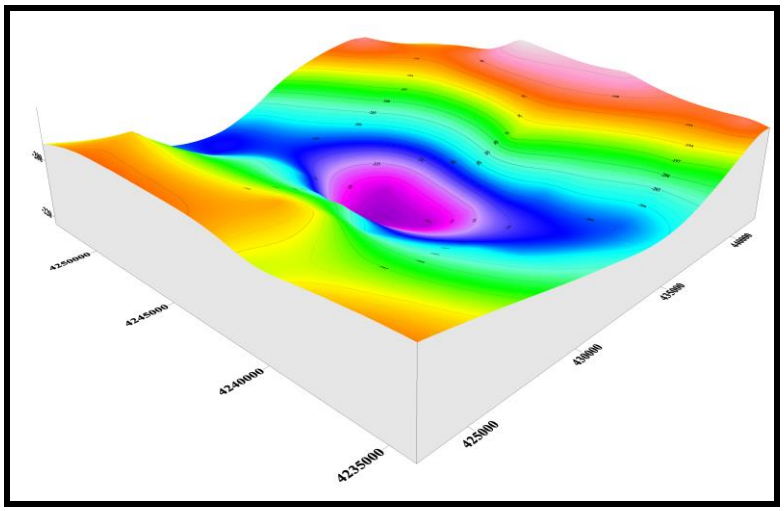
KIBBY BASIN PROPERTY
GEOPHYSICAL REVIEW
WORK PROPOSAL



CBA Gravity Looking Northeast

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INTRODUCTION

Public domain geophysical data are analyzed over the Kibby Basin property with the intent of providing an overview suitable to support subsequent exploration activities. In addition to geophysical data, geologic data are also integrated along with topographic data as both 7.5' quadrangle and digital elevation (DEM) products. The gravity data are extracted from the Great Basin Geoscience database developed by the UGSG and reported upon by Ponce (1997). Airborne magnetic data are a combination of three surveys flown between 1978 and 1985 by the USGS as part of the National Uranium Resources Evaluation (NURE) program and two subsequent detailed surveys termed the Cedar Mountains and Monte Cristo surveys.

The geophysical data are processed to produce the basic data types and interpreted to provide a structural-lithologic frame work. The interpretation integrates the geophysical, topographic and geologic data sets. Recommendations as to additional work are also set forth. All processed data types and interpretation products are provided in both the MAPINFO and ARCGIS GIS applications. The report and GIS files are located on a DVD at the rear of the report. A README file on the DVD explains the file / folder organization.

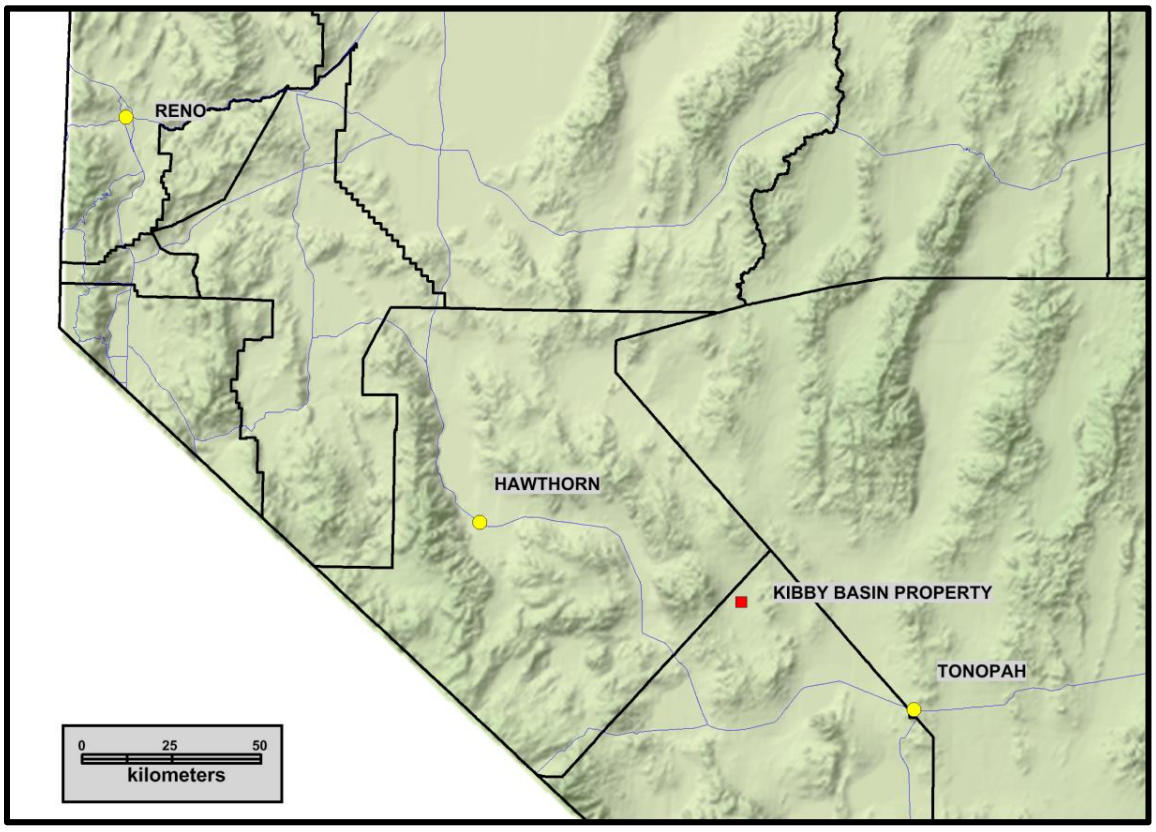

FIGURE 1: Kibby Basin Location over Nevada Topography, Counties and Main Highways

The Kibby Basin property is presented in Figure 1 along with county boundaries, towns and main roads in southwestern Nevada.

PRIMARY DATA SETS

Gravity:

Figure 2 presents the complete Bouguer anomaly of gravity at 2.50 g/cc over the topography. The current property position is shown as a black rectangle. A prominent gravity low, as expected, correlates with the basin center flanked by highs in the outcrop areas to the east and west. Average station spacing is variable but on the order of two kilometers with significant gaps. Such coverage is adequate for large scale analysis but completely inadequate for property scale work.

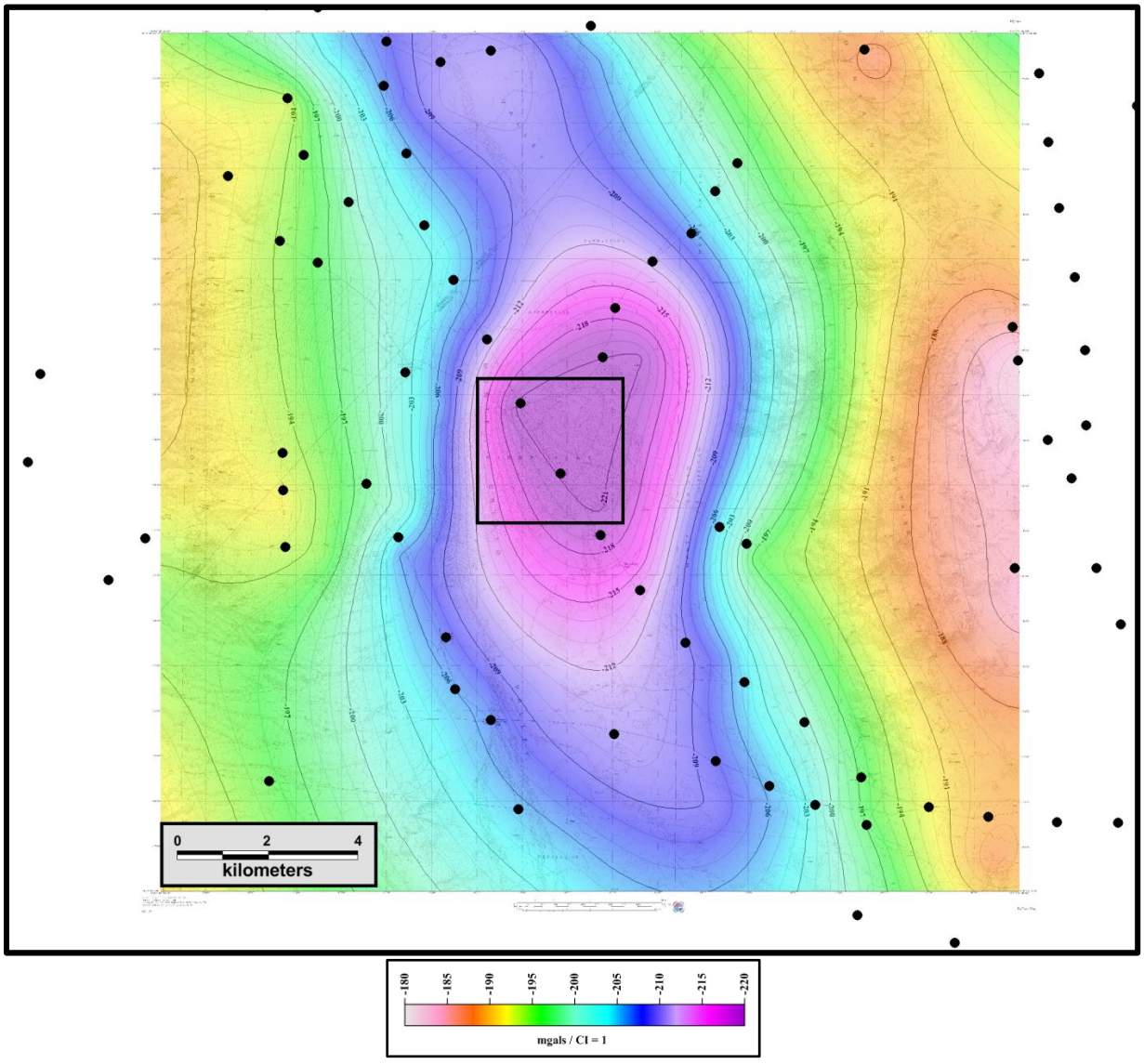

FIGURE 2: CBA Gravity @ 2.50 g/cc and Station Posting over Topography

Airborne Magnetic:

Figure 3 shows the mosaic of three surveys merged to form the airborne magnetic data base. The Cedar Mountains and Monte Cristo data were acquired on east-west and north-south lines respectively with a spacing 0.5 miles and using draping. The NURE data were acquired on one mile spaced lines with no draping. Clearly the Cedar Mountains and Monte Cristo data are of superior quality.

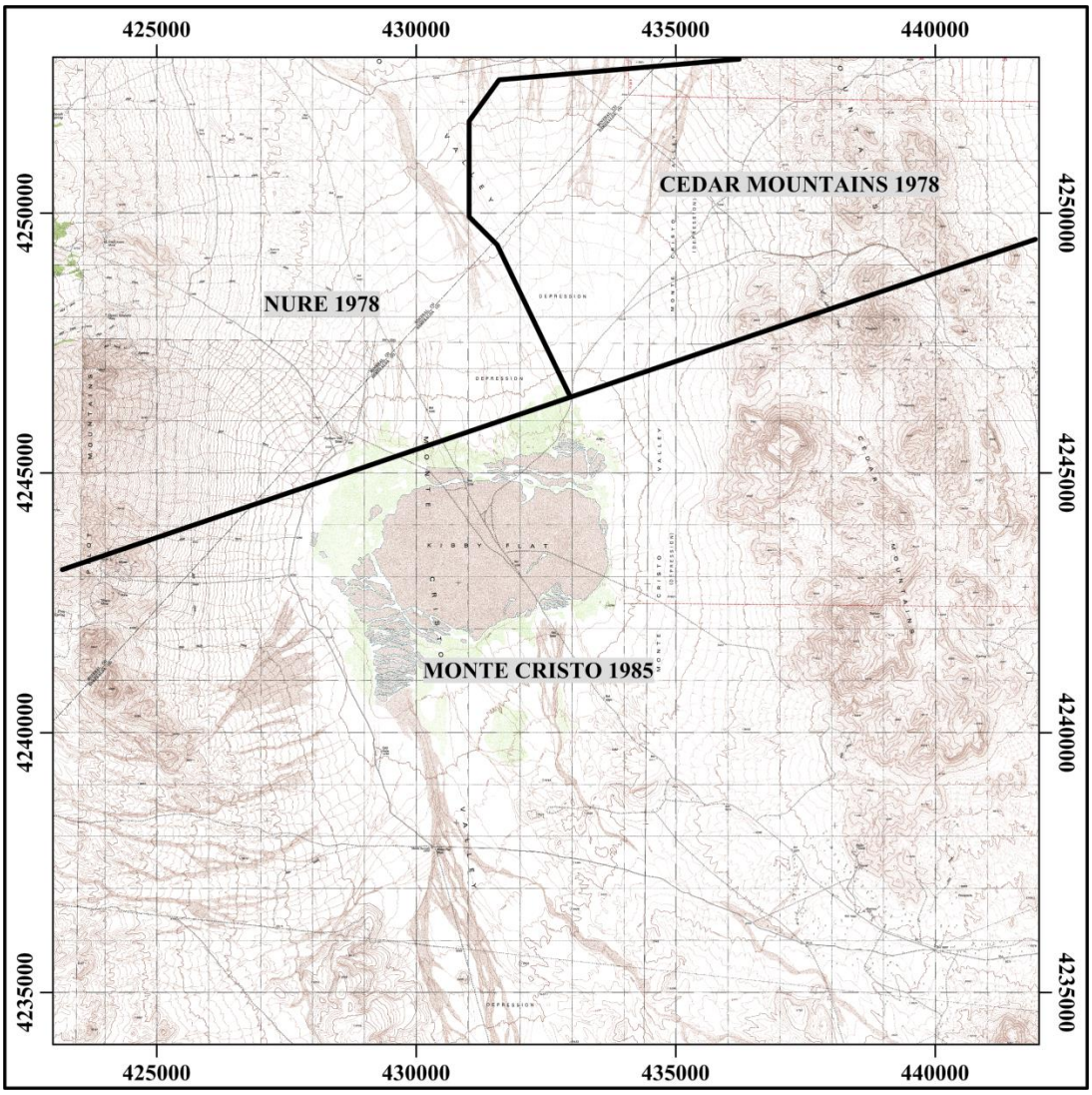

FIGURE 3: Magnetic Survey Coverage Index Map over Topography

The Monte Carlo data are the best quality, so were selected as the primary data set. Level shifting of the Cedar Mountains survey downward was required to match the Monte Carlo data. The NURE data were first level shifted, followed by a linear increase of 70 nT applied to the data from south to north. Finally, all three data sets were gridded and merged. A good merge is observed.

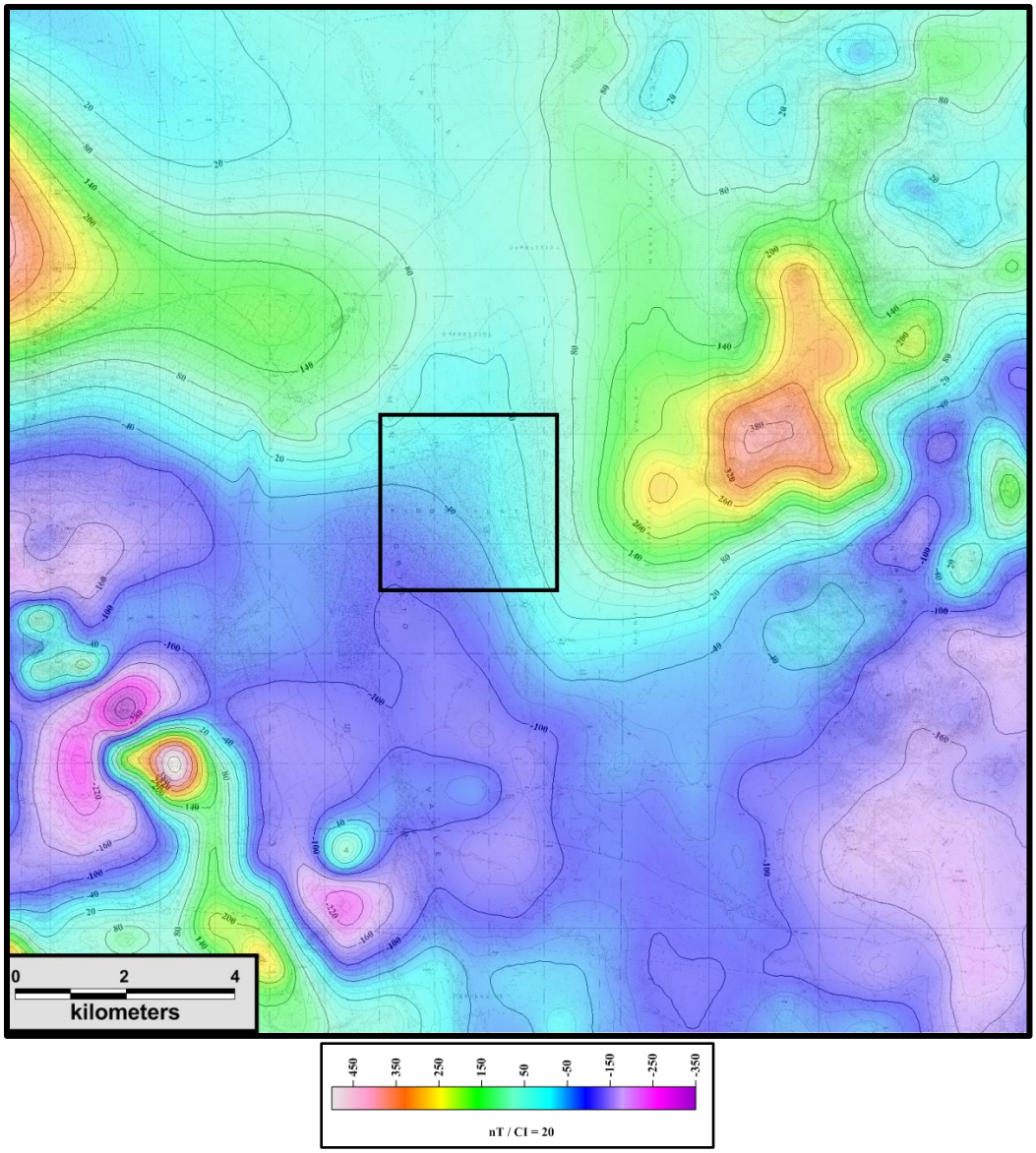

FIGURE 4: RTP Magnetics over Topography

Processing of the merged data included generation of the total magnetic intensity (TMI) grid, which was then reduced-to-pole (RTP) with a USGS algorithm. Figure 4 presents the RTP image over topography. The Kibby Basin property is depicted with a black rectangle. The basin is revealed as a gap in the band of east-west elevated magnetic values.

Geology:

Geology over the property and surrounding area is covered by Ferguson et. al (1953) in the Coaldale 15' quadrangle geologic map. Figure 5 presents the portion of the geologic map covering the property and geophysical data sets. Three rock units are labeled on the map: **Ji** – Jurassic intrusions, **Tol** – older volcanics and **QTb** – young basalt units.

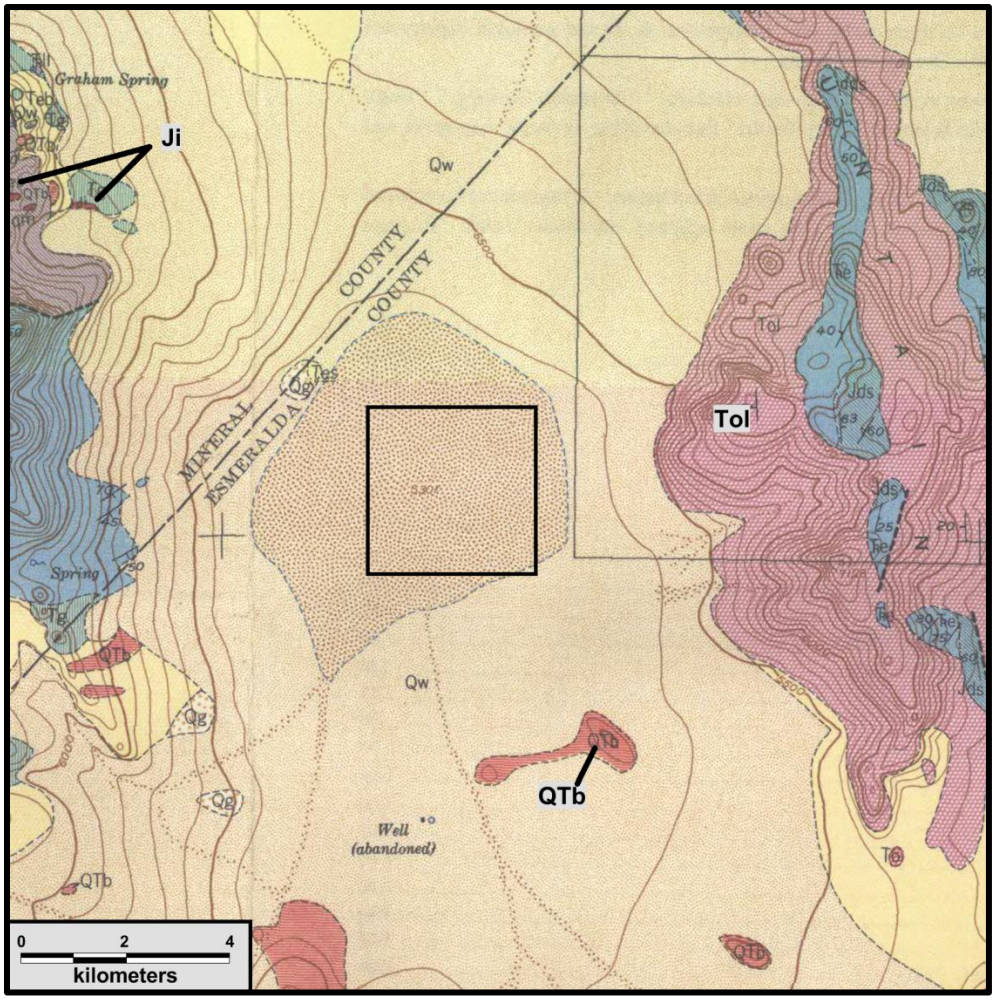

FIGURE 5: Coaldale 15' Quadrangle Geologic Map

INTERPRETATION

An interpretation is presented over the gravity and airborne magnetics in Figures 6 and 7 respectively. Structures are depicted with dashed lines with line width indicating magnitude. Sense of movement is indicated with either arrows or up down labels. Interpreted outlines of the **Ji** and **Tol** are denoted with colored polygons. Finally, mapped outcrop of the **QTb** are depicted with brown hatched polygons.

Examination of the gravity reveals a distinctive pattern to the basin. That is, the northern portion trends northwest-southeast with a relatively shallow amount of basin fill. The central portion of the basin rotates to north-south and deepens considerably; finally, the southern portion of the basin shallows and returns to a northwest-southeast orientation. Hunsaker (2016) notes the complex structure evolution of the area with supporting references to Hardyman et. al. (1990), Oldow (2003) and Oldow et. al. (2009). This complex basin geometry can be accounted for by a left lateral shear couple as depicted with the two west-northwest directed structures labeled with sense of displacement arrows. These structures bound the north and south edges of the central

basin. Between the two lateral displacement structures is a zone of extension typified by at least four high angle normal faults oriented approximately north-northeast. High angle normal displacement along these structures is interpreted to have formed the main central basin. Such fault geometry is indicative of an overall trans tensional environment and termed a pull-apart basin. Figure 8 shows a three dimensional block diagram of such a basin's formation.

A large area of **QTb** is mapped within the basin near the southern lateral fault. The occurrence of a large area of **QTb** within the basin indicates additional **QTb** could well be encased with the basin fill and possibly play a role in ponding and/or controlling the distribution of lithium brines.

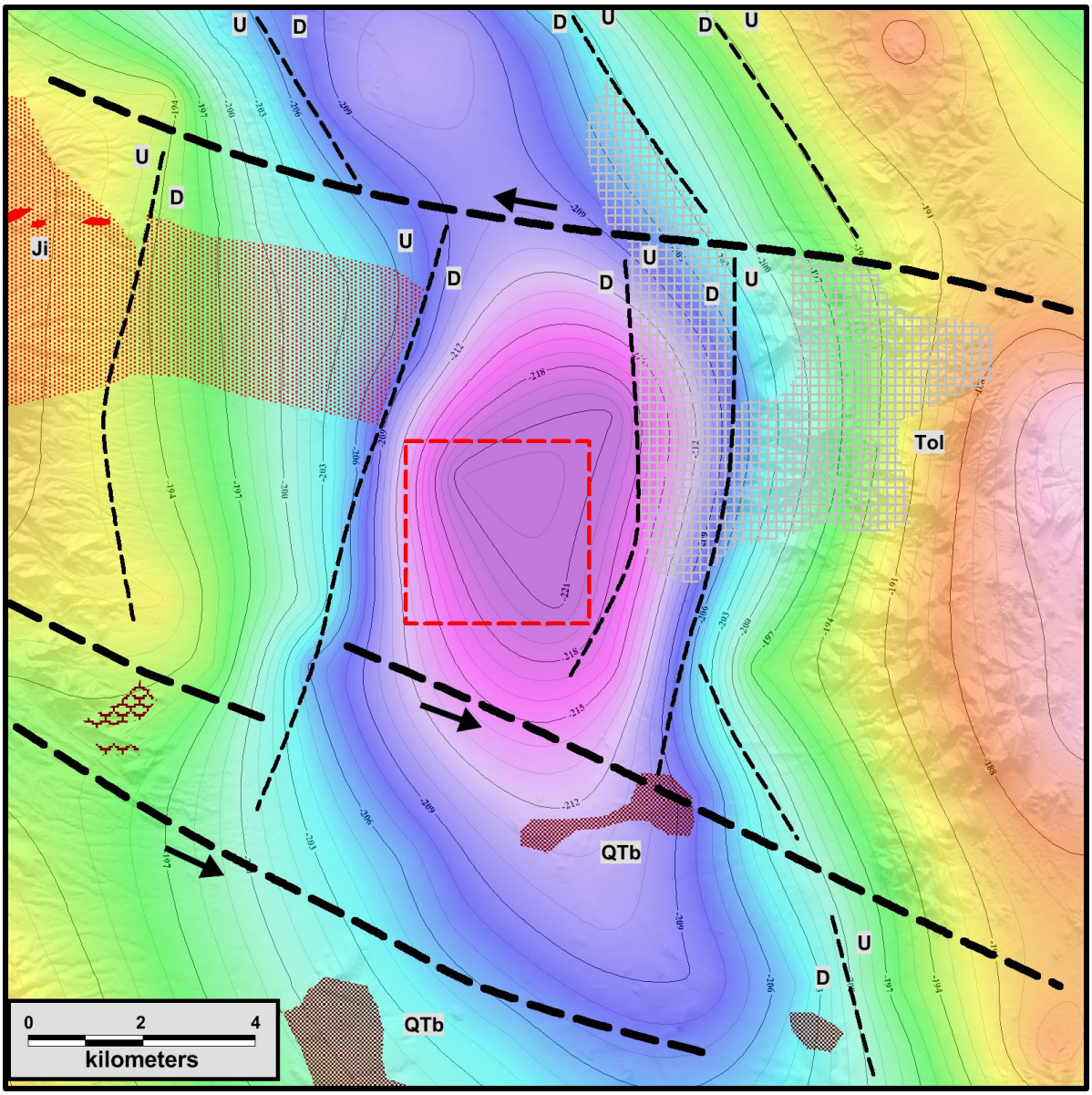

FIGURE 6: CBA Gravity overlain by Interpretation

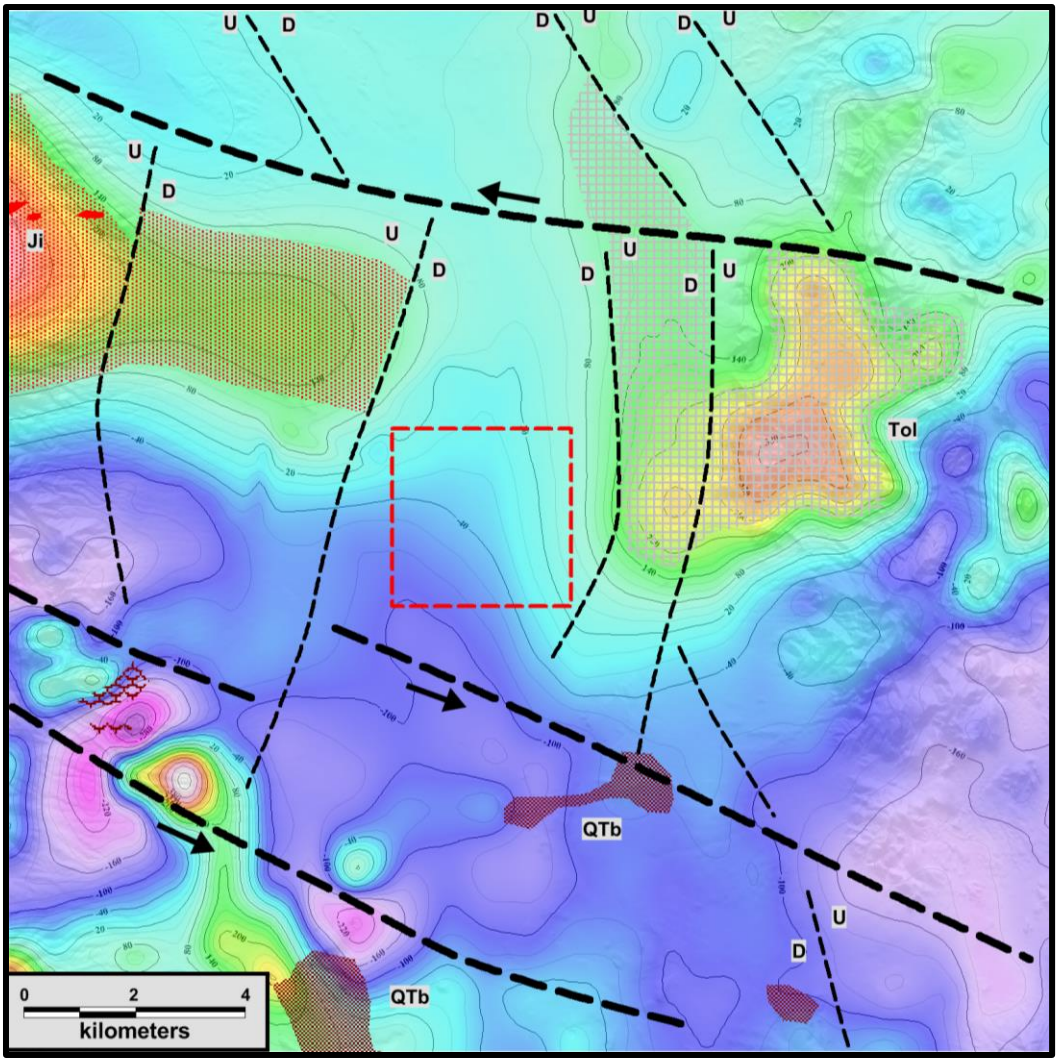

FIGURE 7: RTP Magnetics overlain by Interpretation

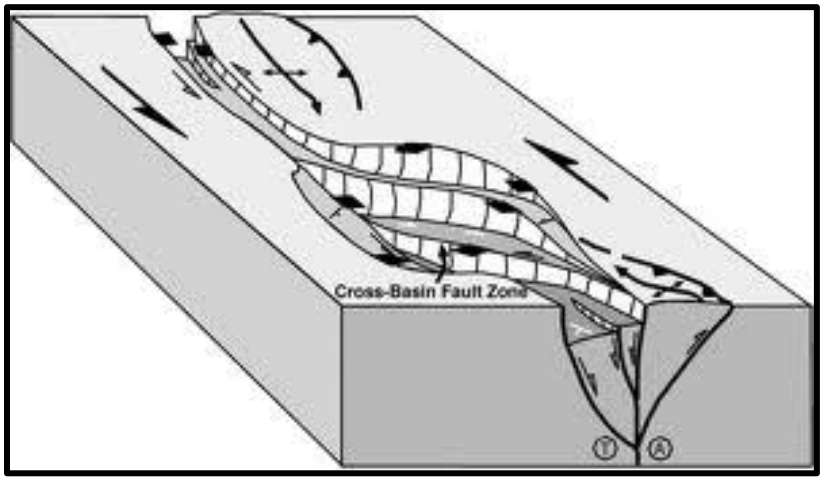

FIGURE 8: Example of Left Lateral Pull-apart Basin.

The RTP magnetics are presented in Figure 7 overlain by the interpretation. Prominent magnetic highs correlate with the **Ji** and **Tol** rock units. As noted by Albers and Stewart (1972), large bodies of Jurassic intrusions occur in this portion of Nevada as eastern outliers to the main Sierra Nevada batholith. Depicted on the figures is an interpreted distribution of the **Ji** based upon the magnetics. A large extension to the east and south from the small outcrops is interpreted, which is down faulted into the basin by two of the north-south directed normal faults. On the east side of the main basin, a large area of **Tol** is mapped which correlates relatively well with strong magnetic values. An interpreted distribution based on the magnetics is depicted a defined with a square hatched polygon. As with the **Ji** to the west, the **Tol** is also down faulted into the basin. Based upon this interpretation, it is reasonable to infer the **Ji** and **Tol**; plus lesser contributions from the Dunlap, Luning, and Excelsior formations form the bottom of the basin. Filling the basin would be the less dense Esmeralda formation (**Te**) and Quaternary material including gravels and playa deposits. As noted previously, bodies of **QTb** could well be found within the gravel fill.

SUMMARY AND WORK PROPOSAL

The interpretation indicates a genetic model for the central basin in which north-northeast directed normal faults accommodates left lateral extension by forming a pull-apart basin. These normal faults form the east and west boundaries to Kibby Basin. Furthermore, the genetic model suggests additional normal faults should be present forming a number of steps down into the basin on both the east and west sides. Clearly, a strong density contrast exists between basement rocks (i.e. **Ji, Tol**, etc.) and the basin fill (i.e. **Te, Qal**). A detailed gravity survey is recommended to map the central basin in sufficient detail so as to permit generation of a three dimensional model of the basin fill.

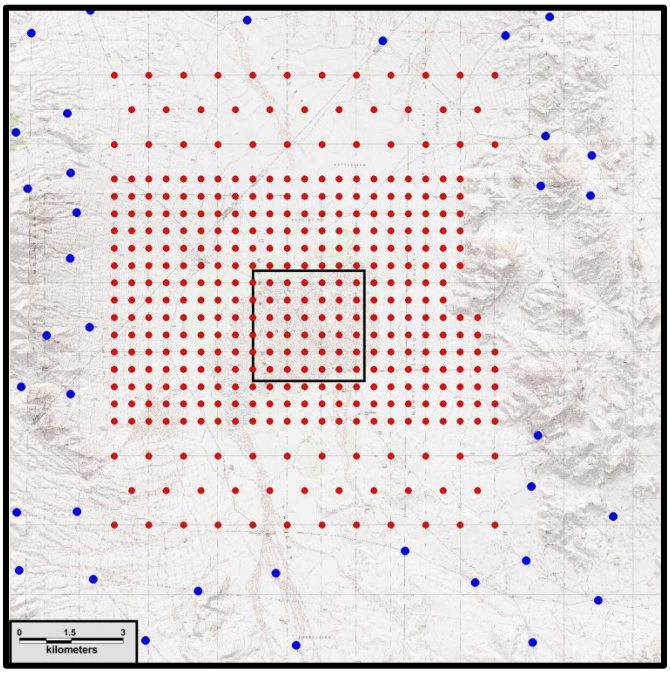

FIGURE 9: Proposed Gravity Stations over Topography

Figure 9 shows proposed gravity stations over topography. A total of 433 stations are involved. These include 500 m square grid coverage over the central basin and property flanked to the north and south by1000 m staggered grid coverage. Further afield are regional stations shown in blue along available roads. Regional stations are required to determine the large scale trend in which the detailed coverage sits. The regional stations are provision pending a review of the public domain USGS data, which could replace some of the stations. Once the gravity data are acquired, a three dimension of the Kibby Basin will be constructed.

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