

# **Mineral Resource Estimation of the Napperby Uranium Deposit**

**Report Prepared for**

**Core Exploration Ltd**

**Report Prepared by**



SRK Consulting (Australasia) Pty Ltd

CRE001

September 2018

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**SRK Project Number CRE001**

**September 2018**

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## Executive Summary

The Napperby Uranium Project (the Project) is located 175 km northwest of Alice Springs in the Northern Territory. The mineralisation occurs within a 14 km paleochannel trending approximately east–northeast. Carnotite mineralisation resides mostly in sands and sandy clays as finely disseminated particles and blobs up to 5 cm long, but can also be found in overlying calcrete as joint coatings. Core Exploration (Corex) recently acquired data concerning the Project from the government of the Northern Territory. SRK Consulting (Australasia) Pty Ltd (SRK) estimated the Mineral Resources in 2009 on behalf of Toro Energy Limited (Toro). SRK has been asked to examine the public data, estimate the Mineral Resources for the Project according to the guidelines of the JORC Code 2012 and make recommendations for further exploration work at Napperby.

SRK's study includes the following steps:

- Review of the public data acquired by Corex
- Estimation of the in situ  $U_3O_8$  resources in the geological model and classification of the Mineral Resources according to the JORC Code 2012 guidelines
- Provision of recommendations for further exploration work.

## Summary of Mineral Resources reported

A review of the Corex data showed good agreement with the data SRK had at its disposal in terms of number of drillholes and statistics (as summarised in SRK's 2009 report). SRK built a new mineralisation model using Leapfrog and Vulcan software, taking the original 2009 model parameters into account.

The grade continuity is limited, as the drill spacing is mostly 100 × 100 m (about 90% of the total area), and calcrete-style uranium deposits are inherently nuggetty. Ranges are short, both vertically and horizontally. The technique used for estimating  $U_3O_8$  is uniform conditioning, based on ordinary Kriging, within the mineralised domain. This is a robust estimation method, well suited to a selective mining approach. The results show an increase in grade with respect to the 2009 estimation, mostly due to the tightening of the mineralisation model.  $V_2O_5$  is estimated by ordinary Kriging, as the number of composites is lower.

The Napperby Mineral Resources are classified as Inferred, because of the reduced quality of the local estimation due to the wide drill spacing and the uncertainty associated with discrepancies between the Deep Yellow and Toro data.

A summary of the classified Mineral Resources is given in Table ES-1.

**Table ES-1: Recoverable Mineral Resources by uniform conditioning (10 × 10 × 1 m selective mining unit)**

Cut-off ( $U_3O_8$ ppm)	Ore Tonnage (Mt)	Grade $U_3O_8$ (ppm)	Metal ( $U_3O_8$ t)	Metal ( $U_3O_8$ Mlb)
0	30.12	196	5901	13.01
50	28.58	204	5841	12.88
100	20.76	253	5243	11.56
150	13.90	316	4398	9.70
200	9.54	382	3643	8.03
250	6.78	446	3027	6.67
300	4.96	510	2531	5.58
350	3.73	572	2131	4.70

Cut-off (U <sub>3</sub> O <sub>8</sub> ppm)	Ore Tonnage (Mt)	Grade U <sub>3</sub> O <sub>8</sub> (ppm)	Metal (U <sub>3</sub> O <sub>8</sub> t)	Metal (U <sub>3</sub> O <sub>8</sub> Mlb)
400	2.86	632	1806	3.98
450	2.23	691	1539	3.39
500	1.76	748	1317	2.90
550	1.41	805	1132	2.50
600	1.14	860	976	2.15
650	0.92	914	844	1.86
700	0.76	968	731	1.61

## Competent Persons' Statement

The Mineral Resource estimation results in this report are based on information compiled by Dr David Rawlings and reviewed by Messrs David Slater and Daniel Guibal. Dr David Rawlings is a member of the Australasian Institute of Mining and Metallurgy (AusIMM) and a full-time employee of Core Exploration Ltd. The Mineral Resource estimation was completed by Mr Daniel Guibal, who is a Fellow of the AusIMM and an Associate Corporate Consultant of SRK Consulting (Australasia) Pty Ltd. The estimation was peer reviewed by Mr David Slater, who is a member of the AusIMM and a full-time employee of SRK Consulting (Australasia) Pty Ltd.

Dr David Rawlings and Mr Daniel Guibal have sufficient experience which is relevant to the style of the mineralisation and type of deposit under consideration, and to the activity being undertaken, to qualify as Competent Persons (Geology and Resource evaluation respectively) as defined in the 2012 Edition of the JORC Code.

## Recommendations

SRK makes the following recommendations:

- The current wide drill spacing is reflected in the Inferred classification. Infill drilling to at least 50 × 50 m of a larger proportion of the resource (currently about 10% is drilled at 50 × 50 m) will be necessary to reach a higher JORC Code classification status (Indicated). Depending on cost, it may be better to drill a limited area at a much closer spacing to test the geology as well as the grade continuity. It is possible to use radiometric data (gamma logs), as these are much cheaper to acquire, but good calibration with chemical measurements needs to be assured and rigorously monitored.
- The mineralisation model built by SRK may be improved by a more detailed 3D geological study, and this will require further infill drilling.
- The selective mining unit (SMU) used by SRK is subject to change depending on the results of future mining studies, and this will have an impact on the recoverable resources, which will have to be re-assessed once the final SMU and grade control procedures are defined.
- Disequilibrium is not an issue for the current estimation, as no radiometric data is used. Nevertheless, the available documentation indicates that Toro's studies on the 2007 data showed a reasonably consistent ratio between chemical grade and radiometric value in the order of 1.4. It is important to address this issue in a more systematic way in future exploration. If this disequilibrium factor is real and consistent, future exploration can potentially rely on aircore drilling and gamma measurements, which are cheaper than other methods. In addition, gamma-derived grades represent significantly larger volumes than traditional core, so are likely to provide a smoother, less nuggetty representation of the grade distribution. Finally, radiometric data can be very useful for grade control in the production stage.

- There appears to be good exploration potential at the Project. Provided the disequilibrium issue is well understood, large-scale regional exploration could rely on aircore drilling and gamma measurements, supplemented by sonic drilling. Existing Uranerz and CRA Exploration data may be of adequate quality to locate initial targets. Based on SRK's experience with this mineralisation style, to reach a level of Indicated Mineral Resources, it is necessary to have a drill spacing of at least 50 m or less, depending on the complexity of the mineralisation and the geology (paleochannels).

# Table of Contents

Executive Summary .....	1
Disclaimer.....	vi
<b>1 Introduction and Scope of Report.....</b>	<b>1</b>
1.1 Background .....	1
1.2 Nature of the brief .....	1
1.3 Program objectives .....	1
1.4 Reporting standard.....	1
1.5 Work program .....	1
1.6 Project team .....	2
1.7 Statement of SRK independence.....	2
<b>2 Data Review and Mineralisation Model.....</b>	<b>3</b>
2.1 Data.....	3
2.2 Mineralisation model .....	4
2.3 Compositing and block fractions .....	4
<b>3 Statistics and Variography .....</b>	<b>5</b>
<b>4 Resource Estimation.....</b>	<b>10</b>
4.1 Choice of the estimation method .....	10
4.2 Choice of the panel size.....	10
4.3 Choice of the SMU size .....	10
4.4 Estimation parameters .....	10
4.5 Kriging results .....	11
4.6 Uniform conditioning .....	13
4.7 Classification of the Mineral Resources.....	14
<b>5 Conclusions and Recommendations.....</b>	<b>15</b>
<b>6 References .....</b>	<b>17</b>

## List of Tables

Table 2-1: 50 × 50 × 1 m block model parameters .....	4
Table 3-1: Raw and declustered statistics .....	5
Table 3-2: Top-cut U <sub>3</sub> O <sub>8</sub> raw and declustered statistics .....	5
Table 3-3: Variogram models parameters.....	9
Table 4-1: Kriging neighbourhood parameters.....	11
Table 4-2: Statistics on the Kriged estimates (ppm) .....	11
Table 4-3: Mineral Resources based on Kriged estimates .....	12
Table 6-4: U <sub>3</sub> O <sub>8</sub> recoverable Mineral Resources by uniform conditioning (10 × 10 × 1 m SMU) .....	13

## List of Figures

Figure 2-1:	Plan view of combined Toro and Deep Yellow drilling .....	3
Figure 2-2:	Plan view of drill holes and mineralisation model .....	4
Figure 3-1:	Declustered histograms of 1 m composites - $U_3O_8$ (left), $V_2O_5$ (right) .....	5
Figure 3-2:	$U_3O_8$ tail distribution of 1 m composites .....	6
Figure 3-3:	Downhole variograms of transformed grades - $U_3O_8$ (left) and $V_2O_5$ (right) .....	6
Figure 3-4:	3D model of transformed $U_3O_8$ .....	7
Figure 3-5:	3D model of transformed $V_2O_5$ .....	7
Figure 3-6:	Back-transformed 3D model of top-cut $U_3O_8$ .....	8
Figure 3-7:	Back-transformed 3D model of $V_2O_5$ .....	9
Figure 4-1:	Histograms of $U_3O_8$ (left) and $V_2O_5$ (right) Kriging slope of regression .....	12
Figure 6-2:	$U_3O_8$ grade-tonnage curves by uniform conditioning (10 × 10 × 1 m SMU) .....	14

## List of Appendices

Appendix A:	Table 1 - JORC Code 2012
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## Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (Australasia) Pty Ltd (SRK) by Core Exploration Ltd (Corex). The opinions in this Report are provided in response to a specific request from Corex to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this Report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.



# 1 Introduction and Scope of Report

SRK Consulting (Australasia) Pty Ltd (SRK) was approached by Core Exploration Ltd (Corex) in March 2017 to review the resource estimation of the Napperby Uranium Project (the Project) in accordance with the JORC Code (2012), following the acquisition by Corex of data concerning the Project from the government of the Northern Territory.

## 1.1 Background

The Project is located 175 km northwest of Alice Springs in the Northern Territory. The mineralisation occurs within a 14 km paleochannel trending approximately east–northeast. Carnotite mineralisation resides mostly in sands and sandy clays as finely disseminated particles and blobs up to 5 cm long, but can also be found in overlying calcrete as joint coatings.

## 1.2 Nature of the brief

In March 2009, SRK estimated the Napperby resource on behalf of Toro Energy Ltd (Toro). Since then, no new data was collected and Toro did not pursue the Project. Corex recently acquired the publicly available data from the government of the Northern Territory. This data includes all exploration information, but no block model of the Mineral Resources. To conform with the guidelines of the JORC Code (2012), a block model is required because it is the only way to test the publicly available resource estimation results. SRK was therefore asked to re-estimate the Mineral Resources, based on the data acquired by Corex.

The estimation process is similar to the one used in 2009, but includes a new mineralisation model, based on a low  $U_3O_8$  cut-off grade. Similar to the 2009 estimate, uniform conditioning, an estimation technique based on ordinary Kriging, was used. The method is well suited to the selective mining approach.

## 1.3 Program objectives

In keeping with the scope of work, the study included the following steps

- Review of the public data acquired by Corex
- Estimation of the in situ  $U_3O_8$  and  $V_2O_5$  resources in the geological model, by ordinary Kriging, followed by an estimation of the  $U_3O_8$  recoverable resources by Uniform conditioning and classification of the resources according to the JORC Code (2012)
- Provision of recommendations for further exploration work.

## 1.4 Reporting standard

This Report is a Mineral Resource Report – it is not a Valuation Report and does not express an opinion as to the value of mineral assets, nor to the ‘fairness and reasonableness’ of any transactions. This Report has been prepared as an internal report only and has not been prepared for external publication; however, information from the report may be used for publication in the form and context it appears, with prior written authorisation from SRK.

## 1.5 Work program

The work took place in April 2017, with draft reporting in May 2017 and final report prepared in September 2018.

## **1.6 Project team**

The estimation work was carried out by Daniel Guibal, Associate Corporate Consultant (Geostatistics & Resources), with project management and peer review carried out by David Slater, Principal Consultant (Resource Geology).

## **1.7 Statement of SRK independence**

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no prior association with Corex in regard to the mineral assets that are the subject of this Report. SRK has no beneficial interest in the outcome of the technical assessment being capable of affecting its independence.

SRK's fee for completing this Report is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the Report.

## 2 Data Review and Mineralisation Model

### 2.1 Data

The data supplied to SRK included the following:

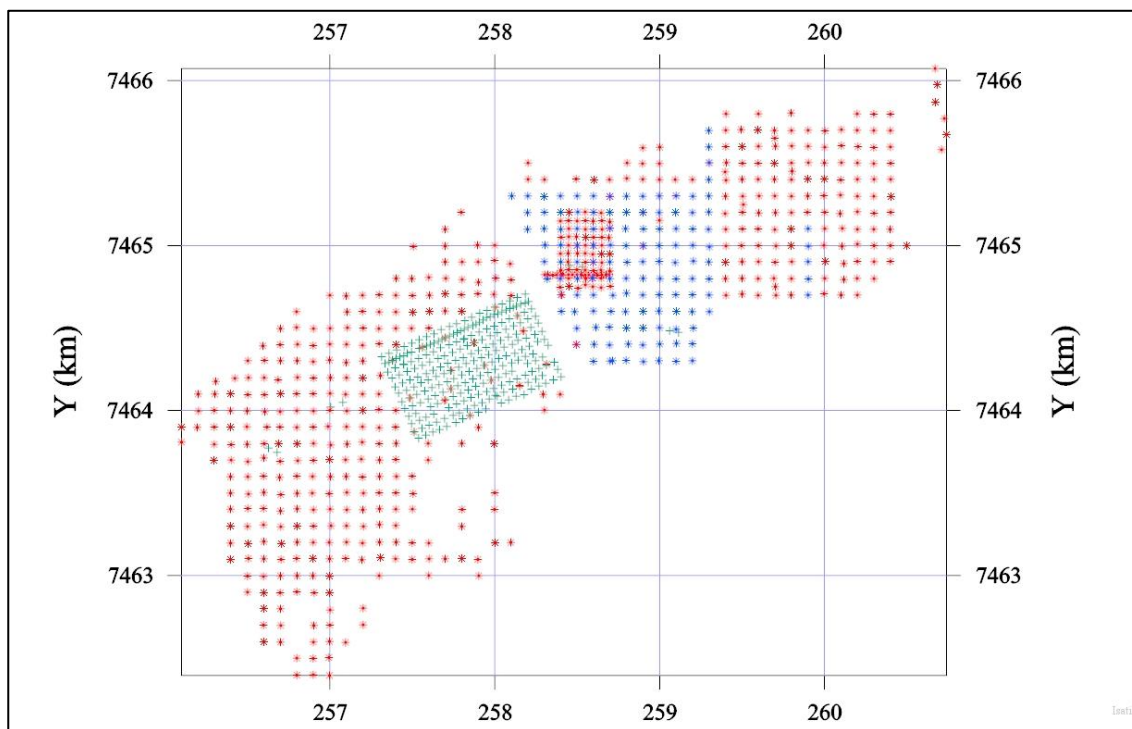
- Toro Energy - Second Combined Annual Report Exploration Licence 24246 and Exploration Licence 24606 Year End 28 December 2008
- Toro Energy - Combined Annual Technical Report EL 24246 and EL 24606 Year End 27 November 2009
- Deep Yellow - Auger drillholes assays and collars (NP holes): 262 holes
- Toro Exploration - Auger, Aircore and Sonic holes assays and collars (NA, NR and NS holes): 1,475 holes.

SRK checked that this information corresponded to the information available to SRK at the time of the 2009 study and was satisfied that there were no apparent discrepancies. The aircore holes were excluded from the estimation (most were used in regional exploration). In addition to the 262 Deep Yellow auger holes, 123 Toro auger holes and 515 Toro sonic holes have been used in the estimation.

Because no mineralised envelope nor block model were supplied, SRK re-evaluated the mineralisation outlines using the geological information from SRK's 2009 report.

More details on the data are given in Appendix A (JORC Code 2012 - Table 1).

The Deep Yellow drilling is on a different grid orientation and spacing to the Toro drilling (Figure 2-1). The Toro holes are mostly on 100 × 100 m grid and cover a total area of ~740 ha, whereas the Deep Yellow holes are on a 50 × 50 m grid, covering ~57 ha.

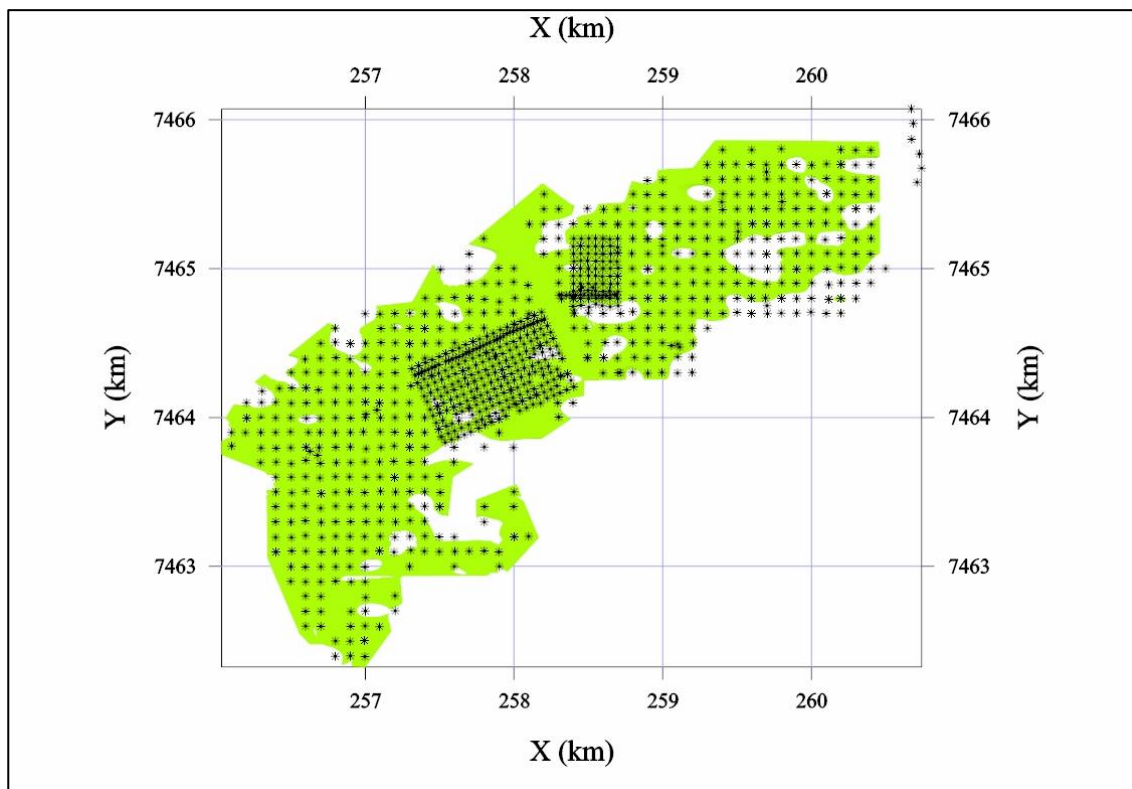


**Figure 2-1: Plan view of combined Toro and Deep Yellow drilling**

Deep Yellow auger holes are in green, Toro auger holes are in blue and Toro sonic holes are in red.

## 2.2 Mineralisation model

The new mineralisation model was built following the method described in SRK's 2009 report, with a 50 ppm cut-off to define the footwall and hanging wall. The modelling was done using a combination of Leapfrog and Vulcan software to obtain a reasonably smooth envelope reflecting the mineralised layer as well as possible within the constraint of the large drill spacing (50 m or 100 m typically) compared to a very narrow vertical thickness (a few metres maximum). A plan view of the model is shown in Figure 2-2.



**Figure 2-2: Plan view of drill holes and mineralisation model**

## 2.3 Compositing and block fractions

The Toro samples are generally 0.5 m long, while Deep Yellow samples are 1 m long. For the sake of consistency, samples within the mineralised envelope were composited in Vulcan to fixed lengths of 1 m. Due to the variable thickness of the mineralisation envelope, some of the composites are less than 1 m. SRK's estimation used composites longer than 0.4 m only. A 50 × 50 × 1 m block model was constructed in Isatis (Table 2-1) and the proportion of each block inside the mineralised envelope was also estimated in Isatis. The block model origins were chosen to be compatible with the 2009 model.

**Table 2-1: 50 × 50 × 1 m block model parameters**

Parameters	X	Y	Z
Minimum	255950	7462250	542.25
Maximum	260650	7466050	562.25
Block size	50	50	1
Number of blocks	94	76	20

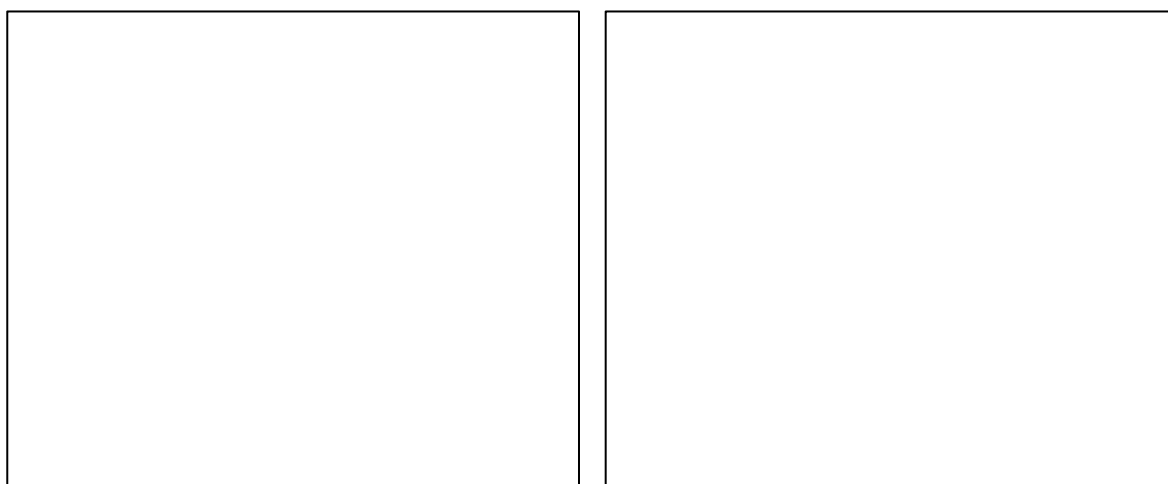
### 3 Statistics and Variography

The Deep Yellow data are drilled on a regular 50 × 50 m grid, with one line in the northern part drilled at 25 m spacing. Outside the Deep Yellow zone of drilling, the data density varies, with most drilling done at a 100 × 100 m grid, some infill drilling at 50 × 50 m and even at 25 × 25 m spacing on the very local scale. Declustering by a 100 × 100 × 1 m cell is therefore logical. Table 3-1 gives the raw and declustered statistics of the composites for U<sub>3</sub>O<sub>8</sub> and V<sub>2</sub>O<sub>5</sub> estimation.

**Table 3-1: Raw and declustered statistics**

Variable	Count	Minimum	Maximum	Mean	Median	Standard deviation	Coefficient of variation
U <sub>3</sub> O <sub>8</sub> (raw, ppm)	2,547	3	5120	225	133	291.78	1.29
U <sub>3</sub> O <sub>8</sub> (declustered, ppm)	2,547	3	5120	193	117	245.87	1.27
V <sub>2</sub> O <sub>5</sub> (raw, ppm)	1,486	55	965	232	213	97.19	0.42
V <sub>2</sub> O <sub>5</sub> (declustered, ppm)	1,486	55	965	229	210	98.13	0.43

Declustering has an impact on U<sub>3</sub>O<sub>8</sub> mean grade, which decreases by approximately 15%; this is due to the fact that most very high grades come from the Deep Yellow NP series holes. V<sub>2</sub>O<sub>5</sub> mean grade remains stable. The overall grade variability is relatively high for U<sub>3</sub>O<sub>8</sub>, and much lower for V<sub>2</sub>O<sub>5</sub>. Declustered histograms of the composites for U<sub>3</sub>O<sub>8</sub> and V<sub>2</sub>O<sub>5</sub> are shown in Figure 3-1.



**Figure 3-1: Declustered histograms of 1 m composites - U<sub>3</sub>O<sub>8</sub> (left), V<sub>2</sub>O<sub>5</sub> (right)**

As expected, the histograms are skewed, particularly for U<sub>3</sub>O<sub>8</sub>. A detailed examination of the tail of the U<sub>3</sub>O<sub>8</sub> distribution (Figure 3-2) suggests good continuity until 2,500 ppm. This value was therefore chosen as top-cut for the variography. No top-cut is required for V<sub>2</sub>O<sub>5</sub>. Raw and declustered statistics of the top-cut values are shown in Table 3-2.

**Table 3-2: Top-cut U<sub>3</sub>O<sub>8</sub> raw and declustered statistics**

Variable	Count	Minimum	Maximum	Mean	Median	Standard deviation	Coefficient of variation
U <sub>3</sub> O <sub>8</sub> (raw, ppm)	2,547	3	2500	224	133	274.93	1.23
U <sub>3</sub> O <sub>8</sub> (declustered, ppm)	2,547	3	2500	192	117	238.80	1.24

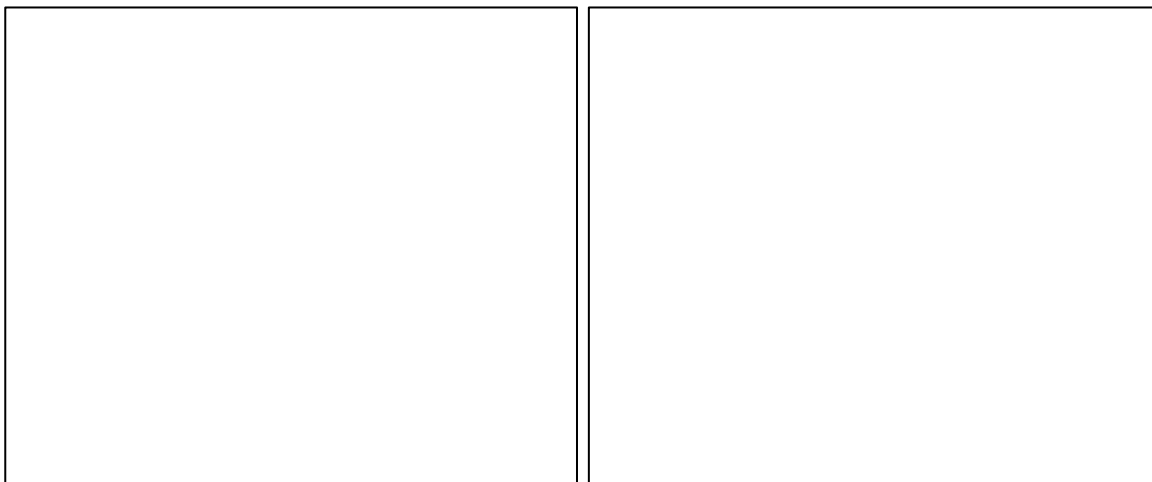


**Figure 3-2: U<sub>3</sub>O<sub>8</sub> tail distribution of 1 m composites**

As few data are affected by the top-cut, the statistics vary by a minimal amount.

Due to the skewness in the histograms, the U<sub>3</sub>O<sub>8</sub> and V<sub>2</sub>O<sub>5</sub> grades were transformed to Gaussian distributed values, with a declustered mean of 0 and declustered variance of 1 (this transformation is called anamorphosis). Once a model is fitted to the Gaussian experimental variogram of the variable, it is back-transformed to the statistical space of the untransformed data.

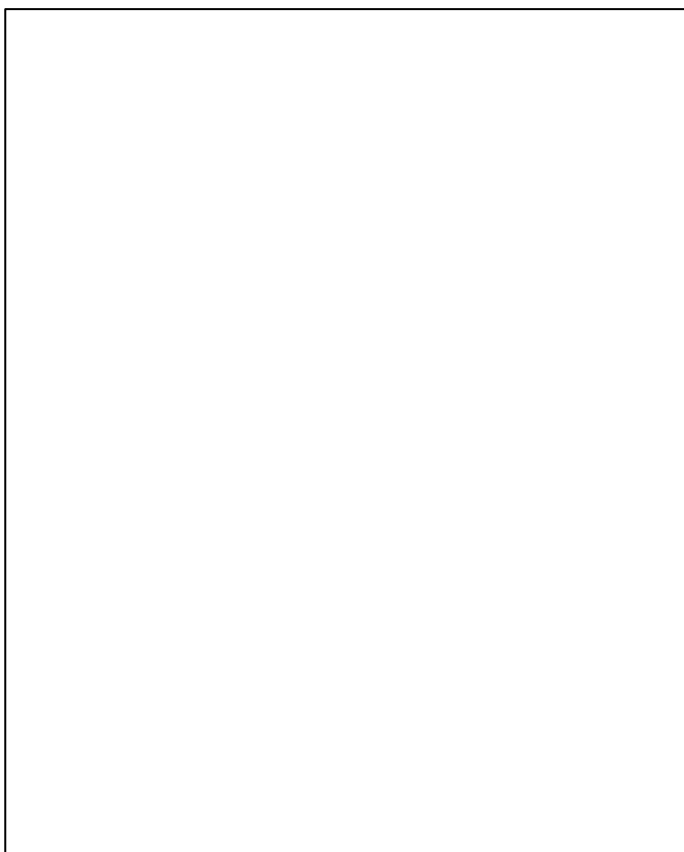
The downhole variograms of the transformed grades are shown in Figure 3-3. They are not very well structured, with medium nugget effect and a short vertical range of ~2–3 m for U<sub>3</sub>O<sub>8</sub>. For V<sub>2</sub>O<sub>5</sub>, there is a low nugget effect, a slightly longer range of 4 m.



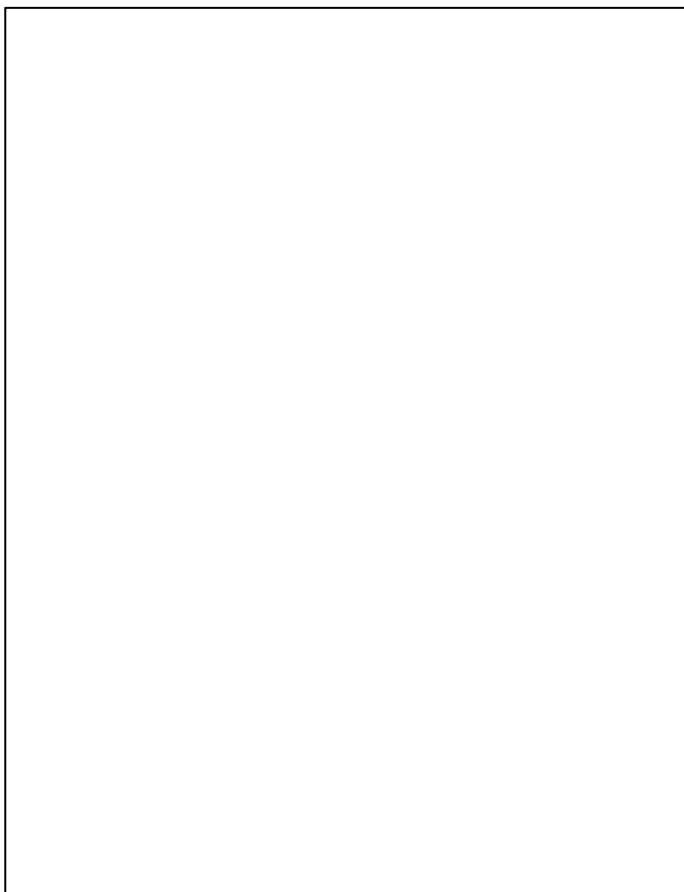
**Figure 3-3: Downhole variograms of transformed grades - U<sub>3</sub>O<sub>8</sub> (left) and V<sub>2</sub>O<sub>5</sub> (right)**

The horizontal directional experimental variogram of U<sub>3</sub>O<sub>8</sub> is not well structured, with ranges up to 90 m and very little anisotropy. Figure 3-4 shows the 3D model fitted to this variogram.

For V<sub>2</sub>O<sub>5</sub>, the experimental horizontal variograms show much longer structures (several hundreds of metres, although most of the variability is concentrated within 100 m). Figure 3-5 shows the corresponding 3D model.



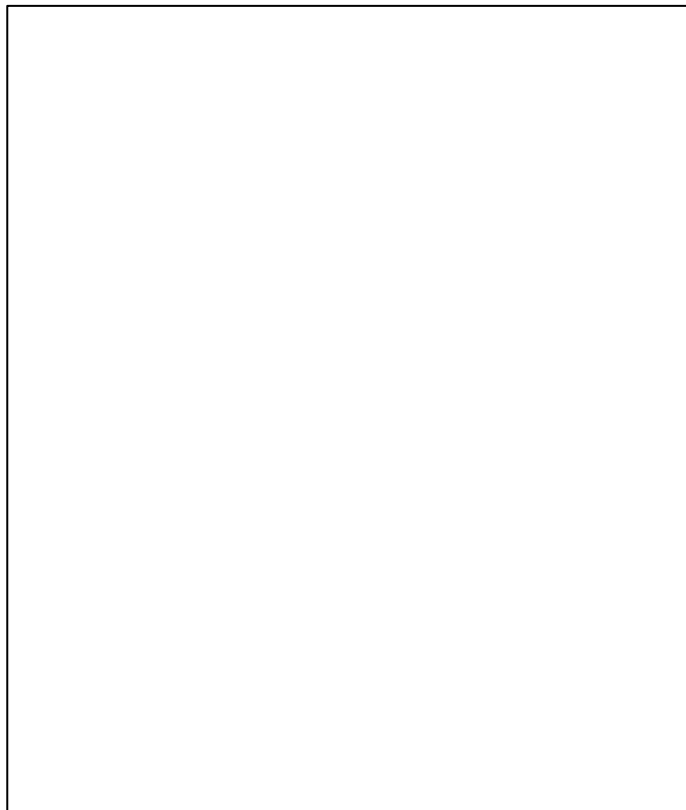
**Figure 3-4: 3D model of transformed  $U_3O_8$**



**Figure 3-5: 3D model of transformed  $V_2O_5$**

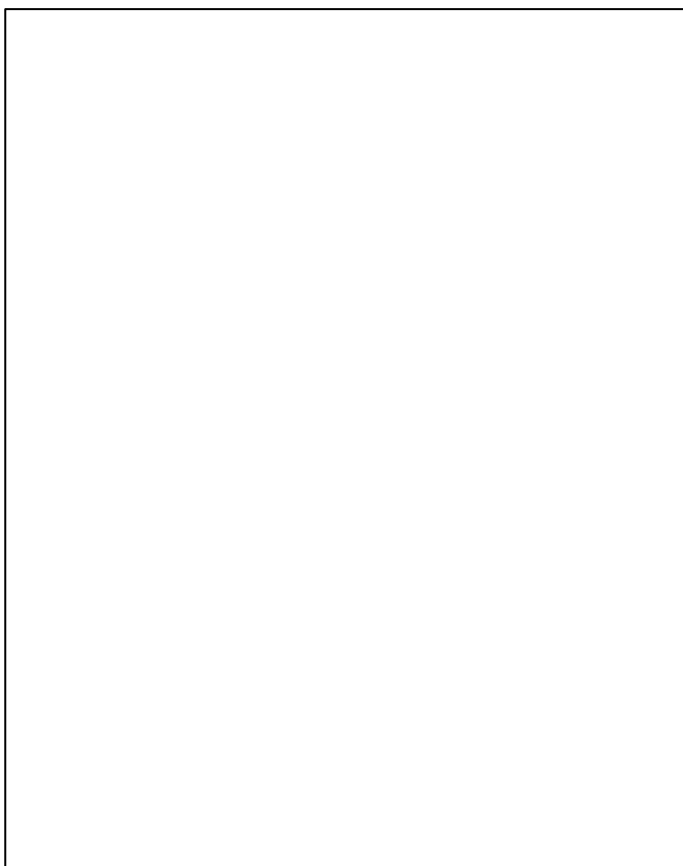
The last step of the variography is the back-transformation of the Gaussian variogram to obtain a model adapted to the original top-cut composite grades. The corresponding models (Figure 3-6 and Figure 3-7) have the same ranges as the Gaussian model. Again, the short ranges for  $U_3O_8$  indicate the lateral continuity is limited.

The variogram model parameters are summarised in Table 3-3.



**Figure 3-6: Back-transformed 3D model of top-cut  $U_3O_8$**





**Figure 3-7: Back-transformed 3D model of V<sub>2</sub>O<sub>5</sub>**

**Table 3-3: Variogram models parameters**

Parameters		Top-cut U <sub>3</sub> O <sub>8</sub>	V <sub>2</sub> O <sub>5</sub>
Nugget		21870	1707
Sill 1		30470	4973
Range 1 major (m)		40	150
Range 1 intermediate (m)		40	50
Range 1 minor (m)		1.5	2
Sill 2		4744	794
Range 2 major (m)		90	150
Range 2 intermediate (m)		90	150
Range 2 minor (m)		2	4.5
Sill 3		0	2149
			1400
			1400
			7.5
Major: Dip/Dip direction		0/067	0/067
Intermediate: Dip/Dip direction		0/157	0/157
Minor: Dip/Dip direction		Vertical	Vertical
Isatis rotation angles*	A	67.5	67.5
	X	0	0
	-Z	0	0

## 4 Resource Estimation

The  $U_3O_8$  variograms show relatively short ranges compared to the dominant drillhole spacing (100 m). This indicates that any *local* estimation of  $U_3O_8$  might not be very precise. In this respect, the Napperby deposit is not different from other calcrete-type deposits in Australia, such as Toro Energy's Wiluna deposit. While the variograms for  $V_2O_5$  appear more regular, there is less data, which also implies uncertainty in local estimation.

### 4.1 Choice of the estimation method

There are several considerations that drive the choice of estimation method:

- Link with the likely mining method and mining selectivity: The Napperby mineralisation will be mined by open pit, possibly using some form of continuous miner. At the mining stage, the mineralisation will be defined by grade control, probably through gamma measurements. Again, the example of Wiluna shows possible mining options.
- Link between drilling density, mining selectivity and the continuity of the grade: In an ideal scenario, SMU size blocks are estimated directly by Kriging, for instance. Unfortunately, given the current drilling density and limited grade continuity, this is not an option and it was necessary to use a non-linear estimation method, where the proportion and grade of SMU parcels are estimated within suitably large panels.
- Tests done by SRK and described in SRK's 2009 report show that a Gaussian-based uniform conditioning method is applicable to Napperby.

Uniform conditioning is performed in two steps:

1. Ordinary Kriging of panels of a suitable size which will give the grade to which the local grade-tonnage curve will be conditioned
2. Estimation within each panel of the proportion of ore above a given cut-off grade and its average grade for a given SMU size.

Note that uniform conditioning is only used for  $U_3O_8$ ; estimation of  $V_2O_5$  is done by ordinary Kriging.

### 4.2 Choice of the panel size

The description of the mineralisation model (Section 2.2) indicates a 50 × 50 × 1 m panel size is used, depending on the data used. The block model characteristics are given in Section 2.3 (Compositing and block fractions).

### 4.3 Choice of the SMU size

The SMU size depends essentially on the selectivity of the mining operation and, at this has not yet been studied in detail. However, it is likely that there is potential for very selective mining based on the possible use of continuous miners and radiometric data for grade control. Based on a plausible SMU, SRK chose blocks of 10 × 10 × 1 m.

### 4.4 Estimation parameters

The panel grades are estimated by ordinary Kriging. The Kriging neighbourhoods were optimised in Isatis. A critical parameter to define is the number of composites to be used in the estimates. The choice was guided by optimisation of the slope of regression. For consistency reasons, the same neighbourhoods were used for  $U_3O_8$  and  $V_2O_5$ . The Kriging neighbourhood parameters are summarised in Table 4-1. Kriging was done in two runs, the second run used a larger neighbourhood

to fill in the very few blocks not estimated in the first run. The orientations of the search ellipsoid correspond to the variogram main directions.

**Table 4-1: Kriging neighbourhood parameters**

Parameters		1 <sup>st</sup> run	2 <sup>nd</sup> run
Major ellipsoid axis radius (m)		200	400
Intermediate ellipsoid axis radius (m)		200	400
Minor ellipsoid axis radius (m)		3	6
Minimum composites required for estimate		5	1
Number of sectors		8	8
Optimum number of composites per sector		7	7
Discretisation	X	10	10
	Y	10	10
	Z	1	1

## 4.5 Kriging results

Statistics of the Kriged results for each run and globally are given in Table 4-2. The grades are weighted by the mineralisation proportion in each block.

**Table 4-2: Statistics on the Kriged estimates (ppm)**

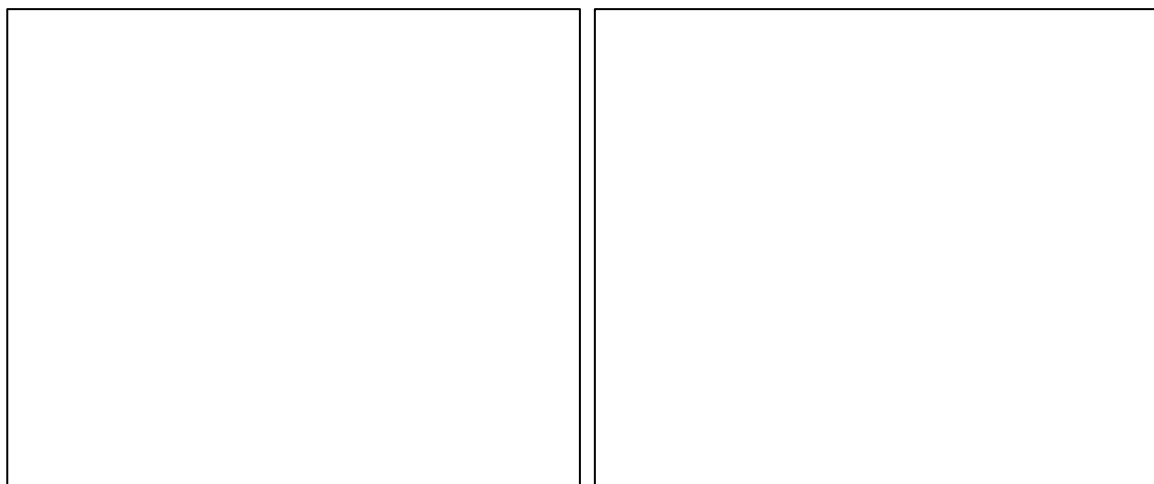
Variable	Count	Minimum (ppm)	Maximum (ppm)	Mean (ppm)	Median (ppm)	Standard deviation	Coefficient of variation
U <sub>3</sub> O <sub>8</sub> 1 <sup>st</sup> run	10,761	51	891	197	184	77.60	0.39
U <sub>3</sub> O <sub>8</sub> 2 <sup>nd</sup> run	924	92	304	163	157	38.61	0.24
U <sub>3</sub> O <sub>8</sub> Total	11,685	51	891	196	183	76.69	0.39
V <sub>2</sub> O <sub>5</sub> 1 <sup>st</sup> run	10,358	85	602	229	223	58.31	0.25
V <sub>2</sub> O <sub>5</sub> 2 <sup>nd</sup> run	1,327	95	404	214	218	48.00	0.22
V <sub>2</sub> O <sub>5</sub> Total	11,685	85	602	228	222	57.86	0.25

Most of the blocks are estimated in the first run; the second run gives smoother results, as evidenced by the lower coefficients of variation.

The quality of the estimation of individual panels is variable. This is illustrated by the histogram of the regression slopes. Figure 4-1 shows a large majority of the panels have a very poor slope of regression (less than 0.5); this is due to the short variogram ranges and the 100 × 100 m drill spacing. For V<sub>2</sub>O<sub>5</sub>, over 70% of the panels have a slope of regression greater than 0.7, which reflects the better V<sub>2</sub>O<sub>5</sub> grade continuity.

The U<sub>3</sub>O<sub>8</sub> results suggest that 100 × 100 m panels may be more appropriate for the estimation; however, without improvement in the variography, it is unlikely that the quality will improve significantly.

The consequence for U<sub>3</sub>O<sub>8</sub> is that the local estimation is not reliable at the panel level, and that groups of panels should be considered in order to obtain more precise estimations. The global estimation is of higher confidence.



**Figure 4-1: Histograms of  $U_3O_8$  (left) and  $V_2O_5$  (right) Kriging slope of regression**

A strong smoothing effect is evident in that the coefficients of variation are low.

The Mineral Resources estimated by ordinary Kriging are listed in Table 4-3 accounting for the mineralised envelope and applying an average density of 1.73 t/m<sup>3</sup>, which was established in a 2007 study undertaken by FinOre.

Due to the smoothing effect of Kriging, there is a very steep decline in the resource between the 100 ppm and 250 ppm cut-offs. As discussed, a more selective mining operation should lead to improvements in grades and contained metal, and the use of uniform conditioning estimation aims to reflect this higher selectivity.

**Table 4-3: Mineral Resources based on Kriged estimates**

Cut-off ( $U_3O_8$ ppm)	Ore Tonnage (Mt)	Grade $U_3O_8$ (ppm)	Metal ( $U_3O_8$ t)	Metal ( $U_3O_8$ Mlb)	Grade $V_2O_5$ (ppm)
0	30.12	196	5901	13.01	228
50	30.12	196	5901	13.01	228
100	29.14	200	5813	12.82	229
150	21.20	227	4804	10.59	231
200	11.94	267	3186	7.02	236
250	5.68	316	1797	3.96	245
300	2.50	371	927	2.04	251
350	1.12	435	486	1.07	261
400	0.56	501	280	0.62	268
450	0.33	553	184	0.41	265
500	0.20	606	121	0.27	275
550	0.13	657	83	0.18	296
600	0.08	700	59	0.13	288
650	0.06	731	44	0.10	299
700	0.05	747	35	0.08	293

## 4.6 Uniform conditioning

The key inputs are the variogram model, the Kriged panel grade, the panel dispersion variance (a variable which is calculated and stored during Kriging) and the SMU size. The uniform conditioning was done in Isatis software.

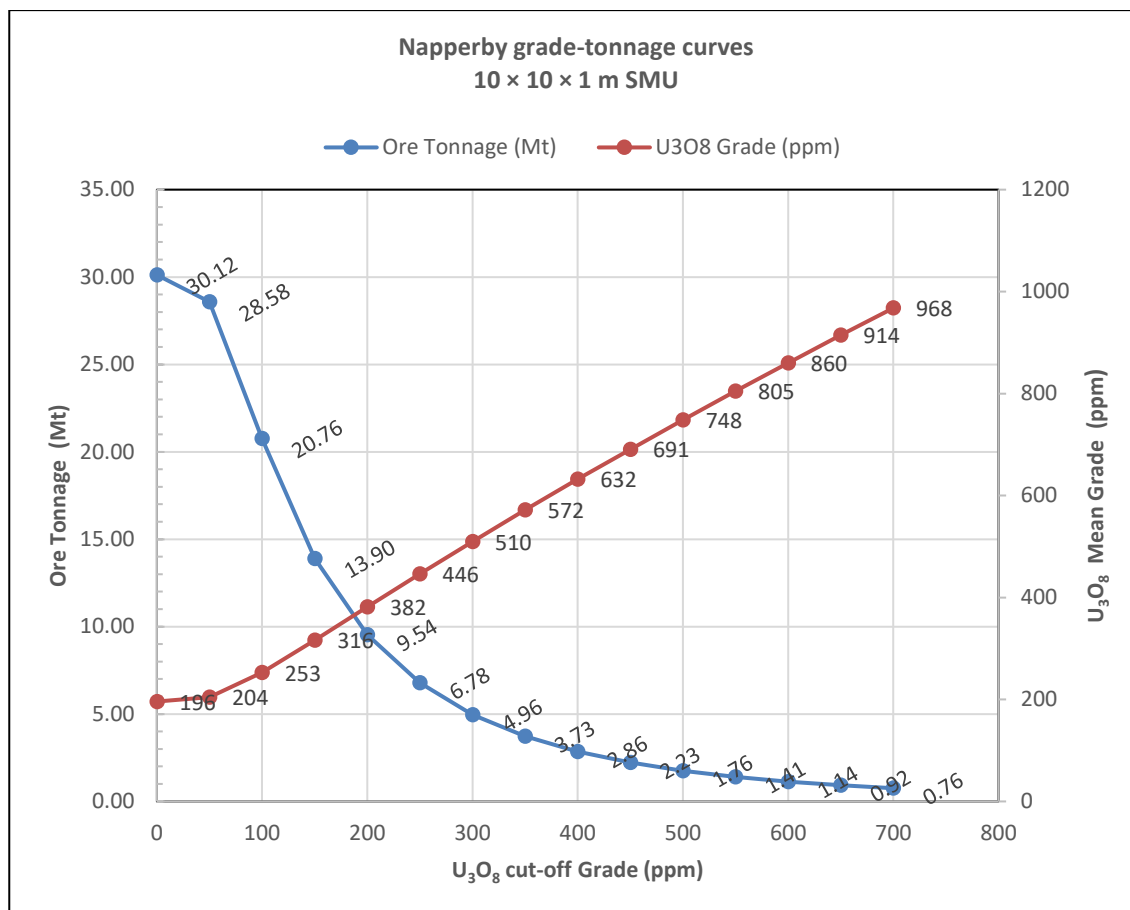
Uniform conditioning is usually performed for a suite of cut-off values – for the Napperby deposit, SRK ran cut-offs from 0 ppm to 700 ppm at 50 ppm increments.

Uniform conditioning incorporates the internal dilution due to the support effect related to the SMU. The implicit assumption is that the mining selection will be based on the 'true' grade of the SMU. In practice, this is not true: the selection at the mining stage will be based on the grade of the SMU **estimated** by the grade control data. This **information effect** can be handled by uniform conditioning, provided some assumptions on the grade control data are made. SRK did not consider the information effect for this study, but it should be accounted for in the Mining studies, as part of the dilution introduced by grade control.

Accounting for the mineralised envelope and applying an average density of 1.73 t/m<sup>3</sup>, the recoverable Mineral Resources are shown in Table 4-4 and in Figure 4-2.

**Table 4-4: U<sub>3</sub>O<sub>8</sub> recoverable Mineral Resources by uniform conditioning (10 × 10 × 1 m SMU)**

Cut-off (U <sub>3</sub> O <sub>8</sub> ppm)	Ore Tonnage (Mt)	Grade U <sub>3</sub> O <sub>8</sub> (ppm)	Metal (U <sub>3</sub> O <sub>8</sub> t)	Metal (U <sub>3</sub> O <sub>8</sub> Mlb)
0	30.12	196	5901	13.01
50	28.58	204	5841	12.88
100	20.76	253	5243	11.56
150	13.90	316	4398	9.70
200	9.54	382	3643	8.03
250	6.78	446	3027	6.67
300	4.96	510	2531	5.58
350	3.73	572	2131	4.70
400	2.86	632	1806	3.98
450	2.23	691	1539	3.39
500	1.76	748	1317	2.90
550	1.41	805	1132	2.50
600	1.14	860	976	2.15
650	0.92	914	844	1.86
700	0.76	968	731	1.61



**Figure 4-2: U<sub>3</sub>O<sub>8</sub> grade-tonnage curves by uniform conditioning (10 × 10 × 1 m SMU)**

## 4.7 Classification of the Mineral Resources

The current drill spacing is too wide to adequately understand the lateral continuity of the mineralisation, and the local estimation of 50 × 50 × 1 m panels is therefore of lower confidence. In addition, in the drilled areas of higher density where Deep Yellow holes are present, there is potential bias with respect to the Toro drillholes. Because of these uncertainties, the Mineral Resources are classified as Inferred according to the JORC Code (2012) guidelines.

## 5 Conclusions and Recommendations

A review of the Corex data show good agreement with the data SRK had at its disposal in terms of number of drillholes and statistics (as summarised in SRK's 2009 report). SRK built a new mineralisation model in Leapfrog and Vulcan software taking the original 2009 model parameters into account.

The  $U_3O_8$  grade continuity is limited, as the drill spacing is mostly  $100 \times 100$  m (approximately 90% of the total area) and calcrete-style uranium deposits are inherently nuggetty. Ranges are short, both vertically and horizontally. The technique used for estimating  $U_3O_8$  is uniform conditioning which is based on Ordinary Kriging within the mineralised domain. This is a robust estimation method, well suited to a selective mining approach. The results show an increase in grade with respect to the 2009 estimation, mostly due to the tightening of the mineralisation model.

There are less  $V_2O_5$  sample data but the continuity is better, and as such the Ordinary Kriging estimation is reasonable in estimation confidence.

The Mineral Resources are classified as Inferred, because of the poor quality of the local estimation due to the wide drill spacing and the uncertainty associated with discrepancies between Deep Yellow and Toro data.

SRK makes the following recommendations:

- The current wide drill spacing is reflected in the Inferred classification. Infill drilling to at least  $50 \times 50$  m of a larger proportion of the resource (currently about 10% is drilled at  $50 \times 50$  m) will be necessary to reach a higher JORC Code classification status (Indicated). Depending on cost, it may be better to drill a limited area at a much closer spacing to test the geology as well as the grade continuity. It is possible in future data collection programs to use of radiometric data (gamma logs) as these are much cheaper to acquire, but good calibration with chemical measurements needs to be assured and rigorously monitored.
- The mineralisation model built by SRK may be improved by a more detailed 3D geological study, and this will require further infill drilling.
- The selective mining unit (SMU) used by SRK is subject to change depending on the results of future mining studies, and this will have an impact on the recoverable resources, which will have to be re-assessed once the final SMU and grade control procedures are defined.
- Disequilibrium is not an issue for the current estimation, as no radiometric data is used. Nevertheless, the available documentation indicates that Toro's studies on the 2007 data showed a reasonably consistent ratio between chemical grade and radiometric value in the order of 1.4. It is important to address this issue in a more systematic way in future exploration. If this disequilibrium factor is real and consistent, future exploration can potentially rely on aircore drilling and gamma measurements, which are cheaper than other methods. In addition, gamma-derived grades represent significantly larger volumes than traditional core, so are likely to provide a smoother, less nuggetty representation of the grade distribution. Finally, radiometric data can be very useful for grade control in the production stage.
- There appears to be good exploration potential at the Project. Provided the disequilibrium issue is well understood, large-scale regional exploration could rely on aircore drilling and gamma measurements, supplemented by sonic drilling. Existing Uranerz and CRA Exploration data may be of adequate quality to locate initial targets. Based on SRK's experience with this mineralisation style, to reach a level of Indicated Mineral Resources, it is necessary to have a drill spacing of at least 50 m or less, depending on the complexity of the mineralisation and the geology (paleochannels).

Project Code: CRE001

Report Title: Mineral Resource Estimation of the Napperby Uranium Deposit

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**Peer Reviewed by**

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Principal Consultant (Resources)



## 6 References

SRK Consulting (Australasia) Pty Ltd, 2009. Resource Estimation Update of the Napperby Uranium Deposit, report prepared for Toro Energy Ltd.

Toro Energy Limited, 2009. Uranium Resource Doubled for Toro's Napperby project in NT (ASX Release dated 25 February 2009),

# Appendices

## **Appendix A: Table 1 - JORC Code 2012**

## JORC Code, 2012 Edition – Table 1

### Section 1 Sampling Techniques and Data

(Criteria in this section apply to all succeeding sections.)

Criteria	JORC Code explanation	Commentary
Sampling techniques	<ul style="list-style-type: none"> <li>Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as downhole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.</li> <li>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</li> <li>Aspects of the determination of mineralisation that are Material to the Public Report.</li> <li>In cases where 'industry standard' work has been done, this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases, more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.</li> </ul>	<ul style="list-style-type: none"> <li>For resource estimation purposes: <ul style="list-style-type: none"> <li>262 auger holes (60 cm diameter) drilled by Deep Yellow (1 m samples)</li> <li>123 auger holes (30 cm diameter) drilled by Toro Energy (0.5 m samples)</li> <li>515 sonic core holes (145 mm outside diameter, 100 mm core diameter) drilled by Toro Energy (0.5 m samples).</li> </ul> </li> <li>Toro auger bulk samples weighing ~60 kg for every 0.5 m were split en masse at site once dry and the resulting sub-sample (average 16 kg) was submitted to the laboratory.</li> <li>Toro sonic cores of average 0.5 m length were cut in half and submitted to the laboratory without further splitting (average 7 kg).</li> <li>Deep Yellow auger samples of ~250 kg per metre were channel sampled from the bulk 1 m interval sample to obtain a 20 kg sub-sample that was riffle split at site to create a 1–2 kg assay sample, which was submitted to the laboratory.</li> <li>At ALS Laboratory, all samples underwent drying (110 °C), Boyd crushing, splitting (if sample was large) and milling in LM5s to 90% passing 75 microns. Weighing was done before and after drying.</li> <li>Toro assayed for a multi-element suite that included U and V at ALS Laboratory by 4-acid-digest ICP-AEA, ICP-MS and XRF pressed pellet, the latter being the routine method. Detailed trials were undertaken to establish the preferred (reliable) method. Matrix-matched standards were created from this process, using a variety of other laboratories and methods, including NAA at Becquerel.</li> <li>Deep Yellow assaying was done at ALS Laboratory by XRF pressed pellet.</li> <li>All Toro holes were gamma probed for disequilibrium studies via quantitative comparison to the chemical assay data. Gamma-derived grade values were not used in the estimation of the resources.</li> </ul>
Drilling techniques	<ul style="list-style-type: none"> <li>Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).</li> </ul>	<ul style="list-style-type: none"> <li>Wide diameter (300 mm or 600 mm diameter auger flight) auger holes were drilled using a Kelly-drive piling rig operated by Australasian Piling Co, Adelaide.</li> <li>Sonic holes were drilled using a sonic core rig operated by Boart Longyear,</li> </ul>

Criteria	JORC Code explanation	Commentary
		<p>Perth. Most had 145 mm hole diameter, but also some larger diameter 210 mm holes were drilled for groundwater studies. Sonic drilling was trialled by Toro and then, on account of its superiority, rolled out for all future resource drilling that required chemical assays. Sonic drilling to that point had largely been reserved for environmental applications, such as investigating chemical dispersion in unconsolidated sediments.</p> <ul style="list-style-type: none"> <li>• Aircore holes were trialled to provide chemical assay data, but there were recovery issues. There are a large number of aircore holes with only gamma-derived grade data, but these have not been used in the estimation.</li> <li>• All holes are vertical.</li> <li>• In 2005–2006, Deep Yellow excavated trenches 6–7 m deep in three sites. The trenches were channel sampled down 1 m spaced vertical channels; the 1 m samples taken were not used in this resource estimate.</li> </ul>
Drill sample recovery	<ul style="list-style-type: none"> <li>• Method of recording and assessing core and chip sample recoveries and results assessed.</li> <li>• Measures taken to maximise sample recovery and ensure representative nature of the samples.</li> <li>• Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.</li> </ul>	<ul style="list-style-type: none"> <li>• Recovery percentage for each sample interval was visually estimated at site, but data was superseded in due course by a more precise system, whereby wet and dry sample weights were recorded to track recovery, using sample drill length and hole diameter.</li> <li>• Auger holes were considered as showing good recoveries in general, but site geologists noted that in wet unconsolidated materials, the recovery from the auger flight deteriorated and required multiple passes with the auger to compile a complete and representative bulk sample of the interval. Where clayey material adhered to the auger flight, it had to be manually removed before moving on to the next interval. Repeated auger passes led to partial collapse and widening of the hole, which translates to contamination or dilution of subsequent samples. This is tempered by the sample size being so large that these effects are negligible.</li> <li>• Recovery for sonic drilling was excellent and was maximised by managing drilling rate of penetration and hydrostatic load to prevent loss of sample from drill bit annulus. Samples were immediately placed in plastic sleeves to prevent loss of fines and moisture.</li> <li>• Contamination in sonic drilling only occurred in the top few metres, above the mineralisation, and was easily removed from the sample tubes. Casing was introduced to minimise this.</li> <li>• Auger samples were piled onto geotextile mats, where the sample</li> </ul>

Criteria	JORC Code explanation	Commentary
		<p>volume could be assessed and bottom of the hole measured. The mat contents were then dried, weighed and split using a large riffle splitter with vibrating solenoids.</p> <ul style="list-style-type: none"> <li>Aircore holes give poor recoveries, and as such were not used in this resource estimation. Historic Uranerz aircore drilling used the Wallis system and recoveries were substantially better, so Corex considers that, if using correct technique, aircore can be a valid exploration and resource infill drilling tool.</li> </ul>
Logging	<ul style="list-style-type: none"> <li>Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.</li> <li>Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.</li> <li>The total length and percentage of the relevant intersections logged.</li> </ul>	<ul style="list-style-type: none"> <li>Lithological logging was done for all samples. Volumetric (%) estimates were made of the various lithologic components, colour, oxidation state, gamma reading, wetness.</li> <li>Sonic cores were logged at the centimetre scale and were therefore of sufficient quality to provide a detailed insight into regolith, infer depositional regimes and enhance understanding of processes governing mineralisation. Visible details include fining-upwards sequences, redox boundaries, fine laminae and coarse sand scouring.</li> <li>Auger samples were logged at 0.5–1 m scale.</li> <li>Paleochannel system, evidence of several mineralised horizons at different levels, but continuity was not easy to assess at 100 m drill spacing.</li> <li>Overall, geology logging of drillholes was sufficient for resource estimation.</li> </ul>
Sub-sampling techniques and sample preparation	<ul style="list-style-type: none"> <li>If core, whether cut or sawn and whether quarter, half or all core taken.</li> <li>If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.</li> <li>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</li> <li>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</li> <li>Measures taken to ensure that the sampling is representative of the in situ material collected, including for instance results for field duplicate/second-half sampling.</li> <li>Whether sample sizes are appropriate to the grain size of the material being sampled.</li> </ul>	<ul style="list-style-type: none"> <li>Auger and sonic core sub-sampling methods described above.</li> <li>Toro sample preparation techniques (screening and splitting) appear adequate, as demonstrated by duplicate regime and twins of auger-sonic and sonic-sonic.</li> <li>Toro instituted a regime of field duplicates, preparation of duplicates and analytical duplicates, beyond the laboratory's QA/QC regime. All data was assessed regularly for uniformity. Umpire assays were also regularly obtained from independent laboratories. No significant sampling issues were identified.</li> <li>Sample sizes, particularly the auger ones, are much larger than in typical exploration programs and therefore adequate for the nuggetty mineralisation that characterises Napperby and other calcrete-style uranium deposits.</li> </ul>
Quality of assay data and laboratory tests	<ul style="list-style-type: none"> <li>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</li> </ul>	<ul style="list-style-type: none"> <li>QA/QC program included field/ laboratory duplicates and matrix-matched standards.</li> </ul>

Criteria	JORC Code explanation	Commentary
	<ul style="list-style-type: none"> <li>For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and their derivation, etc.</li> <li>Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.</li> </ul>	<ul style="list-style-type: none"> <li>QA/QC performance has been documented and indicates good agreeance.</li> <li>Assay method routinely used is XRF pressed pellet, which is routine for this style of mineralisation and best matches the NAA method, which is considered definitive (but too costly and slow to roll out).</li> <li>Toro undertook considerable testwork and umpire analyses using different methods at different laboratories, all indicating this was the most appropriate assay method.</li> <li>High levels of Strontium in some samples were found to affect XRF spectra for Uranium, but not sufficient in quantum or spatial extent to warrant an alternate assay technique.</li> <li>PFN tool was used in 18 holes to compare to gamma and assay measurements.</li> <li>Reputable laboratory (ALS) used for routine assaying.</li> </ul>
Verification of sampling and assaying	<ul style="list-style-type: none"> <li>The verification of significant intersections by either independent or alternative company personnel.</li> <li>The use of twinned holes.</li> <li>Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.</li> <li>Discuss any adjustment to assay data.</li> </ul>	<ul style="list-style-type: none"> <li>Toro twinned five high-grade Deep Yellow holes, and the results suggested that the Deep Yellow NP (auger) holes were biased high, but this might partially be a result of the 'return to the mean' statistical phenomenon. Follow-up twinning of 11 holes with more representative grades around the mean grade showed very little differences.</li> <li>Toro twinned a sufficient number of its own sonic and auger holes to provide a reliable understanding of small-scale variability.</li> <li>Umpire samples showed excellent agreeance with the original data.</li> <li>Data was largely digitally entered into Tablets; data was verified and uploaded into DataShed.</li> <li>No adjustments to the assay data have been carried out.</li> </ul>
Location of data points	<ul style="list-style-type: none"> <li>Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.</li> <li>Specification of the grid system used.</li> <li>Quality and adequacy of topographic control.</li> </ul>	<ul style="list-style-type: none"> <li>All drill hole collars collected by DGPS. During 2016 and 2007, data was collected by BB Surveys from Alice Springs, who established a base station. In 2008, Toro purchased a post-processed DGPS unit (Magellan) and collected collars from that point forward.</li> <li>During the Toro DGPS survey, checks of 2006 Deep Yellow and 2007 Toro collars showed there were errors in elevation (RL) at a decimetre scale and these were rectified by BB Surveys.</li> <li>GDA94 Zone 53.</li> </ul>
Data spacing and distribution	<ul style="list-style-type: none"> <li>Data spacing for reporting of Exploration Results.</li> <li>Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral</li> </ul>	<ul style="list-style-type: none"> <li>Drilling is mostly 100 × 100 m, which is insufficient to define continuity of the mineralisation at a local level.</li> </ul>

Criteria	JORC Code explanation	Commentary
	<p>Resource and Ore Reserve estimation procedure(s) and classifications applied.</p> <ul style="list-style-type: none"> <li>Whether sample compositing has been applied.</li> </ul>	<ul style="list-style-type: none"> <li>Approximately 100 Toro holes were drilled at 50 x 50 m spacing (including a line at 25 m spacing).</li> <li>Central zone of the orebody was drilled at 50 x 50 m (Deep Yellow) with one drilling line drilled at 25 m spacing.</li> <li>Samples were composited to 1 m. Deep Yellow auger samples are 1 m long, while Toro sonic and auger samples are 0.5 m long.</li> </ul>
Orientation of data in relation to geological structure	<ul style="list-style-type: none"> <li>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</li> <li>If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.</li> </ul>	<ul style="list-style-type: none"> <li>The orientation of the sampling is correct (vertical holes for a sub-horizontal mineralisation).</li> <li>No bias due to geometry.</li> <li>Holes are too short to justify downhole surveys.</li> </ul>
Sample security	<ul style="list-style-type: none"> <li>The measures taken to ensure sample security.</li> </ul>	<ul style="list-style-type: none"> <li>Toro samples were weighed, catalogued, batched then road-freighted to ALS in Adelaide on dedicated loads for processing. The sample volumes were large, for auger in particular (~16 kg each), and it is therefore unlikely the samples were changed significantly during transport. Sample receipts and dispatches were audited regularly.</li> <li>Sampling process was supervised by Exploration Manager.</li> </ul>
Audits or reviews	<ul style="list-style-type: none"> <li>The results of any audits or reviews of sampling techniques and data.</li> </ul>	<ul style="list-style-type: none"> <li>Internal Toro reviews of sampling representivity were undertaken during the resource drilling.</li> <li>SRK undertook an audit of the dataset prior to resource calculation.</li> </ul>



## Section 2 Reporting of Exploration Results

(Criteria listed in section 1 also apply to this section.)

Criteria	JORC Code explanation	Commentary
Mineral tenement and land tenure status	<ul style="list-style-type: none"> <li>Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.</li> <li>The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.</li> </ul>	<ul style="list-style-type: none"> <li>EL31449 was granted on 7 September 2017 for a period of 6 years and is held by Uranium Generation Pty Ltd, a 100% owned subsidiary of Core Exploration Ltd. There are no related royalty arrangements, contracts or caveats. The tenement is in good standing with the NT Department of Primary Industry and Resources.</li> <li>The resource area lies within the Napperby Pastoral Lease and has been subject to previous heritage clearances by Deep Yellow and Toro Energy. There are no significant heritage or land ownership related impediments to the future exploration or mining of the resources.</li> </ul>
Exploration done by other parties	<ul style="list-style-type: none"> <li>Acknowledgment and appraisal of exploration by other parties.</li> </ul>	<ul style="list-style-type: none"> <li>All modern exploration to date was carried out by Deep Yellow and Toro (2005–2009). Prior to 2005, exploration was carried out by Paladin and Uranerz. All exploration was focused on uranium mineralisation.</li> <li>The Napperby (New Well) deposit was first discovered and explored by CRA Exploration and Uranerz in the late 1970s and early 1980s. They drilled wide-spaced auger and aircore holes and defined a 'mineralised area', but did not publish a mineral resource.</li> <li>The deposit remained dormant for over a decade until Paladin applied for the ground in the early 2000s. Deep Yellow subsequently acquired the Project from Paladin in 2005, then after undertaking drilling, secured an option to purchase with Toro Energy Ltd.</li> <li>In 2007, Toro Energy drilled 515 sonic core holes, 123 auger holes and 814 aircore holes, followed in 2008 by a further 333 sonic core holes and 784 aircore holes.</li> <li>Following that work, in 2009, Toro Energy expanded the historic Napperby resource by 400% to a JORC Code Inferred Mineral Resource of 9.34 Mt at 359 ppm (0.036%) U<sub>3</sub>O<sub>8</sub> for 3351 t (7.39 Mlbs) of contained uranium oxide using a 200 ppm U<sup>3</sup>O<sup>8</sup> cut-off (Toro Energy, ASX release on 03/03/2009). Only 50% of the known mineralised area was</li> </ul>

Criteria	JORC Code explanation	Commentary
		<p>included in the 2009 Mineral Resource.</p> <ul style="list-style-type: none"> <li>• This option to purchase was not eventually executed following Scoping Studies that concluded the Project was uneconomic at the current scale/ grade. In 2010, the Project fell 100% back into the hands of Deep Yellow. No further exploration took place. The Napperby deposit and a small part of the original EL24246 was relinquished in October 2016.</li> <li>• Corex has inherited an excellent database that includes 1,117 sonic core and aircore drillholes, downhole gamma and assay data, PFN and disequilibrium data, metallurgical testwork, scoping study, airborne electromagnetics and high-resolution magnetics/ radiometrics, gravity, and baseline groundwater environmental monitoring data.</li> <li>• Toro undertook metallurgical testwork from bulk representative samples derived from Napperby in 2008 and 2009, aimed at characterising the ore and gangue, determining how suitable the mineralisation is for beneficiation and the optimal conditions for leaching. Tests included comminution, scrubbing and column leach trials (Toro Energy, ASX release on 09/06/2009).</li> <li>• Toro proceeded to a Scoping and Conceptual Study conducted by URS Australia, which examined various conventional mining and processing options available at the time, such as heap leach, agitated leach, direct precipitation and resin-in-pulp.</li> <li>• Alternative mining cut-off grades and the potential for nearby deposits were also considered, as was initial up-front beneficiation. A high-level review of infrastructure requirements, environmental management and CAPEX and OPEX scenarios was also undertaken.</li> </ul>
Geology	<ul style="list-style-type: none"> <li>• Deposit type, geological setting and style of mineralisation.</li> </ul>	<ul style="list-style-type: none"> <li>• The Napperby Project (historically known as the New Well deposit) comprises an extensive, consistently mineralised zone within 3–10 m of the surface in semi-consolidated and unconsolidated sediments within a Tertiary paleochannel over a 14 km length (striking NNE) in the Arunta Region in the Northern Territory.</li> </ul>

Criteria	JORC Code explanation	Commentary
		<ul style="list-style-type: none"> <li>• Carnotite mineralisation resides mostly in sands and sandy clays as finely disseminated particles and blobs up to 5 cm long, but can also be found in overlying calcrete as joint coatings.</li> <li>• The current geological model has it that uranium is released from basement rocks into the aquifer system due to the presence of acidic-oxidised surface waters. Uranium is carried in solutions with vanadium until it reaches a critical point of supersaturation, caused by evaporation. Uranium precipitates as a vanadate, along with carbonate and silica within the paleochannel system. It is thus effectively controlled by the groundwater regime.</li> </ul>
Drill hole Information	<ul style="list-style-type: none"> <li>• A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drillholes:</li> <li>• easting and northing of the drillhole collar</li> <li>• elevation or RL (Reduced Level – elevation above sea level in metres) of the drillhole collar</li> <li>• dip and azimuth of the hole</li> <li>• downhole length and interception depth</li> <li>• hole length.</li> <li>• If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A (reporting of resources)</li> </ul>
Data aggregation methods	<ul style="list-style-type: none"> <li>• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.</li> <li>• Where aggregate intercepts incorporate short lengths of high grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.</li> <li>• The assumptions used for any reporting of metal equivalent values should be clearly stated.</li> </ul>	<ul style="list-style-type: none"> <li>• N/A (reporting of resources)</li> </ul>
Relationship between mineralisation widths and intercept lengths	<ul style="list-style-type: none"> <li>• These relationships are particularly important in the reporting of Exploration Results.</li> <li>• If the geometry of the mineralisation with respect to the drillhole angle is known, its nature should be reported.</li> <li>• If it is not known and only the downhole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').</li> </ul>	<ul style="list-style-type: none"> <li>• The mineralisation lenses are horizontal in nature, and given all the drill holes are vertical from the surface, they are perpendicular to mineralisation. The mineralisation widths quoted here are therefore true widths.</li> </ul>

Criteria	JORC Code explanation	Commentary
Diagrams	<ul style="list-style-type: none"> <li>Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported. These should include, but not be limited to a plan view of drillhole collar locations and appropriate sectional views.</li> </ul>	<ul style="list-style-type: none"> <li>All relevant maps and figures have been included in the Mineral Resource estimation report.</li> </ul>
Balanced reporting	<ul style="list-style-type: none"> <li>Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>No exploration results in this report – resource drilling only.</li> </ul>
Other substantive exploration data	<ul style="list-style-type: none"> <li>Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.</li> </ul>	<ul style="list-style-type: none"> <li>No exploration results in this report – resource drilling only.</li> </ul>
Further work	<ul style="list-style-type: none"> <li>The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).</li> <li>Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.</li> </ul>	<ul style="list-style-type: none"> <li>No further on-ground exploration is planned at this stage. Corex will largely be undertaking studies involving beneficiation to improve the head grade to any proposed processing plant.</li> <li>If successful, Corex would look to expand the resource by incorporating the existing gamma-derived uranium grades from aircore holes.</li> <li>Economic considerations would determine the next step, which could potentially be to undertake broader-scale and infill drilling to expand the resource and improve the category of part of the resource.</li> </ul>

### Section 3 Estimation and Reporting of Mineral Resources

(Criteria listed in section 1, and where relevant in section 2, also apply to this section.)

Criteria	JORC Code explanation	Commentary
Database integrity	<ul style="list-style-type: none"> <li>Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.</li> <li>Data validation procedures used.</li> </ul>	<ul style="list-style-type: none"> <li>Logging data was entered into a template with fixed formatting and authority tables. The template was directly imported into DataShed by the database manager, who identified any validation errors to be corrected by the author. Assay data files were imported into the same DataShed database and undergo the same validation of data fields. QA/QC of the data takes place to identify outliers and check validity with the laboratory.</li> <li>Data provided to SRK for resource estimation was exported from DataShed to an Access database.</li> <li>Data validation originally by Toro, confirmed by Corex.</li> <li>QA/QC data was reviewed by SRK in 2009. The same dataset (from 2009) was used for this resource estimate.</li> </ul>
Site visits	<ul style="list-style-type: none"> <li>Comment on any site visits undertaken by the Competent Person and the outcome of those visits.</li> <li>If no site visits have been undertaken indicate why this is the case.</li> </ul>	<ul style="list-style-type: none"> <li>David Rawlings (CP) visited the site for Toro throughout the period between 2007 to 2009.</li> </ul>
Geological interpretation	<ul style="list-style-type: none"> <li>Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.</li> <li>Nature of the data used and of any assumptions made.</li> <li>The effect, if any, of alternative interpretations on Mineral Resource estimation.</li> <li>The use of geology in guiding and controlling Mineral Resource estimation.</li> <li>The factors affecting continuity both of grade and geology.</li> </ul>	<ul style="list-style-type: none"> <li>The geological model is a paleochannel with mineralisation clay-calcrete hosted.</li> <li>Model was based on Leapfrog contouring at 50 ppm threshold (see report).</li> <li>The predominant drill spacing (100 × 100 m) is too wide to obtain an accurate local representation of the mineralised horizon.</li> </ul>
Dimensions	<ul style="list-style-type: none"> <li>The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.</li> </ul>	<ul style="list-style-type: none"> <li>The Napperby deposit is surficial with a vertical thickness of ~2–10 m. The explored along-channel strike length is 4–5km and the width across channel is 1–1.5 km.</li> </ul>
Estimation and modelling techniques	<ul style="list-style-type: none"> <li>The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen, include a description of computer software and parameters used.</li> <li>The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.</li> <li>The assumptions made regarding recovery of by-products.</li> </ul>	<ul style="list-style-type: none"> <li>Details of the estimation are given in the report.</li> <li>Statistical analysis of 1 m composites in the mineralisation model was undertaken.</li> <li>Top-cut used was 2,500 ppm.</li> <li>Variography based on Gaussian transformed values of the grade, and back-transformation.</li> <li>Ordinary Kriging of 50 × 50 × 1 m panels using the following Kriging neighbourhood parameters: <ul style="list-style-type: none"> <li>ellipsoid radii 200 × 200 × 4 m</li> <li>minimum 5 composites</li> </ul> </li> </ul>

Criteria	JORC Code explanation	Commentary
	<ul style="list-style-type: none"> <li>Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).</li> <li>In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.</li> <li>Any assumptions behind modelling of selective mining units.</li> <li>Any assumptions about correlation between variables.</li> <li>Description of how the geological interpretation was used to control the resource estimates.</li> <li>Discussion of basis for using or not using grade cutting or capping.</li> <li>The process of validation, the checking process used, the comparison of model data to drillhole data, and use of reconciliation data if available.</li> </ul>	<ul style="list-style-type: none"> <li>maximum 56 composites</li> <li>8 sectors.</li> <li>A larger (400 × 400 × 8 m) ellipsoid was used to estimate panels not estimated within the first run.</li> <li>Validation of the Kriging results by comparison with the composites and swath plots.</li> <li>Uniform conditioning with 10 × 10 × 1 m SMU reflects a more realistic selectivity level.</li> <li>V<sub>2</sub>O<sub>5</sub> was estimated on the same 50 × 50 × 1 m panels using ordinary Kriging.</li> </ul>
Moisture	<ul style="list-style-type: none"> <li>Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.</li> </ul>	<ul style="list-style-type: none"> <li>Tonnages are dry tonnages.</li> </ul>
Cut-off parameters	<ul style="list-style-type: none"> <li>The basis of the adopted cut-off grade(s) or quality parameters applied.</li> </ul>	<ul style="list-style-type: none"> <li>Grade-tonnage curve shows the sensitivity of the resources to the cut-off grade.</li> <li>A 200 ppm cut-off may represent the most likely cut-off compared to similar deposits, but the choice will depend on economic assumptions to be determined by a Scoping Study.</li> </ul>
Mining factors or assumptions	<ul style="list-style-type: none"> <li>Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.</li> </ul>	<ul style="list-style-type: none"> <li>The only assumption made is the size of the SMU (10 × 10 × 1 m).</li> </ul>
Metallurgical factors or assumptions	<ul style="list-style-type: none"> <li>The basis for assumptions or predictions regarding metallurgical amenability. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.</li> </ul>	<ul style="list-style-type: none"> <li>Not considered at this stage.</li> </ul>
Environmental factors or assumptions	<ul style="list-style-type: none"> <li>Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be</li> </ul>	<ul style="list-style-type: none"> <li>Not considered at this stage.</li> </ul>

Criteria	JORC Code explanation	Commentary
	reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	
Bulk density	<ul style="list-style-type: none"> <li>Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.</li> <li>The bulk density for bulk material must have been measured by methods that adequately account for void spaces (vugs, porosity, etc.), moisture and differences between rock and alteration zones within the deposit.</li> <li>Discuss assumptions for bulk density estimates used in the evaluation process of the different materials.</li> </ul>	<ul style="list-style-type: none"> <li>Constant, historical density of 1.73 t/m<sup>3</sup> was used.</li> <li>Samples taken in 2008 and submitted to ALS and AMDEL for determination of bulk density. Results were not fully compiled and assessed by Toro, but are a potentially good source of data to derive a more appropriate bulk density. Preliminary assessments suggest the 1.73 t/m<sup>3</sup> value used for this resource estimate is conservative.</li> <li>Sonic probe data provides a wet density only. Assumptions need to be made to convert to a moist or dry density. Toro had begun assessments of these correction factors for several different lithology types.</li> </ul>
Classification	<ul style="list-style-type: none"> <li>The basis for the classification of the Mineral Resources into varying confidence categories.</li> <li>Whether appropriate account has been taken of all relevant factors (i.e. relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data).</li> <li>Whether the result appropriately reflects the Competent Person's view of the deposit.</li> </ul>	<ul style="list-style-type: none"> <li>Resources are classified as Inferred; drill spacing insufficient to evaluate the continuity of the mineralisation.</li> <li>There is uncertainty with respect to the Deep Yellow high grades, which may be biased high.</li> <li>The CPs are satisfied with this classification, which reflects the degree of knowledge of the orebody.</li> </ul>
Audits or reviews	<ul style="list-style-type: none"> <li>The results of any audits or reviews of Mineral Resource estimates.</li> </ul>	<ul style="list-style-type: none"> <li>No audits or reviews have been undertaken on this resource estimate.</li> </ul>
Discussion of relative accuracy/ confidence	<ul style="list-style-type: none"> <li>Where appropriate, a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate.</li> <li>The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.</li> <li>These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.</li> </ul>	<ul style="list-style-type: none"> <li>The current estimate is consistent with SRK's 2009 estimate; the increase in grade is linked to a tightening of the mineralisation model and the use of a higher top-cut.</li> <li>The quality of the estimation, as measured by the slope of regression obtained in panel Kriging is not very good. This is consistent with the resource being classified on the Inferred Mineral Resource category.</li> </ul>

**Section 4 Estimation and Reporting of Ore Reserves**

N/A



**Section 5 Estimation and Reporting of Diamonds and Other Gemstones**

N/A

## SRK Report Client Distribution Record

Project Number: CRE001

Report Title: Mineral Resource Estimation of the Napperby Uranium Deposit

Date Issued: 7 September 2019

Name/Title	Company
Stephen Biggins, Managing Director	Core Exploration Limited

Rev No.	Date	Revised By	Revision Details
0	07/09/2018	David Slater	Final Report

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