Cameco Australia Pty Ltd

EL 25758

ANGELA PROJECT

NORTHERN TERRITORY

ANNUAL REPORT

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Authors:	John Higgins, Project Geologist
	Gary Price, Project Geologist
	Geoff Beckitt, District Geoscientist
	Lynton Mack, Database Administrator
Tenement manager:	Cameco Australia Pty. Ltd
Contact Details:	PO Box 387, Alice Springs, NT 0871.
	Ph. (08) 8952 4763
Email for further technical details:	jennifer_parks@cameco.com.au
Email for expenditure:	ratih_sagung@cameco.com.au
Datum/Zone:	GDA94 (Zone 53)
Map Sheets:	1: 250, 000: Alice Springs (SF5314)
Copies:	Cameco Australia Pty Ltd (1)
	DRDPIFR - DoR (1)
	Paladin Energy Ltd (1)

SUMMARY

The Angela Uranium Project is located about 25 km from 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 - Paladin Joint Venture on October 03, 2008, for a period of six years. Cameco has managed the project for the 3 October 2009 to 2 October 2010 reporting period. A total of 59 drillholes were drilled for a total of 5,683 m during the reporting period. Downhole gamma and resistivity probing was routinely conducted on all holes drilled and some historical (Uranerz) holes. Geochemical analysis was conducted on a total of 1948 samples from 53 holes for uranium and a selection of other elements. Highest uranium grades intersected were 1.84%. Geological cross-sections and a preliminary geological interpretation have been prepared from the geological logging data. Geological logging confirmed the broad 'Z' shaped geometry of the redox step at Angela I but revealed that on a deposit scale, the geometry is considerably more complex. Mineralisation occurs on the margins of a series of thin, irregular oxidised lobes or tongues that exhibit a surprising lateral consistency and extend southwards into reduced sandstones for considerable distances. Detailed geological logging revealed that the location of these tongues was strongly influenced by thin and discontinuous limestone-mudstone horizons. Uranium mineralisation is strongly associated with zones of intense haematite oxidation occurring along the margins of these redox boundaries. A distinctive mineralogical zonation was recognised to occur across the redox boundaries with bleaching and haematite alteration (along with patchy vanadium mineralisation) observed to precede the mineralisation. A detailed geochemical study conducted on 6 selected drillholes supported the observed mineralogical zonation and indicated that the mineralogy of the deposit was relatively simple. Vanadium was determined to be the only other element associated with uranium in significant concentrations but no direct relationship between uranium and vanadium mineralisation could be demonstrated. Investigation of potential disequilibrium effects at Angela I indicated that disequilibrium was limited to areas affected by surface oxidation. Metallurgical testing determined that the mineralogy of the deposit was relatively simple, consisting predominantly of coffinite plus lesser coffinite/uraninite and minor secondary uranium minerals. Average rock densities were determined to be 2.45 t/m^3 and the ore is amenable to both alkali and acid leaching (with the former method being preferred due to high acid consumption). A high level scoping study investigating the potential of the Angela tenement was completed during the year and a JORC compliant Resource estimate is in preparation at the time of writing. Eligible expenditure on the Angela Uranium Project for the reporting period was AUD$6,595,148.21. Following the NT Government's announcement on 28 September, 2010 that it would not support mine development at Angela, a very limited exploration program is proposed for the third year of tenure.

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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 of Australia. Cameco Australia Pty Ltd (Cameco) and Paladin NT Pty Ltd (Paladin), the 'Angela Project Joint Venture' (JV) as 50:50 partners, submitted an Application to the Northern Territory Government in October 2007 for the grant of an Exploration Licence covering the area in which the Angela and Pamela deposits are located. EL 25758 was granted on 2 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.

The objective of exploration activities in the second year of reporting was to confirm the location of higher grade zones within the Angela I resource identified by Uranerz in the 1970's, and to test for shallow (<200 m) up-plunge extensions of the mineralisation at the Angela II-IV and Pamela that may contribute to a JORC compliant resource.

Location

EL25758 is located approximately 25 km south of the central business district of Alice Springs, and straddles the Old South Road, the historic Ghan Railway Line, the Old Telegraph Line and the Central Australian Railway (Figure 1). The historic Ghan railway line is not currently operational. The Central Australian Railway passes through the tenement on the western extremity. This railway line is in operation and passes the Brewer Industrial Estate just north of the licence.

Apart from these, the only existing infrastructure is a minor gravel road passing through the centre of the licence in a northeast-southwest direction that extends 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.

Additionally, the Licence area is criss-crossed by many old tracks and a neglected dirt airstrip is located on the central western portion of the License.

Figure 1 - Angela Project (EL25758) Location Map

Tenure

Uranerz Australia Ltd (Uranerz) worked extensively on the Angela deposit between 1972 and 1983. In 1990 the company requested the ground be Reserved from Occupation (RO) pending an improvement in the uranium price. Uranerz closed its Australian operations in 1991.

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.

In November 2006, Cameco and Paladin submitted an Exploration Licence application for 12 blocks covering the Angela and Pamela uranium prospects south of Alice Springs for a total of 37.67 sq. km.

On 2 October 2008, Exploration Licence 25758 was granted to the Cameco Australia Pty. Ltd (50%) and Paladin Energy Minerals NL (50%) Joint Venture for a period of six years. Cameco has managed the project for the 3 October 2009 to 2 October 2010 reporting period.

GEOLOGICAL SETTING

Regional Geology

The regional geology of the Alice Springs, Angela Project (Figure 2), has been described in many previous reports and publications and is summarised below:

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 (Figure 3).

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 (Ott et al., 1977).

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 are interpreted to environments included 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 reaches a maximum thickness of 3000 m within the Missionary Syncline, 15 km 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.

Figure 2 - Angela Regional Geology

Figure 3 - Geology of the Angela and Pamela uranium deposits (after Borshoff and Faris, 1990)

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, and from 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 5 km to depths of ~900 m.

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).

PREVIOUS EXPLORATION

Uranerz explored the Alice Springs Project (which extended across the current EL25758) for over 10 years from 1972 to 1983 and the tenements were held 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 1500t U_3O_8. 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 500 m apart to a maximum depth of 150 m. 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 U_3O_8 using a cut-off of 500 ppm over 2 m 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 30-40 m 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 4,900 m 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 30 m 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. Uranerz withdrew from Australia in 1990, and sold its Australian interests to other parties, including Cameco.

2010 EXPLORATION PROGRAM

All activities related to exploration work carried out on EL25758, in the field, during the reporting period are presented in Table 1.

Table 1 - Summary of Exploration Activities

The 2009-2010 exploration program includes;

- 59 drill holes totalling 5,683 metres comprising:
    - Percussion Drilling; completion of 20 percussion precollars for a total of 2,200.0 m.
    - Diamond Drilling; completion of 39 drill holes and 20 diamond tails for a total of 3,483 m.
- All holes subjected to down hole geophysical surveys for gamma, resistivity where possible, and multi-element parameters for selected holes.
- Diamond core samples were submitted from 53 drillholes for either multi-element or uranium/vanadium geochemical analysis.
- Continuation of environmental monitoring.

Drilling

The Angela deposit was extensively explored during the 1970's and early 1980's and the geometry of the mineralisation was sufficiently well understood to permit drilling to be planned using historical data. Drilling in 2009 further defined the geometry of the redox-front and associated mineralisation and indicated a high-grade leading edge to the south. This 'redox-front' is complex in detail and sinuous but has a remarkably linear east-west trend more regionally. The 2010 drilling program was based on geological cross-sections (prepared from 2009 exploration drilling) and an updated geological model (Appendix 1) prepared by Paladin Energy. Drillhole locations are shown in Figure 4 - Figure 7.

Appendix 1 – Angela Geological Model Update

Figure 4 - Angela-Pamela Drillhole Location Plan

Figure 5 - Angela I Drillhole Location Plan

Figure 6 - Angela II-IV Drillhole Location Plan

Figure 7 - Pamela Drillhole Location Plan

The majority of the drilling (Figure 4) conducted in 2009-2010 focused on resource definition drilling to confirm and further delineate the mineral resource at Angela I (Figure 5), particularly areas likely to contain higher grades, and investigate the potential for additional mineralisation at shallow depths (<200m) within the Angela II-IV (Figure 6) and Pamela (Figure 7) deposits amenable mining by conventional open cut methods.

The Cameco-Paladin 2009-2010 drilling program (Figure 4) was designed to improve confidence in the resource at Angela I (Figure 5) and to provide a preliminary appraisal of the economic viability of the Angela II-IV (Figure 6) and Pamela (Figure 7) deposits. A drill program as outlined in Figure 3 was designed and conducted to meet these objectives.

The area targeted for drilling in 2010 is relatively sparsely vegetated, relatively flat and no major clearing was required. A historic exploration access track was upgraded to gain access to the main drilling target area. From there, minor, temporary cross-tracks were established to gain access to the individual drill sites.

All drilling activities on the Angela site were conducted under Authorisation 0493-02 as issued by the Director of Mining and Petroleum Authorisations and Evaluation Division of the Northern Territory Department of Regional Development, Primary Industry, Fisheries and Resources.

To allow drill rig access and operation, a small area surrounding each drill site was cleared. On average, drill pad clearing was approximately 25 m x 20 m per hole to allow safe operation of the drill rigs. However, in some cases, the size of the drill pad depended on the size of the rig and support trucks being used and the nature of the topography.

Drilling activities commenced on 30 April 2010, and were completed on 19 June 2010.

Percussion Drilling

The location and depth of mineralised zones within the Angela and Pamela deposits are relatively well known from previous drilling, therefore depth of the precollars were able to be planned to stop just above the mineralisation with good accuracy.

Where mineralisation was known to occur at depths in excess of 100 m, percussion precollars were drilled to approximately 20 m above mineralisation. Drilling through the mineralised zone was then subsequently completed using diamond coring methods.

Percussion precollars were drilled on 20 holes for a total of 2,200 m.

Percussion drilling ideally produces dry rock chips as compressed air keeps out any formation water ahead of the advancing drill bit. Dust suppression was achieved by directing all sample return into a cyclone splitter with fine spray of water to settle the dust in both the sample and the outside return. The outside return was directed via piping into the disposal trench. The portion from the cyclone (which was not sampled in the 2010 program) was collected in a wheelbarrow and tipped into the disposal trench

Previous drilling experience indicated that logging of precollars was of little value. Percussion samples were buried on site in a disposal trench constructed in accordance with Mining Management Plan protocols.

In all cases where trenches were constructed, topsoil was removed and stockpiled separately on one side of the trench prior to the main excavation commencing. During the preliminary rehabilitation (immediately post-drilling) the trench was backfilled with the subsoil with the separated top soil being replaced last.

Diamond Core Drilling

Diamond core drilling utilises a diamond-impregnated drill bit attached to the end of hollow drill rods to cut a cylindrical core of solid rock. This drilling technique was used to intersect all mineralised zones.

A total of 3,483 meters of NQ2 sized diamond core drilling was undertaken during the reporting period.

A Solids Control Unit (SCU) hired from the Australian Mud Company (AMC) was used in preference to the excavation of in-ground sumps to capture and circulate drill cuttings (Figure 9). This system recycled drilling mud through a network of settling tanks and required minimal ground disturbance activity associated with the drilling process. The SCU was emptied in appropriately constructed disposal trenches as per the percussion chip disposal system.

Downhole orientation surveys were conducted on the majority of the drillholes completed in 2009 in excess of 200 m total depth. Analysis of this data revealed that drillhole deviation was only minor. Accordingly, downhole surveying was not undertaken on any drillhole completed in 2010 and a default value applied (azimuth = 0˚, dip = -90˚).

Geological Logging

Percussion precollars were not logged as previous experience had shown that this was of limited interpretational value. Percussion chip samples were not collected and were instead directed straight into the disposal trench.

All diamond core was logged geologically with particular attention paid to zones of haematite oxidation and discontinuous limestone and/or mudstone interbeds ranging in thickness from <5cm up to ~2m. Due to the highly variable depositional environment, it was difficult for lithological correlations to be made between drillholes. Discontinuous limestone and mudstone interbeds formed the only distinctive lithological units within the deposit that could in places be traced for considerable distances.

All logging data was captured and stored in a MS-SQL database, together with the following information:

- Collar coordinates and planned dip and direction
- Sampling intervals, including QAQC sample data such as duplicates, blanks and reference materials

- Geochemistry results
- Down hole survey data
- General hole information including date drilled, hole type and size, drilling contractor and location.

The data in this database were extracted and written into an ASCII format .txt extension, tab delimited files which can be found in the digital data files accompanying this report, along with the core photography that was conducted on all diamond core drilling.

Geotechnical Logging

No geotechnical drillholes was completed during the reporting period. All exploration holes were logged for RQD's (Rock Quality Designation). These logs can be found in the digital data files accompanying this report.

Geophysics

Geophysical work primarily consisted of multi-parameter probing and the assessment of historical seismic data to estimate the depth to the Mereenie Aquifer.

Mereenie Aquifer Estimate

The citizens of Alice Springs have been concerned with the location of the project with respect to the Mereenie Aquifer, which the community uses as a water source. To help estimate the Mereenie Aquifer depth in the vicinity of Angela, historic seismic sections and oil/gas exploration wells were assessed. Utilising seismic line P80-2 the minimum Mereenie sandstone depth (assumed to host the aquifer) is estimated to be in excess of 1,200 m beneath the Angela Deposit. Appendix 2 outlines the report in more detail.

Appendix 2 - Depth to the Mereenie Aquifer

Probing

Downhole gamma logging was conducted for all exploration 2010 drill holes from AP104 to AP162 as well as some historical holes. For the most part, gamma logging was conducted within the steel drill rods directly after logging and then dual gamma-resistivity-SP (Self Potential) logging was conducted some time later within the open hole (if they remained open through the mineralisation). Towards the end of the exploration program Borehole Wireline were brought in to log a small proportion of holes to verify results and complete logging not undertaken by Cameco.

All probe data has been compiled into a database, which also captures relevant meta-data such as logging information, probes used and processing parameters to estimate uranium. Digital data submitted with this report includes the raw individual probe data as LAS files collecting during the report period. Along with the ongoing database as a series of text files, a capture of the entire database has been included with this report due to the ongoing revision of historical data. Wherever possible, raw data has been recorded in the database. Provision has been made to record a depth correction so that the raw depths can be stored and automatically corrected by queries.

Table 2 lists all the holes in the database along with the number of gamma and resistivity logs generated by Uranerz, Cameco or Borehole Wireline. The database includes relogging and multiple runs but may not include holes which did not get through the main mineralisation. Table 3 shows the same statistics limited to just for the reporting period. Of the 668 holes shown in the database to have been probed, 94 holes were logged (or relogged) during the reporting period, including 87 holes by Cameco and 16 holes by Borehole Wireline.

Table 2 – Geophysical Probing Summary

Table 3 - Geophysical Probing Summary - 2010

Appendix 3 - Borehole Wireline Probing Logistics Report, July 2010

Wherever possible, raw data has been recorded in the database. Provision has been made to record a depth correction so that the raw depths can be stored and automatically corrected by queries.

Primary Gamma Calibration

Cameco and Borehole Wireline probes are calibrated annually at the Adelaide calibration facility run by the South Australian Government (Department of Water, Land and Biodiversity Conservation) with pit grades up to 0.92 % eU3O8. Cameco has calculated the Dead Time using the “two source method” (Scott, 1980) and then used corrected data from the test pits to calculate the K-Factor according to a linear factor. Borehole Wireline has used an alternative approach where the Dead Time and K-Factor has been calculated simultaneously using the “two pit method” described in Appendix 3.

Probing Quality

Care has been taken to collect quality gamma probe data and in several instance holes were relogged to confirm consistency. For situations where there are multiple probe results for the one hole, the preferred probe results are flagged in the database. Measures employed to ensure quality data include:

1. Regular source checks have been performed each time the gamma probes have been used to ensure consistent and reliable counts prior to logging.
2. Appendix 3 contains the Borehole Wireline source checks, which confirms consistency of the probes they are using. Cameco’s source checks suffered from inconsistent placement of the source on the sensor (rotation of the source on the probe) but nevertheless the average was found to still be within 5 % for Cameco.

3. Several times during the program the gamma probes were run down AP057, which is the on-site test hole. This approach confirmed the equivalent uranium concentrations are consistent.
4. In May 2010, probe data was compared with geochemistry up to hole AP070. Further comparisons should be made over the coming months using the recently received 2010 geochemistry.

In September 2010, much of the Cameco resistivity-SP data was reprocessed. It had been found that an improper probe and driver file combination had been used which was primarily seen when using the A635 S207 probe.

Estimating Equivalent Uranium (eU3O8) Grades

Cameco and Borehole Wireline have adopted slightly different methodologies for estimating the equivalent uranium grades.
Appendix 3 describes the methodology employed by Borehole Wireline to convert its probe data to eU3O8 whilst Appendix 4 describes the WGamma program utilised by Cameco to convert its probe data.

Appendix 4 - WGamma_Cameco_Gamma_eU_Calculation_1989

Several aspects of the conversion to equivalent uranium are worth highlighting. Since it is mostly the ore estimates for which accuracy is important and in order to simplify the processing, both Borehole Wireline and Cameco have made several assumptions about the hole conditions away from the ore zone. In particular, it has been assumed that the holes contain water for their entirety when in fact this will slightly over-estimate the uranium for the upper 10 m or so above the water table. Also, for in-rod data the entire hole has been corrected for the rods conditions at the point where there is mineralisation, which will under-estimate the uranium where there is additional casing.

Both the Cameco and Borehole Wireline approaches account for logging within rods or open-hole. Borehole Wireline has calculated a correction for casing using their in-rod and open-hole results whilst accounting for the different hole diameters. Cameco has used the standard in-rod correction factor provided within the WGamma program.

In addition to correction factors, the WGamma program uses a deconvolution to smooth the data and correct for the pulse shape (i.e. veins). Processing employed at Angela utilised the default Impulse Shape Factor (0.13) and Smoothing Filter Factors (5). The Shape Factor does not have a significant impact on the results and therefore the default has been utilised. A Filter Factor of 3 results in no smoothing and the Factor of 5 has been chosen since it slightly smoothes the result.

Geochemistry

Assay results were received for samples submitted to NTEL Laboratories in 2009. During 2010, a total of 53 drillholes were sampled for geochemical analysis. A total of 1948 samples were dispatched in 55 batches and results had been received for 54 batches at the time of writing. A list of these holes and the relevant sample and batch numbers can be found in Table 4. Geochemical results can be found in the Logging

Database Extract in included in the digital data files accompanying this report. In addition, all the returned 2010 laboratory batch results are also included in the digital data files accompanying this report. Highest grades encountered were 1.84% U in AP051 (with the same sample also containing a maximum 8,050 ppm V).

Table 4 - Angela 2010 Sample Batch Tracking

The samples consisted predominantly out of split half core in sampling intervals typically varying between 10 cm and 50 cm and averaging ~30cm. Quarter core duplicate samples were taken at approximately 1 sample in 20 and reference standards were inserted with similar regularity. Blank samples were inserted either side of the mineralised zones.

Geochemical Analysis

All geochemistry was performed at the Northern Territory Environmental Laboratories (NTEL) in Berrimah, Northern Territory, Australia..

Al_2O_3, Ba, CaO, Cu, Fe_2O_3, K_2O, MgO, MnO, Na_2O, P_2O_5, S, TiO_2, and V were analysed using an Agilent 7500a Inductively Coupled Plasma Optical Emission Spectrometer (ICPOES); As, Ce, Co, Dy, Er, Eu, Ga, Gd, Hf, Ho, La, Lu, Mo, Nb, Nd, Ni, Pb, Pr, Rb, Sc, Se, Sm, Sn, Sr, Ta, Tb, Th, Tm, U, Yb, Y and Zr were analysed using a Thermo Iris Intrepid 2 (Radial) Inductively Coupled Plasma Mass Spectrometer (ICPMS); total carbon (TC) and total organic carbon (TOC) were analysed using a Labfit CS2000 Carbon Sulphur analyser with infra red. The mass loss on ignition (LOI) was also recorded using a Leco TGA 701 as was the initial dry weight of the sample before sample preparation.

This comprehensive range of elements detailed above comprises the 2010 AP STANDARD SUITE. All samples from drillholes located in the Angela II-IV and Pamela mineralised zones were analysed for the 2010 AP STANDARD SUITE of elements.

All samples taken from all drillholes sited within the Angela I orebody were assayed for uranium and vanadium only (2010 AP RESOURCE SUITE). Details of the relevant sample suites are contained in Table 5.

Table 5 - Sample Suites

Sample Preparation

Prior to analysis all samples were dried for 24 hours at 110°C and then crushed to 85% -2mm. A 300-400g split of this material was then taken using a rotary splitter before being milled in a carbon steel mill to 85% -75µm. A 100 gram aliquot of the sample was then separated from the powdered sample for analysis. The crusher, splitter and pulveriser were flushed with barren material between every sample.

For the total rock digestion (ICPMS and ICPOES), a catch weight to 4 decimal places of the sample was digested in a mixture of hydrochloric (HCl), nitric (HNO3), perchloric (HClO4), and hydroflouric (HF) acids for 8 hours to achieve as near as possible total solution of the sample. The WAL was performed by agitating a large proportion of sample with a weak acid solution and extracting the solution before presenting to the ICPMS. All sample solutions were volumed accurately and the concentration of the analytes of interest kept within the linear calibrated working range of the instruments.

LOI (mass%) was measured by weighing the sample prior to and after igniting the sample at 1000°C.

QA/QC Procedure

Field duplicates were used to monitor sampling error in the field and/or natural heterogeneity of uranium distribution in the rock. Field duplicates were collected by cutting the half-core sample in half again at a regularity of every 20 samples. An arbitrary flag value of 20% variance from the original sample is used to highlight potential problems (sampling or natural ore distribution) when analyzing the returned geochemical data.

Laboratory duplicates are also monitored during the QA/QC analysis process so that together with the variance from the field duplicates, a total mean error can be calculated for the uranium concentrations returned for each batch of geochemical analyses

Clean silica (beach) sand, sourced from Queensland was used as a blank to test for contamination and cross-contamination during the sample preparation stage in the lab. The blanks are implanted in batches every 20 samples and monitored during the QA/QC process.

Four certified standards are used to monitor the labs ability to analyse for uranium (U), a 535 ppm U standard and a 845 ppm U standard, both sandstone, purchased from AMIS (African Mineral Standards), and a 135 ppm U standard and a 1140 ppm U standard, both blended granitoid/gneiss from Crocker Well purchased from Ore Research Pty. Ltd. An upper and lower monitoring limit of two standard deviations from the mean has been used to flag potential error. Other elements are monitored with these standards, all certified, these include As, Ba, Ce, Co, Dy, Er, Eu, Gd, Ho, K, La, Mn, Mo, Nd, Pr, Rb, S, Sm, Sr, Tb, Th, Tm, Yb, and Y. Batches of geochemical results pass or fail the QC test based on U alone for a single standard, at which point the laboratory is asked to re-analyse the entire batch.

Geochemical Database

All geochemical results that passed the QAQC process are imported to the MS-SQL database where it is matched with the relevant sampling intervals in the drill holes. One sample (C001308) was destroyed in preparation. Unfortunately this sample contained very high-grade visible uranium mineralisation (Figure 23). This sample was unable to be reassayed because, along with the majority of the mineralised core from 2009, this sample formed part of a bulk sample that was submitted to Paladin Energy in order to test the radiometric sorter being developed.

Disequilibrium Study

An investigation into the relationship between geochemistry and geophysical U_3O_8 values has been conducted based on composites over mineralised zones of economic interest and individual core sample intervals. The disequilibrium study can be found in Appendix 5.

Appendix 5 - Disequilibrium Investigation

Data analysis of selected composited intervals and the individual sample data allowed the following preliminary deductions to be made:

- There is a very good correlation between the gamma and geochemically derived uranium grades.
- The gamma derived data tends to overestimate the uranium grades of composited zones of economic interest by 19% on average, but this variance is not related to the grade or the thickness of the composited interval.
- Only very minor evidence exists to suggest there potentially exist disequilibrium in the shallow (<50 m deep) zone.
- On an individual core sample scale, the gamma derived data tends to increasingly overestimate the uranium grade at lower grades, while it tends to increasingly underestimate it at higher grades.
- Rock type plays no role in either the grade or observed variance between the geochemical and the geophysical data.
- The highest grades tend to be concentrated in zones of intense oxidisation, with decreasing grade the more reduced the zone is.
- The alteration style and intensity bears no relationship to observed variances between geochemical and geophysical data.

Age Dating of Mineralisation

Four core samples were selected for age dating of mineralisation by David Huston of Geoscience Australia (david.huston@ga.gov.au) Sample details are contained in Table 6 and results had not been received at the time of writing.

Table 6 - Geoscience Australia Samples

Geochemical Study on Selected Drillholes

A preliminary study was conducted on geochemical data from six selected holes completed in the eastern part of Angela I to determine any specific relationships which could shed light on the paragenesis of the deposit. The study is included in Appendix 6.

Appendix 6 - Geochemical Study on Selected Drillholes

Selected holes contained sampled intervals representing uranium mineralisation in four different stratigraphic locations within the Angela I orebody. Relationships between different elements were examined, within each of these locations. Following the analysis, the following deductions can be made:

Uranium versus Thorium;

- Thorium detected in all samples,
- No relationship between thorium and uranium mineralisation,
- No relationship between thorium and stratigraphic location,
- No relationship between thorium and oxidised-reduced (redox) boundaries,
- No relationship between thorium and discrete lithology (i.e. mudstones).

Uranium versus Total Organic Carbon (TOC);

- TOC below detection in most (n>99%) samples,
- TOC did not control uranium mineralisation,
- TOC occurred rarely in discrete lithology only, not related to stratigraphic location.

Uranium versus Total Carbon (TC) and Loss On Ignition (LOI);

- TC detected in all samples, LOI detected in most samples (n>99%),
- Highest TC/LOI correlated with discrete lithology (e.g. limestones / calcareous mudstones),
- High TC/LOI correlated with increased/visible carbonate,
- Low TC/LOI within some high-grade uranium samples,
- TC/LOI not impacted by stratigraphic location.

Uranium versus Calcium oxide (CaO);

- CaO detected in all samples,
- CaO correlation with TC/LOI identified,
- Carbon largely represented per se in the form of calcite ($CaCO_3$)
- Analysis confirms visual interpretation that calcite is widespread throughout Angela I, particularly in association with limestone interbeds.

Uranium versus Iron oxide (Fe_2O_3);

- Fe_2O_3 detected in all samples,
- Higher %Fe_2O_3 in oxidised zones, lower %Fe_2O_3 in reduced zones,
- High Fe_2O_3 associated with oxidised zone and uranium mineralisation,
- Positive correlation between Fe_2O_3 & MnO,
- Relationship between highest Fe_2O_3 uranium at the nose/bottom redox,
- Relationship between high Fe_2O_3 and some discrete lithologies (e.g. mudstone).

Uranium versus other Oxides;

- No relationship between oxides and uranium mineralisation, except with MnO,
- No relationship between oxides and stratigraphic location,
- Relationship between oxides and discrete lithology, particularly mudstone units.

Uranium versus Rare earth elements;

- Relationship (positive correlation) between REE's and uranium mineralisation,
- No relationship between REE's and stratigraphic location,
- Relationship between REE's and some discrete lithology (mudstones / limestones) only.

Uranium versus Vanadium;

- Vanadium detected in most samples (n>75%), concentrations up to 3,100ppm (0.31%),
- Inverse relationship between vanadium and uranium mineralisation:
- Negative correlation between high-grade uranium and vanadium within individual samples (high U:V ratio's),
- Positive correlation between low-grade uranium and vanadium within individual samples (low U:V ratio's),
- No relationship between vanadium and stratigraphic location,
- Relationship between vanadium with discrete lithology in some cases,
- Inconsistent association between vanadium and strong-intense haematite alteration.

Uranium versus other Base metal elements;

- High concentrations of sulphur (up to 1.3%) and barium (up to 0.62%),
- Relationship (positive and negative correlation) between elements and uranium,
- No relationship Base metal elements and stratigraphic location,
- Relationship between particular Base metal elements and discrete lithology.

Based on the results of this study, a selected suite of elements are recommended for analysis in future programs conducted at Angela I:

For mineralisation (uranium, vanadium + the following);

- **Oxides**: Calcium oxide (CaO), iron oxide (Fe2O3) and manganese oxide (MnO).
- **Base metals**: Barium, vanadium and lead.

For lithology, to assist with identification and classification of mudstone, calcareous mudstone, limestone, siltstone, pyritic and/or carbonaceous siltstones;

- **Carbon**: Total organic carbon (TOC), Total Carbon (TC), Lost on ignition (LOI).
- **Oxides**: Calcium oxide (CaO), aluminium oxide (Al2O3), iron oxide (Fe2O3), magnesium oxide (MgO), titanium oxide (TiO2).
- **Base metals**: Sulphur, barium, zirconium, rubidium, gallium, cobalt, niobium, hafnium,

Further comparison of non-mineralised portions of the Angela I deposit is also recommended, to assist with identification of 'path-finder' elements with known association to uranium that may assist with future exploration work conducted within the local region.

Metallurgy

Results were received for metallurgical testing undertaken during the latter part of 2009 and the relevant report is contained in Appendix 7.

Appendix 7 - Mineralogical and Metallurgical Evaluations of Angela-Pamela Ore

The mineralogical characterisation methods consisted of porosimetry, reflected light microscopy, X-ray powder diffractometry (XRD) and scanning electron microscopy / energy dispersive X-ray spectrometry (SEM/EDX) for mineral distribution, morphology and identification as well as for whole-rock analysis. Bottle roll leach tests and chemical screen analyses were used for metallurgical testing and characterisation. The work was carried out on ore from Angela I only, which is the largest of the orebodies on this property. The main findings confirmed largely earlier reports from Uranerz Exploration and Mining (UEM) and were as follows:

1. The Angela/Pamela drill core studied was not suitable for uranium recovery by ISR due to too low porosity (Table 7) (note that sample numbers do not refer to hole numbers).
2. The uranium mineralisation (Table 8) consisted of mainly of coffinite and some Uraninite with minor contents of uranium vanadate minerals, and was part of the sandstone matrix and only somewhat accessible to leach solutions. However, during leaching, it was found that the uranium recovery was enhanced through ore matrix destruction.
3. High calcite contents caused high acid consumptions in leaching of 110 to 150 kg/t.
4. Close to 90% uranium recovery after 72 hours was obtained with sulphuric acid leaching and hydrogen peroxide additions at ambient conditions for crushed ore of -12 mm top sized (using acid pugging and up-front peroxide addition in bottle rolls).
5. Close to 70% uranium recovery after 670 hours was obtained with sodium carbonate/bicarbonate leaching and hydrogen peroxide additions at ambient conditions for crushed ore of -12 mm top sized (using up-front peroxide addition in bottle rolls).
6. According to projections from the current test results high temperatures would be needed for carbonate leaching of ground ore to 90% uranium recovery (80˚C for 17.5 hours leaching or autoclave leaching at 120-130˚C for 1 hour).
7. The vanadium recoveries obtained in the bottle roll leach tests were low (30 % in acid and 10% in carbonate leach).

An order-of-magnitude economic assessment indicated that for an average ore grade of 0.1% U3O8 and underground mining costs of $50/t, the project becomes marginal if conventional acid leaching is used to process the ore. However, the grade of the drill core studied was 0.19% U3O8, which may indicate that this may be attainable by selective mining and/or radiometric sorting. Further improvements may be possible by using innovative leach and uranium extraction processes that lower the reagent costs, such as agitated carbonate leaching in combination with resin-in-pulp (RIP) technology as well as heap leaching with in situ H2SO4 production from added sulphur via bacteria.

Table 7 - Poresize data for ore samples from individual Angela/Pamela drill holes.

Table 8 - Quantitative summary of interpretation of microprobe spot analyses of uranium mineralisation encountered in polished sections of core from the five drilling locations

Radiometric Sorting Tests

Mineralised and unmineralised intervals from a large number of 2009 Cameco drillholes were combined into a ~500kg bulk sample for testing of a prototype radiometric sorter developed by Paladin Energy. Results have not been received at the time of writing.

Surveying

Drillhole Collar Survey

Two control stations were established within the Angela site in 2009, by static GPS Survey. The position of these two stations was derived from the existing station ASV3 which is situated south of the site in the Maryvale Road Reserve.

The origin control station ASV3 was independently checked by submitting the logged static data to Geoscience Australia, and having the data post processed by the AusPos Facility. The results were deltas of 13 mm east, 21 mm north and 73 mm height. The height difference is attributable to ASV3's RL being derived from an existing AHD benchmark. All data was recorded by RTK GPS method with individual control station locations presented in Table 6.

Following the completion of the drilling program, drillhole collar locations were surveyed by a professional contractor (Ausurv Pty Ltd). Surveyed collar locations are detailed in Table 10, whilst surveyed water bore locations are detailed in Table 11. Consolidated drillhole collars are contained in Table 12.

Table 9 - Survey Control Station Locations

Table 10 - 2010 Angela Surveyed Drillhole Collars

Table 11 - 2010 Angela Surveyed Water Bore Collars

Table 12 - 2010 Angela Consolidated Surveyed Collars

Rehabilitation

All drillholes completed in 2009 and 2010 have been rehabilitated (with the exception of AP091-AP096 which were not rehabilitated to permit downhole probing by Geoscience Australia in late 2010) whilst rehabilitation of historical (Uranerz) drillholes has been ongoing throughout the reporting period. Rehabilitated 2009/2010 drillholes are listed in Table 13 whilst rehabilitated historical (Uranerz) drillholes are listed in Table 14. Photographs of the drill sites, taken before and after rehabilitation, are contained in the digital data files accompanying this report.

Rehabilitation has been conducted in accordance with guidelines contained in the advisory note issued by the Department of Regional Development, Primary Industries, Fisheries and Resources (DPIFM). Cameco's rehabilitation procedure is documented in Appendix 8.

Table 13 - Rehabilitated 2009-2010 drillholes

Table 14 - Rehabilitated historical (Uranerz) drillholes

Appendix 8 - Drill Site Rehabilitation Procedure

GEOLOGICAL AND GEOCHEMICAL INTERPRETATION

As part of geological investigations a detailed logging guide was compiled and is included in Appendix 9. The interpretation of the detailed geology has commenced with the construction of geological cross-sections which are contained in the digital data files accompanying this report.

better assess the exploration potential for the Angela-Pamela licence and to better understand the regional depositional system and its potential.

Appendix 9 - Angela Geological Logging Guidelines

Appendix 10 - Regional Geological Review

Angela I-IV deposits

Although the overall geological setting is relatively simple, the arkosic, pebbly and conglomeratic units in the Undandita Sandstone are highly variable and are difficult to correlate from drill hole to drill hole. However, this is not surprising since the Undandita Sandstone is interpreted as being deposited by braided river systems as part of an alluvial fan molasse complex.

Stratigraphic units correspond to the four broad stratigraphic subdivisions originally proposed by Uranerz (Ferguson, 1975):

- A poorly-sorted conglomeratic zone.
- A well-sorted, sand prone interval.
- A moderately-sorted sand prone-interval (+ minor pebbles).
- A thick reduced interval of clean, well-sorted sandstones.

Mineralisation is hosted by units 2 and 3 which are cleaner, slightly finer, and better-sorted containing relatively rare pebbly and conglomeratic horizons. There is a subtle decrease in average grain size with depth with lithological units comprising predominantly sandstones, with subordinate pebbly- to conglomeratic-sandstones and conglomerates sourced primarily from a granitic hinterland. Minor contributions to clast lithology come from more exotic metamorphic and igneous terranes comprising parts of the Arunta Block. Reworked clasts of older rocks of the Amadeus Basin are also common with >80% of conglomerate clasts being derived from the Heavitree Quartzite.

Siltstone and mudstone beds are only locally traceable from hole to hole at similar stratigraphic positions. Locally where, these units were missing from the expected locations, intraformational conglomerates comprising similar sediments are found at the expected depths for the siltstone/mudstones. Pyrite is observed rarely (but can be difficult to distinguish from the abundant bronze-coloured mica within the sediments) in siltstone/mudstone beds within the reduced zone.

Volumetrically insignificant (<2%), thin and discontinuous argillaceous horizons comprise distinctive lithological units within an otherwise largely uniform sandstone. These horizons typically grade downwards from fractured, nodular and blocky, pale-green to pink limestone (Figure 9) into clayey limestones and into nodular calcareous mudstones and massive non-calcareous mudstones (Figure 10). Note that the Break at base of core in Figure 9 corresponds to break at top of core in Figure 10. Attaining a maximum thickness of 1.5 m, these horizons are typically thin to very thin (average 10-20 cm) and locally range down to < 2 cm in thickness. Although generally discontinuous (coarsening and grading out laterally) these horizons can in places be traced in cross-section for over 300 m.

Angular clasts and fragments of limestone (often incorrectly referred to as ‘breccias’) and fractured, nodular calcareous mudstones, are relatively abundant throughout the Undandita Sandstone. Previous workers have attributed either a structural (fault-breccia) or pedogenic (calcrete) origin to these clasts but detailed logging of the core does not support these conclusions.

Carbonate clasts and nodules bear no resemblance to pedogenic calcretes and although fracturing and brecciation are apparent within limestone nodules, no displacement occurs on these intra-nodular fractures. Evidence of desiccation cracks (Figure 8) and limestone nodules displacing (but not disrupting) sub-millimetre scale sedimentary laminae (Figure 9) indicates that nodule formation (growth) occurred in situ. Fractures are interpreted to have formed as a result of desiccation rather than transport-induced physical brecciation or fragmentation.

Figure 8 - Desiccation cracks preserved at the top of mudstones (AP082, 390.20m)

Together, this evidence rules out a structural or pedogenic origin and the limestone-mudstone horizons are interpreted as having been deposited within abandoned channels (billabongs) or as thin drapes above fluvial channel sands during waning flows. The gradational limestone to mudstone profile and the presence of mud cracks and intra-nodular fractures in the limestone are indicative of subaerial exposure and desiccation under what is interpreted to be seasonal to semi-arid conditions. Abundant carbonate-rich and mudstone clasts distributed throughout the Undandita Sandstone are interpreted to have been derived from the erosion and reworking of these limestone-mudstone horizons.

Whilst the Undandita Sandstone is largely unconfined, the limestone-mudstone horizons are interpreted to have acted as aquitards, exerting a major control over uranium mineralisation by constraining and focusing groundwater movement (and therefore the migration of mineralising geochemical 'cells'). Additionally, limestone-mudstone clasts are typically reduced and represent the major source of reductant distributed throughout the sandstones hosting mineralisation. Argillaceous horizons and mudstone-limestone rich pebbly sandstones are characteristically associated with mineralisation with high grade-mineralisation commonly occurring along the margins of limestone-mudstone interbeds (Figure 11).

Figure 9 - Blocky, fractured nodular limestones developed within preferentially oxidised, thinly laminated, red-brown silts (AP091, Tray 3, ~400.0m)

Figure 10 - Pale-grey, chalky limestone nodules developed within reduced, green calcareous mudstone (AP091, Tray 3, ~400.0m)

Figure 11 - High-grade, disseminated uranium mineralisation developed adjacent to thin, reduced mudstone (MDST). Yellow numbers refer to assay samples (AP051, ~355m)

Pamela Deposits

Exploration drilling at the Pamela deposit (Figure 7) was designed to drill through the northern tip of the reduced wedge (Figure 3) developed within the Undandita Sandstone (see Borshoff & Faris, 1990) in order to investigate mineralisation occurring at depths <100m at the upper and lower redox boundaries. Four drillholes were completed allowing some preliminary comparisons to be made with the Angela deposits:

- Geological logging indicates that the sandstones hosting the Pamela orebody are generally finer-grained, cleaner and better sorted. Both mudstone and conglomerate units are uncommon with the host-rock's lower stratigraphic level being reflected in a reduced abundance of clasts derived from the Arunta Block and Heavitree Quartzite and a greater abundance of clasts derived from younger Amadeus Basin units.
- Whilst very little mineralisation was encountered at Pamela, zones of overprinted patchy to pervasive, moderate to intense haematite alteration are more prevalent than at Angela, suggesting the passage of the redox front through the sandstone leaving the patchy mineralisation at Pamela in its wake.

- Detailed logging indicates that two styles of oxidation occur at the redox boundary at the base of the reduced wedge where a barren strongly-developed mottled profile has been subsequently overprinted and modified by patchy to pervasive haematite (+minor limonite) alteration associated with the migration (Figure 12).
- The prominent mottled profile is developed beneath at generally sharp redox and lithological contact suggesting an disconformable (erosional) contact (as seen at the base of a conglomeratic interval in AP149 in Figure 13). The mottled profile is interpreted to be a palaeo-weathering profile, developed beneath an intraformational disconformity.
- Development of a palaeo-weathering profile implies burial and at least partial diagenetic cementation of the sandstones prior to subsequent exhumation and exposure to surface weathering in response to the episodic tectonic uplift responsible for driving basin evolution on a broader scale.
- Multiple, repetitive depositional cycles therefore imply the potential for multiple mineralising events within different sandstone packages, thereby considerably upgrading the potential of the basin.

- Such an interpretation is in keeping with the alluvial fan tectono-stratigraphic setting and implies that the Undandita Sandstone has the potential to contain more than one regional redox boundary at which uranium mineralisation may be developed.

Figure 12 – Interpreted palaeo-weathering (haematite-mottled) profile developed in AP148 immediately below the disconformable redox contact (red arrow)

Figure 13 – Palaeo-weathering profile developed in AP149 below disconformable redox contact (red arrow) at the base of conglomeratic interval

Figure 14 – Detail of the sharp, erosional redox contact in Figure 13

Basin Evolution

The sandstones hosting mineralisation at Pamela are interpreted to be separated by a disconformity from the sandstones hosting the Angela deposits. The implications of this significantly upgrade the prospectivity of the Amadeus Basin.

The sandstones were initially deposited in an oxidising environment, but Uranerz suggested that increasing maturation of groundwater down-slope into the basin resulted in progressive (diagenetic) reduction of the Undandita Sandstone (
Figure 15). Reduced horizons within the Undandita Sandstone are therefore considered to have formed during the early stages of diagenesis (burial and compaction) in response to increasing groundwater maturation.

Mineralisation is interpreted to have been emplaced within the Undandita Sandstone shortly after deposition (during early diagenesis) in response to the southwards migration of a regionally widespread redox front that was driven by the hydraulic gradient between the Amadeus Basin and the hinterland to the north. Gradual development of diagenetic calcite cement during diagenesis subsequently occluded the pores space within the Undandita Sandstone and prevented any further development or modification of the redox front and associated mineralisation.

Figure 15 – Development of the regional reduced zone in response to increasing groundwater maturity (Ferguson, 1978)

Episodic rejuvenation (uplift) of the proto-MacDonnell Ranges resulted in exposure and erosion that delivered pulses of sediment into the basin and produced intra-formational stratigraphic discontinuities. These stratigraphic breaks separating reduced and oxidised sandstones are reflected in the back-stepping of the surface expression of the regional redox boundary. Each phase of deposition, diagenesis, (partial) exhumation and erosion, is potentially accompanied by a separate mineralising event. The Brewer Conglomerate/Undandita Sandstone therefore has the potential to contain numerous wedges of reduced sediment, with each potentially hosting uranium mineralisation along its margins.

Alteration and Mineralisation

Mineralisation at Angela I occurs at a 30-40 m high and 50-300 m wide step zone in the regional redox boundary. Mineralisation at Angela I is remarkably linear, dipping at approximately 9° to the west and extending down-dip for at least 5,700 m to depths exceeding 900 m. Satellite orebodies (Angela II-IV) are located on smaller step zones to the north of Angela I whereas Pamela occurs at a series of poorly defined steps on the upper and lower sides of the tip of the regionally reduced wedge (Figure 16).

Geological logging confirmed the broad 'Z' shaped geometry of the redox step at Angela I (Figure 16) but revealed that the geometry is considerably more complex, consisting a series of irregular oxidised lobes or tongues that extend forwards (southwards) into the reduced sandstones. Figure 17 illustrates that the broad z-shape is considerably more complex at a local scale whilst the 2 x vertical exaggeration in Figure 18 is used to emphasise the surprisingly consistent lateral continuity of the thin oxidised tongues (<2m thick) that are frequently able to be traced for distances up to 200m.

Figure 16 - Schematic section of the Angela and Pamela deposits

Figure 17 - 386900E Cross-section illustrating the generalised 'Z' shape to the redox boundary and mineralised zones (cf. Figure 16)

Figure 18 – 389450E Cross-section illustrating the complex nature of the redox boundary

The broad 'Z-shape' to the mineralisation at Angela I is attributed to the complex interplay between the regional redox boundary and local-scale redox boundaries controlled by discontinuous lithological horizons. The upper and lower limbs of the 'Z' shape form laterally extensive planar zones that cross-cut lithological boundaries, with mineralisation in the core of the 'Z' forming a series of en echelon flat-lying zones (Figure 17, Figure 18).

Aside from rare and isolated occurrences associated with remnant carbonaceous material (Figure 17) within the oxidised zone, mineralisation at Angela is controlled by the oxidation state of the sediments. Thin and discontinuous, but laterally extensive argillaceous horizons exert a strong control over the location of the redox boundaries that host mineralisation, and where they are absent mineralisation is generally poor.

Detailed logging has defined a mineralogical zonation (Figure 19, Table 15) across the mineralised redox fronts. Five lithological zones are defined (on the basis of their mineralogy) within the transition from unaltered (reduced) to intensely-altered (oxidised). These observations are supported by the recent geochemical study on selected drillholes (Geochemical Study on Selected Drillholes) which highlights the different geochemical signature of the limestone-mudstone horizons, particularly with respect to calcite & oxides, that reflects the clay mineralogy]).

Table 15 – Mineralogical zones across the mineralised redox front

Uranium mineralisation is strongly associated with zones of intense haematite oxidation marked by pervasive brick red to rusty red haematite (+ weak to moderate limonite) oxidation (Figure 20-Figure 22). These zones are generally developed at the margins of the redox front although unmineralised zones of intense alteration within the oxidised zone record the down-dip migration of the mineralising geochemical cells.

High-grade mineralisation generally occurs as visible blebs of black uraninite (Figure 22) or disseminated dark coloured coffinite/uraninite within the Haematite Zone (Figure 23) and Limonite Zone (Figure 25). Yellow secondary mineralisation occurs as small blebs and irregular patches (Figure 26, Figure 27) or as distinctive rinds around quartzite clasts (Figure 27) within the host sandstone.

Development of haematite alteration within the Haematite and Calcite Zones is interpreted to have been accompanied by a lowering of pH. This has remobilised calcite towards the leading edge of the redox front resulting in the patchy and granular texture characteristic of the Calcite Zone (Figure 24). Patchy, vanadium mineralisation is associated with bleaching and haematite alteration towards the tip of the redox front (Figure 19, Figure 20) and precedes uranium mineralisation.

The yellow-coloured, calcium- and vanadium-rich mineral phases (carnotite, tyuyamunite and uranophane) are more prevalent within the leading edge of the redox front (typically Calcite Zone). Although widely referred to as 'secondary' in origin (and attributed to the alteration of primary uraninite/coffinite) yellow uranium mineralisation occurs from surface down to depths of > 500 m, well beyond the effects of surface oxidation. These minerals are interpreted to be primary uranium minerals deposited by the migrating 'geochemical cell'.

Figure 19 – Simplified Angela redox front model

Figure 20 – Alteration zones associated with asymmetrical redox profile developed adjacent to calcareous mudstone interbed (CAMD). Note core interval within the red box is oriented back to front. Coloured arrows indicate correct core orientation (green to green, pink to pink). (APGT01 Tray 16 & 17)

Figure 21 – Mineralogical zonation across redox front: Bleached Zone (BZ) surrounding Calcite Zone (CZ) and Haematite Zone (HZ) (AP087, Tray# 13, ~435.0m)

Figure 22 – Detail of Figure 21 showing black blebs of uranium mineralisation (uraninite?) associated with pervasive intense haematite oxidation (AP087, 434.80m)

Figure 23 – Disseminated dark grey coffinite/uraninite mineralisation associated with pervasive intense haematite oxidation (Haematite Zone) developed on margins of reduced, nodular fractured limestone (AP088, 432.3m)

Figure 24 – Calcite Zone 'granular' texture typical of the Calcite Zone, developed within strongly altered sandstone (AP054, Tray # 12, 377.0m)

Figure 25 - Disseminated uranium mineralisation (black), occurring within a thin (<10cm) Limonite Zone, developed at the redox boundary (AP128, 146.93 -147.14m)

Figure 26 - Calcite Zone. Yellow uranium mineralisation occurring as patches, blebs and rinds around pebbles within the sandstone (AP033, 280.02-280.51m)

Figure 27 – Calcite Zone. Yellow uranium mineralisation occurring as paint on the surface of and as rinds on margins of quartzite pebbles (AP128, ~149.4m)

FEASIBILITY STUDIES

A high level scoping study was completed during the year which did not set out to define any of the major assumptions that would govern the development of the project but was directed at the potential of the overall property. This potential is derived by assessing a range of assumptions and estimates that produce the financial and production outcomes.

Using a range of mining and processing costs derived from other operating mines factored for location, ground conditions and mineralogy a breakeven cut-off grade can be determined. In these studies, this cut-off grade is in the range of 500-600 ppm U_3O_8 for underground mining.

GEOTECHNICAL STUDIES have also been completed which are utilised to ascertain the likely mining recoveries, that is, how large the underground openings could be and what pillars must remain for support purposes.

Initial investigations into the mining method indicate that the upper region could be mined by open pit methods and then used to establish access and ventilation portals to allow continued mining by underground methods. A Room and Pillar method is the most likely method to be employed underground with the possibility of room backfilling allowing for increased recovery. The rooms are unlikely to be regular shaped but will follow the mineralisation and dip to the west. Detailed engineering, at a later stage, will target pillar location to be in the un-mineralised zones as far as practicable.

Combining the likely mining methods and geotechnical parameters a diluted mineable Resource of 5.9 Mt at 1.8m thick containing 14.1 Mlb U_3O_8 was delineated. In addition, a small quantity of ore would be recovered by open pit methods in the construction of the access and ventilation portals.

The study outlines a seven year project life generating 12.5 Mlb U_3O_8 of saleable product.

The project economics are however marginal at current Uranium prices. A Resource/Reserve increase by 50% increasing the mine life to 10 or 11 years would improve the economics of the project considerably.

As mentioned, the study is a high level investigation to ascertain the potential of the project and as such ongoing studies are required to confirm the assumptions made. To date, there has been little engineering undertaken in the study, the mineable Resource has been defined globally from the diluted Resource and no development, access or ventilation designs have been completed. No plant and infrastructure engineering has been done, with the cost estimates derived from factored operating and construction estimates.

GEOTECHNICAL STUDIES

Geotechnical investigations were undertaken during the year, these studies were targeted to generate preliminary findings on possible extraction ratios based on conceptual room and pillar dimensions derived from geotechnical logs, geomechanical tests and empirical design analyses.

Stereographic assessment of (oriented) core log data shows no prominent natural discontinuity (joint sets) other than bedding, and this favourable combination of absence of discontinuity sets (joints) other than bedding and relatively uniform rock strength implies that requirements for local ground support are likely to depend primarily on maintaining stable roof beams, rather than protection against structurally controlled rock falls.

Test work undertaken to ascertain the intact rock strengths for the three main zones, Hanging Wall (HW), Orezone (OZ) and Footwall (FW), resulted in:

- The Uniaxial Compressive Strengths (UCS) test results indicated values between 30 MPa and 35 Mpa for the two sites and three rock types.
- Dry and wet (saturated) rocks yielded the same strengths at both sites.
- NQ, HQ and PQ core sizes yielded very similar strength results.
- The tests results correspond closely with findings of the 1981 tests conducted by the Mt Isa R&D rock mechanics laboratory.

Dimensions and extraction percentages for panel (rib) pillars were calculated for lower, central and upper case room widths, based on variations in uniaxial compressive strengths. Provisional geomechanical design parameters for the central case room widths are for pillars ranging between 5m and 15m for room widths of 12m to 18m, depending on the depth of mining, Indicative mining recoveries are estimated between 65% and 85%, again dependent on the depth.

As further studies are undertaken, *in-situ* and laboratory stress measurements would be priority. These should be done at a range of depths, probably employing the "Acoustic Emission" method. Roof beams and pillar stability hence their designs are very sensitive to the orientation and magnitude of the principle stresses.

More rigorous geomechanical analyses including numerical analyses should also be done, explicitly accounting for the in-situ stress fields to estimate the probable loads (stress changes) at various depths and panel spans.

BULK DENSITY ANALYSIS

During 2009, following the completion of the Angela drilling program, a series of drill holes were selected and subjected to bulk density measurements with the results being compiled during the first quarter of 2010.

An analysis of these bulk density measurements of the Angela I deposit was conducted with the aim to identify any relationships or trends, and to derive values to be applied during Resource estimation exercises. Both individual half core samples measurements (370) as well as composited mineralised intervals per drill hole (27) were investigated. Drillhole locations are shown in Figure 28 whilst drillhole and sample details are contained within Appendix 11.

Following the analysis, the following preliminary deductions can be made:

- The individual sample bulk density data is normally distributed around a mean of 2.45 t/m3 and has a median of 2.46 t/m3.
- The bulk density data for the individual samples show a very poor correlation to the Gamma Scintillometer counts per second and the geochemical uranium grade, with correlation coefficients of 0.321 and 0.259 respectively.
- There is some evidence for increased bulk density with uranium concentration on the individual samples, however the relationship is very poor.
- The composited samples have a smaller spread of bulk density values, but retain a mean of 2.45 t/m3.
- The composited bulk densities have a poor correlation with the composited uranium concentration, even though there is some evidence for a better correlation above 750 ppm U.
- The bulk density data was obtained from holes well distributed over the Angela I deposit.
- Spatially, there is an increase in bulk density with depth, potentially due to weathering effects in the shallower areas.
- The observed bulk density measurements aligns well with that derived during the metallurgical investigation conducted during 2009/2010 (Heinrich, 2010) on an 80 kg sample grading 0.19% U_3O_8 on average. That sample, was reported to have an average bulk density of 2.44 t/m^3. The spread of data was between 2.35 t/m^3 and 2.5 t/m^3, which are very much in line with the newly derived 2.38 t/m^3 and 2.53 t/m^3 of the composites.

Given the above observed tendencies, it is recommended that further bulk density measurements be conducted in the central area of the deposit to enable a better understanding of the regional bulk density variation with depth. In the absence of this it is recommended that an average bulk density of 2.45t/m^3 be used for Resource and Reserve estimation purposes.

Figure 28 - Bulk Density Analysis Sample Locations

Appendix 11 - Bulk Density Analysis

GRAIN SIZE ANALYSIS

An analysis of the geologically logged grain size data, in combination with the rock type and acid reactions logged at the Angela I deposit during 2009 and 2010 was conducted with the aim of identifying any meaningful variations which would provide insight to the stratigraphic location of the Angela I redox step. The data analysis was supplemented by a visual comparison of core photography from selected intervals.

The report is contained in Appendix 12 and the findings can be summarised as follows:

- Based on geological logging data, there is not an average increase in grain size across the step zones
- There is a definite trend towards decreasing grain size with an increase in depth.
- There is no clear relationship in the relative grain size between the oxidized and reduced zones.
- There does seem to be a general increase in acid reaction, and therefore carbonate content (mostly likely in calcite), with lithologies likely to have larger grain size.
- Comparison of the acid reactions in the reduced vs. oxidized zones do not show any meaningful difference in this trend or in the absolute average acid reaction, suggesting that there is no different rock-type preference for the carbonate cement between the oxidized and reduced zones.

These results suggest that any variation in lithology, and therefore likely grain size; and a possible coinciding variation in acid reaction across the step-zone, are either very subtle or not present at all.

Based on visual photographic comparison, the following were observed.

- The oxidized zone generally is generally more pebbly with specifically more muddy content
- The oxidized zone is generally coarser grained
- The reduced zone has more and thicker mudstone units
- The oxidized zone seem to have more grain size variation

It is therefore concluded that there is likely to be a facies change towards finer beds and less conglomerate fraction in the reduced zones, even though average sand grain size remain similar.

The acid reaction distribution, which shows no prevalence for reduced vs oxidized is therefore obviously not a function of redox state, but rather of permeability, and hence grain size. Given that the pervasive carbonisation event would have resulted in blocking any further fluid movement, it obviously occurred post mineralisation, locking the deposit in situ. The degree and location of carbonisation prior to the formation of the redox step and mineralisation event is likely to be important, as it would have acted as further restraint on fluid movement, and could have impacted on preferential flow-paths.

Appendix 12 – Angela I Grainsize Analysis

ENVIRONMENTAL MONITORING

The license conditions as stipulated in the letter of grant 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 tenement and in the immediate region for background uranium and related isotopes be undertaken.

To fulfil these obligations, and to position itself for a more advanced stage of the project, the JV has been conducting a wider range of radiological and environmental baseline studies on EL25758. The studies were scoped and are being undertaken to ensure that all environmental aspects are identified and that adequate information is obtained to enable an environmental impact assessment to be prepared should the Project proceed to a mining stage. The environmental baseline studies initiated include:

- Water (Groundwater & Surface water);
- Air quality (Dust) and Radiation;
- Meteorology;
- Fauna and Flora;
- Heritage (Ethnography and Archaeology).

Vegetation and Flora

A baseline Fauna and Flora survey of the licence area, via two discrete monitoring periods in March and September, was conducted in 2009 by Low Ecological Services P/L (Low, 2010). The baseline flora and fauna report is included in Appendix 13.

Appendix 13 – Baseline Flora & Fauna Report

Vegetation

ARC/INFO coverage for the 1:1,000,000 NT vegetation map based on Wilson et al. (1991) indicates that the vegetation in EL25758 falls within Class 65 S2G2 and Class 59 L1G2. Class 65 S2G2 is described as mulga tall open-shrubland with woolybutt (*Eragrostis eriopoda*) open-grassland understorey. Class 59 L1G2 is described as ironwood (*Acacia estrophiolata*), whitewood (*Atalaya hemiglauca*) low open-woodland with open-grassland understorey. Where S and G refer to a life form and height of >2 tall and tussock grass respectively, and 2 refers to a density (projected foliage coverage) of 10-29%. Both of these vegetation classes are widespread / common and represent 27 % of the Finke Bioregion, of which 0.35 % is reserved.

The baseline vegetation survey of the licence area conducted in 2009 recognised the following four main vegetation types:

- **Spinifex rises occurring on calcareous hills**, dominated by *Triodia basedowii* hummock grassland with sparse patches of Acacia / Senna open shrubland and occasional stands of *Atalaya hemiglauca* trees;
- **Rocky slopes composed of chert/sandstone** as well as limestone, dominated by open Acacia/Senna shrublands and open annual grassland, including *Dactyloctenium radulans* and *Enneapogon spp*;
- **Valley Floors with deep sandy, in parts more saline, soils** with mixed Acacia/Hakea open woodlands, mainly *Acacia aneura* and *Hakea leucoptera* and open annual grassland; and,
- **Drainage Depressions and drainage lines** composed of tall open woodlands of *Acacia estrophiolata*, *Acacia aneura* and *Hakea leucoptera*, open shrub layer and numerous grasses and herbaceous plants and notably Buffel grass.

Flora

A search of the Commonwealth Department of Environment and Heritage's Database (DEH, 2008) and Finke Bioregion report (Baker et al. 2005) for flora species of national and territory significance, suggests that five threatened flora species may exist within the region. However, according to known distribution and ecology (NRETAS, 2008 – Flora Atlas) no threatened flora species listed are known to occur in the area of proposed works. Flora is dominated by relatively common species which occur in common habitat types, some of which are already degraded due to localised grazing pressure and existing erosion. No sites of botanical significance occur within EL25758 as identified by White et al. (2000).

The survey conducted in 2009 identified a total of 111 species during the March and September surveys. 80 species out of the 111 were found in March and 80 in September. The dominant vegetation communities for all the data sampled are represented by herbs and grasses. Low shrubs and tall shrubs take up a minor surface percentage and trees only have 3% coverage.

None of the species is listed as endangered, vulnerable or rare (Albrecht, D.E – 1997. Vascular Plant Checklist for the Southern Bioregions of the Northern Territory: Nomenclature, Distribution and Conservation Status).

Weeds

During the 2009 field survey no weed species declared under the Weeds Management Act 2001 were found within the project area. A number of introduced species' are currently present in the region of the project. In particular these include Buffel grass (*Cenchrus ciliaris*), Mexican Poppy (*Argemone ochroleuca*), Mustard Weed (*Sisymbrium sp.),* Ruby Dock (*Acetosa vesicaria*), Wild Turnip (*Brassica napus*), Paddy Melon (*Citrullus colocynthis*) and Common Sowthistle (*Sonchus oleraceus*) and all except Mexican Poppy and Mustard Weed were found on the EL257258.

Fauna

A search of the DEH database, NRETAS fauna atlas and amalgamation of fauna records from local surveys (e.g. Baker et al., 2005; Burbidge et al. 1988; Low and Miller, 1997; Paltridge & Latz, 2003; Smith & Firth, 2005; and Cole and Pavey, 2003) identified 16 threatened species and three near threatened species that may occur in the region in addition to six migratory bird species.

In 2009 a total of 110 vertebrate animal species were recorded during the two surveys, which included 59 bird, 21 mammal, 28 reptile and two amphibian species. There were at least 28 different species of invertebrates caught in the traps. These consisted only of arthropods including insects, scorpions and spiders.

For the purpose of this survey the fauna was divided into four groups: Birds, Mammals, Reptiles/Amphibians and Invertebrates (which includes Arthropods).

Budgerigars (*Melopsittacus undulatus*) were by far the most commonly encountered birds during both survey periods, followed by Zebra Finches (*Taeniopygia guttata*). Four other bird species made it into the top ten during both survey periods. They included Black-faced Woodswallows (*Artamus cinereus*), Cockatiels (*Nymphicus hollandicus*), Willy Wagtails (*Rhipidura leucophrys*) and Crested Bellbirds (Oreoica gutturalis). The four other species that were most common in March are Crimson Chat (*Epthianura tricolor*), Mulga Parrot (*Psephotus varius*), Richard's Pipit (*Anthus novaeseelandiae*) and Variegated Fairy Wren (Malurus lamberti). In September Bourke's Parrot (*Neopsephotus bourkii*), Torresian Crow (*Corvus orru*), Rainbow Bee-eater (*Merops ornatus*) and Splendid Fairy Wren (*Malurus splendens*) were among the ten most common species. The September survey confirms the March survey result that the "Drainage Depressions" are the most suitable bird habitat. Birds are highly mobile and often migratory species. The overall increase in bird species observed from March to September can be attributed to seasonal changes in distribution due to the availability of food and water, increased visibility of birds during the spring breeding season, increased number of young birds as well as the increased familiarity of the research staff with the survey sites and the local birdlife after processing the photographic material from the March survey.

The most common reptile species recorded during the March and September surveys was the Central Netted Dragon (*Ctenophorus nuchalis*) with 70 and 41 individuals respectively. This is far more than any other reptile species. The total numbers decreased considerably from March to September. This can partly be explained be the survey methods. The number of trap nights was reduced in September because the main interest of this survey was species richness.

The most commonly encountered mammal was the Striped–faced Dunnart (*Sminthopsis macroura*) with 37 individuals trapped in March and 39 in September. A more significant find was the presence of Kultarrs (*Antechinomys laniger*) within the project area with a significant increase in range of this eruptive species between March and September. In addition, seven species of bats were identified within the project area and all are common species.

10 different groups of Arthropods were identified during the March survey and 25 during the September survey. The most important result was the large number of scorpions (228) that were found in the pitfall traps during the March survey. They had almost disappeared in September, when only two individuals were caught during the whole survey period. The second most common group of Arthropods were the wolf spiders with 44 (March) and 21 (September) individuals. All other Arthropods only occurred in small numbers.

Of the 21 mammal species observed during the survey, nine introduced species were present: Camel (*Camelus dromedarius*), Cat (*Felis catus*), Cattle (*Bos taurus*), Fox (*Vulpes vulpes*), Dingo (*Canis lupus dingo*), Horse (*Equus ferus caballus*), House Mouse (*Mus musculus*), Rat (*Rattus sp.*) and Rabbit (*Oryctolagus cuniculus*). Cattle are common within the former pastoral lease in which EL25758 is situated. The occurrence of the identified feral species is not unique to the project area, they are present throughout most of Australia. Active rabbit warrens occur typically in the calcareous rises.

Of the faunal species recorded, two are listed under the TPWC Act 2000: the Emu and the Kultarr. No faunal species observed are listed under the EPBC Act 1999.

Emus occur in low densities throughout northern Australia but substantially decline in the NT, believed to be due to changed fire regimes and increased hunting pressure, which has led to its being listed as vulnerable under the TPWC Act 2000 (Taylor and Woinarski, 2006). An aged emu track was identified at Site 18 during the March survey and another one at Site 10 during the September survey, although no live individual was spotted. The exploration operation will have limited impact on this nomadic species, but awareness of the species should be promoted and any sightings recorded.

Three Kultarrs (2 males, 1 female) were caught on the upper slope of low rocky undulating hills in the northeast of EL25758 east of the Old South Road during the March survey. The site is moderately disturbed by cattle grazing and camping. Disturbed and bare country is a feature of known distributions of Kultarr in the southern NT. During the September survey, two more were caught here, while three more were caught at two different sites west of the South Road, which expanded the potential range of the mammal to the entirety of the project area.

The Kultarr is a mouse-sized marsupial with very large ears, long delicate legs and a thin tail that is tipped with a dark tuft. It is terrestrial and nocturnal and shelters by day in logs or stumps, beneath saltbush and spinifex tussocks, or in deep cracks in the soil.

The species has a broad distribution throughout southern NT and central Australia, and it has been found in many of the central Australian bioregions (Paltridge and McAlpin, 2002). The NT fauna atlas records suggest that populations have come and gone in different areas over time. Kultarrs were recorded 15 km west of the project area as long as 20 years ago.

The conservation status of the Kultarr is mixed across jurisdictions. It is listed as data deficient under the EPBC Act 1999, near threatened in the NT under the TPWC Act 2000, endangered in NSW and rare or unlisted in all other states and territories. Its listing as near threatened in the Territory means it is close to qualifying for a threatened species status. The appearance of the Kultarr within the project area is an interesting and ecologically significant find, as it has not been recorded regionally for nearly 10 years and was found in a relatively disturbed area. The marked increase in numbers and distribution between the March and September surveys and the high pregnancy rate of all females caught reinforces the species reputation for being an eruptive species.

Water Monitoring

Water monitoring was undertaken by Aquaterra (from Adelaide, SA) and encompassed both groundwater and surface water. Details of the surface water and groundwater monitoring program are included in Appendix 14, whilst the water monitoring annual report is detailed in Appendix 15.

Appendix 14 - Surface Water & Ground Water Monitoring Program

Appendix 15 - Surface Water & Ground Water Monitoring Report

Ground Water Monitoring

Groundwater monitoring was undertaken by Aquaterra Consulting Pty Ltd for the periods February, June and September 2009 in accordance with the DRDPIFR exploration licence conditions (Aquaterra, 2010). Due to time and logistical restraints (e.g. drill rig availability to purge holes) quarterly monitoring scheduled for December 2009 was undertaken in February 2010 and therefore results of the fourth monitoring round are not presented in this summary report. The following summary is taken from Aquaterra (2010).

Groundwater samples were collected on 28 February, 5 March, 15 and 16 June, 23 September and 15 October 2009 by Aquaterra and Cameco personnel. The bore sampling programme was slightly modified in February, June and September 2009, in response to field conditions.

Groundwater physical characteristics of pH and electrical conductivity (EC) were measured and recorded in the field prior to sample collection. Collected groundwater samples were submitted for laboratory analysis of:

- pH, EC and Total Dissolved Solids (TDS);
- 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 0.5 Bq / L, speciation for radium, uranium, lead, polonium and thorium was undertaken by Western Radiation Services.

Consultation with the Department of Natural Resources, Environment, the Arts and Sports (NRETAS) confirmed that there are no water quality evaluation guidelines developed specifically for mining projects in the Northern Territory. In lieu of mining-specific guidelines, it was agreed that for the purpose of the Angela project baseline assessment, that water quality results would be compared with the Australia and New Zealand Environment Conservation Council (ANZECC) Guidelines (2000) for the Protection of Stockwater and Aquatic Ecosystems (Freshwater). Although the high salinity of groundwater sampled at Angela exceeds potable (and stock water) quality, the Australian Drinking Water Guidelines (ADWG, 2004) were also considered for comparison purposes in this baseline assessment.

The 2004 Australian Drinking Water Guidelines are not directly applicable to the Angela project because the surface water and groundwater quality at Angela exceeds potable water use criteria. Further, the groundwater at the Angela site also exceeds stockwater criteria in the majority (but not all) of bores sampled. Given that stockwater is the highest value use status for some water at the Angela site, comparison with the ANZECC Stockwater guidelines was used as the default guideline.

Where no guideline exists for stockwater, comparison was deferred to the ANZECC 80% protection level. Following comparison with the 80% protection level, groundwater analytical results were also compared with the 99% protection level. Where stockwater and/or aquatic ecosystems (80% and 90%) protection levels do not exist, water quality results were compared with the ADWG 2004. It is noted that exceeding of the ANZECC and/or ADWG criteria by single samples does not necessarily indicate unacceptable health risks; an assessment of health risk is also dependent upon exposure pathways, toxicity, length of exposure etc, which was outside the scope of the groundwater assessment.

The groundwater at the Angela site can be characterised as being non-potable, saline (greater than 1000 mg/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 were no substantial changes between the February, June and September 2009 sampling results. It is noted that the high radionuclide activity reported in groundwater sampled from EW541 in September is likely due to groundwater contact with the Angela ore body at depth (~500 m bgl) at this location.

These results indicate that the groundwater environment is stable with little or no seasonal variations in quality evident and water quality is not suitable for potable use. The highest value use status of the Angela groundwater is industrial (i.e. mining), or stockwater from certain bores.

Surface Water Monitoring

Surface water monitoring was undertaken on 2 March, 16 June, and 23 September 2009 by Aquaterra and by Cameco personnel following rainfall events throughout the reporting period.

The following summary of the results of the surface water monitoring programme is taken from Aquaterra (2010).

Due to a lack of rainfall between February and September 2009 (apart from a small amount in June) and high evaporation rates (2,800 mm/yr average), surface water at the previously identified "railway dam" was not available. However, a water quality sample was collected from Dam No. 3 (up-gradient of the site and fed by rainfall-runoff). It is noted that the Northern Territory Government has approved access to, and use of, surface water from Dam No. 3 for drill water during the exploration campaign. No opportunistic surface water samples were collected in 2009.

Surface water samples were collected and submitted for laboratory analysis of:

- pH;
- Total dissolved solids (TDS);
- Colour;
- Turbidity;
- Alkalinity as CaCO3;
- Major cations and anions;
- Total 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 (June and September 2009 only) – speciation for Radium, Radon, uranium and thorium was not undertaken based on the premise that total alpha and beta gamma radiation values in surface water samples did not exceed 1000 mBq/L.

Water quality assessment criteria used to compare the results of the surface water monitoring programme were the same as used for the groundwater monitoring programme outlined above.

Detailed Surface Water analytical results can be found in Aquaterra (2010). In summary, surface water at Dam No 3 is of low salinity, turbid, slightly basic and exceeds adopted guidelines (ADWG and ANZECC 80% protection) for two metals: aluminium and copper. Variations due to rainfall events in June indicate that the dam water is subject to seasonality. The highest value use status of this water is interpreted to be stockwater. Surface water results indicate that although not saline, water available for use in Dam No. 3 does not comply with aesthetic ADWG for colour, turbidity, aluminium and manganese, but it does comply generally with ANZECC Stockwater criteria.

Historically, this water has been used for stock watering purposes and although Cameco-Paladin were advised that the Angela site had been de-stocked, scattered stock were present, especially at Dam No 3, at the time of the February and June 2009 sampling programs. Site exploration works are not likely to impact the water quality at Dam No 3, because it is located up-gradient of the Angela site.

Dust Monitoring

Kellogg Brown & Root Pty Ltd (KBR) was engaged by Cameco to undertake baseline data acquisition for the Angela Project. This included monitoring of:

- Dust in air concentrations (gravimetric, and long-lived alpha-emitting radionuclides);
- Passive average radon concentrations in air;
- Continuous radon decay product concentrations in air (potential alpha energy concentration, PAEC);
- Surface gamma dose-rate;
- Personal exposure to dust; and,
- Personal exposure to gamma radiation.

Results for air quality monitoring between May and December 2009 are presented in KBR (2010) and excerpts from the report are presented below. Radiation monitoring results are presented in the Radiation Monitoring section below.

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

- Wind speed and direction;
- Temperature (at 1 m and 10 m. Giving delta temperature);
- Albedo;
- Barometric pressure;
- Evaporation;
- Rainfall and rainfall intensity; and,
- Relative humidity.

A summary of meteorological data (from March to December 2009) taken from the '60 Minute' tables generated by the station is presented in Table 16.

Table 16 - Summary of Meteorological Data

Gravimetric Dust Analysis

Two medium-volume air samplers were used to collect dust on 47 mm filter media. Dry gas meters were used to record the total volume of air sampled. Filters were pre-conditioned by being placed in a desiccator cabinet before being weighed. Following the sampling period, the filters were again conditioned before being weighed on a micro-balance.

The Guideline annual average value for Total Suspended Particulates (TSP) previously cited by the National Health and Medical Research (NH&MRC 1996, since rescinded) was 90µg/m3. The current Guideline value for PM10 concentration is a 24-hour average of 50µg/m3 (NEPC, 2003). Elsewhere (e.g. Olympic Dam Expansion Environmental Impact Statement, 2009) it has been shown that PM10 particulates make up approximately 40-50% of TSP particulates. Results presented in KBR (2010) show gravimetric dust results significantly below these Guideline values. These results show background dust levels that occur naturally in the Alice Springs region, and are not due to activities at the Angela Project.

Dust Deposition Rate

Ten standard dust deposition gauges have been deployed within the Angela Project area. Dust deposition was determined in accordance with AS/NZS 3580.10.1:2003 - Method for sampling and analysis of ambient air. Method 10.1: Determination of particulate matter—Deposited matter—Gravimetric method.

Samplers were deployed for one-month periods, with new sample containers replacing used sample containers during the change-over. Sample containers were sent to an external, NATA-certified, laboratory for analysis. The analyses reported:

- Insoluble matter (g/m2/month);
- Combustible matter (g/m2/month);
- Ash (g/m2/month);
- Soluble matter (g/m2/month);
- Total deposited matter (g/m2/month);
- Uranium-Total (µg/month); and,
- Thorium-Total (µg/month).

Few results showed any uranium or thorium concentration above the detection limit. Table 17 and Table 18 are a summary of the samples showing greater than the detection limit for uranium and thorium (in µg/month). Guideline values for deposited matter are couched in terms of the increment above background caused by a particular activity (such as mining). Since no mining has taken place at the Angela Project, this guideline value has little relevance as the dust deposited in from natural causes. There are no published reference values for the concentration of uranium and thorium in deposited dust.

Table 17 - Summary of samples with uranium concentrations above detection limit (µg/month)

Table 18 - Summary of samples with thorium concentrations above detection limit (µg/month)

Problems have been encountered with the unexpectedly high levels of ambient dust in the project area, leading to air samplers becoming overheated and failing. Several dust storms late in the year caused many pump failures. In periods where the principal air samplers have failed, dust filters from the low volume radon decay product monitors have been used to measure dust concentrations. These results are likely to be less accurate than the medium-volume samplers, since the air pathway leading to the filter holders in the radon decay product monitors is tortuous, and may affect the particle size of the dust collected on the filter. To overcome this problem, it is proposed to operate the pumps intermittently instead of continuously as before. T he samplers would be run at medium flow-rate over periods of one to two days each fortnight, thus providing four discrete samples per month instead of two continuous samples.

Radiation Monitoring

The annual summary report for radiation and air quality monitoring conducted in 2009 was received from KBR and is presented in Appendix 16. KBR’s 2010 annual summary was in preparation at the time of writing. Additionally, Paulka Radiation &

Environment were engaged to undertake an environment and radiation audit and the results are presented in Appendix 17.

Appendix 16 - Summary of baseline data acquisition, 2009

Appendix 17 - Angela Environment and Radiation Audit Report

Long-Lived Alpha Emitter Concentration in Air

Filters used to determine dust concentration (see Section 4.4.1.5) are placed into an alpha counter after a period during which the short-lived decay products of radon decay to insignificant concentrations. This leaves the long-lived alpha emitting radionuclides on the filter.

State and Federal agencies do not report ambient concentrations of long-lived alpha emitting radionuclides in air, however data collected over a period of a year in the pastoral region of mid-northern South Australia, concentrations were measured in the range 0.0 to 0.034 αdps/m3. Results from KBR (2010) show long-lived alpha emitting radionuclide concentrations measured at the Angela Project are considerably below the range reported for a South Australian site used as a comparison. The levels measured at the Angela Project, are background naturally occurring levels, and are not related to any exploration activity.

Radon Concentration and Radon Decay Product Concentration in Air

At twenty locations, track-etch devices were placed to record the average radon concentration in air within the Angela project area. The devices were deployed for three-month periods to allow sufficient sensitivity and statistical robustness.

The concentration of radon in air, of itself, is not a reliable indicator of radiation exposure or dose from the inhalation of radon. This is because the majority of the ‘dose’ that is delivered by the decay of radon comes from the decay of radon decay products, not from radon itself. The concentration of radon decay products in air is partially a function of the concentration of radon, but it is also a function of the ‘age’ of the air sample. In open atmospheres (i.e. outdoors), and in well-ventilated mines and homes, radon is continuously diluted and blown away so that the concentration of radon decay products is low. The Guideline value for radon concentration in the home (US EPA) is 4 ρCi/L (pico Curies per L) which is equivalent to 148 Bq/m3.

Two continuous radon decay product monitors were used. These are located at the meteorological station and the west station.

Table 19 - Summary of PAEC values

The concentration of radon decay products in air measured in this monitoring programme indicates the annual background in the Alice Springs area. The levels are unrelated to any exploration activity.

The annual average effective dose from inhalation of radon decay products worldwide is approximately 1.15 mSv (UNSCEAR). This is a combination of indoor and outdoor exposure and is therefore higher than it would be for purely outdoor exposure. Taking the results summarised in Table 19, the inferred annual average effective dose near Alice Springs is approximately 0.168 mSv/a.

Surface Gamma Dose Rate

The surface gamma dose rate was derived from aerial radiometric survey. The aerial survey was 'ground-truthed' using sensitive gamma survey equipment. The average gamma dose-rate over the area of the Angela deposit is approximately 72 ηGy/h. The median global gamma dose rate from terrestrial radiation is 59 ηGy/h. The range is large being between 18 and 93 ηGy/h outdoors and between 20 and 200 ηGy/h indoors. Thus the median terrestrial gamma dose-rate measured at the Angela site is within the expected range.

Personal Exposures

In the course of exploration drilling and evaluation activities, a number of measurements were made of exposure of personnel to ionising radiation. The measurements included:

- Low-volume, personal dust sampling, including gravimetric and radiometric analyses;
- Thermoluminescent dosimetry (personal gamma radiation TLD badges); and,
- Area gamma dose-rate measurements.

The samplers used were personal dust pumps, equipped with IOM sampling heads and membrane filters (0.45µm). No particle-size fractionation was undertaken, since the sampling complied with the ICRP lung model (i.e. 'inhalable dusts'). Samplers were issued to individuals in three principal occupational categories:

- Diamond drillers (drilling uranium-bearing ores) (85%);
- RC drillers (drilling overburden) (3.5%);
- Field hands (handling drill core) (3%); and,
- Other occupational categories (including geologists) (8.5%).
- Samplers were generally deployed for a full shift, with an air volume collected of about 1 m3.

Approximately 140 individual measurements of personal exposure to dust were undertaken, with a data recovery rate of 88% (gravimetric) and 88% (radiometric). Losses of gravimetric data were due to damaged filter media, missing tare weights or pump failures. Losses of radiometric data were due to the same factors.

The correlation coefficient between gravimetric and radiometric results was low, indicating that dusts experienced by personnel did not necessarily contain uranium related to the orebody, but were due to the generally dusty conditions pertaining to the area.

Table 20 shows the average and median of the gravimetric and radiometric results, sorted by 'occupation', where occupation is denoted by diamond rigs (D10, D5 and D9), and Field hands and RC rig operators.

Table 20 - Summary of average and median gravimetric and radiometric results

Radiation safety standards (dose limits) refer to that part of exposure over and above natural background radiation, i.e. that part caused by undertaking the activity that leads to exposure, in this case, a drilling and exploration program. The average annual radiation dose from natural background radiation in Australia is about 1.5 mSv/y (ARPANSA).
(http://www.arpansa.gov.au/pubs/baseline/bg_rad.pdf)

In most circumstances, the actual natural background radiation dose rate at a particular location is subtracted from that which is measured at that location (rather than the national average for Australia). In the case of the Angela Project, three occupational exposure pathways are considered: inhalation of dust and radon decay products, and direct gamma radiation. The background levels of these three exposure pathways have been measured at the Angela Project, and these levels are subtracted from occupational radiation exposures.

Background exposure from radioactivity in inhaled dust

The median concentration of long-lived alpha-emitting radionuclides in environmental dust is 0.00007 αdps/m3. The dose conversion factor for 5µm activity median aerodynamic diameter dust is 3.5x10-3 mSv/ αdps (ARPANSA)
(http://www.arpansa.gov.au/Publications/codes/rps9.cfm).

The exploration programme extended from 1 May 2009 to 10 September 2009, with a daily work period of 10 hours (although 12 hours is typical at the drill sites). Thus there were 990 hours of exposure (not including weekends). The breathing rate for moderate work activity is 1.6 m3/h (ICRP Publications 23). Thus the radiation 'dose' due to the natural background of long-lived alpha-emitting radionuclides in dust received by an average worker during the drilling campaign is 0.038 µSv.

Background exposure from inhalation of radon decay products

The median concentration of radon decay products in air is 0.017 µJ/m3. Using the same exposure hours and breathing rate as above, the radiation 'dose' due to natural background of radon decay products in air received by an average worker during the drilling campaign is 0.032 mSv.

Background exposure from direct gamma radiation

The average gamma dose rate in air over the Angela deposit and its surrounds is approximately 72 ηGy/h. Using the exposure times outlined above, an average worker on the exploration and drilling program would receive about 0.07 mSv.

Exposure over and above background

The median concentration of long-lived alpha-emitting radionuclides in air (for all personal samples) was 0.0046 αdps/m3. Using the exposure times and breathing rates discussed above, the average worker would have received a total (background and occupational) dose from this pathway of 0.025 mSv. The background dose from dust is 0.038 µSv in the same period. Therefore workers were exposed to 0.025 mSv dose from this source (occupational exposure minus background exposure).

Since drilling and exploration activities do not materially affect the concentration of radon decay products in air, the dose (over and above background) from this source is zero (occupational exposure minus background exposure).

Personal exposure to gamma radiation is measured by individual dosimeters. The laboratory that supplies the dosimeters subtracts background gamma radiation from each batch, thus the reading provided by the laboratory is the gamma dose over and above background. The laboratory does not report the background subtracted from the dosimeters, thus it is not possible to compare this with the estimated background gamma dose-rate discussed above.

Of the 60 TLD badges issued, each worn for one month, 45 badges recorded no gamma dose above background, 5 badges recorded 10 µSv, and 2 badges recorded 70 µSv. The higher values were obtained from people working on logging cores in the core shed. If a person were to work for 12 months and record 70 µSv every month, they would accumulate a gamma dose for the year of 0.84 mSv. The dose limit (from all sources of radiation above background) is 1 mSv/a for members of the public and 20 mSv/a for radiation workers. The results indicate a very low level of exposure over and above background. Indeed, many people recorded no additional exposure.

The calculations assumed that every person worked full-time between May and September (the drilling period), however it is likely that most did not work the full period, thus the calculated dose is likely to be an over-estimate. The low exposure is not surprising given that the activities undertaken during exploration and drilling do not markedly increase the ambient levels of radiation, and the relatively low grade of uranium-bearing minerals extracted during the evaluation program.

COMMUNITY RELATIONS

Community Consultation in the period from October 2009-October 2010 was less compared to the previous year mainly due to difficulties in recruiting to the position of Community Consultation Co-ordinator based in Alice Springs.

Telephone polling in February 2009 had shown that the community wanted more information, particularly on the potential impacts of a uranium mine on the town drinking water. Therefore a range of materials was prepared and distributed including a ‘Water Story’ booklet, DVD, fact sheets and community bulletins. New material is added to the Cameco web-site regularly.

Meetings of the Community Reference Group established in June 2009 continued with meetings roughly every 2-months or whenever new information was available or project milestones achieved. The community reference group was established with members representing a range of community, environmental, business, government, tourism and local government groups. The project environmental consultants all provided briefings on their work to the group and responded to any queries.

The sponsorship program also continued in the year with a focus on educational and sports activities and the Santa Teresa Football Team.

Two meetings were held with the traditional owners and CLC to brief them on progress with the project.

Other activities included a display at the Alice Springs show in July, some media interviews and a few briefings to politicians.

EXPENDITURE

Eligible expenditure for the reporting period on Exploration License 25758 was AUD$6,595,148.21 and is listed in Table 21.

Table 21 - Eligible Exploration Expenditure for EL25758

CONCLUSIONS

All the tasks undertaken during the second reporting period on Exploration License 25758 were designed to target areas of higher grade within the Angela I deposit and better define other areas of mineralisation at shallow depths (<200m) within the Angela II-IV and Pamela deposits amenable to extraction by conventional open pit mining methods.

Geological interpretations are at an intermediate stage and the deposit is now considered to be relatively well understood. Results indicate similar thicknesses and grades of mineralisation as defined by Uranerz and it is considered the historic data are reliable.

The current geological work will culminate in a JORC compliant Resource estimate which is anticipated to be completed in the first quarter 2011. This will form the basis for more detailed mining feasibility studies.

Considerable scope exists for further infill drilling targeting the Angela I orebody and for further exploration drilling targeting the down- and up-dip extensions of the Angela II-IV and Pamela orebodies, should the JORC compliant Resource be of suitable size and grade, and the political status of the project warrants it.

2010 - 2011 PROPOSED WORK PROGRAM AND BUDGET

The current geological work will culminate in a JORC compliant Resource estimate which is anticipated to be completed in the first quarter 2011. This will form the basis for more detailed mining feasibility studies.

Following the NT Government's announcement on 28 September, 2010 not to support mine development at Angela, a very limited exploration program is proposed for the third year of tenure. This is likely to include, but will not be limited to:

- Rotary mud scout drilling of between 5 to 10 drillholes; and
- Continual environmental monitoring.

Expenditure for the proposed exploration program in the third year of tenure covering the 2010 to 2011 reporting period is anticipated to be AUD$300,000.00. A generalised breakdown of proposed expenditure is summarised as below.

Proposed Work Program	**Approx. Expenditure**
Proposed Rotary Mud Drilling: 10 days @ $12,000/day	$120,000.00
Environmental Monitoring	$50,000.00
Administration Costs & Salaries	$130,000.00
TOTAL	**AUD$300,000.00**

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