



PALADIN ENERGY LTD

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1 SUMMARY

The Angela Uranium Project is located about 25km south of the central business district of Alice Springs and consists of a single Exploration Licence (EL25758) encompassing the Angela and Pamela uranium deposits. Exploration Licence 25758 was granted to the Cameco Australia Pty Ltd/Paladin NT Pty Ltd Joint Venture on 3 October 2008, for a period of six years.

Cameco Australia Pty Ltd operated and managed the project from 3 October 2010 until 19 August 2011, from when Paladin Energy Ltd managed the project.

The Northern Territory Government made an announcement on 28 September 2010 that it would not support the development of a mine at Angela, therefore, a substantially reduced program was undertaken during the current and previous reporting period.

2 INTRODUCTION

The Angela Uranium Project (the Project) comprises both the Angela and Pamela uranium deposits located around 25 km south of Alice Springs in the Northern Territory.

Cameco Australia Pty Ltd (Cameco) and Paladin NT Pty Ltd (Paladin), the “Angela Project Joint Venture” (“the JV”) are 50:50 partners in the Angela-Pamela Project on EL 25758, which was granted on 3 October 2008.

Exploration drilling commenced in 2009 and continued through into 2010 with the Project being operated and managed by Cameco under the Cameco/Paladin Joint Venture agreement.

Paladin Energy Ltd assumed the role of operator and manager in August 2011.

Location

Exploration Licence (EL) 25758 is located approximately 25km south of the central business district of Alice Springs. The Old South Road, the historic Ghan Railway Line, the Old Telegraph Line and the Central Australian Railway cross EL25758 (see map at **Figure 1** and **Appendix 1**).

A minor gravel road passes through the centre of the licence in a northeast-southwesterly direction extending south to the No.3 Dam. This road crosses a subsidiary track running in an east-west direction that comes off the Old South Road and continues west to the Stuart Highway.

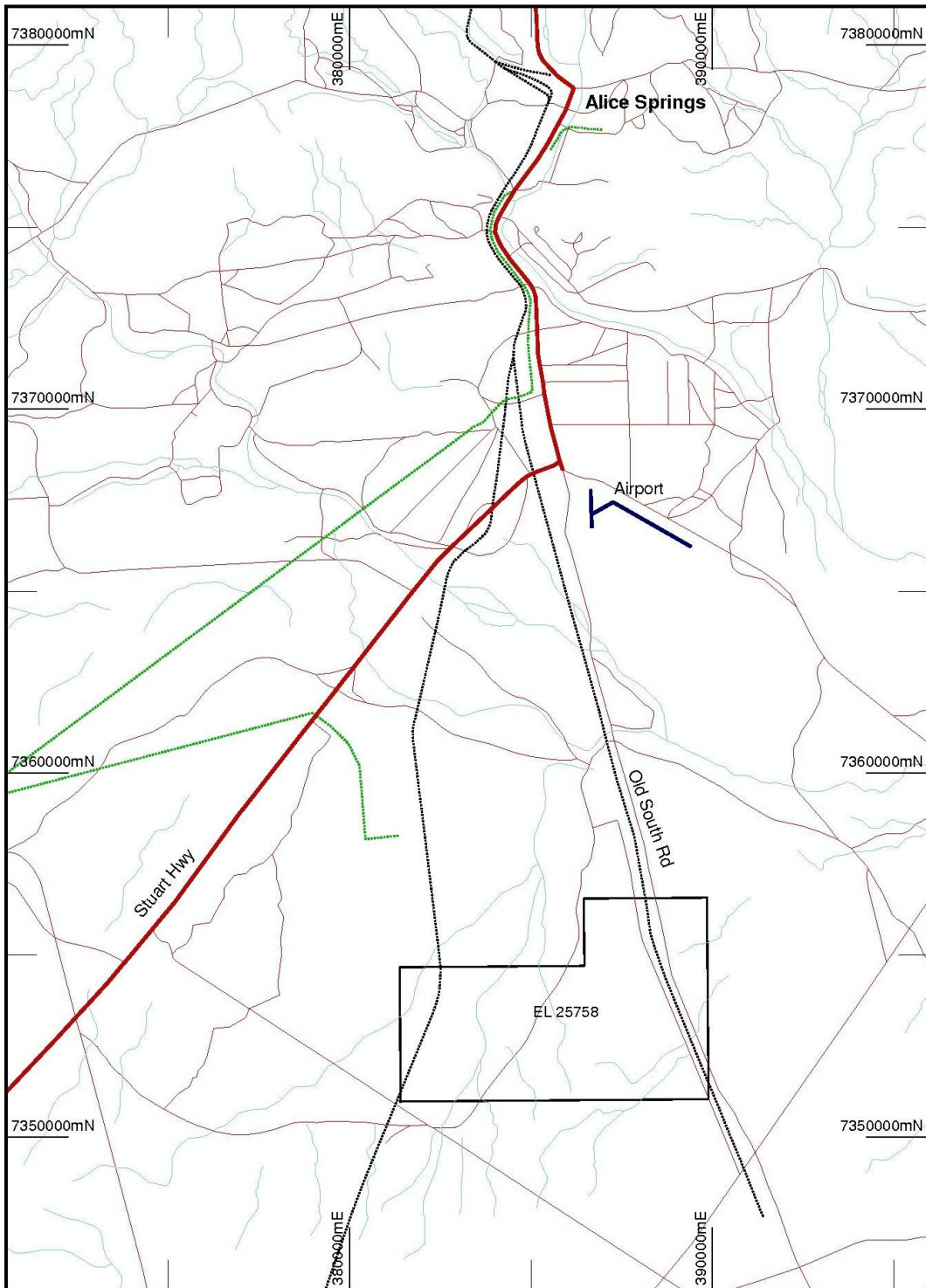


Figure 1 - Location of EL25758

Tenure

Uranerz Australia Ltd explored extensively in the Angela deposit area between 1972 and 1983. In 1990 Uranerz requested the ground be Reserved from Occupation (RO) pending an improvement in the uranium price. Following a review of all ROs in the Northern Territory, the intent to revoke the RO for the Angela-Pamela area was publically announced and subsequently enacted.

The Cameco and Paladin NT JV subsequently submitted an Exploration Licence application covering the 37.67 km² Angela and Pamela uranium prospects south of Alice Springs. On 3 October 2008, Exploration Licence 25758 was granted to the Cameco Australia Pty. Ltd (50%) / Paladin Energy Minerals NL (50%) Joint Venture for a period of six years (expiring on 2 October 2014).

Cameco Australia Pty Ltd operated and managed the project from 3 October 2010 until 19 August 2011, from when Paladin Energy Ltd assumed the role of operator and manager.

3 GEOLOGICAL SETTING

Regional Geology

The Angela and Pamela deposits are hosted within the Undandita Sandstone Member of the late-Devonian to early-Carboniferous Brewer Conglomerate. The Brewer Conglomerate is the youngest geological unit within the Amadeus Basin and was deposited as a wedge-shaped, molasse deposit in a foreland basin setting in response to southwards thrusting of the Arunta Block (to the north) over the Amadeus Basin.

Continued deformation during the latter stages of the Alice Springs Orogeny subsequently deformed the Brewer Conglomerate, producing a series of broad, east-west trending, doubly-plunging synclines within the Amadeus Basin.

Uplift occurred along the northern margin of the Amadeus Basin and progressed from west to east through the later stages of the Alice Springs Orogeny. The lower part of the Undandita Sandstone Member was derived from Upper Proterozoic to Lower Palaeozoic sediments of the basin. With increasing uplift in the Alice Springs Orogeny, the Lower Proterozoic granitic and gneissic Arunta Complex to the north became exposed and contributed increasingly to the upper parts of the Undandita Sandstone Member, providing an intrastratal source for uranium.

The Brewer Conglomerate was deposited as a series of coalescing alluvial fans developed on the southern flanks of the proto-MacDonnell Ranges by southwards draining, braided fluvial channels fed into a large-scale, generally east-west trending, longitudinal drainage system. Depositional environments include braided fluvial channel, abandoned channel, to overbank and possibly lacustrine settings.

Stream gradient decreased away from the ranges (southwards) and the Brewer Conglomerate inter-fingers with, and passes laterally into, the finer-grained, more distal Undandita Sandstone Member. The Brewer Conglomerate reaches a maximum thickness of 3000 m within the Missionary Syncline, 15km southeast of Alice Springs where the largely oxidised Undandita Sandstone Member contains a wedge of reduced sediment between regionally planar upper and lower redox boundaries. Uranium mineralisation and anomalous gamma is concentrated at these redox boundaries.

Project Geology

Uranium mineralisation at the Angela and Pamela deposits is hosted within the Undandita Sandstone Member which ranges from fine to coarse-grained lithic arenite, medium to coarse-grained lithic arkose, intermixed with subordinate conglomerate and pebbly

sandstone horizons, and thin, poorly developed limestone and mudstone units deposited under waning flow conditions and within abandoned channels. Most of the mineralisation is hosted by medium to coarse grained feldspathic lithic arenites, which although finer, are better sorted.

Mineralisation is considered to have been emplaced during the early-Carboniferous (during diagenesis) and has been preserved by extensive calcite cementation of the host rock. Structural deformation during the Alice Springs Orogeny has subsequently folded and exposed the mineralisation at surface. The main Angela I mineralisation crops out near the eastern margin of the licence, close to the Old South Road, and dips ~9° to the west. Mineralisation is known to extend westwards for at least 5km to depths of ~900m.

The target in the area is sandstone hosted uranium mineralisation formed at geochemical (redox) boundaries by deposition of uranium from groundwater. Redox boundaries in the upper part of this reduced zone typically show uranium accumulations. The major accumulations are located in irregularities or steps, mainly on the upper regional redox boundary in the Missionary Syncline. These accumulations were previously identified in the Angela area (Borshoff & Faris 1990).

4 PREVIOUS EXPLORATION

Uranerz explored the Alice Springs Project (which extended across the current EL25758) for over 10 years from 1972 to 1983 and held the tenements until 1990. The following summary is adapted from Uranerz reports as detailed in the Bibliography.

A detailed airborne radiometric survey over the tenements was carried out in 1973 and airborne spectrometry located three anomalies. Trenching and drilling of these anomalies in 1973-1974 led to the recognition of the Angela and Pamela prospects. In 1974, shallow vacuum drilling on a regional grid, together with reconnaissance mapping indicated that these prospects were regionally located along the boundary between oxidised and reduced sandstones.

From 1974 onwards exploration was divided into two broad phases; the first involved diamond/percussion drilling of the known mineralised bodies to test size, grade and establish mineralisation controls; the second involved regional exploration along the reduced zone and its margins. Detailed drilling at the Angela and Pamela prospects in 1974-1975 defined the main outline of the mineralisation. Ore resources for the part of the Angela I deposit that was drilled amounted to about 1,500t U₃O₈. From 1975 to 1977 percussion drilling was carried out along strike of the upper or northern margin of the reduced zone to test the potential of mineralisation at depth in the zone between the Pamela and Angela prospects. The redox boundary was tested by holes drilled approximately 500m apart to a maximum depth of 150m. Drilling was continued southwest from the Angela I deposit.

In 1978 recalculation of ore resources based on results of the latest investigations confirmed a resource of 1,500t U₃O₈ using a cut-off of 500 ppm over 2m for the Angela I deposit, and it was also concluded that considerable resources could occur further down-dip and in separate zones immediately north and south of the Angela I deposit. Detailed drilling of the Angela I deposit in 1979 indicated a 30-40m change in the stratigraphic level of the redox boundary with which the mineralisation is associated. This “step” marks a complex zone of

stacked oxidised and reduced lobes and tongues. In plan, this multi-lobed zone plots as a distinct east-west trend.

Drilling between the Angela I deposit and the Pamela prospect delineated a group of spatially and genetically related step zones containing inter-digitated mineralisation. These are referred to as Angela II, Angela III and IV prospects. Close-spaced drilling at 10 m intervals on the 800W section over the Angela I deposit provided detailed lithology but hole-to-hole lithological correlations could not be demonstrated.

In 1980, the eighth year of project operations, the Angela I deposit was confirmed over a 4,900m strike length and remained open to the west at depth. Infill percussion and diamond drilling upgraded the integrity of defined resources. Angela II-IV satellite prospects were defined as thinner ore zones with similarities to the Angela I deposit. The Angela V satellite prospect was delineated as a new ore zone south of Angela I, similar to the Angela II and III prospects.

All prospects have good potential down-dip to the west. Exploration in 1981 concentrated on establishing the style, continuity and potential of the Angela prospects, flanking the Angela I deposit. A data review was carried out, which included recalculation of all gamma log eU_3O_8 values using the high-resolution deconvolution methodology. Regional sedimentological studies established a sedimentary history for the basin, which led to improved genetic concepts for redox processes and allowed a better evaluation of prospectivity.

Investigations in 1982 were confined to re-logging drill core and data studies of prospects in the East Missionary Syncline. Detailed re-logging allowed more meaningful sedimentological profiles to be constructed. Correlation of sedimentary features was achieved using downhole resistivity logs. Ore distribution profiles from deconvolved down-hole gamma logging were compiled.

Data studies showed individual lenses of ore are related to a regionally continuous 30m stratigraphic sandstone package with a prominent coarse-grained basal unit.

In 1983, Uranerz completed a pre-feasibility study that indicated the Alice Springs Project, comprising the Angela and Pamela deposits, would not be economically viable at the prevailing and predicted short to mid-term uranium price and the project was placed on care and maintenance. In 1990, Uranerz, applied to the Northern Territory Government to have the project area converted to a Reservation from Occupation (RO) to protect the resource.

5 2011-2012 PROGRAM

The program conducted at the Angela site during the reporting period was very limited and was restricted to some environmental management and monitoring. Extensive work was conducted by Paladin to review and collate Cameco's environmental data, and borehole and rehabilitation register.

Rehabilitation

As reported in previous annual reports, all holes from the 2009 and 2010 drilling program have been rehabilitated, with the exception of six holes. These six holes, from the 2009 drilling program (AP091-AP096), were not rehabilitated to allow Geoscience Australia to

carry out downhole probing. Rehabilitation of the historical (Uranerz) drillholes commenced in the previous reporting period. Work was undertaken during this reporting period to review the Uranerz and Cameco borehole database and register to identify boreholes requiring rehabilitation in the future.

6 ENVIRONMENTAL MONITORING

The license conditions as stipulated in the letter of grant for EL25758 require that, prior to the undertaking of any activity that causes a substantial disturbance and triggers the requirement of the *Mining Management Act*, that baseline:

1. Dust monitoring be undertaken; and,
2. Water monitoring of existing bores on the tenement and in the immediate region for background uranium and related isotopes be undertaken.

The monitoring requirements were met and the results provided in previous Annual Reports submitted.

Water Monitoring

The primary aim of the water sampling program has been to provide baseline data as required by the Exploration Licence conditions. Surface water and groundwater samples have been collected from selected locations on a quarterly to bi-annual basis from February 2009 through to December 2011. A total of seven individual sampling events have been completed. The results of the first six sampling events have been collated into a report (RPS Aquaterra, 2011) and the results are summarised as follows. The results from the seventh sampling in December 2011 have been reported separately and will be collated with the previous results.

Groundwater Monitoring

Groundwater samples have been collected across seven sampling events. The initial plan was to undertake quarterly monitoring, and this was successful for the first three quarters (February, June and September 2009) however, as previously reported, the fourth quarter monitoring had to be delayed due to logistical issues.

The results of the fourth round of monitoring, which was carried out in February 2010, plus two additional sampling rounds, carried out in July 2010 and May 2011 are now available and included in the baseline monitoring report. A seventh sampling round was completed in December 2011 with the results being reported in the Paladin Annual Water Report (Paladin, 2012).

Groundwater sampling methods were consistent with standard sampling protocols where possible. Where bores were particularly slow to recover from purging and the recovery time was lengthy (many days to weeks in some cases) the standard sampling protocol was not possible.

Groundwater samples were submitted for laboratory analysis of:

- pH, and Total Dissolved Solids (TDS);

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- Alkalinity as CaCO₃;
 - Major cations (calcium, magnesium, potassium, sodium) and anions (bicarbonate, carbonate chloride, sulphate and sulphur as S);
 - Nutrients (total nitrogen, ammonia, total phosphorous, reactive phosphorous);
 - Dissolved heavy metals (aluminium, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, mercury manganese, molybdenum, nickel, selenium, silicon, uranium, vanadium and zinc); and
 - Total alpha and beta radiation – where readings exceeded 0.5Bq/L, speciation for radium, uranium, lead, polonium and thorium was undertaken.

All samples were contained in laboratory-supplied bottles, placed on ice and transferred to ALS Environmental (Melbourne or Perth) under standard chain of custody documentation. For radiological testing, all groundwater samples were sent to Western Radiation Services (Perth). Field duplicate samples were collected in accordance with standard quality assurance/quality control (QA/QC) procedures.

pH and TDS

Laboratory tested pH of the groundwater samples ranged from 6.85 to 8.14 pH units. All values were reported below the Australian Drinking Water Guidelines (ADWG) health and aesthetic guideline value of 8.5 pH units, and showed broad consistency across seasons.

Laboratory tested TDS ranged generally from about 10,000 to over 30,000mg/L TDS, with the exception of two bores (RN018706 and RN018710) located in the far north east of the lease which have TDS values generally in the range 1,000 to 1,700mg/L. There was broad consistency in quality across the sampling period.

Groundwater at Angela can be generally characterised as unsuitable for stock water on the basis of salinity with the exception of the two aforementioned bores, as TDS values from most bores exceeded the ANZECC stock water Guideline for TDS of 3,000mg/L.

Major Anions and Cations

Values at several bores exceeded the Australia and New Zealand Environment Conservation Council (ANZECC) Guidelines (2000) for sulphate (1,000mg/L) in stock water.

Australian Drinking Water Guidelines (ADWG) criteria for major ions exist for chloride (250mg/L) and sodium (180mg/L) only. All groundwater samples submitted for analysis exceed the guideline values with a few minor exceptions. No significant increasing or decreasing trends were identified in major ion groundwater concentrations.

Heavy Metals

Typically, bores sampled showed one or more metal concentrations that exceeded the ANZECC 80% or 99% criteria and the ADWG criteria. With some exceptions, other heavy metal concentrations were generally below the ANZECC stock water criteria, and showed little variation with time.

Nutrients

With the exception of ammonia as N, guidelines do not exist for nutrients. In May 2011, as distinct to the previous monitoring periods, the concentration of ammonia as N exceeded the ADWG aesthetic guidelines of 0.5mg/L only at bores RN018702 and RN018704. Ammonia as N concentration at RN018704 shows a general decreasing trend with time. Otherwise, the nutrient concentrations are consistent across historical results.

Radionuclides

Groundwater samples collected from the Angela site bores were submitted for laboratory analysis of gross alpha and beta radionuclides. Values for gross alpha nuclides ranged from <5mBq/L at several bores, and up to 3,259mBq/L at RN018712 over the baseline program. With the exception of RN018703, beta values ranged from <10mBq/L at several bores, and up to 12,730mBq/L at RN018705 over the baseline program.

Bore RN018703 had the highest value of beta radionuclides with a value of 40,871mBq/L for September 2009, however this shows a downwards trend over time with a reading at May 2011 of 989mBq/L, indicating that initial sampling may not have been representative of the groundwater system, with ongoing campaigns of purging and sampling possibly providing more representative samples.

For comparison purposes with the Australian Drinking Water Guidelines (ADWG), where values exceed 500mBq/L, speciation is undertaken for radium, lead, uranium, polonium and thorium.

The detailed groundwater radiological speciation results indicate that:

- Uranium-234 activity was below the detection limit of 5µg/L;
- All bores except RN018703, RN018709 and RN018710 showed activity levels higher than the detection limits of 100mBq/L for Thorium; and
- The other elements showed activity levels higher than their detection limits of 100mBq/L for all bores.

Summary of Groundwater Quality

In summary, the groundwater at the Angela site can be characterised as being non-potable, saline (greater than 1,000mg/L TDS), neutral, with elevated concentrations of dissolved heavy metals (including uranium) and alpha and beta radionuclides, but with generally low nutrients (except ammonia as N). There are no substantial changes with time.

The highest value use status of the Angela groundwater is industrial (that is, mining), or stock water in some cases.

Ongoing Water Monitoring Program

A reliable baseline water quality data set has been collected over seven sampling events between February 2009 and December 2011. In consideration of the data collected to date and the reduction in exploration activities in the coming year, it is not planned to carry out any further groundwater or surface water sampling in the near future.

Air (Dust) and Radiation

The baseline dust and radiation monitoring program required in the licence conditions were met in previous reporting years. Due to the current circumstances related to the tenement the dust and radiation monitoring program did not continue into this reporting period.

Meteorology

A fully-automated meteorological station was erected at the Angela site in May 2009. The parameters measured are:

- Wind speed and direction;
- Temperature (at 2m and 10m giving delta temperature);
- Albedo;
- Barometric pressure;
- Evaporation;
- Rainfall and rainfall intensity; and
- Relative humidity.

Raw data continued to be recorded by the weather station during the reporting period. However, the raw data are yet to be collated, analysed and reported and will be should the Angela Project progress towards development.

7 COMMUNITY RELATIONS

No community consultation activity occurred in the period from October 2011 to October 2012, due in significant part to the Northern Territory Chief Minister's announcement on 28 September 2010 that the Government would not support the development of the Angela mine. The Joint Venture subsequently closed its office in the Alice Springs CBD.

8 2012 - 2013 PROPOSED WORK PROGRAM

The work program for the Angela Project for the 2012-2013 reporting period will be very limited and may include further rehabilitation of legacy sites, core logging and further desk top analyses and collation of exploration and environmental data.

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