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Confidential Report to Top End Uranium Limited

Targeting review: McArthur South project, Northern Territory.

April, 2008

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Introduction

This document summarises results of a desktop evaluation of the Top End Uranium Limited McArthur South Project in the Northern Territory. The aim of this work has been as follows:

- Review the open file data located to date over the project areas.
- Use known mineralisation controls for unconformity type uranium deposits, Westmoreland type uranium deposits and various sediment-hosted base metals deposit types to define targets on the project areas.
- Rank target areas, delineating each target as either conceptual of substantive (i.e. prospectivity supported by solid information such as anomalous assay results).

Methods

This study was completed using a variety of digital data sources, as summarsied below:

- Reports from explorers who have previously held ground coincident with the McArthur South project area was reviewed. The aim of this was to find information that may support substantive targets that have been only partly tested or untested.
- The independent geologists report from the TEU prospectus (Jones 2007) was reviewed. This document contains much useful information regarding uranium mineralisation styles sought by TEU, together with some of the more significant targeting criteria.
- Northern Territory Geological Survey (NTGS) geological mapping data was used to provide regional-scale geological control. The faults layer from the NTGS map was used as the basis for building the structural architecture of the project area.
- NTGS geophysics data (radiometrics and aeromagnetics) was used to help interpret the geological character of the project tenements and to assist in delineation of ranked target areas for possible follow up.
- Detailed radiometric and aeromagnetic data collected by TEU over selected areas of McArthur South were reviewed with the aim of delineating discrete target areas in these broader areas that have already been identified by TEU as higher-priority target domains.
- Internet key-word searching was completed to assist in locating recent research on mineralisation controls for unconformity type uranium and various base metals deposit types. Some particularly useful recent publications were located from Canadian sources, including a comprehensive global-scale description of unconformity type uranium deposits published by the Geological Survey of Canada and a variety of very concise deposit profiles published by the British Colombia and Yukon geological surveys.

Review of Previous Exploration

Multi-commodity exploration was undertaken from the early-1970’s to present day, with various companies targeting uranium, base metals and diamonds. This work includes some old uranium exploration dating as far back as the mid-1950’s. Uranium exploration was primarily completed by MIM and Planet Management (see Prospectus). Limited exploration for diamonds and base metals was completed by a number of companies but with generally discouraging results. Work completed throughout these programs included the following:

- Mapping,
- Airborne radiometric and magnetic surveying,
- Falcon^{TM} airborne gradiometer surveying,

- Heavy mineral sampling,
- Stream sediment sampling,
- Loam sampling,
- Airborne EM surveys,
- Drilling (RC, diamond),
- Gas analysis.

The majority of this previous work has focused on diamond exploration, with base metals exploration conducted in parallel in some areas.

Interestingly, work by BHP in the western half of the project area suggested that geochemical responses obtained over Cambrian rocks represented leakage from deeper sequences. Further east, base metals exploration over the exposed Mesoproterozoic sequences identified 8 catchment areas with weakly anomalous base metals signatures. Anomalism appears to be associated with the base of the Sly Creek Sandstone. Low level Pb-Zn anomalism in rock chips has also been reported but this was attributed to Mn scavenging. Broad but weak Cu anomalism has also been intersected in drilling within the Woologorang Formation. However, it is believed this reflects a general low level enrichment in Cu within this sequence.

Previous Uranium Exploration

The McArthur South project area has received little in the way of previous uranium exploration, other than collection of airborne radiometric data. Previous explorers appear to have been unwilling to test the primary host sequences of the lower Tawallah Group due to the extensive Neoproterozoic and younger cover. This remains a major issue for exploration on this project.

Geological Setting

Jones (2007) summarises the geological setting of the McArthur South Project. The following key features are identified by that author:

- Project tenements located at southern end of Batten Trough.
- Tawallah Group rocks dominate the Mesoproterozoic sequence locally. It remains unknown as to whether the Westmoreland Conglomerate and Siegal Volcanics crop out within the project area. However, both units are likely to be encountered at depth.
- McArthur Group rocks evident further north.
- Cambrian Bukalara Sandstone and Cretaceous Mullaman Beds overly the Mesoproterozoic sequence and dominate surface exposures.

Regional Target Areas - Uranium

Jones (2007) recognised two initial primary target areas for uranium mineralisation within the McArthur South Project. The two initial target areas chosen by Jones (2007) are:

- the western strike extension of the contact between the Westmoreland Conglomerate and Siegal Volcanics trending across EL26181 and 24500. This is identifiable as a magnetic gradient marking the suspected contact between the conglomerate and the younger volcanics.

- The western edge of EL25580 where Siegal Volcanics crops out within a complexly faulted Mesoproterozoic sequence.

Targeting Criteria - Uranium

Geological Exploration Criteria

Jefferson et al. (2007) provide a useful summary of exploration criteria for unconformity associated uranium deposits.

- Irregularities of the basal unconformity in Palaeo- to Mesoproterozoic red-bed basins.
- Identification of basement complexes of highly deformed and metamorphosed Archean-Palaeoproterozoic orthogneisses and paragneisses, tectonically interleaved with Palaeoproterozoic platformal sedimentary assemblages. These supracrustal assemblages are characterized by relatively high U "Clarke values" and include graphitic metapelites. Late Palaeoproterozoic granitoid plutons and pegmatites, generated during regional high-grade metamorphism and anatexis from the metasedimentary rocks, are rich in K-Th-U hosted by minerals such as monazite, zircon and uraninite.
- Graphitic strata and fault structures within the basement complex and the presence of subtle but very significant, brittle post-sandstone structures. Ore is typically focused at the intersection of the basement-sandstone contact and high-angle oblique reverse faults that appear to be reactivated older basement structures. These structures have propagated upward into complex splays within the sandstone.
- Significant deposits may also be located in the basement complex.
- Favourable basins show geochemical evidence of large-scale fluid flow resulting in regional clay alteration and the development of local redox boundaries within the overall red-bed sandstone sequence. Local alteration halos of potassic clay alteration minerals (illite), boron alteration minerals (dravite), quartz cement and quartz dissolution are the main vectors for local exploration, and also form extensive corridors within which more detailed searches are conducted.
- Areas of pre-existing complexity along basement structures are particularly favourable, (e.g. extensional or compressional flexures, bifurcations, splays, duplex structures and cross structures). These may have undergone repeated brittle movement
- Palaeo-valleys on the order of 20-40 m deep developed during initial sedimentation of the host sequence. Brittle reactivation of basement structures through time improves the permeability of basement structures in areas of flexure as conduits for mineralizing fluids.
- Alteration halos
    - Large halos of potassic clay alteration minerals (illite), boron alteration minerals (dravite), quartz cement and quartz dissolution, mappable by gamma ray spectrometry. For example, correlates with illite alteration in the McArthur River area.
    - Kaolinite superimposed on illite at local scales.
    - Regional scale Fe-Mg chlorite with more localised Mg-Chlorite (Sudoite) alteration.
    - Local dickite alteration (preserved within silica rich alteration zones).
    - Illite-kaolinite-Mg-Chlorite alteration haloes may be hundreds of metres wide and thousands of metres long and several hundreds of metres vertical extent.

- Alteration envelopes typically enclose the ore controlling structure, typically showing a flattened ball shape profile tapering 'upwards' along the fault trace from base of the sandstones.
- Hydrothermal alteration of monazite leads to formation of Al-phosphate minerals with elevated levels of LREE, Th, Ca and Sr. This commonly correlated with elevated thorium signals in radiometric data and is an alteration feature that may be proximal to mineralisation. However, the effect of laterite scavenging of Thorium probably renders this less relevant in Northern Australia.

Geophysical Exploration Criteria

- Surface expressions of radioactivity associated with near-surface deposits located around the margins of the unconformities. These need to be carefully selected as lateritic rocks scavenge both uranium and thorium and thus tend to throw many anomalies that in reality represent false positives (i.e. are not genuine targets). Detailed follow-up exploration focused on airborne and ground electromagnetic methods remain the most effective tool to identify the precise location, depth and characteristics of basement conductors that may correlate with graphitic shear zones, along which ore deposits are more commonly located.
- Electromagnetic methods (e.g. Tempest) to detect ore-related alteration features (e.g. shallow but hidden, low-resistivity alteration zones) and to crudely map fault offsets of the unconformity. Audiomegnetotelluric methods to map highly altered, clay-rich, quartz-corroded quartz-arenite (relatively low resistivity) versus quartz-rich silicified zones (relatively high resistivity).
- Gravity transects (or airborne gravity) can detect alteration zones as negative gravity anomalies (de-silicified zones) or positive anomalies (silicified zones), but direct detection of ore deposits is a challenge due to their small dimensions that limit the magnitude of gravity anomalies (Thomas and Wood, 2005).

Targeting Criteria – Base Metals

Sedex Deposits

- Depositional environment – second and third order basins splaying off linear fault-controlled half-graben basins. Higher-order basins typified by rapid facies and thickness changes.
- Syn-sedimentary faults localise sulphide deposition. Slump breccia and fan conglomerates typically occur close to these faults.
- Hosted in carbonaceous shale, siltstone and cherty sediments. Minor conglomerates, turbidites, limestones and/or dolostones are common.
- Small volume volcanic successions present in basinal sequence.
- Mid-Proterozoic sequence age.

MVT and Irish Style

- Basin margin faults.
- Syn-sedimentary faults.
- Hosted in non-argillaceous carbonates – typically the lowest such unit in the sequence.

Target Areas – Uranium

The regional and more recent detailed airborne magnetic and radiometric datasets have been interpreted with the aim of identifying key architectural elements. In addition the radiometric layers have been interpreted to show various anomalies that may be associated with mineralisation, as follows:

- K anomalies – possible illite-kaolinite-dickite alteration cells,
- Th anomalies – possible Al phosphate alteration zones and associated thorium. This is unlikely to be reliable for the McArthur South projects given the propensity for lateritic regolith units typical of this region to scavenge thorium and throw false anomalies.
- U anomalies – possible direct fingerprint to mineralisation, may be displaced from source and again affected by the laterite scavenging issue.

Comparison of the architectural features and radiometric anomalies against bedrock was then completed to place these features in geological context and identify areas where anomalies coincide with preferred host sequences and favourable structural elements. On this basis a total of fourteen target areas for uranium mineralisation were identified. All targets are given a ranking from priority 1 to priority 3 on the basis of how many mineralisation criteria coincide with each target. Note that no specific target areas were defined upon EL25580. The radiometrics in this area did not reveal any obvious anomalies above background. Nonetheless fault intersections in and around the Siegal Volcanics in this area may still be of interest.

The fourteen target areas are listed on Table 1, with key criteria and ranking shown. The targets include six priority 1 target areas, five priority 2 target areas and three priority 3 target areas. The target areas are also shown diagrammatically on figures 1 and 2. Figures 3 and 4 show various radiometric anomalies that support the targeting layer. All layers used in these figures have been supplied in Mapinfo format together with this report.

Table 1. Target areas defined on the McArthur South project tenements.

Target	AMGE	AMGN	Structural_Complexity	K_Illite_Alt	Th_AP_Min	U_anom	Host_Sequence	Unconformity	Priority	Comments
MS001	660,800	8,115,700	Fault Intersections	Yes	Yes	No	KRG, Tawallah Group	Yes	One	
MS002	663,200	8,116,200	Fault Duplex	Yes	Yes	No	KRG, Tawallah Group	Yes	Two	
MS003	664,200	8,112,600	Fault Intersections	Yes	Yes	No	Mafic Volcanics (McArthur Group)	Yes	One	
MS004	682,400	8,092,300	Fault Intersections	No	Yes	No	Bukalara Sandstone	No	Three	Deep cover
MS005	682,900	8,089,200	Radiometric Anomaly	No	Yes	No	Bukalara Sandstone	No	Three	Deep cover
MS006	653,800	8,129,200	Thrust fault	Unknown	Unknown	Unknown	Masterton Sandstone	Yes	Two	Upper sequences
MS007	677,400	8,105,300	Fault Duplex	No	Yes	No	Bukalara Sandstone	Yes	Three	
MS008	670,000	8,112,200	Fault Intersections	No	Yes	No	KRG, Tawallah Group	Yes	Two	
MS009	709,000	8,080,000	Fault Intersections	No	No	Yes	Lower Tawallah Gp	Yes	Two	Neoprot cover
MS010	693,000	8,078,000	Fault Intersections	No	No	Yes	Lower Tawallah Gp	Yes	Two	Mesozoic cover
MS011	683,000	8,076,000	Fault Intersections	Yes	No	No	Lower Tawallah Gp	Yes	One	Mesozoic cover
MS012	665,000	8,083,000	Fault Intersections	No	No	No	Lower Tawallah Gp	Yes	One	Mesozoic cover
MS013	648,000	8,101,000	Fault Intersections	No	No	Yes	Lower Tawallah Gp	Yes	One	Neoprot cover
MS014	657,000	8,083,000	Fault Intersections	No	Yes	Yes	Lower Tawallah Gp	Yes	Two	Mesozoic cover

Target Areas – Base metals

Only brief consideration has been given to base metals target styles, focusing on sedex style and MVT-Irish style deposits. These target styles are not the focus of TEU exploration upon the projects and as such only very significant targets have been requested The key factors for locating base metals targets are appropriate host rocks of correct age and structural setting. Basin margin faults, growth faults and higher order basins showing associations with either graphitic rocks or carbonates are the most obvious features of interest. In the absence of NTGS quarter million scale maps of the tenement area no targets have yet been selected. It is suggested that the prominent Mesoproterozoic exposure (Tawallah and McArthur Groups) running NW-SE through the eastern half of the project area may be worth reviewing. In addition, earlier base metals exploration by Amoco and Kennecott located bitumen-rich and gas-rich units of the Barney Creek Formation and Coxco Dolomite at depth in the NW quarter of the project. This raises potential for Century-style mineralisation at depths below 300-500m from surface. However, base metals exploration in targeting upper Tawallah Group and McArthur Group rocks in the general project area has thus far proven unsuccessful.

Conclusions and Recommendations

A total of forteen target areas have been defined upon the McArthur South project tenements comprising six priority 1 targets, five priority 2 targets and three priority 3 targets. Each target has been ranked according to its geological setting and the mineralisation criteria developed from a literature review.

It is recommended that these targets be critically reviewed by TEU management prior to conducting field investigations on the most interesting target areas. Any priority 1 and 2 targets within the outcropping McArthur Basin sequences that survive review should be visited in the field to enable additional information to be collected so as to advance each target to its next logical decision point.

A suggested field-based follow-up program could include the following components:

- Traverse geological mapping to determine orientation and lithological data over areas of interest. Such work should aim to assess the potential host sequence and the nature of structures that affect it.
- Alteration mapping – while traversing target areas it is recommended that chip trays be utilised to collect samples of the bedrock for spectral analysis using an ASD machine. This process aims to map alteration mineralogy such as chlorite and clay species as a means of vectoring towards mineralisation. Collecting located bedrock samples at approximately 100-200m intervals along field traverses should be sufficient for a first-pass survey. In addition, field observations on alteration mineralogy, including distribution of tourmaline, should be completed. Approximately 50-60 grams of bedrock material should be collected at each site. These could be used after ASD analysis for a multi-element analysis using a 4-acid digest ICP-OES technique.
- A hand-held spectrometer should be employed during field traversing to gather information regarding radioactivity in the bedrock sequence. Sample spacing should be decided by TEU staff.
- Any interesting bedrock material (e.g. veins, gossan) should be rock chip sampled for later geochemical analysis. This should include assaying for base metals and gold.

For targets that lie beneath Neoproterozoic or younger cover field mapping is unlikely to prove useful. Further investigation of high priority targets via geophysical techniques prior to drilling may be more appropriate for these targets.

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Jones R.K. 2007. Independent Geologists Report. Section 4 Top End Uranium Limited, Prospectus

Thomas, M.D. and Wood, G., 2005. Geological significance of gravity anomalies in the area of McArthur River uranium deposit, Athabasca Basin, Saskatchewan; *in* Jefferson, C.W., and Delaney, G. , eds., EXTECH IV: Geology and Uranium EXploration TECHnology of the Proterozoic Athabasca Basin, Saskatchewan and Alberta: Geological Survey of Canada, Bulletin 588.

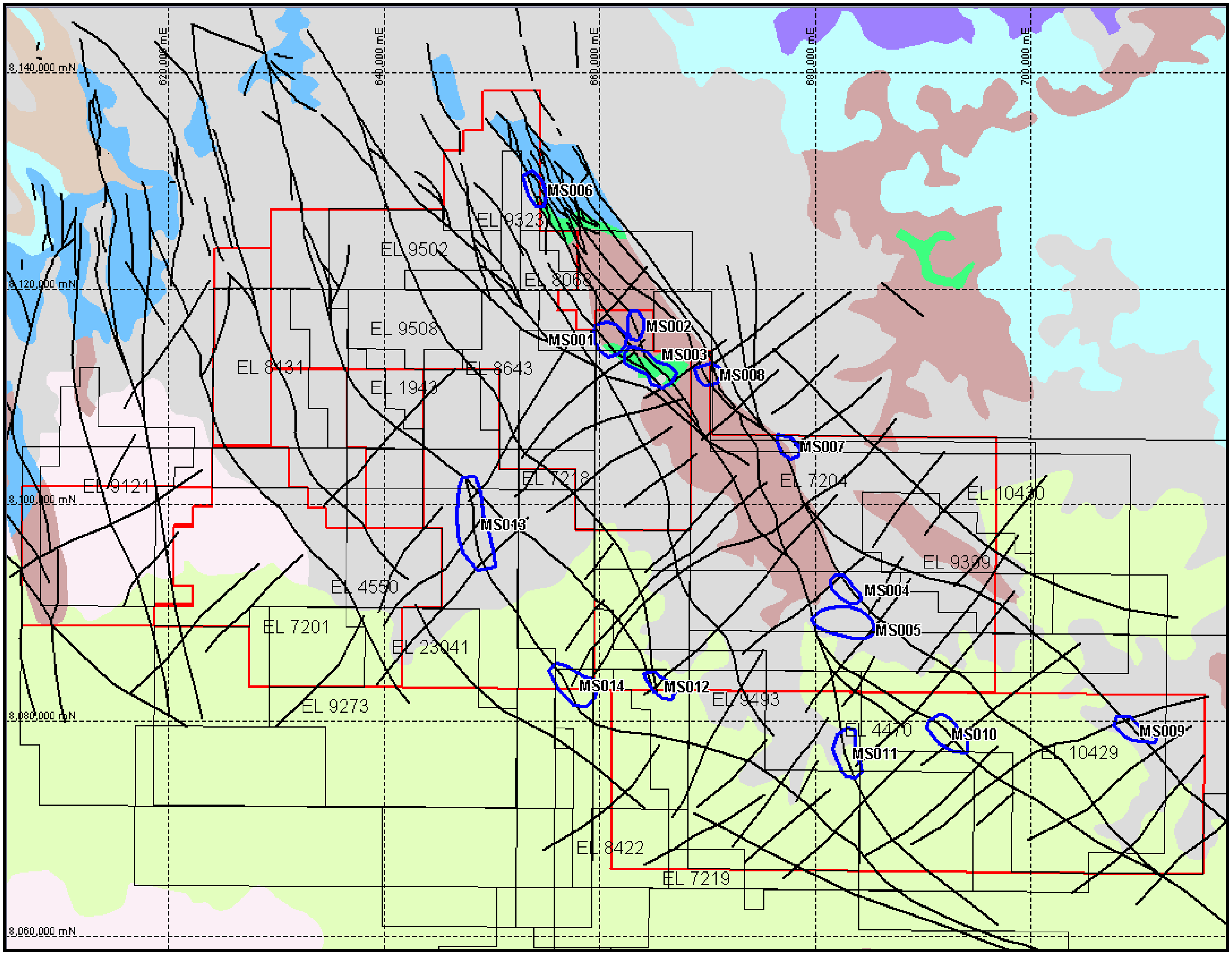

Figure 1. NTGS geological interpretation map showing distribution of targets in relation to main architectural elements discerned during the interpretation. Uranium targets in blue; base metals targets in red. See target description tables for details and ranking.

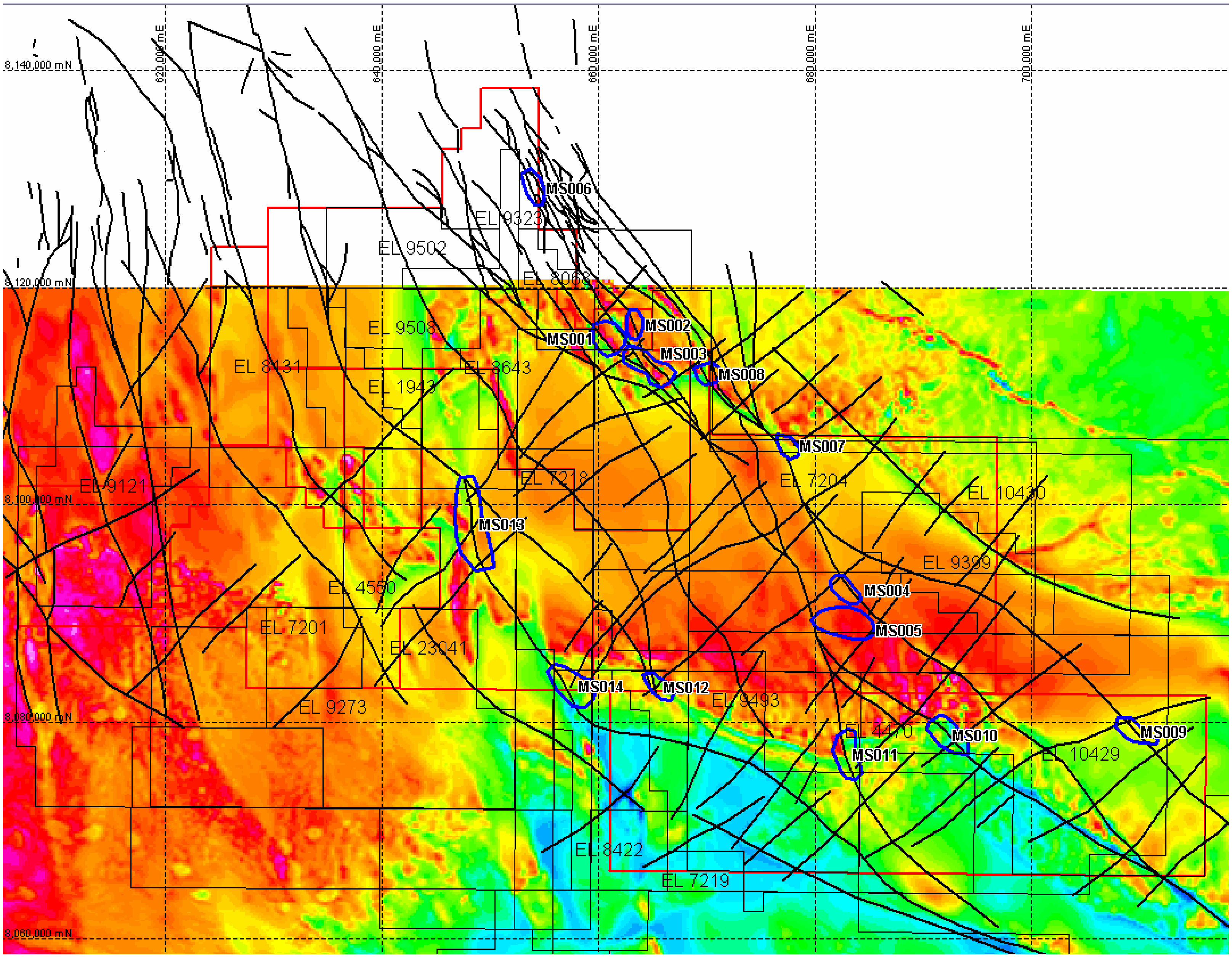

Figure 2. Target areas shown on airborne magnetics image.

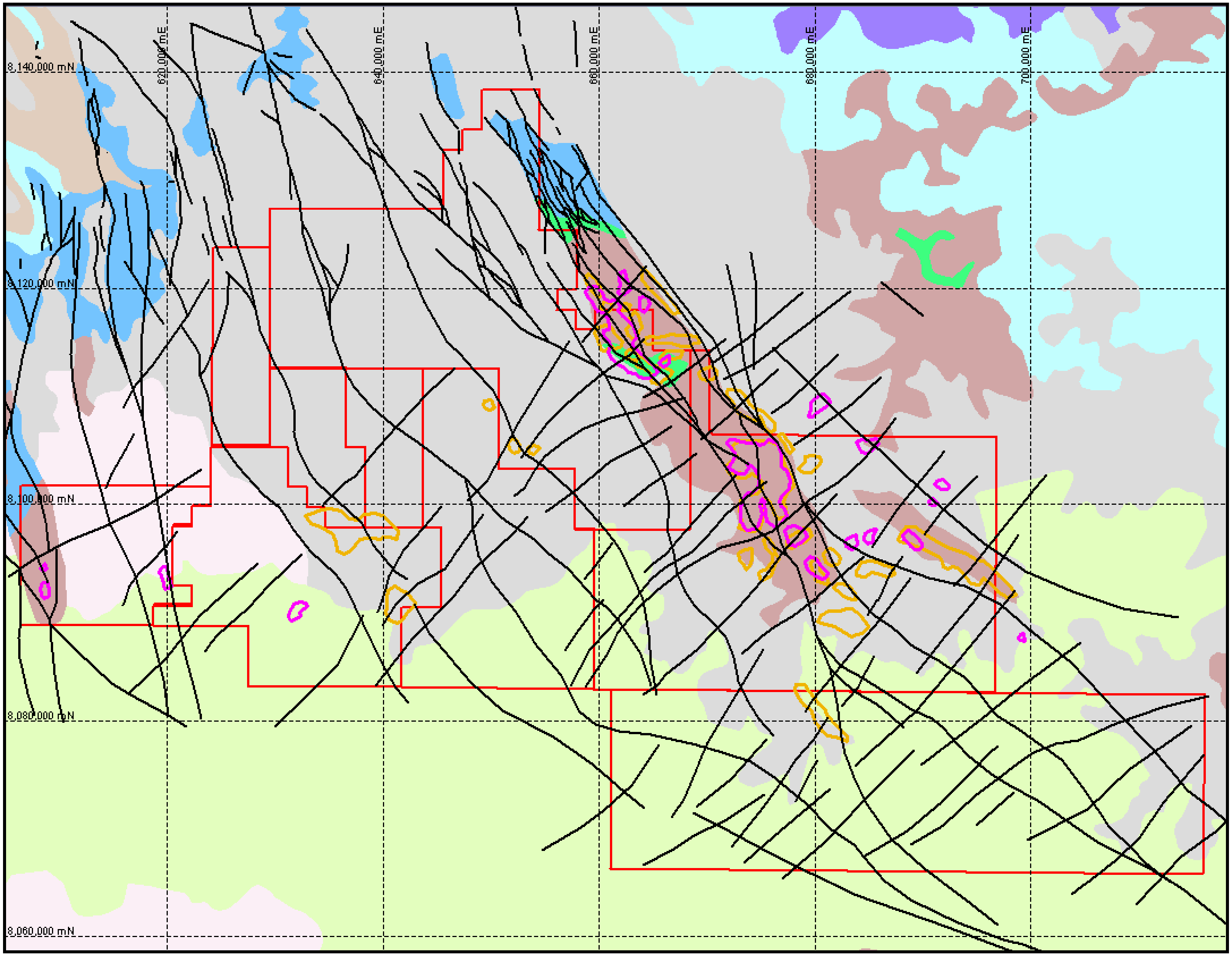

Figure 3. Radiometric anomalies on the NTGS geological interpretation. Tan is uranium; magenta is potassium.

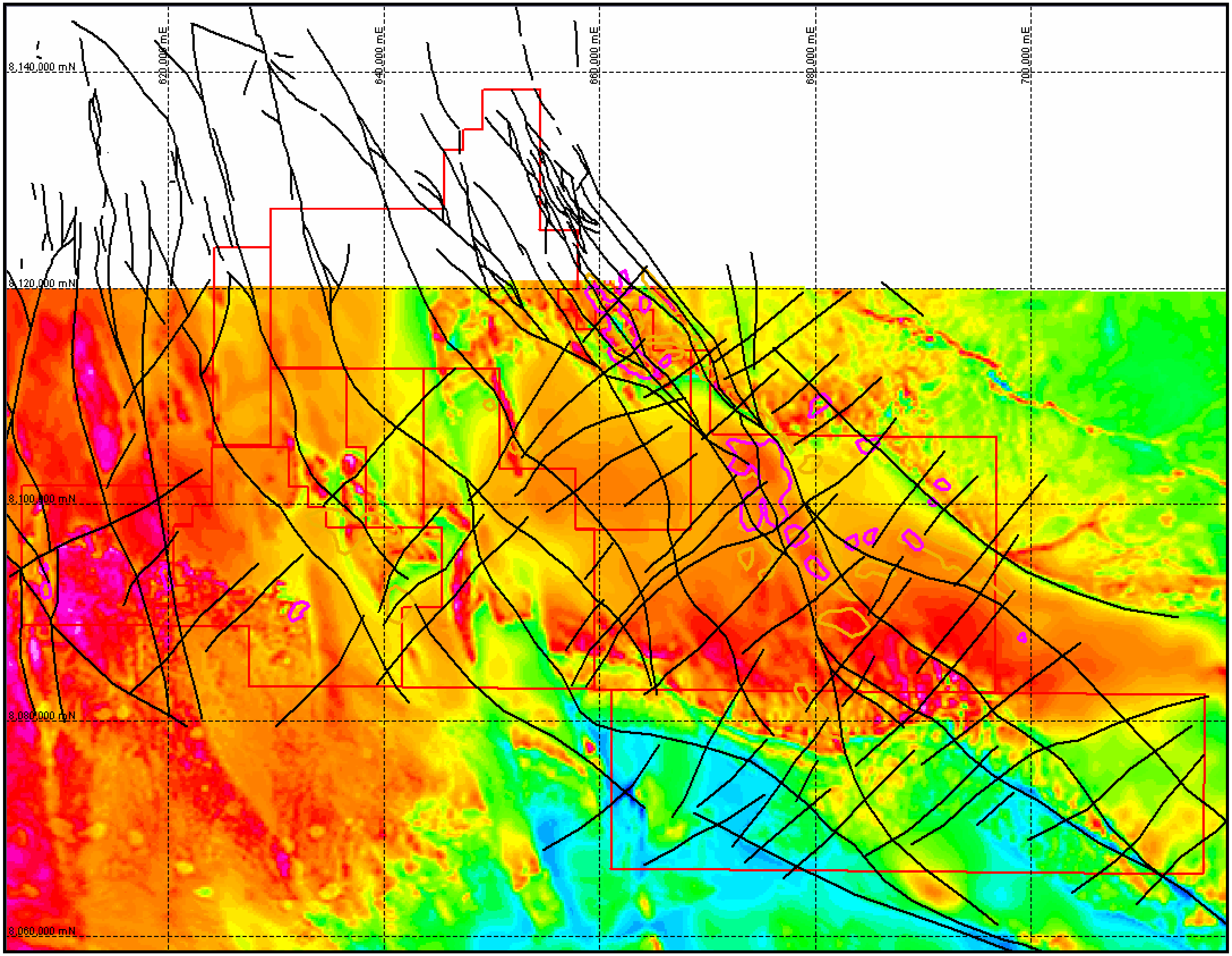

Figure 4. Radiometric anomalies shown on an image of the airborne magnetics data. Tan is uranium; magenta is potassium.