

# **Final Report**

## EL22537 Dulcie

## **Reporting Period 16 July 2001 to 15 July 2011**

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#### SUMMARY

This report details exploration work carried out by Elkedra Diamonds, Uramet Minerals Ltd (Uramet)/Intercept Minerals Ltd (Intercept) within EL22537 in the Northern Territory between 15<sup>th</sup> July 2001 and 15<sup>th</sup> July 2011. The tenement was originally held by Elkedra Diamonds NL, and was transferred to Uramet during the 2007 season. Uramet changed its name to Intercept in July 2011.

Elkedra exploration included; Stream sediment and loam sampling, geological photo interpretation, magnetic surveys and drilling of magnetic anomalies.

In June 2007, Uramet was divested from Elkedra, with the aim of exploring Elkedra tenements for minerals other than diamonds.

The mineralisation within the project area occurs within the Arrinthrunga Formation which predominately comprises a shale and carbonate sequence, which includes several stromatolitic reefs. One of the stromatolitic reefs hosts the historical Kings Workings. The mineralised area is extensively silicified, containing variable amounts of barite (more extensive in the northern part of the project area), galena and sphalerite.

Work in the Box Hole area during the reporting period was concentrated on base metal exploration over the former stromatolitic reefs. This work consisted of mapping, soil and rock chip sampling, VTEM, IP and gravity surveys, vegetation geochemistry, and drilling.

The various geophysical and geochemical methods led to target generation, and those targets with an expected depth of less than 75m were drilled in the 2008 RAB program, with a number of anomalous lead and or zinc intercepts returned.

During 2010, consulting MVT experts CSA Global (CSA) were engaged to review and evaluate all available data on the Box Hole MVT Project, and to make recommendations on future work. CSA concluded that previous work has focused on testing close to outcropping mineralisation, and has not tested significant areas of shallow stratigraphy close to potential feeder zones. In addition, significant target positions are likely to exist at deeper stratigraphic levels and are only tested by extremely limited deeper diamond drilling. The known mineralisation may represent leakage from a more substantial mineralising system at depth, in host rocks more favourable than the mixed carbonates and clastics at shallow depths.

The EL has passed the 10 year period, and was unable to be renewed. Intercept consider that potential for the discovery of an MVT deposit still exists, and consequently has applied for an Exploration Retention Licence over most of the pre-existing EL.

## **1 INTRODUCTION**

Elkedra held the original tenement which is located on the Huckitta 1:250000 mapsheet and was comprised of 484 blocks (1525 km<sup>2</sup>) refer to figure 1. A reduction in 2003 reduced the area down to 68 blocks (215.9km<sup>2</sup>), a further reduction in 2005 reduced the area to 34 blocks (108km<sup>2</sup>). The final reduction in 2009 reduced the size of the tenement down to 18 blocks (57km<sup>2</sup>). Figure 2 shows the historical reductions.

While Elkedra held the tenement they completed Stream sediment sampling, loam sampling, aeromagnetic interpretation, ground magnetic surveys, photo-interpretation study, mineral chemistry analysis and mineral isotope analysis.

Intercept had the mineral rights other than for diamonds within the Box Hole tenement EL 22357.

The Kings Workings galena deposit located within the Box Hole project area was mined by hand in 1960. Since that time, sporadic attempts have been made to find extensions or related deposits in the local area, with work by previous explorers involving mapping, surface sampling, drilling and ground EM. Work conducted by Uramet includes mapping, surface sampling, ground geophysics, VTEM, and RAB drilling.

The purpose of this report is to summarise all previous work carried out by Elkedra, Uramet and Intercept during the life of the tenement.

## 2 LOCATION AND ACCESS

The tenement is located approximately 250km east-northeast of Alice Springs in the Northern Territory, Arapunya Station lies within the tenement boundary.(Figure 1).

Access to the tenement is via the Plenty Highway and station tracks.

Physiography ranges from nodule-paved plains in the south and east to gentle carbonate hills in the northwest. There are two sizable seasonal creeks, and karst features are present in the carbonate areas. The vegetation ranges from savanna woodland near the creeks to annual grasslands to gidgee and acacia scrub. The vegetation is consistent with a continental desert.



Figure 1 EL22357 Location.



**Figure 2 Tenement History** 

#### **3** GEOLOGICAL SETTING

#### 3.1 Regional Geology

The Box Hole tenement is located within the southern Georgina Basin, which was the northern part of the Centralian Superbasin. Following the Peterman Orogeny, the area developed as a stable carbonate platform, with occasional clastic sedimentation. The subsequent Alice Springs Orogeny produced little metamorphism in the southern Georgina Basin, but is thought to be responsible for some mild heating and hydrothermal activity (Dunster at al. 2007).

#### 3.2 Tenement Geology

This tenement lies entirely within the Arrinthrunga Formation of the Georgina Basin. This is a shale/carbonate sequence with some quartzitic sands that was deposited in an occasionally emergent, restricted shallow basin. Stromatolitic reefs are plentiful.

One of the Stromatolitic reefs in the upper Cambrian Arrinthrunga Formation hosts the King's workings deposit, which appears to be a MVT style barite-galena deposit formed during the Alice Springs Orogeny. The mineralized area is extensively silicified, and contains pyrite gossans and occasional sphalerite in addition to the galena and barite.

#### **4** EXPLORATION COMPLETED FOR THE DURATION OF THE TENEMENT

Exploration activities undertaken during the life of the tenement include:

- 1) Stream sediment sampling
- 2) Selected loam sampling
- 3) Aeromagnetic survey interpretation
- 4) Ground magnetic survey
- 5) Photo-interpretation study
- 6) Mineral chemistry analysis
- 7) Gravity survey
- 8) Field mapping and sample collection
- 9) Examination of historical drill core

10) IP survey

- 11) Aerial electromagnetic (VTEM) survey (including magnetics)
- 12) Soil and rock chip geochemical survey
- 13) Vegetation survey
- 14) Drilling
- 15) Geochemistry
- 16) Interpretation of geophysical data by consultants



Figure 3 Exploration Summary Map

#### 4.1 Stream Sediment Sampling

Stream sediment sampling was aimed at confirming open file results, therefore, sample sites were chosen at drainage locations which reported positive for chromite and/or diamond. Based on low grain counts from open file reports it was decided to take a minimum of 40kg of 1.3mm material at each site.

Field samples were initially processed at the Independent Diamond Laboratory then at the Diatech Laboratory in Perth. Material is screened at '0.8mm and heavy mineral concentrate

is routinely observed down to  $^+0.3$  mm size fraction. The  $^-0.3$  to  $^+0.1$  mm fraction is sent for fusion for microdiamond recovery. The  $^-0.1$  mm slimes are discarded.

A total of thirteen stream sediment samples were taken during the report period. All locations are shown on Figure 3. Of all samples, 10 reported positive for chromite and confirm open file data results.

Results define one drainage anomaly (AR01WT001-004), which is located in an area previously reported for chromites and microdiamonds.

## 4.2 Loam Sampling

Loam and/or termite mound sampling was undertaken over the center of selected aeromagnetic targets. A total of four loam/termite samples were taken. Sample locations are shown on Figure 3.

Results of heavy mineral concentrate separation are available for all samples with only one sample reporting positive results. A single microdiamond was recovered from sample AR01WT007 which is a 40kg combined termite and loam sample taken over aeromagnetic anomaly CWN-017. The recovery of a microdiamond from a termite mound sample over CWN-017 is considered significant.

## 4.3 Magnetics

The release of the Elkedra aeromagnetic survey flown by Tesla Airborne for the NTGS formed the basis of all geophysical work undertaken.

#### 4.3.1 Aeromagnetics

All aeromagnetic interpretation and processing was undertaken by Dr. Duncan Cowan of Cowan Geodata Services, Perth. A total of 17 anomalies were identified from the aeromagnetic data refer to Figure 3 for locations. Ground magnetic surveys were completed over the higher priority anomalies.

Field follow-up of several of these anomalies showed that several of the preliminary targets that modeled as small thin-sheets proved to be cultural. Some of the priority anomalies had coincident geomorphic features and these became higher priority anomalies.

## 4.3.2 Ground Magnetics

Nine ground magnetic surveys were undertaken, 6 over aeromagnetic anomalies and 3 over ground magnetic targets.

The ground magnetic survey was done using a GEM System GSM-19W V6 Magnetometer equipped with a GPS for collection of data in real-time walk-mag mode. The digital data is dumped into Toshiba notebook computers in the field and is processed and gridded using the windows version of Chris.dbf. Digital data is also e-mailed via satellite connection facilities to the company's consultant geophysicist, Dr. Duncan Cowan of Cowan Geodata Services for further processing and review.

Generally a 600 X 600 metre grid was centered over the original coordinates of each aeromagnetic anomaly. A total of 75.9 line-km's were surveyed with a line spacing of 50m.

## 4.4 **Photo-Interpretation Geology**

Dr. Nick Lockett of Nick Lockett & Associates undertook a photo and Landsat-7 interpretation at a scale of 1:50,000 of a large portion of the Mount Ultim project area. A total of 3 photo feature anomalies were identified and shown in figure 3. All anomalies are given a low priority rating.

## 4.5 Mineral Chemistry

Mineral chemical analytical work and grain identification was carried out by Dr. Wayne Taylor using a JEOL 6400 analytical SEM at the Centre for Microscopy and Microanalysis, University of Western Australia. High precision element analyses on recovered chromite grains were undertaken by Dr. Wayne Taylor using a Cameca SX-50 electron microprobe at the Electron Beam Laboratory, CSIRO Division of Exploration and Mining, ARRC, Bentley, WA. Some additional analyses were undertaken with a Cameca Camebax and a Cameca SX-100 electron microprobe at the Research School of Earth Sciences, Australian National University, Canberra.

## 4.5.1 Indicator Mineral Chemistry

Individual chromite grains are classified based on internal textures as observed in polished grains under the microscope. Textural classification includes smooth, crack/mosaic, pitted/porous, lamellar, and lattice. The lamellar and lattice textured grains are characterized by the presence of two interfingering chromite types (exsolution domains) whereas all other grains are composed of one chromite type.

Mineral chemical results indicate that the grains are mantled-derived. However, no high Cr  $(>60 \text{ wt}\% \text{ Cr}_2\text{O}_3)$  chromites were recovered.

## 4.6 Gravity Survey

A helicopter-based gravity survey was performed by Daishsat Pty Ltd in July of 2006 in conjunction with the NTGS East Arunta Gravity Survey. This survey involved a 500 metre spaced gravity survey over most of the Box Hole section of the tenement. The gravity data was processed by Dr Duncan Cowen to produce a residual gravity map, from which 15 anomalous targets were generated. Some of these anomalies were then modeled as buried dense bodies. Figure 4 indicates the location of each station.

A second infill gravity survey was performed by Daishsat Pty Ltd in August of 2007. This survey involved 1742 readings at 50 metre spacing over 39 lines on the Box Hole section of the tenement. Data was modelled by consultants Dr Duncan Cowan and Keith Jones. Some gravity anomalies were modelled as high density bodies at depth and targeted for drilling. The completed lines are shown in figure 4.



Figure 4 Gravity Survey

#### 4.7 Field Mapping

Three mapping expeditions were mounted in August 2007, March 2008 and April 2008. The purpose of the first trip was to establish the location of surface mineralization, investigate preliminary gravity targets, and look at archived drill core that was stored on site.

The March and April 2008 trips involved more detailed mapping of the surface mineralization and alteration. To assist with the mapping, 8 aerial photographs were purchased, covering both portions of the tenement. Soil, rock, and vegetation surveys were also completed. A geological map showing all locations visited by Uramet is provided in Figure 5.



Figure 5 . A geologic map, including measured strikes and dips, three generations of faults, and all locations visited by Uramet.

#### 4.8 Examination of Historical Drill Core

Approximately 800 metres of stratigraphic drill core is stored in a core-shed built on site by BHP in the 1970s. Much of this core was examined, and gravimetric measurements were done to determine the density differences between various lithologies for use in gravity data interpretation.

In addition, the DDH92 TC1 drill core, stored in the Alice Springs core library was examined in January 2008. A vein logged as barite was shown to contain neither barium nor sulphur, and a small single sphalerite grain was discovered about 1 cm from the bottom of the core. The lack of disseminated sphalerite around this grain suggests it is one of the isolated sphalerites previously reported from the lower Arrinthrunga by early stratigraphers (Draper 1976).

#### 4.9 IP Survey

An IP survey was completed in August through October, 2008. This entailed 17 lines at 100 or 50 meter spacing, along 28 line kilometres. Figure 3 shows location of lines. The IP data was inverted by consultant Graham Elliot, resulting in the generation of several targets ranging from 20 to 200 meters in depth. An example is shown in Figure 6.



Figure 6. Inversion for IP line 9 showing a chargeability anomaly at approximately 50m depth.

Inverted chargeability and inverted resistivity over the IP lines is presented as figure 7.



Figure 7 IP Line Location showing Inverted Chargeability (Left) and Inverted Resistivity (right)

#### 4.10 VTEM Survey

VTEM (Versatile Time-domain ElectroMagnetics) is the proprietary name for a helicopterborne electromagnetic surveying system. In October 2007, a 417 line kilometre VTEM survey was flown at Box Hole by Geotech Airborne Pty Ltd. The data showed a broad correlation between conductivity highs and gravity lows, presumably related to structure. Figure 8 shows a conductivity map based on channel 11, the 131 to 154 microsecond channel.

Magnetic data ("helimag") was recorded as part of the VTEM survey. No tie lines were flown but the data was levelled using regional aeromagnetics by consultant Dr Duncan Cowan.





#### 4.11 Soil and Rock Chip Sampling

In March and April 2008 a systematic effort was made to measure soil and rock chip base metal concentrations in the field using the Company's Niton portable XRF analyser. The initial study was run over the area of known surface mineralization. Other areas of interest from geophysical surveys were added in May and June, 2008, and soil measurements were obtained for the soil where trees used in the vegetation survey (section 4.7, below) were growing. In all, 458 rock chips and 541 soil samples were analysed. Figure 9 indicates the areal extent of the sampling.

Pb values in soil reached as high as 1330 ppm. The maximum Zn value in soil was 2093 ppm, figure 7 thematically maps the Zinc content of the soils. Rock chips yielded values up to 3% Zn and 1% Pb, excluding values from galena macrocrysts.



Figure 9 Sample Locations showing Zn content in soil, analysis by Niton portable XRF.

#### 4.12 Vegetation Biogeochemistry Survey

A vegetation geochemistry survey was conducted to determine if any anomalous enrichment in base metals or tracer elements was present. 116 samples were collected. Including repeats, 102 total analyses were made on 73 samples, measuring 64 elements location of samples is indicated in figure 10. Anomalies in Pb, Ag, Cd, and Zn were correlated with known shallow mineralization. In the southern area, vegetation over the down dip extension of the surface mineralization also showed elevated base metal content.



Figure 10 Location of Vegetation Samples. (Green Diamonds)

#### 4.13 Drilling

## 4.13.1 RC drilling

Elkedra drilled 7 RC holes (ERC0001 - ERC0007) on the tenement in May 2002 for a total of 442 m refer to figure 3 for locations. The drill spoils were submitted to Ultratrace for analysis and selected samples were submitted to Diatech for Heavy Mineral analysis concentrate (HMC).

## <u>Result</u>

No obvious Kimberlite or volcanic rock sources were intersected. HMC and microdiamond analysis were negative.

## 4.13.2 RAB Drilling

Between 24 June and 6 July 2008, 94 RAB (rotary air blast) holes were drilled on the tenement by URAMET to test base metal (Pb and Zn) targets. Drilling was carried out by Bullion Drilling Pty Ltd, and totalled 4,155 metres. Individual holes varied from 1 to 88 metres in depth, locations are shown in figure 11. Every metre drilled was examined on-site and logged according to lithology, with any visible mineralization or alteration noted. Based on initial inspection, 1,070 metres were chip-trayed for later inspection, while 374 metres were sampled for laboratory assay.

## 4.14 Geochemistry

## 4.14.1 RC Drill Results

Geochemical analysis were taken of down-hole drill spoils and stream sediment sample splits. None of the geochemical results indicate the presence of a kimberlite or related rock type.

## 4.14.2 RAB Drill Results

A Niton portable XRF analyser was used to assist in determining which of the samples would be sent to a commercial laboratory for analysis. Methods, procedures and results are summarised below. Using Niton values of 0.5% or more for zinc, 0.2% or more for lead, plus visible silicification or mineralisation as a guide.

## 4.14.2.1 <u>Niton Analysis</u>

A 15 second Niton XRF analysis was performed on each metre using the base metal ore mode of analysis. This reported metals with 22 or more protons (titanium and higher). Based on Niton and visual inspection, a small quantity of sample was collected from 1070 samples and stored in chip trays for later inspection. Where anomalous XRF results or visual alteration was noticed, multiple Niton analyses per metre were performed.

#### 4.14.2.2 Laboratory Analysis

A total of 374 samples were selected for laboratory analysis. A number of encouraging lead and zinc intercepts were returned from the assaying. The highest zinc intercept returned by the laboratory analysis was 12m @ 2.8% zinc (and 0.67% lead) from 17m, including one metre @14.7% zinc at 24-25m in hole HDB045 which was targeting a gravity anomaly to the south of mapped mineralisation. The best lead intercept received was 2m @ 3.98% (with 2.8% zinc), including 1m @ 5.39% (with 3.4% zinc) in hole HDB001 close to Kings Workings. Also of particular note are HDB079 in the north-western part of the project area, intersection 5m @ 3.2% zinc at 11-16m, including 1m @ 6.8% zinc 12-13m, and HDB029 located approximately 750m south of Kings Workings, returning 5m @ 1.8% Zn including 1m @ 4.9% Zn.

Other than the intercepts mentioned above, Pb and/or Zn mineralisation over 1% was generally confined to intersections of one to two metres in width. Significant results (over 1% of either Pb or Zn) are summarised below in Table 3, with Figure 14 showing best combined one metre Pb+ Zn intercept for each hole.

Mineralisation is generally associated with silicified dolostone. Often there is a strong correlation with Pb and/or Zn mineralisation and Ba, particularly in the northern part of the mineralised area.

A notable exception is hole HDB045, where mineralisation is associated with siltstone. HDB045 is also unusual in that the mineralisation is wider than other intercepts, and has the highest zinc grade



Figure 11 Locations of RAB drillholes (purple circles) on geologic map.

#### 4.15 Consultant Reports

Numerous geophysical consultants were engaged initially to interpret the various geophysical data. Reports by Dr Duncan Cowan, Keith Jones, and Graham Elliot were used to generate targets for the RAB drill program. Those geophysical targets deeper than 75 meters were not targeted in the RAB program.

During 2010, consulting MVT experts CSA Global (CSA) were engaged to review and evaluate all available data on the Box Hole MVT Project, and to make recommendations on future work.

CSA concluded that previous work has focused on testing close to outcropping mineralisation, and has not tested significant areas of shallow stratigraphy close to potential feeder zones. In addition, significant target positions are likely to exist at deeper stratigraphic levels and are only tested by extremely limited deeper diamond drilling. The known mineralisation may represent leakage from a more substantial mineralising system at depth, in host rocks more favourable than the mixed carbonates and clastics at shallow depths.

## 5 CONCLUSIONS

Stream sediment sampling by Elkedra led to the recovery of chromite indicator minerals. The source of the indicators is interpreted to occur outside the tenement boundary. Processing and interpretation of the Aeromagnetic Survey released by the NTGS by Elkedra identified 7 magnetic targets for drill testing. None of the targets intersected kimberlite or volcanic rocks.

Various geophysical and geochemical methods undertaken by Uramet/Intercept led to target generation, and those targets with an expected depth of less than 75m were drilled in the 2008 RAB program, with a number of anomalous lead and or zinc intercepts returned.

A thorough data review by CSA led to the recommendation of further work including wider coverage of soil sampling, RAB and diamond drilling. More work is needed to test significant areas of shallow stratigraphy close to potential feeder zones. The known mineralisation may represent leakage from a more substantial mineralising system at depth and more work is needed to assess this possibility. Intercept has applied for a retention licence to allow for further exploration.

The EL has passed the 10 year period, and was unable to be renewed. Intercept consider that potential for the discovery of an MVT deposit still exists, and consequently has applied for an Exploration Retention Licence over most of the pre-existing EL.

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