



**Intended use:** AMIS0054 is suitable for monitoring the accuracy of a single analysis of uraniferous phosphatic sandstone. The material can be used for routine quality control by inserting within a batch of samples.

Additional geochemical data is presented for this material that will enable its use for method development and for the calibration of equipment.

The recommended mean and "Between Lab" standard deviations for this standard reflect the average results from the laboratories that participated in the round robin. Slight variations in analytical procedures between laboratories will reflect as slight biases to the recommended concentrations and this is acceptable. Good laboratories however will report results within the two standard deviation levels with a failure of <10 %.

**Origin of material:** This material was supplied by Uramin Inc. from their Patricia prospect located 4 km north of the town of Bakouma in the Mbomou district of the Central African Republic, 550 km east of the capital Bangui and 100 km north of the district administrative centre of Bangassou.

**Mineral and chemical composition:** The mineralisation has been known since the early 1960s and was extensively explored throughout the 1960s and 1970s. It occurs in Late Cretaceous to Eocene Phosphatic kaarst sediments of the M'Patou Formation. These comprise thick black shales with pyrite and abundant organic matter, overlain by a 20-25 m thick succession with brown, reddish and yellow phosphatic lenses.

Phosphates occur in the form of microcrystalline, carbonate-substituted fluorapatites that can make up as much as 50% of the rock. The phosphate lenses are highly weathered and contain secondary Al-phosphates.

The main uraniferous phosphate minerals appear to be autunite and torbernite. Autunite is bright yellow in colour and torbernite is bright green. These minerals have been observed as fracture coatings, and fine-grained disseminations. White indurated masses of crandallite (alumina phosphate), have also been documented.

For more information refer:

*Sweeney, Mark and Chesher, Mark. (June 2007). Bakouma Resource Technical Report , Bakouma, Central African Republic, for URAMIN INC by AMC Consultants Pty Ltd., Amc Project 207009B.*  
<http://www.sedar.com/CheckCode.do;jsessionid=0000NEUx3YBP3602KsGBFZLLf-G:-1>

The uncertified major and trace element chemical composition data is presented in the appendix to this certificate.

**Appearance:** The material is a very fine powder. It is coloured a Light Brown (Corstor 5YR 6/4).

**Radioactivity:** Shipments of this material require special labeling and placarding. AMIS0054 contains U (18.4 Bq/g) and Th (0.03 Bq/g) and is classified as EXCEPTED MATERIAL in terms of "Safety Standards Series No. TS-R-1: Regulations for the Safe Transport of Radioactive Material, International Atomic Energy Agency, 2005, para 403, Table 1".

**Method of preparation:** The material was crushed, dry-milled and air-classified to 100% <54um. Wet sieve particle size analysis of random samples confirmed the material was 100% <54um. It was then blended in a bi-conical mixer, systematically divided and then sealed into 1kg Laboratory Packs. Samples were randomly selected for homogeneity testing and third party analysis. Statistical analysis for the consensus test results were carried out by an independent statistician. Explorer Packs are subdivided from the Laboratory packs as required.

**Methods of analysis requested:**

1. Multi-acid digest, including HF, ICP- OES or ICP-MS. Multi element scan ( to include U ).
2. U, XRF.
3. Majors ( Al<sub>2</sub>O<sub>3</sub>, CaO, Cr<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, K<sub>2</sub>O, MgO, MnO, Na<sub>2</sub>O, SiO<sub>2</sub>, TiO<sub>2</sub>. LOI. ) XRF fusion.
4. SG ( gas pycnometer )

**Method of certification:** Twenty laboratories were each given eight randomly selected packages of sample. The results from the sixteen laboratories that issued results timeously were used for the certification.

The mean and standard deviation for all data was calculated. Outliers were defined as samples beyond the mean  $\pm$  2 Standard Deviations from all data. These outliers were removed from the data and a new mean and standard deviation was determined.

Standards with an RSD of near or less than 5 % are then certified, RSD's of between near 5 % and 15 % are given Provisional Concentrations and limits, those with RSD's over 15 % are given Indicated Concentrations.

This method is different from that used to calculate the Confidence Interval shown on many Government-produced standards in that the actual "between-laboratory" standard deviation is used in the calculations. This produces upper and lower limits that reflect actual individual analyses rather than a grouped set of analyses. The limits can therefore be used to monitor accuracy from individual analyses, unlike the Certified Limits published on other standards which quote a Confidence Interval.

**Participating laboratories:** (Not in same order as in the table of assays)

1. ACME Analytical Laboratories Ltd., (Canada).
2. Activation Laboratories Ltd., (ActLabs, Ancaster, ON, Canada).
3. ALS Chemex South Africa ( Pty ) Ltd.
4. ALS Chemex, (Perth, Australia).
5. ALS Chemex, (Vancouver, Canada).
6. Anglo Research (Crown Campus, South Africa).
7. Assayers Canada, (Vancouver).
8. Genalysis Laboratory Services ( Pty ) Ltd., (Australia).
9. Geoservice Centre, Geolaboratory, (GTK. Finland).
10. Mintek (South Africa)
11. OMAC Laboratories (Ireland).
12. Pt Intertek Utama Services (Intertek, Indonesia)
13. Set Point Laboratories ( Pty ) Ltd (South Africa)
14. SGS Lakefield Research (Canada)
15. SGS Welshpool (Australia).
16. Ultra Trace ( Pty ) Ltd. (Australia)

**Assay Data:** Data as received from the laboratories for the certified elements is set out below. A proficiency report has been sent to the managers of the participating laboratories.

Lab Code	As ppm (M/ICP)	Ba ppm (M/ICP)	Co ppm (M/ICP)	Cr ppm (M/ICP)	Cu ppm (M/ICP)	Mn ppm (M/ICP)	Ni ppm (M/ICP)	Pb ppm (M/ICP)	P2O5 % (XRF)	S % (LECO)	SG g/cc	Sr ppm (M/ICP)	U ppm (M/ICP)	U ppm (XRF)	V ppm (M/ICP)	Zn ppm (M/ICP)
A	32	630	27	680	275	957	604	141		0.13	2.74	989	1410	1300	61	9070
A	32	630	27	671	279	954	630	143		0.13	2.73	995	1410	1330	61	9070
A	31	630	27	668	289	950	600	141		0.13	2.71	987	1400	1290	59	9150
A	23	580	26	601	233	801	534	128		0.11	2.76	840	1190	1320	53	8240
A	33	580	29	593	240	798	545	138		0.11	2.75	843	1190	1330	53	8170
A	33	630	29	641	261	869	655	149		0.13	2.81	925	1290	1320	58	8870
A	36	630	30	653	258	881	616	150		0.13	2.73	925	1300	1320	60	9020
A	34	650	31	660	263	915	609	155		0.13	2.76	948	1340	1320	60	9210
B	37	630	32	683	281	920	574	143		0.14		993	1380		63	10000
B	26	620	34	656	281	920	585	142		0.13		1010	1400		59	10300
B	40	650	34	680	294	955	636	151		0.14		1050	1450		64	10300
B	18	650	34	681	296	958	624	143		0.14		1040	1440		66	10100
B	31	650	34	669	290	949	592	153		0.14		1060	1460		64	10000
B	38	660	34	700	295	973	612	155		0.15		1070	1460		70	10200
B	46	630	33	666	287	917	600	145		0.14		1010	1400		61	10400
B	41	630	32	668	292	936	637	151		0.14		1040	1440		62	10200

Assay Data (cont)

Lab Code	As ppm (M/ICP)	Ba ppm (M/ICP)	Co ppm (M/ICP)	Cr ppm (M/ICP)	Cu ppm (M/ICP)	Mn ppm (M/ICP)	Ni ppm (M/ICP)	Pb ppm (M/ICP)	P2O5 % (XRF)	S % (LECO)	SG g/cc	Sr ppm (M/ICP)	U ppm (M/ICP)	U ppm (XRF)	V ppm (M/ICP)	Zn ppm (M/ICP)
C	38	660	35	680	269	920	579	147	16.47	0.15	2.72	1075	1500	1475	60	9910
C	32	660	32	672	264	918	556	141	16.42	0.15	2.72	1070	1480	1470	59	9890
C	39	690	35	723	286	970	612	151	16.47	0.15	2.74	1120	1570	1475	64	9900
C	40	650	34	694	268	912	607	144	16.44	0.15	2.80	1065	1480	1475	58	9890
C	34	680	32	669	271	916	577	142	16.51	0.15	2.72	1065	1480	1475	60	9990
C	26	650	31	675	265	913	564	137	16.50	0.15	2.77	1045	1440	1475	60	9780
C	29	620	33	668	257	867	606	136	16.56	0.14	2.78	1005	1390	1480	57	9450
C	32	640	35	698	274	890	581	141	16.45	0.14	2.80	1040	1430	1480	60	9970
D	29	572	32	570	255	940	585	61				898	1390	1470		9720
D	29	565	30	540	256	920	639	61				896	1380	1470		9560
D	30	628	31	510	264	940	582	59				908	1380	1480		9800
D	29	577	30	420	264	940	581	60				894	1370	1480		9820
D	29	577	30	580	255	920	584	61				894	1390	1470		9580
D	28	606	30	490	259	930	570	59				897	1360	1490		9500
D	29	591	31	460	256	920	582	59				924	1360	1490		9420
D	29	602	31	450	257	910	547	59				914	1370	1480		9330
E		520	29	270	240	800	510	130	15.60		2.89	840	1100	1600		7800
E		570	29	270	230	840	490	120	15.60		2.90	830	1200	1600		7800
E		570	27	260	290	860	530	120	15.70		2.89	820	1200	1600		7700
E		550	25	290	220	800	470	120	15.80		2.88	780	1200	1600		7600
E		580	27	240	230	840	480	130	15.60		2.92	830	1200	1600		7900
E		560	29	230	250	830	520	130	15.70		2.90	820	1200	1600		7800
E		560	29	300	220	820	530	120	15.80		2.90	810	1200	1600		7800
E		560	33	290	250	820	510	120	15.70		2.88	820	1200	1600		7600
F																
F																
F																
F																
F																
F																
F																
G	28	655	30	588	277	961	667	60	16.11		2.09	964	1377		58	10174
G	26	666	32	601	276	985	665	62	16.18		2.38	958	1363		59	9877
G	29	657	35	604	288	968	638	61	16.15		2.23	973	1413		60	9996
G	27	660	34	593	284	980	646	59	16.42		2.19	936	1358		59	10282
G	25	659	33	602	281	987	626	64	16.23		2.21	1020	1354		57	10302
G	27	631	31	596	270	1165	626	157	16.14		2.07	956	1410		63	9344
G	25	618	34	564	254	1126	620	59	16.19		2.21	897	1399		59	9589
G	26	618	33	639	298	1161	631	139	16.18		2.15	950	1377		60	9859
H									15.72					1390		
H									15.66					1390		
H									15.76					1410		
H									15.79					1410		
H									15.83					1430		
H									15.93					1420		
H									15.87					1420		
H									15.94					1420		
I																
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I																
J	29	672	30	750	254	918	642	127		0.12	2.90	977	1370	1540	70	9520
J	27	623	30	750	242	834	606	127		0.11	2.87	916	1350	1560	65	9530
J	27	627	30	700	246	826	682	131		0.12	2.88	919	1340	1570	70	9560
J	29	658	30	750	244	838	636	132		0.12	2.87	986	1380	1560	70	9500
J	28	654	30	800	266	892	684	130		0.14	2.90	951	1340	1580	70	9700
J	28	629	30	750	250	926	650	129		0.12	2.86	913	1360	1570	70	9410
J	29	654	35	800	252	904	604	133		0.12	2.90	946	1400	1560	75	9700
J	28	661	30	750	250	918	656	138		0.13	2.87	974	1450	1570	70	9690
K	26	617	29	621	215	798	502	140	17.12	0.11		885			61	8463
K	25	640	28	624	220	807	496	142	16.98	0.11		890			63	8669
K	28	619	27	587	213	773	512	140	17.04	0.11		866			63	8203
K	27	642	29	632	223	809	537	145	17.03	0.11		891			69	8612
K	28	653	29	622	235	824	541	151	17.16	0.11		914			68	8724
K	26	621	27	611	222	766	578	145	17.25	0.11		865			67	8421
K	25	628	28	601	218	765	515	146	17.36	0.12		882			62	8491
K	29	620	29	621	218	791	517	147	17.37	0.12		874			68	8550
L	28	680	28	705	258	910	578	152	16.25	0.12	3.00	897	1431	1445	62	9426
L	27	670	28	660	253	907	558	153	16.35	0.12	3.12	915	1452	1447	63	9401
L	30	669	29	693	256	914	550	151	16.40	0.12	2.96	856	1455	1452	63	9481
L	29	689	29	668	258	919	600	156	16.36	0.12	3.00	889	1473	1460	63	9574
L	29	698	29	692	252	917	585	155	16.48	0.12	2.99	911	1436	1452	63	9535
L	28	675	29	656	245	915	570	153	16.39	0.12	3.06	878	1448	1459	62	9467
L	28	676	29	693	257	913	552	152	16.33	0.12	3.06	900	1454	1459	62	9585
L	30	697	29	714	256	913	566	151	16.26	0.12	3.03	878	1425	1452	63	9582

## Assay Data (cont)

Lab Code	As ppm (M/ICP)	Ba ppm (M/ICP)	Co ppm (M/ICP)	Cr ppm (M/ICP)	Cu ppm (M/ICP)	Mn ppm (M/ICP)	Ni ppm (M/ICP)	Pb ppm (M/ICP)	P2O5 % (XRF)	S % (LECO)	SG g/cc	Sr ppm (M/ICP)	U ppm (M/ICP)	U ppm (XRF)	V ppm (M/ICP)	Zn ppm (M/ICP)
M									16.50							
M									16.50							
M									16.48							
M									16.59							
M									16.49							
M									16.63							
M									16.70							
M									16.42							
N	26	595	29	542	237	835	558	53		0.12		859	1200	1421	61	8440
N	27	670	32	598	267	832	613	61		0.12		960	1340	1403	69	9510
N	27	652	31	621	258	810	599	59		0.12		932	1310	1410	65	9140
N	27	674	31	635	265	811	592	60		0.12		922	1340	1421	50	9340
N	24	630	30	544	250	788	549	56		0.12		907	1240	1415	61	8810
N	26	657	31	615	262	797	585	58		0.12		954	1280	1397	63	9100
N	26	652	31	582	259	781	607	59		0.12		930	1280	1407	63	9080
N	25	628	30	571	250	799	552	57		0.12		931	1250	1405	61	9000
O	30	658	27	429	263	913	615	148	16.00			893			61	9560
O	28	655	26	371	252	899	630	140	16.00			881			58	9400
O	30	650	26	489	264	898	616	142	15.80			880			60	9340
O	30	658	27	370	257	907	604	144	16.00			890			59	9520
O	30	652	26	373	259	913	626	145	16.00			894			60	9540
O	30	647	26	513	265	908	622	148	15.70			875			59	9430
O	30	653	29	354	254	912	595	144	15.90			885			59	9490
O	28	643	26	378	249	893	637	144	16.00			878			58	9460
P	33	621	33	853	262	988	623	162	16.03	0.14		913	1455		73	9863
P	32	628	33	852	267	984	655	162	16.23	0.14		926	1480		66	9917
P	30	616	33	721	260	978	608	159	15.80	0.13		918	1465		69	9840
P	31	612	34	823	263	969	626	163	16.16	0.14		920	1468		72	9885
P	30	617	33	865	268	961	608	161	16.28	0.13		930	1485		75	9836
P	31	615	33	795	271	971	757	159	15.79	0.13		926	1474		71	9843
P	30	609	31	853	262	961	633	161	16.13	0.14		917	1471		66	9747
P	30	612	32	835	266	962	594	159	15.93	0.13		912	1473		69	9813
Q									17.50							
Q									17.30							
Q									19.00							
Q									17.70							
Q									18.50							
Q									18.70							
Q									16.20							
Q									18.80							
R									14.94		3.05					
R									14.53		3.11					
R									14.27		3.11					
R									14.89		3.05					
R									14.18		3.05					
R									14.59		3.05					
R									15.14		3.03					
R									14.46		3.04					
S	24	203	28	659	244	819	606	131	15.63	0.18	2.92	807	1384	1443		9000
S	18	196	29	652	249	810	598	120	15.49	0.18	2.90	826	1384	1416		9000
S	30	204	33	494	253	830	611	124	15.46	0.18	2.90	853	1375	1433		9200
S	28	224	30	643	245	802	523	136	15.64	0.16	2.92	830	1388	1436		9000
S	16	223	32	679	260	827	555	134	15.50	0.18	2.91	853	1430	1447		9500
S	24	222	32	703	252	830	611	133	15.60	0.16	2.93	856	1382	1421		9100
S	29	214	31	654	240	803	563	127	15.34	0.16	2.92	833	1387	1423		9000
S	30	215	32	665	245	807	568	133	15.34	0.16	2.93	842	1386	1452		9100
T																1560
T																1550
T																1550
T																1530
T																1550
T																1560
T																1540
T																1560

**Availability:** This product is available in Laboratory Packs containing 1kg of material or in Explorer Packs containing client specified weights of material from 50g up to 250g. Laboratory Packs are sealed bottles delivered in sealed foil pouches. Explorer Packs contain material in standard geochem envelopes placed into foil pouches that are nitrogen flushed and vacuum sealed.

**Legal notice:** This certificate and the reference material described in it have been prepared with due care and attention. However AMIS, Set Point Technology (Pty) Ltd, Mike McWha, Dr Barry Smee and Smee and Associates Ltd; accept no liability for any decisions or actions taken following the use of the reference material.

30 January 2008

**Certifying officers:**



**African Mineral Standards:** \_\_\_\_\_

**Mike McWha**  
**BSc (Hons), FGSSA, MSAIMM, Pr.Sci.Nat**



**Geochemist:** \_\_\_\_\_

**Barry W. Smee**  
**BSc, PhD, P.Geo, (B.C.)**

## APPENDIX

Major and trace element results were provided by seventeen laboratories and summary statistics are provided below. This data has not been certified.

### Major element statistics

	<b>MEAN</b>	<b>2SD</b>	<b>UNIT</b>	<b>RSD%</b>	<b>n</b>
Al <sub>2</sub> O <sub>3</sub>	5.70	0.17	%	1.495	103
C	0.370	0.000	%	0.000	14
CaO	20.9	0.5	%	1.099	87
Cr <sub>2</sub> O <sub>3</sub>	0.113	0.020	%	8.676	79
Fe <sub>2</sub> O <sub>3</sub>	4.09	0.14	%	1.657	102
K <sub>2</sub> O	0.931	0.025	%	1.356	75
LOI	3.72	0.67	%	9.056	104
MgO	0.687	0.066	%	4.823	92
MnO	0.124	0.014	%	5.801	111
Na <sub>2</sub> O	0.414	0.305	%	36.906	94
P <sub>2</sub> O <sub>5</sub> *	16.1	0.7	%	2.121	70
SiO <sub>2</sub>	44.9	0.8	%	0.905	99
TiO <sub>2</sub>	0.433	0.019	%	2.220	94

\* Certified

### Trace element statistics

	<b>MEAN</b>	<b>2SD</b>	<b>UNIT</b>	<b>RSD%</b>	<b>n</b>
Ag M/ICP	0.842	0.305	ppm	18.092	63
Al M/ICP	3.00	0.37	%	6.224	77
Be M/ICP	5.51	1.75	ppm	15.914	104
Bi M/ICP	0.256	0.071	ppm	13.814	80
Ca M/ICP	14.4	1.5	ppm	5.331	85
Cd M/ICP	0.836	0.190	ppm	11.343	71
Ce M/ICP	27.5	5.0	ppm	9.140	86
Cs M/ICP	1.35	0.21	ppm	7.704	63
Dy M/ICP	4.56	0.27	ppm	2.922	45
Er M/ICP	6.85	0.74	ppm	5.400	46
Eu M/ICP	0.692	0.110	ppm	7.926	56
Fe M/ICP	2.86	0.17	%	2.987	84
Ga M/ICP	9.04	1.17	ppm	6.465	84
Gd M/ICP	3.31	0.38	ppm	5.741	47

**Trace element statistics  
(cont)**

	<b>MEAN</b>	<b>2SD</b>	<b>UNIT</b>	<b>RSD%</b>	<b>n</b>
Ho M/ICP	1.44	0.11	ppm	3.662	38
In M/ICP	0.041	0.005	ppm	6.326	44
K M/ICP	0.773	0.094	%	6.109	79
La M/ICP	16.2	1.6	ppm	5.025	85
Li M/ICP	19.1	3.7	ppm	9.684	93
Lu M/ICP	2.40	0.14	ppm	2.991	37
Mg M/ICP	0.391	0.048	%	6.143	69
Mo M/ICP	1.57	0.55	ppm	17.640	86
Na M/ICP	0.198	0.033	%	8.269	86
Nb M/ICP	4.33	3.27	ppm	37.786	72
Nd M/ICP	15.3	1.5	ppm	5.004	47
P M/ICP	6.60	0.65	%	4.952	48
Pr M/ICP	3.92	0.43	ppm	5.514	46
Rb M/ICP	28.9	2.3	ppm	3.973	60
Re M/ICP	0.003	0.001	ppm	27.660	28
Sb M/ICP	13.2	5.2	ppm	19.654	72
Sc M/ICP	14.4	2.1	ppm	7.239	68
Se M/ICP	1.47	0.95	ppm	32.284	37
Sm M/ICP	3.09	0.23	ppm	3.732	47
Sn M/ICP	1.85	0.76	ppm	20.670	62
Tb M/ICP	0.559	0.053	ppm	4.751	47
Te M/ICP	0.091	0.024	ppm	13.341	31
Th M/ICP	8.62	2.10	ppm	12.174	84
Tl M/ICP	0.348	0.068	ppm	9.711	69
Tm M/ICP	1.44	0.11	ppm	3.820	38
W M/ICP	1.28	0.39	ppm	15.375	70
Y M/ICP	49.7	6.2	ppm	6.243	84
Yb M/ICP	12.7	1.4	ppm	5.490	48