Edited Informal Comments Sept 2012 Include:

The final data set for Project 37/2012 is as Tables and Crossplots. The references, comments and annotations on the Data Cover Sheet, the Tables, and the Crossplots should be noted. In addition see the following informal comments.

The materials supplied for mesoscale testing comprised eleven split cores of a felsic (granite/gneiss) nature. The sampled areas are considered prospective for gold, fluorspar, tin and tungsten in greisens and veins. Inspection of the samples indicated minor sulphides in #3, 5 and trace amount some others. Veinlets in #3, 4 fluoresced under short wave ultra violet irradiation. Carbonate (HCl test) was noted in #5, 7.

The mass properties are given in Table 1 and Fig. P-D.

The felsic nature of the materials is evident in the densities except for the dark cores #2, 3 which seem to have mafics, and the breccia #5 which has a fair amount of carbonate and some porosity.

Porosities are low for the RBD samples (except #5), and moderate for the weathered/altered BARD samples.

The gneisses #2, 3 show possibly significant density contrasts to the other lithologies.

The inductive properties are given in Table 2 and associated crossplots.

Magnetic susceptibilities, which more or less increase with density (Fig. k-D), are generally very low except for the dense gneisses #2, 3 which have low susceptibilities but in view of their remanences they could show useful magnetisation contrasts to the other lithologies. Samples #1, 4 have some remanence but that is referenced to quite low susceptibilities (Fig. Q-d).

The sample suite is resistive so induced EM conductivities could not be measured as they lie below the lab. resolution limit (0.1 S/m).

The galvanic properties are given in Table 3 and associated crossplots.

The resistive rock suite shows variations in resistivity depending on the degree of saturation with marginally fresh water; Fig. R_{ad}-R_{sat} attests to the importance of knowing the saturation state.

Saturated state resistivity can be interpreted, in Fig. R_{satmin}-P, as varying inversely with porosity especially if fractures are present as seems to be the case with #5, 8. The weathered &/or altered BARD07 samples #8, 9, 10, 11 have moderate resistivities. Sample #11 seems to be altered to some degree (despite the geol. description).

The plot of min. res. against density, Fig. R_{satmin}-WBD), is not particularly informative but it does show clearly the very high to very high resistivities in the RDDD samples except for veined/fractured #5, a breccia.

The IP responses depend on minor sulphides, or, if absent, on membrane/background effects (e.g. pore constrictions). An interpretation of the IP data is given in Fig. IP-WBD.

All samples received for testing require preparation i.e. one or more of coring, cutting, trimming, shaping. Note that different subsamples usually have been used in the series of measurements so that mass, magnetic, dry res., sat res., and IP results, as given in the Tables, do not necessarily refer to measurements on the same subsample.

Note that the IP tests were carried out in the water saturated state. Above a water table IP may decrease or increase with some diminution of saturation (pores only partly filled); it depends on textures. IP will decrease to zero in the completely dry state.

In assessing the field implications of mesoscale lab core data measured at room temperature and pressure, especially electrical results, water saturation conditions (partial, complete; perched water tables, salinity etc.) and the possible effects, in situ, on the energising current from anisotropy, macrofracturing, megaveining and faulting/fault core/fault damage zones [i.e. unsampled shunting or insulating/shorting features] should be borne in mind together with any other relevant features e.g. scaling considerations, pressure and temperature at depth, etc.

In high resistivity areas, i.e. with high rock matrix res. as meas. in the lab., an appreciation of the possible effects of moist/wet macrofracture systems is particularly important. Such fracturing, if it exists, can result in field res. array measurements giving bulk res. values less than the lab. indications (see Emerson & Yang 1998 ref. on cover sheet). These considerations are relevant to the tested rock suite.

The data set has indicated the physical properties character of the various lithologies. This should prove useful in interpreting field data. There do not appear to be any salient features, but the density and magnetic properties for the mafic mineral bearing gneisses #2, 3 could prove useful. Also, any sulphide developments should be mappable by field IP surveys.

These are informal comments based on a brief consideration of the results of a limited number of mesoscale laboratory tests on small samples, and with minimal geological information. Accordingly, these comments may require modification &/or correction in the light of other knowledge when considering their implications for exploration work.

During transmission some symbols/text may be altered

Sept 2012

PETROPHYSICAL RESULTS
MESOSCALE LABORATORY DATA

Systems Exploration (NSW)
Pty Limited

ACN 000 793 699
ABN 18 000 793 699

Postal Address: Box 6001
Dural Delivery Centre
NSW 2158, Australia

Telephone: (02) 4579 1183
Fax: (02) 4579 1290
email: systemsnsw@gmail.con

STUDY:	RSC - AUZEX		Project # 37/2012
REFERENCE:	E Werner, A Buckingham	**AREA:** North Qld	**DATE:** 25 Sept. 2012
METHODS:	mass, inductive, galvanic		

DATA:	**Tables**	**Crossplots**
density, porosity	1	Fig P-D
mag k, em cond.	2a, 2b	Figs k-D, Q-k
galv. res, IP	3	Figs R_{ad}-R_{sat}, R_{satmin}-WBD, R_{satmin}-P, IP-WBD

SAMPLES: eleven (11) split cores

References on Techniques see:

Mass Properties

Emerson, DW, 1990. *Notes on mass properties of rocks - density, porosity, permeability.* Explor. Geophys., 21, 209-216. [volumes usually by water displacement - see USGS Circ. 789, Table 8, p.69, re differences in calipered and Archimedes' volumes]

Emerson, DW & Yang, YP, 1997. *Insights from laboratory mass property crossplots.* ASEG Preview, 70, 10-14.

Magnetic Properties

Clark, DA & Emerson, DW, 1991. *Notes on rock magnetisation characteristics in applied geophysical studies.* Explor. Geophys., 22, 547-555.

EM Conductivity

Yang, YP & Emerson, DW, 1997. *Electromagnetic conductivities of rock cores: Theory and analog results.* Geophysics, 62/6, 1779-1793 (incl. mag. k by induction coil).

Galvanic Meas.

Emerson, DW, 1969. *Laboratory electrical resistivity measurements of rocks.* Proc. Aust. Inst. Min. & Metal., 230, 51-62 (incl. 4 electrode water bath IP technique).

IP general

Bertin, J & Loeb, J, 1976. *Experimental and Theoretical Aspects of Induced Polarisation.* Vol.1 Geopubl. Assoc. Geoexpl. Mon.7 [see 9.14: high resistivity -> high IP]

Fraser et al, Geophysics, 1964, 832 (dissem. and veined sulphides).

Mahan et al, Geophys. Prosp., 1986, 743 (dissem. sulphides).

Nelson & Van Voorhis, Geophysics 1983, 62 (est. sulphide c

Olhoeft, Geophysics, 1985, 2492 (review of meas. & response

for IP four electrode lab meas. info. see cited refs. here & Sumner J. *Principles of Ind. Polarisation,* Elsevier, 1976 (ch.4)

Dielectrics

Emerson, DW & Welsh, HK, 1988. *Low frequency permittivities of skarns and associated rocks.* Geophysics, 53, 1233-1240.

Reference to high resistivity terrains:

Emerson, DW & Yang, YP, 1998. *Physical properties of fractured rock - bulk resistivity.* ASEG Preview, 77, 26-27. (for an example of fracturing & fracture density in carbonates, see: Ghosh & Mitra, AAPG Bull. v.93, 2009, 995-1014)

Relevant to these samples

Important Notes:

_ These petrophysical data results relate to laboratory measurements on small samples. The extrapolation of these results to large masses of in situ material should take account of sampling statistics, and other relevant variables e.g. pressure & temp. gradients, water saturation in electrical studies, anisotropy, jointing etc.

_ The results contained herein relate only to the material submitted for testing and no responsibility is accepted for the representative nature or otherwise of the material submitted.

_ Non uniformity, variability, texture, fabric and structure of lithological formations should be kept in mind when assessing mesoscale petrophysics quantities derived from a limited number of samples. Tested rock *material* properties may not simply represent those of the overall rock *mass* ; other information may be required.

_Errors: Usually on a given sample or subsample, and under fixed conditions, the root mean square error of an individual measurement is better than 1% when taking into account uncertainties in geometry of the specimen of rock material and the instrument specifications between calibrations. However, in no way can this indicative measured value be regarded as a definitive characteristic of the rock mass for which the accurate depiction of a physical property requires adequate and careful sampling (rarely done in routine test programs owing to considerations of cost and time) and cognisance of other variables, including lab. artefacts.

THE NOTES ON THIS COVER SHEET SHOULD BE READ BEFORE CONSIDERING RESULTS SUPPLIED

RBDD07-01:

43-43.23m: **Quartz porphyry**: grey qtz eye fgr porphyritic granite/granodiorite, 2%bi, wk-mod fracturing, common calcite veinlets at random orientations, qtz eyes subrounded 1 10mm,

89.20-89.41: **Microgneiss:** green to green grey thinly banded to more massive fgr chloritic meta-microgranite.

61.0-61.17m: **"Regular" gneiss**: Fgr, biot (75%)-qtz (25%) gneiss with occ foln sub// irregular,discontinuous m-cgr qtz-feld layers <10cm. Gradational margins have more regular segregations and evidence of small-scall folding.

93.32-93.48m: **Porphyroblastic gneiss**: Mesocratic, dominantly mgr, fairly homogenous unit with weak to mod segregations developed. Clearly grt protolith. Occ melanocratic and leucocratic zones.

RBDD07-02:

53.79-53.95m: **Breccia:** Zone of brecciated dark green bio rich orthogneiss - sub-angular orthogneiss clasts floating in qtz infill matrix. 308 ppm Bi, 82 ppm Sn.

98.93-99.09m: **Dark orthogneiss:** Dark grey c-vcgr biot (~40%) orthogneiss. 0.5 ppm Au.

147.0-147.15m: **Orthogneiss:** Dominated by v light grey unfoliated m-cgr qtz (>60-70%) rich residual material. 748 ppm W.

BARD07-05:

75.40-75.60m: **Greisen altered granite:** fr, grey, m-cgr, inegr grt, 2-5% py+/-sp as dissem blebs, 77.8m-5mm qtz+py+/-sp veins follow well defined fractures at 15deg to Ca.

120.50-120-72m:**Greisen altered/unaltered transition zone:** fr orange beige, m-cgr inegr grt, intermittent zones of ser/greisen alt, mainly feld rims and fine fracture selvages.

8.30-8.51m: **As above, but in weathered zone:** m-sox green grey m-cgr inegr grt, mod-strong greisen alteration, fine fracture network and common cavities to 1cm dia with dogstooth qtz-cavity lining+hem+/-py fill.

149.83-150.0 m: **Unaltered granite:** fr orange beige fgr egr grt, minor fine fractures.

SYSTEMS EXPLORATION (NSW) PTY LIMITED
Postal Address: Box 6001, Dural Delivery Centre, NSW, 2158
Telephone: (02) 4579 1183: Fax: (02) 4579 1290

Table 1

MASS PROPERTIES

Project: 37/2012

Date: 11 Sept 2012

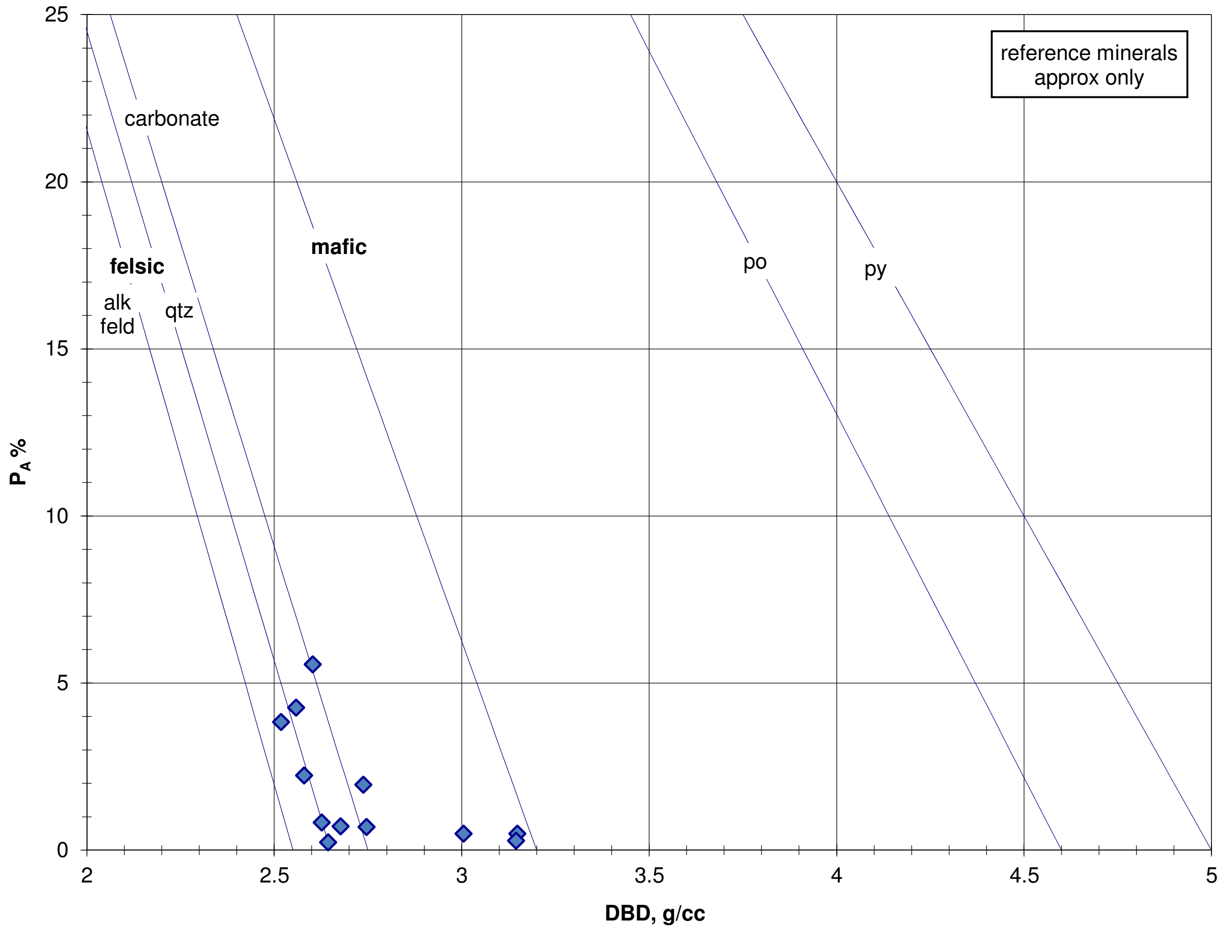
STUDY: RSC AUZEX
INIQUES: mass properties, vac sat technique, occluded voids assumed minor
ERENCE: E Werner, A Buckingham

saturant (by vacuum): water solution
res: 10 ohm m 25 °C
Sw: water saturation level % water-filled pore spac

see cover sheet comment on water displacement (Archimedes) volume meas.

SAMPLES ½ core RSC AUZEX #	(depth m)	lithology	**MESOSCALE PHYSICAL PROPERTIES** Sw -> 0% DBD dry bulk dens. (105°C dry i.e."bone dry") g/cm³, t/m³	P_A apparent porosity (water accessible void vol. wrt total vol) %	(inferred) GDA (composite, por. removed) app. grain dens. g/cm³, t/m³	VALUES ROUNDED Sw->100% WBD wet (vac. sat.) bulk dens. pores water filled g/cm³, t/m³	"as received" est. pore water content % wt loss to 105°C	S_w%	air dry BD density in orig. condition g/cm³
RBDD07-01									
1	(43)	qtz porph				**2.65**			2.65
						2.66			2.66
			2.64	0.2	2.65	2.65	0.04	50	2.64
						2.66			2.65
2	(61)	gneiss				**3.14**			3.14
		seems				3.13			3.13
		MAFIC				3.00			3.00
			3.15	0.5	3.16	3.15	0.10	67	3.15
3	(89.2)	microgneiss				**3.05**			3.05
		seems MAFIC				3.03			3.03
		+ minor sulphide	3.15	0.3	3.15	3.15	0.05	50	3.15
			3.00	0.5	3.02	3.01	0.17	100	3.01
4	(93.3)	porph gneiss				**2.66**			2.66
			2.68	0.7	2.70	2.68	0.20	75	2.68
						2.64			2.64
RBDD07-02									
5	(53.79)	bx				**2.73**			2.72
						2.75			2.75
			2.74	2.0	2.79	2.76	0.62	88	2.75
6	(98.9)	orthogneiss				**2.74**			2.74
		dark				2.69			2.69
			2.75	0.7	2.77	2.75	0.20	80	2.75
7	(147)	orothogneiss				**2.63**			2.63
						2.64			2.64
			2.63	0.8	2.65	2.64	0.26	83	2.63
BARD07-05									
8	(8.3)	weathered				**2.55**			2.53
		greisen gn	2.52	3.8	2.62	2.56	0.92	61	2.54
						2.56			2.54
						2.55			2.52
9	(75.4)	greisen gn				**2.72**			2.71
			2.60	5.6	2.76	2.66	1.20	57	2.63
						2.74			2.74
10	(120.5)	greisen				**2.60**			2.58
		transition	2.56	4.3	2.67	2.60	0.72	44	2.58
						2.58			2.54
						2.60			2.57
11	(149.83)	granite				**2.58**			2.57
		unaltered	2.58	2.2	2.64	2.60	0.49	57	2.59
						2.60			2.59

Fig P_A - D



(This is an Excel generated plot and should be regarded as approximate only)

Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 12 September 2012

SYSTEMS EXPLORATION (NSW) PTY LIMITED
Postal Address: Box 6001, Dural Delivery Centre, NSW, 2158
Telephone: (02) 4579 1183: Fax: (02) 4579 1290

Table 2a

INDUCTIVE TESTS

Project: 37/2012

Date: ###############

STUDY: RSC Global Pty Ltd
TECHNIQUES: induction coils mag k 460 Hz, EM cond. >100 kHz
REFERENCE: E Werner, A Buckingham

SAMPLE TREATMENT: none, tested "as is": air dry

SAMPLES			MESOSCALE PHYSICAL PROPERTIES (LAB.)			
½ core			average of subsamples		large subsamples	
RSC AUZEX			susceptibility	density	lab limit 0.1 S/m	
			mag k	bulk BD	EM cond. conductivity	
#	(depth m)	lithology		g/cc	σ	comments
			SIx10^{-5}	t/m^3	S/m	
RBDD07-01						
1	(43)	qtz porph	23	2.65		
2	(61)	gneiss (mafic)	117	3.14		
3	(89.2)	microgneiss	225	3.05	slight response (po)	
4	(93.3)	porph gneiss	2	2.66		
RBDD07-02						
5	(53.79)	bx	48	2.73		
6	(98.9)	orthogneiss dark	40	2.74		
7	(147)	orthogneiss	2	2.63		
BARD07-05						
8	(8.3)	weathered greisen gn	4	2.53		
9	(75.4)	greisen gn	16	2.71		
10	(120.5)	greisen transition	3	2.58		
11	(149.83)	granite unaltered	8	2.57		
					samples are resistive and below lab of resolution for EM cond.	

SYSTEMS EXPLORATION (NSW) PTY LIMITED

Postal Address: Box 6001, Dural Delivery Centre, NSW, 2158
Telephone: (02) 4579 1183: Fax: (02) 4579 1290

mag k: ind. coil, NRM spinner ma
no AF demag applied
so NRM is raw meas.
may include noise
e.g. drill induced remanence

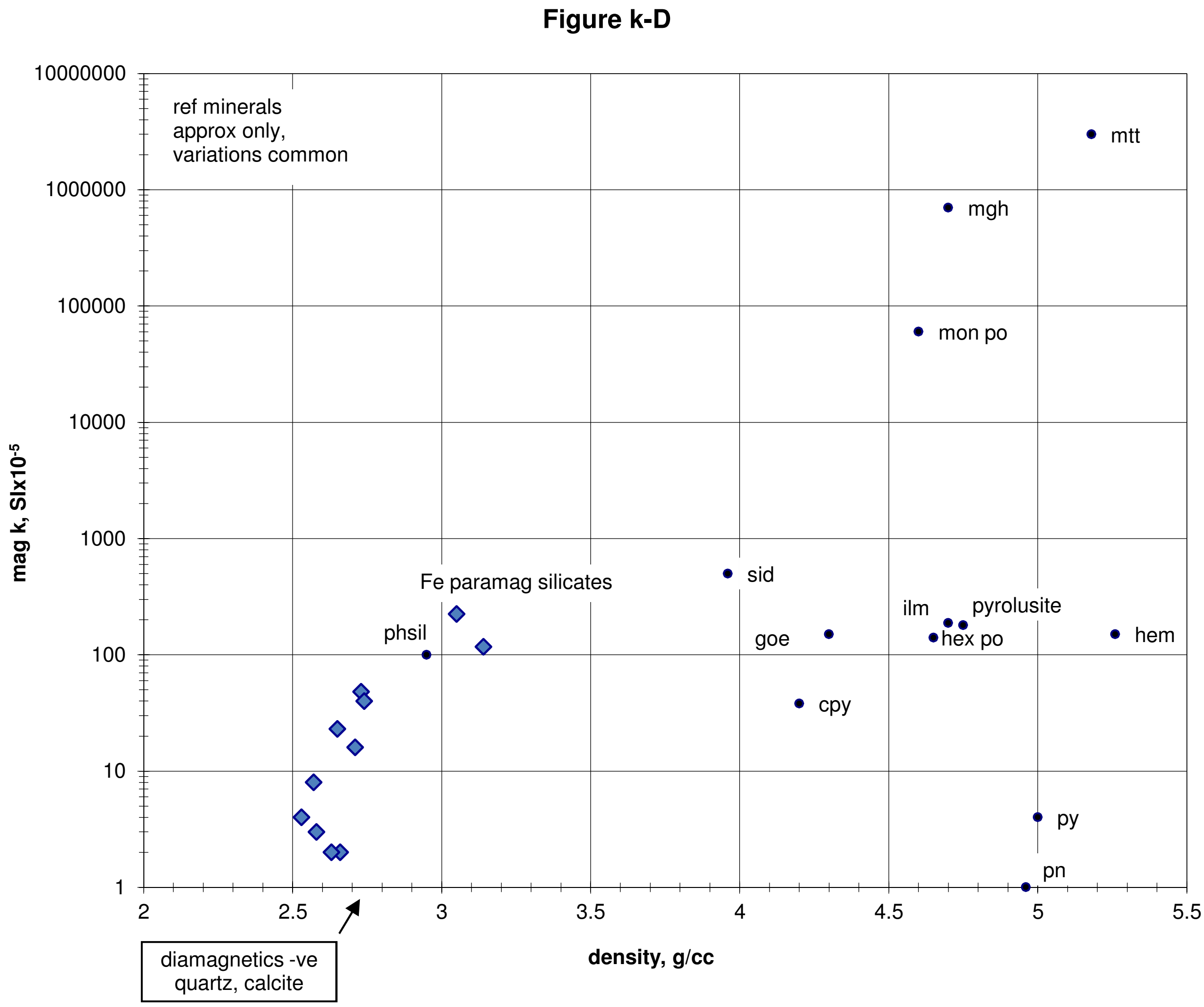
Table 2b
Project: 37/2012
Date: 3 Sept 2012

indicative data values rounded

STUDY__RSC Global Pty Ltd___________________________
TECHNIQUES__magnetic laboratory______________________
REFERENCE__E Werner, A Buckingahm___________________

Note on units: k cgs x 4π -> k SI; B field earth is 0.5 G, cgs, (50 000 γ) nominal so 50 000 nT, SI, assumed unless otherwise; intensities 1 μG cgs = 1 m A/m SI; F or H intensity or earth's field numerically = B flux density cgs, but H = B/μ_o SI; e.g. take a basalt k = $1000x10^{-6}$ cgs -> $1257x10^{-5}$ SI then induced magnetisation = $1000x10^{-6}x0.5$ = 500 μG cgs, or ($50\,000x10^{-9}/4\pi x10^{-7}$) multiplied by ($4\pi x1000x10^{-6}$) = $500x10^{-3}$ A/m = 500 m A/m in SI; k has no units, it is a dimensionless ratio.

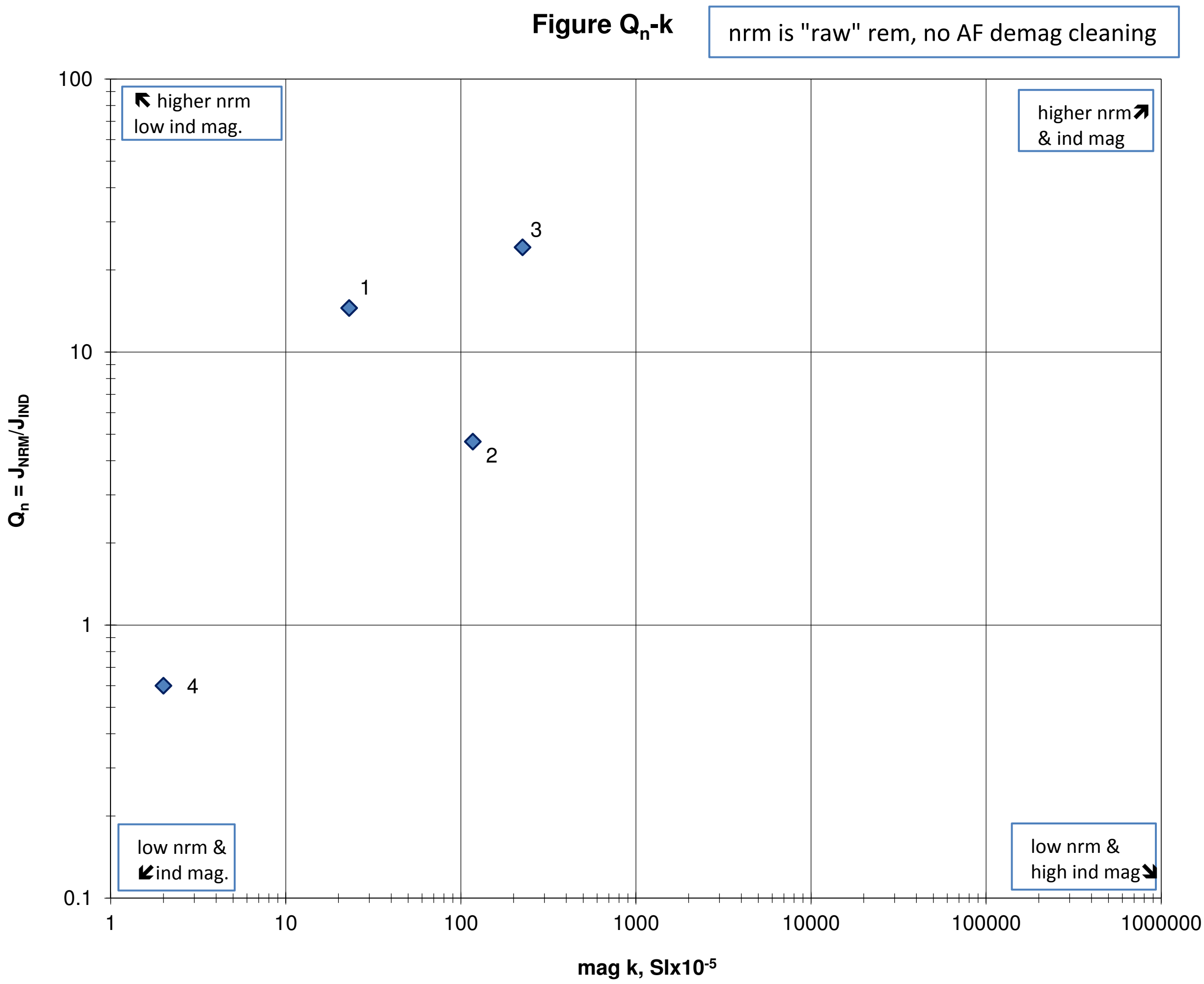
SAMPLES		MESOSCALE MAGNETIC PHYSICAL PROPERTIES							
10 cm^3 subsamples values averaged		suscept k $cgsx10^{-6}$	J_{IND} = kF μG Induction	J_{NRM} intensity μG Remanence	I_{NRM} + down - up incl. degrees	D_{NRM} azimuth degrees	**Qn K.ratio** J_{NRM}/J_{IND}	mag k $SIx10^{-5}$	approx. density g/cm^3
					SAMPLES NOT ORIENTED				
RBDD07-01								see Table 2a	
1	(43)						14.5		
2	(61)						4.7		
3	(89.2)						24.2		
4	(93.3)						0.6		
RBDD07-02									
5	(53.79)						low		
				low responses in spinner magnetic i.e. @ ≈ noise level of the instrument					
6	(98.9)						low		
7	(147)						low		
BARD07-05									
8	(8.3)						low		
9	(75.4)						low		
10	(120.5)						low		
11	(149.83)						low		



(This is an Excel generated plot and should be regarded as approximate only)

Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 12 September 2012

Figure Q_n-k



(This is an Excel generated plot and should be regarded as approximate only)

Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 12 September 2012

SYSTEMS EXPLORATION (NSW) PTY LIMITED
Postal Address: Box 6001, Dural Delivery Centre, NSW, 2158
Telephone: (02) 4579 1183: Fax: (02) 4579 1290

Table 3

GALVANIC TESTS

Project: 37/2012

sat. state by vacuum imbibition
solution: 10 ohm m 25^{O}C

Date: 25 Sept 2012

STUDY: RSC AUZEX
TECHNIQUES: galvanic electric resistivity and IP
REFERENCE: E Werner, A Buckingham

foliation:
□ current along core axis
× current across core axis (prism)

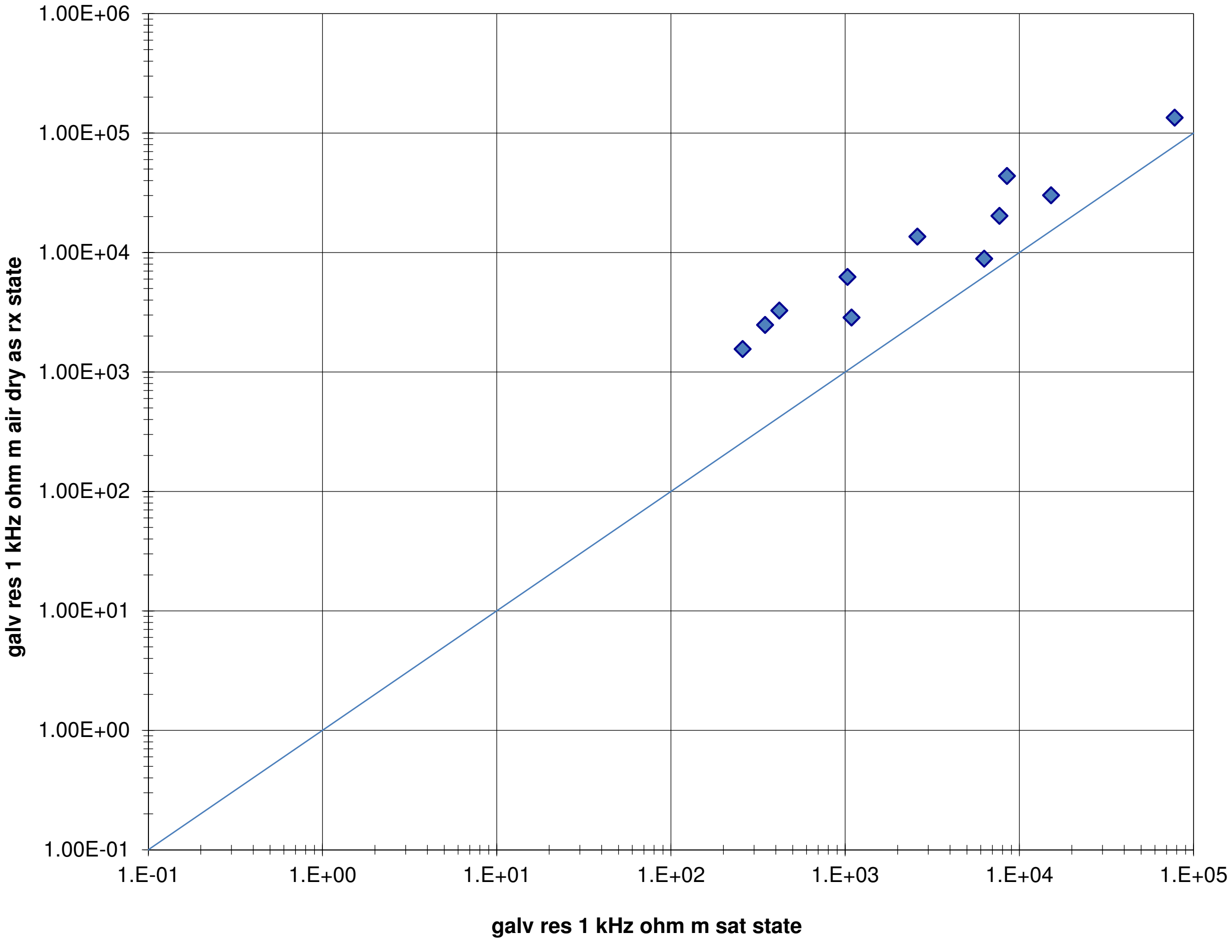
SAMPLES		MESOSCALE PHYSICAL PROPERTIES (LAB.)							IP SAT. STATE
½ core									regard lab IP data (meas. in water bath)
				galvanic electrical resistivity					
RSC AUZEX				res. air dry, as received		res. sat. state			IP effect
				□	×	□	×	sat. density	as equivalent
#	(depth m)	lithology	texture	ρ_t 1 kHz	ρ_t 1 kHz	ρ_o 1kHz	ρ_o 1kHz	WBD	chargeability
				ohm m	ohm m	ohm m	ohm m	g/cc	ms
RBDD07-01									
1	(43)	qtz porph		134752		77842		2.65	1
				dielectric					
2	(61)	gneiss		51735	8888	31675	6282	3.14	5
		(mafic)							
3	(89.2)	microgneiss		26279	13596	13005	2597	3.05	15
4	(93.3)	porph gneiss		30176		15205		2.66	4
RBDD07-02									
5	(53.79)	bx		3270		1054	419	2.73	10
		fract.				wet fractures			
6	(98.9)	orthogneiss		20300		7681		2.74	5
		dark							
7	(147)	orthogneiss		85260	43778	53070	8489	2.63	1
		(quartz?)		dielectric					
BARD07-05									
8	(8.3)	weathered		1557		290	258	2.55	3
		greisen gn							
9	(75.4)	greisen gn		6255		1031		2.72	3
10	(120.5)	greisen		2479		686	347	2.60	3
		transition							
11	(149.83)	granite		2859		1088		2.58	2
		unaltered							

#5, 7 have carbonate
veinlets oblique to core axes
the t??? tp omcrease axial res.

NOTE THE
ANISOTROPY
IN THE GNEISSES

IP is a function of many variables esp. texture, see refs.

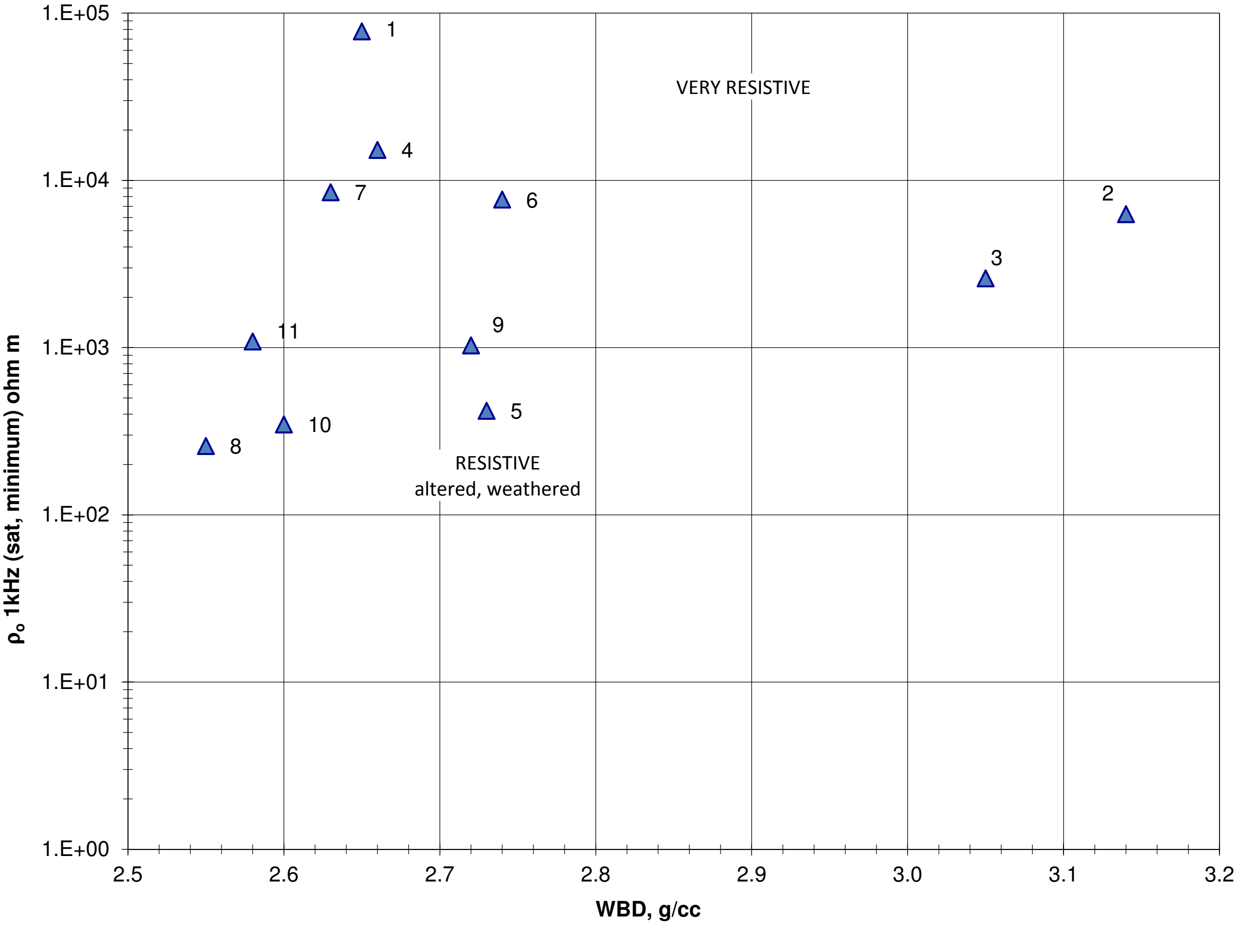
Fig $R_{a\text{-}d}$ - R_{sat}



(This is an Excel plot and should be regarded as approximate only)

Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 12 September 2012

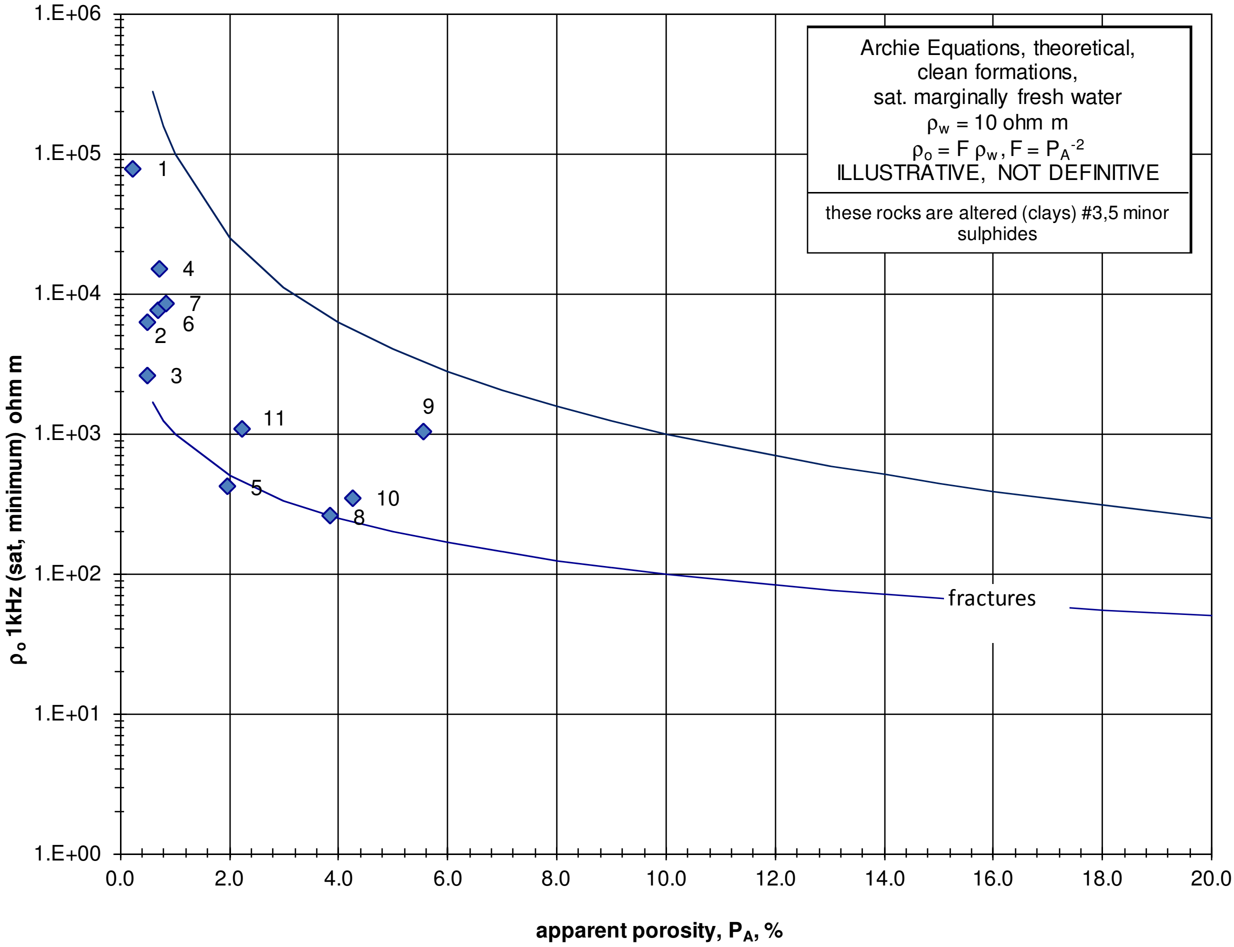
Fig R_{satmin} vs WBD



(This is an Excel plot and should be regarded as approximate only)

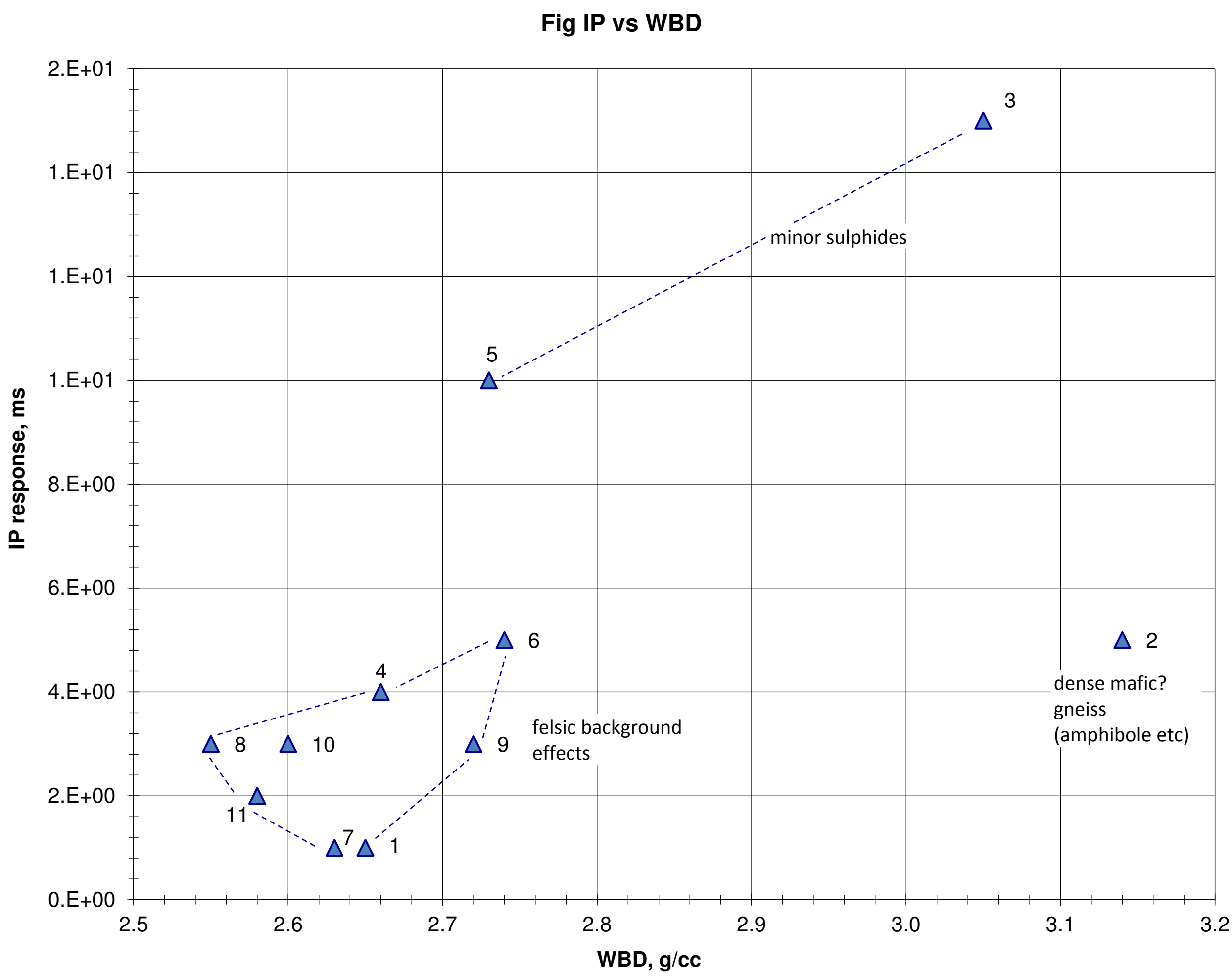
Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 25 September 2012

Fig R_{satmin} vs P_A



(This is an Excel plot and should be regarded as approximate only)

Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 12 September 2012



(This is an Excel plot and should be regarded as approximate only)

Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 12 September 2012

Edited Informal Comments Sept 2012 Include:

The final data set for Project 37/2012 is as Tables and Crossplots. The references, comments and annotations on the Data Cover Sheet, the Tables, and the Crossplots should be noted. In addition see the following informal comments.

The materials supplied for mesoscale testing comprised eleven split cores of a felsic (granite/gneiss) nature. The sampled areas are considered prospective for gold, fluorspar, tin and tungsten in greisens and veins. Inspection of the samples indicated minor sulphides in #3, 5 and trace amount some others. Veinlets in #3, 4 fluoresced under short wave ultra violet irradiation. Carbonate (HCl test) was noted in #5, 7.

The mass properties are given in Table 1 and Fig. P-D.

The felsic nature of the materials is evident in the densities except for the dark cores #2, 3 which seem to have mafics, and the breccia #5 which has a fair amount of carbonate and some porosity.

Porosities are low for the RBD samples (except #5), and moderate for the weathered/altered BARD samples.

The gneisses #2, 3 show possibly significant density contrasts to the other lithologies.

The inductive properties are given in Table 2 and associated crossplots.

Magnetic susceptibilities, which more or less increase with density (Fig. k-D), are generally very low except for the dense gneisses #2, 3 which have low susceptibilities but in view of their remanences they could show useful magnetisation contrasts to the other lithologies. Samples #1, 4 have some remanence but that is referenced to quite low susceptibilities (Fig. Q-d).

The sample suite is resistive so induced EM conductivities could not be measured as they lie below the lab. resolution limit (0.1 S/m).

The galvanic properties are given in Table 3 and associated crossplots.

The resistive rock suite shows variations in resistivity depending on the degree of saturation with marginally fresh water; Fig. R_{ad}-R_{sat} attests to the importance of knowing the saturation state.

Saturated state resistivity can be interpreted, in Fig. R_{satmin}-P, as varying inversely with porosity especially if fractures are present as seems to be the case with #5, 8. The weathered &/or altered BARD07 samples #8, 9, 10, 11 have moderate resistivities. Sample #11 seems to be altered to some degree (despite the geol. description).

The plot of min. res. against density, Fig. R_{satmin}-WBD), is not particularly informative but it does show clearly the very high to very high resistivities in the RDDD samples except for veined/fractured #5, a breccia.

The IP responses depend on minor sulphides, or, if absent, on membrane/background effects (e.g. pore constrictions). An interpretation of the IP data is given in Fig. IP-WBD.

All samples received for testing require preparation i.e. one or more of coring, cutting, trimming, shaping. Note that different subsamples usually have been used in the series of measurements so that mass, magnetic, dry res., sat res., and IP results, as given in the Tables, do not necessarily refer to measurements on the same subsample.

Note that the IP tests were carried out in the water saturated state. Above a water table IP may decrease or increase with some diminution of saturation (pores only partly filled); it depends on textures. IP will decrease to zero in the completely dry state.

In assessing the field implications of mesoscale lab core data measured at room temperature and pressure, especially electrical results, water saturation conditions (partial, complete; perched water tables, salinity etc.) and the possible effects, in situ, on the energising current from anisotropy, macrofracturing, megaveining and faulting/fault core/fault damage zones [i.e. unsampled shunting or insulating/shorting features] should be borne in mind together with any other relevant features e.g. scaling considerations, pressure and temperature at depth, etc.

In high resistivity areas, i.e. with high rock matrix res. as meas. in the lab., an appreciation of the possible effects of moist/wet macrofracture systems is particularly important. Such fracturing, if it exists, can result in field res. array measurements giving bulk res. values less than the lab. indications (see Emerson & Yang 1998 ref. on cover sheet). These considerations are relevant to the tested rock suite.

The data set has indicated the physical properties character of the various lithologies. This should prove useful in interpreting field data. There do not appear to be any salient features, but the density and magnetic properties for the mafic mineral bearing gneisses #2, 3 could prove useful. Also, any sulphide developments should be mappable by field IP surveys.

These are informal comments based on a brief consideration of the results of a limited number of mesoscale laboratory tests on small samples, and with minimal geological information. Accordingly, these comments may require modification &/or correction in the light of other knowledge when considering their implications for exploration work.

During transmission some symbols/text may be altered

Sept 2012

PETROPHYSICAL RESULTS
MESOSCALE LABORATORY DATA

Systems Exploration (NSW)
Pty Limited

ACN 000 793 699
ABN 18 000 793 699

Postal Address: Box 6001
Dural Delivery Centre
NSW 2158, Australia

Telephone: (02) 4579 1183
Fax: (02) 4579 1290
email: systemsnsw@gmail.con

STUDY: RSC - AUZEX — Project # 37/2012

REFERENCE: E Werner, A Buckingham — **AREA:** North Qld — **DATE:** 25 Sept. 2012

METHODS: mass, inductive, galvanic

DATA:	**Tables**	**Crossplots**
density, porosity	1	Fig P-D
mag k, em cond.	2a, 2b	Figs k-D, Q-k
galv. res, IP	3	Figs R_{ad}-R_{sat}, R_{satmin}-WBD, R_{satmin}-P, IP-WBD

SAMPLES: eleven (11) split cores

References on Techniques see:

Mass Properties

Emerson, DW, 1990. *Notes on mass properties of rocks - density, porosity, permeability.* Explor. Geophys., 21, 209-216. [volumes usually by water displacement - see USGS Circ. 789, Table 8, p.69, re differences in calipered and Archimedes' volumes]

Emerson, DW & Yang, YP, 1997. *Insights from laboratory mass property crossplots.* ASEG Preview, 70, 10-14.

Magnetic Properties

Clark, DA & Emerson, DW, 1991. *Notes on rock magnetisation characteristics in applied geophysical studies.* Explor. Geophys., 22, 547-555.

EM Conductivity

Yang, YP & Emerson, DW, 1997. *Electromagnetic conductivities of rock cores: Theory and analog results.* Geophysics, 62/6, 1779-1793 (incl. mag. k by induction coil).

Galvanic Meas.

Emerson, DW, 1969. *Laboratory electrical resistivity measurements of rocks.* Proc. Aust. Inst. Min. & Metal., 230, 51-62 (incl. 4 electrode water bath IP technique).

IP general

Bertin, J & Loeb, J, 1976. *Experimental and Theoretical Aspects of Induced Polarisation.* Vol.1 Geopubl. Assoc. Geoexpl. Mon.7 [see 9.14: high resistivity -> high IP]

Fraser et al, Geophysics, 1964, 832 (dissem. and veined sulphides).

Mahan et al, Geophys. Prosp., 1986, 743 (dissem. sulphides).

Nelson & Van Voorhis, Geophysics 1983, 62 (est. sulphide c

Olhoeft, Geophysics, 1985, 2492 (review of meas. & response

for IP four electrode lab meas. info. see cited refs. here & Sumner J. *Principles of Ind. Polarisation,* Elsevier, 1976 (ch.4)

Dielectrics

Emerson, DW & Welsh, HK, 1988. *Low frequency permittivities of skarns and associated rocks.* Geophysics, 53, 1233-1240.

Reference to high resistivity terrains:

Emerson, DW & Yang, YP, 1998. *Physical properties of fractured rock - bulk resistivity.* ASEG Preview, 77, 26-27. (for an example of fracturing & fracture density in carbonates, see: Ghosh & Mitra, AAPG Bull. v.93, 2009, 995-1014)

Relevant to these samples

Important Notes:

_ These petrophysical data results relate to laboratory measurements on small samples. The extrapolation of these results to large masses of in situ material should take account of sampling statistics, and other relevant variables e.g. pressure & temp. gradients, water saturation in electrical studies, anisotropy, jointing etc.

_ The results contained herein relate only to the material submitted for testing and no responsibility is accepted for the representative nature or otherwise of the material submitted.

_ Non uniformity, variability, texture, fabric and structure of lithological formations should be kept in mind when assessing mesoscale petrophysics quantities derived from a limited number of samples. Tested rock *material* properties may not simply represent those of the overall rock *mass* ; other information may be required.

_Errors: Usually on a given sample or subsample, and under fixed conditions, the root mean square error of an individual measurement is better than 1% when taking into account uncertainties in geometry of the specimen of rock material and the instrument specifications between calibrations. However, in no way can this indicative measured value be regarded as a definitive characteristic of the rock mass for which the accurate depiction of a physical property requires adequate and careful sampling (rarely done in routine test programs owing to considerations of cost and time) and cognisance of other variables, including lab. artefacts.

THE NOTES ON THIS COVER SHEET SHOULD BE READ BEFORE CONSIDERING RESULTS SUPPLIED

RBDD07-01:

43-43.23m: **Quartz porphyry**: grey qtz eye fgr porphyritic granite/granodiorite, 2%bi, wk-mod fracturing, common calcite veinlets at random orientations, qtz eyes subrounded
1 10mm,

89.20-89.41: **Microgneiss:** green to green grey thinly banded to more massive fgr chloritic meta-microgranite.

61.0-61.17m: **"Regular" gneiss**: Fgr, biot (75%)-qtz (25%) gneiss with occ foln sub// irregular,discontinuous m-cgr qtz-feld layers <10cm. Gradational margins have more regular
segregations and evidence of small-scall folding.

93.32-93.48m: **Porphyroblastic gneiss**: Mesocratic, dominantly mgr, fairly homogenous unit with weak to mod segregations developed. Clearly grt protolith. Occ melanocratic and
leucocratic zones.

RBDD07-02:

53.79-53.95m: **Breccia:** Zone of brecciated dark green bio rich orthogneiss - sub-angular orthogneiss clasts floating in qtz infill matrix. 308 ppm Bi, 82 ppm Sn.

98.93-99.09m: **Dark orthogneiss:** Dark grey c-vcgr biot (~40%) orthogneiss. 0.5 ppm Au.

147.0-147.15m: **Orthogneiss:** Dominated by v light grey unfoliated m-cgr qtz (>60-70%) rich residual material. 748 ppm W.

BARD07-05:

75.40-75.60m: **Greisen altered granite:** fr, grey, m-cgr, inegr grt, 2-5% py+/-sp as dissem blebs, 77.8m-5mm qtz+py+/-sp veins follow well defined fractures at 15deg to Ca.

120.50-120-72m:**Greisen altered/unaltered transition zone:** fr orange beige, m-cgr inegr grt, intermittent zones of ser/greisen alt, mainly feld rims and fine fracture selvages.

8.30-8.51m: **As above, but in weathered zone:** m-sox green grey m-cgr inegr grt, mod-strong greisen alteration, fine fracture network and common cavities to 1cm dia with dogstooth
qtz-cavity lining+hem+/-py fill.

149.83-150.0 m: **Unaltered granite:** fr orange beige fgr egr grt, minor fine fractures.

SYSTEMS EXPLORATION (NSW) PTY LIMITED
Postal Address: Box 6001, Dural Delivery Centre, NSW, 2158
Telephone: (02) 4579 1183: Fax: (02) 4579 1290

Table 1

MASS PROPERTIES

Project: 37/2012

Date: 11 Sept 2012

STUDY: RSC AUZEX

saturant (by vacuum): water solution

INIQUES: mass properties, vac sat technique, occluded voids assumed minor

res: 10 ohm m 25 °C

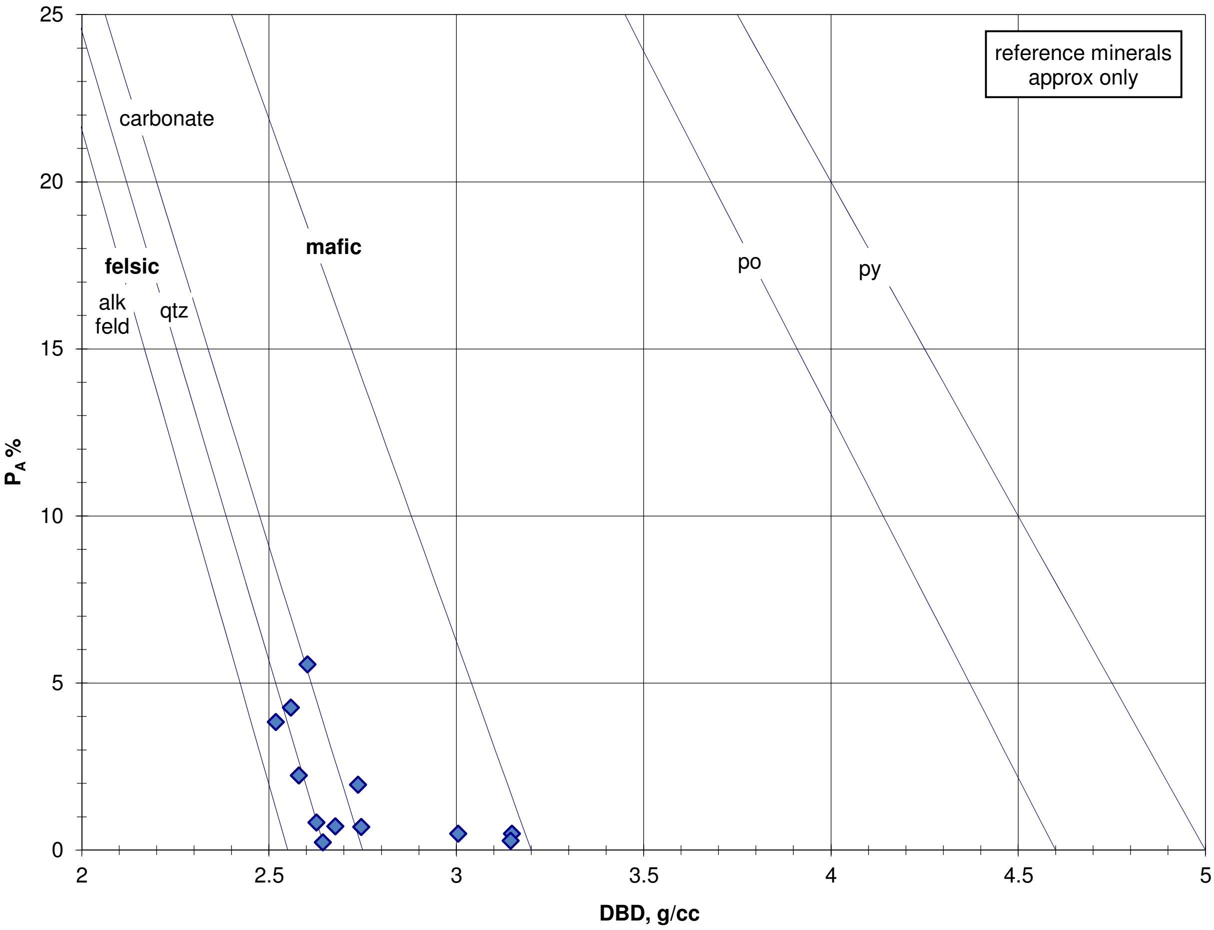
ERENCE: E Werner, A Buckingham

Sw: water saturation level % water-filled pore spac

see cover sheet comment on water displacement (Archimedes) volume meas.

SAMPLES		**MESOSCALE PHYSICAL PROPERTIES**				VALUES ROUNDED	"as received" est.		
½ core			Sw -> 0%		(inferred)	Sw->100%	pore water content		air dry
RSC AUZEX			DBD	P_A apparent	GDA	WBD			BD
			dry bulk dens.	porosity	(composite,	wet (vac. sat.)	% wt		density
			(105°C dry	(water accessible	por. removed)	bulk dens.	loss		in orig.
#	(depth m)	lithology	i.e."bone dry")	void vol. wrt total vol)	app. grain dens.	pores water filled	to 105°C	S_w%	condition
			g/cm³, t/m³	%	g/cm³, t/m³	g/cm³, t/m³			g/cm³
RBDD07-01									
1	(43)	qtz porph				**2.65**			2.65
						2.66			2.66
			2.64	0.2	2.65	2.65	0.04	50	2.64
						2.66			2.65
2	(61)	gneiss				**3.14**			3.14
		seems				3.13			3.13
		MAFIC				3.00			3.00
			3.15	0.5	3.16	3.15	0.10	67	3.15
3	(89.2)	microgneiss				**3.05**			3.05
		seems MAFIC				3.03			3.03
		+ minor sulphide	3.15	0.3	3.15	3.15	0.05	50	3.15
			3.00	0.5	3.02	3.01	0.17	100	3.01
4	(93.3)	porph gneiss				**2.66**			2.66
			2.68	0.7	2.70	2.68	0.20	75	2.68
						2.64			2.64
RBDD07-02									
5	(53.79)	bx				**2.73**			2.72
						2.75			2.75
			2.74	2.0	2.79	2.76	0.62	88	2.75
6	(98.9)	orthogneiss				**2.74**			2.74
		dark				2.69			2.69
			2.75	0.7	2.77	2.75	0.20	80	2.75
7	(147)	orothogneiss				**2.63**			2.63
						2.64			2.64
			2.63	0.8	2.65	2.64	0.26	83	2.63
BARD07-05									
8	(8.3)	weathered				**2.55**			2.53
		greisen gn	2.52	3.8	2.62	2.56	0.92	61	2.54
						2.56			2.54
						2.55			2.52
9	(75.4)	greisen gn				**2.72**			2.71
			2.60	5.6	2.76	2.66	1.20	57	2.63
						2.74			2.74
10	(120.5)	greisen				**2.60**			2.58
		transition	2.56	4.3	2.67	2.60	0.72	44	2.58
						2.58			2.54
						2.60			2.57
11	(149.83)	granite				**2.58**			2.57
		unaltered	2.58	2.2	2.64	2.60	0.49	57	2.59
						2.60			2.59

Fig P_A - D



(This is an Excel generated plot and should be regarded as approximate only)

Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 12 September 2012

SYSTEMS EXPLORATION (NSW) PTY LIMITED **Table 2a**

Postal Address: Box 6001, Dural Delivery Centre, NSW, 2158
Telephone: (02) 4579 1183: Fax: (02) 4579 1290

INDUCTIVE TESTS

Project: 37/2012

Date: ###############

STUDY: RSC Global Pty Ltd
TECHNIQUES: induction coils mag k 460 Hz, EM cond. >100 kHz
REFERENCE: E Werner, A Buckingham

SAMPLE TREATMENT: none, tested "as is": air dry

SAMPLES			MESOSCALE PHYSICAL PROPERTIES (LAB.)			
½ core			average of subsamples		large subsamples	
RSC AUZEX			susceptibility mag k	density bulk BD	lab limit 0.1 S/m EM cond. conductivity	
#	(depth m)	lithology		**g/cc**	σ	comments
			$SIx10^{-5}$	t/m^3	S/m	
RBDD07-01						
1	(43)	qtz porph	23	2.65		
2	(61)	gneiss (mafic)	117	3.14		
3	(89.2)	microgneiss	225	3.05	slight response (po)	
4	(93.3)	porph gneiss	2	2.66		
RBDD07-02						
5	(53.79)	bx	48	2.73		
6	(98.9)	orthogneiss dark	40	2.74		
7	(147)	orthogneiss	2	2.63		
BARD07-05						
8	(8.3)	weathered greisen gn	4	2.53		
9	(75.4)	greisen gn	16	2.71		
10	(120.5)	greisen transition	3	2.58		
11	(149.83)	granite unaltered	8	2.57		
					samples are resistive and below lab of resolution for EM cond.	

SYSTEMS EXPLORATION (NSW) PTY LIMITED
Postal Address: Box 6001, Dural Delivery Centre, NSW, 2158
Telephone: (02) 4579 1183: Fax: (02) 4579 1290

mag k: ind. coil, NRM spinner ma
no AF demag applied
so NRM is raw meas.
may include noise
e.g. drill induced remanence

Table 2b
Project: 37/2012
Date: 3 Sept 2012

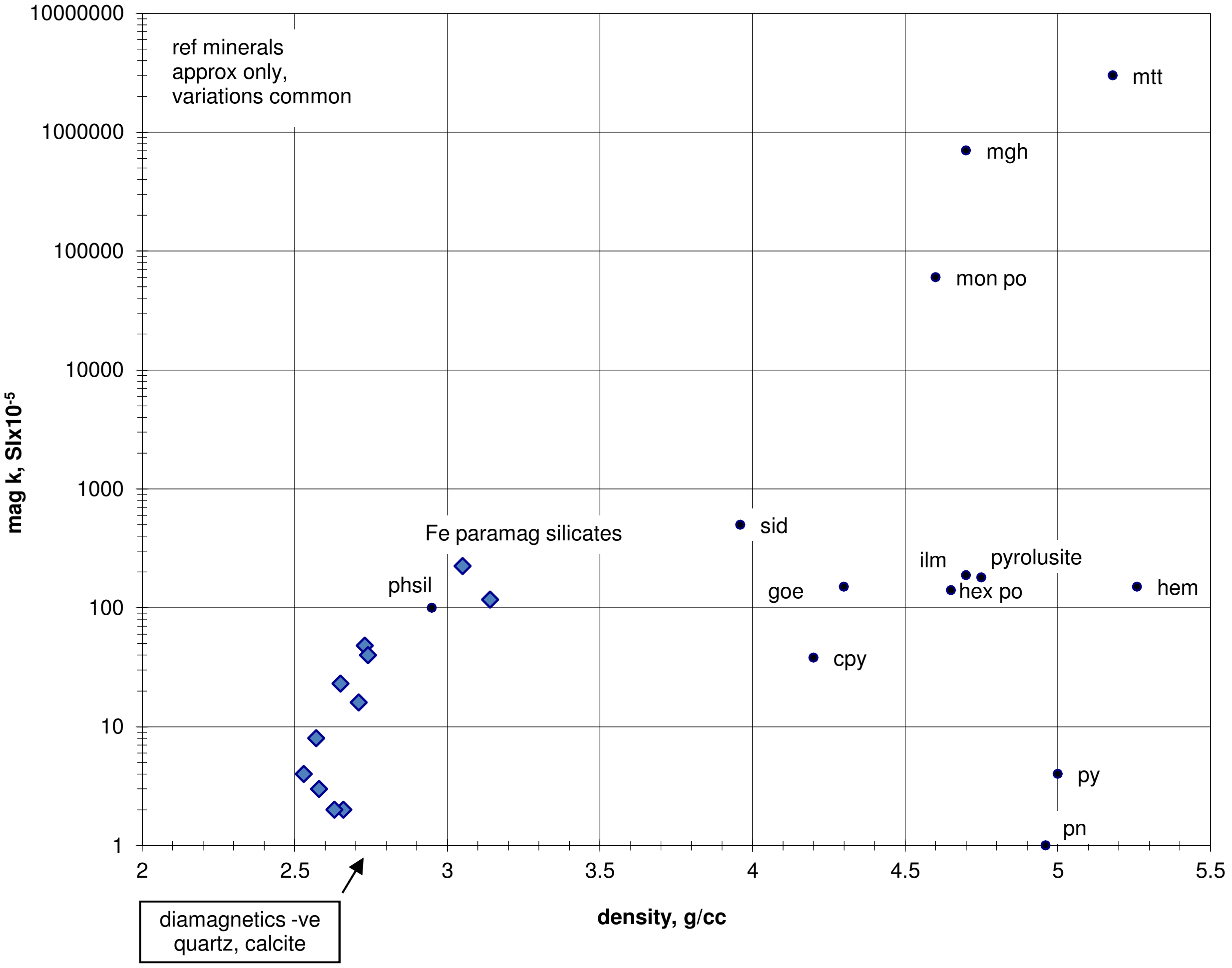
indicative data values rounded

STUDY__RSC Global Pty Ltd___________________________
TECHNIQUES__magnetic laboratory______________________
REFERENCE__E Werner, A Buckingahm___________________

Note on units: k cgs x 4π -> k SI; B field earth is 0.5 G, cgs, (50 000 γ) nominal so 50 000 nT, SI, assumed unless otherwise; intensities 1 μG cgs = 1 m A/m SI; F or H intensity or earth's field numerically = B flux density cgs, but H = B/μ_o SI; e.g. take a basalt k = 1000×10^{-6} cgs -> 1257×10^{-5} SI then induced magnetisation = $1000\times10^{-6}\times0.5$ = 500 μG cgs, or ($50\,000\times10^{-9}/4\pi\times10^{-7}$) multiplied by ($4\pi\times1000\times10^{-6}$) = 500×10^{-3} A/m = 500 m A/m in SI; k has no units, it is a dimensionless ratio.

SAMPLES		MESOSCALE MAGNETIC PHYSICAL PROPERTIES								
10 cm^3 subsamples values averaged		suscept k $cgsx10^{-6}$	J_{IND} = kF μG Induction	J_{NRM} intensity μG Remanence	I_{NRM} + down - up incl. degrees	D_{NRM} azimuth degrees	**Qn K.ratio** J_{NRM}/J_{IND}	mag k $SIx10^{-5}$	approx. density g/cm^3	
					SAMPLES NOT ORIENTED					
RBDD07-01								see Table 2a		
1	(43)						14.5			
2	(61)						4.7			
3	(89.2)						24.2			
4	(93.3)						0.6			
RBDD07-02										
5	(53.79)						low			
				low responses in spinner magnetic i.e. @ ≈ noise level of the instrument						
6	(98.9)						low			
7	(147)						low			
BARD07-05										
8	(8.3)						low			
9	(75.4)						low			
10	(120.5)						low			
11	(149.83)						low			

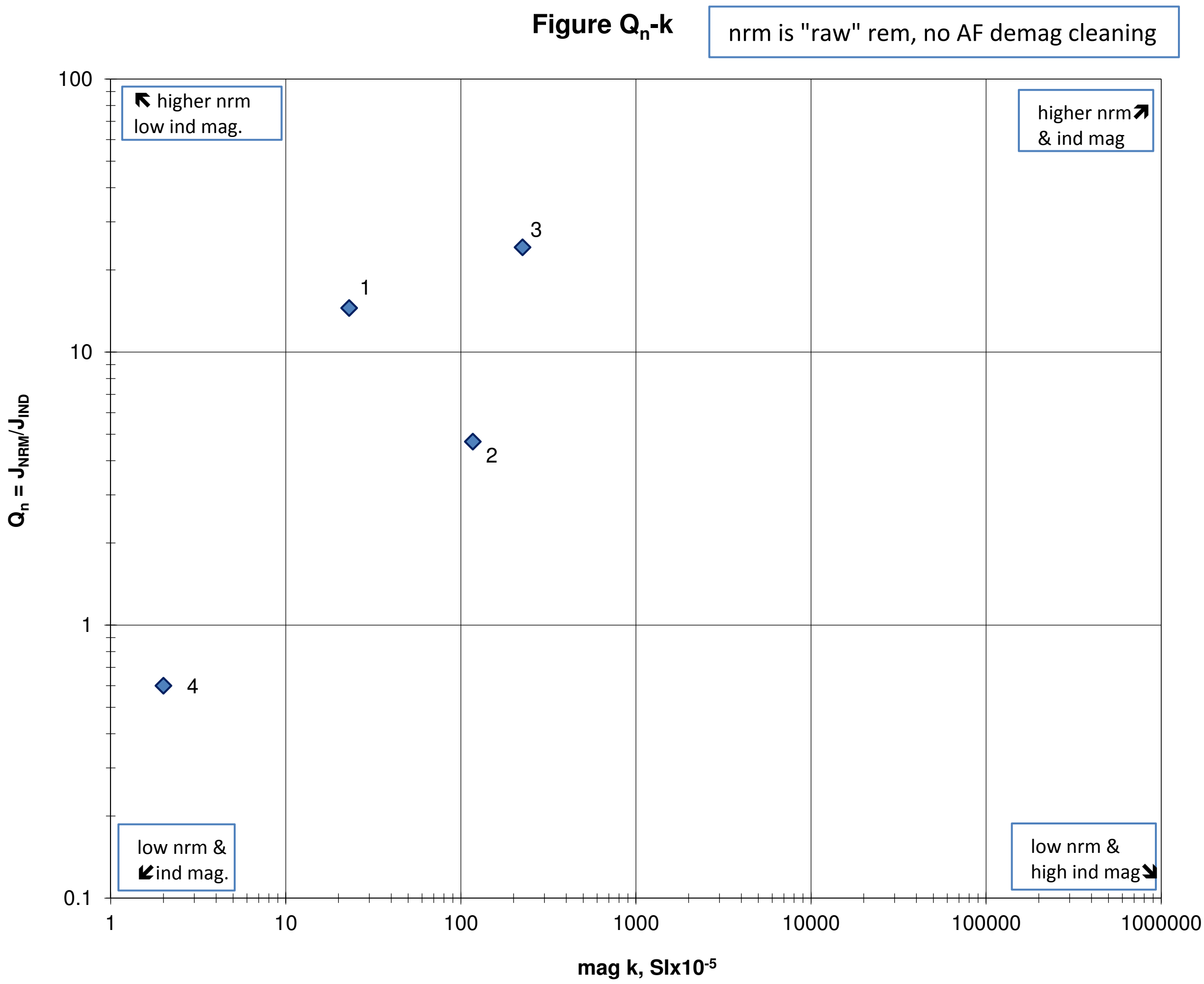
Figure k-D



(This is an Excel generated
plot and should be regarded
as approximate only)

Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 12 September 2012

Figure Q_n-k



(This is an Excel generated plot and should be regarded as approximate only)

Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 12 September 2012

SYSTEMS EXPLORATION (NSW) PTY LIMITED
Postal Address: Box 6001, Dural Delivery Centre, NSW, 2158
Telephone: (02) 4579 1183: Fax: (02) 4579 1290

Table 3

GALVANIC TESTS

Project: 37/2012

sat. state by vacuum imbibition
solution: 10 ohm m 25^{O}C

Date: 25 Sept 2012

STUDY: RSC AUZEX
TECHNIQUES: galvanic electric resistivity and IP
REFERENCE: E Werner, A Buckingham

foliation:
□ current along core axis
× current across core axis (prism)

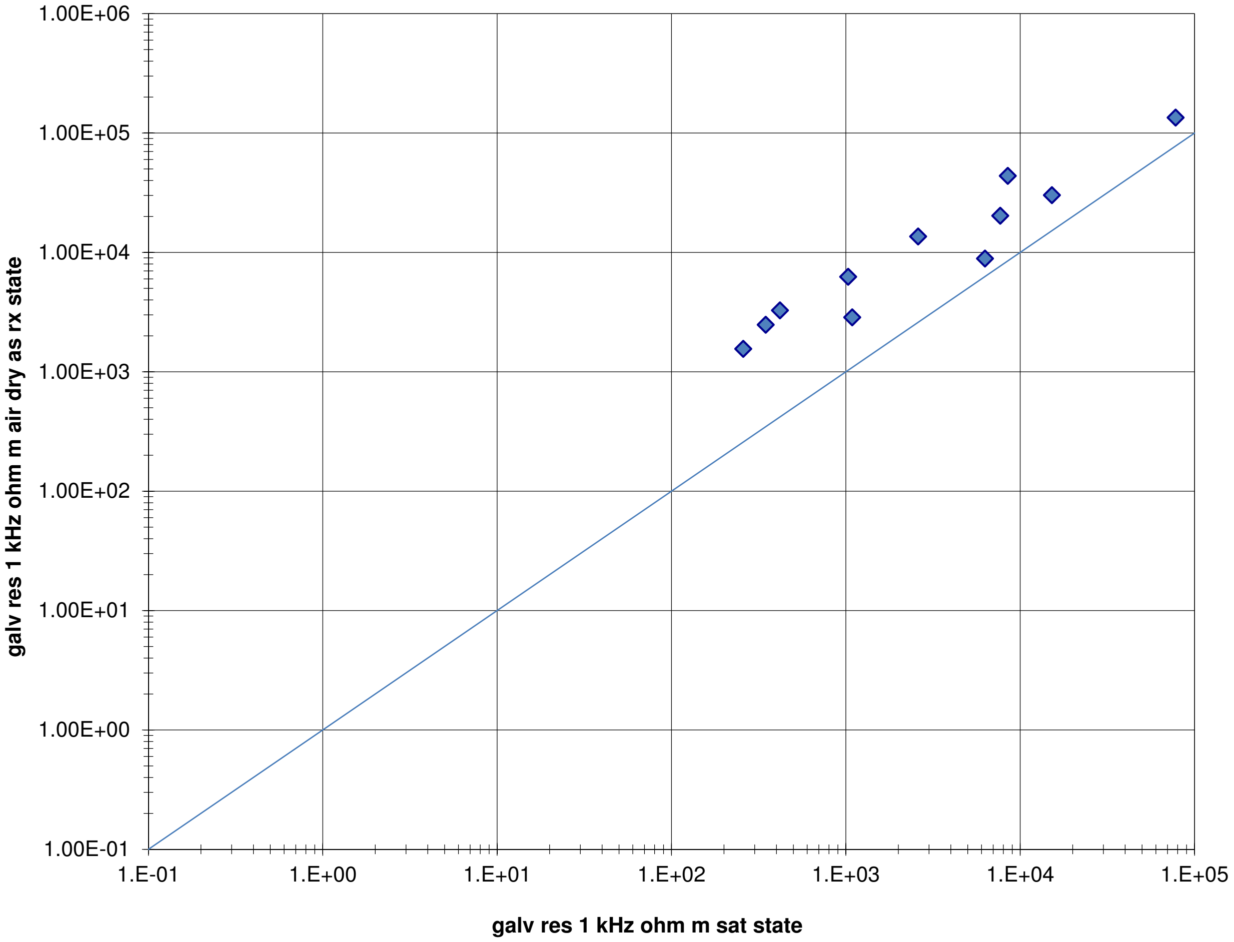
SAMPLES		MESOSCALE PHYSICAL PROPERTIES (LAB.)							IP SAT. STATE
½ core									regard lab IP data (meas. in water bath)
					galvanic electrical resistivity				
RSC AUZEX				res. air dry, as received		res. sat. state			IP effect
				□	×	□	×	sat. density	as equivalent
#	(depth m)	lithology	texture	ρ_t 1 kHz	ρ_t 1 kHz	ρ_o 1kHz	ρ_o 1kHz	WBD	chargeability
				ohm m	ohm m	ohm m	ohm m	g/cc	ms
RBDD07-01									
1	(43)	qtz porph		134752		77842		2.65	1
				dielectric					
2	(61)	gneiss		51735	8888	31675	6282	3.14	5
		(mafic)							
3	(89.2)	microgneiss		26279	13596	13005	2597	3.05	15
4	(93.3)	porph gneiss		30176		15205		2.66	4
RBDD07-02									
5	(53.79)	bx		3270		1054	419	2.73	10
		fract.				wet fractures			
6	(98.9)	orthogneiss		20300		7681		2.74	5
		dark							
7	(147)	orthogneiss		85260	43778	53070	8489	2.63	1
		(quartz?)		dielectric					
BARD07-05									
8	(8.3)	weathered		1557		290	258	2.55	3
		greisen gn							
9	(75.4)	greisen gn		6255		1031		2.72	3
10	(120.5)	greisen		2479		686	347	2.60	3
		transition							
11	(149.83)	granite		2859		1088		2.58	2
		unaltered							

#5, 7 have carbonate
veinlets oblique to core axes
the t??? tp omcrease axial res.

NOTE THE ANISOTROPY IN THE GNEISSES

IP is a function of many variables esp. texture, see refs.

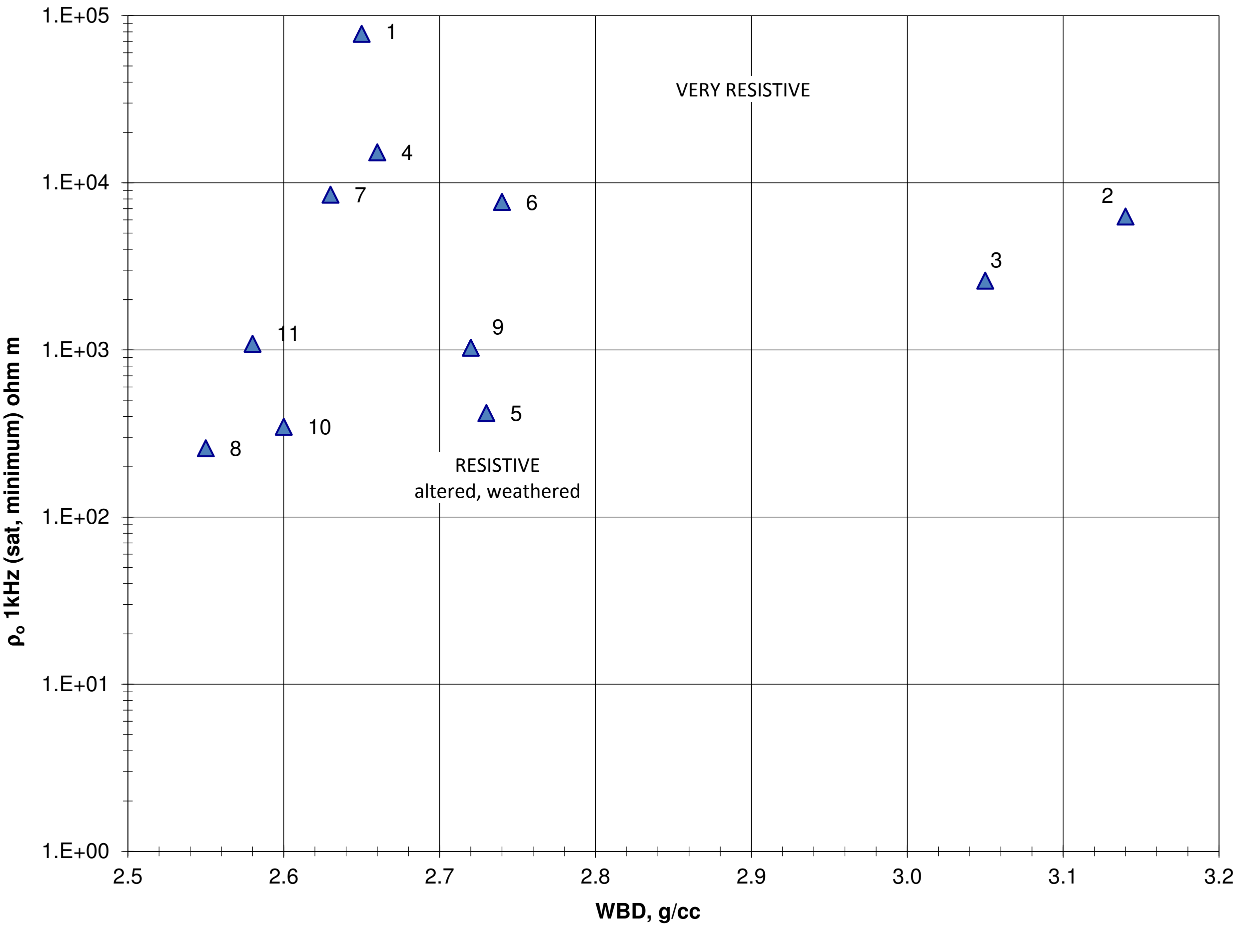
Fig R_{a-d} - R_{sat}



(This is an Excel plot and should be regarded as approximate only)

Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 12 September 2012

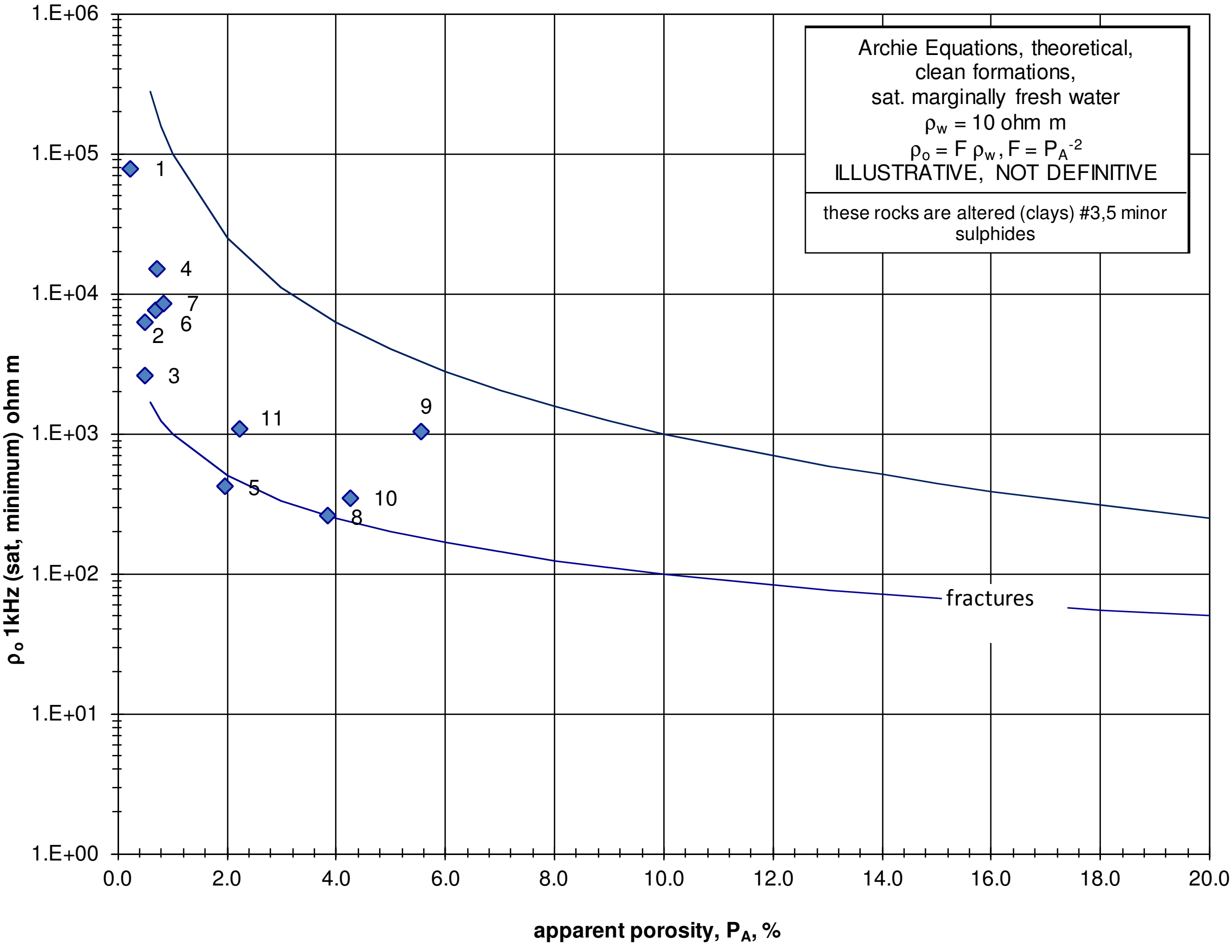
Fig R_{satmin} vs WBD



(This is an Excel plot and should be regarded as approximate only)

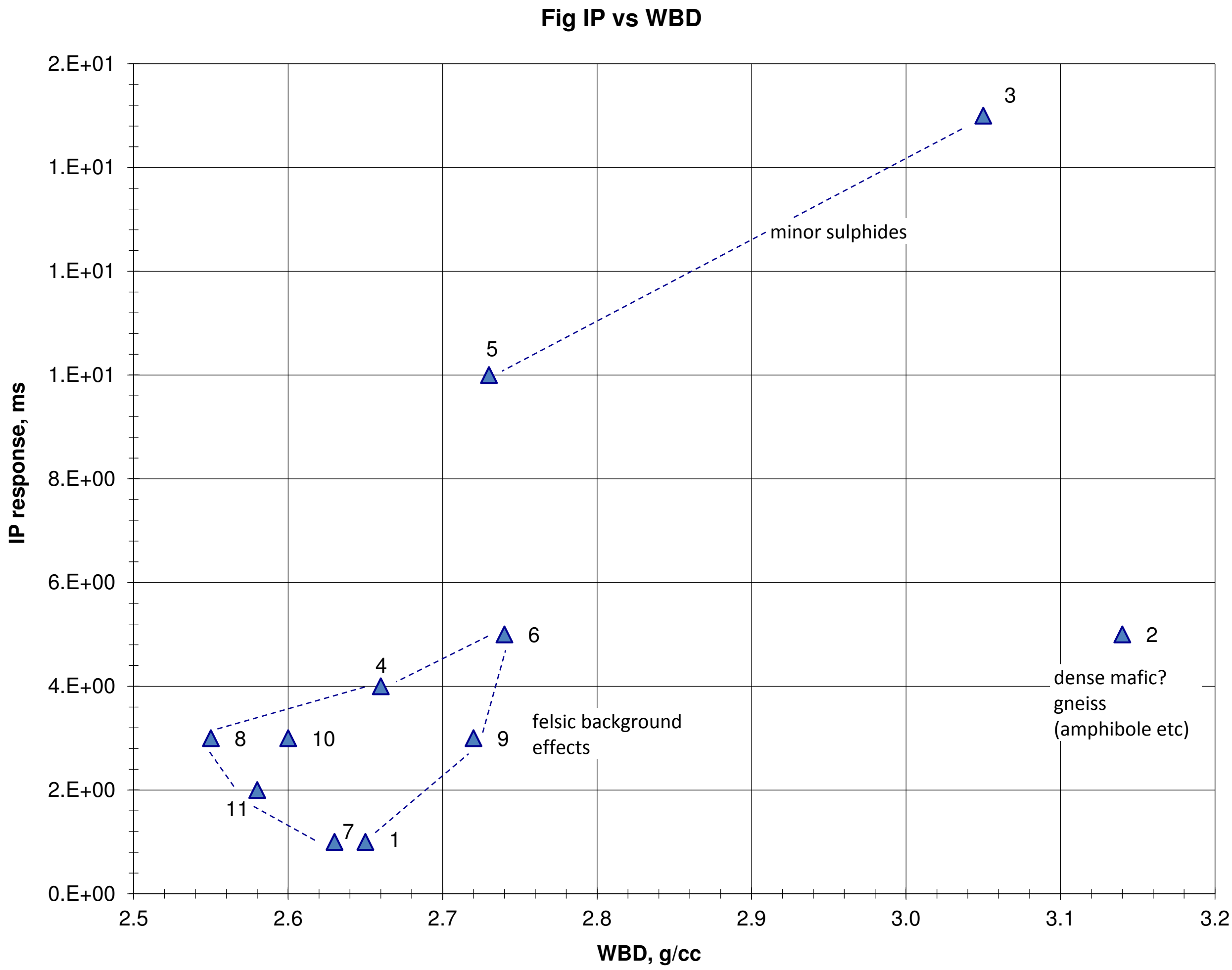
Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 25 September 2012

Fig R_{satmin} vs P_A



(This is an Excel plot and should be regarded as approximate only)

Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 12 September 2012



Systems Exploration (NSW) Pty Ltd
Project: 2012/37
Date: 12 September 2012

(This is an Excel plot and should be regarded as approximate only)