

Appendix 4

Thundelarra Geological Codes



Field Code & Reference Booklet

29 September 2010

Drilling Codes			
Events			
BOCO	Base of Complete Ox	WT	Water Table
BOPO	Base of Partial Ox		
Drill Methods			
AC	Air Core	MR	Mud Rotary
AT	Air Track	RA	Rotary Air Blast
AU	Auger	RC	Reverse Circulation
CO	Costean	RP	Rotary percussion
DD	Diamond	VA	Vacuum
PE	Percussion	MR	Mud Rotary
Survey Types			
E	Eastman Camera	C	Compass
G	Gyro	D	Digital Camera
		W	Wireline logging
Sample Types/SubTypes			
Drilling Sample Types			
1S	1m Split	AUG	Auger
2C	Composite - 2m	CHIPS	RAB/RC chips
3C	Composite - 3m	SLUDGE	Sludge
4C	Composite - 4m	WCORE	Whole core
5C	Composite - 5m	HCORE	Half core
6C	Composite - 6m	QCORE	Quarter core
		W	Whole core
SampleType = Soils		SampleType = Rock	
SOBL	Soil Bleg	RCMD	Mine/DH/Tch Dump Composite
SOLG	Soil Lag	RCPT	Rock chip for petrology
SOMS	Soil Mesh	RCTR	Trench / Costean sample
SOUN	Soil undifferentiated (recovered data)	RCUN	Rock Chip undif. (hist. data)
STD	Standard (Includes Pills, Caps etc)	RFCM	Float Composite
SampleType = Stream		RFSE	Float Select
SSMS	Mesh	ROCH	Outcrop Channel
SSBL	Bulk (not sieved)	ROCM	Outcrop Composite
SSPC	Panned concentrate	ROCP	Outcrop Chip
QA/QC Samples		RSCM	Subcrop Composite
FDUP*	Field Duplicate	RSSE	Subcrop Select
STD**	Field Standard	STD	Standard (Includes Pills, Caps etc)
BLK	Field Blank		
* record the SampleID of the "original" sample in the ParentSampleID field of the duplicate.			
** use the Standard field to record the proper name/code of a standard.			

ROCK TYPE			
Metamorphic (M)			
Mam	amphibolite	Mvu	metavolcanic general
Mcs	calc-silicate	Mmi	migmatite
Mes	endoskarn	Moa	orthoamphibolite
Mxs	exoskarn	Mog	orthogneiss
Mfs	felsic schist	Mpa	para-amphibolite
Mgn	gneiss	Mpg	paragneiss
Mgf	granofels	Mph	phyllite
Mgr	granulite	Rph	phyllonite
Mhf	hornfels	MsK	skarn
Mms	mafic schist	Msc	schist
Mmb	marble	Mst	slate
Mmu	metamorphic undifferentiated	Mum	ultramafic schist
Msu	metasediment general		
Veins (VN)			
Rvc	carbonate vein		
Rvq	quartz vein		
Rvu	vein general		
Breccias (BX)			
Rbx	breccia		
Rfb	fault breccia		
Tectonic (T)			
Rcc	cataclasite		
Rfz	fault rock or zone undifferentiated		
Rgx	gouge		
Rmy	mylonite		
Rsz	sheared zone or rock undifferentiated		
Rtt	tectonite		

ROCK TYPE

Igneous (P)

Gad	adamellite	Glt	latite
Gal	alaskite	Glg	leucogranite
Gan	andesite	Gmu	mafic rock undifferentiated
Gao	anorthosite	Gmz	monzonite
Gap	aplite	Gnr	norite
Gcb	carbonatite	Gop	orthopyroxenite
Gcp	clinopyroxenite	Gpg	pegmatite
Gdc	dacite	Gpr	peridotite
Gdr	diorite	Gph	phonolite
Gdl	dolerite	Gpp	porphyry
Gdn	dunite	Gpy	pyroxenite
Gfu	felsic rock undifferentiated	Gqd	quartz diorite
Gft	felsite	Gqg	quartz gabbro
Ggb	gabbro	Gql	quartz latite
Ggt	granite (sensu stricto)	Gqm	quartz monzonite
Ggu	granitic rock undif. - granitoid	Grd	rhyodacite
Ggd	granodiorite	Gry	rhyolite
Ggp	granophyre	Gsp	serpentinite
Ghz	harzburgite	Gsy	syenite
Ghb	hornblendite	Gto	tonalite
Guu	igneous rock undifferentiated	Gta	trachyandesite
Giu	intermediate rock unclassified	Gtr	trachyte
Gkb	kimberlite	Gtj	trondhjemite
Glm	lamprophyre	Gum	ultramafic general

Mineralisation (\$*)

Rms Massive sulphide rock

* Prefix any rock type code with "\$" to indicate "economic" mineralisation is present

ROCK TYPE			
Sedimentary (S)			
Sco	coal	Sdu	sediment undifferentiated
Sdi	diatomite	Sbx	sedimentary breccia
Sph	phosphorite		
Sedimentary - Chemical (SM)			
Rcp	caprock	Sif	iron formation general
Rcb	carbonate rock undifferentiated	Sio	iron formation oxide facies
Sct	chert	Sil	iron formation silicate facies
Rcy	clay	Sis	iron formation sulphide facies
Sdc	dolomite	Sjs	jaspilite, jasper
Sex	exhalite	Slm	limestone
Sic	iron formation carbonate facies	Smg	magnesite rock (sedimentary)
Sedimentary - Clastic (ST)			
Sar	arenite	Smd	mudstone
Sag	argillite	Sqo	orthoquartzite
Sak	arkose	Spa	packstone (carbonate)
Sbo	boundstone (carbonate)	Spe	pelite
Sca	calcarenite	Sps	psammite
Scl	calclutite	Sqt	quartzite
Scr	calcirudite	Srd	rudite
Scy	claystone	Srs	rudstone (carbonate)
Scg	conglomerate	Ssn	sandstone
Scs	carbonaceous shale	Ssh	shale
Sdm	diamictite	Ssl	siltstone
Sgs	grainstone (carbonate)	Ssa	subarkose
Sgw	greywacke	Ssg	subgreywacke
Sgr	grit	Sti	tillite
Sml	marl	Stb	turbidite
Smc	micrite	Swk	wacke

ROCK TYPE

Soils / weathering (SU)

Osa	A-horizon soil	Oln	lignite
Oal	alluvium	Olo	loam
Obt	bauxite	Omg	magnesite rock (weathering related)
Osb	B-horizon soil	Omd	mud
Occ	calcrete	Oou	overburden general
Ocp	caprock	Opt	plinthite
Osc	C-horizon soil	Ops	podsol
Ocy	clay	Obx	regolithic breccia
Ocl	colluvium	Orb	rubble
Odu	duricrust general	Osn	sand, unconsolidated
Oel	eluvium	Osr	saprock
Ofc	ferricrete	Osp	saprolite
Ogo	gossan	Osk	scree
Ogv	gravel	Ost	silcrete
Ogy	gypcrete	Osl	silt, unconsolidated
Ohp	hardpan	Osu	soil general
Ohm	humus	Otr	travertine
Ois	ironstone		
Olg	lag (gravel)		

Other (Z)

Rnb	not rock - backfilled stope	Rns	not rock - no sample return
Rnc	not rock - contamination	Rnp	not rock - stope
Rnh	not rock - hole	Rnw	not rock - wood

ROCK TYPE

Volcanic (V)

Vag	agglomerate, volcanic	Vob	obsidian
Van	andesite volcanic	Vpp	peperite
Vbs	basalt	Vpc	pyroclastic
Vdc	dacitic volcanic	Vrd	rhyodacitic volcanic
Vvf	felsic volcanic	Vry	rhyolitic volcanic
Vft	felsitic volcanic	Vsp	spilite (volcanic)
Vhm	high magnesium basalt	Vth	tholeiitic volcanic
Vhc	hyaloclastite	Vta	trachyandesitic volcanic
Vig	ignimbrite	Vtb	trachybasaltic volcanic
Vvi	intermediate volcanic	Vtc	trachytic volcanic
Vkt	keratophyre (volcanic)	Vum	ultramafic volcanic
Vkm	komatilitite	Vvu	volcanic undifferentiated
VIh	lahar	Vvc	volcaniclastic
Vvm	mafic volcanic	Vmc	mafic volcaniclastic

Volcanic - Tuffaceous (VT)

Tan	andesitic tuff	Ttm	mafic tuff
Txl	crystal lithic tuff	Try	rhyolitic tuff
Txx	crystal tuff	Tta	trachyandesitic tuff
Txv	crystal vitric tuff	Ttc	trachytic tuff
Tdc	dacitic tuff	Ttu	tuff general
Ttf	felsic tuff	Tum	ultramafic tuff
Tti	intermediate tuff	Tvx	vitric crystal tuff
TLx	lithic crystal tuff	Tvl	vitric lithic tuff
Tll	lithic tuff	Tvv	vitric tuff
Tlv	lithic vitric tuff		

MINERALS

ac	actinolite	ca	calcite	fe	fe oxides (undiff)
ad	adularia	cn	carbonaceous	fx	feldspar (undiff)
aa	agate	cb	carbonate	fm	ferromag. minerals (undiff)
ab	albite	ci	carnotite	fl	fluorite
aw	allanite	ct	cassiterite	fu	fuchsite
af	allophane	cg	cerargyrite	gh	gahnite
ai	almandine	ce	cerussite	ga	galena
al	alunite	cj	chabazite	gn	garnet
am	amphibole	ck	chalcedony	gi	garnierite
ax	anatase	cc	chalcocite	gl	glauconite
an	andalusite	cp	chalcopyrite	go	goethite
ae	andradite	cs	cherty silica	gp	graphite
ag	anglesite	cl	chlorite	gs	grossularite
ah	anhydrite	cd	chloritoid	gt	grunerite
ak	ankerite	cm	chromite	gy	gypsum
ay	anthophyllite	cq	chrysoprase		
at	antigorite	ch	chrysocolla	hm	heavy minerals (undiff)
ap	apatite	cy	clay	hd	hedenbergite
ar	aragonite	cx	clinopyroxene	he	hematite
as	arsenophyrite	cz	clinozoisite	hb	hornblende
ao	asbestos	cf	coffinite		
au	auridium	cu	copper (native)	im	ilmenite
az	azurite	co	cordierite		
		cv	covellite	ja	jarosite
ba	barite	cr	cuprite		
bi	biotite			ka	kaolin
bs	bismuthinite	di	diopside	kf	K-feldspar
bn	bornite	do	dolomite	ky	kyanite
		dr	dravite		
		en	enargite		
		ep	epidote		
		er	erythrite		

MINERALS

le	lepidolite	pn	pentlandite	ss	smithsonite
lx	leucoxene	pp	phlogopite	sp	sphalerite
li	limonite	ph	phosphate (undiff)	sf	sphene
lc	limonite after carbonate	pi	pitchblende	st	staurolite
lp	limonite after pyrite	pl	plagioclase	sb	stibnite
ls	limonite after sulphide	pt	platinum	sx	sulphates (undiff)
lz	lizardite	pr	prehnite	su	sulphides (undiff)
		ps	psilomelane		
mh	maghemite	py	pyrite	tc	talc
mg	magnesite	pz	pyrolusite	tn	tennantite
mt	magnetite	pm	pyromorphite	tt	tetrahedrite
mk	malachite	pf	pyrophyllite	tz	topaz
mn	manganese oxides (undiff)	px	pyroxene	tb	torbanite
mr	marcasite	po	pyrrhotite	tm	tourmaline
mi	mica (undiff)			tr	tremolite
mc	microline	qz	quartz		
ml	mineral (undiff)	qc	quartz-carbonate mixture	ur	uraninite
mo	molybdenite			ux	uranium minerals (undiff)
mz	monazite	rc	rhodochrosite		
mu	muscovite	rd	rhodonite	vc	vein carbonate
		rb	riebeckite	vq	vein quartz
ne	neotocite	ru	rutile	vs	vesuvianite
nf	nepheline			vl	violarite
nt	nontronite	sa	sanidine		
		sc	scapolite	wl	willemitite
ol	olivine	sh	schreeite	wf	wolframite
op	opaline silica	so	scorodite	wo	wollastonite
oc	orthoclase	sr	sericite		
ox	orthopyroxene	se	serpentine	ze	zeolite
		sd	siderite	zo	zoisite
		si	silica		
		sl	silliminitite		
		sm	smectite, montmorillonite		

QUALIFIERS			
Mineralisation Styles			
blb	blebby	rep	replacement
bou	boudin	smv	semi-massive
bxk	breccia - clast	asi	silicification
bxk	breccia - crackle	skn	skarn
bxm	breccia - matrix	stf	strataform
clt	clots	sth	structurally hosted
cli	colliform	vsl	vein - selvage
cst	crustiform	vsk	vein - stockwork
dis	disseminated	vnw	veining - network
fof	foliation/fabric fillings	vlt	veinlets
frf	fracture fillings	vns	veins
gos	gossan	vuf	vug fill
mas	massive	vus	vuggy silica
pse	pseudomorph		
Composition			
acd	acid	kom	komatiitic
alk	alkaline general	ool	oolitic, oolites, ooliths
amb	amphibolitic	lab	labile
and	andesitic	leu	leucocratic
apl	aplitic	lim	limey as in limestone
arn	arenaceous	lth	lithic
arg	argillaceous	maf	mafic
ark	arkosic	mag	magnetic
ash	ash bearing	mgw	magnetic - weakly
bst	basaltic	mel	melanocratic
bas	basic	mon	monomictic
bic	bioclastic	mnz	monzonitic
cmt	cemented, cement	mud	muddy
cty	cherty	olg	oligomictic
cly	clayey	peg	pegmatic
cln	clean (washed)	pel	pelitic
cgt	conglomeratic	plm	polymictic
dct	dacitic	pot	potassic
drt	diontic	rhy	rhyolitic
dyt	dirty	ryd	ryhodacitic
dir	doleritic	sny	sandy

QUALIFIERS			
Composition (cont.)			
dIm	dolmitic	srp	serpentinitic
dun	dunitic	shy	shaley
fsp	feldspathic	sly	silty
fel	felsic	sty	slatey
fst	felsitic	spl	spilitic
fer	ferruginous	syt	syenitic
gab	gabbroic	thl	tholeiitic
grn	granitic	ton	tonalitic
grd	granodioritic	ubc	ultrabasic
grp	granophyric	umf	ultramafic
gph	graphitic	vit	vitnc
hmg	high magnesium (basalt)	vcl	volcanolithic
int	intermediate		
Texture			
acc	acicular	brn	branchings, anastomosing
adc	adcumulate textured	cch	conchoidal
agg	agglomeratic	cls	clastic or as clasts
alt	alternating	cnv	convoluted (not bedding - use "bdc")
amd	amygdaloidal or as amygdules	con	concretionary, concretions
ams	amorphous	cry	cryptocrystalline
ang	angular	csp	clast supported
anh	anhedral	ctg	coatings
aph	aphanitic	dis	disseminated/disseminations
apy	aphyric	dir	doleritic
bdb	bedded, banded	ear	earthy
bdc	bedded, convoluted	eqg	equigranular
bdg	bedded, graded	euu	euhrdal
bdi	interbedded	fgm	fragmental or as fragments
bdk	bedded, thick	fb	fibrous
bdl	bedded, laminar	fis	fissile
bdm	bedded, medium	flb	flow banded
bdn	bedded, thin	flg	flaggy
bdr	bedded, irregular	flt	flattened
bds	bedded, massive	fri	friable, loose
bdt	bedded, turbiditic	fst	felsitic
bdu	bedded/bedding general	glp	glomero-porphyrific

QUALIFIERS

Texture (cont)

bdv	bedded, varved	gls	glassy
bdw	bedded, wavy	gns	gneissic
bdx	bedded, cross	grb	granoblastic
blb	blebs	het	heterogeneous
blk	blocky	hfl	hornfelsic
bot	botryoidal or as botryoids	hom	homogeneous
xtl	crystalline	rel	relict
hrd	hard, hardened	rip	rippled, ripples
imb	imbricated	rod	rodded, columnar
inq	inequigranular	rdd	rounded
ing	intergranular	skl	skeletal
ist	interstitial	stg	sorting good
irr	irregular (not bedding, see "bdr")	stm	sorting moderate
knt	knotted	stp	sorting poor
lap	lapilli textured, lapilli	sph	spherulitic, spherules
len	lenticular or as lenticles	sfx	spinifex textured
mas	massive (not bedding, see "bds")	stl	stylotitic
mtx	matrix (in or of)	sba	subangular
mxs	matrix supported	sbh	subhedral
mct	mesocumulate textured	sbo	subordinate
mig	migmatitic	sbr	subrounded
mlk	milky	sug	sugary
nod	nodular or as nodules	thk	thick, large
ocl	ocellar, ocelli	thn	thin, small
oct	orthocumulate textured	trc	trachytic
plt	peletoidal	trn	transitional
ptc	perthitic	ufx	uniform textured
pil	pillowed	vgd	variegated
prs	porous	var	variolitic
por	porphyritic	vrn	vermiform
ppb	porphyroblastic	ves	vesicular or in vesicles
prd	predominant or main	vug	vuggy
rad	radiating	wld	welded
rex	recrystallised	xen	xenolith or xenolithic

QUALIFIERS			
Regolith			
ars	arenose (weathering profile term)	mot	mottled or as mottles
blc	bleached	oxd	oxidised
bxw	boxworked (as in feox-after-sulphide)	pal	pallid
ccr	calcreted	ped	pedogenic
cap	cap or capping	pis	pisolitic, pisolites, pisoliths
fcr	ferricreted	pmc	plasmic
frs	fresh	res	residual
gly	gley	sap	saprolitic
gos	gossanous	sit	silcreted
hpn	hardpanized, hardpanned	spg	supergene
ind	indurated	sfl	surficial
lat	lateritic	whl	weathered, highly
lch	leached	wmd	weathered, moderately
lsg	liesegang	wsl	weathered, slightly
lir	lithorelics	wtd	weathered, weathering
lom	loamy		
Oxidation			
blc	bleached	oxd	oxidised
mot	mottled	wox	oxidised - weakly
tox	transitional	mox	oxidised - moderately
rox	reduzate	sox	oxidised - strongly
Structure			
aug	augen textured or as augen	iso	isoclinal
bou	boudinaged	jnt	jointed, jointing
bxx	brecciated	lin	lineated or forming lineation
cta	cataclastic	mas	massive
clv	cleaved, cleavage	myl	mylonitic
ctt	contorted	phy	phyllitic
cbx	crackle brecciated	ptg	ptygmatic
crn	crenulated	sch	schistose, schistosity
fau	faulted, fault	scl	schlieren textured, schlieren
fld	folded, folds	shd	sheared
fol	foliated, foliation	sls	slickensided
frc	fracture, in fractures	tec	tectonic
cnt	geological contact	unf	unfoliated

QUALIFIERS			
Veining			
vcb	carbonate veined	vst	stringers
vmr	massive vein, reef	vnu	vein - undifferentiated
vqc	quartz carbonate veined	vlc	vein on lithologic contact
vqz	quartz veined	vsv	vein subvertical
vsk	stockworked or as stockworks	vlt	veinlet
Structures and Structural Textures			
mnl	mineral layering	shz	shear zone
gst	glacial striations	lcr	crenulation lineation
pcd	paleocurrent direction	lfp	fold plunge lineation
gnb	gneseic banding	lil	intersection lineation
slc	slaty cleavage	lme	mineral elongation lineation
spc	spaced cleavage	lmf	mineral fibre lineation
fbx	fault breccia	lpl	parting lineation
shn	shear - narrow (<2cm)	lsf	shape fabric lineation
shb	shear bands	lsl	slickenside lineation
		frc	fracture
Grain Size			
gzv	very fine grained (<0.1mm)	gzg	granule, gritty (2.0-4.0mm)
gzf	fine grained (0.1-.25mm)	gzp	pebbly (4-16mm)
gzm	medium grained (.25-0.5mm)	gzo	cobbly (16-256mm)
gzc	coarse grained (0.5-1.0mm)	gzb	bouldery (>256mm)
gzy	very coarse grained (1.0-2.0mm)		

QUALIFIERS

Genetic

aeo	aeolian	igb	ignimbritic
agg	agglomeratic	ins	in situ
agc	authigenic	inf	intraformational
all	allochthonous	itv	intrusive
alv	alluvial	mml	low grade metamorphism
mma	amphibolite facies	mmm	medium grade metamorphism
aqu	aqueous	mmc	metamorphic, metamorphosed
aug	authigenic	sil	occurring as a sill
aut	autochthonous	dyk	occurring as a dyke
clp	collapse (as in collapse breccia)	flw	occurring as a flow
col	colluvial	ocp	outcrop
dep	depositional	pmy	primary
dig	diagenetic	pyc	pyroclastic
elv	eluvial	rew	reworked
epc	epiclastic	sec	secondary
epg	epigenetic	sed	sedimentary
ept	epithermal	smc	stromatolitic
ext	extrusive	syg	syngenetic
flo	float	tpd	transported
flv	fluvatile	tuf	tuffaceous
glc	glacigenic	tur	turbiditic
mmn	granulite facies	vol	volcanic
mmg	greenschist facies	vcc	volcaniclastic
mmh	high grade metamorphism		

QUALIFIERS			
Alteration			
aaa	advanced argillic	ahp	hypogene
aau	alteration unspecific	amc	metasomatic
aag	argillic alteration	apv	pervasive
abi	biotite alteration	apc	phyllic
abl	bleached, bleaching	apt	potassic
acb	carbonate alteration	app	propylitic
aci	chlorite alteration	asr	sericite alteration
acy	clay alteration	ase	serpentinised
agz	greisenized	asi	silica alteration
ahd	hydrothermal	asp	spilitic
ahc	hematite alteration	atm	tourmaline alteration
alm	limonite alteration		
Colour - Hue			
N	black (noir)	O	orange
U	blue	I	pink
B	brown	P	purple
G	green	R	red
A	gray	W	white
L	olive	Y	yellow
		C	cream
Colour - Shade			
cs1	very pale	cs6	dusky
cs2	pale	cs7	very dusky
cs3	light	cs8	dark
cs4	medium light	cs9	very dark
cs5	moderate		
Abundance / Quality			
0	absent	low	low quality
1	trace, rare	mod	moderate quality
2	weak, minor	high	high quality
3	moderate, common		
4	strong, abundant		
5	intense, very abundant		