



**CSA Global**  
Mining Industry Consultants

## NI 43-101 Technical Report

## DASA Uranium Project, Central Niger

For  
**Global Atomic Fuels  
Corporation**

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Client Name	Global Atomic Fuels Corporation
Project Name/Job Code	DASA-U Uranium Deposit, NI 43-101 Report GAFNIR01
Contact Name	George Flach
Contact Title	Vice President of Exploration
Office Address	8 King Street West, Suite 1700, Toronto, Ontario, M5C1R5, Canada

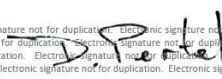

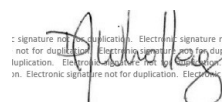

### Report issued by

CSA Global Office	CSA Global Pty Ltd Suite 501, 365 Bay Street Toronto, Ontario M5H 2V1 Canada  T +1 416 368 7041 E csaaus@csaglobal.com
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### Author and Reviewer Signatures

Author	Dmitry Pertel	Signature:	 Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication.
Co-Author	Maxim Sereдкин	Signature:	 Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication.
Peer Reviewer	Daniel Wholley	Signature:	 Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication.
CSA Global Authorization	Aaron Meakin Manager – Resources	Signature:	 Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication. Electronic signature not for duplication.

# Contents

Report prepared for.....	II
Report issued by .....	II
Report information .....	II
Author and Reviewer Signatures .....	II
<b>1 SUMMARY.....</b>	<b>8</b>
1.1 Executive Summary .....	8
1.2 Conclusions.....	9
1.3 Recommendations.....	9
1.4 Technical Summary.....	10
1.4.1 Property Description and Location.....	10
1.4.2 Land Tenure.....	10
1.4.3 <i>Existing Infrastructure</i> .....	10
1.4.4 History .....	10
1.4.5 Geology and Mineralization .....	11
1.4.6 Exploration Status .....	11
1.4.7 Mineral Resources.....	12
<b>2 INTRODUCTION .....</b>	<b>13</b>
2.1 Issuer .....	13
2.2 Terms of Reference .....	13
2.3 Qualified Person Property Inspection.....	13
2.4 Sources of Information .....	13
<b>3 RELIANCE ON OTHER EXPERTS.....</b>	<b>15</b>
<b>4 PROPERTY DESCRIPTION AND LOCATION .....</b>	<b>16</b>
4.1 Location of Property .....	16
4.2 Mineral Tenure .....	16
<b>5 PROPERTY DESCRIPTION AND LOCATION .....</b>	<b>19</b>
5.1 Accessibility .....	19
5.2 Climate.....	20
5.3 Physiography .....	20
5.4 Local Resources and Infrastructure .....	21
<b>6 HISTORY .....</b>	<b>23</b>
6.1 Introduction.....	23
6.2 Regional exploration by the French Nuclear Energy Commission- 1957 to 1981 .....	23
6.3 Regional Exploration by PNC and ONAREM-1981 to 1990 .....	24
6.4 Exploration activity from 2007 onwards .....	24
6.5 Previous Mineral Resource Estimation.....	25
6.6 Production from the Property .....	25
<b>7 GEOLOGICAL SETTING AND MINERALISATION .....</b>	<b>26</b>
7.1 Introduction.....	26
7.2 Regional Geology .....	26
7.3 Structural setting .....	30
7.4 Property Geology.....	32
7.5 Structural Geology of the Property .....	43
7.6 Uranium Mineralization.....	44

<b>8</b>	<b>DEPOSIT TYPE .....</b>	<b>47</b>
<b>9</b>	<b>EXPLORATION .....</b>	<b>51</b>
9.1	Data compilation and old drill holes location .....	51
9.2	Radiometric ground survey and geo-structural mapping .....	52
9.3	Topographic survey .....	54
9.3.1	Ground control .....	54
9.3.2	Aerial Survey .....	54
<b>10</b>	<b>DRILLING .....</b>	<b>56</b>
10.1	Geological Exploratory Drilling .....	56
10.1.1	Drilling procedures .....	57
10.1.2	Drilling monitoring .....	58
10.2	Down-hole survey .....	59
10.2.1	GR Logging .....	59
10.2.2	Downhole Survey .....	61
10.2.3	Drill hole Diameter Measurements (“CL”) .....	61
10.2.4	PFN Logging .....	61
10.3	Rotary chips and core logging .....	61
10.4	Sampling .....	65
<b>11</b>	<b>SAMPLE PREPARATION, ANALYSES AND SECURITY .....</b>	<b>67</b>
11.1	Sample Preparation and Analyses .....	67
11.2	Specific Gravity Data .....	67
11.3	Quality Assurance and Quality Control Programs .....	68
11.4	Radioactive Equilibrium Factor (REF) .....	71
11.5	CSA Global Comments .....	73
<b>12</b>	<b>DATA VERIFICATION .....</b>	<b>74</b>
<b>13</b>	<b>MINERAL PROCESSING AND METALLURGICAL TESTING .....</b>	<b>75</b>
13.1	Comminution .....	75
13.2	Leaching .....	76
13.3	Solid-Liquid separation .....	77
13.4	Solvent Extraction and Ion Exchange .....	77
13.5	Uranium Precipitation .....	77
13.6	Tailings characterization .....	78
13.7	Metallurgical Testing — Conclusion and Recommendations .....	78
<b>14</b>	<b>MINERAL RESOURCE ESTIMATES .....</b>	<b>79</b>
14.1	Software Used .....	79
14.2	Database Compilation .....	79
14.3	Data Validation .....	79
14.4	Exploratory Data Analysis – Statistical Analysis .....	80
14.5	Interpretation of Mineralized Bodies .....	82
14.6	Wireframing .....	86
14.7	Drill hole Data Selection and Compositing .....	86
14.8	Transformation of Coordinates and Unfolding .....	87
14.9	Geostatistical Analysis .....	87
14.10	Block Modelling .....	90
14.11	Grade Interpolation .....	90
14.12	Density Values .....	91



14.13	Mineral Resource Classification Strategy .....	91
14.14	Block Model Validation.....	92
14.15	Mineral Resource Report.....	96
<b>15</b>	<b>MINERAL RESERVE ESTIMATES .....</b>	<b>102</b>
<b>16</b>	<b>MINING METHODS .....</b>	<b>103</b>
<b>17</b>	<b>RECOVERY METHODS .....</b>	<b>104</b>
<b>18</b>	<b>PROJECT INFRASTRUCTURE .....</b>	<b>105</b>
<b>19</b>	<b>MARKET STUDIES AND CONTRACTS .....</b>	<b>106</b>
<b>20</b>	<b>ENVIRONMENTAL STUDIES, PERMITTING AND SOCIAL OR COMMUNITY IMPACT .....</b>	<b>108</b>
<b>21</b>	<b>CAPITAL AND OPERATING COSTS .....</b>	<b>109</b>
<b>22</b>	<b>ECONOMIC ANALYSIS .....</b>	<b>110</b>
<b>23</b>	<b>ADJACENT PROPERTIES .....</b>	<b>111</b>
<b>24</b>	<b>OTHER RELEVANT DATA AND INFORMATION .....</b>	<b>113</b>
<b>25</b>	<b>INTERPRETATION AND CONCLUSIONS.....</b>	<b>114</b>
<b>26</b>	<b>RECOMMENDATIONS .....</b>	<b>116</b>
<b>27</b>	<b>REFERENCES .....</b>	<b>118</b>
<b>28</b>	<b>DATES AND SIGNATURES - CERTIFICATES OF QUALIFIED PERSONS .....</b>	<b>120</b>

## Figures

Figure 4-1:	Location Plan of the exploration project of the Global Atomic Fuels Corporation.....	16
Figure 4-2:	Adrar Emoles 3 and 4 Exploration Permits and location of the DASA deposit .....	17
Figure 5-1:	Road N25, just north of Agadez .....	19
Figure 5-2:	Global’s Dajy exploration camp .....	20
Figure 5-3:	Typical terrain at DASA project area .....	21
Figure 7-1:	Regional Geology map after F. Julia printed by BRGM in 1963 at 1:500,000 .....	27
Figure 7-2:	Major structures in the Tim Mersoï Basin, shaping it in a succession of ridges and basins. ..	28
Figure 7-3:	Stratigraphic column of the Series and Formations in the southern part of the Tim Mersoï Basin and including the GAFC property .....	29
Figure 7-4:	NW-SE profile in the Arlit area, see A-B cut on above (modified Cominak document, 1989, Gerbaud, 2006). .....	30
Figure 7-5:	Stratigraphic column of the ASA project area.....	33
Figure 7-6:	DASA structural map .....	34
Figure 7-7:	DASA schematic geological section.....	35
Figure 7-8:	Cross-beds in coarse grained to micro-conglomeratic sandstone, Tchirezrine 1 Formation..	39
Figure 7-9:	Massive analcimolite, Abinky Formation .....	39
Figure 7-10:	Tchirezrine 1 sandstone covered in the foreground by analcimolite of the Abinky Formation .....	40
Figure 7-11:	Cross-bed figures in the Tchirezrine 2, Northern outcrops at DASA.....	40
Figure 7-12:	North-South structures in sandstone, Tchirezrine 2 unit, Eastern outcrops DASA.....	40
Figure 7-13:	Siltstone outcrop, Assaouas Formation, Southern outcrops .....	41
Figure 7-14:	Irhazer Formation, Limestone strata within argillite, crosscut by E-W transform faults , North-Eastern outcrops.....	41
Figure 7-15:	Heavily quartz veined Tegama sandstone; mount inside the Assouza Graben .....	42
Figure 7-16:	Conjugate fracture veined in quartz in coarse cross-bed Tegama sandstone .....	42

Figure 7-17: Looking SW, Asouza Graben: Cretaceous Tegama sandstones in the foreground, resting on several hundred meters of Cretaceous Irhazer Formation to the left with Jurassic Tchirezrine 2 sandstone in the background. Displacement is in the order of several hundred meters .....	44
Figure 7-18: Uranium mineralization controlled by zones of formation of oxidation .....	45
Figure 8-1: Most important Uranium deposits of the Tim Merso Basin, Niger .....	48
Figure 9-1: Radiometric sampling points .....	53
Figure 10-1: DASA drill holes location map .....	57
Figure 10-2: Diamond core photogrpah example .....	59
Figure 10-3: GAFC data collect and handling system / CAE Mining FUSION .....	62
Figure 11-1: Average Density determination from core samples .....	68
Figure 11-2: Comparison of the ordinary samples and duplicates for the DASA project.....	70
Figure 11-3: Comparison of grade-thickness $eU_3O_8$ defined by gamma logging and grade-thickness $U_3O_8$ defined by assays.....	72
Figure 11-4: Distribution of REF in mineralised intervals.....	73
Figure 14-1: Log histogram for unrestricted uranium grades.....	81
Figure 14-2: Log histogram for uranium grades within mineralised envelopes .....	81
Figure 14-3: Schematic example of -interpretation of the DASA deposit – Section 360100mE.....	84
Figure 14-4: Plan view of 100ppm interpreted wire frames.....	85
Figure 14-5: Oblique view of the wireframed uranium mineralized envelopes and fault planes for the DASA deposit (looking northwest) .....	86
Figure 14-6: The Principal of Unfolding/Flattening.....	87
Figure 14-7: Downhole absolute semivariogram model for uranium.....	88
Figure 14-8: Semivariogram map (plan view) .....	89
Figure 14-9: Relative semivariogram models for uranium (three main directions).....	89
Figure 14-10: Resource Classification Strategy, Section 360100mE .....	92
Figure 14-11: Swath plot for 50m Easting sections.....	94
Figure 14-12: Swath plot for 50m Northing sections .....	94
Figure 14-13: Swath plot for 20m flitches.....	95
Figure 14-14: Plan showing extent of 1200ppm blocks .....	97
Figure 14-15: Grade tonnage curve for block model. ....	101
Figure 19-1: UxC $U_3O_8$ Historical Uranium Prices.....	106
Figure 19-2: SNL consensus pricing forecast.....	107
Figure 23-1: Location of the Tin Negouran Uranium Permits .....	111

## Tables

Table 1-1: DASA Mineral Resources as at 1 January 2017 .....	9
Table 4-1: Adrar Emoles 3 and 4 Exploration Permits .....	18
Table 6-1: Mineral Resource Statement*, DASA Uranium Project, Republic of Niger, SRK Consulting (Canada) Inc., September 20, 2013 Category .....	25
Table 9-1: PNC significant drillholes.....	51
Table 9-2: First rock samples of DASA area.....	52
Table 10-1: GAFC DASA project drilling statistics (21/05/2015 statement).....	56
Table 10-2: gamma-ray probes parameters.....	60
Table 10-3: Codes of geological formations.....	64
Table 10-4: Codes of colour .....	64
Table 10-5: Codes of sediments / rocks .....	64
Table 10-6: Codes of alteration and mineralisation.....	65



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Table 11-1: Comparison of ordinary assays of certified reference material samples with passport parameters .....	69
Table 14-1: Summary of Supplied Data.....	79
Table 14-2: Classical Statistics for uranium grades (weighted on length) .....	82
Table 14-3: Number of Interpreted Wireframes at the DASA Deposit .....	86
Table 14-4: Semivariogram Characteristics.....	89
Table 14-5: Block Model Characteristics .....	90
Table 14-6: Interpolation Parameters.....	91
Table 14-7: Comparison of Grades between Ordinary Kriging and IDW Method.....	93
Table 14-8: Conceptual cost analysis .....	98
Table 14-9: DASA Mineral Resources as at 1 January 2017 .....	99
Table 14-10: DASA Grade-tonnage summary (base case cut-off highlighted yellow) .....	100
Table 26-1: Summary budget for next step programmes to complete PEA .....	117

# 1 Summary

## 1.1 Executive Summary

In February 2017, CSA Global Pty Ltd (“CSA Global”) was commissioned by Global Atomic Fuels Corporation (“GAFC”) to estimate a Mineral Resource and prepare a NI 43-101 Technical Report for the DASA uranium deposit, located in the central part of the Republic of Niger, West Africa. The DASA project is 100% owned by GAFC and forms part of a larger package of projects in Niger in which GAFC has an interest.

The estimate and report were commissioned by GAFC to support the continued development of the project and fundraising activities. It is understood that this may include listing the company on the Toronto Stock Exchange and as such this document could be published and available to third parties or the general public.

This report contains information on all main phases and stages of the work to model and estimate the deposit’s Mineral Resources and results of quality assurance / quality control (QA/QC) analysis. At this time, more detailed studies of the project in terms of mining or project economics has not been undertaken.

Dmitry Pertel, Principal Geologist for CSA Global, visited the DASA project area in March-April 2017 at the request of GAFC. The purpose of the visit was to examine resource definition drilling practices used at DASA, collect QA/QC data, and to inspect the sample preparation laboratory in Niamey.

Review and analysis of both the historical and recent QA/QC data, procedures and protocols indicate that the quality of data is acceptable to allow Mineral Resources to be reported in accordance with the CIM guidelines. The risk associated with the quality of the data is believed to be low.

The recent exploration programmes at the deposit were run by the GAFC exploration team. GAFC provided CSA Global with all exploration results completed to date. The databases included drill hole collar coordinates, lithological codes and analytical information for uranium. Most of uranium grades were calculated from the gamma-logging results. The topographic surface was also provided in form of digital terrain models (DTMs).

Geological interpretation and wireframing were completed by CSA Global. It included interpretation of the main mineralized bodies based on a nominal cut-off grade of 100 ppm  $U_3O_8$ , and of the main faults that control mineralized bodies. Closed wireframe models were generated for each modelled mineralized body.

The Ordinary Kriging (OK) method was chosen to interpolate uranium grades into a block model. A dry bulk density value of 2.36 t/m<sup>3</sup> was calculated following exploration programmes and directly assigned to the model.

The Mineral Resources have been classified and reported in accordance with the CIM guidelines. Mineral Resource classification is based on confidence in the adopted sampling methods, geological interpretation, drill hole spacing and geostatistical measures. Mineral Resources were reported using cut-off grade of 1200 ppm  $U_3O_8$ .

The Mineral Resource statement is shown in Table 1-1.

Table 1-1: DASA Mineral Resources as at 1 January 2017

Category	Tonnes	eU <sub>3</sub> O <sub>8</sub>	Contained metal
	Mt	ppm	Mlb
Indicated	3.7	2,608	21.4
Inferred	7.7	2,954	49.8

Notes:

1. Mineral Resources are based on CIM definitions.
2. A cut-off grade of 1200ppm eU<sub>3</sub>O<sub>8</sub> has been applied.
3. A bulk density of 2.36t/m<sup>3</sup> has been applied for all model cells.
4. Rows and columns may not add up exactly due to rounding.

## 1.2 Conclusions

CSA Global concludes the following:

- The data and work completed to date is of high standard allowing the estimation of a reliable Mineral Resource for the project
- The mineral resource model documented herein is sufficiently reliable to support engineering and design studies to evaluate the economic viability of a mining project.
- Continued exploration and evaluation programs are warranted at the project, and completion of preliminary economic analysis study is warranted (leading to more detailed feasibility studies in the future).
- Significant upside exists to extend and upgrade the Mineral Resources at the DASA project. Mineralisation is open to the north and south and several sections of the deposit would benefit from infill drilling to improve the Resource classification.
- Infill drilling in critical areas would significantly reduce any potential risk in the resource estimation update and further economic assessment of the project.

## 1.3 Recommendations

CSA Global recommends the following are completed to support the exploration and evaluation effort:

- Current QA/QC procedures should be maintained to ensure high quality data is available for subsequent Mineral Resource estimates.
- Further exploration is required to upgrade the confidence of the extent and quality of mineralization at the deeper parts of the DASA deposit (mainly inside the graben). This would include drilling, down hole logging and stratigraphy studies.
- It is recommended to consider some areas of the deposit for in-situ leaching techniques.
- The project demonstrates economic potential, thus subsequent scoping and preliminary feasibility studies are recommended.
- Some additional investigations are required for definition of radioactive equilibrium factor ("REF") distribution to upgrade resource categories and understanding of uranium mineralization. CSA Global recommends doing assaying of radium in close cans and uranium by XRF. Comparison of radium and uranium assays allows to define



the REF and comparison of radium assays and gamma logging allows to define radon degassing factor. This factor may also influence the definition of eU<sub>3</sub>O<sub>8</sub> grades.

- Additional metallurgical tests are recommended.

More detailed recommendations are provided in the main body of the report.

## 1.4 Technical Summary

### 1.4.1 Property Description and Location

GAFC's exploration operations are located in the north central part of the Republic of Niger, West Africa, approximately 100km north of the city of Agadez.

### 1.4.2 Land Tenure

The DASA project is located in the southwest of the Adrar Emoles 3 Permit (AE3) which has a total area of 121.3 km<sup>2</sup>. The centre of DASA is positioned at longitude 7.8° east and latitude 17.8° north. GAFC has another tenement in Niger.

The Exploration permit for Adrar Emoles 3 was granted on February 8, 2008 for the first three-year period on the perimeter defined to include approximately 488.7 km<sup>2</sup>. On August 16, 2010, the Exploration permits for all six Mining Agreements were extended by the minister of Mines. The first three-year renewal of the Adrar Emoles 3 Exploration permit was received on January 17, 2013 concurrent with the required 50% reduction in area to approximately 243.7 km<sup>2</sup>. The second renewal was granted on Jan 29, 2016 reducing the area to approximately 121.4 km<sup>2</sup>.

### 1.4.3 Existing Infrastructure

The project area is accessible by an all-weather road connecting Agadez, Niger's second largest city, located 120km south of the project with the mining town of Arlit, some 100 km north of the area of interest and the capital, Niamey some 1000km to the west.

There are two airports serving the general area: Agadez, Niger's second largest city has a major airport, Mano Dayak, with a paved 3000m runway and recently significantly upgraded infrastructure. It is connected to the airport in Niamey, some 720 km to the west, via charter flights or daily scheduled connections and at one time also handled international tourist flights from Europe.

### 1.4.4 History

Systematic uranium exploration in the area started in 1959 after the first uranium mineralization was noted during geological reconnaissance missions on surface in the Air Mountains in 1956 by CEA. In the late 1960's Cogema completed wide spaced drilling-spacing of several km to test the stratigraphy of the area and to investigate how closely the geology resembled that of the Arlit area further north where uranium mineralization was already known since the mid 1960's.

The Japanese company PNC took over the landholdings in 1981 and worked on them till 1990. In 1982, 4,686m were drilled on several km wide spaced grids exploring a number of ground anomalies. A much larger program was completed in 1983, 36 holes totalling 11,000m as a combination of rotary and cored drilling.

In 1985/86, 27 drill holes (10,702m) were completed of which 7,808m were core and 2,894m were rotary. Some of the holes were over the northern sector while others were placed over

Dajy and Isakanan. Additional drilling was done in 1987 (7,672m) 7 holes with 2,139m in 1988 and 11 holes in 1988 totalling 3,505m and finally 12 drill holes or 3,466m in 1990.

In September 2007, the Adrar Emoles 3 and 4 blocks were granted to GAFC totalling about 1,000 km<sup>2</sup> located some 50km south east of AREVA's proposed large Imouraren open pit. The Adrar Emoles 3 block includes the Dajy prospect where uranium mineralization was known within a 10km long by 2km wide zone. Dajy is situated along a NW-SE trending major lineament, the Azouza fault along which the Azelik deposit (37 Million lbs) is situated, owned by CNNC, a Chinese government agency.

A NI 43-101 compliant resource estimate by GEOEX in 2009 yielded 27.9 Mt of ore at a grade of 821ppm eU<sub>3</sub>O<sub>8</sub> or 50.5 Mlbs eU<sub>3</sub>O<sub>8</sub> for Adrar Emoles concession (Isakanan area and Dajy).

In 2011, GAFC announced new uranium discoveries at the Adrar Emoles 3 concession, on the current known DASA (Dajy Surface Anomaly) area named to differ from the known Dajy prospect.

The mineralization is contained in a horst and graben environment with up thrust blocks. Intersections at Dasa 1 were 0.26% U<sub>3</sub>O<sub>8</sub> over 8.8m; Dasa 2 0.11% U<sub>3</sub>O<sub>8</sub> over 8.6m and Dasa 3 0.11%U<sub>3</sub>O<sub>8</sub> over 76m.

Additional exploration work located uranium grades from blow outs on surface as high as 30% U<sub>3</sub>O<sub>8</sub> within the Tchirozerin 2 sandstone.

Later drilling confirmed that high grade mineralization exists below the planned open pit with reported grades in hole ASDH 307 of 0.35% eU<sub>3</sub>O<sub>8</sub> over 30m and hole ASDH 248 at 0.21% eU<sub>3</sub>O<sub>8</sub> over 25m.

#### *1.4.5 Geology and Mineralization*

The rocks present within the GAFC property range in age from Cambrian to lower Cretaceous age. They are mostly clastic sediments (sandstone, siltstone and shale) with some minor carbonates. They originated from the Air Massif which has been continuously eroded since at least the Mesozoic. The sediments were laid down in a continental setting and are generally the result of fluvial and deltaic deposition. In this environment, large shallow rivers meander across flat topography and create complex flow patterns where the coarse-grained sands and gravel are concentrated in the channels with the highest flow energies while low energy flow regimes on the floodplains and tidal areas create silt and mudstone type sediments.

Carboniferous sedimentary formations are the major host rocks for uranium mineralization particularly in the northern part of the basin.

Uranium mineralization in Niger is located exclusively in sediments of the Tim Mersoï Basin and occurs in almost every important sandstone formation, however not always in economic concentrations and tonnage.

The uranium in many of the deposits of the Tim Mersoï Basin is generally oxidized. Among the primary tetravalent minerals, coffinite is dominant and accompanied by pitchblende and silico titanates of uranium. Uranium hexavalent minerals such as uranotile and meta-tyuyamunite are present in the Imouraren and TGT-Geleli deposits.

#### *1.4.6 Exploration Status*

In September 2007, the government of the Republic of Niger granted Global Atomic the Adrar Emoles 3 and 4 permits. Ongoing exploration work and metallurgical studies have confirmed

that most of the significant uranium mineralization is located around the DASA area within the Adrar Emoles 3 permit. Other uranium occurrences exist within the Adrar Emoles 3 and 4 permits.

Global Atomic has undertaken exploration activities on the DASA project since 2010. The DASA project area covers an area measuring approximately 10 kilometres along the strike of the Azouza graben by about 2 kilometres. However, drilling has only focussed on a small portion of this area.

In 2011, drilling efforts were realigned to achieve two goals: expand mineral resource, particularly the deeper higher-grade uranium mineralization, and to understand the geological controls on the distribution of the uranium mineralization.

In June 2012, the Dajy exploration camp was opened, enabling easier access to the entire concession area and drilling sites.

#### *1.4.7 Mineral Resources*

The DASA Deposit Mineral Resources was estimated and reported in April 2017 by CSA Global. The Mineral Resources were estimated by Ordinary Kriging using a geological model and a 100ppm U<sub>3</sub>O<sub>8</sub> edge grade on the mineralized envelope. All mineralized intervals were flagged and composited to 0.5 m and estimated into 20x20x4m blocks approximating half the drill density. The Mineral Resource is summarised in Table 1-1. The estimate has been completed by CSA Global's Principal Resource Geologist Dmitry Pertel who is the Qualified Person for this Report.

## 2 Introduction

### 2.1 Issuer

Global Atomic Fuels Corporation (“GAFC”) is a private mineral exploration and development company based in Toronto, Ontario, Canada. Founded in 2005, GAFC has been successfully investigating the uranium potential of six permits covering approximately 1,500 square kilometres in the Agadez Region of central Niger.

GAFC’s mineral assets in Niger occur in two project areas; Adrar Emoies and Tin Negouran. The most advanced investigation has occurred at the DASA project which forms part of the Adrar Emoies group of tenements. Exploration and evaluation programs completed to date are sufficient to estimate Mineral Resources. Other tenement areas have also been explored and have demonstrated potential for uranium mineralisation which will likely result in additional Mineral Resources for the project overtime.

GAFC engaged CSA Global Pty Ltd (“CSA Global”) to prepare this independent Technical Report, in accordance with Canadian National Instrument 43-101 requirements, on DASA. This Technical Report is based on the outcomes of the exploration programmes completed by GAFC at the property by the end of 2016.

CSA Global is a geological, mining and management consulting company with 30 years experience in the international mining industry. Headquartered in Perth, Western Australia, the company has eleven offices located in Australia, Canada, the UK, Russia, South Africa, Indonesia, Singapore and Dubai. CSA Global services cover all aspects of the mining industry from project generation to exploration, evaluation, development, operations and corporate advice. CSA Global has undertaken the geological assessment and resource estimation for the DASA Project, including the site inspection.

### 2.2 Terms of Reference

The primary purpose of this document (“the Report”) is updated estimate of the Mineral Resources of the DASA Project.

CSA Global acted independently as Global Atomic Fuels Corporation’s (“GAFC”) consultant, and was paid fees based on standard hourly rates for the services provided. The fee was commensurate with the work completed and was not contingent on the outcome of the work. Neither CSA Global, nor any of its staff rendering the services in connection with this Report, had any material, financial or pecuniary interest in GAFC or its subsidiaries, or in the Project.

### 2.3 Qualified Person Property Inspection

The CSA Global Qualified Person (QP) < Dmitry Pertel, has undertaken a site visit to the DASA exploration camp and the deposit between 25 March and 6 April 2017. The QP inspected core logging and storage facilities, QA and QC protocols and procedures, local geology of the deposit, reviewed sample preparation techniques and visited the laboratory in Niamey.

### 2.4 Sources of Information

This report partly relies on information provided by GAFC and others, including documents, data and reports compiled by GAFC management and technical staff and previous reports by other independent experts (see Section 3.0).





### 3 Reliance on Other Experts

For the purpose of this Report, CSA Global has relied on ownership information provided by GAFC. To the extent possible CSA Global has reviewed the reliability of the data but has not researched property title or mineral rights for the Mine and expresses no opinion as to the ownership status of the property.

CSA Global was supplied the results of previous work completed by GAFC in the course of exploration and evaluation of the project. Which included geological reports, the results of drilling in a digital database, geophysical surveys (surface and down hole) and the results of previous Mineral Resource estimates.

The primary data set used to inform the Mineral Resource is the digital drill hole database Provided by GAFC at commencement of our engagement. CSA Global has reviewed the data, completed relevant QAQC checks and is satisfied the data is adequate for estimation of Mineral Resources.

In the metallurgy and processing section CSA Global has relied on the work of Kerr 2011-2012 to provide the summary of work completed in this area.

These data have been used by CSA Global in the course of our work to estimate the Mineral Resources at the DASA project. Where possible CSA Global has verified the work of others.

## 4 Property Description and Location

### 4.1 Location of Property

GAFC’s exploration operations are located in the north central part of the Republic of Niger (Figure 4-1), West Africa, and approximately 100 km north of the city of Agadez. The country is bordered by Algeria and Libya in the North, Chad to the East, Nigeria and Benin to the South, and Burkina Faso and Mali to the West.

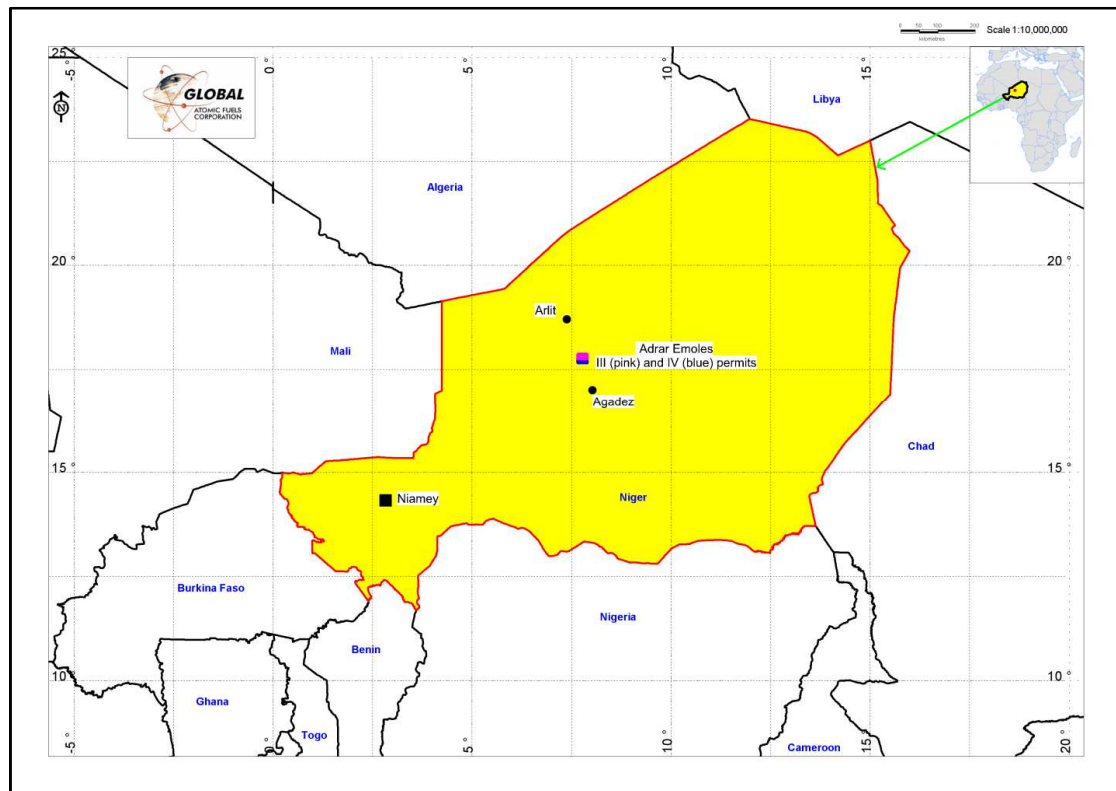


Figure 4-1: Location Plan of the exploration project of the Global Atomic Fuels Corporation

### 4.2 Mineral Tenure

GAFC entered into six Mining Agreements in Niger: Four Mining Agreements known as Tin Negouran 1, 2, 3, 4 on Jan 22 2007 and two Mining Agreements named Adrar Emoles 3 and 4 on September 25 2007 (Figure 4-2). Each Agreement initially covered an area of approx. 500 km<sup>2</sup> Exploration Permits were then granted under each Mining Agreement. Over the intervening period GAFC has relinquished certain areas in compliance with the mining law of Niger.

The DASA project is located in the southwest of the Adrar Emoles 3 Permit (AE3) which itself has a total area of 121.3 km<sup>2</sup>. The centre of DASA is positioned at longitude 7.8° east and latitude 17.8° north.

Exploration permits and Mining permits are granted within the provisions of a Mining Agreement that is negotiated between the ministry of Mines and the applicant. Such an agreement covers a period of up to twenty years, being the exploration period (3 years plus two 3 year renewals) and the first ten-year validity period of a mining permit. The Mining

Agreement is then renegotiated at each renewal of a Mining permit. The Mining Agreement can only be amended upon the mutual consent of both parties. The agreement must be approved by a Decree of the Council of Ministers and is then signed by the parties and stipulates rights and obligations of the parties during the validity period.

The Exploration permit for Adrar Emoles 3 was granted on February 8, 2008 for the first three-year period on the perimeter defined to include approx. 488.7 km<sup>2</sup>. On August 16, 2010, the Exploration permits for all six Mining Agreements were extended by the minister of Mines as a result of force majeure provisions. The first three-year renewal of the Adrar Emoles 3 Exploration permit was received on January 17, 2013 concurrent with the required 50% reduction in area to approximately 243.7 km<sup>2</sup>. The second renewal was granted on January 29 2016 reducing the area to approximately 121.4 km<sup>2</sup>.

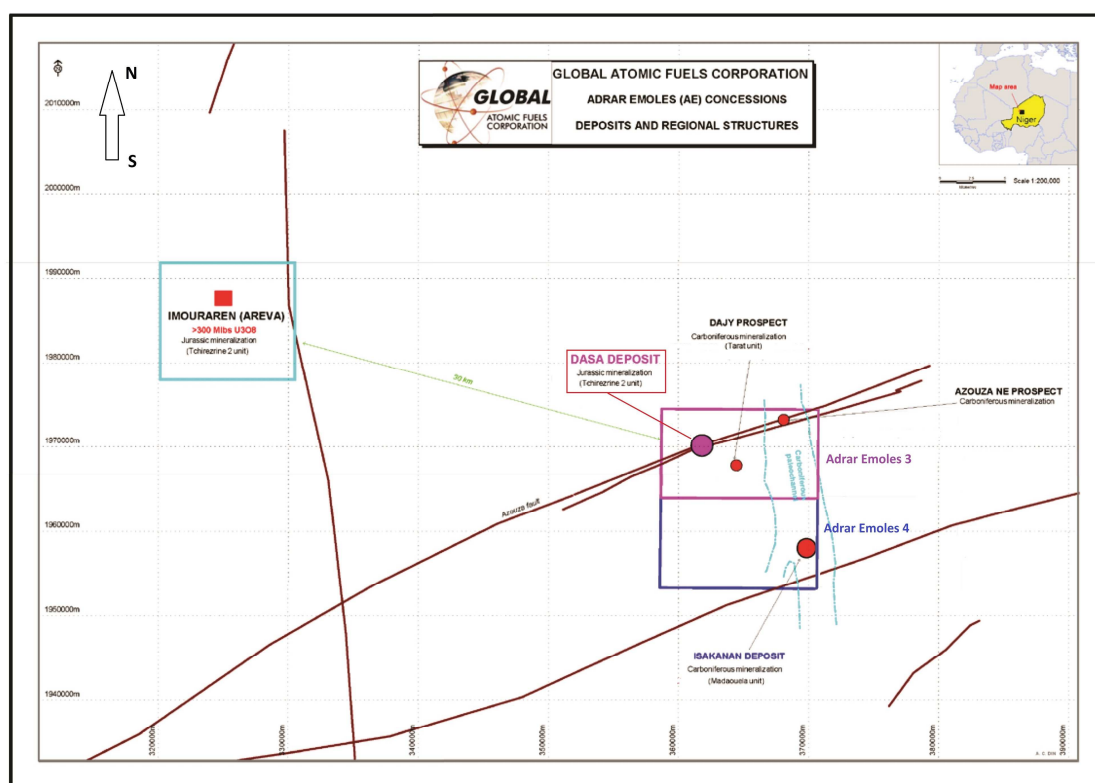


Figure 4-2: Adrar Emoles 3 and 4 Exploration Permits and location of the DASA deposit

Upon completion of a feasibility study, the holder of a Mining Agreement may apply for a Mining Permit. A separate Niger Mining Company must be established to hold each Mine permit. The Republic of Niger is granted a 10% carried interest in the share capital of the Niger Mining Company at the time of its formation and is entitled to its share of dividends that may arise.

The cumulative expenditures incurred to the date of formation of the Niger Mining Company and granting of the Mining permit are calculated and GAFC must negotiate with the Republic of Niger the amount that is to be reimbursed to GAFC by the Niger Mining Company and the mechanisms for such reimbursement.

On the establishment of the Niger Mining Company the Republic of Niger has the option to subscribe to an additional 30% in the share capital of the Niger Mining Company. If the Republic of Niger fails to exercise the option at that time, then it permanently loses the option.

If the Republic of Niger exercises some or all its option to the additional 30%, the Republic of Niger is obligated to contribute its proportionate share of cash, financial commitments, capital contributions, shareholder advances, bank and other loans for the duration of the Niger Mining Company.

A large-scale Mine permit is valid for ten-years and may be renewed for five additional five-year periods. At the time of renewal of a Mine Permit, the Mine Agreement is also renegotiated.

The area and geographic coordinates for the Adrar Emoles 3 the adjacent Adrar Emoles 4 permit are summarized in the table below.

*Table 4-1: Adrar Emoles 3 and 4 Exploration Permits*

Adrar Emoles 3			Adrar Emoles 4		
Tenement type: Exploration Company: GAFC Data granted: 29/01/2016 Validity: 3 years (second period) Area: 121.2 km <sup>2</sup>			Tenement type: Exploration Company: GAFC Data granted: 29/01/2016 Validity: 3 years (second period) Area: 122.4 km <sup>2</sup>		
Point	Longitude East	Latitude North	Point	Longitude East	Latitude North
A	7°40'00"	17°51'14"	A	7°40'00"	17°45'30"
B	7°46'28"	17°51'14"	B	7°46'28"	17°45'30"
C	7°46'28"	17°45'30"	C	7°46'28"	17°39'43"
D	7°40'00"	17°45'30"	D	7°40'00"	17°39'43"

## 5 Property Description and Location

### 5.1 Accessibility

The project area is accessible by an all-weather road connecting Agadez, Niger's second largest city and the final 10km by unsealed sand road. The mining town of Arlit is some 100km north of the area of interest and Niamey (the capital of Niger) is some 1000km to the west. The main sealed road N25 (Figure 5-1) is also known as the Routed 'Uranium (RTA) as it is here where all the yellow cake from the two AREVA uranium mines near Arlit is transported by truck to the port of Cotonou in Benin, West Africa.

The road continues north from Arlit as a sand piste to the Algerian border and from there as a bitumen road via Tamanrasset all the way to Algiers and the Mediterranean coast.



*Figure 5-1: Road N25, just north of Agadez*

There are two airports serving the general area: Agadez, Niger's second largest city has a major airport, Mano Dayak, with a paved 3000m runway and recently significantly upgraded infrastructure. It is connected to the airport in Niamey, some 720km to the west, via charter flights or daily scheduled connections and at one time also handled international tourist flights from Europe.

Arlit also has an airport with an unpaved much shorter runway, however nearly all flights operating from here are charters for AREVA's mining operations.



The GAFC exploration “Daji” camp Figure 5-2, is located some 100km north of Agadez and 10km straight east of the N25 highway, easily accessible via a sand piste. Its coordinates are 17°47’54” N and 7°43’33” E.



*Figure 5-2: Global’s Daji exploration camp*

With a few exceptions of rough, rocky terrain the whole project area is easily traversed by all-terrain vehicles or 4WD cars.

## **5.2 Climate**

The region is characterized by an arid intermediate climate of the Sahalian desert type with two distinct main seasons: the dry season between October and May and the wet season from June to September.

The temperatures can vary between 0°C at night in January to more than 55°C in May or June during the day.

The mean annual precipitation is less than 200mm and up to 90% of it occurs during the wet season. The rainy season provides sufficient precipitation to allow local basic agricultural activities. Flash floods are frequent inside alluvial dry river beds originating in the Air Mountains and can quickly turn into torrential streams making local roads temporarily impassable. Much of the sparse vegetation grows around the river beds.

## **5.3 Physiography**

The exploration permits are located between the western foreland of the Air Mountains and the N25 highway connecting Agadez to Arlit on the eastern edge of the Tim Mersoï Basin. The terrain is generally flat (Figure 5-3) monotonous sandy peneplain with an average elevation of some 500m ASL with elevations decreasing to the west. The highest elevation is in the Azouza hills, 553m ASL, whereas the Air Mountains, located some 30km to the east may reach over 1800m ASL



*Figure 5-3: Typical terrain at DASA project area*

#### **5.4 Local Resources and Infrastructure**

The project is located in the department of Agadez which comprises 52% of the surface area of Niger, but has only 322,000 inhabitants with a population density of 0.2/km<sup>2</sup>.

The GAFC project area is traversed by a 132KV power line connecting the Sonichar power plant—located some 40km south of the project near the small city of Tchirezrine- with the two uranium mines near Arlit, 120km to the north. The power plant runs two 16MW generators and is fed by coal which was discovered during the uranium exploration phase in the early 1970's.

Sonichar also supplies electricity to the city of Agadez and has considerable excess capacity for any industrial development in the area.

There are no permanent surface water sources available but several underground aquifers exist at depths between 300 and 500m.

A large pool of mostly unskilled labour is available on short notice within the immediate project area or from Agadez and Arlit. The AREVA (ex Cogema) uranium operations have trained a local labour force over the years and able workers can be expected to be available. This includes technical personnel from supervisory levels upwards.

The labour code and the organization of labour are very much based upon the French system.

Mining equipment and most supplies need to be imported from outside Niger. Warehousing facilities exist to some extent in Agadez or Arlit.

Niger has a long history of resource extraction and mining and exploration services are available on a local level reaching from drilling companies to environmental consultants and support services.

## 6 History

### 6.1 Introduction

Uranium exploration did not commence in Niger until the early 1950s following up on indications from spotty surface mineralization. The exploration for uranium occurred over time in three phases dictated by the economics of the mineral at various times.

This following section is based on information sourced from the following reports: Périmètre In Adrar (1977), Rapport des activités de la champagne de prospection d'uranium, Association Onarem PNC (1983), Projet Sekiret, Programme des Travaux de la 3eme Campagne 1983-1984, Association Onarem PNC, Annual technical report (1984), Projet Sekiret, Programme des Travaux de la 4eme Campagne 1984-1985, Association Onarem PNC (1985), Projet Sekiret, Programme des Travaux de la 5eme Campagne 1985-1986, Association Onarem PNC (1986).

### 6.2 Regional exploration by the French Nuclear Energy Commission- 1957 to 1981

Systematic uranium exploration in the area started in 1959 after the first uranium mineralization was noted during geological reconnaissance missions in the Air Maintains in 1956 (J.R. Leconte mission) and in 1957/58 near Azelik just west of the GAFC property during an exploration program for copper in the Teguida n'Adrar- Assaouas region.

The French Nuclear Energy Commission (Commissariat à l'Énergie Atomique, "CEA") was responsible for all the work. From 1957-1967 an intensive geological exploration program was implemented, which resulted in the discovery of the uranium deposits of Azelik (1960), Madaouela (1964), and finally Arlit-Akouta (1966-1967).

Airborne radiometric and magnetic surveys located a large number of surface anomalies which were quickly followed up on the ground. The CEA later merged into Cogema (now called AREVA) and substantial exploration programs were carried out over the years. The exploration permit over the areas presently held by GAFC was called In Adrar.

In the late 1960's, Cogema completed wide spaced drilling (several kilometers apart) to test the stratigraphy of the area and to investigate how closely the geology resembled that of the Arlit area further north where uranium mineralization was already known since the mid 1960's.

In addition to the drilling other exploration techniques such as geological mapping, rock and water well sampling, ground radiometric surveys and airborne surveys such as magnetic, EM and radiometric were employed.

A 250m line spaced airborne radiometric survey delineated a large number of anomalies which were confirmed on the ground and consequently drilled. At this stage the drilling rather aimed at identifying the stratigraphy than mineralization. Much of this drilling was rotary, "wild cat" spaced at several kilometres. This was reduced to 800m and 400m in more encouraging areas. Core drilling was used to confirm the geology and lithology as needed.

The first holes were completed in 1960 and continued until 1972 within the "In Adrar" concession including the Dajy area. A total of 652 holes were completed all over the concession of which 12 were in the closer ranges of Dajy. No holes were drilled within the actual DASA area.

The drilling confirmed that the area was underlain by stratigraphy closely resembling that of the Arlit region.

All holes were probed by radiometric and electric methods using Cogema's own logging systems.

Significant radiometric anomalies were discovered within the AE 3 permit in strata younger than the Upper Jurassic Imouraren world class uranium deposit, located only some 40km NW of DASA.

### **6.3 Regional Exploration by PNC and ONAREM-1981 to 1990**

In 1981, Cogema dropped major parts of their landholdings due to the suppressed uranium market at that time. A joint venture between Power Reactor and Nuclear Fuel Development Corporation (PNC) based in Japan and ONAREM (Niger National Geological Survey) acquired a large exploration permit called Sekiret which covered an area of some 4,200 km<sup>2</sup>. PNC conducted stratigraphic drilling on 800 x 800m and 400 x 400m centres.

In 1982, 4,686m were drilled on several km wide spaced grids exploring a number of ground anomalies. A much larger program was completed in 1983, 36 holes totalling 11,000m as a combination of rotary and cored drilling. Drill hole spacing was 2.5 x 2.5km over western and eastern sections of the property. All drill holes were probed for natural gamma, resistivity sonic and caliper using Japanese made equipment.

In 1984, encouraging results were noted in 13 drill holes (6,266m) in the Dajy area, 13 core holes (1,848m) in the Sekiret area and five drill holes (2,672m) near the Arlit fault in the west.

In 1985/86, 27 drill holes (10,702m) were completed of which 7,808m were core and 2,894m were rotary. Some of the holes were over the northern sector while others were placed over Dajy and Isakanan. Additional drilling was done in 1987 (7,672m) 7 holes with 2,139m in 1988 and 11 holes in 1988 totalling 3,505m and finally 12 drill holes or 3,466m in 1990.

PNC's work confirmed that uranium was present in the Tarat, Madaouela and Guezouman Formations and in a surface anomaly at DASA in the sandstones of the Tchirezrine 2 Formation.

The drilling was successful in expanding the Dajy prospect and discovering the Isakanan prospect. The joint venture terminated in 1988.

From 1990 to 2007, the AE 3 and AE4 areas remained unexplored and no known exploration activity can be reported.

### **6.4 Exploration activity from 2007 onwards**

In September 2007, the Adrar Emoles 3 and 4 blocks were granted to GAFC totalling about 1,000 km<sup>2</sup> located some 50km east of AREVA's proposed large Imouraren open pit. Mineralization was known to exist within the lower Carboniferous Guezouman and Tarat sediments and the lower Cretaceous Tchirezrine 2 sandstone. The Adrar Emoles 3 block includes the Dajy prospect where uranium mineralization was known to occur within a 10km long by 2km wide zone. Dajy is situated along a NW-SE trending major lineament, the Azouza fault along which the Azelik deposit (37 Million lbs) is situated, owned by CNNC, a Chinese government agency.

The Tchirezrine 2 sandstone is outcropping in the Adrar Emoles 3 block over wide areas and this strata also hosts the very large (>300Million lbs AREVA owned) Imouraren deposit.



A NI 43-101 compliant resource estimate by GEOEX in 2009 yielded 27.9 Mt of ore at a grade of 821ppm eU<sub>3</sub>O<sub>8</sub> or 50.5 Mlbs eU<sub>3</sub>O<sub>8</sub> for Adrar Emoies concession (Isakanan area and Dajy).

In 2011, GAFC announced new uranium discoveries at the Adrar Emoies 3 concession, on the current known DASA (Dajy Surface Anomaly) area named to differ from the known Dajy prospect. The discoveries are located along the Azouza fault and hosted in the Tchirozerine 2 lower Cretaceous sandstones which also hosts the proposed AREVA Imouraren >300million lbs open pit deposit. Imouraren is situated less than 50km away. The mineralization is contained in a horst and graben environment with up thrust blocks. Intersections at Dasa 1 were 0.26% U<sub>3</sub>O<sub>8</sub> over 8.8m; Dasa 2 0.11% U<sub>3</sub>O<sub>8</sub> over 8.6m and Dasa 3 0.11%U<sub>3</sub>O<sub>8</sub> over 76m.

Additional exploration work located uranium grades from blow outs on surface as high as 30% U<sub>3</sub>O<sub>8</sub> within the Tchirezrine 2 sandstone.

Later drilling confirmed that high grade mineralization exists below the planned open pit with reported grades in hole ASDH 307 of 0.35% eU<sub>3</sub>O<sub>8</sub> over 30m and hole ASDH 248 at 0.21% eU<sub>3</sub>O<sub>8</sub> over 25m.

In June 2012, the Dajy exploration camp was opened which allows easier access to the whole concession area and the drill sites.

## 6.5 Previous Mineral Resource Estimation

Mineral Resource estimation for the DASA project has previously been done by SRK Consulting (Canada) in 13/09/2013 (Mineral Resource Evaluation, 2013) (Table 6-1: Mineral Resource Statement\*, DASA Uranium Project, Republic of Niger, SRK Consulting (Canada) Inc., September 20, 2013 Category Table 1-1).

*Table 6-1: Mineral Resource Statement\*, DASA Uranium Project, Republic of Niger, SRK Consulting (Canada) Inc., September 20, 2013 Category*

Category	'000 tonnes	eU <sub>3</sub> O <sub>8</sub> ppm	eU <sub>3</sub> O <sub>8</sub> Mlb
Inferred (Open pit)**	4,713	579	6.01
Inferred (Underground)***	19,396	1,797	76.84
Inferred (Total)	24,109	1,559	82.86

\* All figures rounded to reflect the relative accuracy of the estimates. Mineral resources are not mineral reserves and have not demonstrated economic viability.

\*\* Open pit mineral resources reported at a cut-off grade of 250 ppm of eU<sub>3</sub>O<sub>8</sub> per tonne assuming: metal price of US\$70 per pound of U<sub>3</sub>O<sub>8</sub>, mining cost of US\$5 per tonne, processing and G&A cost of US\$5 per tonne, processing cost of US\$24 tonne, process recovery of 90 percent, exchange rate of C\$1.00 equal US\$1.00, a mining rate of 10,000 tonnes per day and a pit slope angles of 45 degrees

\*\*\* Underground mineral resources reported at a cut-off grade of 600 ppm of eU<sub>3</sub>O<sub>8</sub> per tonne assuming: metal price of US\$70 per pound of U<sub>3</sub>O<sub>8</sub>, mining cost of US\$71 per tonne, processing and G&A cost of US\$5 per tonne, processing cost of US\$24 tonne, process recovery of 95 percent, exchange rate of C\$1.00 equal US\$1.00 and a mining rate of 5,000 tonnes per day

## 6.6 Production from the Property

No production from the property is known.

## 7 Geological Setting and Mineralisation

### 7.1 Introduction

This section is prepared based on the following reports: Activation Lab. (2007), Perimetre Tin Adradar; Dossier Technique (1977), Jean Martin von Siebenthal (2013), Cazoulat (1985), Gauthier (1972), Gauthier (1974), Gerbaud (2006), [https://www.uni-hohenheim.de/atlas308/startpages/page2/french/content\\_fr/conframe\\_fr.htm](https://www.uni-hohenheim.de/atlas308/startpages/page2/french/content_fr/conframe_fr.htm), Guiraud (1981), Greigert and Pougnet (1967), Hirlemann and Robert (1977), Hirlemann and Faure (1978), Hirlemann and Robert (1980), Joulia (1957), Joulia (1959), Joulia (1963), Joulia and Obellianne, (1976), Konaté et al. (2007), Lang et al. (1991), Molebale (2012), Sempéré (1981), Valsardieu (1971), Wright (1993), Wright (2010), Wright (2012), Yahaya (1992), Yahaya and Lang (2000).

### 7.2 Regional Geology

The GAFC property is located in north-eastern Niger inside the Tim Mersoi sedimentary basin (Figure 7-1). The basin covers an area of some 114,000 km<sup>2</sup> and is part of the much larger lullemeden Basin (Palaeozoic-Tertiary) that stretches into Mali, Algeria, Benin and Nigeria.

In the north and east the lullemeden Basin (including Tim Mersoi Basin) is bounded by the Hoggar Massif in Algeria and the Air Massif in Niger forming part of the Central Saharan Massif (Figure 7-2). The basin gets deeper to the south and the west. During the early Palaeozoic continental sediments were deposited into an open gulf to the south of the Central Saharan Massif. In the Mesozoic and Tertiary marine transgressions invaded from time to time diminishing in thickness to the south and passing laterally into continental series. Uplifts commence in the mid Eocene filling the basin with fluvial and lacustrine sediments.

All uranium deposits currently known in Niger are located within the Tim Mersoi Basin in several areas (Figure 7-1 & Figure 7-3):

- Near the city of Arlit, in the two AREVA mines of SOMAIR - open pit (discovered in 1967) and COMINAK Akouta - underground mine (discovered in 1974), with historical production of over 110,000 tons of uranium. Production in 2015 was some 4,116t of uranium;
- In the Teguida area, Azelik – open pit (SOMINA/CNNC producing since 2011 but presently closed);
- At Imouraren (Imouraren SA/AREVA, construction starting in 2009 and production was originally planned to commence in 2015), projected to be the largest open pit uranium mine in the World. This project is currently on standby.

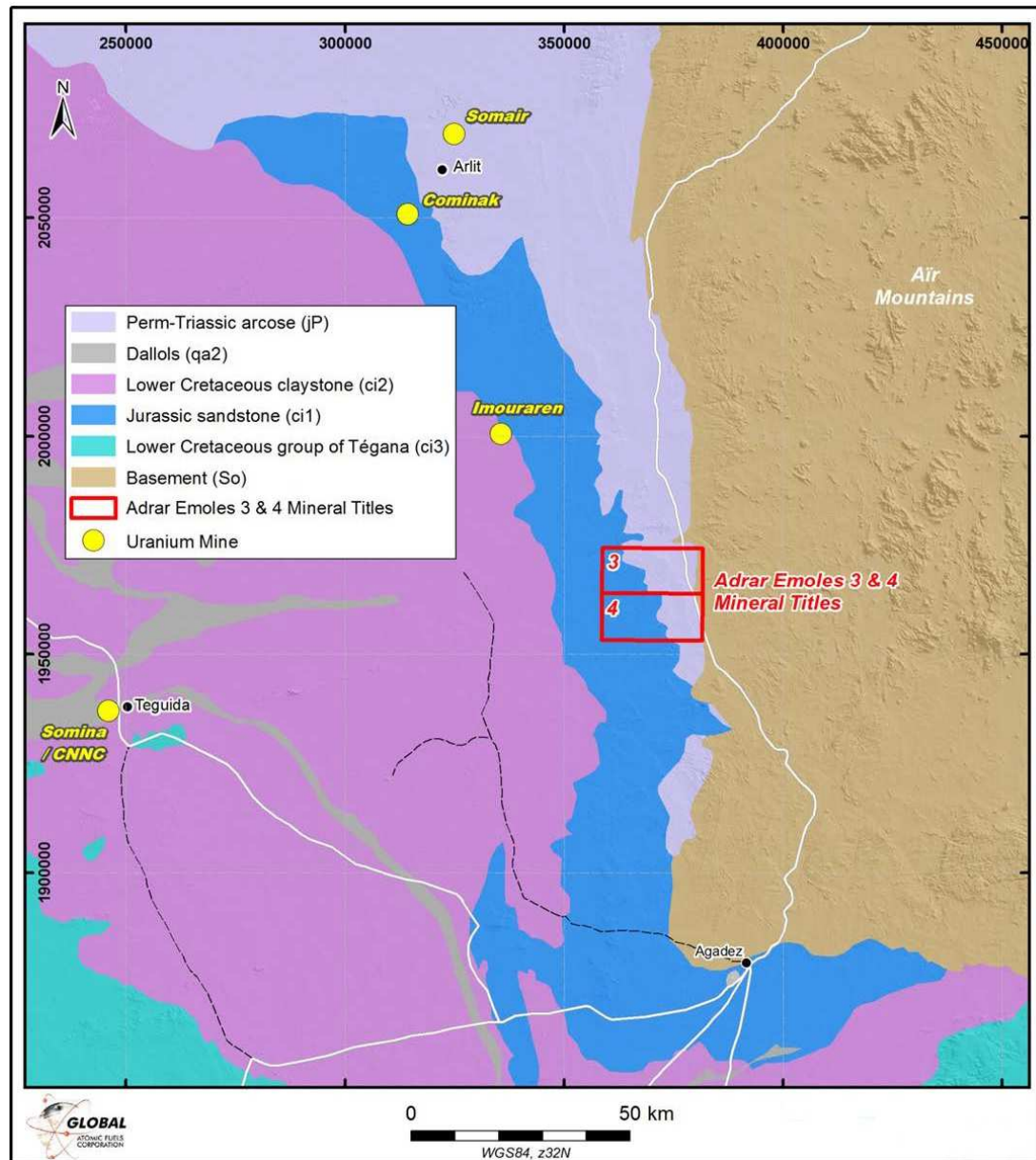


Figure 7-1: Regional Geology map after F. Julia printed by BRGM in 1963 at 1:500,000

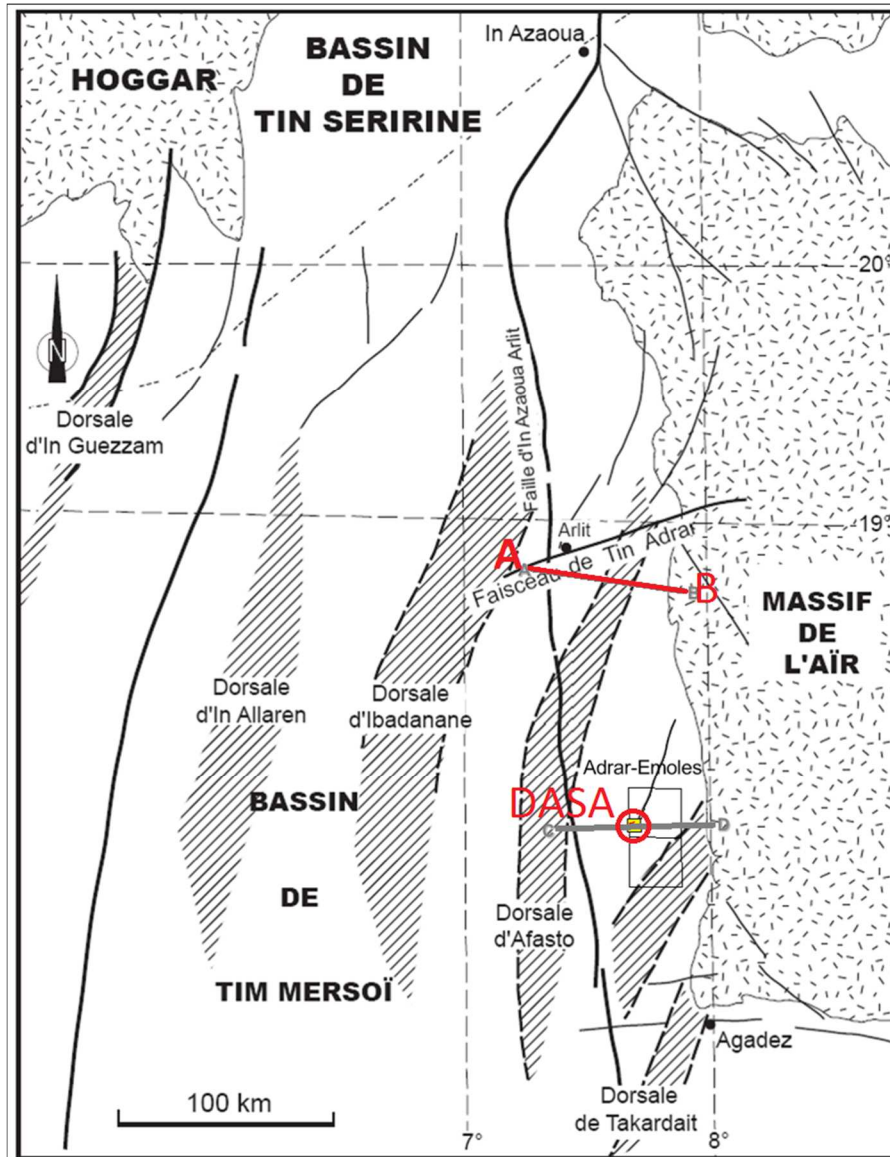


Figure 7-2: Major structures in the Tim Mersoï Basin, shaping it in a succession of ridges and basins.

To the east the basin rests unconformably on the crystalline basement of the Air Massif, a Precambrian metamorphic terrain intruded by post Mesozoic felsic and mafic intrusives and in the north and northwest on the basement rocks of the Hoggar in Algeria. The Air Massif extends north into Algeria where it becomes the Ouzalian Craton also of Precambrian age. The Air Massif represents the source for all the clastic sediments that over time have filled the Tim Mersoï Basin and is probably also the source of at least some of the uranium found in the basin's clastic sediments.

The sediments of the basin reach in age from Paleozoic to Cenozoic (Figure 7-3 and up to 1500m in total thickness deposited on a relatively stable platform.



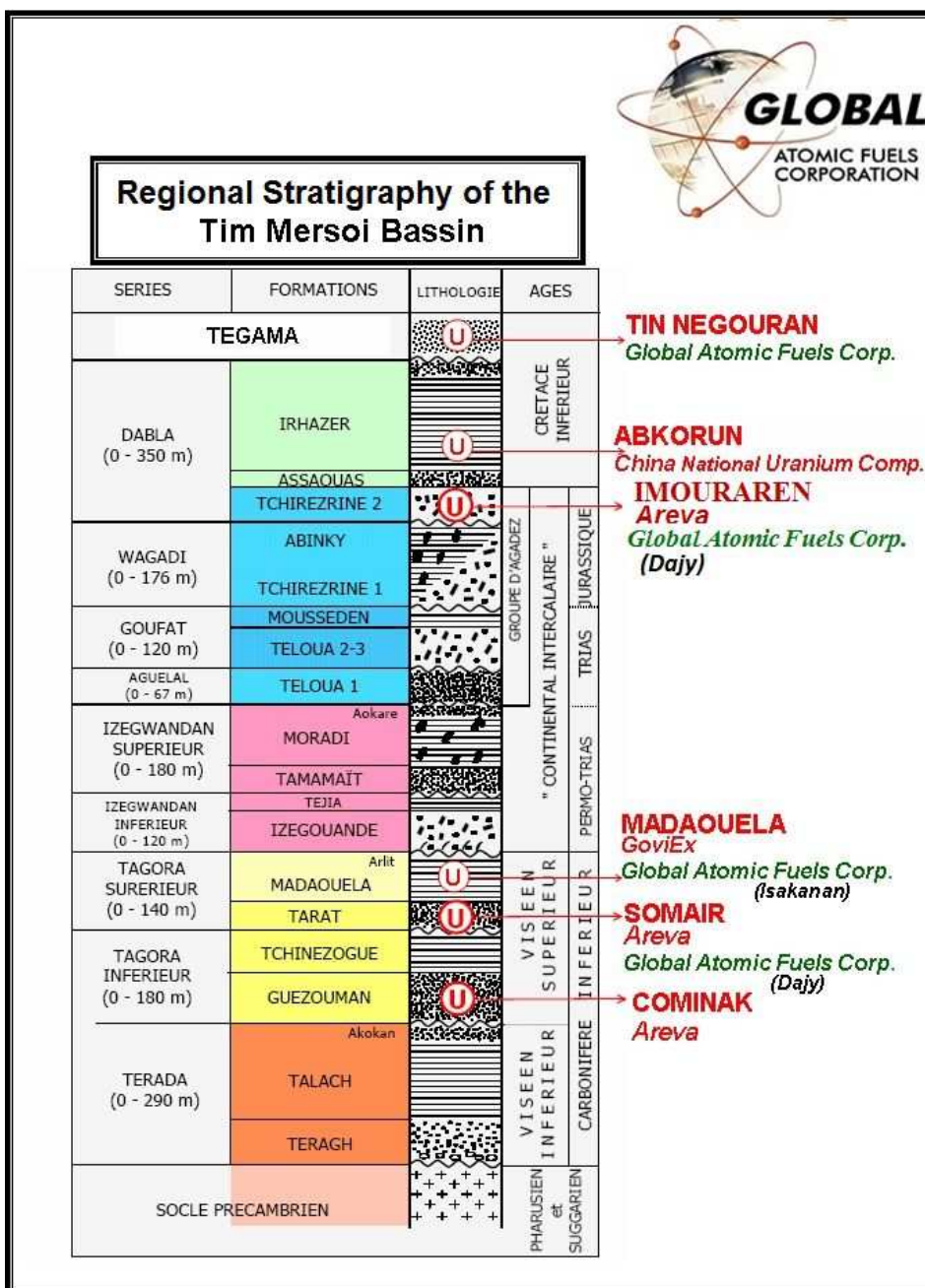


Figure 7-3: Stratigraphic column of the Series and Formations in the southern part of the Tim Mersoï Basin and including the GAFC property

There are a number of upward fining sedimentary cycles that have been identified, starting with coarse to conglomeratic sandstone at the base with minor intercalations of siltstone and clay fining upwards into fine grained sandstone or argillite and clay before the next cycle starts. Each cycle is unique and reflects changes in climate, topography, tectonic events as well as changes in the source areas for the sediments.

The strata of the Tim Mersoï Basin has a shallow dip to the west caused by the uplift of the Air Massif (Figure 7-4). The basin deepens gradually to the west and north and shallows over the In Guezzam ridge in Mali. Since the lower Devonian sedimentation is predominantly continental and marginal littoral comprising conglomerate, sandstone, siltstone and shale,

deposited by large meandering rivers in fluvial and deltaic settings into a slowly subsiding foreland. Further to the west a more marine environment existed (Joulia et al., 1959).

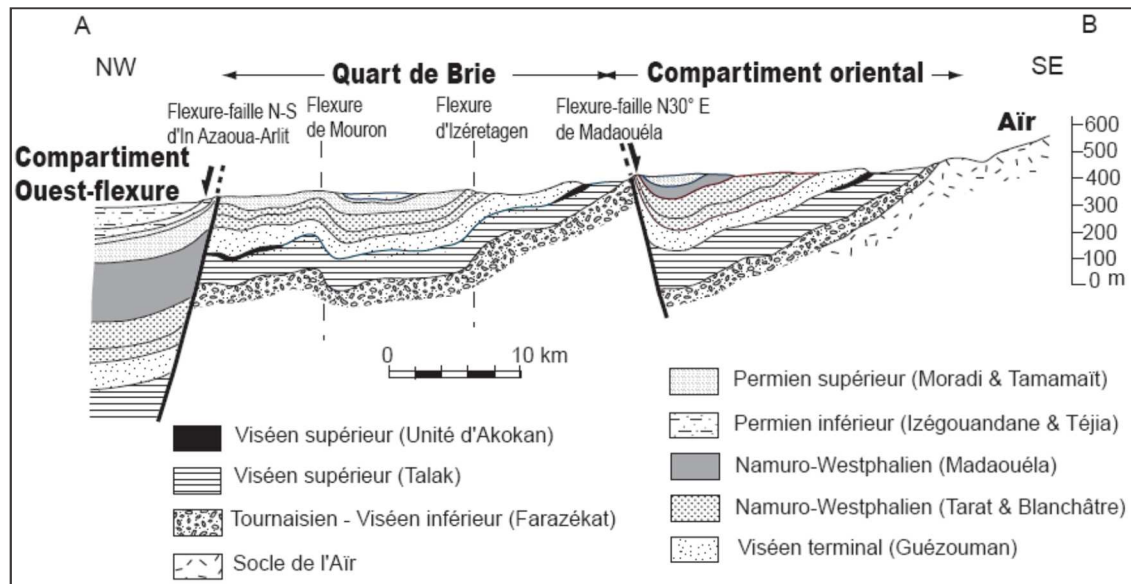


Figure 7-4: NW-SE profile in the Arlit area, see A-B cut on above (modified Cominak document, 1989, Gerbaud, 2006).

The general direction of transport is assumed to have been from the east to the west and in the area of interest a more NE to the SW direction of transport would have prevailed.

In general, it can be said that the sedimentary strata becomes younger from north to south possibly a combination of uplift of the Air Massif and erosion and transport directions.

Obelliane et al. (1971) have identified three distinct sedimentary areas within the Tim Mersoï Basin with the main depositional areas moving slowly north to south over time:

- A Lower Carboniferous basin (The Tin Seririne synclinorium) of fluvial-deltaic marine and sediments. This strata is rich in organic matter and silicified trees are common in certain areas of the basin;
- A smaller Permo-Triassic basin with intercalations of volcano sedimentary and fluvial sediments;
- A lower Cretaceous basin with lacustrine deposits overlain by fluvial-deltaic sediments.

### 7.3 Structural setting

The Tim Mersoï Basin occurs as a regional scale syncline with a fold axis trending north-south, affected by a combination of brittle faults, mixed flexure-faults, or low amplitude folds or flexures.

The Tin Seririne synclinorium was formed during the Pan African Orogenic event from 550M onwards and forms the northern part of the Tim Mersoï Basin with sedimentation that began during the Cambrian (Joulia et al. 1959).

The structural development of the Tim Mersoï Basin commences at the end of the Pan African Orogen event (1000MA). The basin develops by N-S and E-W compression with NW to WNW

sinistral shears caused by anti-clockwise rotation in the NE of the basin. With the widening and deepening of the basin its centre and the north-eastern edges see the development of sinistral shear zones and conjugate structures trending NW-SE and NE-SW. The intersections between these structures contain rotational deformation causing dome and basin structures.

Major movements are related to N-S zones which strike parallel to the eastern and the western edges of the Air Massif. The compressional sinistral strike slip movements have caused three main structural directions which are N-S; 40-80°; and 90-135°. Where these structures intersect ideal pathways for circulating uranium bearing fluids to form deposits are created-***S fault system and N30°E associated structures.***

The fold-fault of In Azaoua-Arlit comprises a major regional-wide N-S fault system. This family of structures is related to ancient late-Panafrican transform events. Its frequent reactivation, depending on the epochs, translates into faults, flexures and flexure-faults in the sedimentary cover.

The N30° family of structures are the most evident on surface in the Tim Mersoï Basin. They appear in the Air basement in the east and stop at the In Azaoua-Arlit lineament in the west, where they are truncated. They are linked to the In Azaoua-Arlit history (Sempéré, 1981).

In the sedimentary cover, the deformation is characterized by flexures (Gauthier, 1972, Hirlemann et Robert, 1977, 1980), creating in some instances a substantial vertical displacement in the order of 100-200 m. According to Hirlemann and Robert (1977, 1980), these flexures are linked with sinistral reverse-strike-slip faults activity of the basement structures in a compressive regime.

According to Guiraud et al. (1981), the compressive phase associated with the formation of the N30° flexures is of Upper Cretaceous age, with a shortening direction of N140°.

#### ***N130-N140°E and N70-N80°E conjugate fault system***

A second grouping of faults occurs with orientations of N130-N140°E and N70-N80° these brittle structures are the most important family in the Air Massif. They are of late-Panafrican origin according to Greigert and Pougnet (1967).

The N70-N80°E faults are conjugate to the N130-N140°E directions. They are mainly present in the southern half of the Tim Mersoï Basin. During the Carboniferous, these structures controlled the sedimentation in the basin (Wright et al. (1993). These faults played a major structural role in the regional context of the basin, by localizing large scale dextrous strike-slip faults (Gauthier, 1972, Hirlemann & Robert, 1980).

#### ***Fold-like structures***

Fold-like structures are common within the sediments. According to geological drilling data, the thickness and dip variations in some strata from West to East are linked with synsedimentary tectonic activity (Gerbaud, 2006).

Two families of fold-like structures are distinguished:

- anticlines / synclines, with fold axes roughly parallel to the N30°E structures;
- closed structures (domes), which generally appear at the intersection of the N30°E structures and N70-N80°E.

In the South, near the AE3 and AE4 permits, the N-S, E-W and sinistral shears combine to develop folding, the most obvious being a syncline, in which the Asouza structure is an integral



part. The stratigraphy is also folded on approximately layer parallel axis which gives wider exposures and repetition of units. The layers are thickened by layer parallel shortening and on echelon structures develop (Wright, 2010, 2012).

#### **7.4 Property Geology**

The rocks present within the GAFC property range in age from Cambrian to lower Cretaceous age (Figure 7-5). The schematic geological map is shown in Figure 7-1 and on the schematic cross section in Figure 7-7 .

They are mostly clastic sediments with minor carbonates. They originated from the Air Massif which has been continuously eroded since at least the Mesozoic. The sediments were laid down in a continental setting and are generally comprised of fluvial and deltaic settings. In this environment large shallow rivers meander across flat topography and create complex flow patterns where the coarse-grained sands and gravel are concentrated in the actual channels with the highest flow energies while low energy flow regimes on the floodplains and tidal areas create silt and mudstone type sediments.

GLOBAL ATOMIC FUELS CORPORATION		STRATIGRAPHIC COLUMN DASA AREA (Tim Mersoï Basin, Rep. of Niger)			
Age (Ma)	Formation	Uranium mineralization Project / Company	Lithology	Depositional Environment	Color code DHLogger
Lower Cretaceous (145 - 100 Ma) IRHAZER GROUPE	Tégama	Tin Negouran / Global	Coarse sandstones, ocre to reddish colour with fine grained lenses Conglomerats with white quartz pebbels	Fluvial	Series Red
	Irhzazer	Abkorun / China National Uranium Co	Alternating carbonatic argillites, marls and clayish carbonates incl dolomitic, greyish layers of silt, mainly reddish colours Reddish argillites with intercalations of silt and sandstones	Lacustrine	
	Assaouas		Silt and argillitic silt greyish-greenish colours		
AGADEZ Triassic - Jurassic GROUP (250 - 145Ma)	Tchirezrine 2	Imouraren / Areva Dasa / Global	Alternating of medium - coarse grained arkosic sandstones with analcimolite, greenish to brownish colours , cross bedding, silicified wood	Fluvial/ lacustrine	Series Red
	Abinky		Analcimolite, very hard, red brown; massive banks; Argillites and analcimolitic sandstones partly arkosic, iron cement; med grained sandstones with microcline feldspar; blobs of altered analcimolite; frequent silicified wood in sandy layers	Lacustrine / acide fissure volcanism	
	Tchirezrine 1		Medium-coarse grained feldspatic sandstones with abundant analcimolitic cement; also siliceous cement	Fluvial and exhaustive volcanism	
	Mousseden		Reddish argillites with analcimolite; analcimolitic sandstones		
	Téloua 2-3		Equigranular sandstones with argillitic-siliceous cement, carbonatic Levels with reddish argillites and silts Carbonatic cemented arkoses	Fluvial / lacustrine	
	Téloua 1		Fine grained equigranular sandstones sometimes without cement; qtz grains dull sheen and rounded		
Permian (296 - 250Ma) IZEGOUANDE SERIES	Aokare		Equigranular sandstones medium to conglomeratic with iron stains reddish argillites and very fine grained sand lenses carbonatic cemented Arkosic channels strongly oxidized Conglomerates with quartz and clay pebbles	Lacustrine with fluvial intercalations	Series Red
	Moradi		Medium - fine grained sandstones; carbonate cement; silts and very fine grained sandstones clayish matrix		
	Tamamaït		Reddish argillites and very fine grained sand lenses	Fluvial	
	Téjia		Arkoses and feldspatic sandstones with carbonate cement; reddish argillite lenses; conglomeratic intercalations with pebbles of quartz, rhyolite, silicified wood, cross bedding		
	Izegouande		Silts and very fine grained carbonatic sandstones ; reduced fazies	Estuary / wetlands/eolian	
Carboniferous (Namurien 326 - 313 Ma) TAGORA SERIES	Madaouéla	Madaouéla / Goviex Isakanan & Dasa / Global	Alternating argillites and very fine grained sandstones rich in organic matter; medium to coarse grained sandstones with organic matter and pyrite	Fluvial-Deltaic	Series Green
	Tarat	Somair / Areva Dasa / Global	Alternating black argillites and sandstones, generally abundant organic matter, silt layers	Marine-epicontinental lacustrine	
	Tchinzogue		Alternating very fine grained kaolinitic sandstones and medium-coarse grained sandstones rich in organic matter and pyrite	Fluvial-Estuary	
	Guezoumane	Cominak / Areva Dasa / Global	Argillites dark brown to blueish green; cone in cone structures	Continental marin platform	
Lower Carboniferous Visée (358 - 326 Ma) TERADA SERIES	Talak		Coarse grained sandstones with argillitic intercalations; well rounded distinct white quartz pebbels (pigeon eggs) at the base	Fluvial to fluvial-glacial	Grey - green
	Farazekat (Gabo)		Alternating medium and fine grained sandstones with blackish/greyish argillite lenses; microconglomerate at the base with silica cement; horizontal strata	Fluviatil / lacustrine	
Devonian ? (419 - 358 Ma) TERADA SERIES	Tindirenen		Sandstone conglomeratic and feldspathic, kaolinitic	Fluvial	Grey - green
	Teragh		Granitoids / Pink granite with biotite; some basic dykes		
	Basement Precambrian				

Figure 7-5: Stratigraphic column of the ASA project area

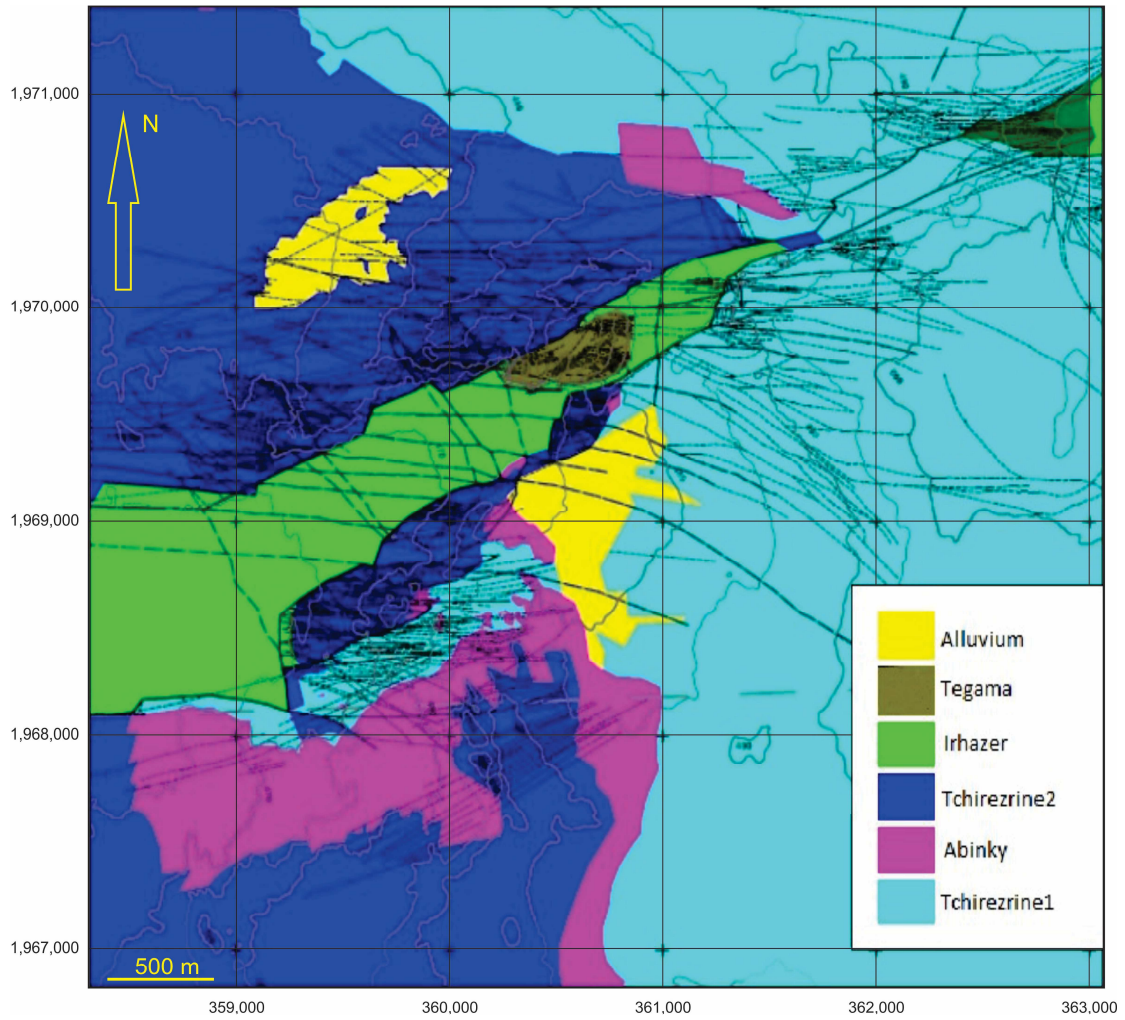


Figure 7-6: DASA structural map

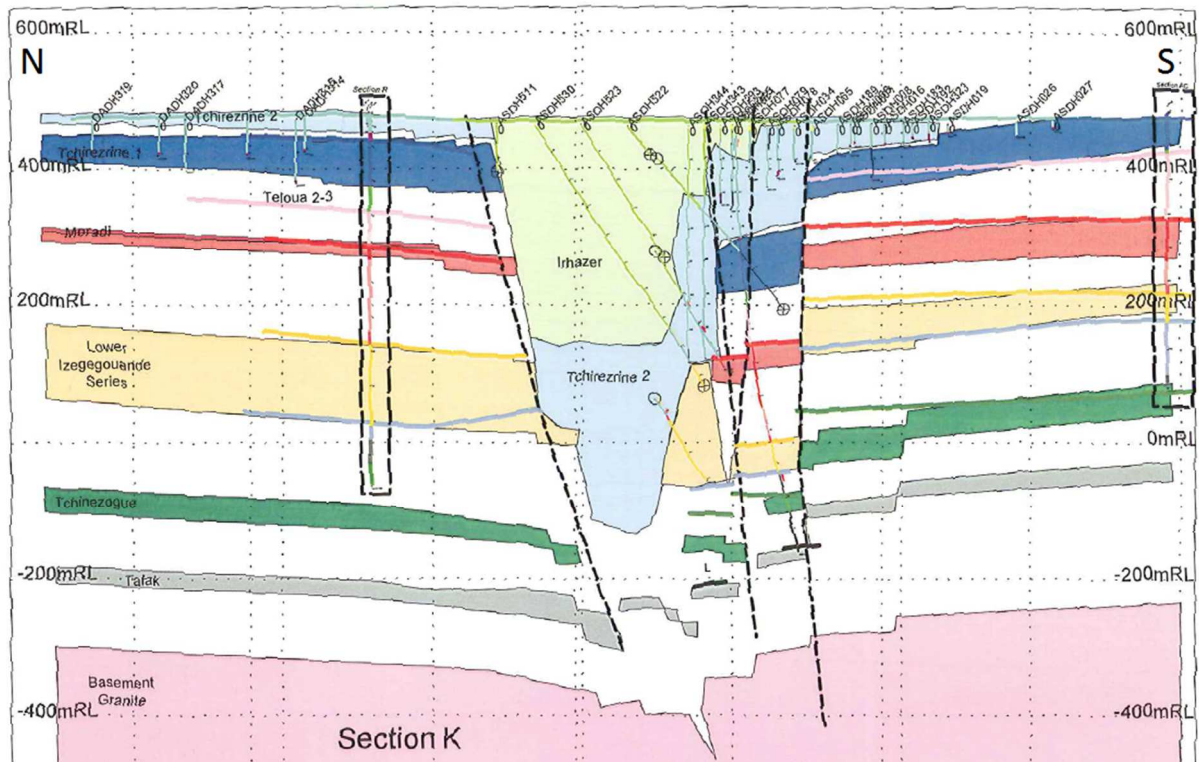


Figure 7-7: DASA schematic geological section

The points below provide a brief summary of the lithologies of the project recorded in drilling, surface mapping and geophysical surveys of the project areas:

- **Precambrian**  
Metamorphic Basement is exposed in the Air Mountains to the east. Some of GAFC’s drill holes inside the DASA graben terminated in altered and in fresh granite. Its position within the basement suites is unknown at this time.
- **Cambro-Ordovician undifferentiated**  
Cambrian to Devonian rocks exist in this part of the Tim Merso Basin, however they have not been positively identified yet by GAFC’s work. A major discordance near the Air Massifs western boundary separates the basement from conglomerates and tillites of the Timesgueur Formation followed by In Azawa sandstone followed by another major discordance.
- **Upper Ordovician**  
The upper Ordovician consists of fine grained sandstones with quartz pebbles and calcite.
- **Silurian**  
The Silurian consists of graptolite schists.
- **Devonian**  
The Lower Devonian starts with an unconformity followed by conglomerate with pebbles of schists and basalt, Idekel sandstone with silicified wood and is overlain by

Middle Devonian Touaret sandstone, fossiliferous beds and the Akara schist. The Devonian is completed by Upper Devonian Amesgueuer sandstone.

- *Carboniferous*

Carboniferous formations are major host rocks for uranium mineralization particularly in the northern part of the basin. The Carboniferous -Lower Visean- begins with fossiliferous marine argillites which are overlain by the clastic terrestrial Terada Series which may reach thicknesses of up to 290m. The Terada itself is made up of the Teragh Formation consisting of coarse grained sandstones, which can contain coal beds, and is overlain by the siltstones and sandstones of the Aoulingen Formation. This passes laterally to the north into the marine Talach argillites.

The Carboniferous – Upper Visean-continues with the important fluvio-deltaic Tagora Series which hosts uranium in the wider Arlit region of the basin. The Tagora is made up of two cycles: The lower Tagora up to 180m thick- starting with the conglomerates of the Teleflak and continuing into the sandstones making up the Guezouman Formation. This is a major host for uranium mineralization in the Akouta area (Cominak underground mine-AREVA) and which is overlain by the siltstones of the Lower Tchinezogue Formation which is a mega-sequence comprised of the whitish sandstones of the Middle and Upper Tchinezogue.

The second cycle of the Tagora (0-140m thickness) often is marked with a thin layer of conglomerate overlain by the sandstone of the Tarat Formation with intercalations of siltstone and argillite in an upward fining sequence. The uranium at Arlit (Somair open pit mines-AREVA) is hosted in this second cycle. The top of the Carboniferous is completed by sandstones and siltstones of the Madaouela Formation (GOVIX Madaouela project).

The Carboniferous in the whole basin is characterized by reducing conditions displayed in predominantly greyish colours, pyrite and organic matter providing ideal conditions for the precipitation of uranium.

- *Permian*

During the Permian a major change in climatic conditions occurred and this is reflected in the rocks of that period. The Permian sediments are generally characterized by an abundance of arkosic sandstones containing significant volcanic debris. Reddish colours and abundant calcite are dominant for the Permian strata indicating oxidizing conditions. The sedimentation occurred mostly in interwoven channels with frequent and abrupt facies changes. Within the project area the thickness of the Permian strata can vary considerably and reach a thickness of some 300m.

The Lower Izegouandane Series begins with coarse grained sandstones containing pebbles of rhyolite and quartzite. It is overlain by five to ten metres of a red claystone (equivalent to the Teja Formation) and followed by the sandstones of the Tamamait Formation. Further up in the sequence the red siltstone of the Moradi Formation is common. The latter two Formations belong to the Upper Izegouande Series.

- *Triassic*



Initially the Triassic shows a continuation of the Permian conditions beginning with the conglomerates of Anou Melie that contain many pebbles shaped by aeolian actions (windkanter).

These are covered by fluvio-deltaic sandstones belonging to the Teloua 1 Formation. This package may reach 60m in thickness and belongs to the Aguelal Series. In some areas the Teloua 1 displays as re-worked sediment with well sorted and rounded quartz pebbles reflecting the local paleo topography.

The following sediments of the Goufat Series contain masses of volcanic debris (origin volcanic tuffs?) and are called the Teloua 2 (some 70m thick). The Teloua 2 appears as distinct poorly sorted sand lenses of the original sedimentation cycle. Analcimolite begins to appear as well. It is followed by the Teloua 3 Formation generally less than 80m thick consisting of coarse grained to conglomeratic sandstone with frequent rhyolite pebbles. This can be intercalated with analcimolite beds and lenses. These sediments were deposited by very high energy torrential floods. Massive analcimolite intercalated with sandstone layers follows on top as the Mousmeden Formation reflecting a very active eruptive volcanic phase. This formation is generally around 80m thick, but may reach up to 150m.

- *Jurassic*

The Jurassic consists of the Wagadi Series with a thickness of 80-110m. It commences with the Tchirezrine 1 Formation (Figure 7-9) representing the channel sedimentation of a large river flowing from north to south. Coarse grained sandstones are intercalated with finer grained portions or with siltstones containing much analcimolite. Graben syndimentary tectonics have caused the variations in thickness as known from the drilling. In general the Tchirezrine 1 is quite similar to the higher following Tchirezrine 2 except that it does not contain uranium mineralization.

The top of Tchirezrine 1 is marked by the Abinky Formation (Figure 7-9) below a massive sequence of analcimolite partly silicified or sandy. It is testimony to a period of active volcanism. The formation can be strongly altered and mineralized with copper.

The Dabla Series, up to 350m thick, begins with the Tchirezrine 2 Formation which can reach thicknesses of 40 to 200m in some parts. It lies unconformable on the Abinky Formation showing local scouring. It was laid down in a fluvial-deltaic and lacustrine environment. The sediments are mostly coarse grained sandstones and micro conglomerates with cross bedding at the base and with angular detritus pointing to a short and high energy transport path. This is also documented in local erosion of older sediments. The formation contains the AREVA Imouraren uranium deposit and much of the uranium discovered on the GAFC property. It is the most important target for uranium exploration at this time in this area.

In general the Tchirezrine 2 displays particular sedimentary conditions. Massive sandstone banks at the bottom of the formation with poor grain sorting, erosion laid down in a high energy flow regime. The remaining, stratigraphically higher, parts are made up of fine grained well sorted sandstone with analcimolite on the top and in lenses within the sandstone. This sequence is repeated several times. The analcimolites are considered to represent a similar environment and occupy a similar position to the shale in the lower Carboniferous strata. The sandstone generally

consists of over 80% quartz, 4-5% feldspar and rock fragments of the Abinky or reworked sandstone.

The sandstones are generally poorly cemented. The analcimolite appears in two forms; blue, grey or green within a chloritic matrix or massive brownish in a hematite matrix. The formation was affected by syn-sedimentary tectonics and later shearing. This has contributed to the several hundred metre thickness reporting in the drilling. The sediments are rich in organic matter which may include coal beds, providing a favourable environment for uranium precipitation.

- *Cretaceous*

The Cretaceous starts with the Assaouas Formation Figure 7-13, a transition facies to the more argillitic rocks stratigraphically above. The Assaouas reaching a thickness of up to 30m consists of re-worked older quartz rich sediments and is overlain by fine grained sandstones and argillites.

Overlying the Assaouas Formation is the Irhazer (Figure 7-14), which covers much of the basin and is a testament to a period of little tectonic activity and low erosional regime. It is confined to the Asouza Graben. It represents a lacustrine transgression probably originating in the south or southeast and covering a vast plain affected by subsidence of fine grained sediments.

Uranium exists here and is being mined at the Abkorun property by China National Uranium Corporation just to the west of the GAFC property.

The stratigraphic column of the project area culminates in the sandstones of the Tegama Series which lie with a marked unconformity on the Irhazer sediments. Tegama sandstone is present in two bigger hills inside the Asouza Graben. The lithology here are sandstones which are cross-bedded and coarse to micro conglomeratic. The formation displays heavy quartz veining related to the faults and fractures bisecting it (Figure 7-15, Figure 7-16).





Figure 7-8: Cross-beds in coarse grained to micro-conglomeratic sandstone, Tchirezrine 1 Formation



Figure 7-9: Massive analcimolite, Abinky Formation



Figure 7-10: Tchirezrine 1 sandstone covered in the foreground by analcimolite of the Abinky Formation

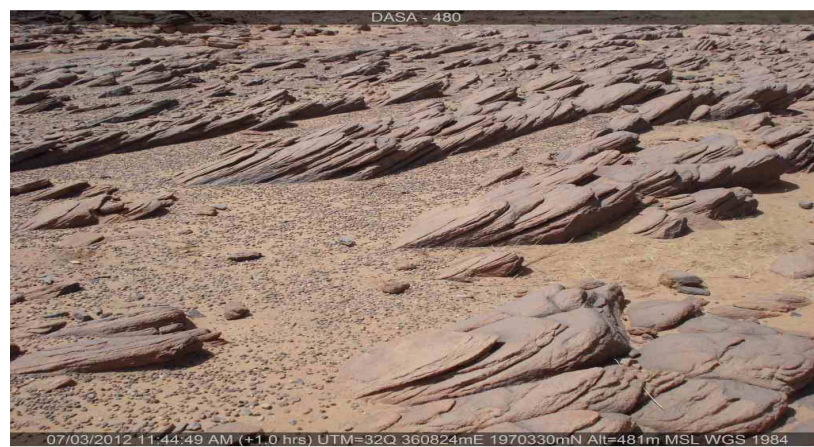


Figure 7-11: Cross-bed figures in the Tchirezrine 2, Northern outcrops at DASA



Figure 7-12: North-South structures in sandstone, Tchirezrine 2 unit, Eastern outcrops DASA





Figure 7-13: Siltstone outcrop, Assaouas Formation, Southern outcrops



Figure 7-14: Irhazer Formation, Limestone strata within argillite, crosscut by E-W transform faults , North-Eastern outcrops



Figure 7-15: Heavily quartz veined Tegama sandstone; mount inside the Assouza Graben



Figure 7-16: Conjugate fracture veined in quartz in coarse cross-bed Tegama sandstone



## 7.5 Structural Geology of the Property

Structural control is important in the formation of most uranium deposits and the DASA area is no exception. The arid climate has prepared and well preserved structural features many of which can be observed at surface.

The DASA site corresponds to a major structural intersection of the Adrar-Emoles flexure and the Asouza fault which resulted in the doming and creation of the Asouza Graben (Siebenthal, JM. 2013). These are features that characterize other major uranium deposits in the Tim Merso Basin as well.

- Adrar Emoles flexure

The Adrar Emoles flexure-fault, one of the major NE-SW structures, intersects the Asouza fault at DASA. This intersection formed a dome, the opening of which created the Asouza Graben (Figure 7-17) moving the Cretaceous formations to the same topographic elevation as the surrounding Jurassic sandstones.

- Asouza Fault

Major NE-SW vertical faults are associated with the Asouza Graben, and characterized by significant vertical displacement of several hundred meters.

The creation of the graben preserved the Tegama and Irhazer Formations at depth, elsewhere found much farther to the west in the deeper areas of the Tim Merso Basin. It also preserved the rocks of the Tchirezrine 2 formation which are much eroded on the sides of the graben.

This vertical displacement has had a major impact in the continuation of potential host rock geometry, and has also provided feeder faults and mineralization traps for mineralising fluids as evidenced by veining within the sandstones NNW-SSE faults and folds

Of key interest are the NNW-SSE faults observed NW of the graben. They cut the sandstone formations of the Tchirezrine 2 unit, inducing vertical displacement, with evidence of fluid circulation, enacting localized alteration and copper mineralization in analcimolite formation of the Tchirezrine 2 unit.

- Shearing fractures and veins

Shearing fractures and veins appear in the limestone, particularly of Jurassic age, near the major faults that have a strike-slip component similar to the Asouza and its branches, and the E-W strike-slip faults

- E-W strike-slip faults

Within the upper, northern termination of the Asouza Graben and elevated from the surrounding plain a limestone outcrop of the Irhazer Formation displays strike-slip faults evidence. A closer examination of the satellite imagery reveals a set of roughly E-W oriented structures on both sides of the graben. These are most likely conjugate to the Asouza fault.



Figure 7-17: Looking SW, Asouza Graben: Cretaceous Tegama sandstones in the foreground, resting on several hundred meters of Cretaceous Irhazer Formation to the left with Jurassic Tchirezrine 2 sandstone in the background. Displacement is in the order of several hundred meters

## 7.6 Uranium Mineralization

Uranium mineralization in Niger is located in sediments of the Tim Mersoï Basin and occurs in most of the thicker sandstone units described earlier, however not always in economic concentrations and tonnage. Uranium is known in the Carboniferous Terada series, in the Carboniferous Tarat and Guezouman Formations (Arlit mines), in the Permian Izegouande, the Jurassic Tchirezrine 2 Formation (Imouraren, DASA, Azelik) and the Cretaceous Dabla Series as well as in the Tegama Series.

There are three areas in eastern Niger where uranium is presently being mined or could be mined in the near future:

- Arlit-Akokan (Akouta) hosting the Somair open pit and the Cominak underground mines (both mainly owned by AREVA) which have produced so far over 110 000t of uranium since the early 1980's with considerable reserves remaining.
- Azelik (Teguida open pit/underground mine) operated by CNNC, 160 km SW of Arlit, however presently not producing.
- AREVA's Imouraren deposit some 80km south of Arlit where an open pit mine is planned to be developed.

The uranium in many of the deposits of the Tim Mersoï Basin is oxidized. Among the primary tetravalent minerals, coffinite is dominant and accompanied by pitchblende and silico titanates of uranium. Uranium hexavalent minerals such as uranotile and meta-tyuyamunite are present in the Imouraren and TGT-Geleli deposits.

The gangue is composed of quartz, feldspar, analcime and often illite, kaolinite and chlorite; with accessories such as some zircon, ilmenite, magnetite, tourmaline, garnet, anatase and leucoxene.

The uranium minerals are frequently associated with copper minerals (native copper chalcocite, chalcopyrite, malachite, chrysocolla) and also with iron minerals such as pyrite, hematite and goethite. The organic plant substances are generally plentiful in un-oxidized facies of greyish-greenish colour.



The geometry and the distribution of the uranium mineralization as seen in the DASA drill core is to a large extent comparable with what has been reported from the uranium mines in the Arlit and Imouraren areas:

- There is a strong control by stratigraphy and lithology - with mineralization mainly hosted within the Tchirezrine 2 sandstones, particularly in the coarser-grained micro-conglomeratic facies of greyish-greenish colour containing frequent sulfides and organic matter such as plant remains.
- The mineralized lenses are contained within NE-SW trending channels. The thickness of the mineralization may vary considerably between drill holes most likely an indication that channel stacking of favourable lithologies has increased the normal thickness of the sediment pile.
- There are strong indications that the mineralization is influenced by a tectonic control along late NE and SW faults where some leaching has been observed.
- Uranium mineralization is controlled by zones of oxidation – from surface (ground oxidation) and local / regional zones on depth (Figure 7-17)
- Ground water circulation has created over time discontinuities in the mineralization as a result of tectonic movements

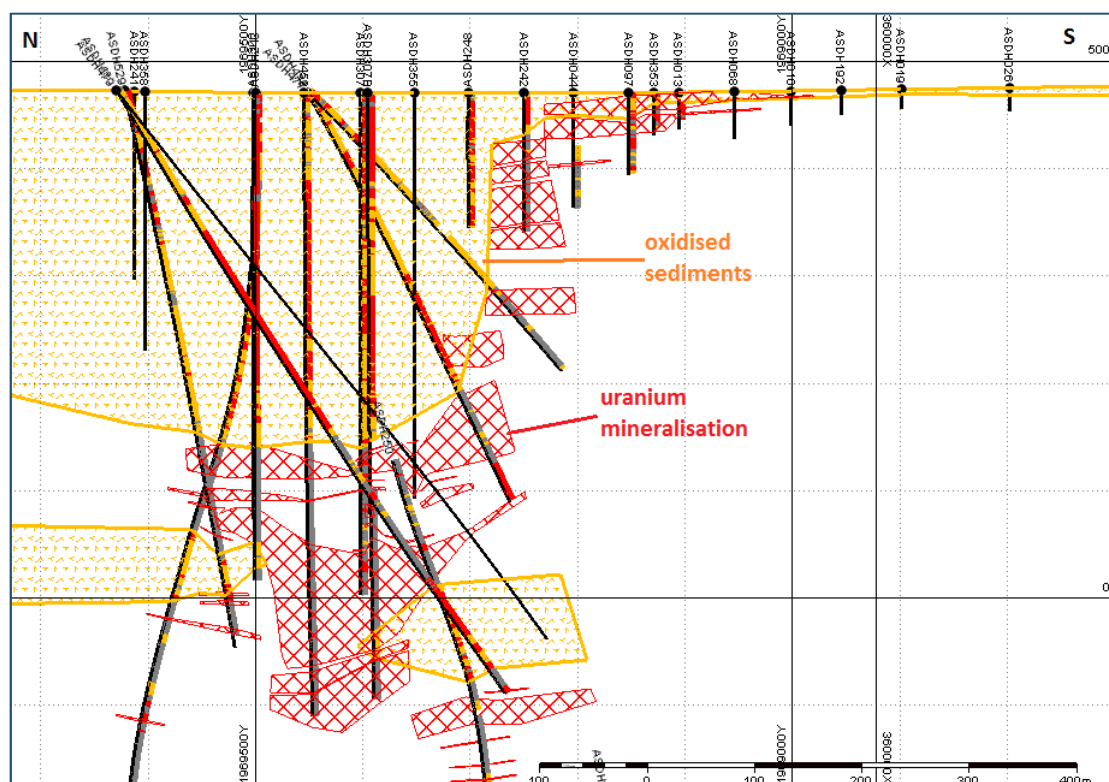


Figure 7-18: Uranium mineralization controlled by zones of formation of oxidation

Thin section work and petrographic studies by Activation Lab (2007) on DASA samples has revealed that the uranium host rocks are sandstone and wacke which are variably oxidized. The main component is angular quartz, some plagioclase and lesser orthoclase. They are cemented by goethite, amorphous Fe-hydroxides and various secondary U rich minerals.

The original cement between the grains of quartz and feldspar consisted of sericite and carbonate which were replaced during later stages by goethite and the amorphous Fe-hydroxides. The quartz and the feldspar contain micro fractures partly filled with U rich oxide. The latter also rim some of the silicates. Uranophane in form of radiating aggregates forms cement between the silicates and partly replaces them.

GAFC initiated a mineralogical study of the uranium mineralization on its property (Molebale, 2012). Five drill samples and five residue samples were submitted for analysis. The samples were from drill holes ASDH 351,353, 354(1), 354(2) and one DADH sample. The samples were split into representative portions and polished sections were prepared. Subsamples were pulverized for x-ray diffraction (XRD).

Five uranium bearing minerals have been identified in DASA samples (Molebale, 2012):

- Carnotite  $K_2(UO_2)_2(VO_4)_2 \times 3H_2O$ ;
- Uranophane  $Ca(UO_2)_2SiO_3(OH)_2 \times 5H_2O$ ;
- U-rich titanite  $(U,Ca,Ce)(Ti,Fe)_2O_6$ ;
- Coffinite  $U(SiO_4)_{1-x}(OH)_{4x}$
- Torbernite  $Cu(UO_2)_2(PO_4)_2 \times 11H_2O$ ;
- Autunite  $Ca(UO_2)_2(PO_4)_2 \times 12H_2O$

The majority of the mineralization is comprised of Carnotite, Uranophane and U rich titanite and contribute to most of the uranium in the ASDH samples in terms of mass %, while torbernite is dominant in the DADH sample. The average grain size for the observed uranium-bearing minerals is  $\sim 38 \mu m$ .

The source of the uranium is very likely leaching of the frequent volcanic tuff and ash blankets and intercalations now altered to analcimolite within the Wagadi and Dabla sediment packages. This has occurred over time in the geological history of the area and probably began as pre U concentrations during the early sedimentation in favourable reducing environments such as organic matter rich lower flow regimes and in favourable lithologies. The first stratiform mineralized bodies would have been formed during the early diagenesis. Later, structural deformation and ground water movement within coarser grained organic rich sediments aided by fluid movements and influenced by faults and tectonic activity initiated roll front like re-distribution of the uranium thus giving the mineralized bodies their present shape.

## 8 Deposit Type

All known uranium occurrences and deposits in Niger are located in sandstones and conglomerates within the Tim Merso Basin. They are all classified to belong to the sedimentary tabular, paleo channel and roll front or sandstone types.

Sandstone hosted uranium deposits are marked by epigenetic concentrations of uranium in fluvial/lacustrine or deltaic sandstones deposited in fluvial continental environments frequently in the transition areas of higher to lower flow regimes such as along paleo ridges or domes. Roll front type deposits contain impermeable shale or mudstones often capping or underlying or separating the mineralized sandstones and ensure that fluids move along within the sandstone bodies thus imitating roll front type systems most famous in Wyoming and Colorado in the western USA.

In the sandstone type deposits uranium was typically precipitated from oxidising fluids by reducing agents such as plant matter, amorphous humate, sulfides, Fe minerals and hydrocarbons. The oxidation and reducing facies display typical colours and can assist in exploration target selection. The fluid migrations and deposition of uranium leaves behind a distinct colour change from red hematitic (oxidized) to grey green (reduced). The primary uranium minerals in most sandstone type deposits are uraninite, pitchblende, coffinite and some secondaries.

Uranium deposits hosted in sandstone make up some 30% of the world's known uranium resources and contain up to 500,000t of uranium with average grades between 0.1 to 0.5% U

In general, it can be noted that in eastern Niger from north to south the uranium mineralization seems to occur in younger and younger strata. This is most likely a combination of a change in source areas and delivery of uranium over time as well as the fact that to the south the younger strata are exposed on surface necessitating deeper and deeper drilling in southern areas to explore e.g. for the Carboniferous-aged targets.

In the DASA deposit characteristics more consistent with the paleo channel tabular type seem to prevail. The uranium within the Tchirezrine 2 sandstones are most likely derived from leaching of thick packages of volcanic tuff and ash layers (the so called analcimolite) with the Wagadi and Dabla formations. The Carboniferous Tarat and Guezouman formations most likely had the uranium originating from weathering of the Air Massif crystalline basement and volcanic activity at the time. Alteration and leaching of the strata and subsequent sedimentation introduced the uranium into favourable reducing environments such as organic- rich lacustrine areas within coarser grained sandstones.

Stratiform lenses of uranium mineralization at DASA probably formed during the early diagenesis.

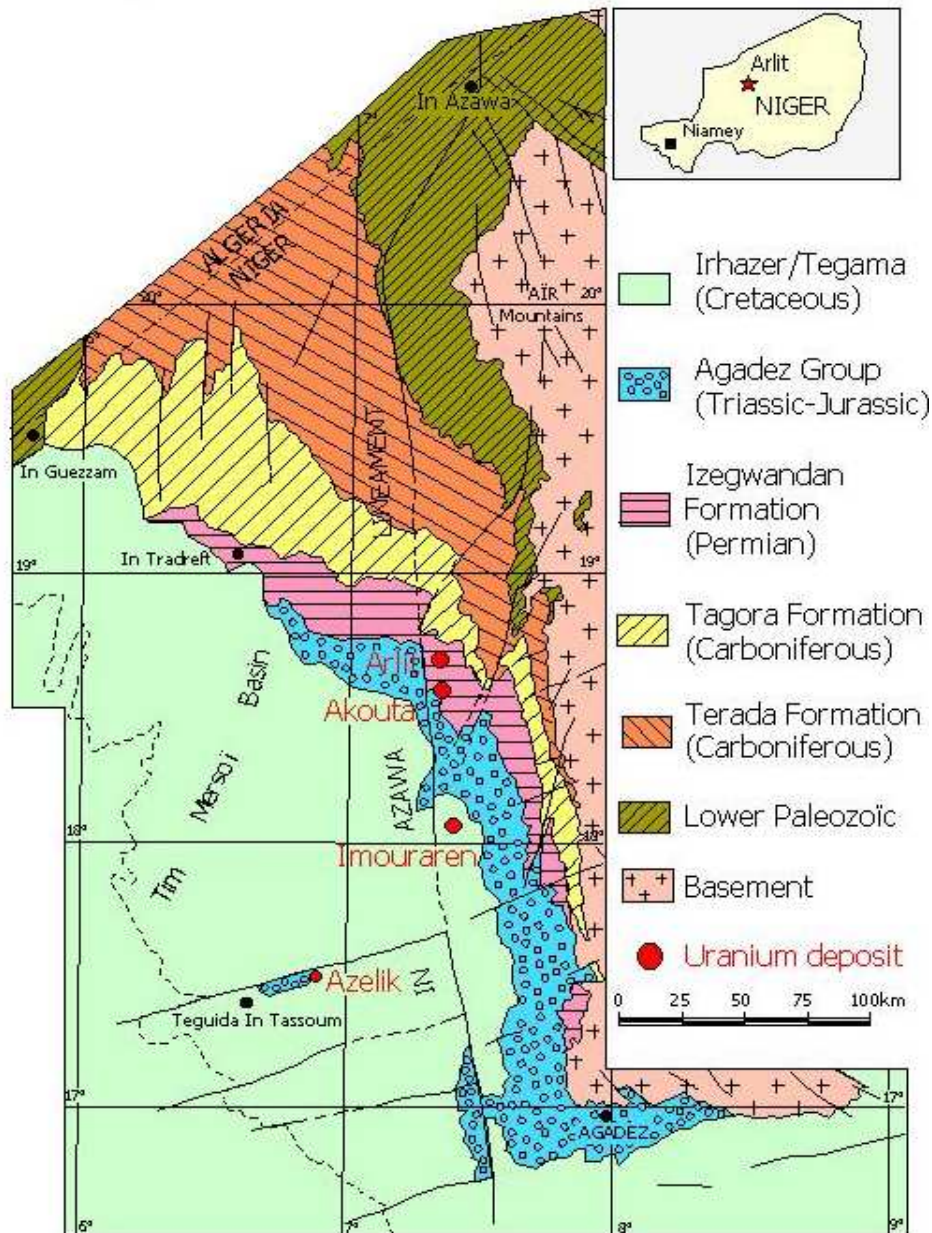


Figure 8-1: Most important Uranium deposits of the Tim Mersoï Basin, Niger

Uranium mineralization in the Tim Mersoï Basin has been observed in seven geological formations:

- in Devonian Teragh Formation;
- in Carboniferous Guezouman and the Tarat Formations;
- in Permian Madaouela Formation;
- in Jurassic Tchirezrine and Moradi Formations; and
- in Cretaceous Assaouas Formation and sandstone lenses of the Irhazer Formation.

The main uranium deposits in the Tim Mersoï Basin occur in:

- Guezouman Formation

The south limit of its outcrop area is situated in the neighbourhood of 17°30'N. This formation at the base of the Tagora Formation is composed of coarse sandstones with intercalations of silty argillites rich in organic plant substance and rests in discordance over argillites of the Talak. The conglomerate of Teleflak is sporadically present at the base of the Guezouman and is generally a uranium bearing horizon. The Guezouman formation is characterized by three main levels of mineralization in the Afasto, Akouta and Akola deposits near Arlit. The Madaouela deposit containing 6,000 tons of uranium metal is also partially within the Guezouman.

- Tarat Formation

This formation from the Upper Tagora series is composed of sandstone; non oxidized facies which are locally impregnated by pyrite. Thin beds of argilo-silt rich in plant substances can be found near the top of the formation. The extension of the Tarat southward up to 17°30'N is more important than the Guezouman.

The stratigraphic series begins with the Lower Carboniferous and the termination of the Carboniferous period is marked either by the Tarat, the Arlit or the Madaouela formations, depending on the area.

The Tarat is the host formation for most deposits in the Arlit area and is the second in importance for its uranium potential. The mineralization is essentially at its base or near the contact with the Tchinezogue. The Arlit deposits have produced to date over 110,000t of U.

- Madaouela Formation

This formation rests on the Tarat and is composed of an alternation of clayey fine sandstone and clayey siltite rich in plant fragments, the uranium mineralization is associated with sandstones. The Madaouela deposit about thirty kilometres to the Southeast of Arlit discovered in this formation by the ONAREM-PNC association turned out to be uneconomic at the time and was later explored again by Goviex- (Madaouela deposit).

- Tchirezrine Formation

This Jurassic sandstone formation is part of the Upper Irhazer Group. Its thickness may reach over about 150 metres, outcrop areas are east of 7°30'E and between 18°N to 16° 45'N. The formation includes two levels (Tchirezrine 1 and 2) discontinuously separated by layers of analcimolite from the Abinky Formation.

Most of the uranium mineralization is within the Tchirezrine 2 and related to a roll front type depositional environment displayed in the very large Imouraren deposit of which many characteristics are also seen at DASA.

- Assaouas Formation

The fine grained sandstones of the Assaouas Formation are an intermediate passage between the coarse detritic sediments of the Tchirezrine II and the argillites of the Irhazer Formation. This formation is famous for its imprints of dinosaurs. Although not bearing any important deposit, the Assaouas sandstones contain thin highly mineralized layers most notably in the Tin Adrar area.

- Irhazer Formation

The Irhazer series rest on the Agadez Group and is composed of fine argilo-silteous layers with intercalations of marne-calcareous layers, sandstone lenses and beds of volcanic tuffs. Its outcropping area is roughly west of 7°40'E between 16°45' and 19°N.

This formation is characterized by a dozen level of uranium mineralization of which the most important is situated at the base of the Irhazer at an average depth of 190 metres. The Geleli and IR deposits of 15,000tU at 0, 25 % near Teguidan Tessoum is hosted in this formation.

The best uranium grade and tonnage on GAFC's property found so far is hosted in sandstones of the Tchirezrine 2 Formation, the same formation that also contains the huge 300,000t U Imouraren deposit of AREVA, located just 40km to the northwest (Cazoula, 1985). It has already been proven by GAFC's exploration work that many of the characteristics of Imouraren exist also within the GAFC's tenure. These include:

- Stratigraphy and Sedimentology:

Uranium is primarily found in the Tchirezrine 2, especially in heterogranular sandstones with analcimolite pebbles.

- Palaeography:

Mineralization is found in the vicinity of the main channel, the formation of which was partly controlled by post and synsedimentary tectonics while the Tchirezrine 2 was laid down.

- Tectonics:

Some remobilization of uranium along faults is known along E-NE directions, which are post Tchirezrine 2 faults.

- Paleohydrology:

Ground water circulation has affected an earlier concentration stage and has dissolved U in some parts of the deposit and re-concentrated it in other parts.

- Uranium mineralogy:

Contrary to the Carboniferous mineralization in the Arlit area, the uranium in the Tchirezrine 2 appears mainly as uranium hexavalent minerals in an oxidized environment. Uranotile is the most abundant mineral. It may form small aggregates or appear as continuous coating parallel to the stratification.

Uranotile is commonly associated with chrysocolla and in small quantity also associated with boltwoodite. Metatyuyamunitite has also been found. Some coffinite exists in residual reduced zones along with chalcocite and native copper. Pitchblende was noted in small amounts.

The uranium mineralization occurs in two main types: Interstitial within the sandstones and massive ore associated with sulphides in micro fissures with galena and blende.

Few other minerals have been found, however calcite seems to appear only at the periphery of the mineralized body.



## 9 Exploration

GAFC acquired the Tin Negouran 1, 2, 3, and 4 exploration permits in January 2007. Exploration work was initiated by re-sampling material residual from historical PNC exploration activities. This re-sampling confirmed high uranium values in the material.

In September 2007, the government of the Republic of Niger granted Global Atomic the Adrar Emoles 3 and 4 permits. Ongoing exploration work and metallurgical studies have confirmed that significant uranium mineralization is located around the DASA area within the Adrar Emoles 3 permit. Other uranium occurrences exist within the Adrar Emoles 3 and 4 permits.

GAFC has undertaken exploration and evaluation activities on the DASA project since 2010. The DASA project area covers an area measuring approximately 10 kilometres along the strike of the Azouza graben by about 2 kilometres. However, drilling has only focussed on a small portion of this area.

In 2012, drilling efforts were realigned to achieve two goals: expand the Mineral Resource, particularly the deeper higher grade uranium mineralization, and to understand the geological controls on the distribution of the uranium mineralization.

### 9.1 Data compilation and old drill holes location

In 2008, GAFC started data compilation to physically locate historical drill holes, mainly from the previous operations of the Japanese company PNC (Power Nuclear Fuel Development Corporation). This work was successful at locating many holes at the Azouza North East prospect (holes G030, G094, G097, G130...) and the Dajy prospect (G120 to G136) located south of the DASA deposit. Only peak radiometric values recording was available (Table 9-1).

Table 9-1: PNC significant drillholes

Hole-id	Location X (UTM WGS84 / 32N)	Location Y (UTM WGS84 / 32N)	Peak radiometric value (CPS)	Depth (m)	Prospect	Location
G030	366591	1973277	6600	174	AZOUZA NORTH-EAST	North-East of actual DASA deposit
G034	361739	1968205	2150	438	DAJY	South of actual DASA deposit
G067	361746	1970731	2000	581.45		North-East of actual DASA deposit
G094	364216	1971980	5899	528.3	AZOUZA NORTH-EAST	North-East of actual DASA deposit
G096	361165	1969340	4467	412	DAJY	South of actual DASA deposit
G097	362183	1971953	2811	474.7	AZOUZA NORTH-EAST	North-East of actual DASA deposit
G120	361256	1969305	5417	428	DAJY	South of actual DASA deposit
G129	362697	1970250	2360	420.95	AZOUZA NORTH-EAST	North-East of actual DASA deposit
G130	365843	1972250	2327	275.5	AZOUZA NORTH-EAST	North-East of actual DASA deposit
G132	361735	1969110	1547	407.7	DAJY	South of actual DASA deposit
G133	361436	1969235	3542	428	DAJY	South of actual DASA deposit
G134	361720	1970070	4461	398	DAJY	South of actual DASA deposit
G135	360889	1969449	5727	427.7	DAJY	South of actual DASA deposit
G136	360825	1968195	1000	453	DAJY	South of actual DASA deposit

GAFC first exploration activities were then concentrated on the above areas, and included:

- Radiometric ground survey
- Geology and structural studies
- Topographic 3D survey
- Drilling

## 9.2 Radiometric ground survey and geo-structural mapping

GAFC did ground scintillometer survey on DASA area (DASA1, 2, 3 prospect) covering about 4 km<sup>2</sup> using SAIC Exploranium GR-135 Plus radioisotope identification device. Natural gamma peak value was recorded for each sampling station.

The DASA 1 prospect was covered at a sampling density of 100m x 100m; 100m x 50m; to 25m x 25m locally for a total area of 1.5 km<sup>2</sup> covered and 105 points surveyed. The objective was to delineate the surface anomaly of this area's Tchirezrine 2 sandstone.

The DASA 2 prospect was covered at a sampling mesh of 100m x 100m; 50m x 50m; to 25m x 25m locally for a total area of 1.39 km<sup>2</sup> covered and 124 points surveyed.

13 points were surveyed on the DASA 3 prospect at regular sampling mesh of 100m x 100m covering a total area of 2.4 km<sup>2</sup>.

A total of 15 rock samples were collected on the highest radiometric count survey point for assays (Table 9-2).

Table 9-2: First rock samples of DASA area

Rock Sample	Location X (UTM WGS84 / 32N)	Location Y (UTM WGS84 / 32N)	Peak radiometric value (CPS)	Prospect	Assay Sample #	%U <sub>3</sub> O <sub>8</sub>	PPM	lbs/tonne
Dasa-1-001	360978	1970418	4218	DASA 1	D1 - 1	0.447	4,470	9.85
Dasa-1-002	361078	1970393	4800	DASA 1	D1 - 2	0.554	5,540	12.21
Dasa-1-003	361178	1970368	4700	DASA 1	D1 - 3	0.025	250	0.55
Dasa-1-004	361178	1970343	3850	DASA 1	D1 - 4	1.92	19,200	42.32
Dasa-1-005	361203	1970368	65535	DASA 1	D1 - 5	24.3	243,000	535.57
Dasa-2-001	360440	1970280	57200	DASA 2	D2 - 1	1.43	14,300	31.52
Dasa-2-002	360415	1970280	3617	DASA 2	D2 - 2	0.042	420	0.93
Dasa-2-003	360465	1970280	21542	DASA 2	D2 - 3	0.056	560	1.23
Dasa-2-004	360490	1970280	3434	DASA 2	D2 - 4	0.01	100	0.22
Dasa-2-005	360515	1970255	3870	DASA 2	D2 - 5	0.013	130	0.28
Dasa-3-001	360360	1969241	1500	DASA 3	D3 - 1	0.028	280	0.62
Dasa-3-002	360160	1969110	1800	DASA 3	D3 - 2	0.008	80	0.18
Dasa-3-003	360060	1969080	1800	DASA 3	D3 - 3	0.012	120	0.26
Dasa-3-004	359964	1969031	33000	DASA 3	D3 - 4	0.836	8,360	18.43
Dasa-3-005	359848	1968998	1720	DASA 3	D3 - 5	0.003	30	0.07

The highest radiometric peak survey points were designated to be the first drill points in Year 2010 (Figure 9-1).

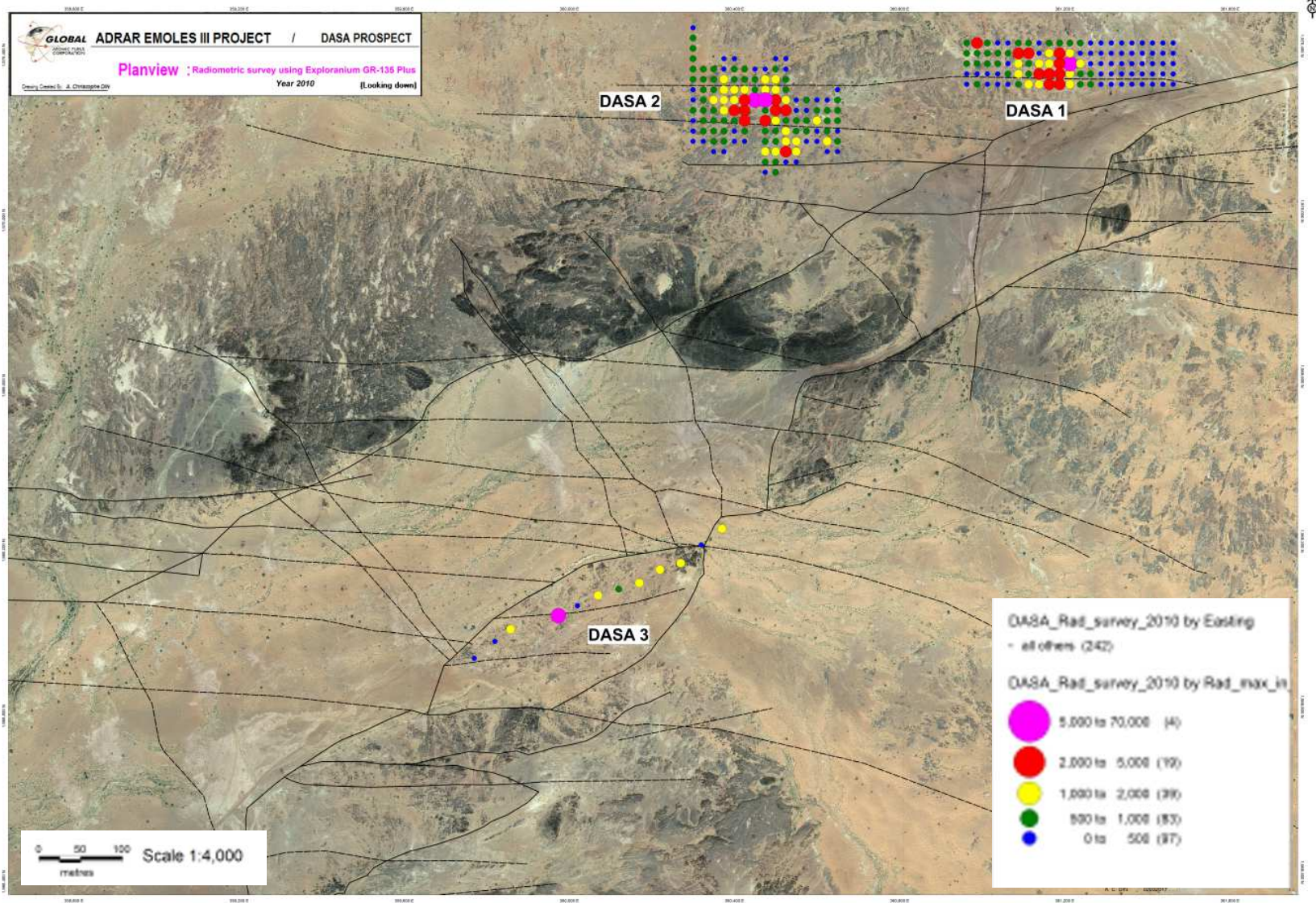


Figure 9-1: Radiometric sampling points



Following this survey, Dr Leslie Wright from NewMines Management Services Ltd was hired to complete a study of the mineral potential of the concession. This led Dr Leslie to conduct an Interpretation of the tectonic structures, their age and influence in the control of the uranium mineralization using the initial radiometric survey results and the earlier drilling results as mineralization evidence.

The study took place during May 2010 concluding that the DASA area was affected by a main N010 fault system crosscut by the N075 (Azouza fault). The intersection of the first N010 and N075 with the N090 -110 structures appears to be key to creating higher grades which are strongly focused at the location of the prospect but are concentrated also at two areas to the south in this area and pretty much along the line of the main N-S UTM grid co-ordinate. DASA 1 and 2 prospects are affected by a rotated continuation of the 120° trending faults axial planar to the dome structure which hosts the mineralization. DASA 3 shows a slightly different picture in terms of the definition of targets with the fold/fault repetition of the mineralized layer appearing likely with the structure being faulted by a 160° trending fault set.

The 010° fault in the east of DASA 3 area is only marginally deformed but the rotational interaction between the N045 (Adrar Emoles regional fault) and N010 in the middle of the prospect area creates a compressional environment which may focus mineral deposition.

### **9.3 Topographic survey**

In order to better define the topographic level of the DASA area, GAFC hired Terrascan airborne for the LiDAR survey and aerial photography totalling approximately 120 km<sup>2</sup>. The detailed aerial survey was conducted in December 2013 by CK Aerial Surveys (CKAS) appointed as a sub-consultant on behalf of Terrascan airborne. The survey was conducted from a fixed-wing platform and consisted of three-dimensional laser scanning (LiDAR) and high resolution aerial photography.

#### *9.3.1 Ground control*

Ground control points were surveyed throughout the site using surveying grade GPS receivers. The surveying was done by means of baseline post-processing. All surveyed baselines had resolved integer ambiguities and therefore none of the surveyed baselines were rejected.

#### *9.3.2 Aerial Survey*

Following is a summary of the aerial data capturing dates and equipment:

The survey was done on 31<sup>st</sup> December 2013 using Diamond DA42 MPP Aircraft equipped with a Leica ALS50-II Laser scanner and a 39-megapixel Leica RCD105, 60 mm lens Camera.

During the execution of the aerial survey, a GPS base station was operated in order to enable accurate differential processing of the aircraft trajectories. In addition to the position of the aircraft being determined along the flight trajectory, its orientation angles were determined at every point along the trajectory through the use of a state-of-the-art inertial measurement unit (IMU). Using the orientations and GPS-based positions of the aircraft, an accurate point cloud was generated from the continuous laser scanning and aerial photographs were also captured throughout the flight. The laser scanning data was fitted onto the ground control survey. Thereafter, the points were thinned to only include ground points in order to generate a digital terrain model (DTM). The pixels from each individual photograph were projected onto the DTM to create rectified photos. Corresponding pixels on overlapping photographs were

identified as so-called tie-points. The ground control points were also added as tie-points on the photos and the image orientations were adjusted by means of a statistical least-squares adjustment in order to fit onto ground control and each other. Finally, the individual photos were adjusted to match seamlessly onto each other to form an orthophoto mosaic.

The final DTM is used as the topographic surface on which all the drill holes are now pressed to get the homogenized elevation (Z).



## 10 Drilling

### 10.1 Geological Exploratory Drilling

GAFC started drilling on the Adrar Emoles 3 property in 2010. To date, 970 holes (Figure 10-1) including 867 rotary holes and 103 diamond drill holes were drilled for total of about 119,620m on the project delineating the DASA deposit. Drilling of these holes were executed by local drilling companies including TIDIT, ENYSA, ESAFOR, LEGENI (owned and managed by Nigerians), ULC a small French geo-consulting company and finally the West African branch of the French drilling company FORACO. The drilling with detailed statistics is summarized in Table 10-1.

Table 10-1: GAFC DASA project drilling statistics (21/05/2015 statement)

Year	Rotary Drill Holes		Diamond Drill Holes		Total	
	Holes	m	Holes	m	Holes	m
2010	46	1,142	3	437	49	1,579
2011	607	38,381	18	986	625	39,366
2012	197	36,504	41	6,251	238	42,755
2013	17	10,734	28	16,621	45	27,355
2014	0	0	12	8,064	12	8,064
2015	0	0	1	501	1	501
<b>Total</b>	<b>867</b>	<b>86,761</b>	<b>103</b>	<b>32,859</b>	<b>970</b>	<b>119,620</b>

The earlier drilling was concentrated on the DASA surface anomalies with drill depths less than 300 meters and mostly drilled by rotary (653 Rotary Drill holes for 21 Diamond Drill holes between 2010 and 2011). These lead to the discovery of the surface mineralization of DASA 1, 2, 3 hosted in Tchirezrine 2 sandstone.

In 2012 during a deeper drilling campaign (up to 754), GAFC discovered the graben main deposit at DASA. Drilling in this area below 350 meters of Irhazer mudstone targeted the Triassic-Jurassic sandstones (Tchirezrine 2 [hosting AREVA's huge Imouraren deposit] and the Teloua formations) and even deeper, the Carboniferous formations hosting the AREVA Cominak and Somair deposits at Arlit. Figure 10-1 shows the drill hole locations.

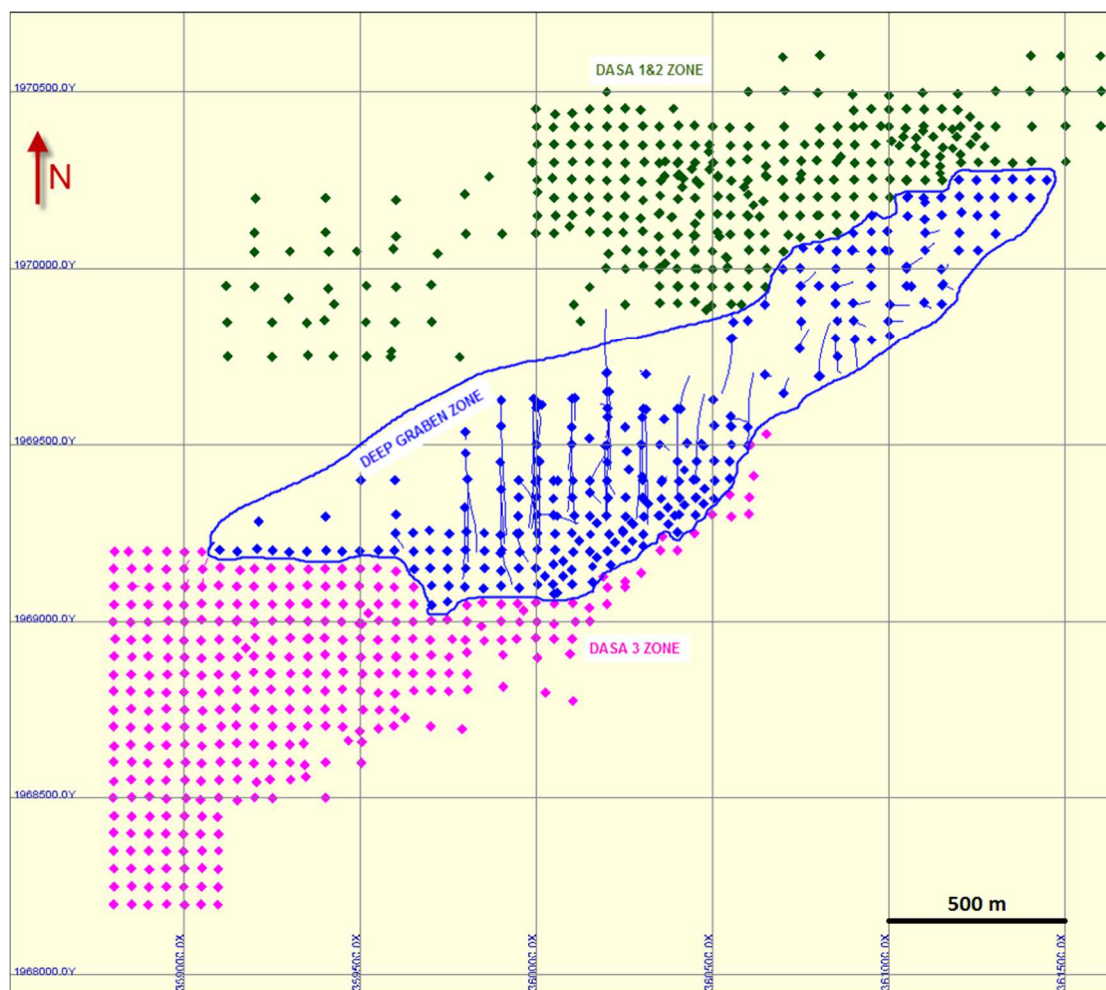


Figure 10-1: DASA drill holes location map

### 10.1.1 Drilling procedures

The drilling process through to the sampling is guided by the company procedures validated by the qualified person (QP). The drill programs were designed by GAFC staff in Toronto and implemented by the company Exploration Manager based in Niger with the contribution of the Niger exploration team.

The planned holes locations were pegged by a surveying crew using appropriate surveying tools (Leica DGPS when available or simple GPS). The geologist in charge of drilling checks the hole location before the drilling commences. A subset of the drill holes collars were verified by CSA Global’s QP during site visit and were found in the appropriate locations.

Each new drill set up on a hole requires a Geologist to be present. He checks the rig settings: azimuth and dip of the mast before leaving the drill monitoring technician to follow up on the drilling.

### *10.1.2 Drilling monitoring*

All drilling is monitored by a GAFC technician or geologist recording the drill time of each rod and notes any technical issue occurred during the drilling.

During diamond drilling a GAFC geologist supervises the drilling being physically present on drilling site.

#### *Rotary drilling*

On a rotary drill rig, the rock chips come out with the mud. The drill company workers collect the drill chips from the drill pipe at the hole collar every meter and arrange them in individual piles for the lithological logging. Since 2014, part of the chips of each one meter run are washed and put in the chip tray for further description and archives in the core shed at the GAFC base camp.

Each meter run is tested with the handheld radiometric scanner by GAFC workers. The depth and the radiometric counts are recorded. For earlier holes, these records were not always kept to be used for further depth corrections (lithology versus gamma probe depth). Comments are recorded on recovery and suspected contamination.

#### *Diamond drilling*

For diamond drilling, it is GAFC procedure to have a geologist physically present for the drill supervision with at least one technician. For each run, GAFC Technician collects the core from the drillers. The core is cleaned and laid down in the core box on which the technician has prior written the hole id, and box number. Cores are arranged as they would be in situ. A wooden or plastic block is placed at the end of each run recoding the depth. The recovered core is measured to state the recovery percentage. Any detected core loss is recorded marked with a tag indicating the length of core loss. The core depth is then marked on the core at 1 m intervals.

When an orientation survey is done, the core is marked by the Geologist using a solid line with arrows pointing downhole as orientation survey marks. When the core orientation is not reliable, the core is marked using a broken line with arrows pointing downhole. All Diamond Drill holes from 2012 were oriented using an ACT II Reflex tool when ground condition allowed it.

Each core run is scanned using a Thermo Scientific RADEye PRD – ER to record the radiometric response in counts per second (Cps). Measurements are taken at 10 cm intervals for 5-10 seconds duration. The exposure time can vary up to 10 seconds when the count rate is over 200 Cps.

The core is collected daily and transported to the core storage facility for detailed geological logging and photographed (Figure 10-2) at the dedicated core photography facility.



Figure 10-2: Diamond core photograph example

## 10.2 Down-hole survey

During investigation of uranium projects the following list of downhole geophysical surveys are commonly used to help refine the geology of the deposit.

- gamma-ray logging (“GR”);
- electrical methods (resistivity logging (“RL”) and spontaneous polarisation (“SP”) logging);
- directional survey (“DS”);
- calliper logging (“CL”);
- prompt fission neutron logging (“PFN”).

During exploration and evaluation GAFC have used some of these methods and the results and methods are discussed in the following sections.

### 10.2.1 GR Logging

GR was done routinely in the open hole conditions. In most holes (rotary or diamond core) the holes were filled with water or mud. In areas of problematic ground conditions the logging was done inside the drill string or casing.

Several probes were used on the project for the gamma logging. The parameters of each are summarized in the Table 10-2.

Holes DADH-081 and DADH-011 were used as calibration holes. Each hole was logged once a week to calibrate the gamma tool.

The majority (97%) of down hole logs were interpreted in Germany by Terratec al Services; the remaining 3% of holes were interpreted by Semm Logging in France. The logging

companies were based at the GAFC base camp and all logging was started within 30-60 minutes of completion of the drill hole.

Table 10-2: gamma-ray probes parameters

PROBE ID	Probe K factor (U)	Probe diameter (mm)	Mud shielding factor (mm-1)	Probe dead-time (s)	Casing shielding factor (mm-1)	Probe_length (mm)	CRISTAL reference
DIL38 #1125	0.1305	38	0.0047	0.000004	0.043	2120	1"x 2" NaI crystal
DIL38 #1126	0.1305	38	0.0047	0.000004	0.043	2120	1"x 2" NaI crystal
DIL38 #1250	0.1362	38	0.0047	0.000004	0.043	2120	1"x 2" NaI crystal
DIL38#801	0.126	39	0.0047	0.000004	0.043	2120	1"x 2" NaI crystal
BDVG #735	0.1119	42	0.0047	0.000004	0.043	140	1"x 2" NaI crystal
DGGG1307, PM	0.8089	42	0.0047	0.000004	0.043	150	2cmx5cm NaI
DGGG1304, PM	0.8089	42	0.0047	0.000004	0.043	150	2cmx5cm NaI
DGGG9354, PM	0.8089	42	0.0047	0.000004	0.043	150	2cmx5cm NaI

Prior to 2014, a logging protocol was not clearly defined. Based on investigation by CSA Global most work comprised dual induction and gamma log measurements (DIL). The logging speed has been estimated at 3 to 4m per minute, which was deduced from the time spent on hole logging. Sampling intervals varied from 0.01 m; 0.05 m or 0.1 m.

Starting in 2014, Terratec geophysical services used the following logging methods:

- Dual induction and gamma log measurements of the rock conductivity; total count gamma was used for the determination of the equivalent radiometric grades of  $eU_3O_8$
- Combination tool including verticality/focused electric resistivity/Natural Gamma (DGGG)
- The first measurement run was performed inside the fully cased borehole or drill string with the DGGG or DIL Probe with an approximate logging speed of 4 – 6 m/min and a sampling rate of 0.1 m.
- After the rods were removed the drill hole was filled with water and re-logged using the Combined Verticality/Focused Electric Resistivity/Gamma Probe (as long as the drill hole is still open). The measurement speed of approximately 5.00 m/min was used in unmineralized intervals at a sampling rate of 0.1 m. within the mineralized zones the logging speed is decreased to approximate 1.5 m/min. One meter beneath the mineralized zones the logging speed will be increased again to 5 m/min.

All the equivalent uranium oxide ( $eU_3O_8$ ) was determined by GAFC consultants taking into account a steel correction factor when the logging was completed inside the casing or drill rods. A report in \*.LAS format was sent to GAFC including the radiometric survey and the calculated  $eU_3O_8$ .

For quality - and calibration-control, the calibration holes were tested at least twice a month and always just before probing a new drill hole. Records are kept by the contractor and delivered to GAFC.

Terratec has indicated that all probes used on the project are properly calibrated to a defined U-Standard. One calibration U-Standard that was used is located in Saskatoon-Saskatchewan/Canada and a second one in Straz Pod Ralskem/Czech Republic. The last available calibration report from Terratec is from September 2013 which returned good



results and the calibration was performed at the Saskatchewan Research Council Uranium Test Pits in Canada.

More detail discussion about  $eU_3O_8$  and Radioactive Equilibrium Factor (REF) is provided in the Section 11.

#### *10.2.2 Downhole Survey*

Prior to year 2012, GAFC was drilling shallow holes, and no deviation surveys were completed. Since 2012, all the holes drilled especially in the graben area were systematically measured for deviation (if the hole remained open).

Both Terratec and SemmLogging recorded the azimuth and the dip of the drill hole at the same time as gamma logging using a combination tool.

GAFC also owns a Ranger Explorer Mark II wireless magnetic multi-functional survey system that was used to measure azimuth and inclination for drill holes not surveyed during down hole logging.

GAFC also rented a Reflex tool EZTRAC (same system as the RANGER Explorer), operated by its rig monitoring technicians. Some holes were surveyed using this tool.

Each completed drill hole was marked on surface using a heavy cement concrete slab containing:

- The project company name: GAFC,
- The hole name/ number,
- The hole type (DD, RD...),
- Total length (Core length or the reconciled depth after comparing probe and handheld radiometric scanner depth when rotary drilling),
- The azimuth and dip, and
- The drill date (Year).

The hole was then surveyed using the Leica DGPS or Total station by the surveying crew or appointed technician / geologist.

#### *10.2.3 Drill hole Diameter Measurements ("CL")*

Calliper logging was not routinely done. CSA Global recommends that all future down hole logging include this feature to improve the gamma-logging interpretation. The interpretation of uranium grades from gamma-logging includes hole diameter. The cavities could also influence the interpretation results and ultimately the calculated uranium grades.

#### *10.2.4 PFN Logging*

PFN logging was not done, CSA recommends a selection of future drill holes to try this method to assess radiological disequilibrium.

### **10.3 Rotary chips and core logging**

GAFC uses CAE Mining's commercial data management software called Fusion. GAFC uses four main modules of Fusion for data capture and storage:

- FUSION ADMINISTRATOR: to manage user rights and data transfer instructions
- DHLOGGER: for logging the geology, structure and geotechnical aspects; for both core and chip logging. It is also used to merge down holes logging and assay import and depth correction.
- FUSION CLIENT: to facilitate data transfer from the field to the office server (intermediate based in Niger and called Fusion Remote, and Central based in Toronto).
- QUERY BUILDER: to export stored data for external use.

The workflow for this system is summarized in Figure 10-3.

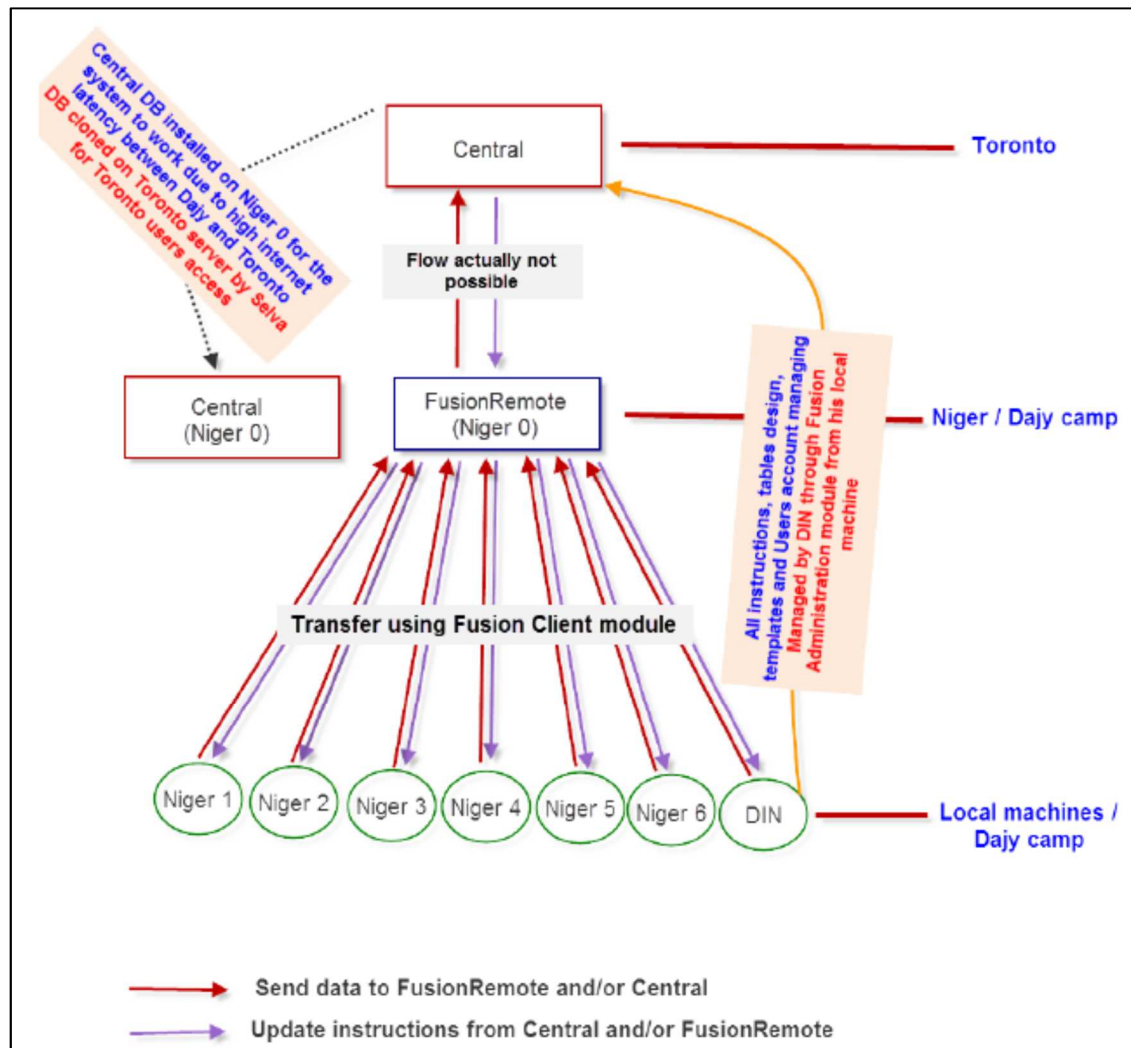


Figure 10-3: GAFC data collect and handling system / CAE Mining FUSION

### Rotary chip logging

All rotary drill holes have been geologically logged based on one metre subsamples. Initially these were based on piles of chips presented by the drillers or the GAFC technicians at the logging facility. However, more recently GAFC has collected washed reference samples into

chip trays for logging and future reference. Initially logging was completed on paper logs, but since the implementation of Fusion all data capture has been done digitally.

### *Core logging*

More detailed logging procedure were implemented by GAFC for core logging to ensure the more detailed data was captured. The information below outlines the procedures used.

- A geologist remained at the rig at all times during coring
- All core was processed at site depth measurement, recovery and core cleaning
- Core was then transported to the logging facility on daily basis
- A core library has been established at the base camp to aid in the identification of lithology and rock type aiming to ensure consistent descriptions by the logging crews.
- Special procedures were in place for the handling of radioactive core for logging and sampling. The procedures are available in hard copy in the logging facility.
- Radioactive core was hand scanned with a personal radiation detector to allow comparison with the down hole probing. The radiometric core was taken from the box and hand scanned every 10cm on a table inside the core shed. Measurements were recorded in an Excel spreadsheet.
- The core boxes were laid down on the logging table at the core shed and descriptions were made using DHLOGGER. When geological logging was complete, then the core was marked for geotechnical logs when the core was oriented.
- Each hole was then marked up sampling.
- All core was photographed in a dedicated facility and transferred to the commercial TEC-CORIM software allowing image manipulation including transfer to the Fusion data base.
- Geological logging was completed for the following attributes:
  - Geological formations (Table 10-3);
  - Colour (Table 10-4), which is important for definition of initial reduced sediments and epigenetic oxidised rocks;
  - Sediments / rocks (Table 10-5); and
  - Alteration and mineralisation (Table 10-6).

Table 10-3: Codes of geological formations

-	<u>Formation</u>	
Tegama : Teg	Moradi : Mor	Talach : Tal
Irhazer : Irh	Tamamaït : Tam	Farazekat : Far
Assaouas : Ass	Tejia : Tej	Tindirenen : Tin
Tchirezrine 2 : Tch2	Izeguandane : Ize	Teragh : Ter
Abinky : Abi	Arlit : Arl	
Tchirezrine 1 : Tch1	Madaouela : Mad	
Mousseden : Mou	Tarat : Tar	
Teloua 2-3 : Tel2-3	Tchinezogue : Tch	
Teloua 1 : Tel1	Guezouman : Gue	
Aokaré : Aok	Akokan : Ako	

Table 10-4: Codes of colour

<u>Color</u>	
Red: R	Green: Gr
White: W	Black: Bl
Yellow: Y	Beige: Be
Orange: Or	Purple: Pur
Brown: Br	Gray: G
Pink: P	Blue: B

Table 10-5: Codes of sediments / rocks

<u>Code</u>	<u>Lithology</u>	<u>Code</u>	<u>Lithology</u>	<u>Code</u>	<u>Lithology</u>
1	Sand	11	Conglomerate	21	Mudy Siltstone
2	Alluvium	12	Limestone	22	Granite
3	Clay	13	Marl	23	Diorite
4	Mudstone	14	Mudy Sandstone	24	Amphibolite
5	Siltstone	15	Sandy Mudstone	25	Gneiss
6	Fine Sandstone	16	Calcareous Sandstone	26	Schist
7	Medium grain sandstone	17	Carbonate Mudstone	27	Organic matter Sandstone
8	Coarse grain sandstone	18	Arkosic Sandstone	28	Pyritic Sandstone
9	Very coarse grain sandstone	19	Analcimolite	29	Coal
10	Microconglomerate	20	Dolomite	30	Graywacke
31	Analcimolitic sandstone				

Table 10-6: Codes of alteration and mineralisation

<b>Alteration</b>	<b>Mineralization</b>
Carbonate: Ca	Uranium
Iron: Fe	Pechblende: Pe
Chlorite: Cl	Uraninite: Ur
Sulfides: Su	Coffinite: Co
Manganese: Mn	Carnotite: Ct
Clay : Cy	Yellow products: Pj
	Others
	Pyrite: Py
	Organic material: Om

## 10.4 Sampling

No rotary chips were sampled for assaying.

For core sampling, a mineralized interval was established from the downhole logging. Prior to 2014 drilling, the eU<sub>3</sub>O<sub>8</sub> results were composited at 100 ppm cut-off (allowing 3 m internal dilution of grade lower than 100 ppm). The mineralized interval was sampled from one meter above and below the interval. Starting in 2014 the cut-off grade was changed to 300 ppm from the downhole gamma logging and proceeding the same way as the 100 ppm cut-off.

After geological and geotechnical logging of the core, the designated mineralized interval was marked for sampling. Sampling was done to reflect the lithological contacts and then routinely at 1 m intervals and during the most recent program holes this was reduced to 0.5 m intervals.

Sampling was lithological facies related: samples were taken in same lithological unit (each texture of sandstone should be considered as separate lithological unit, mudstone etc.).

The sample number was written on each core sample using red marker pen. The marked cores were sent to the splitting facility in the base camp where and half core was sampled, bagged and sealed for mechanical preparation at the ISO 17025 certified Sahel Lab facility in Niamey. The remaining half core is kept in the core boxes at the base camp. Pulp was shipped from Sahel Lab to an assay facility in Canada.

According to Niger mining legislation, half of any core collected on mining/exploration project is dedicated to the ministry of mines, unless you get a special authorization to use the entire core. GAFC has sought such authorization for some of their sampling. Subject to the ministry of mines authorization, the full core of each marked length was broken and sampled.

A 5 to 10 cm piece of sample was taken for specific gravity test prior to bag and seal the to-be assayed sample.

Each sample was packed in dedicated plastic bag on which the sample number was marked on both sides. A GAFC designed sample tag with the sample number printed on it was also inserted into the bag and sealed.

The sample numbering was designed to include 10% quality control material:



- 
- Certified reference materials (from ORE Research & Exploration Pty Ltd / Australia) were inserted in the sampling at a rate of five per hundred samples.
  - Certified blank material (from ORE Research & Exploration Pty Ltd / Australia) was inserted at a rate of 2%.
  - Blank material sourced from rocks near Niamey was inserted at a rate of one per hundred samples.
  - Pulp duplicate samples taken from the same half core sample were made for 2 out of every 100 samples and submitted for analysis.

# 11 Sample Preparation, Analyses and Security

## 11.1 Sample Preparation and Analyses

Core sampling was undertaken by GAFC staff. Samples were collected from quarter (before year 2013) / half core and appropriately bagged and labelled. Samples were sent by truck to the Sahel Laboratory in Niamey for preparation. Until April 2013, pulps prepared by the Sahel Laboratory were sent to ALS Geochemistry in Johannesburg, South Africa for analyses. From April 2013 onwards, pulps have been sent to ALS Geochemistry in North Vancouver, Canada for analyses.

The Sahel Laboratory in Niamey is accredited ISO 17025:2005 by Universal Registrars, Bangalore, India for sample preparation. Both ALS Minerals laboratories in Johannesburg and in North Vancouver are also accredited ISO-9001:2000 by QMI Management Systems and to ISO/IEC Guideline 17025:2005 by the Standards Council of Canada for conducting certain testing procedures. The scope of accreditation includes the procedures used for assaying of the samples submitted by GAFC. ALS laboratories also participates in a number of international proficiency tests, such as those managed by CANMET and Geostats.

At Sahel Laboratory samples were prepared using a standard rock preparation procedure. Quarter or half core was ground using a jaw crusher until 95 percent of the material passed a 2mm mesh. One eighth of this was taken and pulverized until 90 percent of the material passed through a 75-micron mesh. One hundred grams of the resulting pulp is sent to the ALS laboratory for assay. The remaining rejects were returned to Global Atomic and transported back to the field camp for storage.

Up until April 2013, prepared pulp samples were sent to ALS Geochemistry in Johannesburg and were assayed for a suite of elements (including uranium) using inductively coupled plasma atomic emission spectroscopy (ME-ICP61) and x-ray fluorescence spectroscopy (ME-XRF05).

In April 2013, prepared pulp samples were sent to ALS Geochemistry in North Vancouver, where samples were assayed for Uranium using x-ray fluorescence spectroscopy (ME-XRF05; ME-XRF10).

The switch between ALS laboratories was made primarily to gain access to the XRF10 method of assaying, which can measure more accurately the concentration of uranium exceeding 10,000 parts per million (ppm). The XRF05 method used in South Africa is accurate to concentrations of uranium up to 10,000 ppm.

The SGS Lakefield laboratory in Lakefield, Canada was used as an umpire laboratory. The SGS laboratory in Lakefield, and Mintek laboratories in Randburg, South Africa were also used to conduct metallurgical testing on surface and core samples representative of the uranium mineralization found on the DASA project. The SGS Lakefield and Mintek laboratories are accredited ISO-9001 and to ISO Guideline 17025 for the testing procedures undertaken on material from the DASA project.

## 11.2 Specific Gravity Data

During 2012 to 2015 drilling campaigns, GAFC hired the ISO 17025 certified laboratory SAHEL Lab in Niger to perform specific gravity test on core samples. A total of 3594 core samples

sizing about 5cm each were submitted during the concerned period and this gives an average specific gravity value of 2.36 t/m<sup>3</sup>. The density of 2.36 was thus used for the current study.

About SAHEL Lab specific gravity test: the specific gravity of these samples was determined by the method of water displacement. This method consists of weighing the sample in air after covering it with wax, and then measures its apparent volume through water displacement. The specific gravity is thus calculated by the quotient of the mass of the sample over the volume.

The water displacement is noted and the sample apparent volume determined (v). The specific gravity is then calculated by  $SG = m/v$ . A relative error (E) is also calculated by Sahel Lab using this formula

$$E = |dm/m - dv/v|$$

Where:

dm - the precision of the weighing scale used (0.001g)

dv - the precision of the cylinder used (1ml).

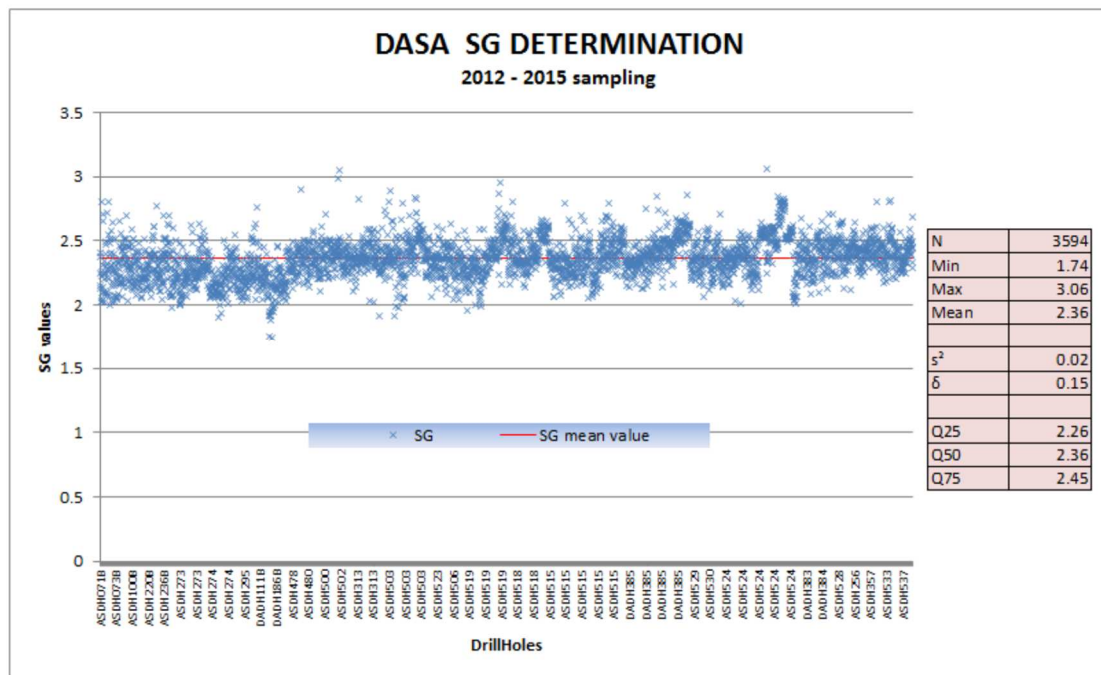


Figure 11-1: Average Density determination from core samples

### 11.3 Quality Assurance and Quality Control Programs

Quality control measures are typically set in place to ensure the reliability and trustworthiness of exploration data. These measures include written field procedures and independent verifications of aspects such as drilling, surveying, sampling and assaying, data management and database integrity. Appropriate documentation of quality control measures and regular analysis of quality control data are important as a safeguard for project data and form the basis for the quality assurance program implemented during exploration.

Analytical control measures typically involve internal and external laboratory control measures implemented to monitor the precision and accuracy of the sampling, preparation and assaying. They are also important to prevent sample mix-up and to monitor the voluntary or inadvertent contamination of samples.

Five different reference materials are employed and sent blind to the assay laboratory for analysis. Field duplicate and blank samples are also inserted into the assay stream. The quality control programs also include a small check assaying program at the SGS laboratory in Lakefield, Canada, which is ISO/IEC 17025 accredited. The check assaying program is not undertaken on an ongoing basis.

Comparison of ordinary assays of certified reference material samples with control limit parameters is shown in the Table 11-1. Results show that quality of sampling and assaying is acceptable. Comparison of ordinary samples and duplicates is provided in the QAQC reports on DASA Project (2012, 2013) (Figure 11-2).

*Table 11-1: Comparison of ordinary assays of certified reference material samples with passport parameters*

Number of CRM	Parameters of CRM			Ordinary assays of CRM samples			
	LL	Nom	UL	NN	Min	Average	Max
<b>ALS_JOHANNESBURG</b>							
AMIS0028	4,200	4,670	5,150	5	4,220	4,382	4,590
AMIS0054	1,320	1,470	1,620	8	1,385	1,456	1,480
AMIS0090	809	903	997	4	880	884	889
AMIS0098	774	848	922	8	850	855	865
AMIS0114	491	550	609	9	521	538	542
GBM908-5	4	5	5	14	4	15	128
GEOMS-03	3	4	4	4	3	4	5
MRGeo08	5	6	6	19	4	6	9
SARM-98	181	205	230	12	198	200	205
UTS-1	44	49	54	10	36	45	52
<b>ALS_VANCOUVER</b>							
BL-1	210	220	230	89	200	216	231
BL-4a	1,241	1,248	1,255	88	1,205	1,238	1,290

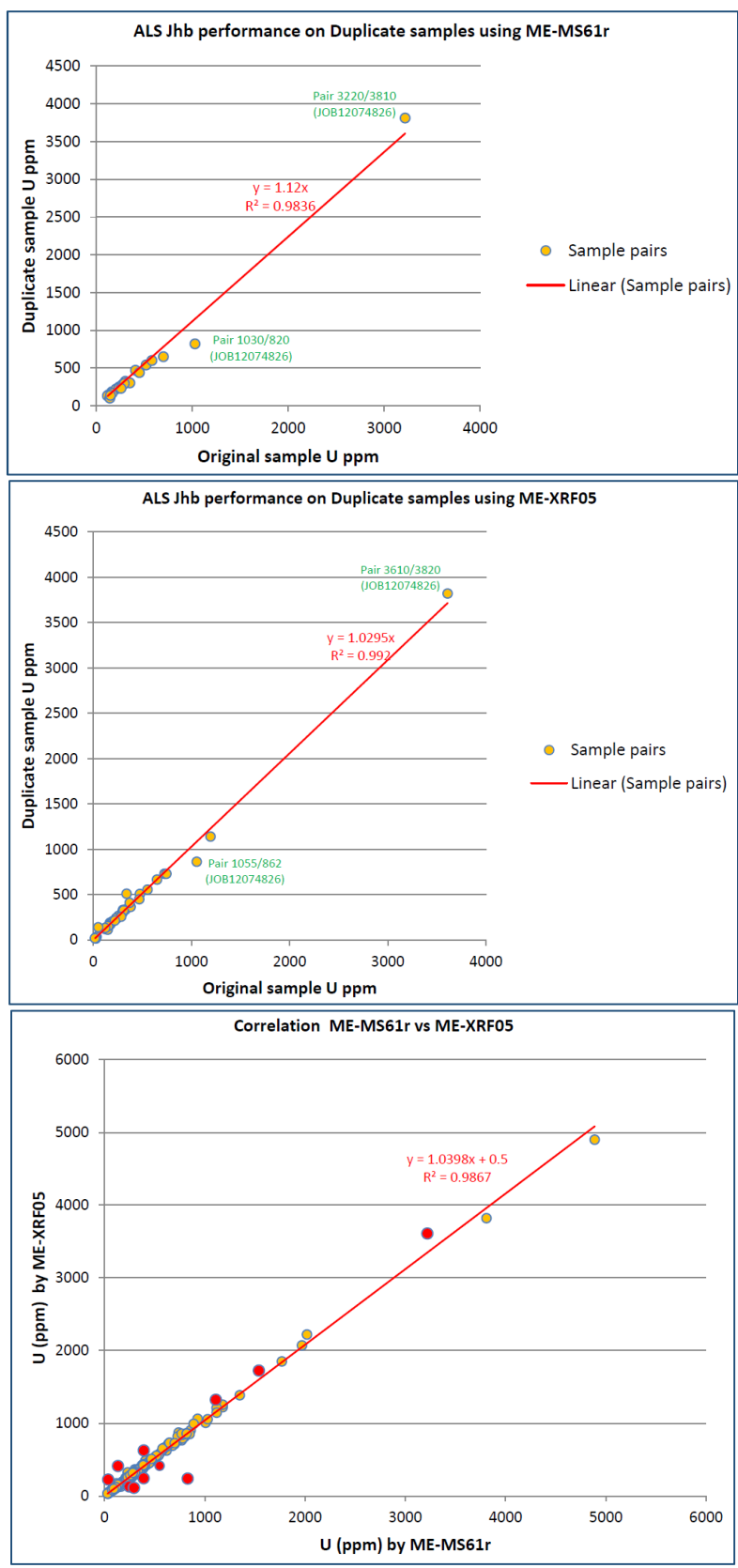


Figure 11-2: Comparison of the ordinary samples and duplicates for the DASA project



## 11.4 Radioactive Equilibrium Factor (REF)

Geophysical gamma logging data is the primary information source used for uranium resources estimation. From these data, it is then possible to determine:

- Mineralised intervals based on gamma logging data;
- Conversion of radium grade to uranium based on Radioactive Equilibrium Factor (REF).

Radioactive Equilibrium Factor (REF) =  $C(\text{radium}) / C(\text{uranium})$  should be estimated based on uranium assays and radium assays sampled into closed cans. But radium grades were not determined. In this situation comparison of the  $eU_3O_8$  based on gamma logging and  $aU_3O_8$  based on assays may be used for determination of REF. This is possible by using the scintillometer readings made on the core to compare and correct gamma logging data.

The average grade of potassium is 1.91% (0.01-6.39%) and thorium is 25 ppm (0.6-417 ppm), equals 25 ppm of uranium.

In practical experience grade-thickness is a more convenient parameter for REF definition:

$$\text{REF} = \text{GT}(\text{radium}) / \text{GT}(\text{uranium}).$$

The total grade-thickness  $eU_3O_8$  based on gamma logging is 171 m% and  $aU_3O_8$  based on assays is 175 m%, REF = 0.97.

Comparison of  $eU_3O_8$  based on gamma logging and  $aU_3O_8$  based on assays shows acceptable correlation close to 1 (Figure 11-3), coefficient of correlation is 0.96, precision is 100%.

Generally, mineralisation on the DASA project is close to equilibrium, but this does vary of the project area (Figure 11-4).

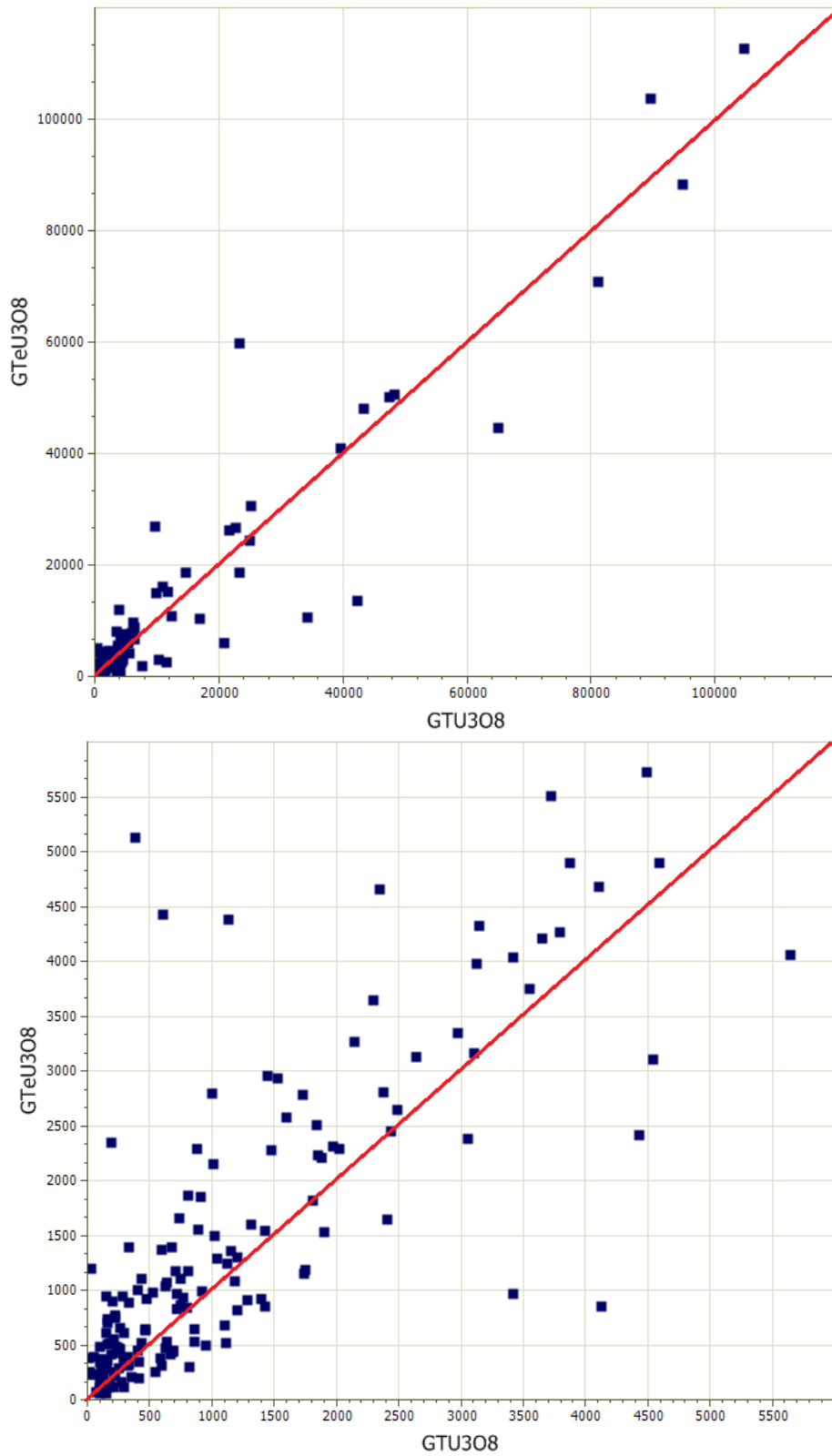


Figure 11-3: Comparison of grade-thickness  $eU_3O_8$  defined by gamma logging and grade-thickness  $U_3O_8$  defined by assays

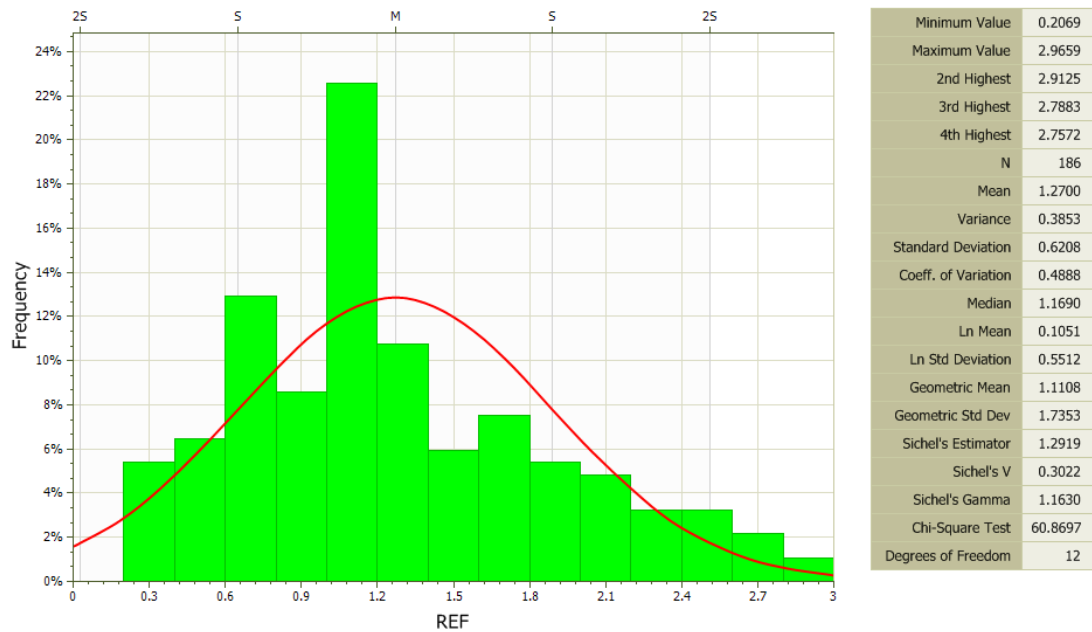


Figure 11-4: Distribution of REF in mineralised intervals

### 11.5 CSA Global Comments

In the opinion of CSA Global, the sampling preparation, security, and analytical procedures used by GAFC are consistent with generally accepted industry best practices and are therefore adequate for the purpose of Mineral Resource estimation.

However, more work is required to define the radiological parameters such as REF more reliably. Some additional investigations are required for definition of REF distribution as well as some additional drilling for converting Mineral Resources to Measured and upgrading Inferred category to Indicated.

CSA Global recommends to do assaying of radium in closed cans and uranium by XRF. Comparison of radium and uranium assays allows to define the REF and comparison of radium assays and gamma logging allows to define radon degassing factor. This factor may also influence the definition of eU<sub>3</sub>O<sub>8</sub> grades.

## 12 Data Verification

Dmitry Pertel visited the Project site from 20 March 2017 through to 6 April 2017. During the visit, Dmitry Pertel reviewed geological reports, drilling procedures and surveys, logging facilities and overall deposit geology. Geological exploration drilling procedure, core recovery methods and documentation and geophysical logging have been analysed from the provided reports.

During the site visit, the QP observed a number of drill collars, took their photographs and geographic coordinates. The measured coordinates were compared with those reported in the provided database. The difference between the measured and reported coordinates were within the acceptable limits.

From 2 March 2017 through 4 April 2017, Dmitry Pertel visited the Sahel Laboratory in Niamey, and had an opportunity to interview the personnel there. The laboratory was in the middle of the relocation process, and therefore it was not possible to observe the working equipment which was all dismantled at the time of the inspection.

CSA Global has reviewed the drill logs, cross-sections, plan maps for the DASA geological database.

All work relating to geological exploration and leach testing was found to be of a high quality. The data is considered suitable for Mineral Resource estimation.

Caution should be exercised when estimating Mineral Resources based on geophysical data due to the complex radiology of the deposits.

## 13 Mineral Processing and Metallurgical Testing

Mineral processing and metallurgical testing have been conducted by Global Atomic Fuels (“GAFC”) from 2011 to 2014. Summary was prepared by Fergus P Kerr, P.Eng.

Testing was conducted on samples obtained from the DASA project by the GAFC at various stages of the mineral resource development. The samples were located as representative of the mineral resource known at that time. Samples were obtained from diamond drill holes by GAFC personnel and shipped in core boxes or in rice bags secured with security seals to SGS Mineral Services, Lakefield, Ontario, Canada and Mintek, Randburg, South Africa.

SRK Consulting (UK), SRK Consulting (Australia) and Hatch (Mississauga) have provided technical support and review of the mineral processing and metallurgical test work.

Three separate investigations were conducted:

1. Characterization studies: in 2011 samples were obtained from diamond drill holes in various portions of the upper mineralisation to determine variability and metallurgical characteristics of the DASA 1 and DASA 3 areas. SGS conducted testing on five samples from five different holes in the DASA 1 and DASA 3 areas, including comminution studies, variability leach testing, precipitation, uranium recovery and mineralogy. The head analysis of these samples was approximately 600 ppm  $U_3O_8$ .
2. Heap leach study: samples were obtained as representative of the low grade near surface material with potential for heap leaching. Five samples were obtained for a total of 878 kg and shipped in 2012 to Mintek, South Africa by DHL Courier services. The head analysis of the samples was 250 ppm  $U_3O_8$  which was close to the anticipated grade of the heap leach material.

Test work conducted by Mintek included mineralogical analysis, bottle roll testing, scrubbing investigation, small and large diameter column leach tests and geomechanical test work.

3. Agitated leach testing: samples were selected to represent the higher grade mineralisation in the DASA 3 area. A total of 8 samples from 3 drillholes, for a total weight of 110 kg, were shipped to SGS for additional leach testing of the higher grade material and additional Bond Work Index testing to confirm the grindability from previous comminution studies. The head analysis of these samples was from 1200 to 1900 ppm  $U_3O_8$ .

No testing has been conducted on the potential high grade underground mineralisation.

### 13.1 Comminution

SGS conducted test work on two samples from the DASA project – one composite sample from DASA 1 and DASA 3 drill holes and one composite sample from DASA 3 area.

The first samples were tested for the entire suite of comminution tests including abrasion test, Bond Work Index tests, high pressure grinding roll test, JK drop-weight, SAG mill comminution test, SAG power index, static pressure test and derivation of Comminution Economic Evaluation Tool (CEET).



The second samples were tested for Bond Work Index (BWI) to confirm results from the lower grade testing. The results were consistent with other BWI results.

Test results indicate the material is categorised as soft to very soft, except for the crusher work index which is categorised as moderately hard. Results include the following:

- Crusher Work Index 11.5 kWh/t,
- Bond Work Index 16.1 kWh/t,
- Abrasion Index 0.096 g
- Static Pressure test 1.42 HPI (9.9 kWh/t), and
- CEET 15.9 Cl.

### 13.2 Leaching

Extensive leach testing was conducted at SGS Mineral Services and Mintek including bottle roll, agitated leach, two stage leaching, scrubbing and column leach testing with both acid and alkaline leach conditions. Intent of the testing was to understand the leach kinetics of the samples and develop potential leach flowsheets.

Bottle roll testing showed uranium extraction of 78 to 86 % for tests run at 20 grams per litre free acidity.

Bottle roll testing to determine variability of the leach kinetics of 30 separate samples showed uranium extractions of 30 % to 95 % with an average of 73 % and acid consumption of 33 kilograms per tonne to a high of 273.3 kilograms per tonne and average of 115 kilograms per tonne. It was noted that samples with extraction below 50 % had low uranium concentration.

Lower acidity testing showed comparable extraction over longer time.

The best uranium extraction was achieved with high acid and high temperature—80 grams per litre sulphuric acid and 90 degrees Celsius gave extractions over 97 %.

Carbonate leaching gave poor extraction of 68 percent.

Two stage counter-current leach reduced acid consumption by half at 90 percent extraction.

Grinding of the ore was not required to achieve high uranium extractions: < 10 mesh (1.7 mm) ore leached under high acid and temperature gave extraction at or better than 95 %.

Work at Mintek indicated scrubbing was not effective on the very low grade samples. Bottle roll tests showed that acid-in-agglomeration and curing had a positive effect on the initial kinetics and extent of overall uranium dissolution in acidic conditions.

An alkaline leach test at Mintek indicated only 62% recovery after 73 days of leaching, similar to results at SGS.

Heap leach test results showed an 80% recovery with acid consumption of 50 kg acid per ton was achievable after 17 days. Stacking tests and hydraulic conductivity testwork indicated stacking heights of the leach material of 5 to 7 m. were achievable.

Agitated leach testing at SGS showed uranium recovery of 93% was achievable for the higher grade samples at a pH of 1.5, 44°C, and a grind P80 of 170 µm after 24 hours and sulphuric acid addition of 53 kg/t. An additional higher grade sample showed a uranium recovery of 90% at 70°C and acid consumption as high as 250 kg/t. Leach kinetics indicates no significant increase in extraction after 8 hours.

Using two-stage leaching to utilise excess free acid and averaging the results from the two composite samples suggests a recovery of 95% at an acid consumption of 180 kg/t would be a conservative estimate of leach recovery.

The pregnant leach solutions had no significant levels of impurities (<0.6 mg/L Mo, <10 mg/L V).

### **13.3 Solid-Liquid separation**

A bulk leach sample was generated from the uranium leach tests and subjected to flocculent selection, CCD modelling, vacuum filtration thickener and washed thickener underflow testing.

The optimum flocculent was Ciba Magnafloc 333 (a non-ionic flocculent) at a dose rate of 60 ppm and produced a 48% w/w solids underflow from a 6% w/w solids thickener feed. The resulting supernatant was clear after 10 minutes settling time. Settling rates of 1,135 to 1,219 cubic metres per square metre per day were measured.

Rheology testing indicated critical solids density was approximately 55 % weight corresponding to 60 Pa yield stress value (unsheared) for the bulk leach pulp at -30 mesh.

CCD scenario testing resulted in a water requirement of 1.59 to 3.21 cubic metres fresh water per tonne of dry feed depending on the number of stages (5-7) and the wash efficiency required. The final stage discharge varied between 0.001 and 0.007 grams uranium per litre.

The direct filtration scoping tests conducted with, and without, a filter aid indicate the sample was not amenable to direct filtration.

### **13.4 Solvent Extraction and Ion Exchange**

Uranium was recovered from solution effectively using commercial tertiary amine extractant. When aggressive leach conditions were used, the phase separation and clarity of phases suffered but efficient extraction was achieved. Counter current stripping of loaded organic with 400 grams per litre H<sub>2</sub>SO<sub>4</sub> was performed at O/A of 10/1 producing strip liquor containing 31 grams uranium per litre.

Several strong base anionic exchange resins were found to effectively absorb uranium from the leach solution, achieving loadings upwards of 50 grams uranium per litre.

Ambersep 920U was effectively stripped with 160 grams per litre H<sub>2</sub>SO<sub>4</sub> resulting in a strong eluate of 6 grams uranium per litre.

Resin in pulp (RIP) was tested as an alternative to leaching followed by solid-liquid separation. A660 resin performed well, loading to 40 grams per litre and achieving 99.7 percent uranium recovery from solution after four contacts of 2 hours each.

Selection of uranium extraction methods will depend on the tenor and characteristics of the pregnant leach solution. At lower grade feed Ion Exchange will be used for uranium recovery.

### **13.5 Uranium Precipitation**

Strip liquors from SX testing were used for uranium precipitation testing. The strip liquors were neutralised with hydrated lime and advanced to precipitation using hydrogen peroxide. The final precipitate (yellowcake) contained 64.3% uranium, equivalent to 91% uranyl peroxide.

### 13.6 Tailings characterization

The tailings from the leach process were neutralized in two stages with limestone and lime to a pH of 9.

Samples of the tailings were taken for multi element and Radium analysis with both below effluent standards.

### 13.7 Metallurgical Testing — Conclusion and Recommendations

Results of the metallurgical test work shows the mineralogy and metallurgy of the DASA mineralisation is readily amenable to acid leaching with conventional uranium recovery – similar to the AREVA operation at Arlit, Niger.

Fine grinding is not required for acceptable uranium recovery; a grind to P80 of 170 µm is adequate.

Two stage leaching with preleaching of the fresh ore with strong acid reduces acid consumption and will recover over 90% of the uranium, recovery will improve with higher temperatures and grades. Acid consumption is related to head grade.

Leach slurries can be separated effectively using conventional thickeners and flocculants.

Depending on the head grade and tenor of the pregnant leach solution IX or SX would be used for uranium recoveries achieving over 99% recovery of the uranium.

Hydrogen peroxide precipitation is effective. No impurities have been detected in either the final precipitate or in the tailings.

Based on the results the following recommendations are made:

- Leaching test work is required on the high grade underground resource.
- Mineralogical and metallurgical testing is required of the Tchirezine 2 and Tarat hosted mineralization.
- The discharge slurries from the leach tests should be subjected to solid liquid separation testing. Rheology testing of the slurries is required to determine maximum pulp density of the leach.
- Mass balance modelling of the two stage leach is required to better quantify acid consumption.
- At higher head grades uranium recovery testing is required.
- Further environmental characterisation of the leach residue and neutralisation products should be conducted.

This testing recommended is bench scale testing and would require 40 to 50 kg of fresh material.

- Pre concentration methods should be investigated; radiometric sorting or ablation could dramatically reduce the mass pull to the processing facility with significant reduction in capital and operating costs.

## 14 Mineral Resource Estimates

### 14.1 Software Used

The DASA uranium deposit Mineral Resources were estimated by CSA Global geologists using Micromine version 2016.1 software (Licence ID: MM2747).

### 14.2 Database Compilation

GAFC supplied CSA Global with the database in Text CSC format. The database included all the exploration results for all exploration stages. The main analytical database comprises estimated uranium equivalent grades (eU<sub>3</sub>O<sub>8</sub>) based on the gamma-logging of the drill holes.

The uranium oxide equivalent grades were calculated from the LAS files (gamma-logging results). LAS files included counts per second (CPS) values, which were converted to uranium oxide grades using standard corrections and coefficients that account for the probe type (K-factor), casing steel thickness, presence of water and other factors. All other correction factors and parameters are shown in Table 10-2.

The uranium equivalent grades were calculated for each 10cm interval using LAS files. Some holes were however not gamma-logged to the total depth, but had results of the chemical assays which were also used for interpretation and modelling. The available data is summarised in Table 14-1.

*Table 14-1: Summary of Supplied Data*

Category	Amount
Drill holes	970
Metres drilled	123,914
Survey records	6,435
Records in assay data file, including	2,199,933
Assayed intervals for U <sub>3</sub> O <sub>8</sub> (combined chemical assays and deconvolved grades)	2,169,554
Records in geology logging file	3,465

The databases consisted of several parts:

- 1) Analytical database, including
  - a. Drill hole collar coordinates,
  - b. Drill hole survey data,
  - c. Drill hole sampling database (combined chemical assays and deconvolved uranium grades from gamma logging), and
  - d. Drill hole geological logging and codes.
- 2) Topography data in the form of a DTM (supplied as a DXF file).

Import of the various data sets into Micromine proceeded without incident.

### 14.3 Data Validation

The analytical database was checked using macros and processes designed to detect the following errors:

- Duplicate drill hole names;

- One or more drill hole collar coordinates missing in the collar file;
- FROM or TO missing or absent in the assay file;
- FROM > TO in the assay file;
- Sample intervals are not contiguous in the assay file (gaps exist between the assays);
- Sample intervals overlap in the assay file;
- First sample is not equal to 0 m in the assay file;
- First depth is not equal to 0 m in the survey file;
- Several downhole survey records exist for the same depth;
- Azimuth is not between 0 and 360 degrees in the survey file;
- Dip is not between 0 and 90 degrees in the survey file;
- Azimuth or dip is missing in survey file; and
- Total depth of the holes is less than the depth of the last sample.

It was found that 10 holes do not have analytical information. All these holes were excluded from the resource estimation process.

Some holes had negative FROM values (gamma-logging started above hole collars). All those intervals were excluded from the database.

No other errors have been identified in the databases, and no corrections were introduced to the database.

#### **14.4 Exploratory Data Analysis – Statistical Analysis**

Classical statistical analysis was implemented twice for the deposit. The first study was carried out to determine the distribution parameters of uranium grades.

Figure 14-1 summarise the statistical properties of the unrestricted assay databases for uranium. The statistical parameters for all uranium grades are shown in Table 14-2.

The histogram for unrestricted uranium grade population has a positively skewed log distribution and demonstrates that there is no apparent mixing of grade populations. The histogram does not show an obvious cut-off grade that could be used for interpretation of uranium mineralization. A decision was made to employ the nominal cut-off grade of 100 ppm for the subsequent interpretation of mineralized bodies. The adoption of 100 ppm cut-off grade also reduces the residual effect of any radium halos by their exclusion.

Once the uranium mineralization was interpreted for all mineralized lenses and wireframed, classical statistical analysis was repeated for the composited samples within the interpreted envelopes to meet the following objectives:

- To estimate the mixing effect of grade populations for uranium within the interpreted mineralized bodies;
- To estimate the necessity of separation of grade populations if more than one population was observed; and
- To reveal the possible top-cut grades for uranium for grade interpolation.



The input sample file was flagged to exclude those intervals that appeared outside the wireframed mineralized envelopes for uranium. The modelled histogram for the uranium samples restricted within mineralized envelopes does not demonstrate apparent mixing of grade populations for uranium (Figure 14-2).

The lognormal histograms and cumulative probability plots were analyzed to determine the top-cut grades to be applied to the input analytical data before the geostatistical analysis. The majority of the input intervals with uranium grades were determined from the gamma logging results for 10cm intervals. Thus, a decision was made that no-top cut grade values are applied on the analyzed intervals because deconvolving of uranium grades from gamma-logging results usually takes into account abnormally high grades and, therefore, top-cutting is not required. Where deconvolving is the conversion from the geophysical gamma response to an equivalent uranium grade using K-factors, and any required radiological factors relating to radium.

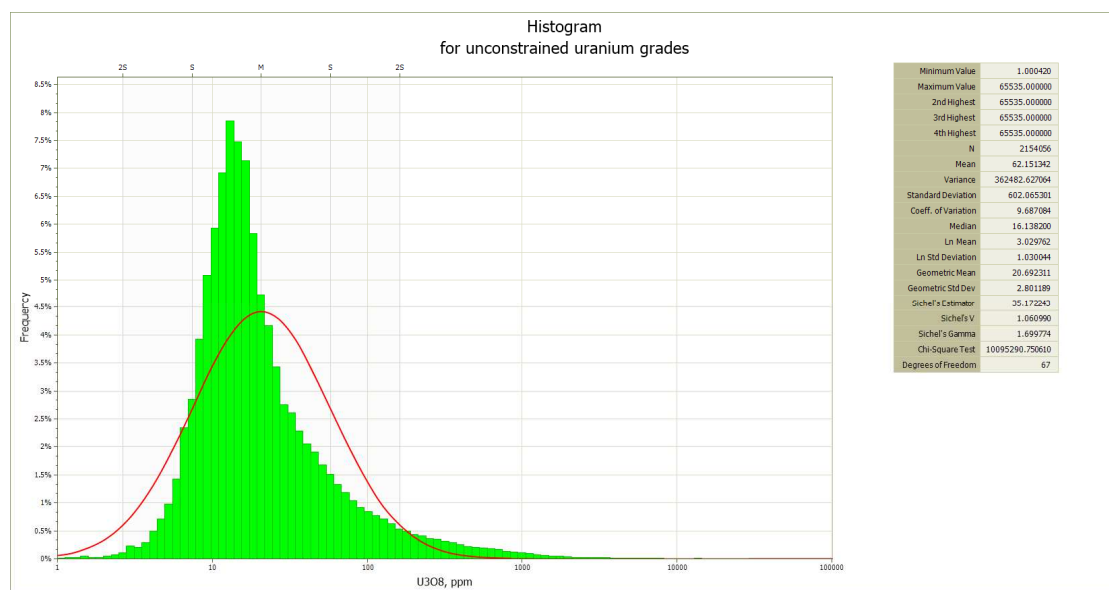


Figure 14-1: Log histogram for unrestricted uranium grades

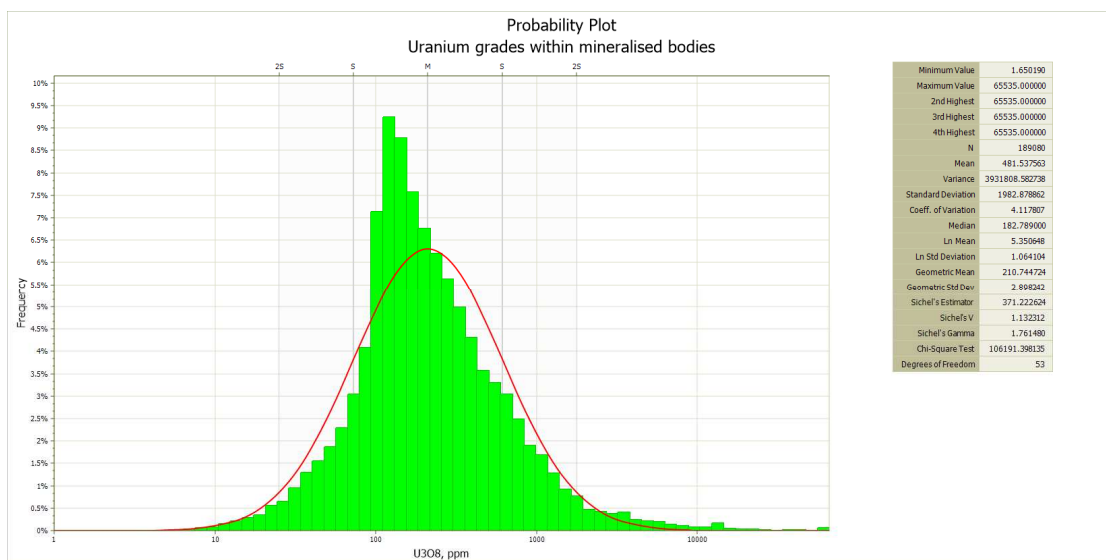


Figure 14-2: Log histogram for uranium grades within mineralised envelopes

The coefficient of variation for the composited uranium grades is close to 3, which indicates that the possibility of modelling robust semivariograms is relatively poor.

Table 14-2: Classical Statistics for uranium grades (weighted on length)

Element	Min, ppm	Max, ppm	No of Points	Mean, ppm	Variance	Std. Dev.	COV	Median, ppm
eU <sub>3</sub> O <sub>8</sub>	Unrestricted sample intervals							
	0	65535	2169124	88	358464	599	9.7	16
	Intervals within mineralized bodies							
	0	65535	189119	538	2619309	1618	4.1	183
	0.5m composites within mineralized intervals							
0	65535	28453	538	2580146	1606	3.0	180	

### 14.5 Interpretation of Mineralized Bodies

The grade compositing process was employed to calculate the mineralised intervals using 100ppm cut-off grade. The calculated grade composites were displayed along the drill hole traces to assist with interpretation only. The interpretation process involved correlation of identified mineralized intervals between the holes along exploration lines and also between the sections to make sure that the correct lens numbers would subsequently be assigned to the analytical data file. The grade compositing process employed the following input parameters:

- Cut-off value 100 ppm eU<sub>3</sub>O<sub>8</sub>
- Minimum composite length 1 m
- Minimum grade of final composite 100 ppm eU<sub>3</sub>O<sub>8</sub>
- Maximum consecutive length of internal waste 0.5 m
- Minimum grade \* length 200 ppm\*m eU<sub>3</sub>O<sub>8</sub>

Interpretation was carried out interactively for 56 SN cross sections which were 50m apart. When uranium grades were interpreted, each section was displayed in Micromine's Vizex display environment together with drill hole traces, grade composites and interval grade values. A total number of 184 individual mineralized lenses were interpreted for the deposit. The following techniques were employed while interpreting the uranium mineralization:

- Each cross section was displayed on screen with a clipping window equal to a half distance from the adjacent sections;
- All interpreted strings were snapped to the corresponding drill hole composited intervals, i.e. the interpretation was constrained in the third dimension;
- Internal waste within the mineralized envelopes was not interpreted and modelled. It was initially included in the composited grade intervals used for the resource estimation;
- The interpretation was extended perpendicular to the corresponding first and last interpreted cross section to the distance equal to a half distance between the adjacent exploration lines; In this case the interpretation honoured the general direction of the structure and the tendency for changes of the form of the geological body;

- If a mineralized envelope did not extend to the adjacent drill hole section, it was projected half way to the next section keeping its thickness and terminated. The general direction and dip of the envelopes was maintained;
- If a mineralized envelope did not extend to the next drill hole within the interpreted exploration line, it was interpolated half way to the next drill hole keeping its thickness and terminated. The general direction and dip of the envelopes was maintained;
- If a mineralized envelope was at the topographic surface, it was extended above the topographic base. This was done to make sure there would be no gaps between the block model and the topographic base when the block model was built; and
- When faults were interpreted along with the mineralized envelopes, mineralization was truncated by interpreted fault planes.

Drill hole traces were also colour coded for the main lithological types to assist with the interpretation. This coding helped to understand and to interpret major fault systems and mineralized bodies displacements and the edges of the graben.

An example of an interpreted section is shown in the Figure 14-3, where thick red lines along drill hole traces – grade composites, traces are colour coded according to lithology, red strings – interpreted mineralized bodies, purple lines - faults. A plan showing the extent of the 100ppm wire frames is presented in Figure 14-4.

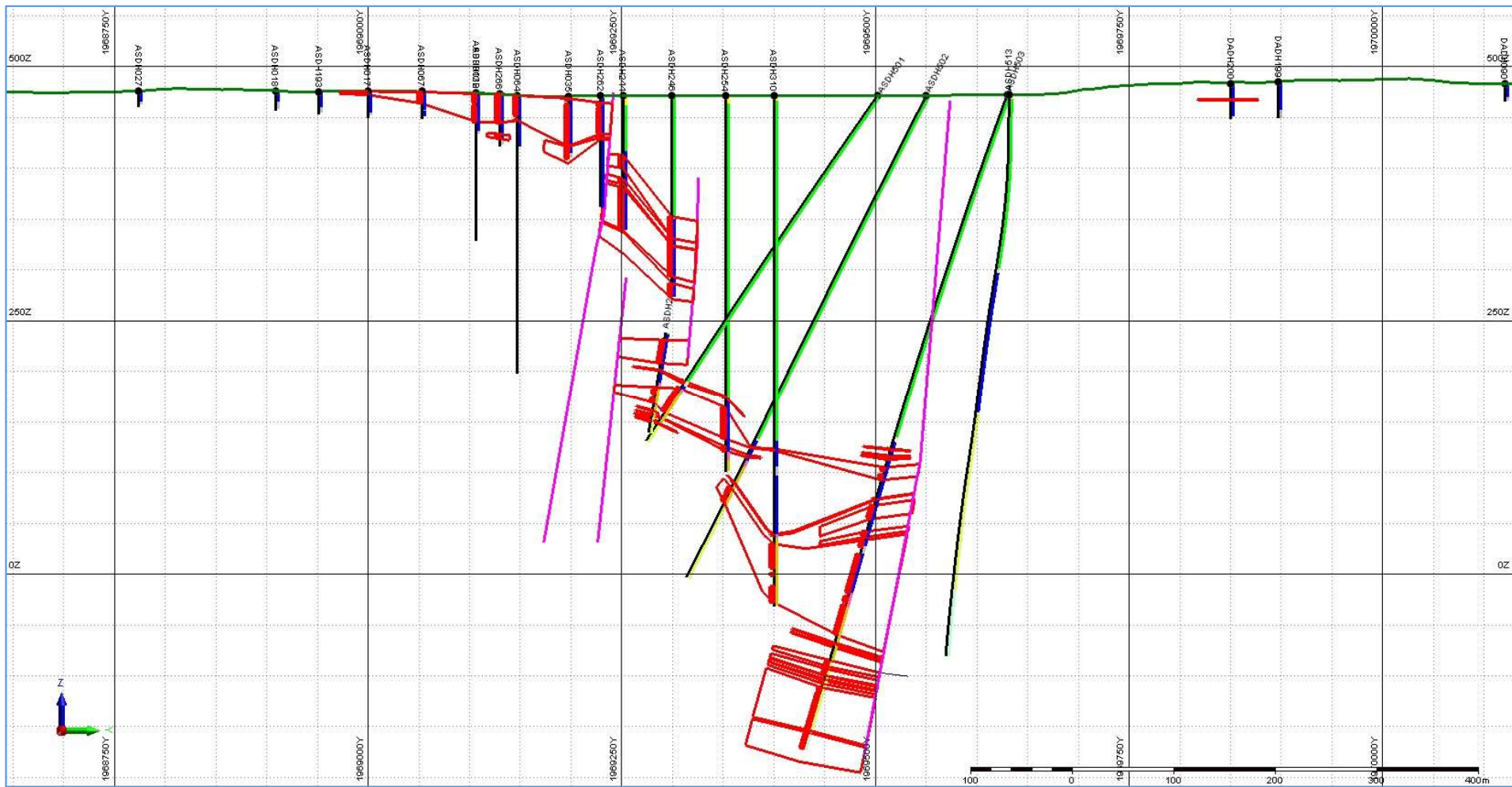


Figure 14-3: Schematic example of -interpretation of the DASA deposit – Section 360100mE

Where: pink is faults, red is mineralized envelopes, black is drill hole trace with red hatches on the left – grade composites.

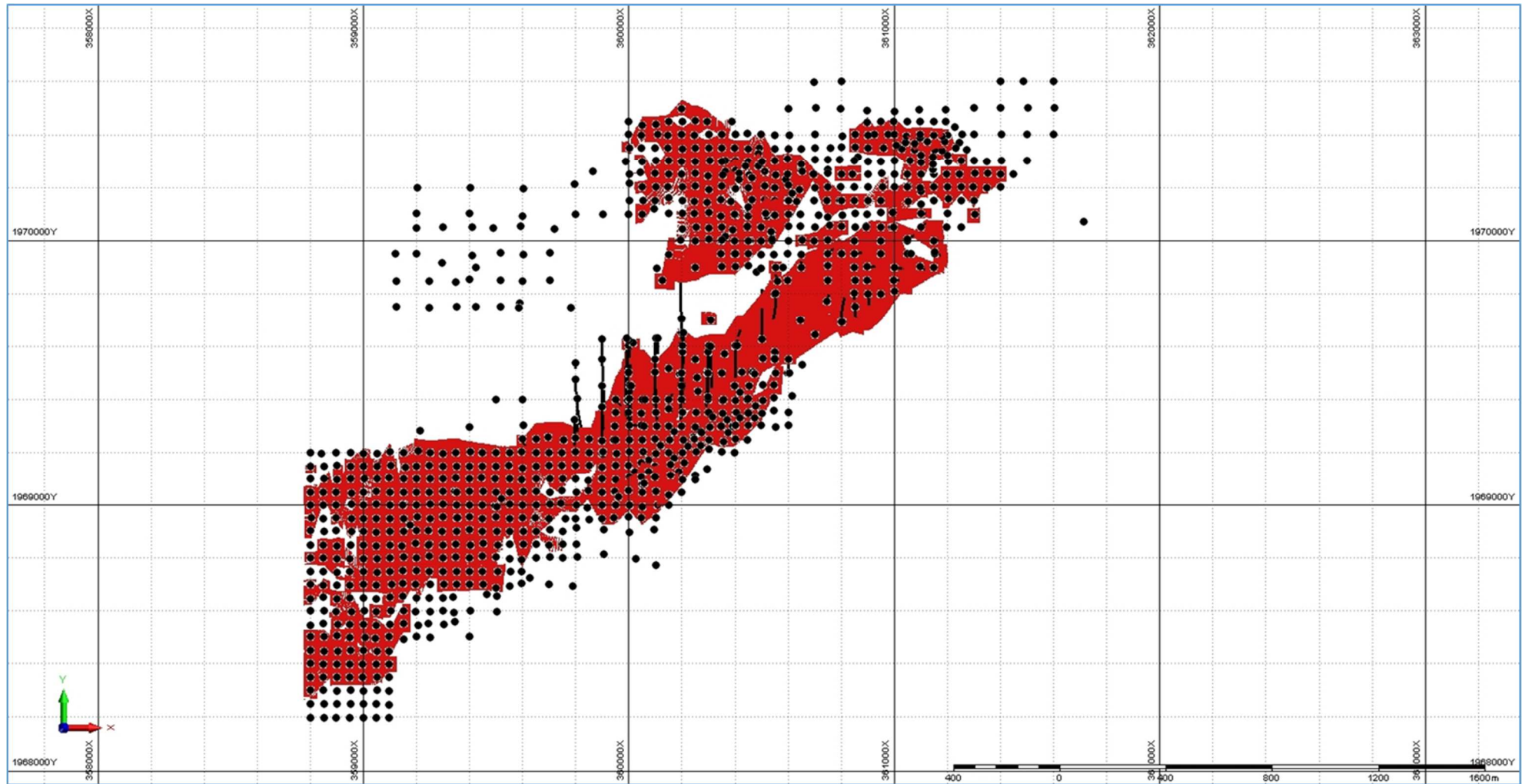


Figure 14-4: Plan view of 100ppm interpreted wire frames



### 14.6 Wireframing

The interpreted strings were used to generate three-dimensional solid wireframes for the mineralized envelopes. Every cross section was displayed on the screen along with the closest interpreted section. If the corresponding envelope did not appear on the next cross section, the former was projected halfway to the next section, where it was terminated. Every mineralized envelope was wireframed separately and individually. Mineralized bodies were extended and projected to the interpreted sub-vertical fault planes, where it was possible, and then terminated. Internal waste was included within the interpretations where continuity would be improved by doing so. Figure 14-5 is a 3D view of the modelled mineralized bodies. A total number of 184 wireframes were modelled for the deposit. Each wireframed lens had a different colour, and steeply dipping faults are shown with dark red colour on the figure. The modelled mineralized bodies between the faults generally represent the graben structure, while all other bodies outside the graben are generally flat and relatively shallow mineralized lenses.

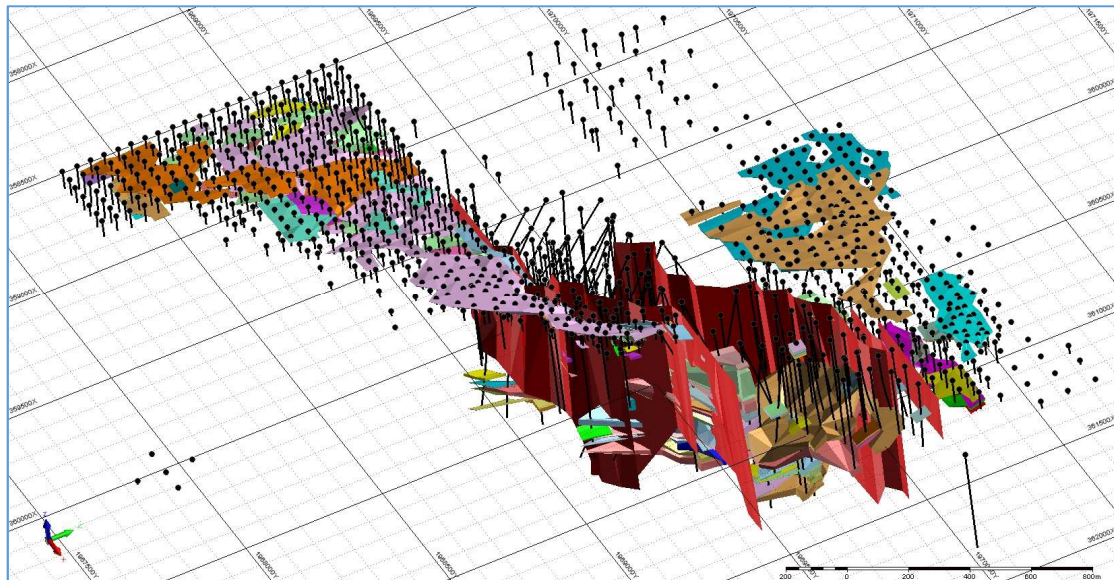


Figure 14-5: Oblique view of the wireframed uranium mineralized envelopes and fault planes for the DASA deposit (looking northwest)

All wireframe models were validated so that they are all solids (closed) and that they do not contain intersecting triangles.

Table 14-3: Number of Interpreted Wireframes at the DASA Deposit

Number of wireframes	Volume, m <sup>3</sup>
184	51,388,105

### 14.7 Drill hole Data Selection and Compositing

Drill hole data selection is a standard procedure which ensures that the correct samples are used in classical statistical and geostatistical analyses and grade interpolation processes. For this purpose, the solid wireframes for each mineralized envelope were subsequently used to

select the drill hole sample intervals. Samples were selected for individual envelopes and flagged accordingly for each modelled mineralized envelope.

Visual validation of the flagged samples was carried out to make sure the correct samples were selected by the wireframes.

Classical statistical analysis was then repeated for those uranium grades within the mineralized envelopes.

The majority of intervals in the analytical data file were 10cm based on gamma-logging. It was decided to composite all intervals to 0.5m. Thus, the selected samples within each mineralized envelope were separately composited over 0.5m intervals, starting at the drill hole collar and progressing downhole. Compositing was stopped and restarted at all boundaries between mineralized envelopes and waste material.

### 14.8 Transformation of Coordinates and Unfolding

CSA decided to flatten each lens before the geostatistical analysis and grade interpolation. The flattening is required for accurate grade interpolation in each lens. The data flattening principle is demonstrated schematically in the figure below (Figure 14-6).

CSA performed transformation of the coordinates of the block models and composited grade intervals individually for each lens prior to the geostatistical analysis and grade interpolation. This was done to flatten the model to provide a constant orientation of mineralization for grade interpolation.

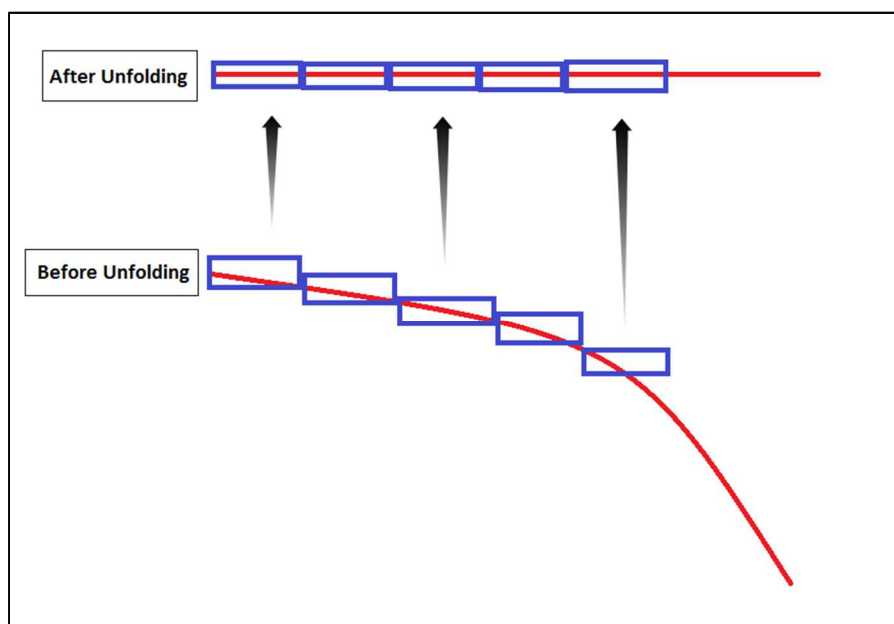


Figure 14-6: The Principal of Unfolding/Flattening

### 14.9 Geostatistical Analysis

The purpose of geostatistical analysis was to generate a series of semivariograms that can be used as the input weighting mechanism for kriging algorithms. The semivariogram ranges

determined from this analysis contribute heavily to the determination of the search neighbourhood dimensions. Therefore, geostatistical analysis was conducted in order to :

- estimate the spatial continuity of gold and silver grades in the main directions of anisotropy;
- obtain the semivariogram parameters (nugget effect, total sill and ranges) to be input into the interpolation process; and
- obtain and analyse semivariogram ranges which could be used to justify search ellipse radii.

Downhole experimental variogram was modelled to estimate the expected nugget effect for uranium grades (Figure 14-7). The estimated nugget effect was then applied to model directional semivariogram models.

A semivariogram map was then generated in plan view to establish the direction of maximum grade continuity (Figure 14-8). The map clearly demonstrated that the azimuth of maximum continuity is 55 degrees which generally matches with the overall strike of the mineralized bodies. Since the analytical data were flattened, therefore, the directions for semivariogram models were established as 55° azimuth, 0° dip; 145° azimuth, 0° dip; and vertical.

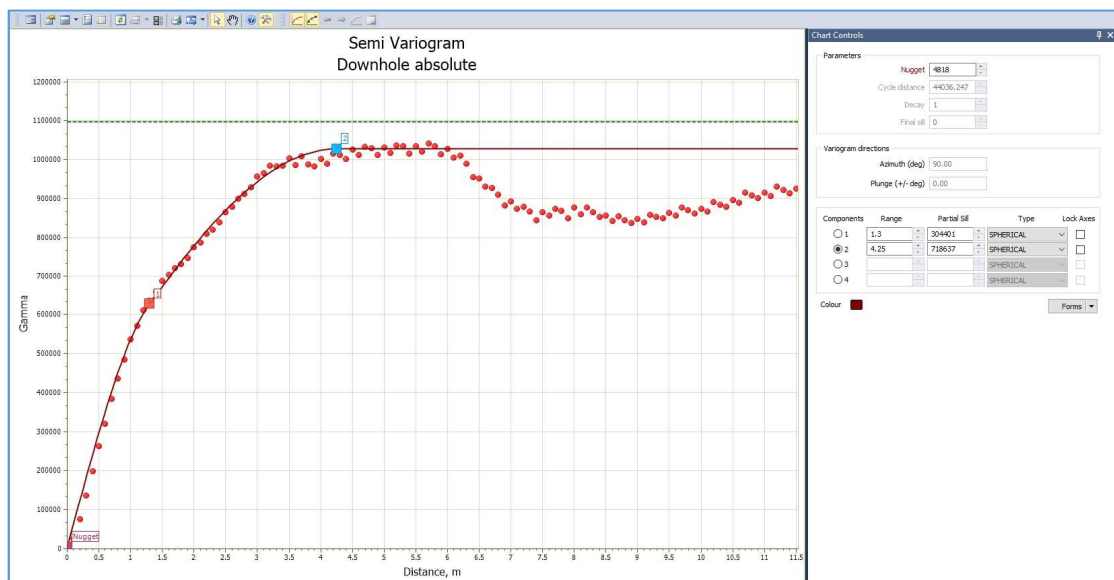


Figure 14-7: Downhole absolute semivariogram model for uranium

It was found that robust absolute semivariograms are difficult to model most likely due to the high coefficient of variation of uranium grades. Therefore, relative semivariogram models were calculated and modelled for the composited uranium sample file without applied top cut grades (Figure 14-9).

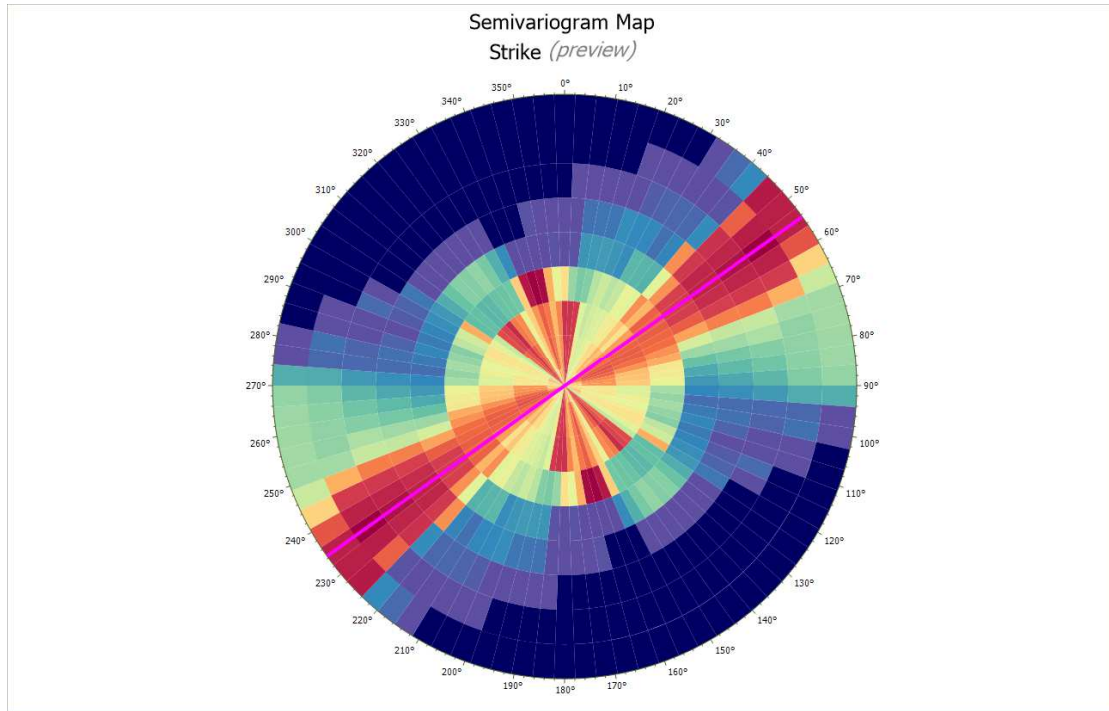


Figure 14-8: Semivariogram map (plan view)

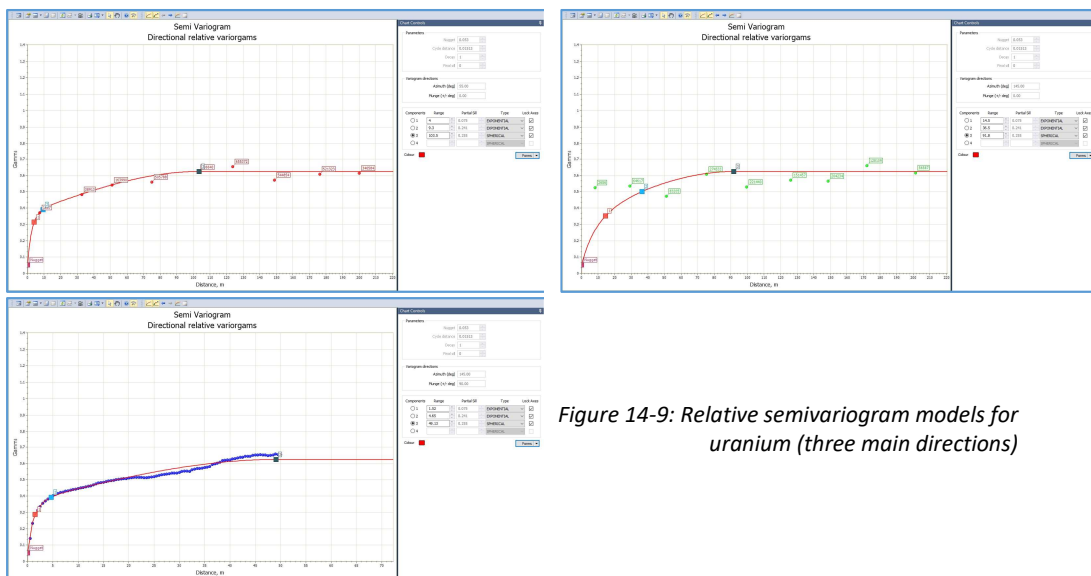


Figure 14-9: Relative semivariogram models for uranium (three main directions)

All modelled experimental semivariograms were exponential and spherical with three nested structures. The obtained semivariogram ranges were used to determine the search radii. The latter were used in the grade interpolation processes.

Table 14-4: Semivariogram Characteristics

Element	Type	Axis	Azimuth	Dip	Nugget	Partial Sills	Ranges
U <sub>3</sub> O <sub>8</sub>	Rel. Exp. and Spherical	Main	55	0	0.053	0.075, 0.241 and 0.255	4, 9.3 and 103.5
		Second	145	0			14.5, 36.5 and 91.8
		Third	145	90			1.52, 4.65 and 49.13

## 14.10 Block Modelling

An empty block model was created within the closed wireframe models for the mineralized envelopes. Each modelled lens was assigned a unique code in the model file. The block model was then restricted below the topography surface, i.e. all the model cells above the surface were deleted from the model file.

Block model parameters are shown in Table 14-5.

The initial filling with a corresponding parent cell size was followed by subcelling where necessary. The subcelling occurred near the boundaries of the mineralization or where model was truncated with the topographic surface. The parent cell size was chosen on the basis of the exploration grid and general morphology of the mineralized bodies and in order to avoid the generation of excessively large block model. The subcelling size was chosen to maintain the resolution of the mineralized bodies. The subcells were optimised in the model where possible to form larger cells.

Table 14-5: Block Model Characteristics

Axis	Extent, m		Block Size (m)	Maximum Subcelling (m)	Number of Parent Blocks
	Minimum	Maximum			
Easting	358,740	361,460	20	2	136
Northing	1,968,240	1,970,560	20	2	116
RL	-302	502	4	1	201

## 14.11 Grade Interpolation

Uranium equivalent ( $eU_3O_8$ ) grades were interpolated into the empty block model using the Ordinary Kriging (“OK”) interpolation method. This was then re-run using Inverse Distance Weighted (IDW) method with the powers of two and three as cross check.

The OK and IDW processes were performed at different search radii until all model cells were interpolated. The search radii were determined by means of the evaluation of the semivariogram parameters. Each mineralized lens was estimated separately.

The first search radii for all lenses were selected to be equal to one third of the semivariogram long ranges in all directions. Model cells that did not receive a grade estimate from the first interpolation run were used in the next interpolation with greater search radii equal to two thirds of semivariogram long ranges in all directions. The third interpolation run employed radii equal to full semivariogram ranges. The model cells that did not receive grades from the first three interpolation runs were then estimated using radii incremented by the full semivariogram ranges until all model cells were informed with uranium grade.

When model cells were estimated using radii not exceeding full semivariogram ranges, a restriction of at least three samples from at least two drill holes was applied to increase the reliability of the estimates. The general definition of the interpolation strategy is presented in Table 14-6 below.

The blocks were interpolated using only assays restricted by the corresponding lens. Declustering was performed during the interpolation process by using four sectors within the search neighbourhood. Each sector was restricted to a maximum of four points for all the lenses, and the search neighbourhood was restricted to an overall minimum of three points from at least two drill holes for the interpolation runs using radii within the semivariogram ranges. The maximum combined number of points allowable for the interpolation was



therefore 16. Change of support was honoured by discretising to 5-points by 5-points by 5-points. These point estimates are simple averages of the block estimates. The general definition of the interpolation strategy is presented in Table 14-6.

Table 14-6: Interpolation Parameters

Interpolation Method	Ordinary Kriging				
	Less or equal to 1/3 of semivariogram ranges	Less or equal to 2/3 of semivariogram ranges	Less of equal to semivariogram ranges	2 semivariogram ranges	Greater than 2 semivariogram ranges
Search Radii					
Minimum number of points	4	4	4	1	1
Maximum number of points	16	16	16	16	16
Minimum number of drill hole	3	3	3	1	1

### 14.12 Density Values

Dry density values were obtained by previous and recent exploration programmes on the deposit and direct measurements of 3,594 core samples taken and processed by GAFC. More information is provided in the previous sections of this report (Section 11.2).

Density values can be assigned to block model cells using the following methods:

- Direct assignment of the values to block model cells,
- Calculation of values for each cell using regression formulas,
- Interpolation of values, and
- Use of geological model to assign values into each model cell.

CSA Global used the first method, i.e. the density values were assigned to each model cell based on the average value from the density data set collected and provided by GAFC.

Each model cell was assigned a density value of 2.36 t/m<sup>3</sup>.

### 14.13 Mineral Resource Classification Strategy

The Resource classification strategy utilised in this report is based primarily on search and interpolation parameters, and exploration drill hole density. Kriging variance was also used to assist with the classification. The specific requirements concerning the minimum number of samples and minimum number of drill holes used for grade interpolation for each block were applied, and are tabulated in Table 14-6.

The block model was displayed in Micromine's Vizex environment and colour coded according to interpolation runs. After visual inspection, it was decided that the classification of Mineral Resources could be based on exploration drill hole density and interpolation runs which were based on modelled semivariogram ranges. It was decided that the exploration grid of at least 50 by 50m would support the Indicated resource category if blocks were estimated from at least two drill holes by search ellipse not exceeding semivariogram ranges. All the remaining model cells were classified as Inferred. No Measured Mineral Resource category was applied to the DASA model.

The resource classification strategy is illustrated below (colours: green – Indicated, blue – Inferred) in Figure 14-10.

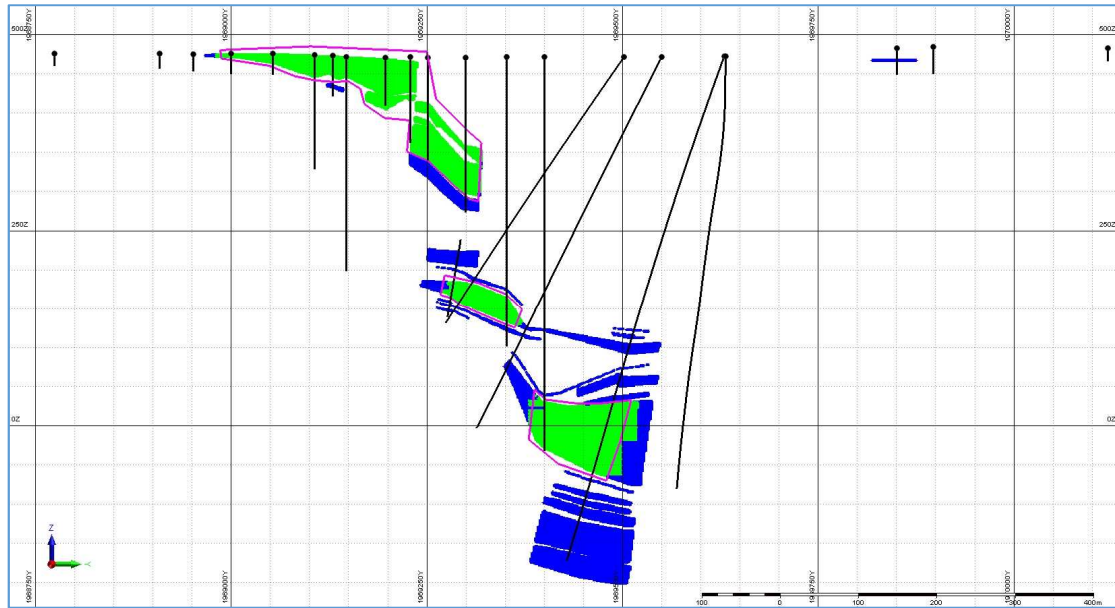


Figure 14-10: Resource Classification Strategy, Section 360100mE

#### 14.14 Block Model Validation

The generated block model for the DASA deposit with interpolated uranium grades was validated both visually and digitally. Close correlation between the sample grades and the model grades was observed.

The average block model grades were compared against average uranium grades in the sample composite file. The modelled grades were very close to the average uranium grade in the sample composite file (2% relative difference – 538ppm in the composite file and 549ppm in the model).

All grades were also interpolated using the Inverse Distance Weighting method with the power of two and three and then compared to the grades estimated by Ordinary Kriging method. A comparison of the grades and metal tonnage using Kriging vs. IDW method at various cut-off grades is given in the table below. Kriging returned generally lower grades, but overall the grades differ within acceptable limits.

Table 14-7: Comparison of Grades between Ordinary Kriging and IDW Method

Cut-Off U <sub>3</sub> O <sub>8</sub> , ppm	Kriged Model		IDWx2 Model		IDWx3 Model		Difference, %			
	U <sub>3</sub> O <sub>8</sub>	Metal	U <sub>3</sub> O <sub>8</sub>	Metal	U <sub>3</sub> O <sub>8</sub>	Metal	With IDWx2		With IDWx3	
	ppm	Mlb	ppm	Mlb	ppm	Mlb	Grade	Metal	Grade	Metal
0	549	147	569	152	570	152	-3.7	-3.7	-3.9	-3.9
100	582	145	615	150	623	150	-5.6	-3.5	-7.0	-3.6
200	803	133	863	138	883	138	-7.5	-3.8	-10.0	-3.9
300	1,070	120	1,146	125	1,177	126	-7.1	-4.9	-10.0	-5.2
400	1,314	110	1,403	116	1,446	117	-6.7	-5.8	-10.0	-6.3
500	1,544	102	1,648	109	1,701	109	-6.8	-6.5	-10.2	-7.3
600	1,757	96	1,877	102	1,935	104	-6.8	-7.1	-10.1	-8.2
700	1,963	90	2,093	97	2,169	98	-6.6	-7.8	-10.5	-8.9
800	2,149	86	2,300	93	2,385	94	-7.0	-8.1	-11.0	-9.5
900	2,330	81	2,505	88	2,600	90	-7.5	-8.4	-11.6	-10.0
1,000	2,508	78	2,704	85	2,810	86	-7.8	-8.8	-12.1	-10.6
1,100	2,670	74	2,892	81	3,015	83	-8.3	-9.1	-12.9	-11.0
1,200	2,841	71	3,074	78	3,201	80	-8.2	-9.7	-12.7	-12.0
1,300	2,994	68	3,259	75	3,393	77	-8.9	-9.9	-13.3	-12.5
1,400	3,151	66	3,425	73	3,580	74	-8.7	-10.6	-13.6	-13.2
1,500	3,287	64	3,562	71	3,738	72	-8.4	-11.3	-13.7	-13.9

Note to reader: the above information should not be construed as Mineral Resource estimates, the figures are provided solely as a validation check for the interpolation methodology.

The block model was validated both visually and statistically.

Swath plots were generated for each 20m bench and each 50m vertical section in east-west and north-south directions. The results of this validation are shown from Figure 14-11 to Figure 14-13. The plots demonstrate close correlation between the modelled uranium grades and sample composites. It is apparent that the model has smoothed the composite grades, which is to be expected due to the volume variance effect.

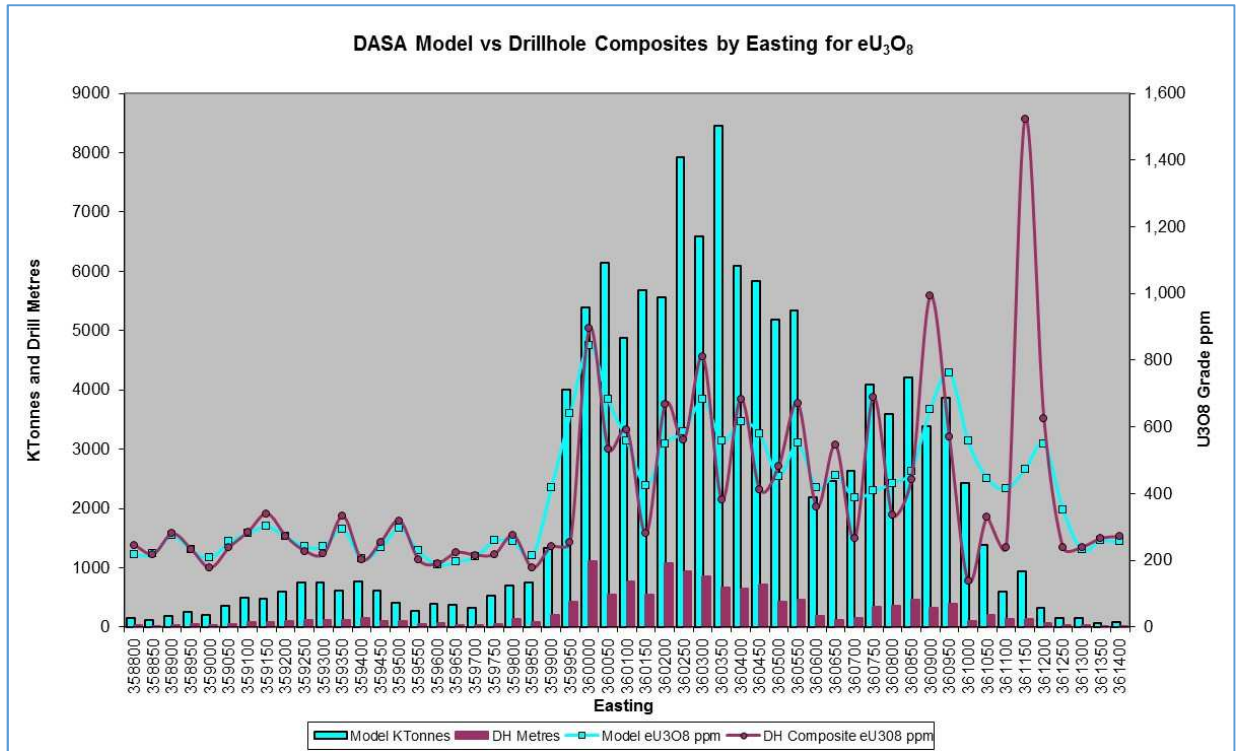


Figure 14-11: Swath plot for 50m Easting sections

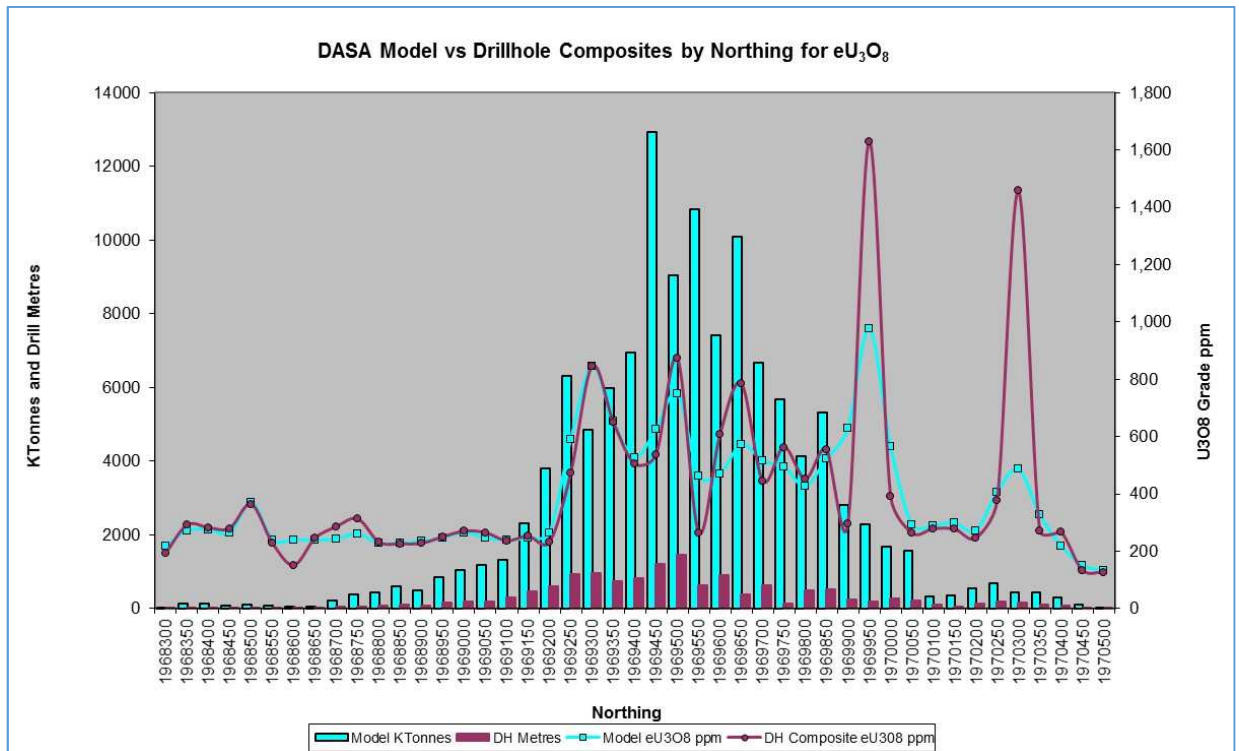


Figure 14-12: Swath plot for 50m Northing sections

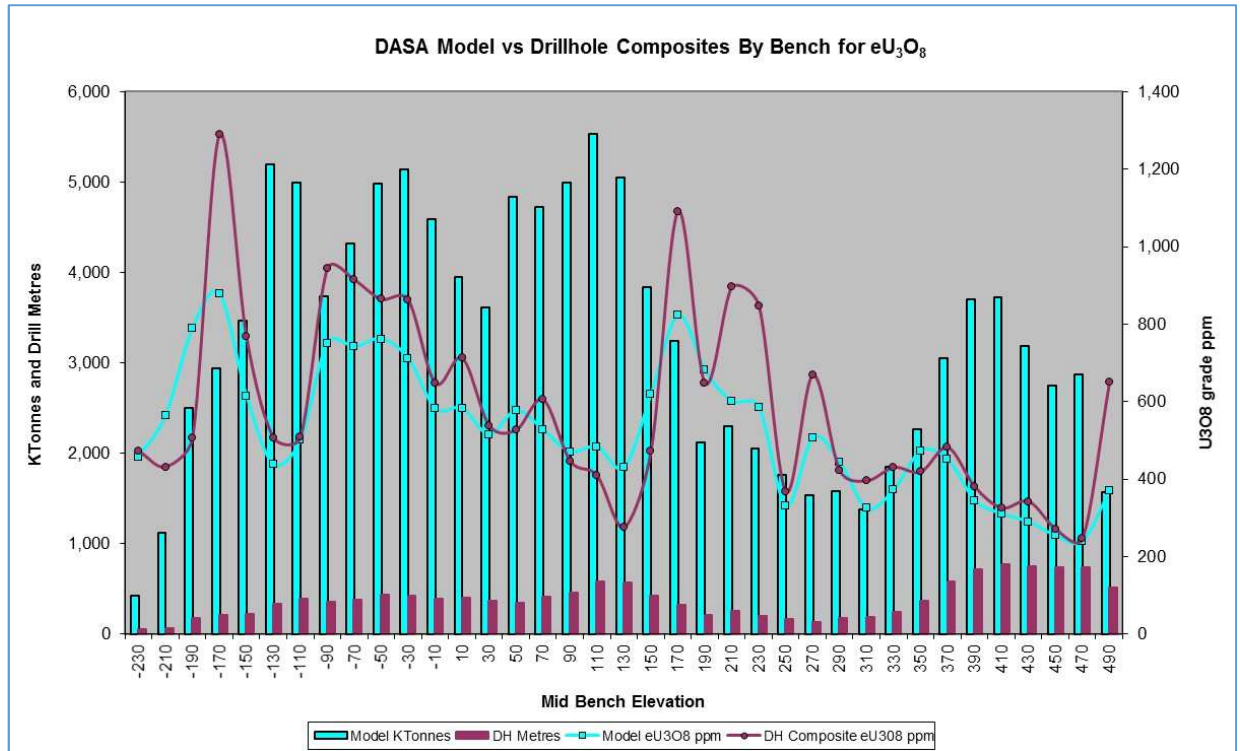


Figure 14-13: Swath plot for 20m fitches

### 14.15 Mineral Resource Report

The Mineral Resource estimate for the DASA deposit is based on estimated grades in the block model spatially constrained by geological and statistical parameters. The Mineral Resource estimate has been classified and reported in accordance with the CIM guidelines.

The Mineral Resource report is shown in Table 14-9 has adopted a  $eU_3O_8$  cut-off grade of 1200 ppm. A grade-tonnage table, with a range of  $eU_3O_8$  cut-off grades applied (between 0 and 3,500 ppm  $U_3O_8$ ), and subdivided by Mineral Resource classification, is included in the Table 14-10. The cut-off grades were applied to the  $eU_3O_8$  values in the block model.

CSA Global has elected to be conservative in the selection of cut-off grade based on current subdued pricing and to align with the likely underground mining scenario for the project. Based on our global experience in uranium Mineral Resource estimation and mining planning and upon review of similar projects in Niger (Goviex, Areva) CSA Global believes that a 1200  $eU_3O_8$  ppm cut-off represents a sound basis for development of underground mining. The 1200ppm blocks that occur within the 100ppm wireframes are displayed in Figure 14-14.

This cut-off is supported by conceptual cost analysis based on similar underground mining scenarios. The costs used are in line with industry standards and represent a reasonable case for development of a project at this scale. The key assumptions in costs analysis are provided below in Table 14-8: Conceptual cost analysisTable 14-8.



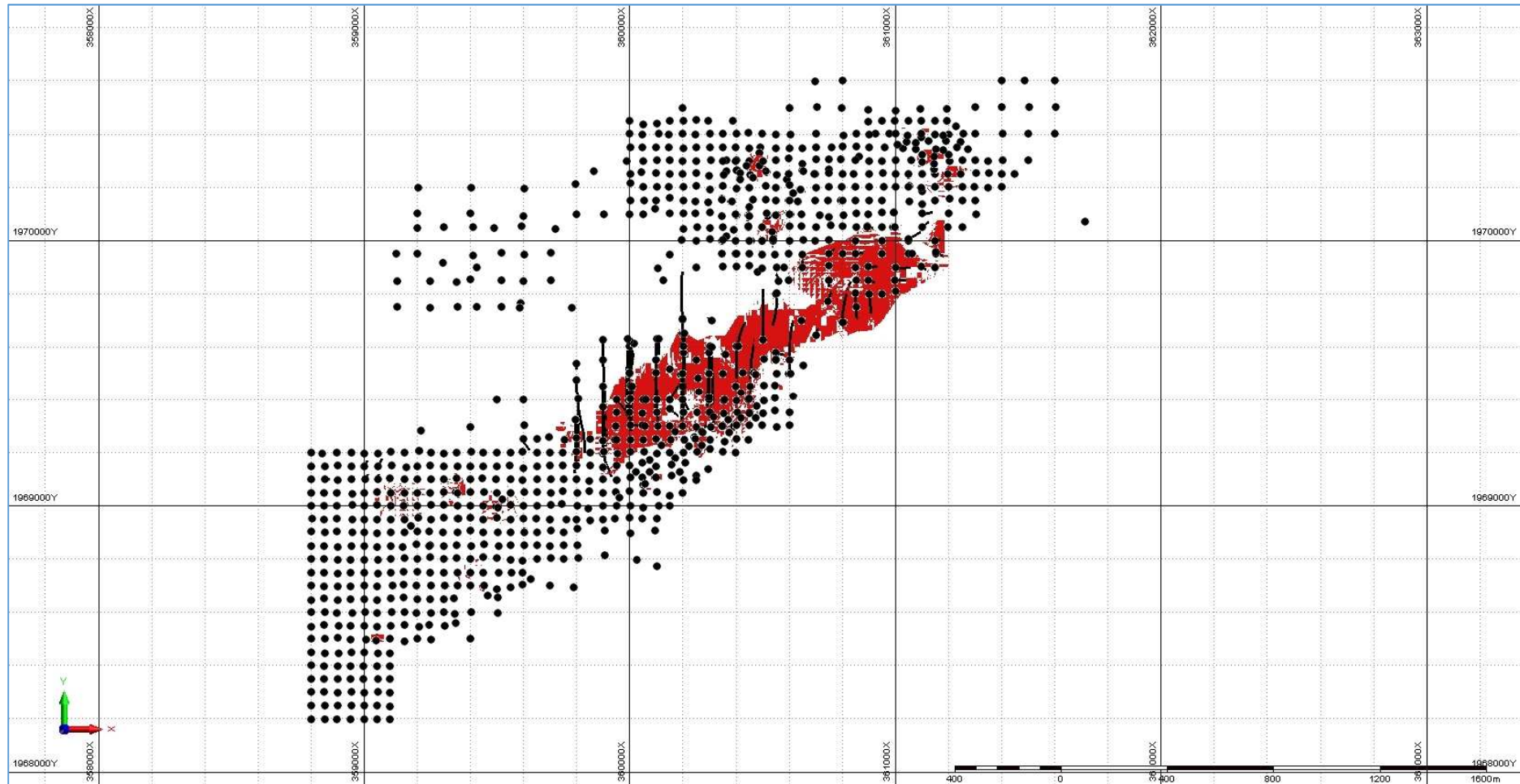


Figure 14-14: Plan showing extent of 1200ppm blocks

Table 14-8: Conceptual cost analysis

	Units	
Mining rate per day	tonnes	2,000
<b>Price</b>	\$/lb	50
<b>OPEX</b>	\$/tonne	
Mining, ore		65
Processing		25
Transport		15
G&A		5
<b>TOTAL OPEX</b>	\$/tonne	110
Gross Breakeven grade	lb/t	2.200
	kg/t	0.998
	ppm	998
Recovery	%	95%
Mill COG	%U3O8	1,051
Mining recovery	%	85%
<b>Cut-off grade</b>	ppmU3O8	1,236

- Mineral resources have been reported at a cut-off grade of 1200 ppm of eU3O8 per tonne assuming: metal price of US \$50 per tonne;
- mining cost of US \$65 per tonne, processing and transport cost of US \$40 per tonne, G&A cost of US \$5 per tonne (the processing and transport costs are based on an assumption that milling will be done at one of the Areva mills in Arlit);
- processing recovery rate of 95%, mining recovery rate of 85%; and
- mining rate of 2,000 tonnes per day.

Only Mineral Resources are identified in this Report. No economic work that would enable the identification of Mineral Reserves is carried out and no mineral reserves are defined. Mineral Resources that are not Mineral Reserves do not account for mineability, selectivity, mining loss and dilution and do not have demonstrated economic viability. These Mineral Resource estimates include Inferred Mineral Resources that are normally considered too speculative geologically to have economic considerations applied to them that would enable them to be categorized as Mineral Reserves. There is also no certainty that these Inferred and Indicated mineral resources will be converted to the Indicated and Measured categories through further drilling, or into mineral reserves, once economic considerations are applied.

For the purposes of this Mineral Resource no detailed mining studies have been conducted. Previous work on the project by SRK for the previous Mineral Resource estimated 600ppm eU<sub>3</sub>O<sub>8</sub> is appropriate for underground mining in this location. based on decline and long hole stoping methods to recover the mineralisation (SRK NI43-101 Technical Report 2013). This demonstrates the conservative nature of the cut-off price assumptions used in this Mineral Resource estimate.

CSA Global believes that further study is also warranted to assess the open cut mining of lower grade mineralisation in the near surface environment. As this would likely yield additional tonnage into the Mineral Resource inventory.

Grade-tonnage curves for all the Mineral Resource classification categories are shown in Figure 14-15, and are tabulated in Table 14-10. The data is presented from 400ppm upwards to reflect possible lower grade options in open cut mining scenarios.

Table 14-9: DASA Mineral Resources as at 1 January 2017

Category	Tonnes Mt	eU <sub>3</sub> O <sub>8</sub> ppm	Contained metal Mlb
Indicated	3.7	2,608	21.4
Inferred	7.7	2,954	49.8

Notes:

5. Mineral Resources are based on CIM definitions.
6. A cut-off grade of 1200 ppm eU<sub>3</sub>O<sub>8</sub> has been applied
7. A bulk density of 2.36t/m<sup>3</sup> has been applied for all model cells.
8. Rows and columns may not add up exactly due to rounding.

CSA is not aware of any known environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant issues that could potentially affect this mineral resource estimate.

Table 14-10: DASA Grade-tonnage summary (base case cut-off highlighted yellow)

Cut-Off eU <sub>3</sub> O <sub>8</sub> , ppm	Category	Volume Mm <sup>3</sup>	Tonnes Mt	eU <sub>3</sub> O <sub>8</sub> ppm
400	Indicated	5.2	12.3	1,258
	Inferred	10.8	25.6	1,342
500	Indicated	4.2	9.9	1,457
	Inferred	8.5	20.1	1,587
600	Indicated	3.5	8.3	1,639
	Inferred	7	16.5	1,816
700	Indicated	3	7	1,811
	Inferred	5.8	13.8	2,041
800	Indicated	2.6	6.2	1,960
	Inferred	5	11.9	2,247
900	Indicated	2.3	5.4	2,119
	Inferred	4.4	10.5	2,439
1,000	Indicated	2	4.7	2,293
	Inferred	4	9.4	2,616
1,100	Indicated	1.8	4.2	2,451
	Inferred	3.6	8.5	2,777
1,200	Indicated	1.6	3.7	2,608
	Inferred	3.2	7.7	2,954
1,300	Indicated	1.4	3.3	2,769
	Inferred	3	7	3,100
1,400	Indicated	1.3	3	2,914
	Inferred	2.7	6.4	3,262
1,500	Indicated	1.2	2.8	3,046
	Inferred	2.5	6	3,398
2,000	Indicated	0.8	1.8	3,751
	Inferred	1.8	4.4	4,029
2,500	Indicated	0.6	1.3	4,296
	Inferred	1.4	3.4	4,563

Note to reader: the above information should not be construed as a Mineral Resource statement the information is provided only to demonstrate the sensitivity of the block model to various grade cut-off scenarios.

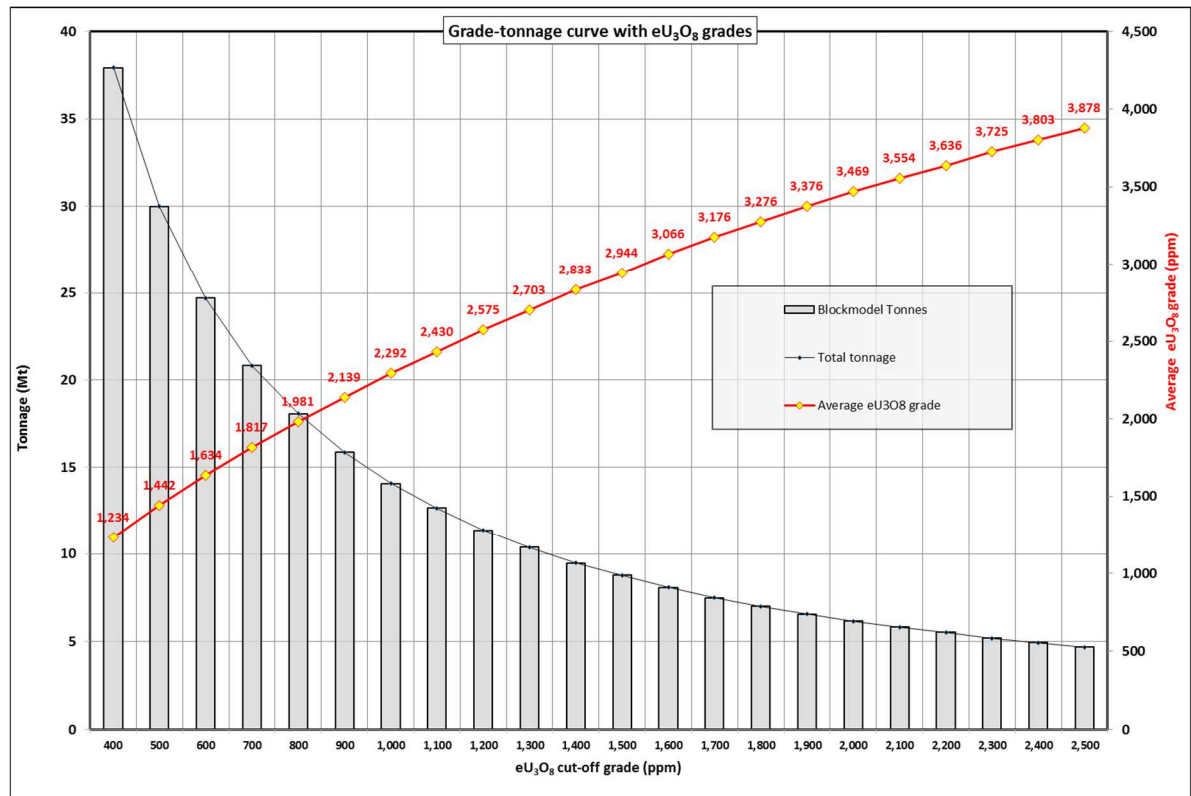


Figure 14-15: Grade tonnage for block model.

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## 15 Mineral Reserve Estimates

This section is not applicable to the current report.



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## 16 Mining Methods

This section is not applicable to the current report.

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# 17 Recovery Methods

This section is not applicable to the current report.

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## 18 Project Infrastructure

This section is not applicable to the current report.

# 19 Market Studies and Contracts

CSA Global notes that the market for uranium has fluctuated during the past five years. Figure 19-1, copied from the Ux Consulting Company LLC (“UxC”) website, shows the trend in uranium pricing over the past two years.

The spot price quote listed by UxC on December 23, 2016 was US\$20.38/lb U<sub>3</sub>O<sub>8</sub>.

UxC used the following spot price as median: US\$20.5/lb U<sub>3</sub>O<sub>8</sub> in 2017, US\$19.8/lb U<sub>3</sub>O<sub>8</sub> in 2018, US\$21.1/lb U<sub>3</sub>O<sub>8</sub> in 2019, US\$23.6/lb U<sub>3</sub>O<sub>8</sub> in 2020, US\$27.3/lb U<sub>3</sub>O<sub>8</sub> in 2021, US\$31.9/lb U<sub>3</sub>O<sub>8</sub> in 2022, US\$36.9/lb U<sub>3</sub>O<sub>8</sub> in 2023, US\$40.8/lb U<sub>3</sub>O<sub>8</sub> in 2024, US\$45.0/lb U<sub>3</sub>O<sub>8</sub> in 2025, US\$49.3/lb U<sub>3</sub>O<sub>8</sub> in 2026, and US\$53.7/lb U<sub>3</sub>O<sub>8</sub> in 2027 thereafter. Average price is US\$33.6/lb U<sub>3</sub>O<sub>8</sub>.

Metal prices used for Mineral Resources are based on consensus, long term forecasts from banks, financial institutions, and other sources. The SNL consensus outlook is more bullish than UxC and has uranium prices rising over the next three years to \$45 dollars by 2020 (Figure 19-2)

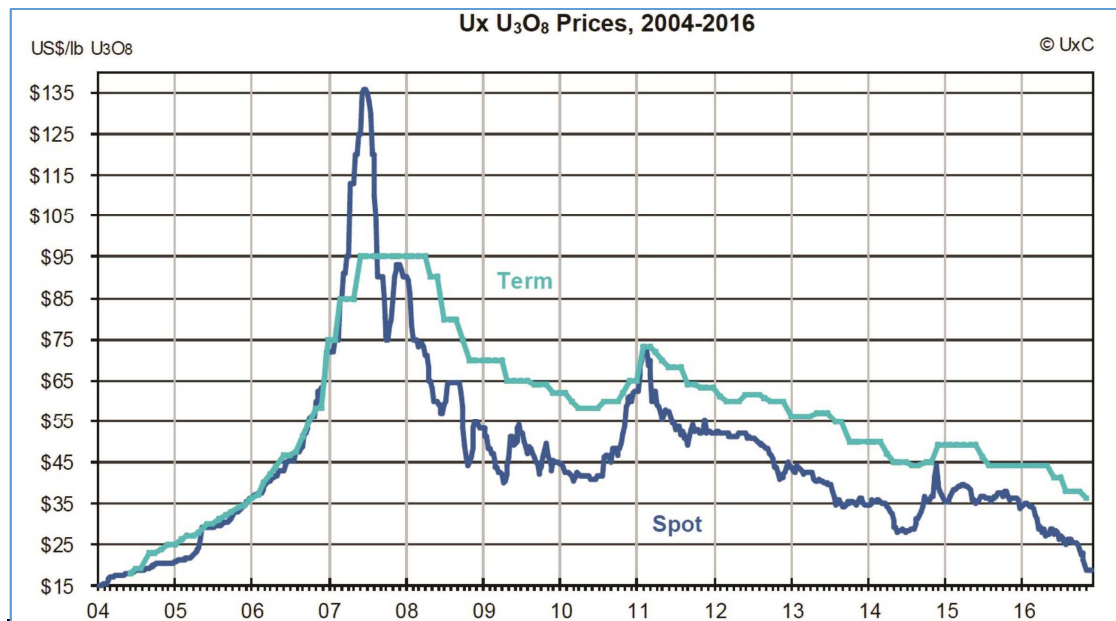


Figure 19-1: UxC U<sub>3</sub>O<sub>8</sub> Historical Uranium Prices

<b>Consensus commodity forecast prices</b>				
Commodity*	2016 (actual)	Average forecast as of July 10, 2017		
	Average price	2017	2018	2019
Gold (US\$/oz)	1,248.0	1,257.9	1,286.6	1,301.5
Silver (US\$/oz)	17.1	17.8	18.6	19.1
Platinum (US\$/oz)	985.4	1,018.1	1,068.5	1,080.4
Rhodium (US\$/oz)	683.5	894.6	920.0	945.3
Palladium (US\$/oz)	612.4	792.1	812.2	837.4
Aluminum^	0.7	0.8	0.9	0.9
Cobalt	11.6	21.1	21.5	21.0
Copper	2.2	2.6	2.7	2.8
Iron Ore (US\$/t)**	58.5	64.2	58.3	58.2
Lead	0.8	1.0	1.0	1.0
Molybdenum	6.4	7.1	7.5	8.1
Nickel	4.4	4.7	5.2	6.0
Tin^	8.2	9.1	9.1	9.5
Zinc	0.9	1.2	1.2	1.2
Uranium	25.7	29.3	36.4	44.9

Data as of July 10, 2017.  
 \* US\$/lb unless stated otherwise.  
 \*\* Iron ore is for 62% Fe.  
 ^ Aluminum and tin 2016 average prices provided by S&P Capital IQ.  
 Prices in red represent a lower price, while prices in green represent a higher price, compared to previous year forecast.  
 Forecast price data provided by S&P Capital IQ Consensus Estimates.  
 Source: S&P Global Market Intelligence

Figure 19-2: SNL consensus pricing forecast

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## 20 Environmental Studies, Permitting and Social or Community Impact

This section is not applicable to the current report.



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## 21 Capital and Operating Costs

This section is not applicable to the current report.

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## 22 Economic Analysis

This section is not applicable to the current report.

## 23 Adjacent Properties

GAFC has six exploration licences (including Adrar Emoles III) located in Niger as outlined in the tenure section of this report. GAFC has been conducting exploration and evaluation programs across all of these project areas resulting in the delineation of several prospects and deposits.

The most advanced of these is the Isakanan uranium prospect, located about 125km North from Agadez and about 15km SE from the DASA uranium project. Uranium mineralization at the Isakanan prospect occurs mainly within the series of Carboniferous sediments, predominantly within the reduced Madaouela formation that occurs as silts and fine grained sandstones. Mineralized bodies form flat sub-horizontal lenses with an average thickness of about 2 to 3 metres. The average depth of the main mineralized body is about 250m from the surface. Preliminary estimate of the Isakanan deposit returned about 18-22 Mt @ 450-550 ppm  $U_3O_8$  (180-220 Mlb of metal oxide).

CAFC also runs exploration programme within the Tin Negouran permits, which are located about 150km west from the town of Agadez and about 160km south-west from the DASA deposit (Figure 23-1). Three mineralized areas have been identified within the permits with the following intersections:

- Tagadamat Central: hole TDH-12 with 1,557ppm  $U_3O_8$  over 14 metres from 1 to 15 metres depth;
- Ershanf: hole TDH-129 with 290ppm  $U_3O_8$  over 5 metres from 35 to 40 metres depth; and
- Tagadamat East: hole TDH-179 with 115ppm  $U_3O_8$  over 7.5 metres from 7.5 to 15 metres depth.



Figure 23-1: Location of the Tin Negouran Uranium Permits

All other adjacent properties to DASA deposit area are third party properties, at a very early exploration stage and no relevant public data was published for inclusion within this study.

## 24 Other Relevant Data and Information

At the time of writing GAFC are undertaking a conceptual mining study to review the economic potential of developing a small-scale underground trial mine. The aim of the concept is to develop a decline down to the mineralisation at the shallowest depths possible in a cash flow positive scenario. The aim being to collect bulk mineralisation samples for test milling and uranium recovery studies at a scale that would allow the sale of the uranium. This concept has the dual benefit of completing the underground development required to support a much larger underground mining scenario in the future should it be required.

The selected scenario will necessarily target higher grade material from within the deposit to make an economic case for development. However it will also mean that during trial mining GAFC can complete further technical work on the Mineral Resource to increase the size and improve the confidence and classification. Using these data they could then move the project towards higher confidence feasibility studies.

The concept study will evaluate a range of production rates from 500 to 2000 tonnes per day and will look to target material from within the resource with a grade suitable to cover the costs of development. The concept would involve treating the mined material at a nearby processing facility. This limit the capital expenditure requirements to those required directly for underground mining, thus keeping such capital costs to a minimum.

## 25 Interpretation and Conclusions

This report was initiated by GAFC for CSA Global to estimate Mineral Resources for the DASA project located in Niger. The report describes previous work by GAFC (and others) and the work done by CSA Global to estimate Mineral Resources at the DASA project. The interpretation and modelling work has resulted in CSA Global estimating a Mineral Resource for the project in the Indicated and Inferred categories. The results of this Mineral Resource are summarised in the Table below.

Category	Tonnes Mt	eU <sub>3</sub> O <sub>8</sub> ppm	Contained metal Mlb
Indicated	3.7	2,608	21.4
Inferred	7.7	2,954	49.8

CSA Global believes this Mineral Resource is a reliable estimate of the mineralization present at the DASA. The data used as inputs to the model have been collected and compiled at high standard and indicate that the project is a high quality mineral asset. Additionally, mineralization potential exists within the project along strike to the north and south, as well as within the graben providing significant upside potential. As such, CSA Global recommends that additional exploration work be conducted at the project to enlarge the resource and improve the classification of the current Mineral Resource to a higher classification.

A review of the project risks identified the following:

- Initial data: Radioactive Equilibrium Factor was defined based on comparison of assays with gamma logging. There is no investigation of radon degassing factor which may influence significantly the gamma activity. Comparison of gamma logging with radium assays in closed cans as well as radium assays in closed cans with uranium assays allows to define reliably the radiological factors;
- Mineral Resource: The mineral resource model documented herein is sufficiently reliable to support engineering and design studies to evaluate the viability of a mining project at a scoping level followed by preliminary feasibility level. The Project's economic viability is sensitive to the estimated uranium grade of the resource and the uranium market price. Infill drilling in critical areas would significantly reduce any potential risk in the resource estimation.
- Mining: It is expected that part of the deposit will be mined using industry standard open pit mining techniques utilising modern technology with proven success, with no requirement for untried or untested technology. deeper parts of the of the deposit could also be mined using underground methods, and some areas could also be considered for in-situ uranium leaching. However, this has not been assessed in this report.
- Processing: Results of the metallurgical test work shows the mineralogy and metallurgy of the DASA mineralisation is readily amenable to acid leaching with conventional uranium recovery – similar to the AREVA operation at Arlit, Niger.



- Environmental and Social: Were not part of the Project scope. However, the deposit is located in an area with very limited population. The environment is very arid with limited flora and fauna. Additionally, other similar mining operations are active in the area. These conditions may be favourable for mine development.
- Economic Outcomes: Economic studies were not part of the Project scope.
- Permitting: The exploration permit granted to GAFC was renewed two times. The most recent renewal occurred in 2016 resulting in an area of 121.3km<sup>2</sup> from the initial area of 488.7 km<sup>2</sup> granted in 2007. GAFC needs to apply for the exploitation permit again within 3 years.

## 26 Recommendations

CSA Global recommends the following are completed to support the exploration and evaluation efforts estimated budgets are provided in Table 26-1: Summary budget for next step programmes to complete PEA

- Current QA/QC procedures should be maintained to ensure high quality data is available for subsequent Mineral Resource estimates.
- Further exploration and evaluation programs are required to upgrade the confidence of the extent and quality of mineralization at the deeper parts of the DASA deposit (inside the graben). Key programs include:
  - Additional diamond core drilling to test the morphology of the mineralization within the shear/fault zones bounding the graben as well as to study the distribution of the uranium disequilibrium factor at the deposit.
  - Step out drilling to North and south should be considered to enlarge the resources.
  - Infill drilling will be required within the Inferred and Indicated Resource areas if a higher classification is sought by GAFC.
  - Supporting studies such as hydrological, geotechnical and metallurgical should be completed during drilling programmes to inform the PEA.
  - Consider logging the drill holes using a PFN tool to assist in mapping any disequilibrium within the deposit
  - Complete a stratigraphic study within the DASA project area to assess where other targets may exist and host similar deep mineralisation.
- It is recommended to consider some areas of the deposit for in-situ leaching techniques.
- The project should be subject to Preliminary Economic Assessment to assess the economics and areas that require more detailed study. Should this be successful more detailed feasibility studies should be considered. Supporting studies such as hydrological, geotechnical and metallurgical should be completed during drilling programmes.
- Some additional investigations are required for definition of radioactive equilibrium factor (“REF”) distribution to upgrade resource categories and understanding of uranium mineralization. CSA Global recommends to do assaying of radium in sealed cans and uranium by XRF. Comparison of radium and uranium assays allows the reliable assessment of the REF and comparison of radium assays and gamma logging allows to define radon degassing factor. This factor may also influence the definition of eU<sub>3</sub>O<sub>8</sub> grades.
- Additional metallurgical tests are recommended to assess the recovery of uranium of the deeper mineralisation within the Graben structure to better understand the metal recovery for the entire deposit.

Table 26-1: Summary budget for next step programmes to complete PEA

Programme	Costs (CAD)
Metres Drilled	17,250 m
Drilling	\$3,795,000
Niger camp & admin	\$900,000
Hydrogeology	\$150,000
Geotechnical	\$100,000
Metallurgical	\$50,000
EIA	\$-
Resource update	\$50,000
Mine design	\$50,000
PEA	\$100,000
<b>Total</b>	<b>\$5,195,000</b>

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## 28 Dates and Signatures - Certificates of Qualified Persons

### CERTIFICATE OF QUALIFIED PERSON – DMITRY PERTEL


I, Dmitry Pertel, Geologist, as an author of this report entitled NI 43-101 Technical Report for the DASA Uranium Project, Niger, prepared for Global Atomic Fuels Corporation and dated 31 July 2017, do hereby certify that:

- 1) I am a Principal Geologist with CSA Global Pty Ltd. My office address is Level 2, 3 Ord Street, West Perth, Western Australia 6005.
- 2) I am a graduate of the Saint Petersburg Mining University in 1986 with a Master's degree in Geology.
- 3) I am a Member of Australian Institute of Geoscientists (AIG) and registered as a Professional Geoscientist, Certificate #2248. I have worked as a Geologist for a total of 31 years since my graduation. My relevant experience for the purpose of the Technical Report is:
  - Development and reporting of Mineral Resource models
  - Review and report QA and QC procedures and protocols, site visits and laboratory inspections
  - Principal Geologist on a number of Mineral Resource studies and development of block models in the uranium industry in Africa, Australia and Asia.
- 4) I have read the definition of 'qualified person' set out in National Instrument 43-101 ('NI 43-101') and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a 'qualified person' for the purposes of NI 43-101.
- 5) I have visited the DASA Project in March-April 2017.
- 6) I am responsible for all of preparation of Item Numbers: 1 (sub sections: 1, 2, 3, 4), 2, 3, 4, 14, 25 and 26 of the Technical Report.
- 7) I am independent of the Issuer applying the test set out in Section 1.5.(4) of NI 43-101.



- 8) I have not been involved in any previous Technical Report on the DASA uranium Project.
- 9) I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- 10) To the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated this 31<sup>st</sup> July 2017

  
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Dmitry Pertel

CSA Global Principal Geologist

## CERTIFICATE OF QUALIFIED PERSON – MAXIM SEREDKIN

I, Maxim Seredkin, Geologist, as an author of this report entitled NI 43-101 Technical Report for the DASA Uranium Project, Niger, prepared for Global Atomic Fuels Corporation and dated 31<sup>st</sup> July 2017, do hereby certify that:

- 1) I am a Principal Geologist with CSA Global Pty Ltd. My office address is Level 2, 3 Ord Street, West Perth, Western Australia 6005.
- 2) I am a professional geologist having graduated with a BSc (Geology), 1997, from the Moscow State University, Russia and a PhD from the Moscow State University, Russia, majoring in petrology and volcanology in 2001.
- 3) I am a Fellow of Australasian Institute of Mining and Metallurgy (FAusIMM), and Member of the Australian Institute of Geoscientists (MAIG), expert of NAEN. I have worked as a geologist for a total of 19 years since my graduation from university including 11 years at uranium deposits in Kazakhstan, Russia and Africa.
- 4) I have read the definition of 'qualified person' set out in National Instrument 43-101 ('NI 43-101') and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a 'qualified person' for the purposes of NI 43-101.
- 5) I have not visited the DASA Project.
- 6) I am responsible for all of preparation of Item Numbers: 1 (sub sections: 2, 3, 4), 4, 5, 6, 7, 8, 9, 10, 11 and 12 of the Technical Report.
- 7) I am independent of the Issuer applying the test set out in Section 1.5.(4) of NI 43-101.
- 8) I have not been involved in any previous Technical Report on the DASA uranium Project.
- 9) I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
- 10) To the best of my knowledge, information, and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

Dated this 31<sup>st</sup> July 2017

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Dr Maxim Seredkin

CSA Global Principal Geologist



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