



Cameco Australia Pty Ltd

## DHLOGGER DRILL LOGGING CODES

### Lithology Codes

<u>Code</u>	<u>Description</u>	<u>Code</u>	<u>Description</u>
(G)MS	slightly muddy sandstone	GAGN	garnetiferous gneiss
(G)S	slightly conglomerate sandstone	GFCY	graphitic clay
(G)SM	slightly conglomerate sandy mud	GMS	conglomeratic muddy sandstone
AGLM	agglomerate	GNIS	gneiss
AMPH	amphibolite	GOUG	gouge
ANAT	anatexite	GRAN	granite
ANDA	andesite to dacite	GRAV	gravel
ANDS	andesite	GRDT	granodiorite
ANXT	andesite crystal tuff	GRGN	granite gneiss
AP/D	aplite dyke	GRST	granule stone
APLT	aplite	GRWK	greywacke
ARGL	argillite	GS	conglomeratic sandstone
ARKS	arkose	IN/D	intermediate dyke
BASL	basalt	IRFM	iron formation
BIF	banded iron formation	KFGR	alkali feldspar granite
BSTF	basaltic tuff	LOST	lost core
BX	breccia	MARB	marble
CAAK	calcarkose	MCGN	microgneiss
CALC	calcsilicate	MDSH	muddy shale
CATA	cataclasite	MDST	mudstone
CAVI	open cavity	MF/D	mafic dyke
CBBX	carbonate breccia	MFGN	mafic gneiss
CHQZ	cherty quartz	MFTF	mafic tuff
CHRT	chert	MFVL	volcanics
CLAY	clay	MGPE	moderate gf pelite
CLSP	calcsemipelite	MISS	missing core
CONG	conglomerate	MONZ	monzonite
CRET	Cretaceous sediments	MS	muddy sandstone
CSHL	carbonaceous shale	MSG	muddy sandy conglomerate
CYST	claystone	MTSD	metasediment
DACT	dacite	MUD	mud
DCPR	dacitic porphyry	MVAM	mafic volcanic: amygdule-rich
DIAB	diabase	MVFW	mafic volcanic: flow layered
DIOR	diorite	MVFX	mafic volcanic: flow Breccia
DOL	dolerite	MVMV	mafic volcanic: massive
DOLM	dolomite	MVPN	mafic volcanic: phenocrysts
DYKE	dyke	MVPW	mafic volcanic: pillowed
FER	ferricrete	MVTF	mafic volcanic: tuffaceous
FL/D	felsic dyke	MYLN	mylonite
FLGN	felsic gneiss	MZDR	monzodiorite
FLSG	felsic segregation	OB	overburden
FLTF	felsic tuff	PEGM	pegmatite
FLZN	fault zone	PELT	pelite
FQZT	feldspathic quartzite	PEST	pebbly sandstone
GABR	gabbro	PHON	phonolite

PHYL	phyllite
PISO	pisolith layer
PSAM	psammite
PYRX	pyroxenite
QARK	siliceous arkose
QFBG	quartz feldspar biotite gneiss
QFGN	quartz-feldspar gneiss
QFPR	quartz feldspar porphyry
QSMP	quartz rich semipelite
QZBX	quartz breccia
QZDR	quartz diorite
QZFX	quartzofeldspathic
QZIT	quartzite
QZMD	quartz monzodiorite
QZMZ	quartz monzonite
QZPL	quartz rich pelite
QZPR	quartz porphyry
QZSG	felsic qz segregations
QZSP	quartz semipelite
QZSY	quartz syenite
QZVN	vein quartz
RBQZ	ribbony quartz
RGLT	regolith
RHYD	rhyodacite
RHYL	rhyolite
RYTF	rhyolite tuff
SAND	sand
SAP	saprolite
SAPI	saprolite (iron banding)
SCH	schist
SDSL	sandy siltstone
SDST	sandstone
SFZN	silica flooded zone
SG	sandy conglomerate
SGPE	strong gf pelite
SHER	shear
SHLE	shale
SILC	silicified regolith (silcrete)
SILT	silt
SLMD	silty mudstone
SLSD	silty sandstone
SLST	siltstone
SM	sandy mudstone
SMPL	semipelite
SYEN	syenite
TONL	tonalite
TOVN	tourmaline vein
UX	uranium intersection
VUG	Vug
WGPL	weak gf pelite

## Minerals

<u>Code</u>	<u>Description</u>	<u>Code</u>	<u>Description</u>
\$P	serpentine	PL	scapolite
AA	andalusite	PO	pyrrhotite
AB	albite	PS	phosphate
AC	actinolite	PX	pyroxene
AD	anhydrite	PY	pyrite
AE	ankerite	QC	quartz carbonate
AF	altered feldspar	QF	quartzofeldspathic
AS	arsenopyrite	QM	quartz tourmaline
AT	apatite	QZ	quartz
AU	gold	RM	rammelsbergite
AX	amphibole	RQ	ribbony quartz
AY	anthophyllite	RU	rutile
BA	barite	S\$	stibnite
BI	biotite	SC	scheelite
BR	bornite	SD	siderite
CB	carbonate	SE	sericite
CC	calcite	SI	sillimanite
CD	cordierite	SN	sphene
CF	coffinite	SP	sphalerite
CH	chert	SR	sparite
CL	chlorite	ST	staurolite
CO	cobaltite	SV	saussurite
CP	chalcopyrite	SX	sulphides
CU	copper	TA	talc
CY	clay	TE	tetrahedrite-tennantite
DI	diopside	TO	tourmaline
DO	dolomite	TR	tremolite
DV	dravite	UR	uraninite (pitchblende)
EP	epidote	UX	uranium minerals
FL	fluorite	VI	vivianite
FU	fuchsite	XX	any mineral (define)
FX	feldspar	YC	yellow clay mineral
GA	garnet	YU	yellow uranium
GE	gersdorffite	YX	yellow uranium
GF	graphite	YY	any mineral
GL	galena	ZE	zeolites
GO	goethite	ZI	zircon
GS	gypsum	ZO	zoisite
HA	halite		
HB	hornblende		
HE	hematite		
HS	specular hematite		
HV	heavy minerals		
IL	illite		
KA	kaolinite		
KF	k-feldspar		
LI	limonite		
M\$	montmorillonite		
M@	malachite		
MA	marcasite		
ME	micrite		
MF	mafic minerals		
MI	mica		
ML	millerite		
MN	manganese minerals		
MO	molybdenite		
MR	microcline		
MT	magnetite		
MU	muscovite		
NI	niccolite		
NX	black mineral		
OU	orange uranium		
OX	oxides (gen.)		

## Alteration Types

<u>Code</u>	<u>Description</u>	<u>Code</u>	<u>Description</u>
\$P	serpentine	HY	hydrothermal alteration
AB	albite	IL	illite
AC	actinolite	KA	kaolinite
AE	ankerite	KF	k-feldspar
AP	aplite	LI	limonite
AU	gold	LID	limonite (diagenetic)
AX	amphibole	M\$	montmorillonite
BCB	brown carbonate	MI	mica
BH	bleaching	MKQ	milky quartz
BHD	bleaching (diagenetic)	MN	manganese
BHH	hydrothermal bleach	MT	magnetite
BI	biotite	MU	muscovite
BP	brittle overprint	OX	oxides
CA	carbonite	PF	plagioclase
CB	carbonate	PO	pyrrhotite
CC	calcite	POT	potassic
CH	chert	PS	phosphate
CL	chlorite	PY	pyrite
CP	chalcopyrite	QA	quartz ankerite vein
CQ	cherty quartz	QAFX	quartz ankerite feldspar vein
CU	copper	QC	quartz carbonate
CVG	cleavage	QFX	quartz feldspar vein
CY	clay	QM	quartz tourmaline
CYD	clay (diagenetic)	QZ	quartz
DQZ	drusy quartz	QZD	quartz dissolution
DV	dravite	RQ	ribbony quartz
EP	epidote	SAUS	saussuritization
FL	fluorite	SE	sericite
FRAC	fracture	SIL	silicification
FU	fuchsite	SILD	silicification (diagenetic)
FX	feldspar	SMQ	smokey quartz
GA	garnet	ST	staurolite
GF	graphite	STK	columnar stylolites
GG	gouge	STM	microstylolites
GL	galena	SV	saussurite
HB	hornblende	TA	talc
HE	hematite	TO	tourmaline
HED	hematite (diagenetic)	TR	tremolite
HS	specular hematite	TRQ	translucent quartz
HS	specular hematite	UX	uranium mineralization
HV	heavy mineral	VI	vivianite
		XX	unknown mineral

## Alteration Distribution

<u>Code</u>	<u>Description</u>		
BED	bedding controlled	LM	laminated
BIR	irregular bands	MATR	matrix
BLEB	blebs	MDIS	moderately disseminated
BLOT	irregular spots	MOT	mottled
BN	banded	MTC	mineral control
BO	botryoidal	MX	massive
BOUD	boudinaged	ND	nodules
BP	brittle overprint	PAT	patches
BW	boxwork	PB	porphyroblasts
BX	breccia filling	PDIS	pod hosted disseminated
CJG	conjugate	PERV	pervasive
CLAS	clasts	PHEN	phenocryst
CLOT	clot	POD	pods
COAT	coating	REPL	replacement
CON	contact	RIB	ribbons
CORR	corroded	RQ	ribbony quartz
CUBE	cubic	RTC	rock type control
DISS	disseminated	S/	streaky
DN	dendritic	SBLB	stockwork hosted blebs
DQZ	drusy quartz	SDIS	stockwork hosted diss
DSG	indurate sandy gouge	SEGR	segregated
EN	enveloping	SELV	selvage
EV	envelope	SH	shear
FBLB	fracture hosted bleb	SMX	semi massive
FDIS	fracture hosted diss	SPEC	speck
FK	flake	SPOT	discrete spots
FM	fragmental	SSTR	stockwork hosted stringers
FO	foliated	SSUR	s surfaces
FOL	foliation controlled	STK	columnar stylolites
FRAC	fracture coating	STM	microstylolites
FRCT	fractured	STRG	stringers
FSTR	fracture hosted stringers	STRT	structural control
FT	fault	SUB	subhedral
GG	gouge	SW	stockwork
GM	groundmass	TQ	total quartz
GOUG	gouge	UC	unconformity
HDIS	heavily disseminated	VLB	vein hosted bleb
HX	hydrothermal breccia	VDIS	vein hosted diss
IN	interstitial	VN	vein/stringers
INT	interstitial	VSTR	vein hosted stringers
IR	irregular	VUG	vug controlled
IRR	irregular	WDIS	weakly disseminated
LENS	lenses	WRM	worm rock
LIES	liesegang	WSW	weak stockwork
		XL	crystalline

## Fracture Features

<u>Code</u>	<u>Description</u>		
\$P	serpentine	GO	goethite
AA	andalusite	GS	gypsum
AB	albite	HA	halite
AC	actinolite	HB	hornblende
AD	anhydrite	HBX	healed breccia
AE	ankerite	HE	hematite
AF	altered feldspar	HF	healed fractures
AP	aplitic	HFT	healed fault
AP/D	aplite dyke	HM	hematized
AS	arsenopyrite	HS	specular hematite
AT	apatite	HV	heavy minerals
AU	gold	IAE	pink ankerite
AX	amphibole	IL	illite
AY	anthophyllite	IN/D	intermediate dyke
BA	barite	KA	kaolinite
BC	broken core	KF	k-feldspar
BED	bedding	LI	limonite
BH	bleached	M\$	montmorillonite
BI	biotite	M@	malachite
BP	brittle overprint	MA	marcasite
BR	bornite	ME	micrite
BS	basalt	MF	mafic minerals
BX	breccia	MF/D	mafic dyke
CB	carbonate	MGG	muddy gouge
CBV	carbonate vein	MI	mica
CC	calcite	ML	millerite
CD	cordierite	MN	manganese minerals
CF	coffinite	MO	molybdenite
CGG	clay gouge	MR	microcline
CH	chert	MT	magnetite
CL	chlorite	MU	muscovite
CO	cobaltite	MY	mylonite
CON	contact	NCL	black chlorite
CP	chalcopyrite	NCY	black clay
CU	copper	NI	niccolite
CX	cross-cutting fracture	NOX	black oxides
CY	clay	NSX	black sulfide mineral
DAE	indurated ankerite	OF	open fractures
DI	diopside	OSK	oblique slip slickensides
DK	dyke	OX	oxides (gen.)
DO	dolomite	PCY	purple clay
DQZ	drusy quartz	PEGM	pegmatite
DSG	indurated sandy gouge	PF	plagioclase
DSK	dip slip slickensides	PLB	parallel to bedding
DV	dravite	PLF	parallel to foliation
EP	epidote	PO	pyrrhotite
FD	folded	POT	potassic
FL/D	felsic dyke	PS	phosphate
FT	fault	PX	pyroxene
FU	fuchsite	PY	pyrite
FX	feldspar	QC	quartz-carbonate
GA	garnet	QF	quartzofeldspathic
GE	gersdorffite	QM	quartz tourmaline
GF	graphite	QZ	quartz
GG	gouge	QZD	quartz dissolution
GL	galena	QZV	quartz veinlet
		RQ	ribbony quartz

RU	rutile	TE	tetrahedrite-tennantite
S\$	stibnite	TO	tourmaline
SC	scheelite	TR	tremolite
SD	siderite	UC	unconformity
SE	sericite	UN	unconsolidated
SGG	sandy gouge	UR	uraninite (pitchblende)
SH	sheared	UX	uranium minerals
SI	sillimanite	VI	vivianite
SIL	silicification	VN	vien
SK	slickensides	VU	vuggy
SMQ	smokey quartz	VUG	cavity in rock
SN	sphene	XE	xenolith
SP	sphalerite	XX	cherty quartz
SR	sparite	ZE	zeolites
SSK	strike slip slickensides	ZI	zircon
ST	staurolite	ZO	zoisite
SV	saussurite		
SX	sulphides		
TA	talc		

### Fracture Intensity

<u>Code</u>	<u>Description</u>
<1	less than one
0	zero
BC	broken core
BK	blocky
BP	brittle overprint
BX	breccia
FS	fissle
FT	fault
GG	gouge
HF	healed fractures
HX	hydrothermal breccia
IR	irregular
LC	lost core
MC	missing core
MY	mylonites
OF	open fracture
R0	extremely weak rock
R1	very weak rock
R2	weak rock
R3	weak rock
R4	strong rock
R5	very strong rock
R6	extremely strong rock
S1	very soft clay
S2	soft clay
S3	firm clay
S4	stiff clay
S5	very stiff clay
S6	hard clay
SA	saprolite (weathering)
VG	vuggy

### Color

<u>Code</u>	<u>Description</u>
1	light
2	medium
3	dark
A	grey
B	brown
C	colorless
F	buff
G	green
I	pink
M	maroon
N	black
O	orange
P	purple
R	red
T	tan
U	blue
V	Violet

W	white
Y	yellow

### Stratigraphy (paleoweathering)

<u>Code</u>	<u>Description</u>
A	absent
B	bleached
D	diagenetic alteration
F	fresh
G	green zone
H	hematite zone
L	limonitic alteration
N	not preserved
P	partial preservation
R	regolith
T	transition zone
W	white zone (weathered)
Y	hydrothermal alteration

### Alteration Intensity

<u>Code</u>	<u>Description</u>
1	weak
2	moderate
3	strong

### Friability

<u>Code</u>	<u>Description</u>
1	competent (very hard)
2	moderately friable
3	friable (crumples in hand)
4	locally friable over interval
5	unconsolidated

### Prefix

<u>Code</u>	<u>Description</u>
L	locally
M	moderate
S	strong
T	trace
W	weak

### Grain Size

<u>Code</u>	<u>Description</u>
AH	aphanitic
CY	clay
MD	mud
ST	silt
<1	less than 1 millimetre

## Textures

<u>Code</u>	<u>Description</u>		
AG	augen structured	LM	laminated
AH	aphanitic	LN	lenticular
AL	altered	LT	lithic
AM	amygdaloidal	LX	low angled crossbedded (1-10)
AN	anhedral	MH	mesh structure
AP	aplitic	MK	myrmekitic
BD	bedded (horizontal)	MM	migmatitic
BH	bleached	MP	matrix supported
BK	blocky	MX	massive
BL	bladed	MY	mylonitic
BN	banded	ND	nodular
BO	botryoidal	NP	not preserved
BP	brittle overprint	OV	ovoid
BX	brecciated	P\$	porphyroclastic
C\$	cumulate	PB	porphyroblastic
CA	cataclastic	PE	pebble beds
CM	compact	PG	pegmatitic
CN	concordant	PH	phelbitic
CR	crenulated/folded	PP	partially preserved
CS	clast supported	PR	porphyritic
CT	clastic	PW	pillowed
DE	dense	R1	roundness, very angular
DF	drag folded	R2	roundness, angular
EL	elongated (=prolate)	R3	roundness, subangular
EQ	equigranular	R4	roundness, subrounded
ET	eutaxitic	R5	roundness, rounded
EU	euheral	R6	roundness, very rounded
F\$	fissile	RB	rotated beds
F)	fluidal	RE	remobilizate
FB	flow banded	RQ	ribbony quartz
FE	felsic	S/	streaky
FM	fragmental	S1	sorting, very well
FO	foliated	S2	sorting, well
FR	fractured	S3	sorting, moderate
FS	flaser structure	S4	sorting, poor
FY	flaggy	S5	sorting, very poor
G\$	granoblastic	SB	slabby
GC	graphic	SF	spherulitic
GD	graded bedded	SH	sheared
GG	gouge	SK	slickensides
GN	gneissic	SL	slaty
GP	glomero-porphyritic	SO	scoriaceous
GT	granitic	SS	schistose
GU	granulose	SU	subheral
GY	greasy	SW	stockwork
HG	hypidiomorphic granular	TB	tabular (=platy)
HO	homogeneous	TF	tuffaceous
HT	heterogeneous	TT	trachytic
IB	interbedded	UF	uniform textured
IM	intermediate	VN	veined
IN	interstitial	VR	variolitic
IQ	inequigranular	VS	vesicular
IT	intraclasts	VU	vuggy
LC	loosely consolidated	VV	varved
LL	lit-par-lit	WB	wavy banded
		WF	weakly foliated
		XB	crossbedded (11 degrees)
		XE	xenolithic
		XL	crystalline

## Rock Type Qualifiers

<u>Code</u>	<u>Description</u>		
AB	albite	GB	gabbroic
AG	augen structured	GC	graphic
AH	aphanitic	GD	graded bedded
AK	arkosic	GF	graphitic
AL	altered	GG	gouge
AM	amygdaloidal	GN	gneissic
AN	anhedral	GP	glomero-porphyrific
AP	aplitic	GR	granitic (comp.)
AR	arenaceous	GT	granitic
AT	altered	GU	granulose
BD	bedded (horizontal)	GY	greasy
BH	bleached	HE	hematite
BI	biotite	HG	hypidiomorphic granular
BK	blocky	HM	hematized
BL	bladed	HO	homogeneous
BN	banded	HR	hornfelsic
BO	botryoidal	HT	heterogeneous
BP	brittle overprint	HX	healed breccia
BR	broken core	IB	interbedded
BS	basaltic	IM	intermediate
BX	brecciated	IN	interstitial
C\$	cumulate	IQ	inequigranular
CA	cataclastic	IR	irregular
CH	cherty	IS	intrusive
CM	compact	IT	intraclasts
CN	concordant	KF	k-feldspar
CR	crenulated/folded	KT	clotty (for dykes)
CS	clast supported	LC	loosely consolidated
CT	clastic	LE	leached
CY	clayey	LG	liesegang
DB	diabasic	LL	lit-par-lit
DC	dacite	LM	laminated
DE	dense	LN	lenticular
DF	drag folded	LS	limy
DK	dyke	LT	lithic
DR	dioritic	LX	low angled crossbedded (1-10)
DS	discordant	M	moderate
EL	elongated (=prolate)	M#	mesocratic
EQ	equigranular	MC	mud clasts
ET	eutaxitic	MF	mafic
EU	euohedral	MH	mesh structure
F\$	fissile	MK	myrmekitic
F)	fluidal	MM	migmatitic
FB	flow banded	MO	mottled
FD	folded	MP	matrix supported
FE	felsic	MR	microcline
FM	fragmental	MT	magnetite
FO	foliated	MX	massive
FR	fractured	MY	mylonitic
FS	flaser structure	ND	nodular
FT	fault	NF	non-fragmental
FW	flow	NN	black
FY	flaggy	NP	not preserved
G\$	granoblastic	OV	ovoid
		P\$	porphyroclastic

PB	porphyroblastic
PC	purple clay
PE	pebble beds
PG	pegmatitic
PH	phelbitic
PM	polymictic
PP	partially preserved
PR	porphyritic
PT	ptgmatic folds
PW	pillowed
PY	pyritic
QT	quartzitic
R1	roundness, very angular
R2	roundness, angular
R3	roundness, subangular
R4	roundness, subrounded
R5	roundness, rounded
R6	roundness, very rounded
RB	rotated beds
RE	remobilizate
RQ	ribbony quartz
RY	rhyolitic
S/	streaky
S1	sorting, very well
S2	sorting, well
S3	sorting, moderate
S4	sorting, poor
S5	sorting, very poor
SA	silicified
SB	slabby
SF	spherulitic
SH	sheared
SK	slickensides
SL	slaty
SO	scoriaceous
SS	schistose
SU	subhedral
SW	stockwork
SY	syenitic
SZ	sill
TB	tabular (=platy)
TF	tuffaceous
TN	tonalitic
TT	trachytic
UF	uniform textured
UM	ultramafic
UX	uranium mineralization
VL	volcanic
VN	veined
VR	variolitic
VS	vesicular
VU	vuggy
VV	varved
WB	wavy banded
WF	weakly foliated
XB	crossbedded (11 degrees)
XE	xenolithic
XL	crystalline