not established by the time production at Yeelirrie commences, Cameco proposes to transport the product by road from Yeelirrie along the Goldfields and Eyre highways to Port Adelaide for direct export. Port Adelaide is an approved UOC export port and the Project would use the established facilities and processes (see the following section on the export of uranium consignments).

Figure 5-2: Transport options and major transport routes for uranium oxide concentrate

The following considerations and benefits arise from the selected transport option:

- The use of the Goldfields Highway (eastern bypass), which is already a major transport route, reduces the interaction with Kalgoorlie-Boulder communities.
- Benchmarking of transport solutions from existing Australian uranium mines and international organisations identified no transport incidents where the UOC cargo presented a hazard to the community or environment because of road transport operations. Those operations, which include BHP Billiton's Olympic Dam, have successfully used road transport over similar distances as the proposed Yeelirrie mine site to Adelaide (approximately 2,230 km).
- The use of the Parkeston intermodal facility, depending on its development, location, road access and location east of KCGM's super pit, could further reduce road transport through Kalgoorlie-Boulder communities.

Export Ports for Uranium Consignments

Shipments of UOC would be transported by Australian Safeguards and Non-Proliferation Office (ASNO) approved carriers, which hold permits allowing the transport of radioactive material by approved vessels operating along approved routes from the Australian point of export through to the final overseas discharge port.

Western Australian and interstate ports were considered for the export of UOC consignments from Yeelirrie. However, the use of a Western Australian port was rejected because these ports are not currently licensed by either the Australian or Western Australian governments to export UOC. If the regulations change and Western Australian ports become licensed to export UOC, their suitability would be considered by Cameco and be subject to a separate approval process.

Port Adelaide is currently used to export shipments of UOC from BHP Billiton's Olympic Dam operation and other Australian producers. Darwin is the only other port in Australia that is currently approved to export UOC.

5.2.9 Consequences of Not Proceeding with the Project

Not proceeding with the Project will typically result in the loss of the benefits outlined in Section 5.1. However, if the Project does not proceed as planned, then it may well remain as a development option for the future. In other words, the costs and benefits may just be deferred.

Nonetheless, the consequences of the forgone benefits and impacts do have some immediacy:

- the time value of money means that collateral benefits to the State and regional communities are preferable now rather than later;
- a new development adds to the critical mass of the industry, from which a number of broader benefits flow beyond the Project itself; and
- diversification of the resources sector.

5.3 Optimisation Initiatives

The above sections identified the selected alternatives for the proposed Yeelirrie development and the reasons for rejecting other options. The following lists the key design elements that will be the focus of optimisation initiatives investigated during the detailed design phase:

- improve energy efficiency and reduce greenhouse gas emissions;
- improve process efficiency to reduce reagent requirements;
- improve water efficiency;
- review at-source and operational controls for dust;
- further minimise the Project's footprint and its impact; and
- minimise the net area of disturbance at any given time through refinements to the mining and processing schedules, with regard to progressive development and rehabilitation of the open pit and tailings storage cells.