



# AGAT

Laboratories

## FINAL CORE ANALYSIS REPORT

**IMPERIAL SUN ARROWHEAD AURORA  
300/M-47-6040-12230/0**

**Prepared for:**

**NORTHWEST TERRITORIES GEOLOGICAL SURVEY  
20RC31659**

February 2020

**"In Pursuit of Excellence"**

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*Results relate only to the items tested and to all the items tested*

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### **General Information**

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**CORE ANALYSIS DATA**

**IMPERIAL SUN ARROWHEAD AURORA  
300/M-47-6040-12230/0**

COMPANY : NORTHWEST TERRITORIES GEOLOGICAL SURVEY  
 LOCATION : 300/M-47-6040-12230/0  
 FORMATION : NAHANNI  
 WELL NAME : IMPERIAL SUN ARROWHEAD AURORA  
 DRILLING FLUID : WATER BASE MUD

PAGE : 1  
 DATE : 28-Feb-2020  
 W/O No : RC31659

## ROUTINE CORE ANALYSIS

Sample	Interval (m)		Rep Thick (m)	Sample Length (m)	Gas Permeability			Capacity Kmax mD·m	Porosity	Capacity Ø·m	Density (Kg/m³)		Residual Saturation		Remarks
	Top	Base			Kmax (mD)	K90 (mD)	Kv (mD)				Bulk	Grain	Oil	Water	
SP001	2368.30	2368.30	0.00	-	0.01	-	-		0.005	0.000	2700	2710	-	-	Is:vfxl:styl:pyr(P26)
SP002	2369.82	2369.82	0.00	-	0.08	-	-		0.016	0.000	2670	2710	-	-	Is:vfxl:styl:fracs(P25)
SP003	2371.13	2371.13	0.00	-	0.05	-	-		0.015	0.000	2660	2700	-	-	Is:f-vcgr:styl:fracs(P24)
SP004	2372.65	2372.65	0.00	-	8.06	-	-		0.027	0.000	2620	2700	-	-	Is:f-vcgr:styl:fracs(P23)
SP005	2373.02	2373.02	0.00	-	52.1	-	-		0.043	0.000	2580	2690	-	-	Is:f-vcgr:fracs(P22)
SP006	2375.34	2375.34	0.00	-	0.03	-	-		0.007	0.000	2690	2710	-	-	Is:vf-vcxl:fracs(P21)
SP007	2376.25	2376.25	0.00	-	0.01	-	-		0.005	0.000	2710	2720	-	-	Is:f-vcgr:fracs(P20)
SP008	2377.65	2377.65	0.00	-	0.02	-	-		0.005	0.000	2690	2710	-	-	Is:f-vcgr:styl:fracs(P19)
SP009	2378.35	2378.35	0.00	-	0.03	-	-		0.005	0.000	2690	2710	-	-	Is:f-vcgr:pyr:fracs(P18)
SP010	2379.91	2379.91	0.00	-	0.03	-	-		0.009	0.000	2680	2710	-	-	Is:f-vcgr:styl:fracs(P17)
SP011	2381.83	2381.83	0.00	-	0.03	-	-		0.014	0.000	2670	2710	-	-	Is:f-vcgr:styl:pyr:fracs(P16)

Company : NORTHWEST TERRITORIES GEOLOGICAL SURVEY

Location : 300/M-47-6040-12230/0

FIGURE : 1

Well Name : IMPERIAL SUN ARROWHEAD AURORA

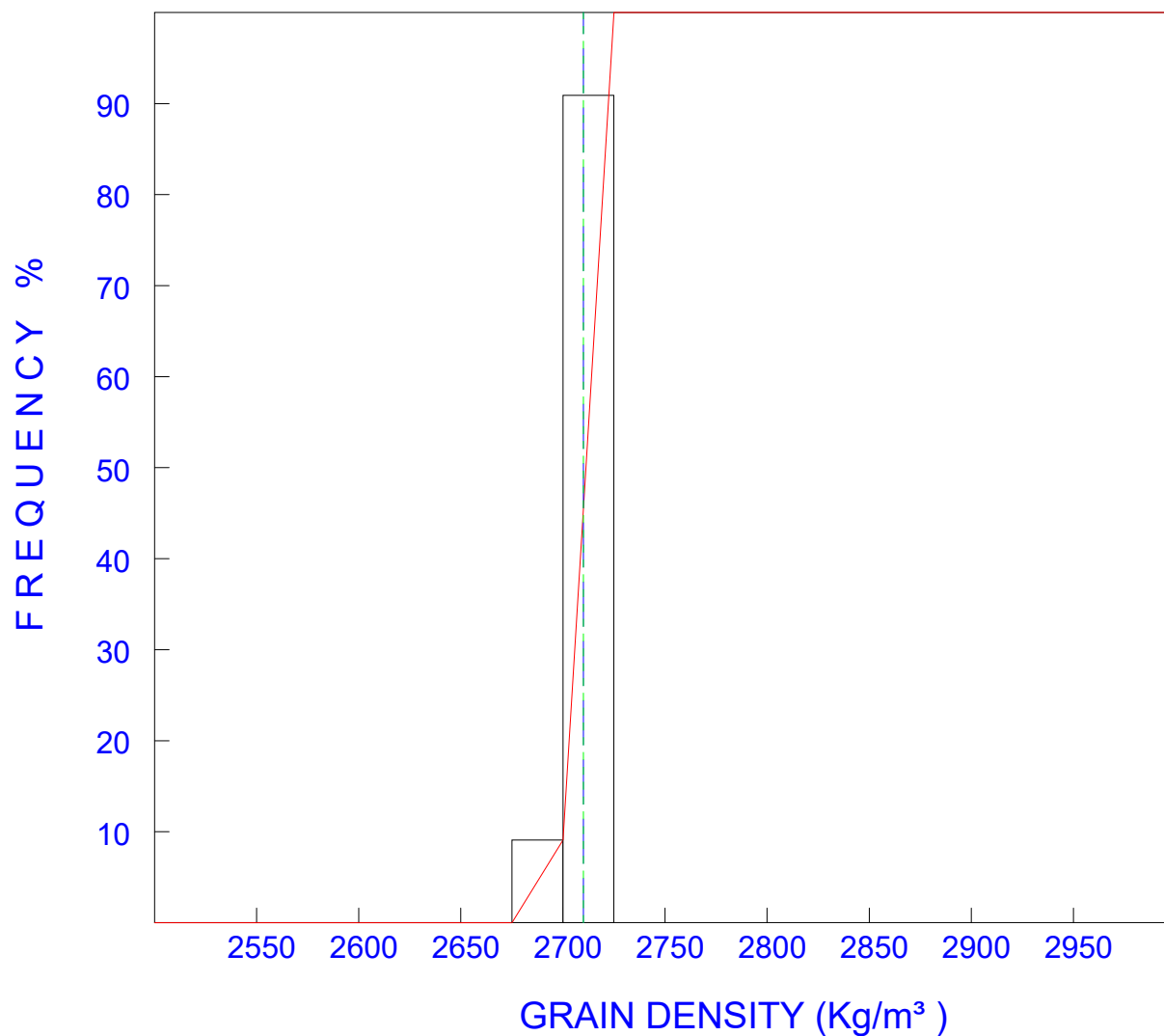
Date : 28-Feb-2020

Interval : 2368.30-2381.83m

AGAT Job : RC31659

Formation : NAHANNI

## GRAIN DENSITY DISTRIBUTION



Arithmetic Mean

.....

Mean: 2710

Median

-----

Median: 2710

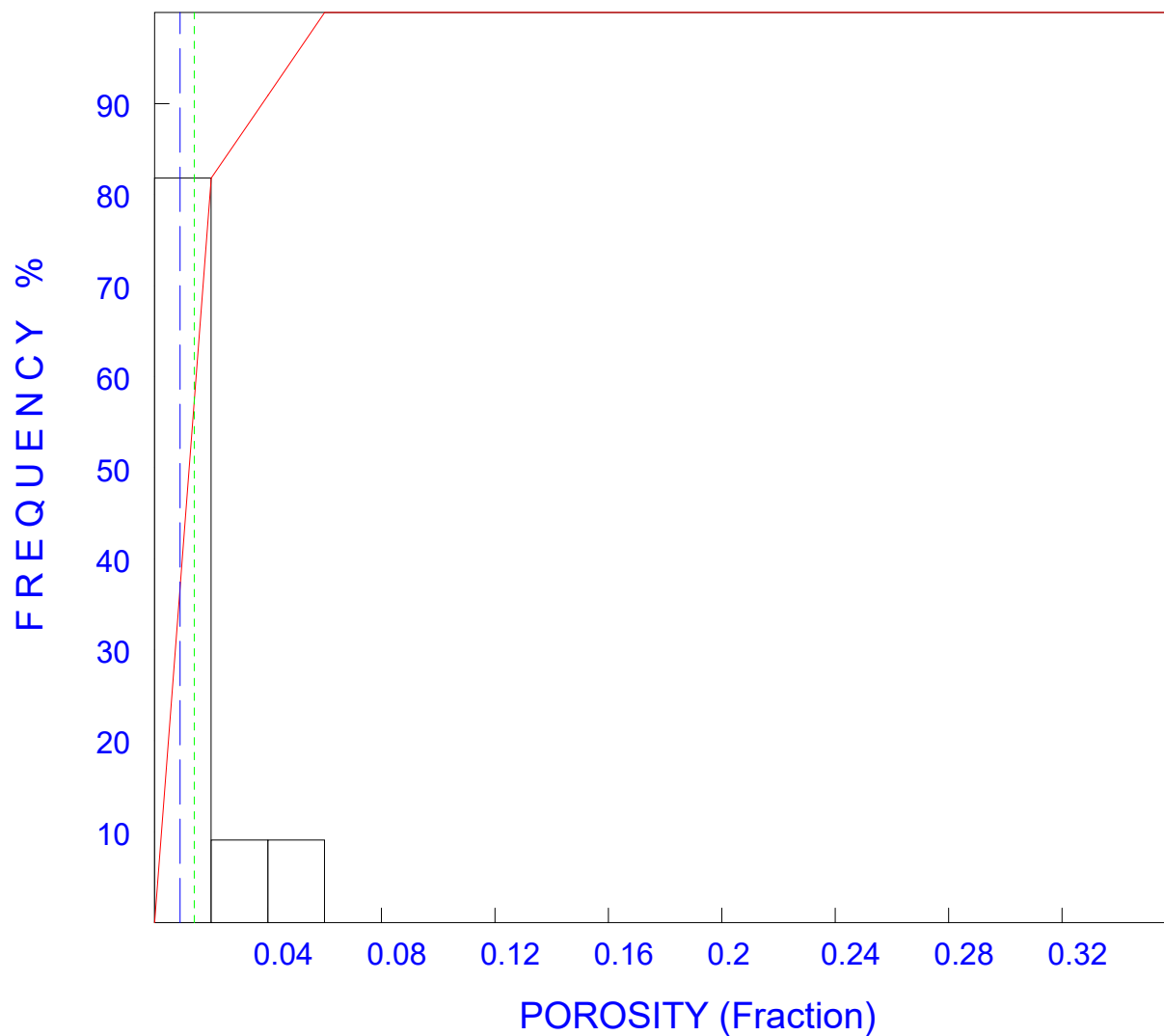
Cum. Frequency %

—————

Company : NORTHWEST TERRITORIES GEOLOGICAL SURVEY  
 Location : 300/M-47-6040-12230/0  
 Well Name : IMPERIAL SUN ARROWHEAD AURORA  
 Interval : 2368.30-2381.83m  
 Formation : NAHANNI

FIGURE : 2  
 Date : 28-Feb-2020  
 AGAT Job : RC31659

## POROSITY DISTRIBUTION

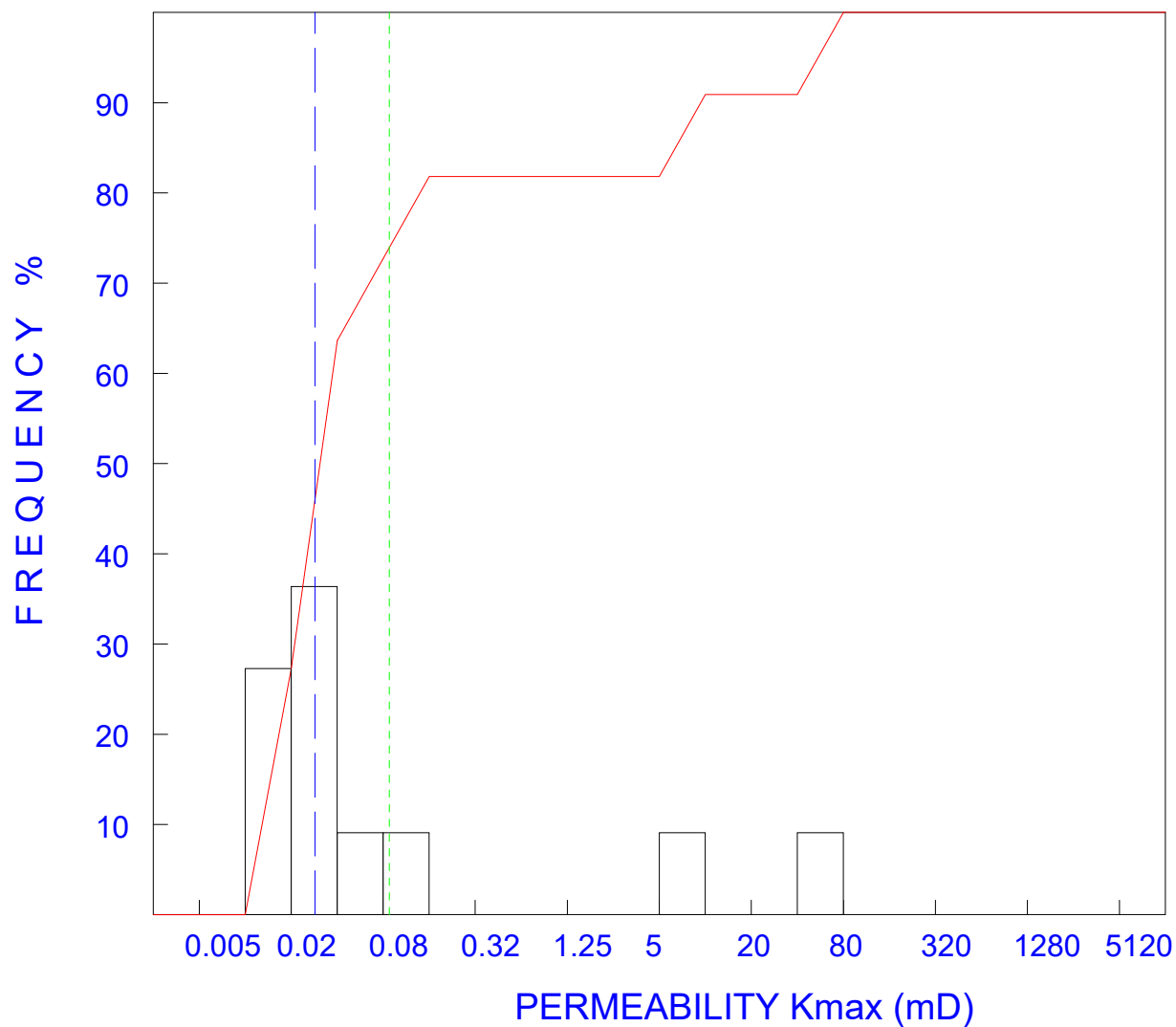


Arithmetic Mean	.....	Mean: 0.014
Median	-----	Median: 0.009
Cum. Frequency %	—————	

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 Interval : 2368.30-2381.83m  
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FIGURE : 3  
 Date : 28-Feb-2020  
 AGAT Job : RC31659

## PERMEABILITY Kmax DISTRIBUTION

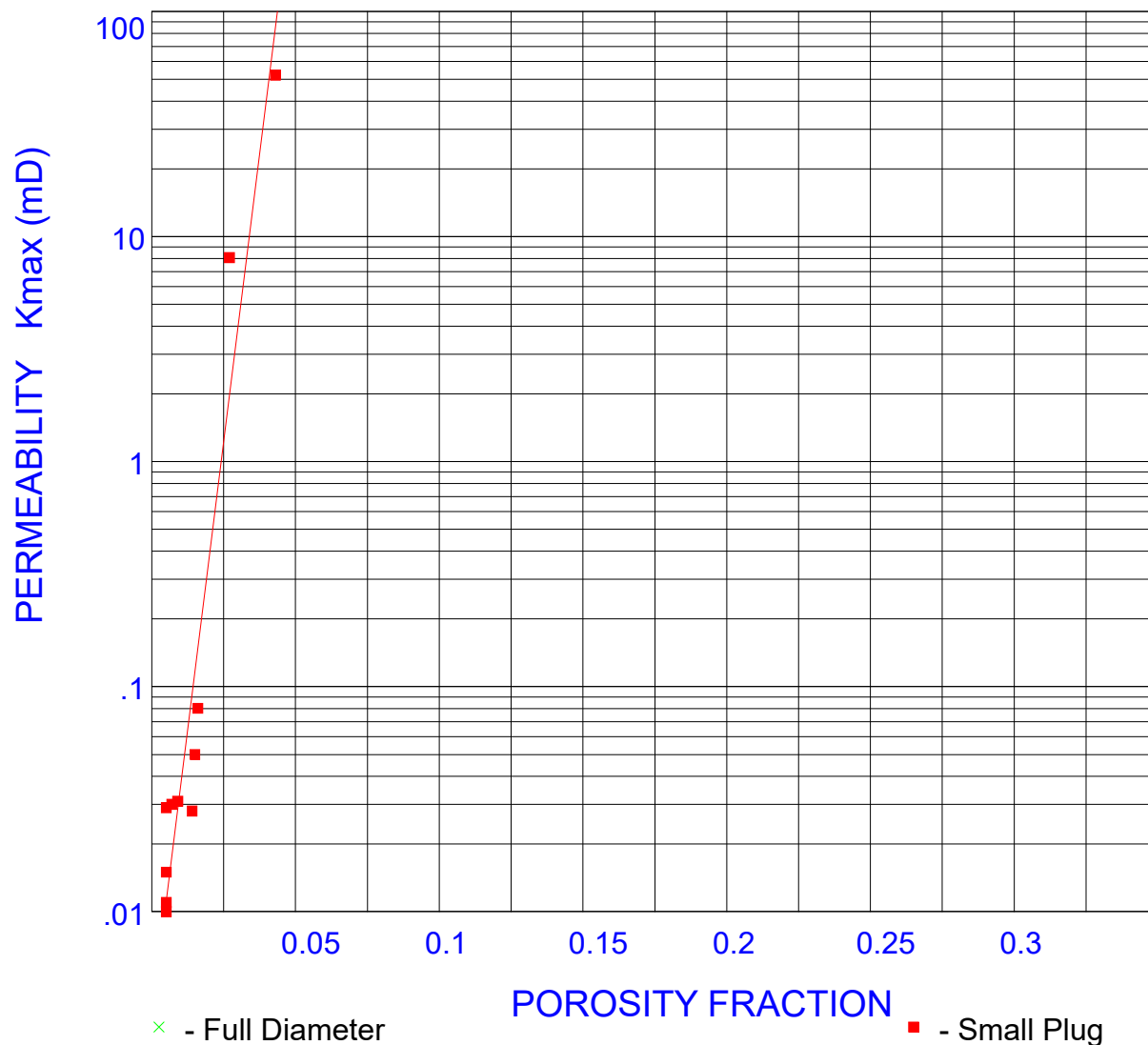


Arithmetic Mean	.....	Mean: 0.09
Median	-----	Median: 0.03
Cum. Frequency %	-----	

Company : NORTHWEST TERRITORIES GEOLOGICAL SURVEY  
 Location : 300/M-47-6040-12230/0  
 Well Name : IMPERIAL SUN ARROWHEAD AURORA  
 Interval : 2368.30-2381.83m  
 Formation : NAHANNI

FIGURE : 4  
 Date : 28-Feb-2020  
 AGAT Job : RC31659

## POROSITY-PERMEABILITY CORRELATION



Equation of Line :  $\text{Log (Kmax)} = -2.47 + 102.35 \times \text{Porosity}$   
 Correlation Coefficient  $r = 0.96$



## **SAMPLE HANDLING**

## AGAT LABORATORIES CORE SERVICES

### **SAMPLE HANDLING AND ANALYSIS INFORMATION**

Company : NORTHWEST TERRITORIES GEOLOGICAL SURVEY  
Well : IMPERIAL SUN ARROWHEAD AURORA  
Location : 300/M-47-6040-12230/0

Coring Equipment : Diamond  
Coring Fluid : Water Base Mud

W/O Number : 20RC31659  
Date : 28-Feb-20

#### **HANDLING**

Core Transported in : Box  
Drying Equipment : Convection Oven  
Drying Time/Temp : 48 hours @ 108°C

#### **ANALYSIS**

Grain volume measured by Boyle's Law using helium  
Bulk volume measured by calipering on right-cylindrical samples  
Permeability measured by Steady State; Nitrogen to Air on 38.1/25.4mm diameter drilled plugs

## **ABBREVIATIONS**

## COMMON ABBREVIATIONS

abnt		c	Coarse (ly)	f	Fine (ly)
abv	Abundant	calc	Calcite (areous)	fau	Fauna
Alg	Abbreviations	carb	Carbonaceous	Fe	Iron-Ferruginous
alt	Algae (al)	cbl	Cobble (64-256 mm)	Fe-mag	Ferromagnesian
amor	Altered (ing)	Ceph	Cephalopod	fenst	Fenestral
Amph	Amorphous	cgl	Conglomerate	fis	Fissile
ang	Amphipora	chk	Chalk (y)	fl	Fill (ed)
anhy	Angular	chlor	Chlorite	fld	Feldspar (thic)
app	Anhydrite (ic)	cht	Chert	flk	Flake
apr	Appear	chty	Cherty	flky	Flaky
aprox	Apparent	cl	Clastic	flor	Fluorescence
arg	Approximate (ly)	cln	Clean	flt	Fault (ed)
ark	Argillaceous	clr	Clear	fltg	Floating
asph	Arkose (ic)	cly	Clay (ey)	foram	Foraminifera
AST	Asphalt (ic)	com	Common	fos	Fossil (iferous)
	Assigned similar to	coq	Coquina	fr	Fair
apha	(no actual sample taken)	Cor	Coral	frac	Fracture (ed)
	Aphanitic	crbnt	Carbonate	frag	Fragment (al)
bcm		Crin	Crinoid (al)	fri	Friable
bd	Become (ing)	crm	Cream	frmwk	Framework
bdd	Bed	crpxl	Cryptocrystalline	fros	Frosted
bdg	Bedded	ctc	Contact		
Belm	Bedding			g	Good
bent	Belemnites	deb	Debris	Gast	Gastropod
bf	Bentonite (ic)	decr	Decrease (ing)	gl	Glass (y)
biocl	Buff	desi	Desiccation	glau	Glaucinite (ic)
bioturb	Bioclastic	dism	Disseminated	gn	Green
bit	Bioturbated	dk	Dark (er)	gr	Grain (ed)
bl	Bitumen (inous)	dns	Dense (er)	gran	Granular
blk	Blue (ish)	dol	Dolomite (ic)	grd	Grade (ed)
blky	Black	drs	Drusy	grnl	Granule (2-4 mm)
bnd	Blocky	dtrl	Detrital (us)	gy	Grey
Brac	Band (ed)			gyp	Gypsum (iferous)
brec	Brachiopod	elg	Elongate		
bri	Breccia (ted)	euhed	Euhedral		
brit	Bright				
brn	Brittle				
Bry	Brown				
Bulb	Bryozoa				
bur	Bulbous				
	Burrowed				

## COMMON ABBREVIATIONS

hal	Halite	m	Medium	pk	Pink
hd	Hard	mar	Maroon	plag	Plagioclase
hfrac	Horizontal Fracture	mas	Massive	plcy	Pelecypod
hi	High	mat	Material, matter	pl	Plant
hrtl	Horizontal	mica	Mica (ceous)	plty	Platy
hvy	Heavy	mic	Micro	por	Porous (sity)
hydc	Hydrocarbon	mky	Milky	pos	Possible (ility)
		mnr	Minor	p-p	Pin-Point
ig	Igneous	mnrl	Mineral (ized)	pred	Predominant (ly)
imbed	Imbedded	mnut	Minute	prim	Primary
imp	Impression	Mol	Mollusca	prob	Probable (ly)
incl	Included (sion)	mot	Mottled	prom	Prominent (ly)
incr	Increase	mrly	Marly	pt	Part (ly)
indst	Indistinct	mtx	Matrix	ptch	Patch (es)
intbd	Interbedded			ptg	Parting
intcl	Intracast (s)	n	No, none, non	purp	Purple
intfrag	Interfragmental	nod	Nodule	pyr	Pyrite (ic) (ized)
intgran	Intergranular	num	Numerous	pyrbit	Pyrobitumen
intlaml	Interlaminated				
intr	Intrusion (ive)	o	Oil	qtz	Quartz
intv	Interval	occ	Occasional	qtzc	Quartzitic
intxl	Intercrystalline	od	Odor	qtzs	Quartzose
ireg	Irregular	ool	Oolite (ic)		
ird	Iridescent	op	Opaque	rd	Round (ed)
intrsk	Intraskeletal	org	Organic	repl	Replaced (ing) (ment)
		org	Orange	rexl	Recrystallized
kao	Kaolin	orth	Orthoclase	rmn	Remains (nant)
		Ost	Ostracod	rr	Rare
lam	Laminated	ovgth	Overgrowth	rsns	Resinous
lchd	Leached	ox	Oxidized	rthy	Earthy
len	Lentil (cular)				
lith	Lithographic	p	Preliminary (as suffix)	s	Small
lmy	Limy	pbl	Pebble (4-64 mm)	sa	Salt (y)
lrg	Large (er)	pel	Pellet	S	Sulphur
ls	Limestone	perm	permeability	s&p	Salt & Pepper
lse	Loose	pet	Petroleum (iferous)	sat	Saturated
lstr	Lustre	phos	Phosphate (ic)	sb	Sub
lt	Light (er)				

## COMMON ABBREVIATIONS (CONTINUED)

sc	Scales	tab	Tabular	xbd	Cross-bedded
scat	Scattered	tex	Texture	xbdg	Cross-bedding
sd	Sand (1/16 - 2mm)	Tham	Thamnopora	xl	Crystal (line)
sdv	Sandy	thk	Thick	xlam	Cross-laminated
sec	Secondary	thn	Thin		
sed	Sediment (ary)	thru	Throughout	yel	Yellow
sft	Soft	tr	Trace		
sh	Shale	trns	Translucent	zn	Zone
shad	Shadow	trnsp	Transparent		
shy	Shaly	tt	Tight	*	Broken core
sid	Siderite (ic)	tub	Tubular	/	With
sil	Silica			>10000	Permeability over 10000 mD
sks	Slickensided	uncons	Unconsolidated	<0.01	Permeability less than 0.01 mD
sl	Slight (ly)	unident	Unidentifiable	CC	Cracked Core
sln	Solution	up	Upper	DR	Drilled
slt	Silt			LC	Lost Core
sltst	Siltstone	v	Very	RU	Rubble
slty	Silty	var	Variable	mD	milliDarcy
sm	Smooth	vc	Varicolored		
SP	Small Plug (as prefix)	vfrac	Vertical Fracture		
sp	Spot (ted) (ty)	vgt	Varigated		
spec	Speck (led)	vn	Vein		
spl	Sample	vrtl	Vertical		
srt	Sort (ed) (ing)	vug	Vug (gy) (ular)		
strg	Stringer				
Strom	Stromatoporoid	w	Well		
stromlt	Stromatolite	wh	White		
struc	Structure	wk	Weak		
styl	Stylolite (ic)	wthrd	Weathered		
suc	Sucrosic	wtr	Water		
sug	Sugary	wvy	Wavy		
sup	Supported	wxy	Waxy		
surf	Surface	wsrt	Well sorted		
sz	Size				