PGPC

Report prepared for:

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PETROLOGY & SEDIMENTOLOGY STUDY OF THE TIRRAWARRA-MERRIMELIA FORMATION, BIG LAKE FIELD

VOLUME II BASIC DATA

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Thin section photomicrograph of Big Lake-32, core, depth 9410.00 ft. Plane light. Horizontal field of view 1.35mm.

1. INTRODUCTION

Santos Limited submitted 41 core samples and 8 cuttings samples to PGPC for detailed petrological description and sedimentological interpretation. Samples were taken from 12 wells in the Big Lake/Moomba Field in Late Carboniferous to Early Permian Tirrawarra-Merrimelia Formation. This Volume (II) contains all the basic data accumulated for the study and the interpretations are presented in Volume I. The study was designed to:

- aid facies identification, and
- ascertain the factors controlling reservoir quality

The client supplied preliminary interpretations of facies, core analyses results, core photographs, wireline logs and copies of previous petrology reports for the wells used in this study. Services provided by PGPC are listed in Table 1. All depths are drillers depths in feet.

TABLE 1 SAMPLES & SERVICES

Depth (ft) (Driller)	Thin section	Photo-micrograph	Grain size	Point count	XRD
BIG LAKE-4					
9790	*	*	*	*	-
9799	*	*	*	*	*
9808	*	*	*	*	-
BIG LAKE-27					
9490.5	*	*	*	*	*
9498.5	*	*	*	*	-
BIG LAKE-29					
9660.35	*	*	*	*	-
9665	*	*	*	*	-
9667.7	*	*	*	*	-
BIG LAKE-31					
9961.92	*	*	*	*	*
9975.75	*	*	*	*	*
9987.67	*	*	*	*	*
10193.96	*	*	*	*	-
10195.25	*	*	*	*	*
10206.19	*	*	*	*	-
10218.17	*	*	*	*	-
10224.71	*	*	*	*	*
BIG LAKE-32					
9359.11	*	*	*	*	-
9361.21	*	*	*	*	*
9374.21	*	*	*	*	-
9375.92	*	*	*	*	-
9390.67	*	*	*	*	-
9399.83	*	*	*	*	-
9406.04	*	*	*	*	-
9410	*	*	*	*	*
9415.5	*	*	*	*	*
BIG LAKE-33					
10076.21	*	*	*	*	-
10088	*	*	*	*	-
10090.33	*	*	*	*	*

TABLE 1 continued SAMPLES & SERVICES

Depth (ft)	Thin section	Photo-micrograph	Grain size	Point count	XRD
BIG LAKE-34					
9814.71	*	*	*	*	-
9820.69	*	*	*	*	-
9822.04	*	*	*	*	*
9827.86	*	*	*	*	*
9830.83	*	*	*	*	-
BIG LAKE-46					
9900+	*	*	-	-	*
BIG LAKE-49					
10660+	-	-	-	-	*
10840+	*	*	-	-	-
10950+	*	*	-	-	-
BIG LAKE-51					
10870+	*	*	-	-	*
10910+	*	*	-	-	-
BIG LAKE-52					
9412	*	*	*	*	-
9412.8	*	*	*	*	-
9432	*	*	*	*	*
9435	*	*	*	*	-
9454.1	*	*	*	*	-
9464	*	*	*	*	-
9466	*	*	*	*	*
9482	*	*	*	*	-
MOOMBA-82					
9910+	*	*	-	-	*
10060+	*	*	-	-	-

+ denotes cutting sample

2. METHODS

Thin section

Fragments of core and cuttings were impregnated with araldite prior to thin section preparation. Blue dye was used in the araldite to facilitate description of porosity and permeability. Thin sections were systematically scanned to determine lithology, composition, porosity and textural relationships. All percentages given in thin section descriptions are point counts based on 500 counts. Rock classifications utilise Folk (1974) for clastics.

The basic data for grain size analyses was collected by measuring the long axis of 100 representative grains in thin section. The graphic mean and inclusive graphic standard deviation (Folk, 1974) were then calculated.

X-ray diffraction (XRD)

To determine bulk mineralogy by XRD, samples were ground in a Siebtechnick mill and back mounted into aluminium holders. Continuous scans were run of these powder pressings from 3^o to 75^o 2θ , at 1^o/minute, using Co Kα radiation, 50kV and 35mA, on a Philips PW1050 diffractometer. For detailed clay mineralogy a less than 5 micron size fraction was separated. This was obtained by hand crushing, addition of dispersion solution, mechanical shaking for 10 minutes and settling of the dispersed material in a water column according to Stokes' Law. The less than 5 micron fraction was pipetted off and prepared as an oriented sample on ceramic plates held under vacuum. Samples were saturated with Mg solution and treated with glycerol. Continuous scans of oriented clay samples were run from 3^o to 45^o 2θ at 1^o/minute. Peaks were identified by comparison with JCPDS files stored in a computer program called XPLOT.

3. PETROLOGY

3.1.1 Big Lake-4, depth 9790 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	fracture parallel to laminae, microstylolites
Sorting	moderately well
Packing	moderately open, but ductile grains highly deformed
Avg grain size	coarse sand
Range of grain size	fine to very coarse sand
Roundness/sphericity	subrounded/ low to moderate sphericity
Pore types & distribution	fracture (artifact), micropores associated with clays

Composition:

Framework grains	monocrystalline & polycrystalline quartz, deformed lithics of micaceous schist, shale & illitic siltstone plus chalcedony, quartzite and possible volcanic lithics, bent muscovite, accessory zircon
Matrix	trace of detrital illite and organic matter along sutured grain contacts - microstylolites
Authigenic minerals	pore filling & grain replacing kaolin booklets & verms (~20 μm diameter), fan shaped fibrous bundles of chlorite & brown grain size patches of chlorite, illite has replaced ductile grains & rims grains replaced by kaolin, minute subhedral crystals of anatase/sphene are clustered in the illite, rare quartz overgrowths, partial oxidation of chloritic patches, dusty micrite, grain replaced by pyrophyllite

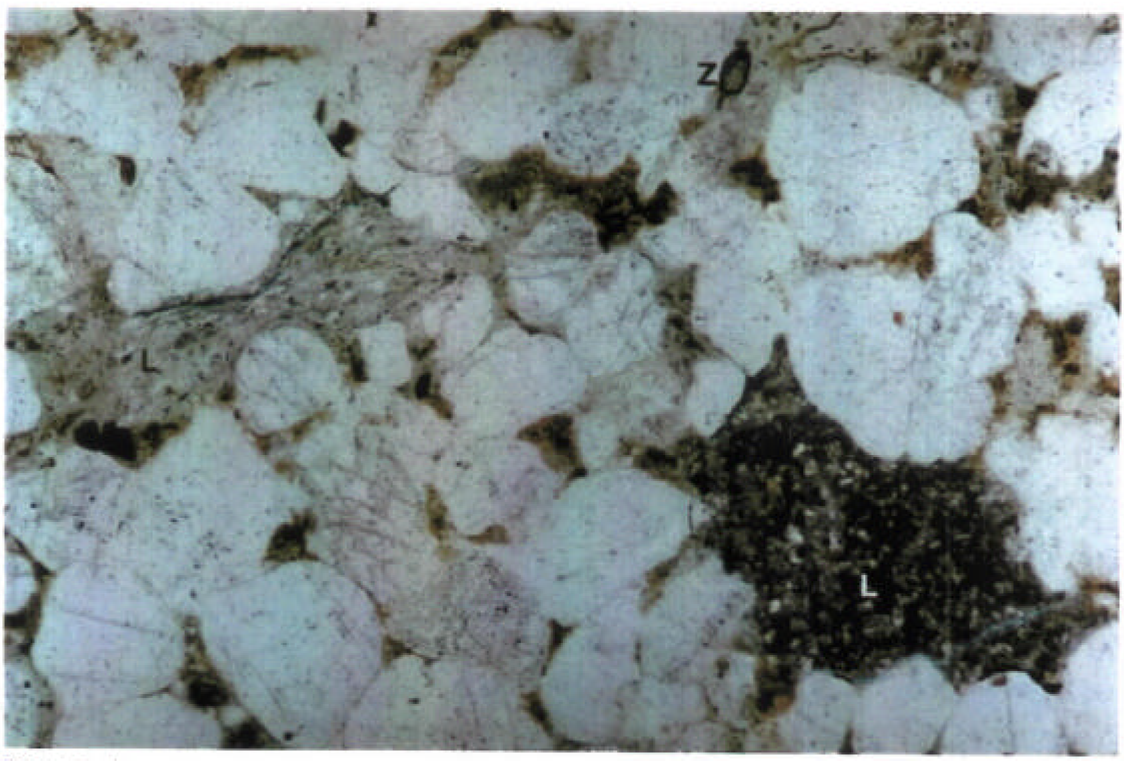


Figure 1
Lithics (L) are deformed and intergranular pores filled with brown matrix plus chlorite in this sublitharenite. Accessory zircon (Z) is evident. Plane light. Horizontal field of view 3.37mm.

3.1.2 Big Lake-4, depth 9799ft

Lithology:	**Sublitharenite**
Texture:	
Sedimentary structures	stylolites along the edge of the section
Sorting	moderately well, lithics commonly coarser grained
Packing	close adjacent to stylolite, moderately open elsewhere, ductile lithics highly deformed
Avg grain size	coarse sand
Range of grain size	fine sand to granules
Roundness/sphericity	subrounded/ low to moderate sphericity
Pore types & distribution	scattered secondary grain size & oversize pores could be due to either dissolution, or plucking during thin section preparation.
Composition:	
Framework grains	monocrystalline & polycrystalline quartz, lithics of quartzite, chert, illitic siltstone, fine sandstone, shale, ?volcanics & micaceous schist, bent muscovite, accessory zircon, sphene & opaques
Matrix	organic matter in the stylolites
Authigenic minerals	bundles of fibrous brown chlorite fill intergranular pores & partially to completely replace grains, authigenic sphene/ anatase concentrates along the stylolite & as clusters of crystals, dusty microspar, pore filling & grain replacing kaolin booklets (~5-20 μm) postdate chlorite & have a jagged contact with quartz overgrowths, illite and rare pyrophyllite has replaced grains

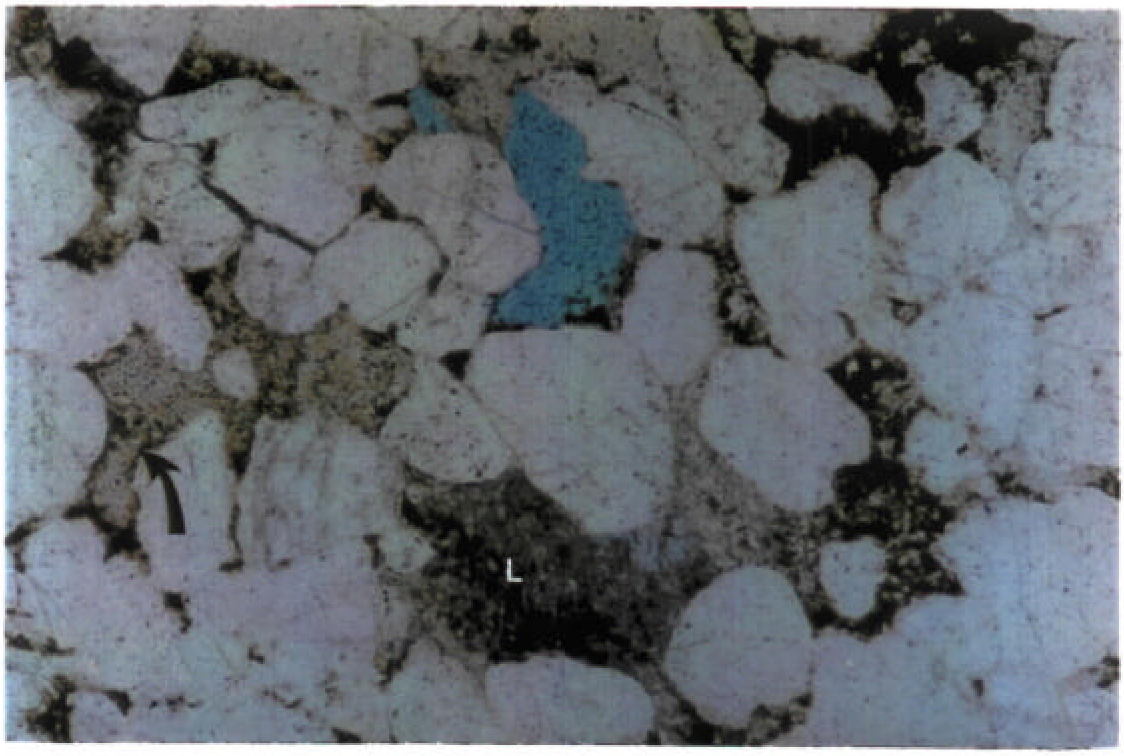


Figure 2
Secondary grain size pores (blue) are the only obvious types of porosity. Brown chlorite fills intergranular pores and rims (arrow) patches of kaolin. Lithics (L) are deformed. Plane light. Horizontal field of view 3.37 mm.

3.1.3 Big Lake-4, depth 9808 ft

Lithology: **Quartzarenite**

Texture:

Sedimentary structures	planar laminae are apparent due to changes in grain size, elongate grains are aligned
Sorting	moderately well
Packing	close, ductile lithics are deformed
Avg grain size	medium sand
Range of grain size	very fine to coarse sand
Roundness/sphericity	subrounded/ low sphericity
Pore types & distribution	scattered grain size pores, micropores associated with the authigenic clays

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of micaceous schist, illitic siltstone, dusty chert, quartzite & shale, muscovite, accessory tourmaline, epidote & zircon
Authigenic minerals	bundles of fibrous brown chlorite have filled intergranular pores & replaced grains, subhedral crystals of anatase/sphene are scattered along grain margins, grains have been replaced by illite & glaucony (colourless to greenish brown), kaolin booklets (~10-20 μm diameter) fill grain size & intergranular pores after the chlorite, quartz overgrowths are best developed where clays are absent, blocky pore filling carbonate spar & dusty micrite postdate chlorite

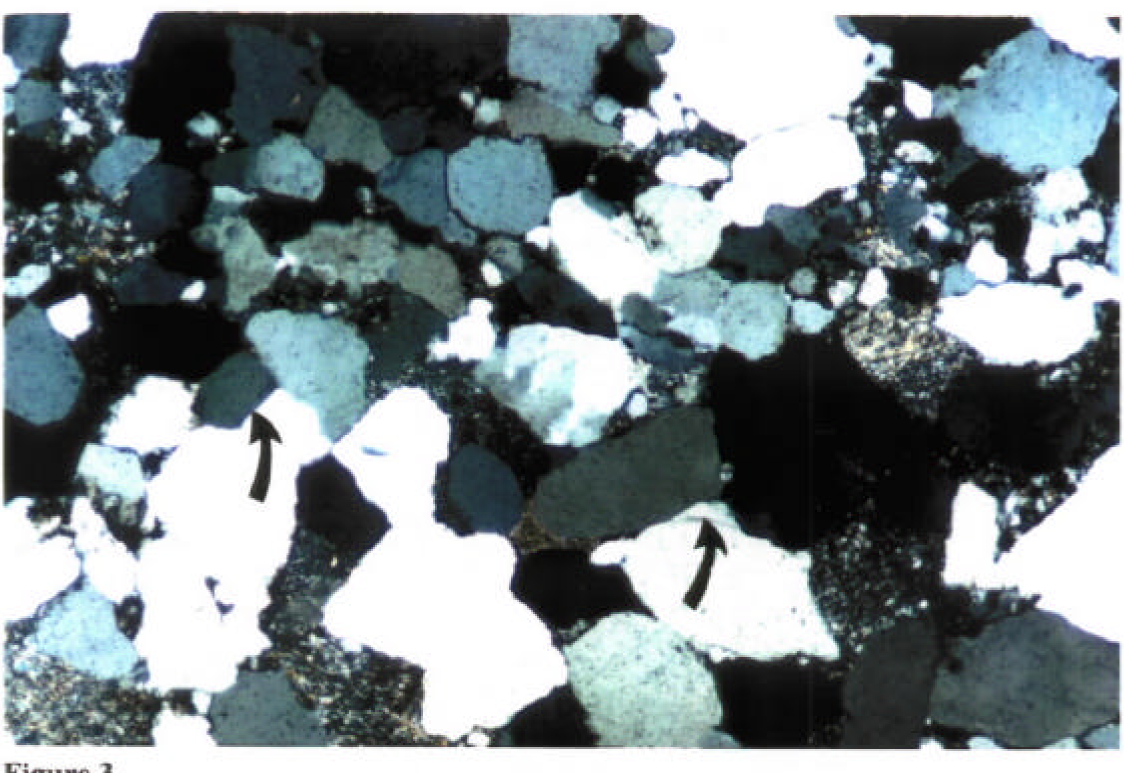


Figure 3
Contact between laminae as indicated by a change in grain size. Note the quartz overgrowths (arrows) where grain contacts are straight and dust rims are apparent. Crossed nicols. Horizontal field of view 3.37 mm.

3.2.1 Big Lake-27, depth 9490.5 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	none apparent
Sorting	moderately well
Packing	open prior to silicification
Avg grain size	coarse sand
Range of grain size	fine to very coarse sand
Roundness/sphericity	subrounded to rounded/ moderate sphericity
Pore types & distribution	scattered grain size pores, intragranular pores in lithics, micropores associated with authigenic clays

Composition:

Framework grains	monocrystalline & rare polycrystalline quartz, lithics of ?devitrified glass, illitic sandstone & siltstone, chert, micaceous schist, quartzite, highly altered mica, accessory tourmaline, zircon & opaques
Authigenic minerals	distinctive reddish dust rims (?iron oxide) outline pervasive quartz overgrowths, these dust rims are most pronounced adjacent to altered lithics, grains have been replaced by illite laths & illite with wormy texture, greenish brown fibrous chlorite has partially replaced grains & rarely fills pores, kaolin booklets (~10 μm diameter) fill intergranular pores, rare pore filling/grain replacing ?pyrophyllite, clear carbonate spar

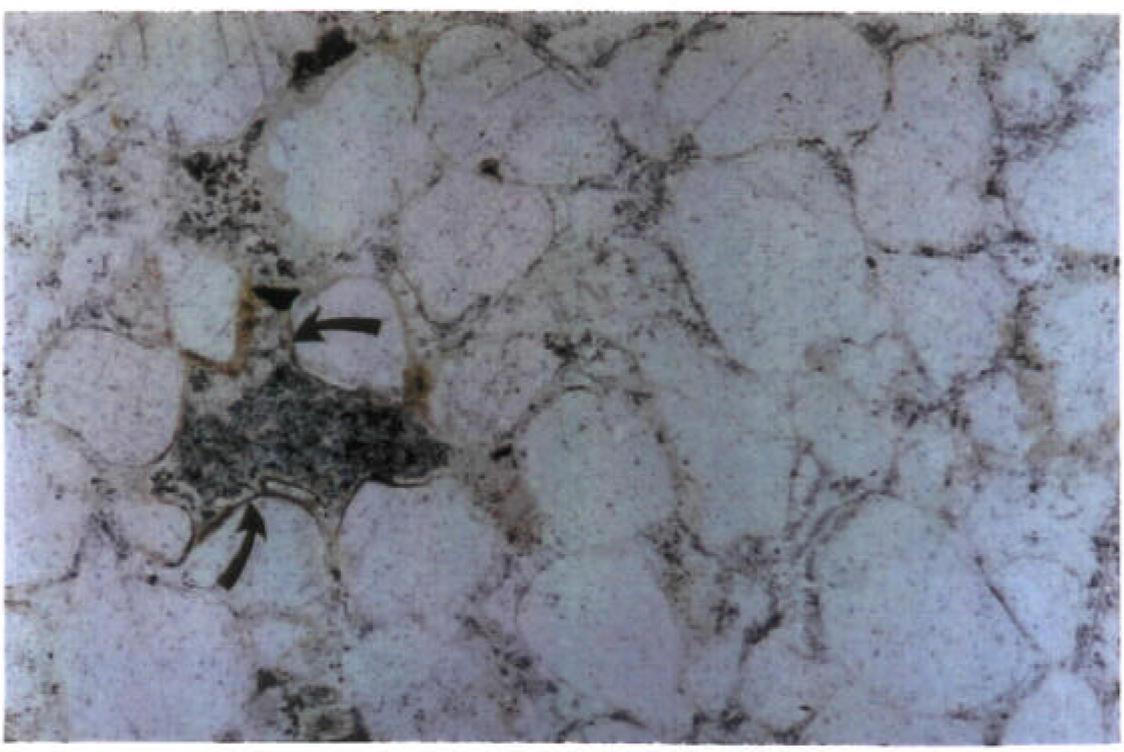


Figure 4
Reddish dust rims (arrows) are developed adjacent to a grain replaced by illite. Overgrowths have been slightly inhibited by the ?oxide. Elsewhere the rims do not appear to be ?oxidised. Plane light. Horizontal field of view 3.37 mm.

3.2.2 Big Lake-27, depth 9498.5 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	weak grain alignment may indicate bedding
Sorting	moderately well
Packing	moderately close, deformed ductile grains
Avg grain size	medium-coarse sand
Range of grain size	very fine to very coarse sand
Roundness/sphericity	subrounded to rounded/ moderate to low sphericity
Pore types & distribution	rare intergranular & intragranular pores, grain size pores & micropores

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of quartzite, micaceous schist, illitic siltstone, chert, shale and sandstone, accessory zircon and sphene
Authigenic minerals	dust rims outline pervasive quartz overgrowths, clear blocky spar fills pores after quartz overgrowths & appears to replace grains, grains are replaced by illite with laths & wormy texture, traces of fibrous chlorite & ?pyrophyllite partially replace grains

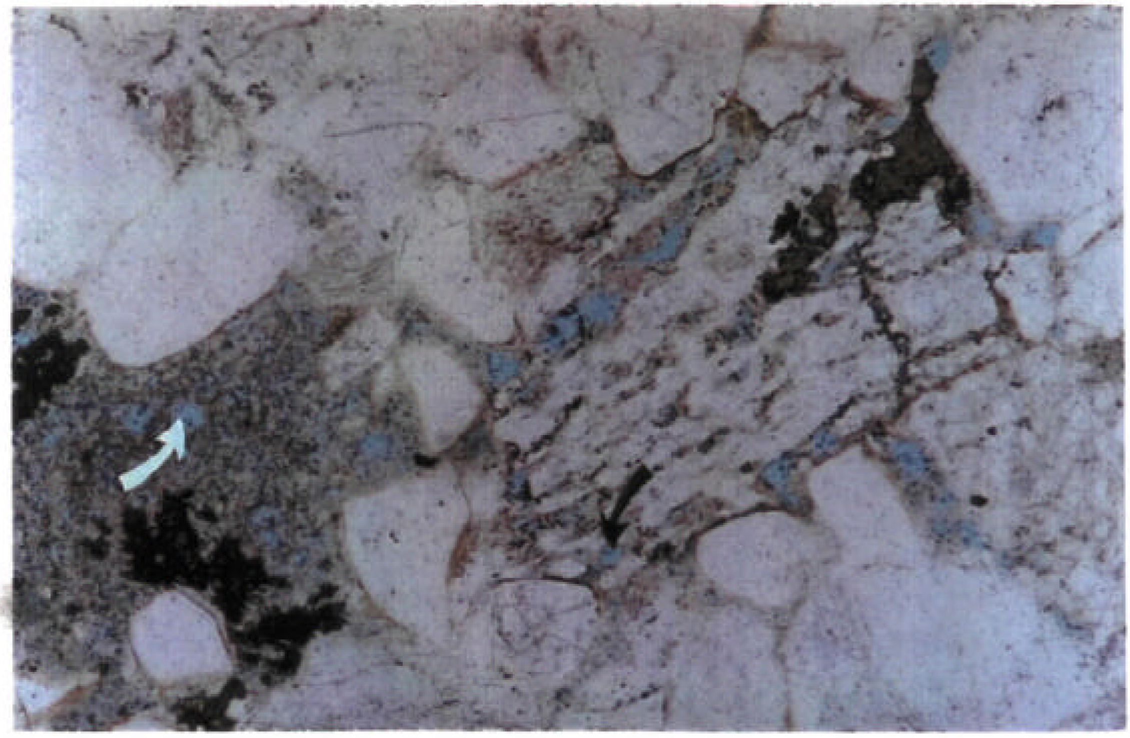


Figure 5
Intragranular pores (arrows) within altered lithics are the dominant form of porosity. Carbonate spar (dark brown) has partially replaced the lithics. Plane light. Horizontal field of view 3.37mm.

3.3.1 Big Lake-29, depth 9660.35 ft

Lithology: **Sandy Conglomerate**

Texture:

Sedimentary structures	weak grain alignment & discontinuous stylolites
Sorting	moderately
Packing	close, deformed ductile grains & micas
Avg grain size	very coarse sand
Range of grain size	fine sand to pebbles
Roundness/sphericity	subangular/ low sphericity
Pore types & distribution	rare fractures parallel grain alignment & occur within micas

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of altered quartzite, shale & granite, hydrated or expanded micas partially oxidised, accessory zircon
Matrix	organic matter outlining the stylolites, possible detrital illite
Authigenic minerals	grain replacing & pore filling illitic laths & wormy texture, grain replacing & pore filling kaolin booklets (~10-20 μm diameter) after wormy illite, rare jagged contacts with quartz overgrowths, pore filling clear blocky carbonate spar & rare Fe stained spar are late phases

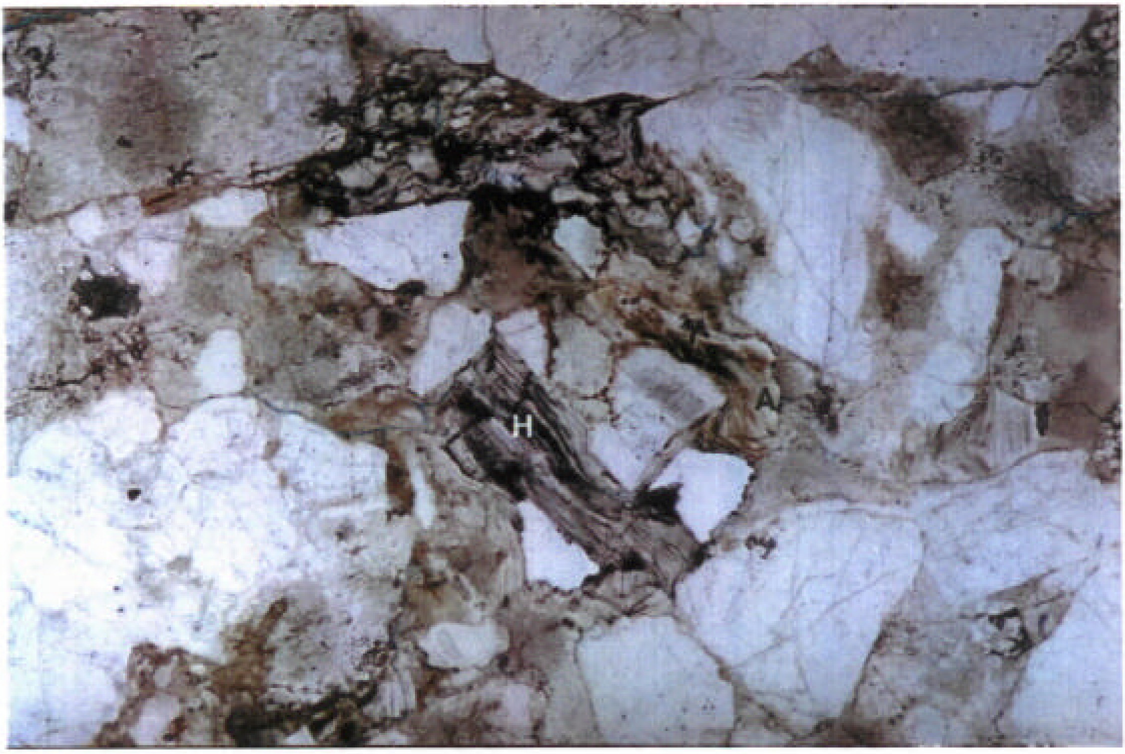


Figure 6
Hydrated mica (H) and altered micas (A) are surrounded by patches of dusty illite and kaolin, and clear grains of quartz. Plane light. Horizontal field of view 6.75mm.

3.3.2 Big Lake-29, depth 9665.0 ft

Lithology: **Micaceous sublitharenite/conglomerate**

Texture:

Sedimentary structures	planar bedding is apparent from stylolites & changes in grain size
Sorting	poor
Packing	close, deformed ductile grains
Avg grain size	coarse sand
Range of grain size	very fine sand to granules
Roundness/sphericity	angular to subangular/ low sphericity
Pore types & distribution	fractures parallel bedding

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, chert & quartzite, hydrated or expanded mica partially oxidised, accessory zircon, tourmaline, sphene, epidote & opaques concentrate in finer bed
Matrix	organic matter forms crenulated stringers, micas concentrate in the fine laminae, & there is probably some detrital illitic matrix
Authigenic minerals	illite (laths & wormy texture) & kaolin have replaced grains & filled pores, anhedral kaolin booklets are 5-20 μm diameter & form patches within the illite, rare clusters of minute sphene/anatase crystals adjacent to the stringers

Figure 7
Contact between laminae outlined by stringers of organic matter. Note the deformed illitic grain (D) and hydrated mica (H). Plane light. Horizontal field of view 6.75mm.

3.3.3 Big Lake-29, depth 9667.7 ft

Lithology:	**Sandy Conglomerate**
Texture:	
Sedimentary structures	bedding outlined by grain orientation & changes in grain size
Sorting	poor
Packing	close, deformed ductile grains
Avg grain size	very coarse sand
Range of grain size	fine sand to pebbles
Roundness/sphericity	angular to subangular/ low sphericity
Pore types & distribution	random fractures through & around grains, rare dissolution pores
Composition:	
Framework grains	monocrystalline & polycrystalline quartz, hydrated mica partially oxidised, lithics of shale, granite & quartzarenite, accessory zircon & opaques
Matrix	stringers of organic matter & probably detrital illite
Authigenic minerals	grains replaced by illite & anhedral kaolin booklets (~10 μm diameter), kaolin forms patches within the illite & has a jagged contact with rare quartz overgrowths where grains have been replaced, rare patches of blocky carbonate spar, rare bundles of fibrous chlorite and pyrophyllite in altered grains

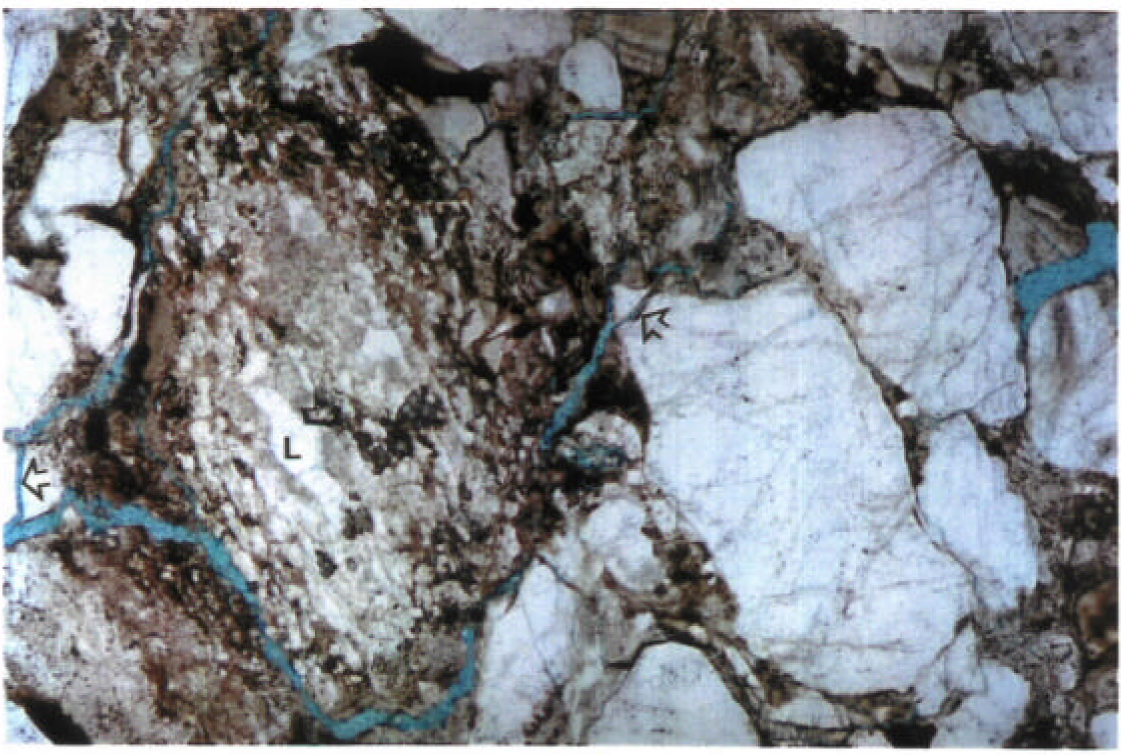


Figure 8
Fractures through grains (arrow) and around grains (blue) are the dominant form of porosity. The lithic (L) has been partially replaced by illite, chlorite and carbonate. Plane light. Horizontal field of view 6.75 mm.

3.4.1 Big Lake-31, depth 9961.92

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	none apparent but very weak grain alignment
Sorting	moderately well
Packing	moderately close, ductile grains deformed
Avg grain size	medium-coarse sand
Range of grain size	fine sand to granules
Roundness/sphericity	subrounded/ low to moderate sphericity
Pore types & distribution	micropores associated with the clay, rare dissolution pores

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of chert, micaceous schist, shale, quartzite, sandstone & illitic siltstone, accessory tourmaline, sphene, opaques & zircon
Authigenic minerals	pervasive quartz overgrowths, scalenohedra and blocky carbonate spar fills pores & appear to replace grains, pore filling & grain replacing kaolin booklets (~10-20 µm diameter) have a jagged contact with quartz, illite laths have replaced grains & form partial rims on grains, traces of illite have a wormy texture, rare fibrous chlorite replaces lithics, anatase/sphene associated with the illite

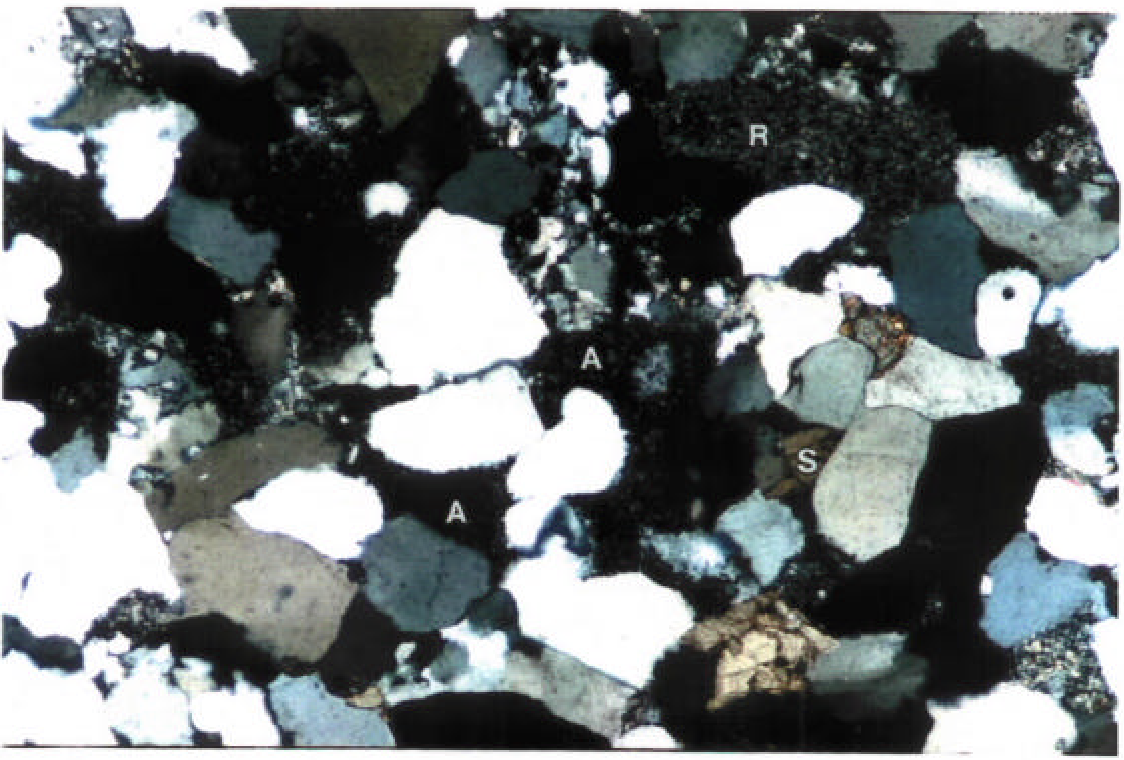


Figure 9
General view of patches of kaolin (A) which has replaced grains and filled pores. Illite has replaced (R) grains and carbonate spar (S) fills pores. Crossed nicols. Horizontal field of view 3.37mm.

3.4.2 Big Lake-31, depth 9975.75 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	none apparent
Sorting	well
Packing	moderately open, deformed ductile grains
Avg grain size	coarse sand
Range of grain size	medium to coarse sand
Roundness/sphericity	rounded/ moderate sphericity
Pore types & distribution	micropores associated with the clays

Composition:

Framework grains	monocrystalline & rare polycrystalline quartz, lithics of chert, micaceous schist, illitic siltstone, quartzite & shale, crushed muscovite, accessory tourmaline
Authigenic minerals	abundant pore filling & grain replacing kaolin booklets (~10 µm diameter) have a jagged contact with quartz overgrowths, rare vermiform kaolin ~ 40 µm diameter, traces of illite partially rimmed grains prior to kaolin, illite laths & rare illite with wormy texture (greenish) has replaced grains, trace of iron stained carbonate scalenohedra and blocky spar, anatase/sphene associated with illitic lithics

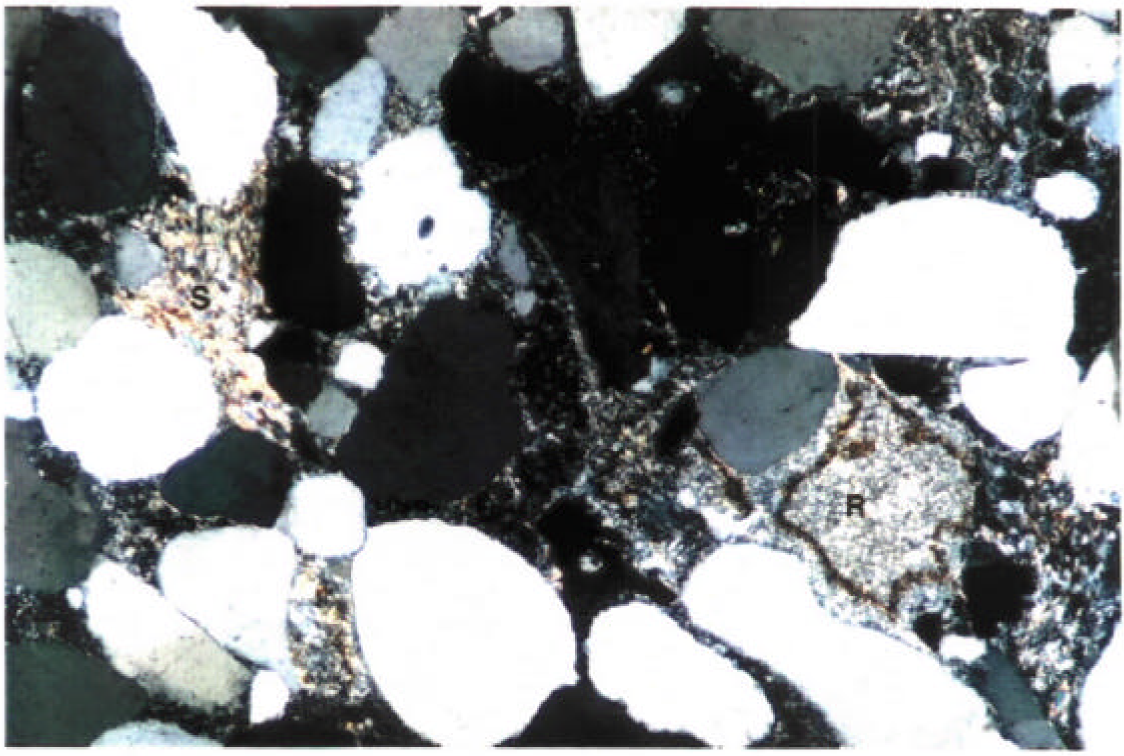


Figure 10
Deformed lithics of micaceous schist (S) and grains replaced by illite (R) contrast with the rounded monocrystalline quartz. Kaolin has filled intergranular pores & replaced grains. Crossed nicols. Horizontal field of view 3.37mm.

3.4.3 Big Lake-31, depth 9987.67 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	laminae outlined by stylolites & grain alignment
Sorting	well
Packing	close, deformed ductile grains
Avg grain size	coarse sand
Range of grain size	fine to coarse sand
Roundness/sphericity	subrounded to rounded/ low to moderate sphericity
Pore types & distribution	micropores in patches of authigenic clay, fractures parallel stylolites

Composition:

Framework grains	monocrystalline & rare polycrystalline quartz, lithics of chert, quartzite, micaceous schist, shale & illitic siltstone, chloritised deformed mica & fresh muscovite, accessory tourmaline & zircon
Matrix	detrital illite & shale lithics concentrate adjacent to discontinuous crenulated stringers of organic matter
Authigenic minerals	illite laths & wormy texture replaced grains & form partial rims on grains, pervasive quartz overgrowths, scalenohedra & blocky iron rich carbonate spar, pore filling & grain replacing kaolin booklets have jagged contact with quartz, rare fibrous chlorite bundles fill pores, grain replacing ?pyrophyllite and sphene/anatase

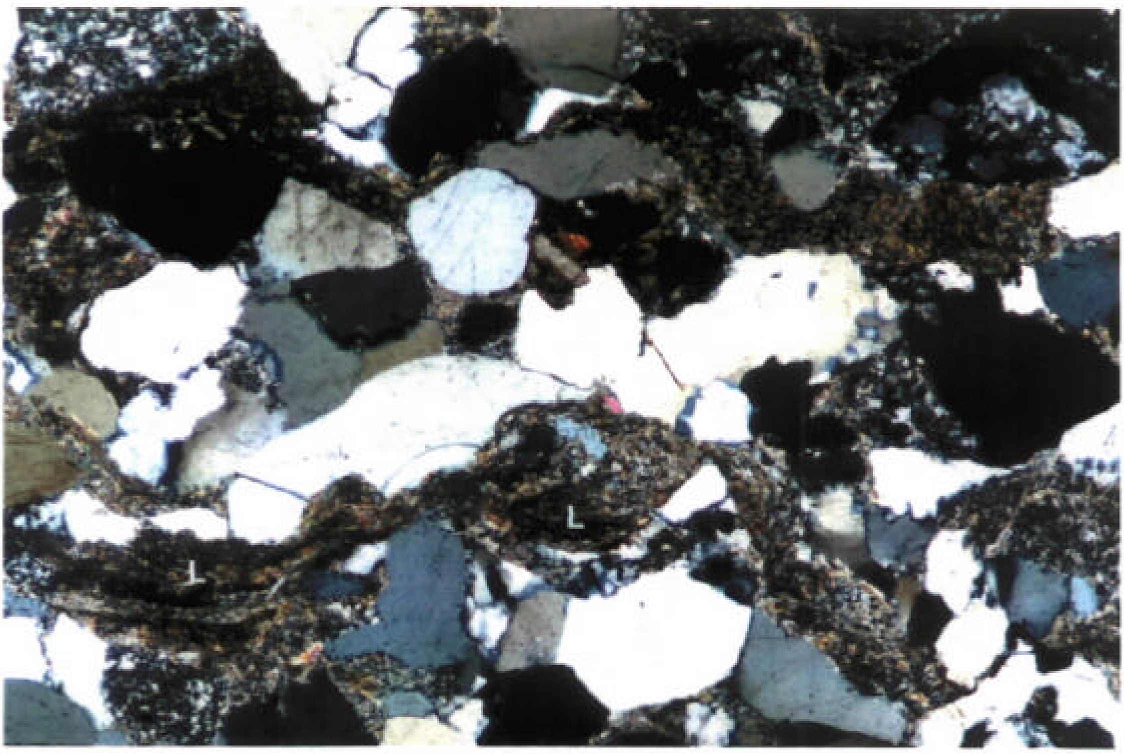


Figure 11
Stylolites developed along laminae, which have abundant shale lithics (L). Crossed nicols. Horizontal field of view 3.37mm.

3.4.4 Big Lake-31, depth 10193.96 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	weak grain orientation may indicate bedding
Sorting	very well
Packing	close, deformed ductile grains
Avg grain size	coarse sand
Range of grain size	medium to coarse sand
Roundness/sphericity	rounded to subrounded/ low to moderate sphericity
Pore types & distribution	rare intergranular pores, dissolution of carbonate spar, grain size pores, micropores associated with authigenic clay & fracture parallel to ?bedding

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of ?devitrified glass, illitic siltstone, micaceous schist, chert, quartzite & shale, accessory tourmaline
Authigenic minerals	pervasive quartz overgrowths outlined by dust rims, clear blocky corroded spar partially fills pores & appears to replace grains, grains replaced by illite laths & wormy texture, chlorite platelets fill pores & replace grains, rare grain replacing ?pyrophyllite

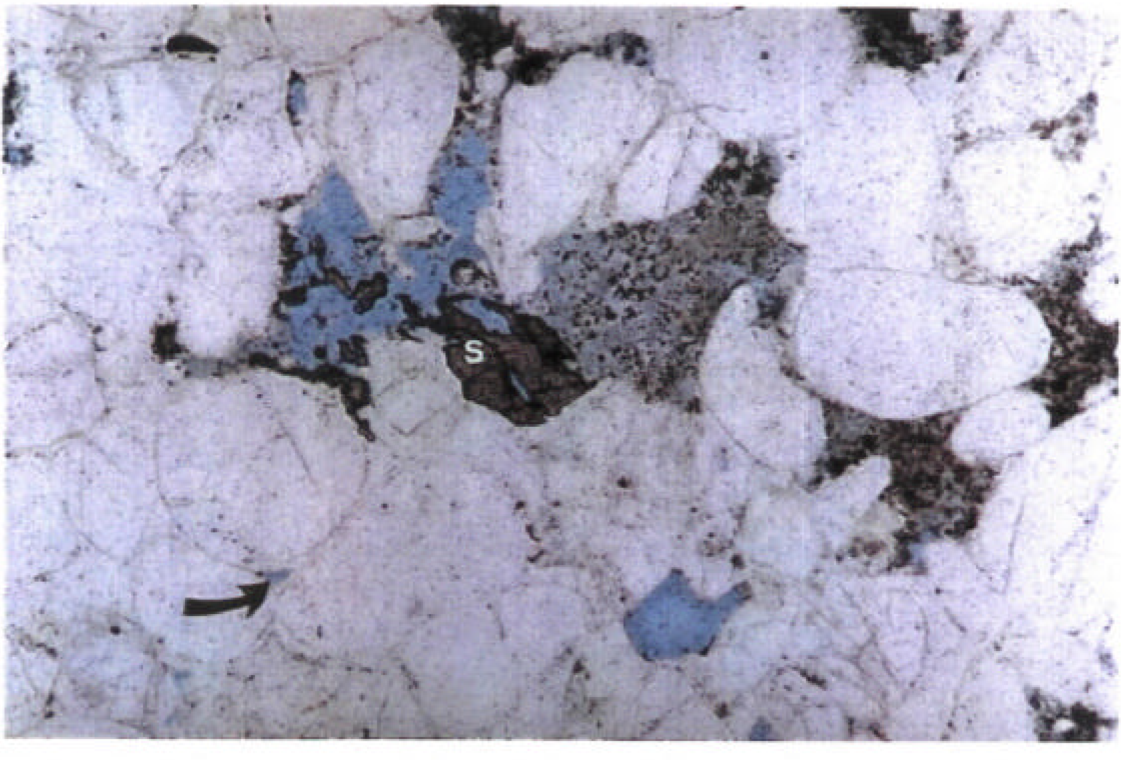


Figure 12
Corroded carbonate spar (S) on the edge of an oversize pore. Rare intergranular pores (arrow) are preserved between quartz overgrowths. Illite and chlorite have replaced the dusty deformed grains. Plane light. Horizontal field of view 3.37mm.

3.4.5 Big Lake-31, depth 10195.25 ft

Lithology: **Sandy Conglomerate**

Texture:

Sedimentary structures	none apparent
Sorting	poor
Packing	close, highly deformed grains with sutured contacts
Avg grain size	very coarse sand
Range of grain size	fine sand to pebbles
Roundness/sphericity	angular to subangular/ low to moderate sphericity
Pore types & distribution	random fractures both healed & open, grain size pores where clays plucked during thin section preparation.

Composition:

Framework grains	monocrystalline & polycrystalline quartz, expanded & partially oxidised mica, lithics of ?devitrified glass & chert, accessory corroded opaques & zircon
Matrix	anhedral brown clay concentrates along sutured grain contacts
Authigenic minerals	fractures healed with illite & then kaolin, anhedral kaolin booklets (~10 μm diameter) have replaced grains & commonly are surrounded by illite, patches of illite occur as both laths &/or have a wormy texture, carbonate spar appears to replace grains

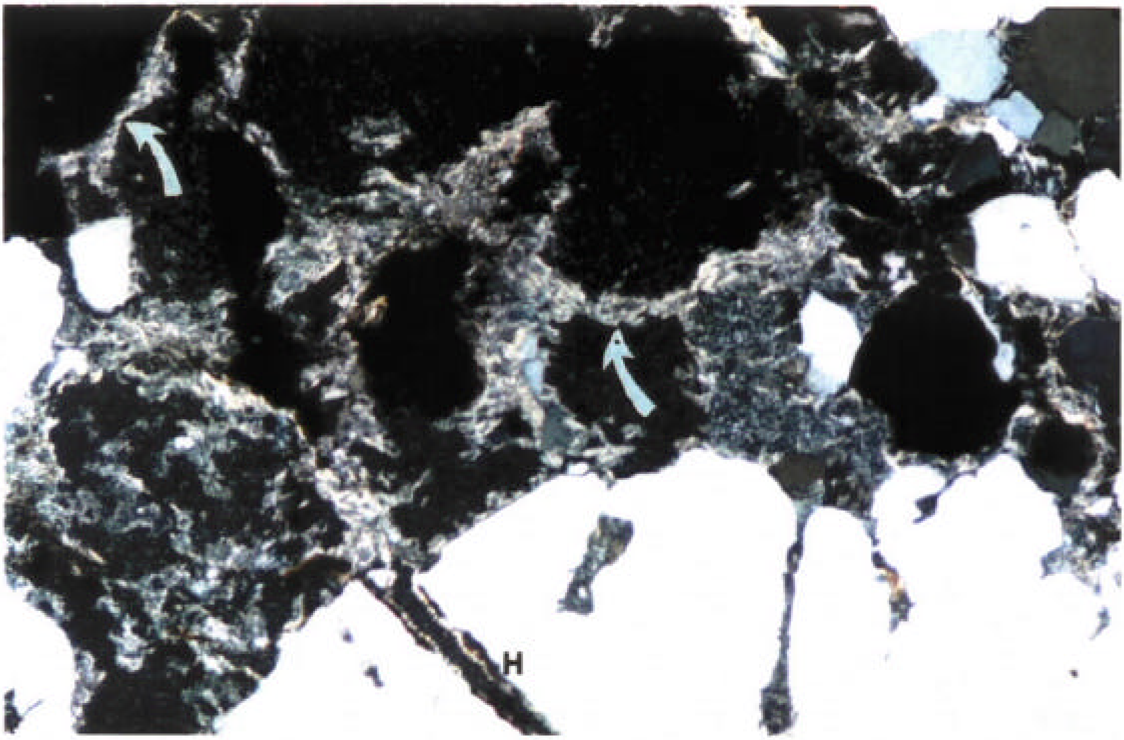


Figure 13
Patches of grain replacing kaolin are rimmed by illite (arrows). The healed fracture (H) is rimmed by illite and filled with kaolin. Crossed nicols. Horizontal field of view 6.75 mm.

3.4.6 Big Lake-31, depth 10206.19 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	weak grain alignment indicates orientation of bedding
Sorting	well
Packing	close, deformed ductile grains
Avg grain size	coarse sand
Range of grain size	fine sand to granules
Roundness/sphericity	subrounded/ low sphericity
Pore types & distribution	no macropores, but micropores associated with authigenic clays

Composition:

Framework grains	monocrystalline & minor polycrystalline quartz, lithics of shale, quartzite, chert, illitic siltstone & micaceous schist, rare straight muscovite, accessory zircon
Authigenic minerals	scalenohedral & blocky iron stained spar fills pores and replaces grains, quartz overgrowths, grains replaced by illite laths & rare wormy texture, illite forms partial rims on grains, bundles of fibrous chlorite filled pores & replaced grains, scattered anhedral crystals of sphene/anatase, rare patches of subhedral kaolin booklets (~20 μm diameter) and pyrophyllite

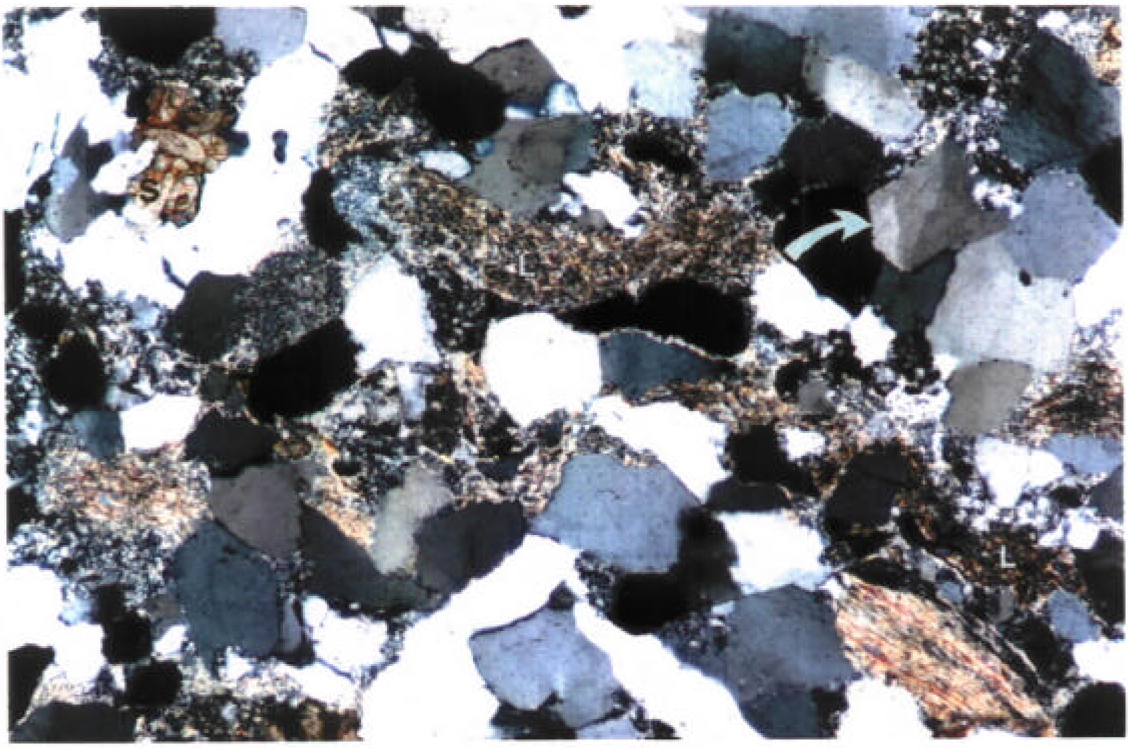


Figure 14
General field of view illustrating the abundance of deformed lithics (L). Carbonate spar (S) and quartz overgrowths (arrow) are also apparent. Crossed nicols. Horizontal field of view 3.37mm.

3.4.7 Big Lake-31, depth 10218.17 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	planar laminae indicated by changes in grain size
Sorting	well
Packing	moderately open, rare deformed ductile grains
Avg grain size	coarse sand
Range of grain size	medium to coarse sand
Roundness/sphericity	rounded/ moderate sphericity
Pore types & distribution	isolated intergranular pores, secondary grain size pores dominant, thin open fractures through grains & cement parallel to bedding, micropores

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, quartzite, micaceous schist, chert & siltstone, rare crushed mica, accessory zircon, opaques & tourmaline
Matrix	traces of illite along sutured grain contacts
Authigenic minerals	pervasive quartz overgrowths, chlorite trapped in the overgrowths, grains replaced & pores filled by fibrous chlorite, illite laths & wormy texture, ?pyrophyllite, trace of clear blocky spar, rare crystals of anatase/ sphene

Figure 15
The central grain has been replaced by chlorite. Adjacent grain size pores are also partially filled with chlorite. Note the open fracture (arrow). Plane light. Horizontal field of view 3.37mm.

3.4.8 Big Lake-31, depth 10224.71 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	stylolites
Sorting	well
Packing	moderately open except adjacent to stylolites where grain contacts are sutured
Avg grain size	coarse sand
Range of grain size	fine to very coarse sand
Roundness/sphericity	rounded/ moderate sphericity
Pore types & distribution	grain size & oversize pores, rare intergranular pores, micropores associated with authigenic clays

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of quartzite, micaceous schist, shale, illitic siltstone & chert (& possibly other volcanics), straight & crushed muscovite, accessory zircon & tourmaline
Matrix	detrital illite concentrates along the stylolites
Authigenic minerals	pervasive quartz overgrowths & prisms, traces of blocky clear spar, fibrous chlorite has replaced grains & filled pores, illite with wormy texture and/or laths has replaced grains, crystals of anatase/sphene, grains replaced by ?pyrophyllite

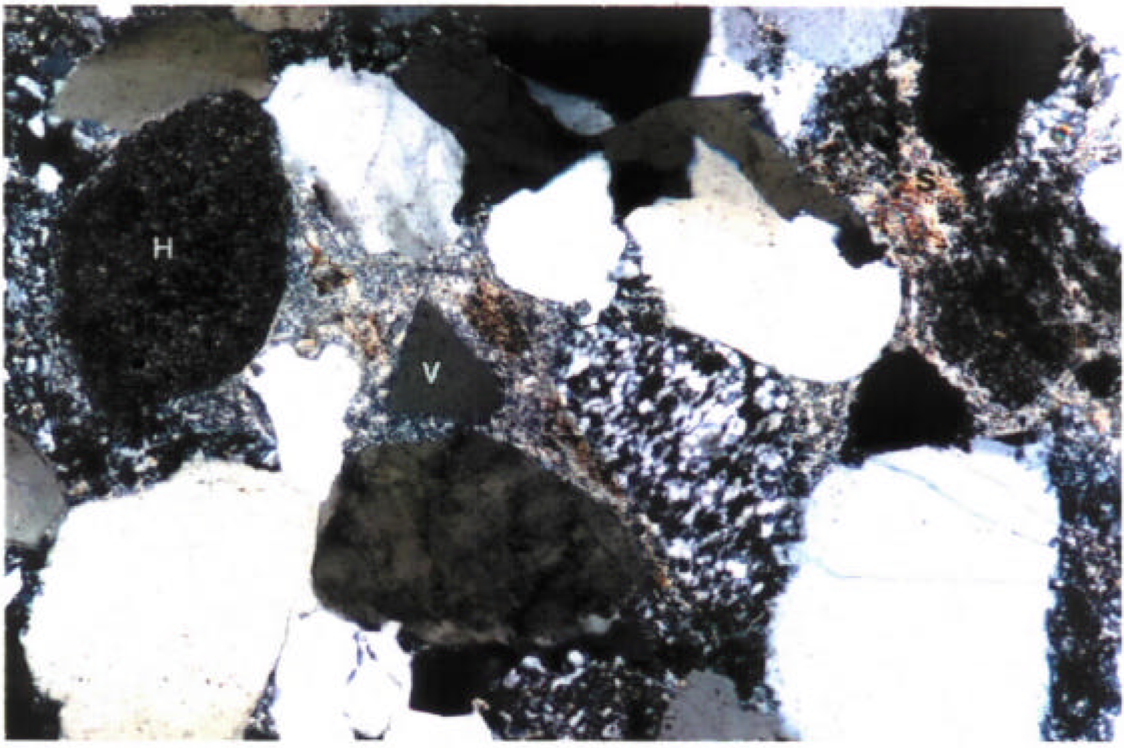


Figure 16
Lithics of chert (H), shale (S) and possible volcanics (V) are evident. Note the angular quartz within the ?volcanic lithic. Surrounding quartz grains are cemented by quartz overgrowths. Crossed nicols. Horizontal field of view 3.37mm.

3.5.1 Big Lake-32, depth 9359.11 ft

Lithology:	**Sandy conglomerate/Sandstone**
Texture:	
Sedimentary structures	interbedded conglomerate & sandstone, stylolites separate lithics in the conglomerate
Sorting	moderate
Packing	close in conglomerate, moderately open in the sandstone
Avg grain size	coarse sand
Range of grain size	medium sand to pebbles
Roundness/sphericity	sandstone: subrounded / low to moderate sphericity, conglomerate: subangular/ low sphericity
Pore types & distribution	sandstone: grain size pores & micropores associated with kaolin, conglomerate: intragranular pores within lithics
Sandstone Composition:	
Framework grains	dominantly monocrystalline & polycrystalline quartz, minor lithics of shale, siltstone, micaceous schist, chert, quartzite & ?volcanics
Matrix	one bed contains brown anhedral clay & has illite along a stylolite
Authigenic minerals	abundant pore filling kaolin, blocky & scalenohedral carbonate spar, illite laths & chlorite have replaced grains, rare quartz overgrowths
Conglomerate Composition:	
Framework grains	minor monocrystalline & polycrystalline quartz, dominantly lithics of illitic siltstone, sandstone, shale, chert, quartzite, micaceous schist & ?volcanics, altered mica (?hydrated), accessory tourmaline & zircon
Matrix	illite concentrates along the stylolites
Authigenic minerals	pore filling kaolin, illite with wormy texture and/or laths has replaced grains, rare quartz overgrowths, blocky carbonate spar, and sphene/anatase in the stylolites

Figure 17
Contact between sandstone and conglomerate. A grain size pores (blue) is apparent in the sandstone. Note the stylolite developed between lithics of illitic siltstone (T) and quartzite (Q) in the conglomerate. Plane light. Horizontal field of view 6.75 mm.

3.5.2 Big Lake-32, depth 9361.21 ft

Lithology:	**Sandy Conglomerate**
Texture:	
Sedimentary structures	numerous stylolites indicate the orientation of bedding, interfingering of conglomerate & rare sandstone
Sorting	poor
Packing	close, sutured contacts & deformed ductile grains
Avg grain size	very coarse sand
Range of grain size	medium sand to pebbles
Roundness/sphericity	subangular to rounded/ low to moderate sphericity
Pore types & distribution	micropores associated with authigenic clays, rare fractures
Composition:	
Framework grains	dominantly granules of shale, quartzite, illitic siltstone & sandstone, chert, micaceous schist & ?volcanics, minor monocrystalline & polycrystalline quartz in the sandstone, rare muscovite flakes (fresh & altered), accessory zircon, tourmaline & opaques concentrate in the stylolites
Matrix	organic matter & illite outline the stylolites
Authigenic minerals	illite laths & wormy texture have replaced grains, pore filling & grain replacing kaolin concentrates in the sandstone, sphene/anatase, oxidation within lithics, grain replacing ?pyrophyllite & rare quartz overgrowths

Figure 18
Medium amplitude stylolites (opaque) separate lithics of various lithologies. Note the highly altered texture of the ?volcanic lithic (L). Plane light. Horizontal field of view 6.75 mm.

3.5.3 Big Lake-32, depth 9374.21 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	cross bedding is outlined by stylolites & changes in grain size
Sorting	well
Packing	close, deformed ductile grains
Avg grain size	medium sand
Range of grain size	fine to coarse sand
Roundness/sphericity	angular to subrounded/ low sphericity
Pore types & distribution	isolated dissolution pores rarely associated with corroded carbonate, micropores

Composition:

Framework grains	dominantly monocrystalline quartz, rare polycrystalline quartz, lithics of chert, quartzite, illitic siltstone & sandstone, ?volcanics & shale, muscovite, accessory zircon, opaques & tourmaline
Matrix	anhedral brown clay rims pores, illitic clay & organic matter in stylolites
Authigenic minerals	quartz overgrowths, blocky & scalenohedral iron stained carbonate spar filled pores & replaced grains after quartz, pore filling kaolin (~10 μm diameter), sphene/anatase, greenish illite with wormy texture & laths replaced grains, ?pyrophyllite

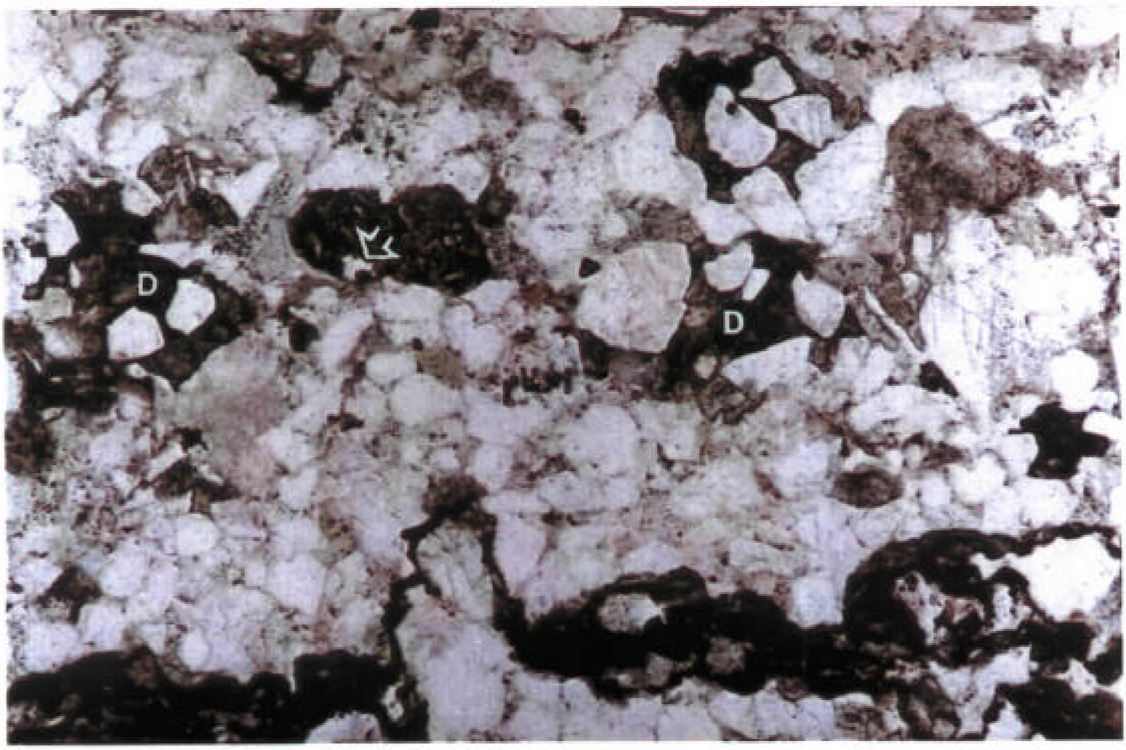


Figure 19
Patches of dusty carbonate cement (D) are evident. Low to medium amplitude stylolites are outlined by opaque material. Note the glass shards (arrow) in the volcanic lithic. Plane light. Horizontal field of view 3.37 mm.

3.5.4 Big Lake-32, depth 9375.92 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	grain alignment indicates the orientation of bedding
Sorting	moderately well
Packing	moderately open, except where ductile grains have been deformed
Avg grain size	coarse sand
Range of grain size	fine to very coarse sand
Roundness/sphericity	subrounded/ low to moderate sphericity
Pore types & distribution	scattered grain size & oversize dissolution pores, rare fractures, intergranular & intragranular pores & micropores

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, quartzite, micaceous schist, illitic sandstone, siltstone & chert, muscovite, accessory tourmaline, opaques & zircon
Matrix	detrital illite concentrates along sutured grain contacts, brown staining on the rims of pores filled with kaolin may be detrital clay, trace organic matter
Authigenic minerals	pore filling kaolin booklets (~10-20 µm diameter) have jagged contact with quartz overgrowths, blocky carbonate spar precipitated after quartz and kaolin, illite laths/wormy texture & fibrous brown chlorite have replaced grains, anatase/sphene

Figure 20
Angular intergranular pore (blue) remains despite quartz overgrowths. Note brown rim (arrow) where lithics have been deformed (D) and a grain has been replaced by kaolin and sphene/anatase (opaque). Dusty pore filling carbonate spar is also apparent. Plane light. Horizontal field of view 3.37 mm.

3.5.5 Big Lake-32, depth 9390.67 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	none apparent
Sorting	moderately well
Packing	moderately close, deformed ductile grains
Avg grain size	coarse sand
Range of grain size	fine to very coarse sand
Roundness/sphericity	rounded/ low to moderate sphericity
Pore types & distribution	intergranular & dissolution pores scattered throughout, micropores associated with clays

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of siltstone, quartzite, chert, ?volcanics & shale, muscovite, accessory zircon, tourmaline & opaques
Matrix	anhedral brown clay fills pores & inhibits quartz overgrowths, illite concentrates along sutured grain contacts, opaque material in intergranular pores could be reservoir bitumen
Authigenic minerals	pervasive quartz overgrowths, pore filling & grain replacing kaolin booklets (~10 µm diameter) have a brown stain (?hydrocarbons), illite laths & rare wormy texture have replaced grains, clear & dusty blocky & scalenohedral (radiating blades) carbonate spar fills pores, rare fibrous bundles of brown chlorite

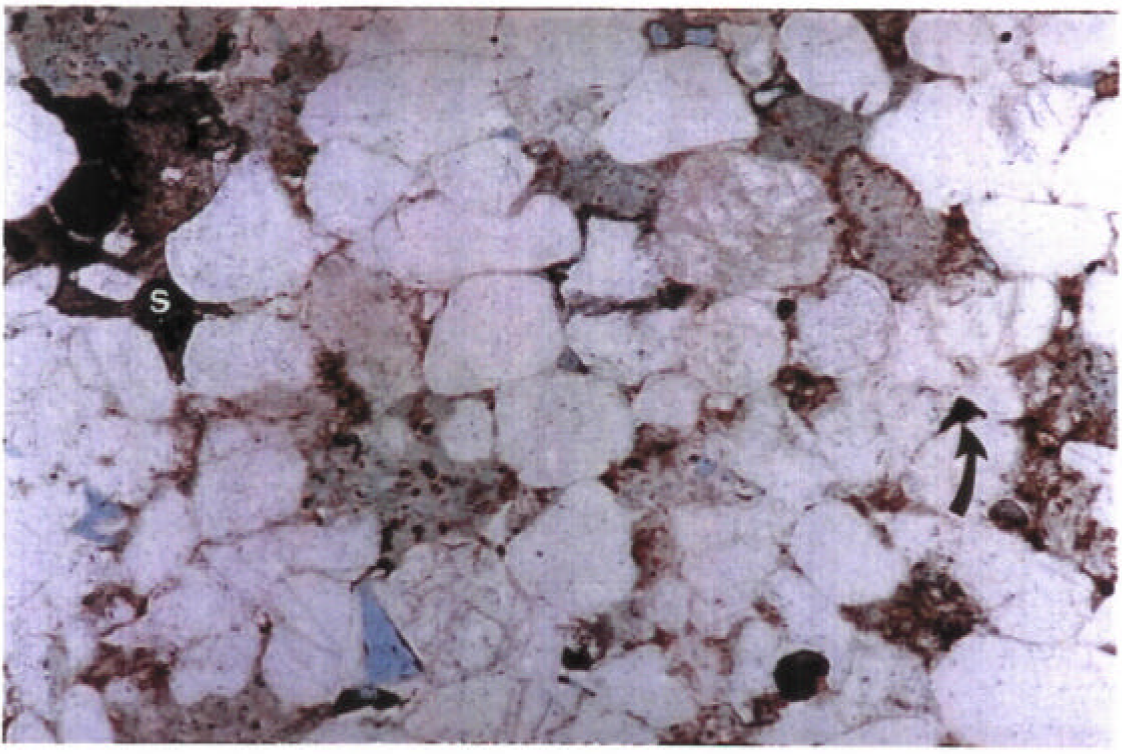


Figure 21
Patchy brown clay rims and fills pores. Intergranular pores (blue) are angular and rarely filled with organic matter (arrow). Note the carbonate spar (S) forming a patchy cement. Plane light. Horizontal field of view 3.37mm.

3.5.6 Big Lake-32, depth 9399.83 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	grain alignment indicates the orientation of bedding
Sorting	moderate
Packing	moderately open except ductile grains are deformed
Avg grain size	coarse sand
Range of grain size	fine sand to pebbles
Roundness/sphericity	subrounded to rounded/ low to moderate sphericity
Pore types & distribution	scattered intergranular & intragranular pores, grain size & oversize pores, micropores associated with the clay, fractures parallel to bedding

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of chert, micaceous schist, siltstone, quartzite, shale & ?devitrified glass, accessory tourmaline, opaques & ?epidote
Matrix	illite concentrates along sutured grain contacts
Authigenic minerals	quartz overgrowths, zoned iron rich scalenohedral carbonate spar fills pores & replaces ?glass, pore filling & grain replacing kaolin, wormy texture illite & illite laths replace grains, sphene/anatase, pyrophyllite

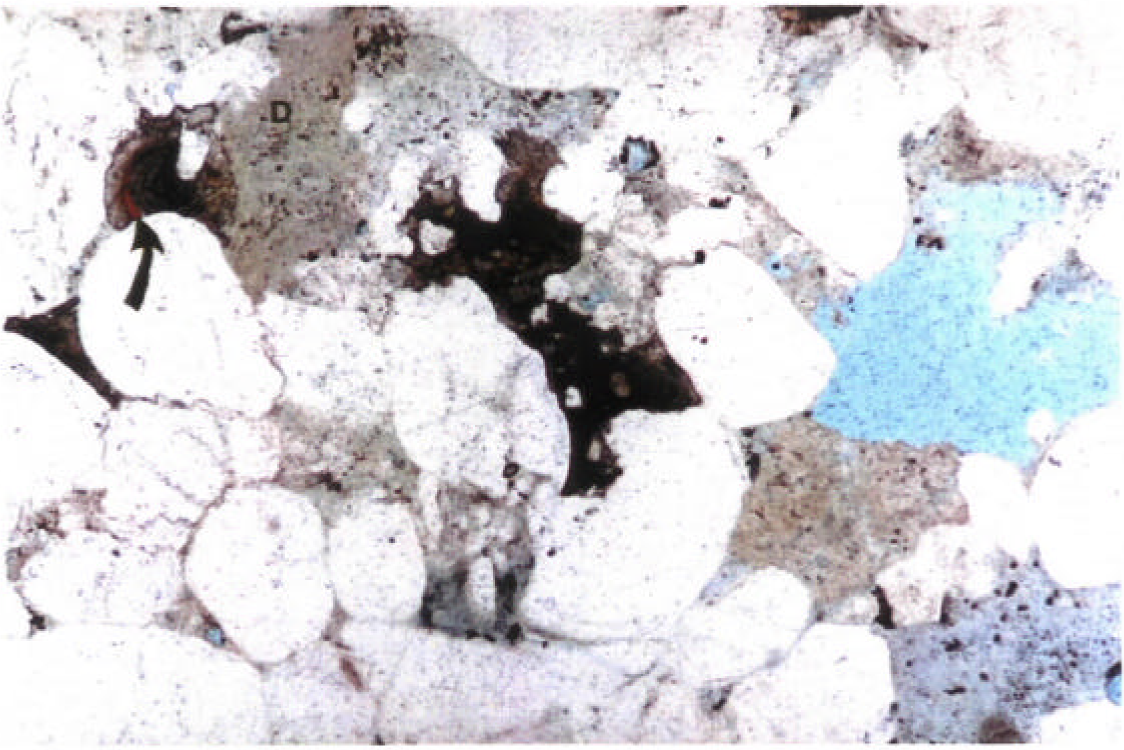


Figure 22
Zonation in the carbonate spar is pronounced due to the iron rich (arrow) interval. Adjacent grain replaced by illite laths is deformed (D). Rare intergranular & oversize pores (blue) are apparent. Plane light. Horizontal field of view 3.37mm.

3.5.7 Big Lake-32, depth 9406.04 ft

Lithology:	**Sublitharenite**
Texture:	
Sedimentary structures	none apparent
Sorting	well
Packing	moderately open, except for ductile grains which are deformed
Avg grain size	medium sand
Range of grain size	fine to coarse sand
Roundness/sphericity	subrounded to rounded/ low to moderate sphericity
Pore types & distribution	scattered intergranular pores, grain size pores & micropores associated with the clays
Composition:	
Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, quartzite, chert, siltstone, sandstone, micaceous schist & ?volcanics, accessory tourmaline & zircon
Matrix	traces of illite concentrate along sutured contacts
Authigenic minerals	quartz overgrowths (rare sutured contacts), grain replacing kaolin, carbonate spar forms a patch around a large siltstone lithic elsewhere it fills pores, grain replaced by ?pyrophyllite, grain replacing illite of laths or wormy texture, sphene/anatase

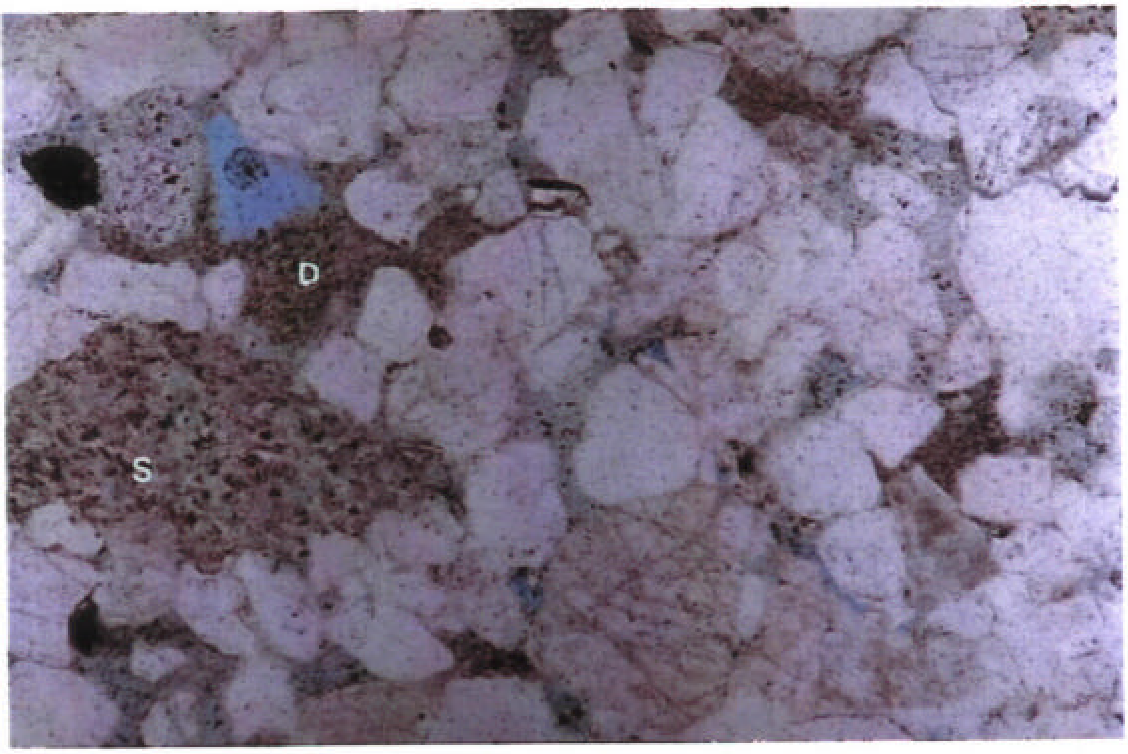


Figure 23
General field of view showing isolated dissolution and intergranular pores (blue), deformed shale lithics (D), a siltstone lithic (S) & carbonate spar (dark brown). Plane light. Horizontal field of view 3.37 mm.

3.5.8 Big Lake-32, depth 9410 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	weak grain alignment
Sorting	moderately well
Packing	moderately open, deformed ductile grains
Avg grain size	coarse sand
Range of grain size	fine sand to pebbles
Roundness/sphericity	rounded/ low to moderate sphericity
Pore types & distribution	intergranular, grain size, oversize, fractures parallel bedding, micropores associated with clays

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, chert, illitic siltstone, quartzite, ?volcanics & micaceous schist, accessory zircon
Matrix	rare intergranular pores are filled with organic matter
Authigenic minerals	pervasive quartz overgrowths, pore filling blocky & scalenohedral carbonate spar, pore filling & grain replacing kaolin booklets (~15 μm diameter) are commonly stained brown (?possibly due to hydrocarbons), illite laths & wormy texture replace grains, grain replaced by ?pyrophyllite, anatase/sphene, fibrous dark brown chlorite

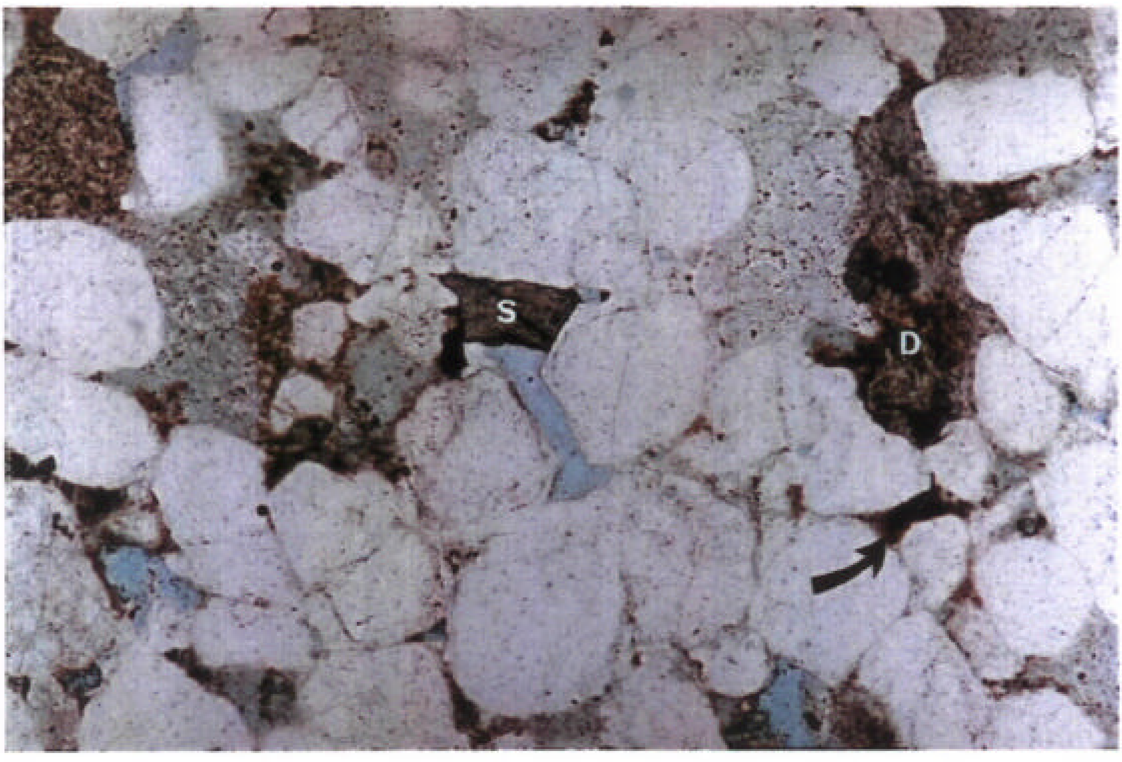


Figure 24
Carbonate spar (S) partially fills an intergranular pore. Brown ?chlorite has partially replaced a deformed (D) shale lithic and fills an intergranular pore (arrow). Plane light. Horizontal field of view 3.37mm.

3.5.9 Big Lake-32, depth 9415.5 ft

Lithology:	**Sublitharenite**
Texture:	
Sedimentary structures	stylolites, bedding
Sorting	moderate
Packing	moderately close, deformed ductile grains
Avg grain size	coarse sand
Range of grain size	fine sand to pebbles
Roundness/sphericity	subangular to subrounded/ low sphericity
Pore types & distribution	fracture parallel to bedding, micropores associated with the clay
Composition:	
Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, quartzite, illitic siltstone, micaceous schist & chert, muscovite, accessory tourmaline, opaques & zircon
Matrix	illite rims grains & concentrates along sutured contacts, pronounced in one bed, organic matter outlines the stylolites
Authigenic minerals	pervasive quartz overgrowths outlined by dust rims, kaolin booklets replace grains & fill pores, illite laths & wormy texture replace grains, blocky & scalenohedral iron stained carbonate spar, grain replaced by ?pyrophyllite, sphene/anatase

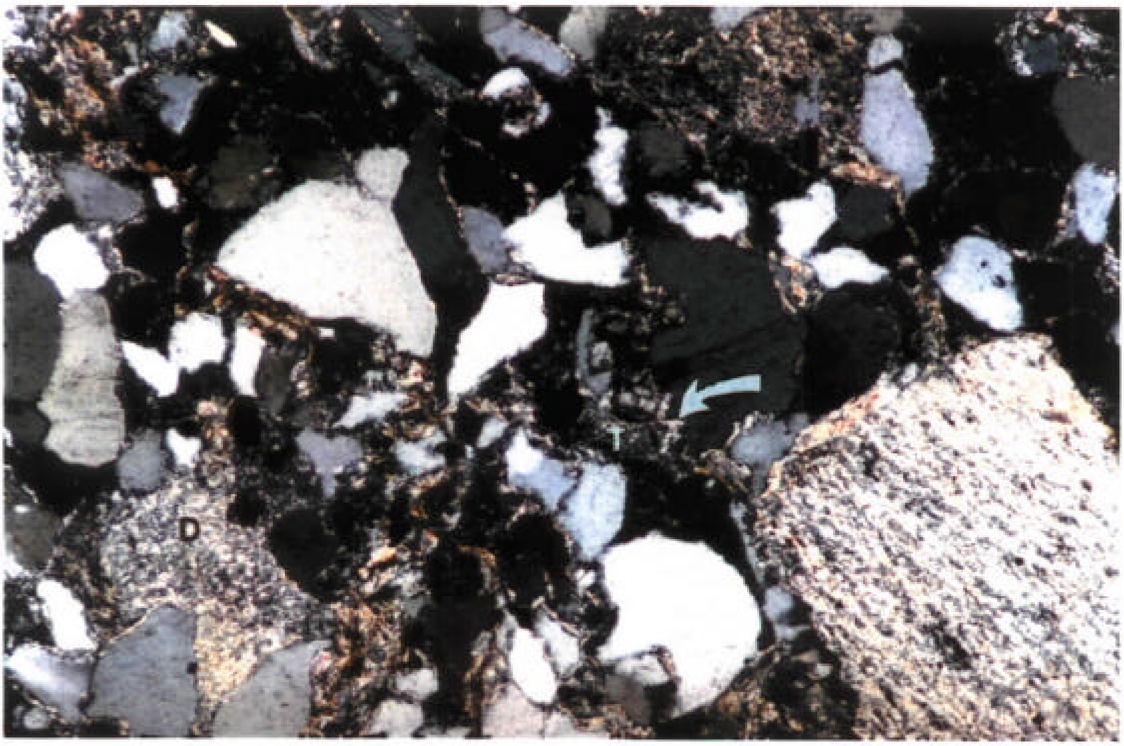


Figure 25
Immediately below the stylolites grains are rimmed by illite (arrow) and kaolin booklets (T) fill the pores. Note the highly deformed (D) shale lithic and the larger shale lithic, which was not significantly deformed. Crossed nicols. Horizontal field of view 3.37mm.

3.6.1 Big Lake-33, depth 10076.21 ft

Lithology:	**Sublitharenite**
Texture:	
Sedimentary structures	planar laminae indicated by changes in grain size & grain orientation
Sorting	well
Packing	close, sutured contacts
Avg grain size	medium sand
Range of grain size	fine to coarse sand
Roundness/sphericity	subrounded/ low sphericity
Pore types & distribution	rare grain size pores, micropores associated with the clay & fracture parallel to bedding
Composition:	
Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, chert, illitic siltstone, micaceous schist & quartzite, accessory tourmaline, opaques & zircon
Matrix	illite concentrates in the finer laminae
Authigenic minerals	quartz overgrowths in the coarser laminae, bundles of fibrous brown chlorite fill pores & partially replace grains, blocky carbonate spar, illite laths & wormy texture replace grains, sphene/anatase, rare patches of grain replacing kaolin booklets

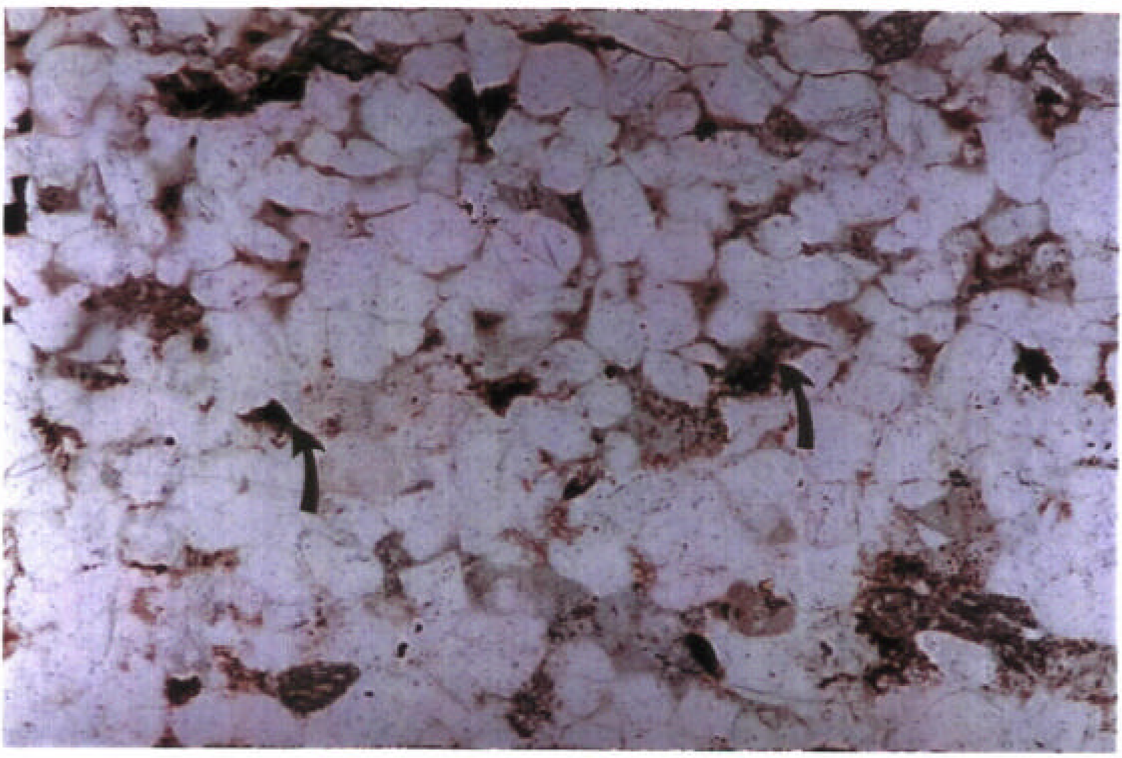


Figure 26
In the finer grained laminae grains are rimmed by detrital illite (pale brown). In the coarser laminae traces of dark brown (arrows) on the edge or replacing grains is composed of chlorite. Plane light. Horizontal field of view 3.37 mm.

3.6.2 Big Lake-33, depth 10,088 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	laminae are evident due to changes in grain size
Sorting	well
Packing	close, deformed ductile grains
Avg grain size	medium sand
Range of grain size	very fine to coarse sand
Roundness/sphericity	subrounded to rounded/ low sphericity
Pore types & distribution	rare intergranular & grain size pores, micropores associated with the clay

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, quartzite, illitic siltstone, micaceous schist, ?devitrified glass & chert, muscovite, accessory zircon, opaques, ?rutile & tourmaline
Matrix	illite occurs along sutured grain contacts & is trapped within quartz overgrowths
Authigenic minerals	illite laths & wormy texture, kaolin booklets, ?pyrophyllite, sphene/anatase, quartz overgrowths, platelets of pale green chlorite & fibrous brown chlorite replace grains & fill pores, trace of carbonate spar

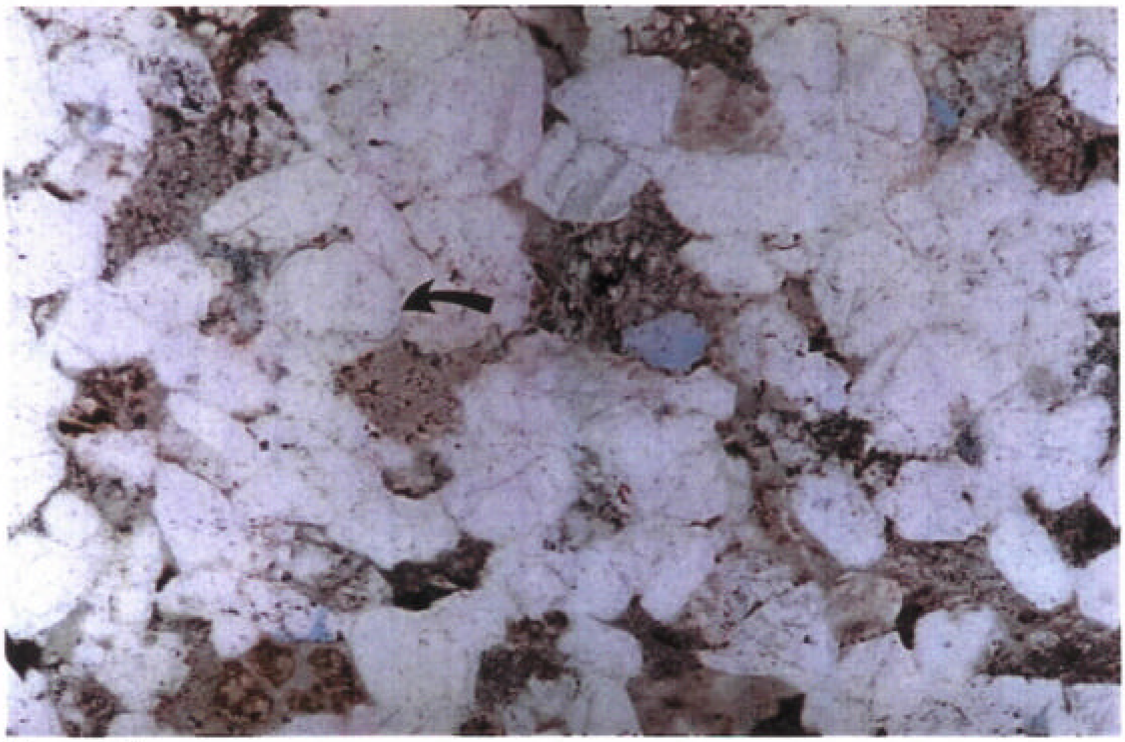


Figure 27
Abundant deformed ductile & altered grains (brown). Rare dissolution & intergranular pores (blue). Note rounded (arrow) nature of grains prior to silicification. Plane light. Horizontal field of view 3.37mm.

3.6.3 Big Lake-33, depth 10090.33 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	weak grain alignment indicates the orientation of bedding
Sorting	moderately well
Packing	close, deformed ductile grains
Avg grain size	medium sand
Range of grain size	fine to coarse sand
Roundness/sphericity	subrounded/ low sphericity
Pore types & distribution	rare grain size pores & micropores associated with the clays

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, quartzite, micaceous schist, chert & ?altered volcanics, muscovite, accessory zircon, sphene, opaques & tourmaline
Matrix	traces of illite are trapped between grains
Authigenic minerals	pseudohexagonal platelets of pale green chlorite replace grains & fibrous brown chlorite fills pores, illite with wormy texture & fibrous illite replace grains, ?pyrophyllite, kaolin booklets replace grains, quartz overgrowths, sphene growing on edge of detrital sphene, rare ?oxidised grains, trace carbonate spar

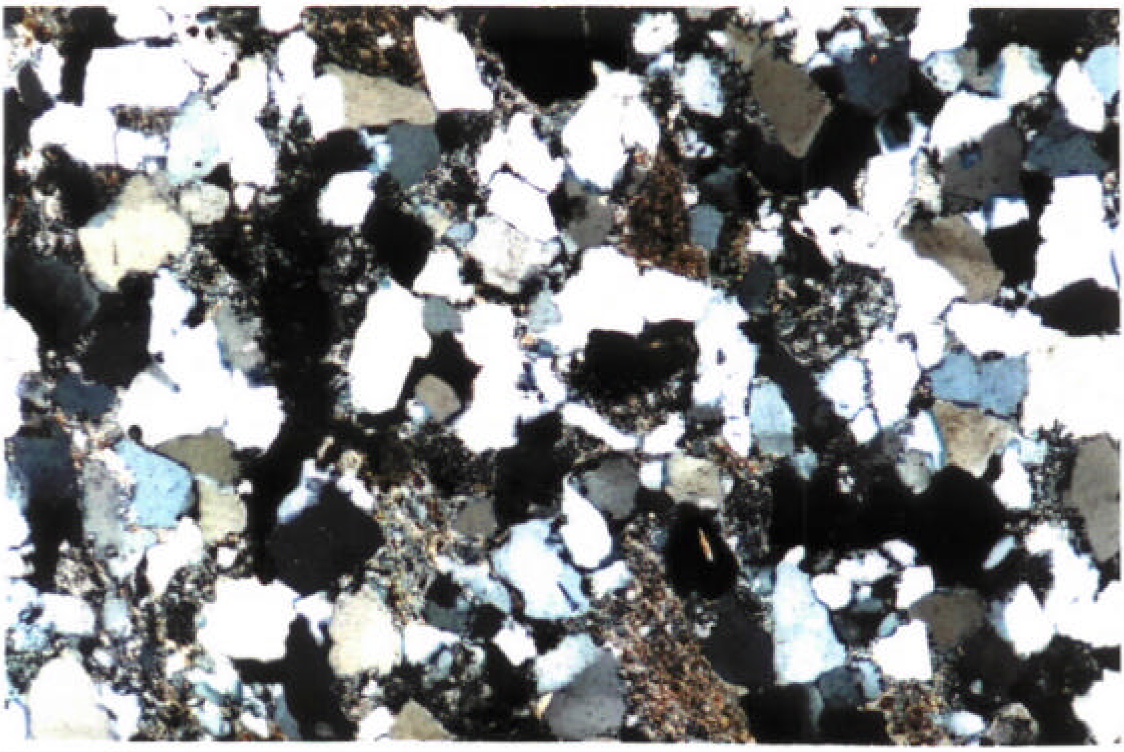


Figure 28
General view illustrating the high percentage of grains either composed of or replaced by illite/ chlorite. Crossed nicols. Horizontal field of view 3.37 mm.

3.7.1 Big Lake-34, depth 9814.71 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	subtle changes in grain size & concentration of accessory minerals indicate laminae
Sorting	well
Packing	moderately open, minor deformed ductile grains
Avg grain size	medium sand
Range of grain size	very fine to coarse sand
Roundness/sphericity	subrounded to rounded/ low to moderate sphericity
Pore types & distribution	scattered grain size pores, rare intergranular pores, micropores associated with clays, fracture parallel to bedding

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of chert, shale, micaceous schist & quartzite, muscovite, accessory tourmaline, sphene, opaques & zircon
Authigenic minerals	fibrous bundles of yellowish-brown chlorite, illite laths & wormy texture replace grains, pervasive quartz overgrowths, grain replacing kaolin booklets, minor oxidation of chlorite, sphene/anatase, traces of clear carbonate spar, ?pyrophyllite

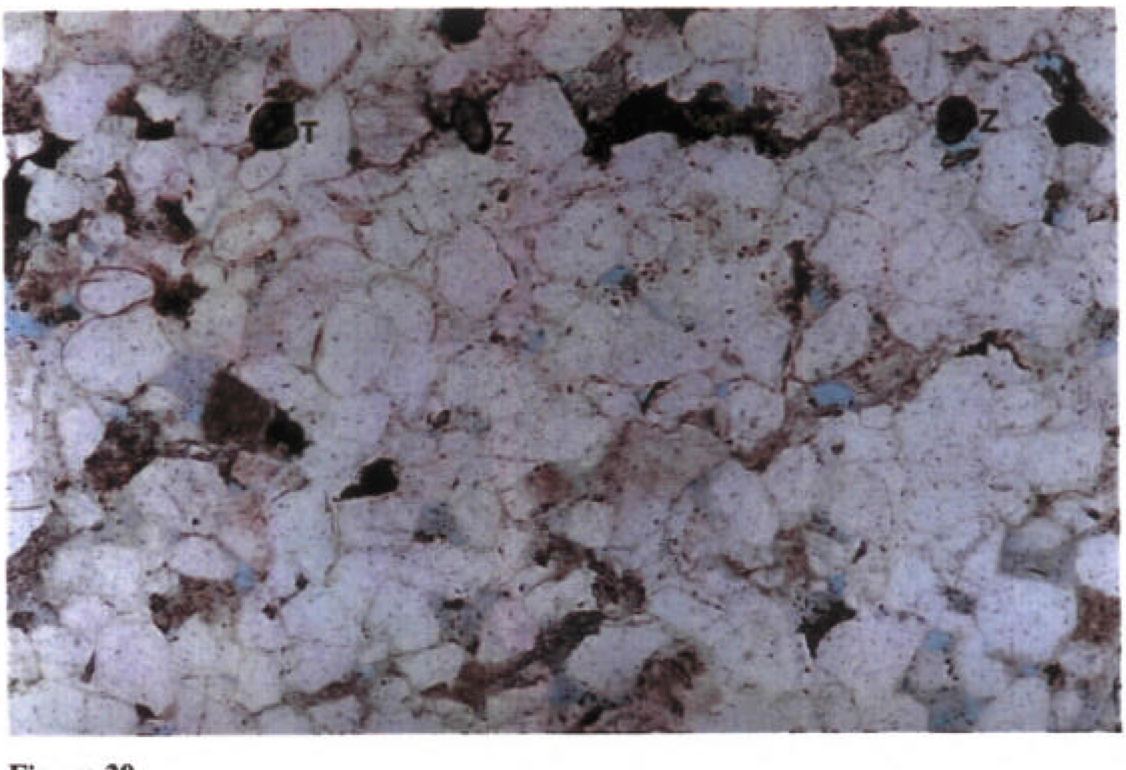


Figure 29
Concentration of zircon (Z) and tourmaline (T) indicates the orientation of laminae. Dissolution pores and intergranular pores are apparent. Note the rounded nature of grains prior to silicification. Plane light. Horizontal field of view 3.37 mm.

3.7.2 Big Lake-34, depth 9820.69 ft

Lithology: **Litharenite**

Texture:

Sedimentary structures	grain alignment indicates the orientation of bedding
Sorting	moderately well
Packing	close, stylolites, deformed ductile grains
Avg grain size	coarse sand
Range of grain size	medium to very coarse sand
Roundness/sphericity	subangular to subrounded / low sphericity
Pore types & distribution	dominantly micropores associated with kaolin

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of quartzite, chert, shale, micaceous schist, ?volcanics & siltstone, accessory zircon, opaques & tourmaline
Matrix	detrital illite & traces of organic matter concentrate along sutured grain contacts
Authigenic minerals	quartz overgrowths, fibrous bundles of yellowish & dark brown chlorite, kaolin booklets, illite laths & wormy texture replaces grains, ?pyrophyllite, carbonate replaces chlorite, sphene/anatase

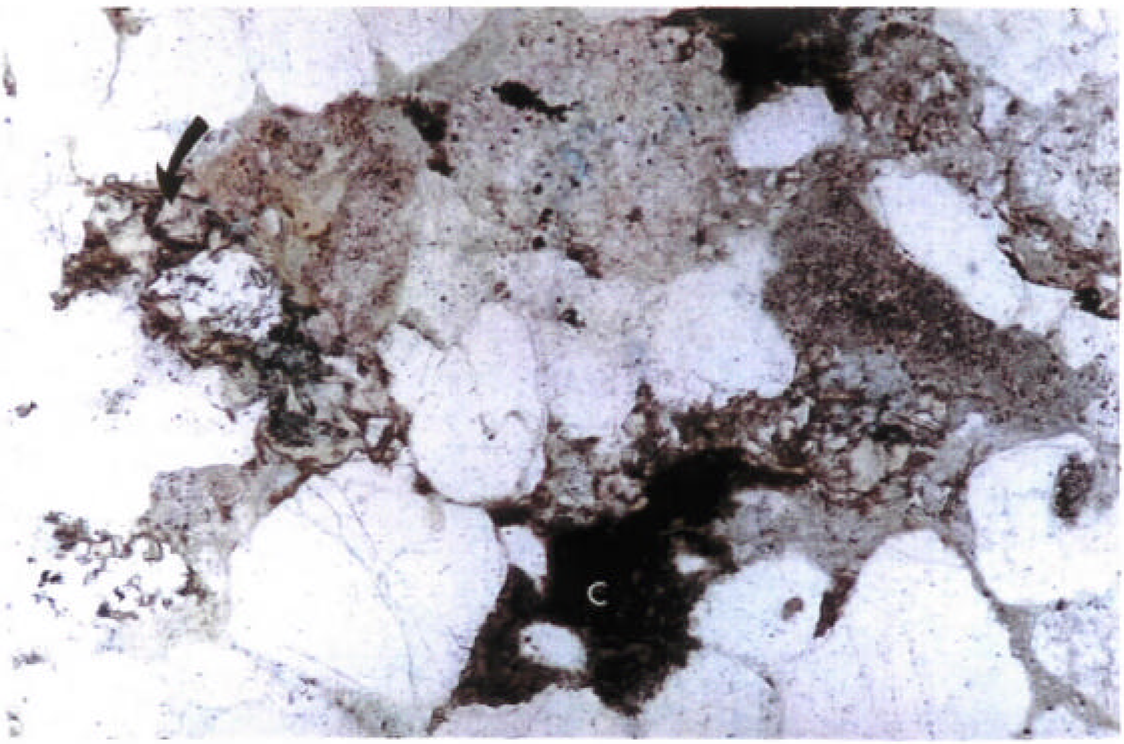


Figure 30
Fibrous yellowish chlorite (arrows) and brown chlorite (C) has replaced grains. Other dusty grains are composed of chert, quartzite and illite. Plane light. Horizontal field of view 3.37mm.

3.7.3 Big Lake-34, depth 9822.04 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	weak alignment of elongate grains may indicate laminae
Sorting	well
Packing	moderately open, minor deformed ductile grains
Avg grain size	coarse
Range of grain size	fine to very coarse sand
Roundness/sphericity	rounded / low to moderate sphericity
Pore types & distribution	intergranular, intragranular in quartzite, grain size, micropores associated with clays

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of quartzite, micaceous schist, illitic siltstone, shale & chert, muscovite & biotite, accessory tourmaline
Authigenic minerals	bundles of fibrous yellow chlorite fill pores & replace grains, quartz overgrowths, illite laths & wormy texture replace grains, pores are filled & grains replaced by kaolin booklets, traces of clear carbonate spar postdate other authigenic minerals, rare grain replacing ?pyrophyllite, sphene/anatase

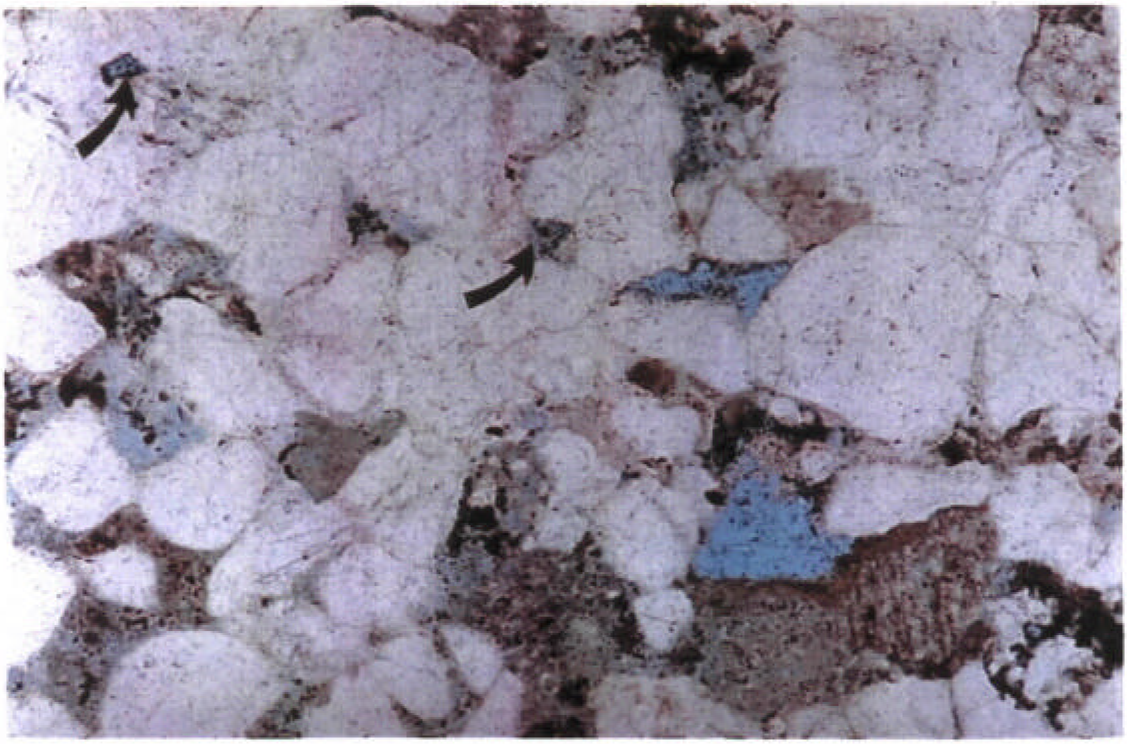


Figure 31
Grain size pores and minute angular intergranular pores (arrows) are apparent. Dusty grains have been replaced by illite and darker brown chlorite. Plane light. Horizontal field of view 3.37mm.

3.7.4 Big Lake-34, depth 9827.86 ft

Lithology: **Litharenite**

Texture:

Sedimentary structures	weak alignment of elongate grains
Sorting	moderate
Packing	close, minor stylolites & deformed ductile grains
Avg grain size	coarse sand
Range of grain size	fine sand to pebbles
Roundness/sphericity	subrounded / low sphericity
Pore types & distribution	rare fractures parallel bedding, micropores associated with clays

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of micaceous schist, muddy siltstone, shale, quartzite, sandstone, ?volcanics & chert, hydrated & oxidised mica, accessory zircon & rutile
Matrix	illite & opaque material concentrates along stylolites
Authigenic minerals	pore filling & grain replacing kaolin booklets (~20μm diameter), illite laths & wormy texture replace grains, late zoned carbonate spar rare Fe staining, anatase/sphene, quartz overgrowths

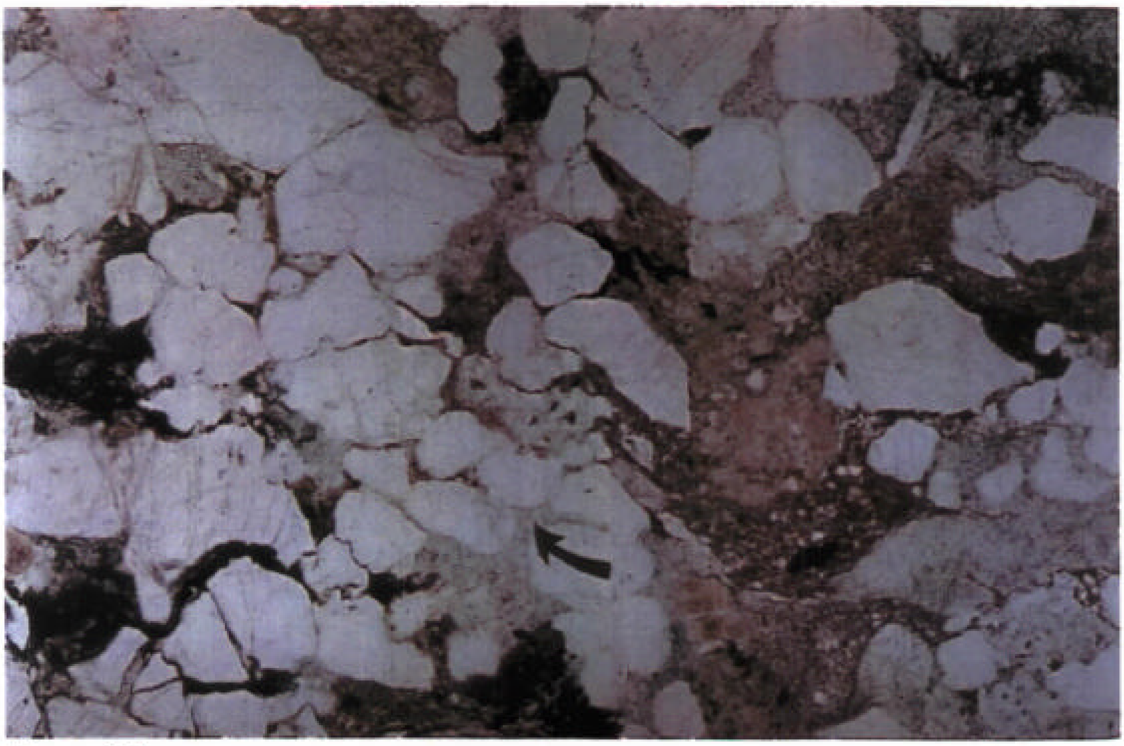


Figure 32
Deformed ductile grains (brown) create a pseudo-matrix. Pores are filled with kaolin (arrow). Oxidation associated with hydrated micas and stylolites is opaque. Plane light. Horizontal field of view 6.75 mm.

3.7.5 Big Lake-34, depth 9830.83 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	changes in grain size & grain alignment indicate bedding
Sorting	moderately well
Packing	moderately close, minor stylolites & deformed ductile grains
Avg grain size	coarse sand
Range of grain size	fine sand to granules
Roundness/sphericity	subrounded / low to moderate sphericity
Pore types & distribution	dominantly micropores associated with clays, rare fractures

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, micaceous schist, chert, illitic siltstone & quartzite, muscovite, accessory tourmaline, rutile & zircon
Matrix	illite along stylolites
Authigenic minerals	fibrous brown chlorite, late pore filling zoned clear carbonate spar, kaolin booklets fill pores & replace grains, illite laths & wormy texture replace grains, pervasive quartz overgrowths, ?pyrophyllite

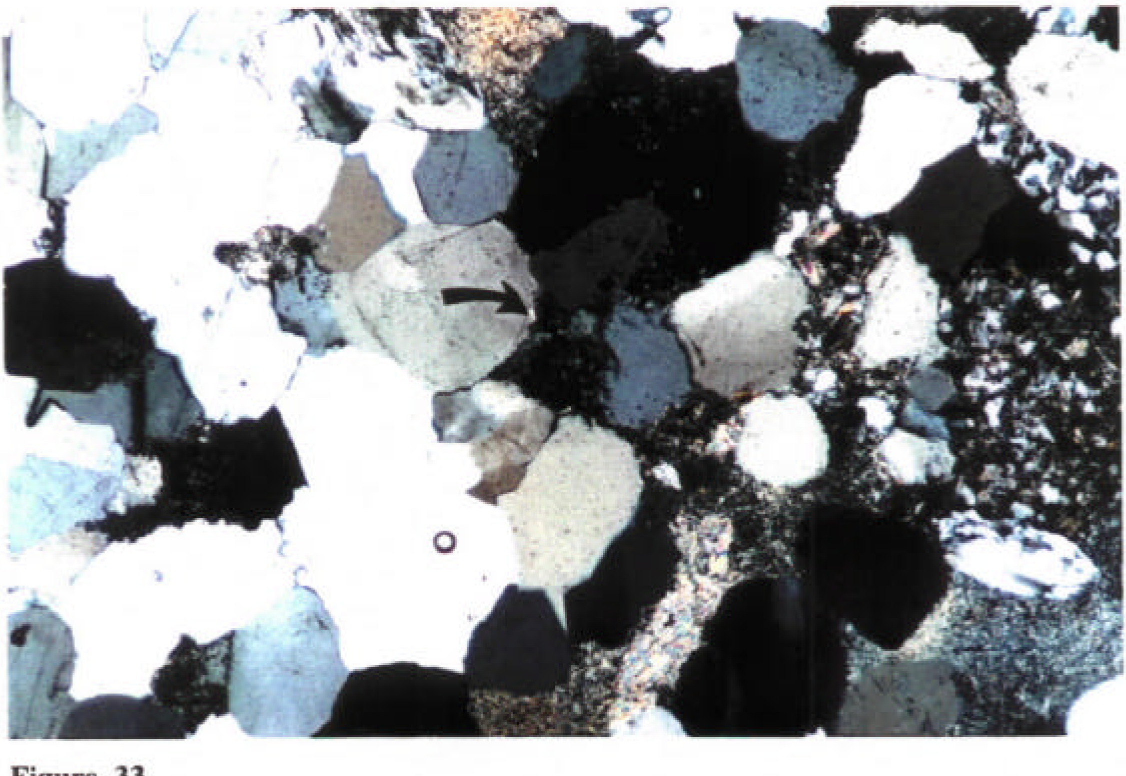


Figure 33
Central grain has been replaced by kaolin, which has a jagged contact with the adjacent quartz overgrowth (arrow). Overgrowths are well developed between grains of monocrystalline quartz. Crossed nicols. Horizontal field of view 3.37mm.

3.8.1 Big Lake-52, depth 9412 ft

Lithology:	**Sandy Conglomerate**
Texture:	
Sedimentary structures	grain alignment indicates possible bedding
Sorting	moderate
Packing	close, deformed ductile grains & low amplitude stylolites
Avg grain size	very coarse sand
Range of grain size	medium sand to pebbles
Roundness/sphericity	subangular / low sphericity
Pore types & distribution	rare dissolution pores, intragranular pores & fractures parallel bedding
Composition:	
Framework grains	monocrystalline & polycrystalline quartz, lithics of illitic sandstone, siltstone, shale, chert, ?weathered granite & volcanics, micaceous schist & quartzite, altered muscovite, accessory zircon & apatite
Matrix	traces of illite & opaque material along sutured grain contacts
Authigenic minerals	grains replaced & pores filled by kaolin booklets, zoned carbonate spar with rare Fe staining, illite laths & wormy texture, quartz overgrowths, pyrophyllite, fibrous chlorite, anatase/sphene crystals along sutures & within grains replaced by illite

Figure 34
Poor reservoir quality characterised by intragranular pores (arrows) within a sandstone lithic and a fracture (F) parallel to the orientation of bedding in a shale lithic. Traces of carbonate spar (S) cement are also apparent. Plane light. Horizontal field of view 6.75mm.

3.8.2 Big Lake-52, depth 9412.8 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	none apparent
Sorting	well
Packing	moderately open
Avg grain size	coarse sand
Range of grain size	fine sand to granules
Roundness/sphericity	subrounded / low to moderate sphericity
Pore types & distribution	isolated grain size pores, fractures through grains & micropores associated with the clays

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, quartzite, micaceous schist & chert, muscovite, accessory apatite & tourmaline
Authigenic minerals	pervasive quartz overgrowths, grain replacing & pore filling kaolin booklets (~20μm diameter), illite laths & wormy texture, blocky carbonate spar with traces of Fe staining, trace of fibrous chlorite replacing grains, ?pyrophyllite, sphene/anatase

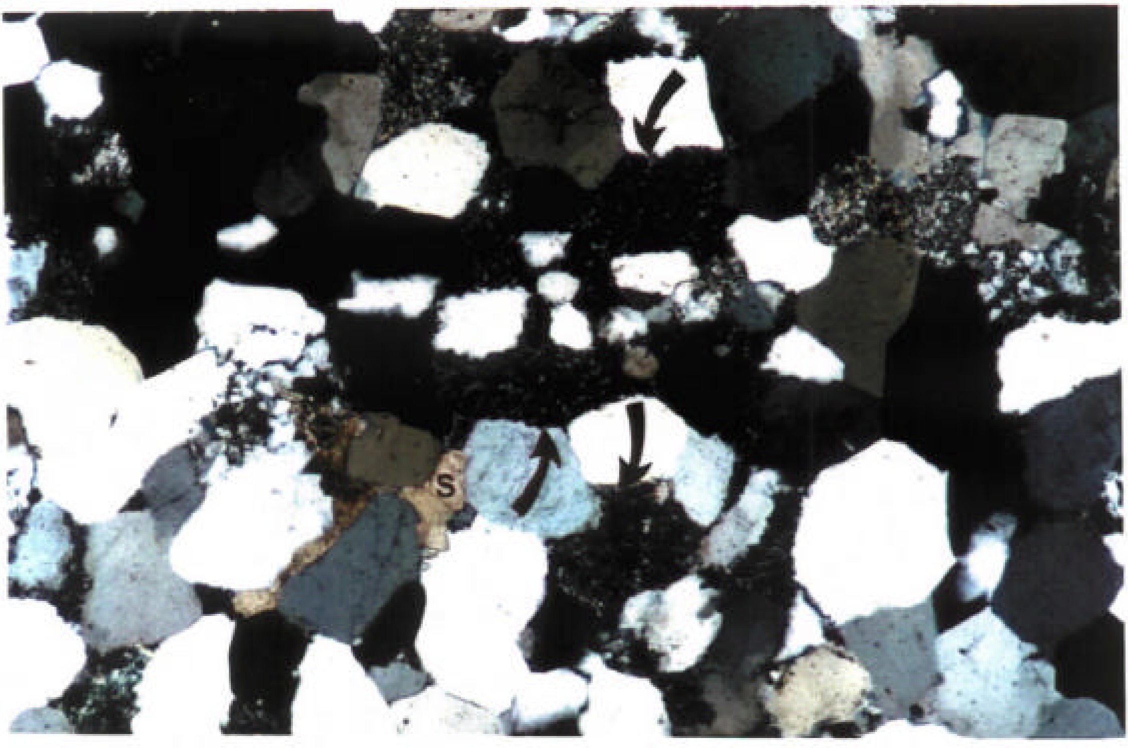


Figure 35
General view of grains replaced by kaolin (arrows), abundant quartz overgrowths outlined by straight grain contacts and minor carbonate spar cement (S). Crossed nicols. Horizontal field of view 3.37mm.

3.8.3 Big Lake-52, depth 9432 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	none apparent
Sorting	well
Packing	moderately open
Avg grain size	coarse sand
Range of grain size	fine to very coarse sand
Roundness/sphericity	rounded / low to moderate sphericity
Pore types & distribution	isolated intergranular pores, intragranular pores, grain size pores, micropores associated with clays & a fracture through the section which could be an artifact

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of quartzite, siltstone, ?volcanic, micaceous schist, shale & chert, altered mica, accessory tourmaline
Authigenic minerals	grains are replaced & pores filled by fibrous brown chlorite, rare bright green fibrous chlorite, kaolin booklets have a brown stain (?hydrocarbons), patchy carbonate spar, illite laths, wormy texture, quartz overgrowths, sphene/anatase

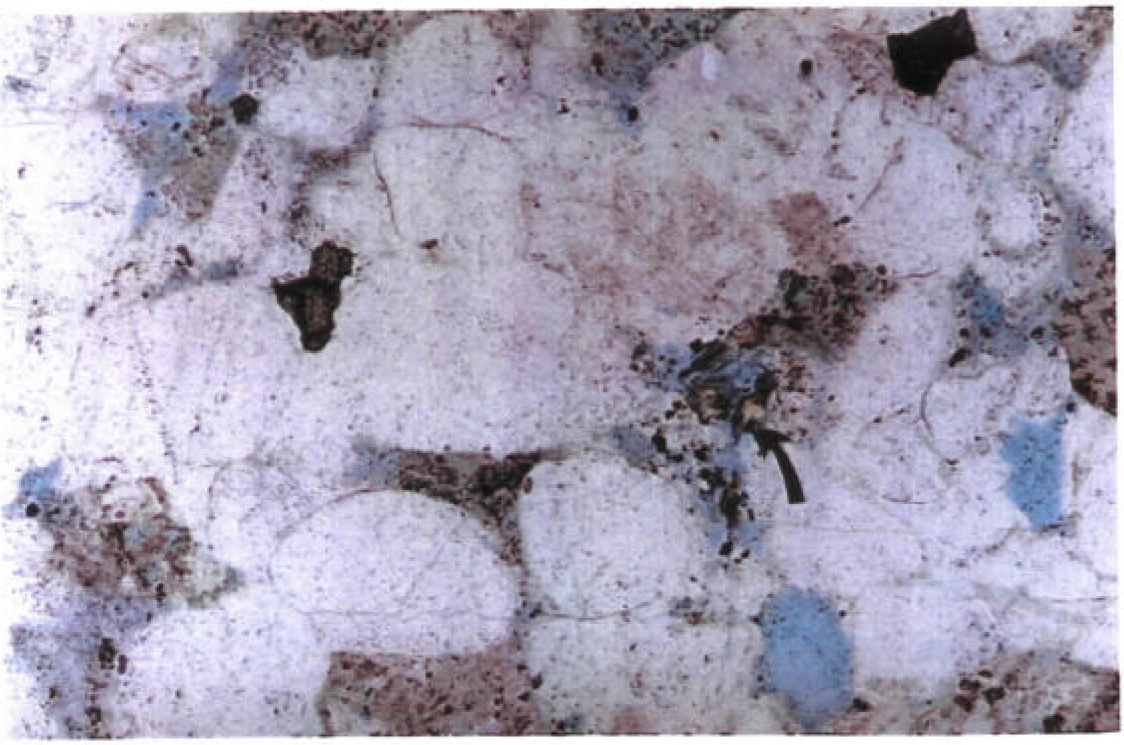


Figure 36
Fibrous brown chlorite (arrow) partially fills a secondary pore. Other grain size secondary pores (blue) lack authigenic minerals. The dark high relief mineral is carbonate spar and the dusty grains are composed of either illite or chert. Plane light. Horizontal field of view 3.37mm.

3.8.4 Big Lake-52, depth 9435 ft

Lithology:	**Sublitharenite**
Texture:	
Sedimentary structures	grain alignment indicates the orientation of bedding
Sorting	moderately well
Packing	moderately close, deformed ductile grains
Avg grain size	coarse sand
Range of grain size	very fine sand to granules
Roundness/sphericity	subrounded to rounded / low to moderate sphericity
Pore types & distribution	rare intergranular pores, grain size pores, micropores & fractures parallel to bedding
Composition:	
Framework grains	monocrystalline & polycrystalline quartz, lithics of chert, shale, muddy siltstone, ?weathered volcanics & quartzite, accessory zircon & opaques
Authigenic minerals	grains are replaced & pores filled by kaolin booklets, illite laths, wormy texture, carbonate spar (scalenohedra & blocky), quartz overgrowths, anatase /sphene & rare fibrous brown chlorite

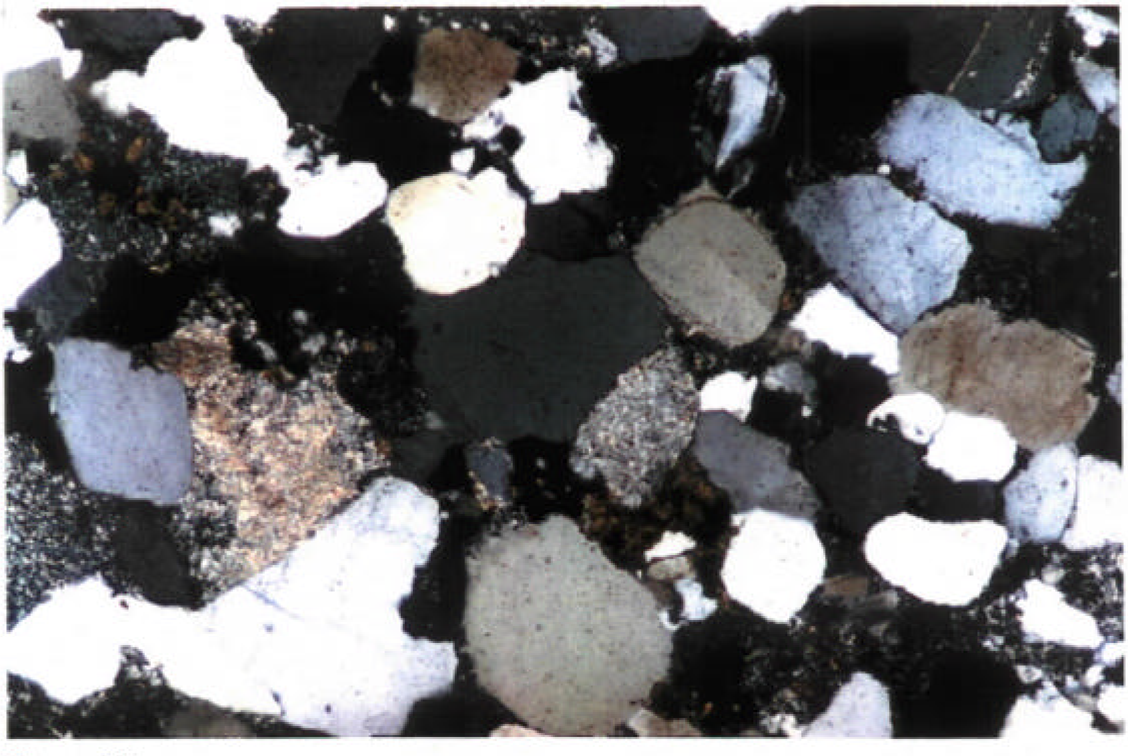


Figure 37
General field of view showing the extent of grain alteration and pore filling by authigenic minerals. Illite and kaolin replace grains, whilst kaolin, quartz and carbonate spar fill pores. Crossed nicols. Horizontal field of view 3.37mm.

3.8.5 Big Lake-52, depth 9454.1 ft

Lithology: **Sublitharenite**

Texture:

Sedimentary structures	none apparent
Sorting	moderately well
Packing	moderately close, deformed ductile grains
Avg grain size	coarse sand
Range of grain size	very fine to very coarse sand
Roundness/sphericity	subrounded / moderate to low sphericity
Pore types & distribution	intragranular pores, micropores & rare fractures

Composition:

Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, siltstone, quartzite, ?altered volcanics, chert, micaceous schist & sandstone, muscovite, accessory sphene
Authigenic minerals	grains are replaced & pores filled with kaolin booklets, carbonate spar (blocky & scalenohedra), illite laths, wormy texture, quartz overgrowths & traces of brown chlorite

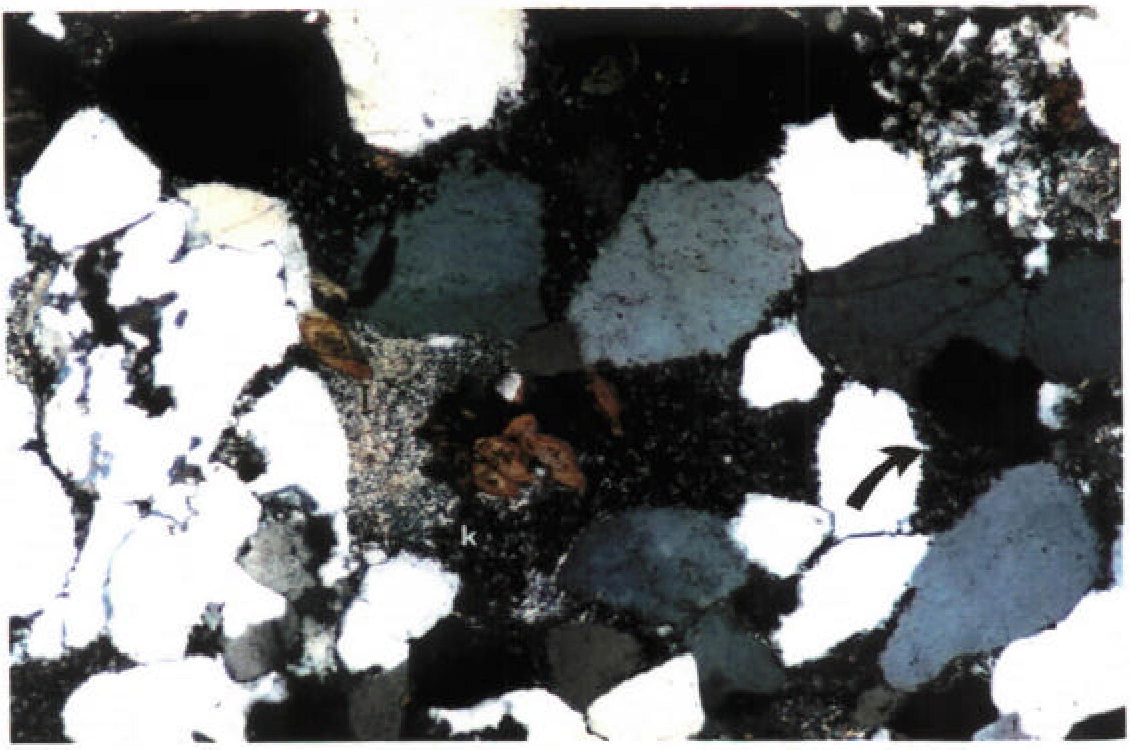


Figure 38
Carbonate scalenohedra (possibly siderite) have precipitated after both grain replacing kaolin (K) & illite (I). Note the jagged contact (arrow) of quartz grains with patches of kaolin. Crossed nicols. Horizontal field of view 3.37mm.

3.8.6 Big Lake-52, depth 9464 ft

Lithology:	**Sublitharenite**
Texture:	
Sedimentary structures	changes in grain size indicate the presence of bedding
Sorting	well to moderately well
Packing	close, deformed ductile grains
Avg grain size	medium sand
Range of grain size	fine to coarse sand
Roundness/sphericity	subrounded / low sphericity
Pore types & distribution	micropores, rare grain size pores & intragranular pores
Composition:	
Framework grains	monocrystalline & polycrystalline quartz, lithics of shale, siltstone, quartzite, micaceous schist & chert, muscovite, accessory zircon & tourmaline.
Matrix	traces of detrital illite concentrate along sutured contacts
Authigenic minerals	grains have been replaced and pores filled by thick illite laths, wormy texture, fibrous brown chlorite & quartz overgrowths (jagged contact with illite laths), rare oxidised grains, pyrophyllite, sphene/anatase

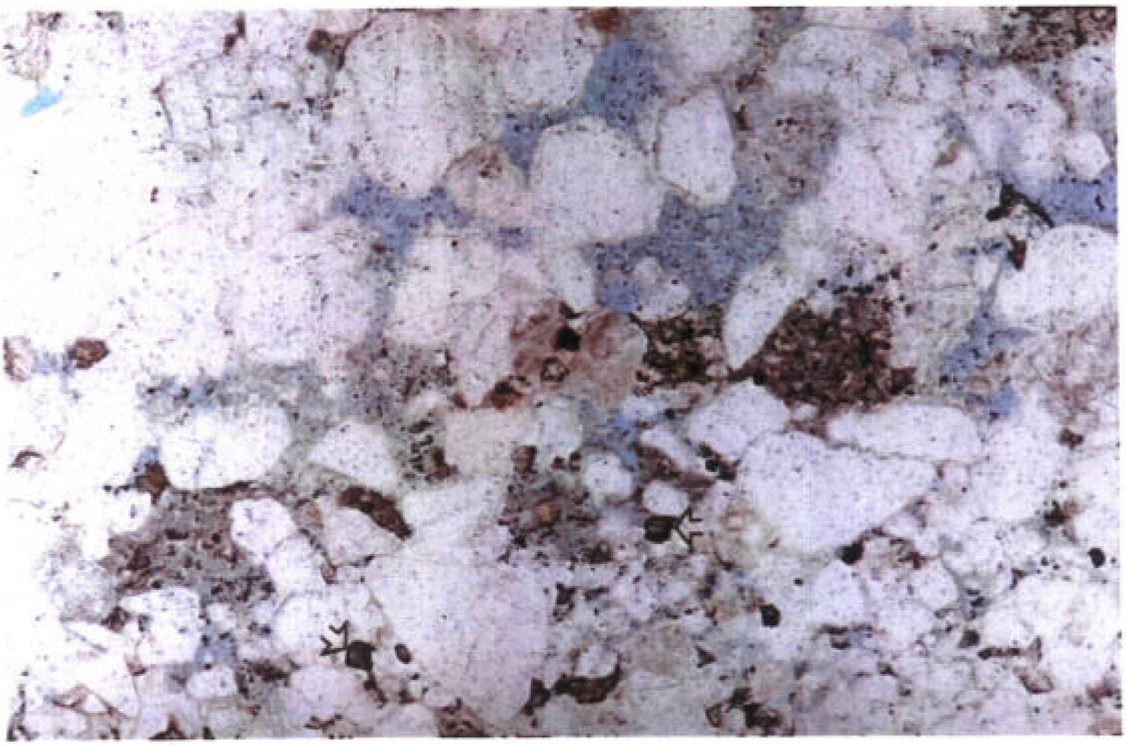


Figure 39
Intergranular and grain size pores (pale blue) are filled with thick illite laths with intervening micropores. Note the concentration of zircon (arrows) in the finer grained laminae. Plane light. Horizontal field of view 3.37mm.

3.8.7 Big Lake-52, depth 9466 ft

Lithology:	**Sublitharenite**
Texture:	
Sedimentary structures	changes in grain size indicate bedding
Sorting	moderately well
Packing	moderately close, deformed ductile grains
Avg grain size	medium-coarse sand
Range of grain size	very fine to very coarse sand
Roundness/sphericity	rounded / low sphericity
Pore types & distribution	micropores associated with pore filling illite, fractures parallel bedding.
Composition:	
Framework grains	monocrystalline & polycrystalline quartz, lithics of quartzite, illitic siltstone, chert & shale, muscovite, accessory tourmaline & zircon
Authigenic minerals	pores are filled & grains replaced by brown fibrous chlorite, thick illite laths, quartz overgrowths, wormy texture, & micrite, ?pyrophyllite, anatase/sphene

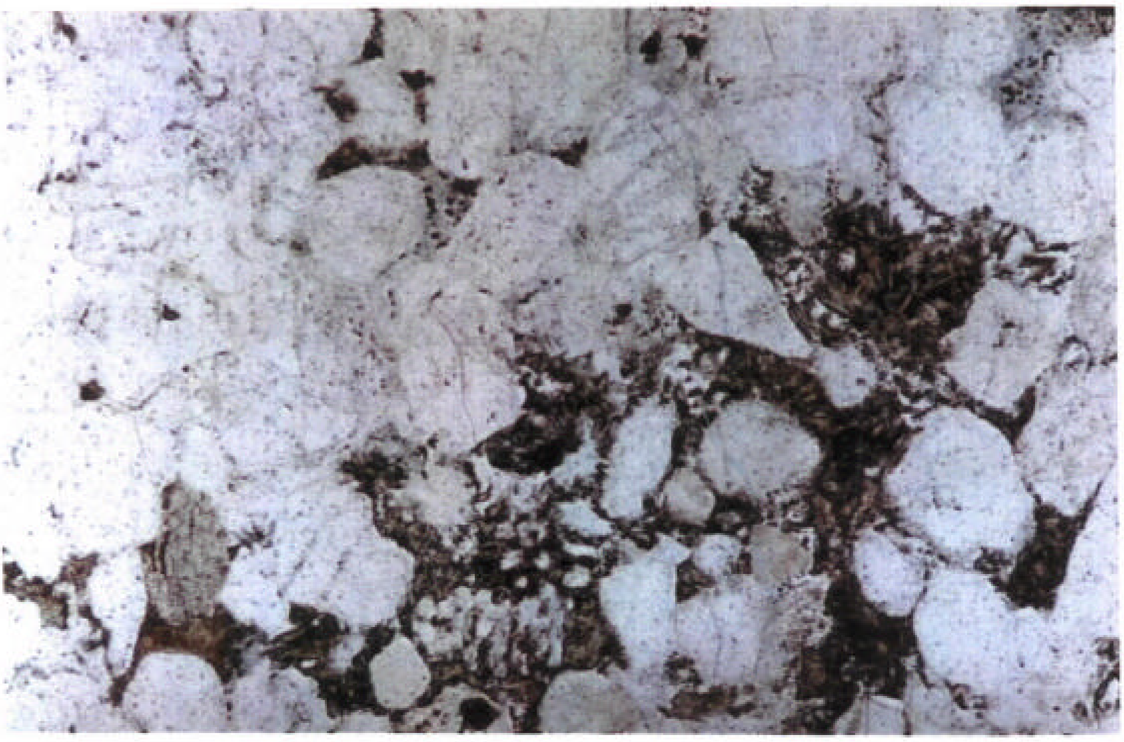


Figure 40
Fibrous brown chlorite plus micrite have partially replaced grains and filled pores in this sublitharenite. Note the rounded nature of grains prior to alteration. Plane light. Horizontal field of view 3.37mm.

3.8.8 Big Lake-52, depth 9482 ft

Lithology:	**Siltstone**
Texture:	
Sedimentary structures	laminae indicated by concentration of detrital clay
Sorting	moderately well
Packing	close
Avg grain size	coarse silt
Range of grain size	medium silt to fine sand
Roundness/sphericity	subangular / low sphericity
Pore types & distribution	none apparent
Composition:	
Framework grains	monocrystalline & polycrystalline quartz, muscovite, accessory zircon, tourmaline, opaques & sphene/anatase
Matrix	illite
Authigenic minerals	patches of anhedral dusty spar

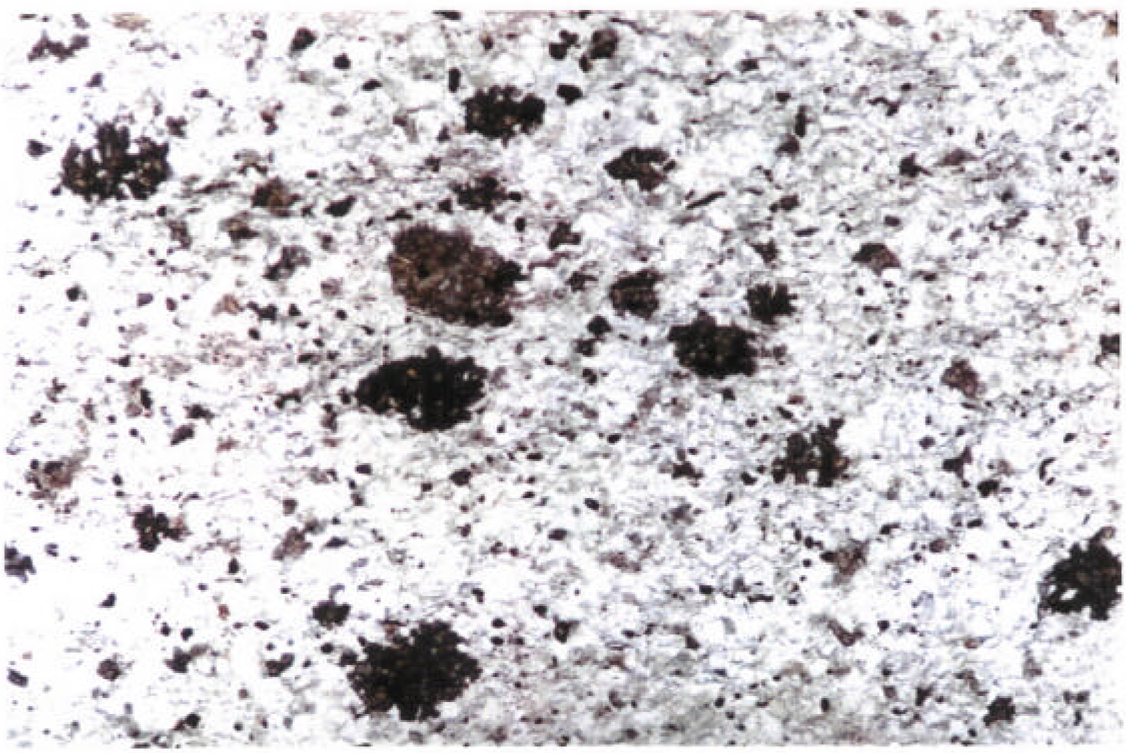


Figure 41
Siltstone with patches of diagenetic carbonate spar (brown). Note the high percentage of accessory minerals (opaque). Plane light. Horizontal field of view 3.37mm.

3.9 Big Lake-46, cuttings, depth 9900 ft

Lithology: **Weathered granite**

Cuttings consist of single grains of monocrystalline and polycrystalline quartz, feldspar, opaques, iron oxide, siderite and chloritised grains. Composite chips are dominated by intergrowths of quartz and feldspar with minor muscovite. These chips could be weathered granite which may be representative of this depth interval. There are rare examples of shale and muddy siltstone, which could be downhole contaminants.

Composition:
Monocrystalline quartz has straight extinction and scattered vacuoles. Polycrystalline quartz has straight crystal boundaries. Quartz crystals are interlocking with feldspars. The feldspars have been extensively altered to sericite and lack any remnants of twinning. Rarely there has been partial replacement of the feldspars by carbonate and less commonly by kaolin booklets. Accessory minerals within the granite consist of muscovite, zircon and tourmaline.

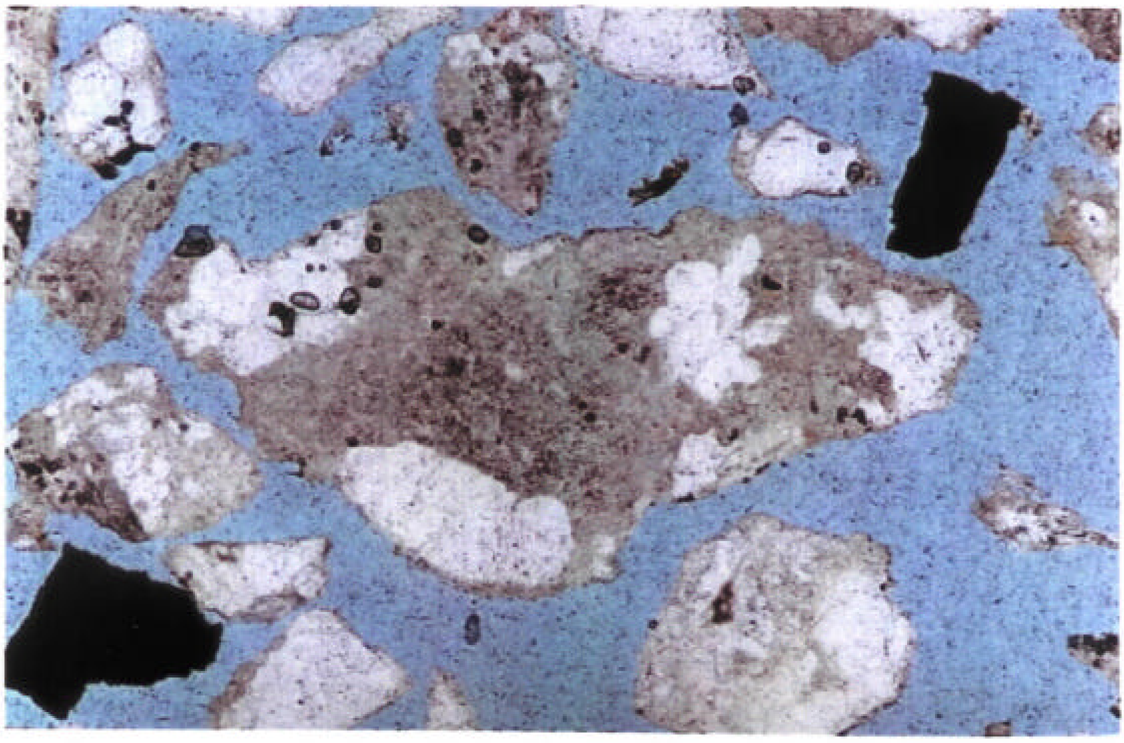


Figure 42
The central chip is typical of weathered granitic cuttings at this depth. The white patches are composed of quartz and the dusty areas are sericitised feldspars. High relief globular features are bubbles in the thin section glue. Plane light. Horizontal field of view 3.37mm.

3.10.1 Big Lake-49, cuttings, depth 10840 ft

Lithology: **?Sublitharenite**

Cuttings are dominated by single grains of quartz and composite chips of sublitharenite. Other chips of iron oxide, siderite, sericite, micaceous schist, siltstone and shale are also apparent. This description is based on the composite chips of sublitharenite which are thought to be representative of this depth interval.

Texture:

Sedimentary structures	none apparent
Sorting	moderate
Packing	moderately close, point, tangential & rare sutured grain contacts
Avg grain size	medium - coarse sand
Range of grain size	fine sand to very coarse sand
Roundness/sphericity	subrounded/ low to moderate sphericity
Pore types & distribution	none apparent but better preservation is anticipated in those areas, which were well cemented

Composition:

Framework grains	monocrystalline & polycrystalline quartz, sericitised grains could have been feldspars, lithics of dusty chert, shale, siltstone and micaceous schist, and mica (?hydrated examples)
Authigenic minerals	pervasive syntaxial quartz overgrowths, rare chloritised grains and patches, grains replaced by wormy illite, illite laths and ?pyrophyllite, one crystal of sphene/anatase in a patch of chlorite

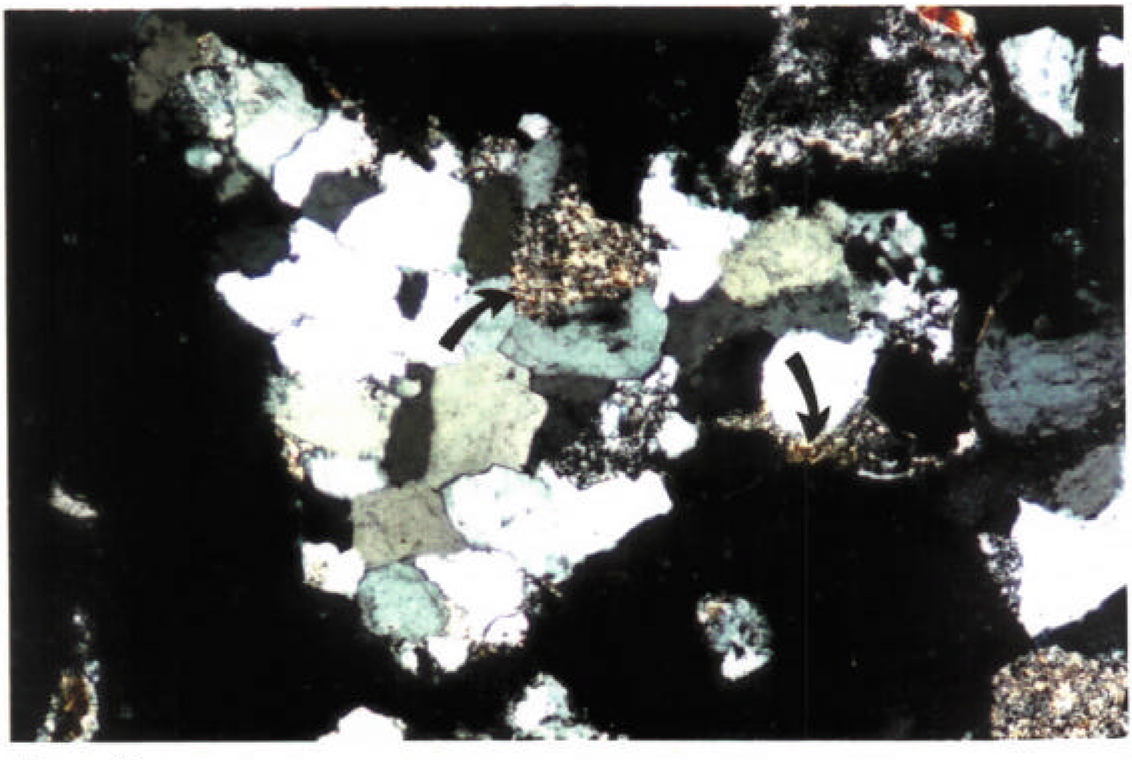


Figure 43
General view of a composite chip of medium grained sublitharenite. Note the abundance of quartz overgrowths and grains replaced by illite (arrows). Crossed nicols. Horizontal field of view 3.37mm.

3.10.2 Big Lake-49, cuttings, depth 10950 ft

Lithology: **?Litharenite**

Cuttings are dominated by chips of litharenite and single grains of quartz. Rare chips of fresh and weathered granite consist of either quartz plus freshly twinned albite, or interlocking crystals of sericitised feldspar and quartz. Other chips include opaques, siderite, shale, mica and muddy siltstone. The chips of litharenite are considered representative of this depth interval.

Texture:

Sedimentary structures	none apparent
Sorting	moderate
Packing	close
Avg grain size	coarse sand
Range of grain size	fine to very coarse sand
Roundness/sphericity	subrounded/ low sphericity
Pore types & distribution	none apparent

Composition:

Framework grains	monocrystalline and polycrystalline quartz, lithics of fresh & weathered granite, shale, chert and quartzite, accessory muscovite & zircon
Authigenic minerals	pervasive quartz overgrowths, common grain replacing illite laths and wormy texture, rare fibrous chlorite and pyrophyllite

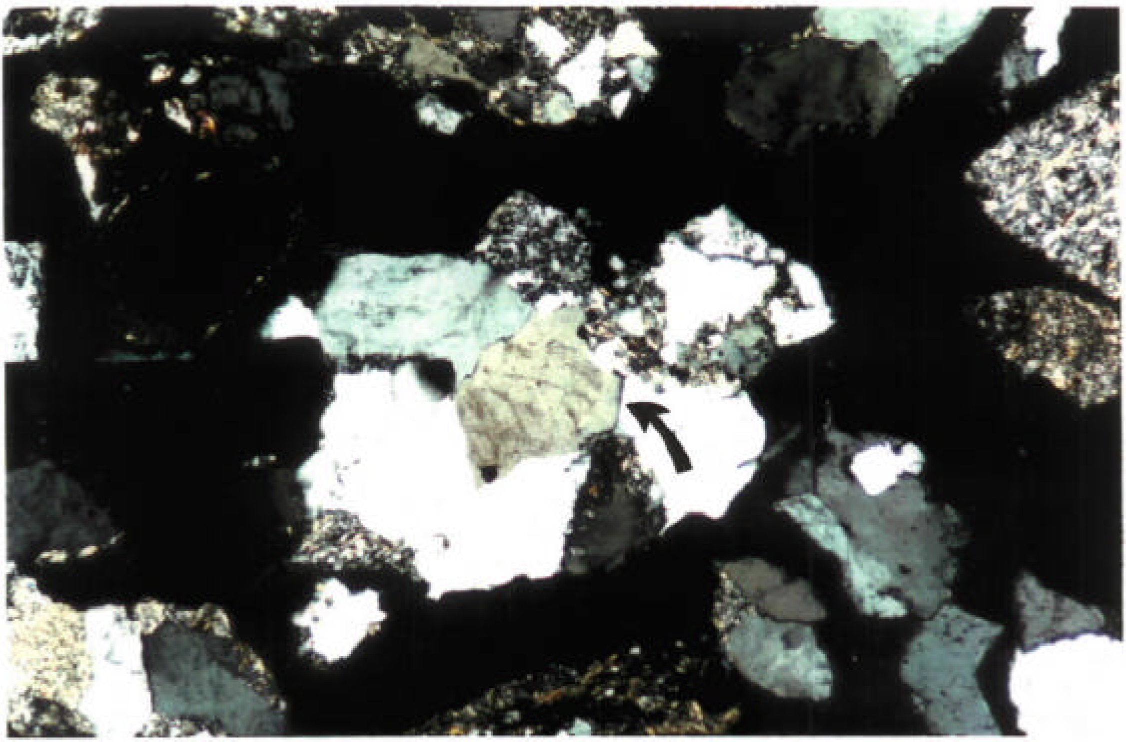


Figure 44
The central chip is composed of medium to coarse grained litharenite. Quartz overgrowths (arrow) have cemented the chip. Surrounding chips have grains replaced by illite. Crossed nicols. Horizontal field of view 3.37mm.

3.11.1 Big Lake-51, cuttings, depth 10870 ft

Lithology: **?Weathered granite**

Chips are dominantly comprised of coarse single grains of quartz, shale/siltstone and fine grained sublitharenite. There are minor opaques, micas and chips of siderite. Cuttings of shale contain abundant altered mica and organic matter. In addition, there are single grains of quartz with inclusions which have been sericitised and other grains of mica floating in a sericitised matrix. These cuttings could represent either fragments of Tirrawarra Conglomerate or weathered granite. Given the very high gamma ray response at this depth it is assumed that weathered granite is representative of this depth interval.

Composition:
Monocrystalline quartz has straight to slightly undulose extinction. Inclusions within the quartz have been replaced by sericite and were probably composed of feldspar. Polycrystalline quartz has straight crystal boundaries and undulose extinction. Both types of quartz commonly are coated by sericite/illite, which probably represents altered feldspars intergrown with the quartz. Hydrated muscovite and flakes of biotite also float within the sericite/illite.

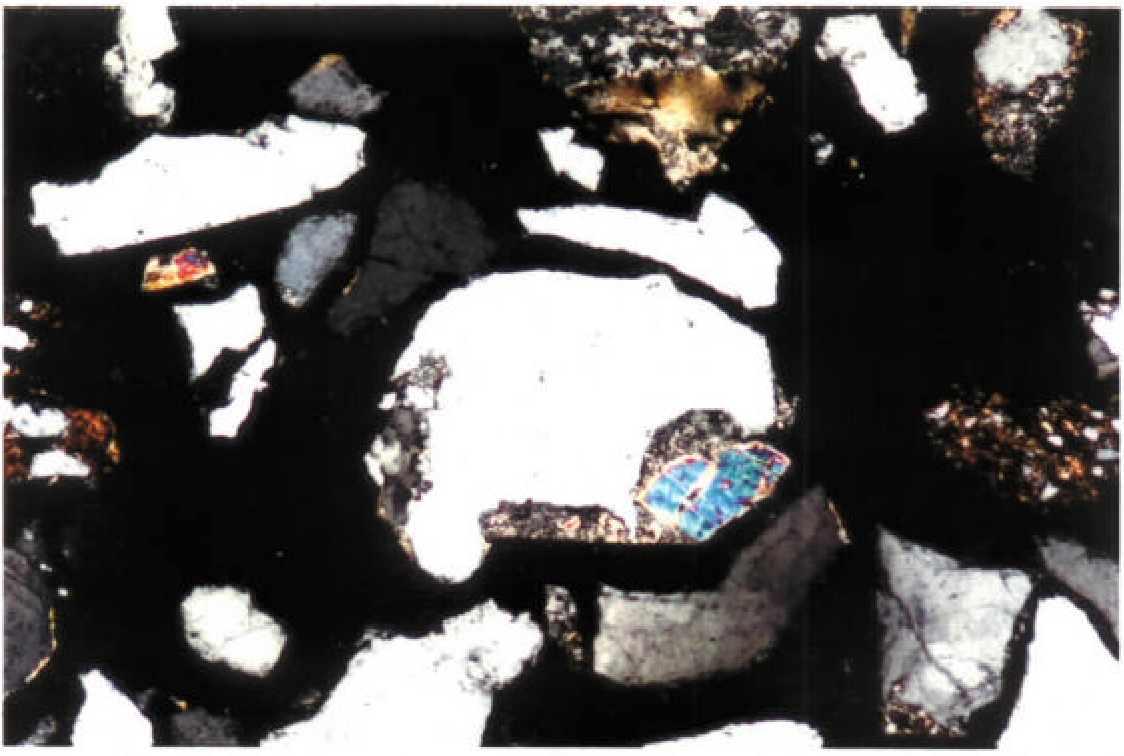


Figure 45
The central chip illustrates an embayed quartz grain adjacent to a patch of illite in which floats a large flake of muscovite. This chip could have been derived from weathered granite. Crossed nicols. Horizontal field of view 3.37mm.

3.11.2 Big Lake-51, cuttings, depth 10910 ft

Lithology: **?Weathered granite/granodiorite**

Cuttings are dominated by single grains of quartz, with minor opaques, siderite, iron oxide, weathered granite, fine grained chloritic sublitharenite, medium grained litharenite, micaceous ?sandy conglomerate (hydrated micas) and silty mudstone. Based on the number of feldspars preserved and the high gamma ray log, this interval is probably composed of weathered granite or granodiorite.

Composition:
Completely sericitised angular inclusions within grains of monocrystalline quartz were probably composed of feldspar. Quartz has embayed margins. Rare chips of polycrystalline quartz contain numerous intergrowths with finer grained feldspar, which has remnants of pericline twinning and is partially sericitised. Traces of carbonate spar postdate the sericite. These chips could represent relatively fresh granodiorite. Other chips of sericitised grains and quartz include relatively fresh biotite.

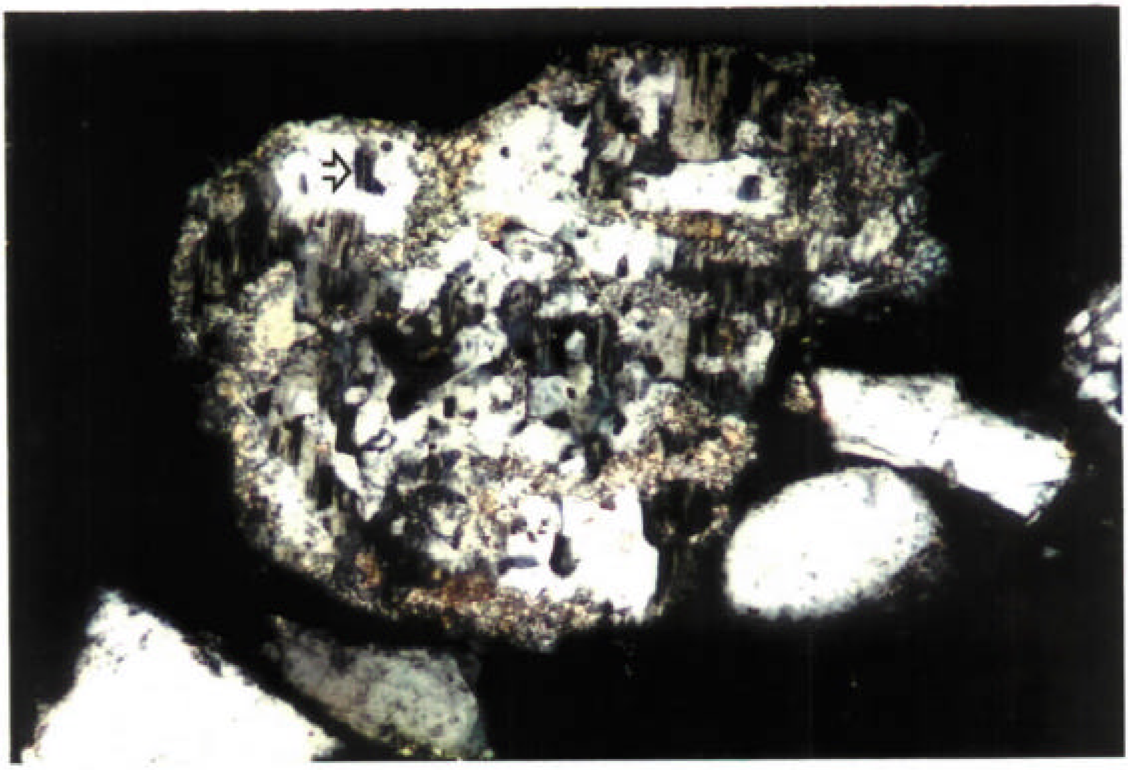


Figure 46
Twinning indicates the presence of minute feldspars (arrow) floating within quartz and partially replaced by sericite, which has a wormy texture. This chip is indicative of an igneous lithology at this depth. Horizontal field of view 1.35mm.

3.12.1 Moomba-82, cuttings, depth 9910 ft

Lithology: **?Weathered granite**

Cuttings are dominated by single grains of coarse sand to granule size quartz and ?weathered granite. There are rare chips of fine to medium grained, chloritic sandstone, opaques and shale that are probably downhole contaminants.

Composition:
Monocrystalline quartz has straight to undulose extinction. Polycrystalline quartz is less abundant, it has straight crystal boundaries and undulose extinction. Feldspars that are interlocking with the quartz have been extensively replaced by illite. No twinning is apparent and therefore the feldspars are probably potassic in composition. There are minor flakes of muscovite and rare zircon present in the muscovite typical of the hydrated mica described elsewhere. Opaque material is associated with the muscovite. Clear blocky spar and dusty spar have precipitated after the illite and rarely fill fractures in the quartz.

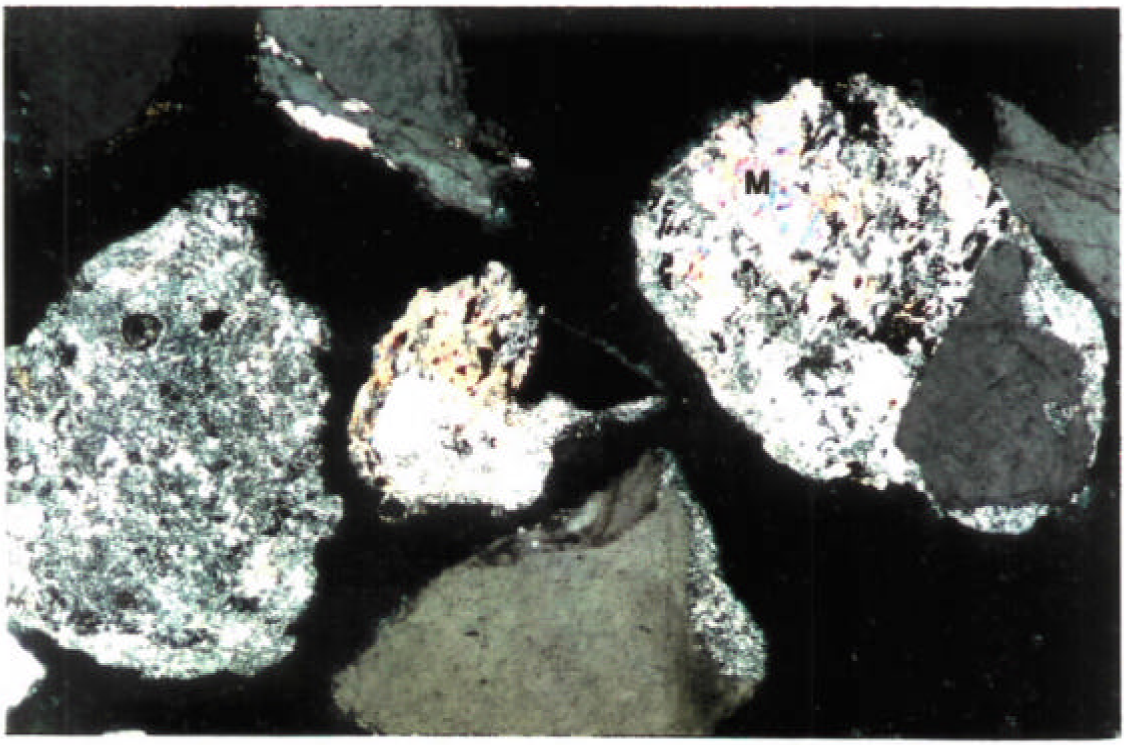


Figure 47
The cuttings in this field of view are typical of the ?weathered granite. Embayed quartz floats in sericite and there are remnants of altered muscovite (M). Crossed nicols. Horizontal field of view 3.37mm.

3.12.2 Moomba-82, cuttings, depth 10060 ft

Lithology: **?Weathered granite**

Cuttings from this depth interval are dominated by single grains of quartz and ?weathered granite. In addition there are chips of fine to medium grained chloritic sandstone, opaques and clear carbonate spar.

Composition:
Monocrystalline is more abundant than polycrystalline quartz. Completely sericitised grains that were probably feldspars are intergrown with the quartz. Rare single grains with remnants of albite twinning are highly altered. Muscovite flakes are more altered than cuttings from 9910ft. Accessory zircon and sphene/anatase are apparent. Dusty carbonate spar has partially replaced the feldspar remnants and fills rare fractures in the quartz grains.

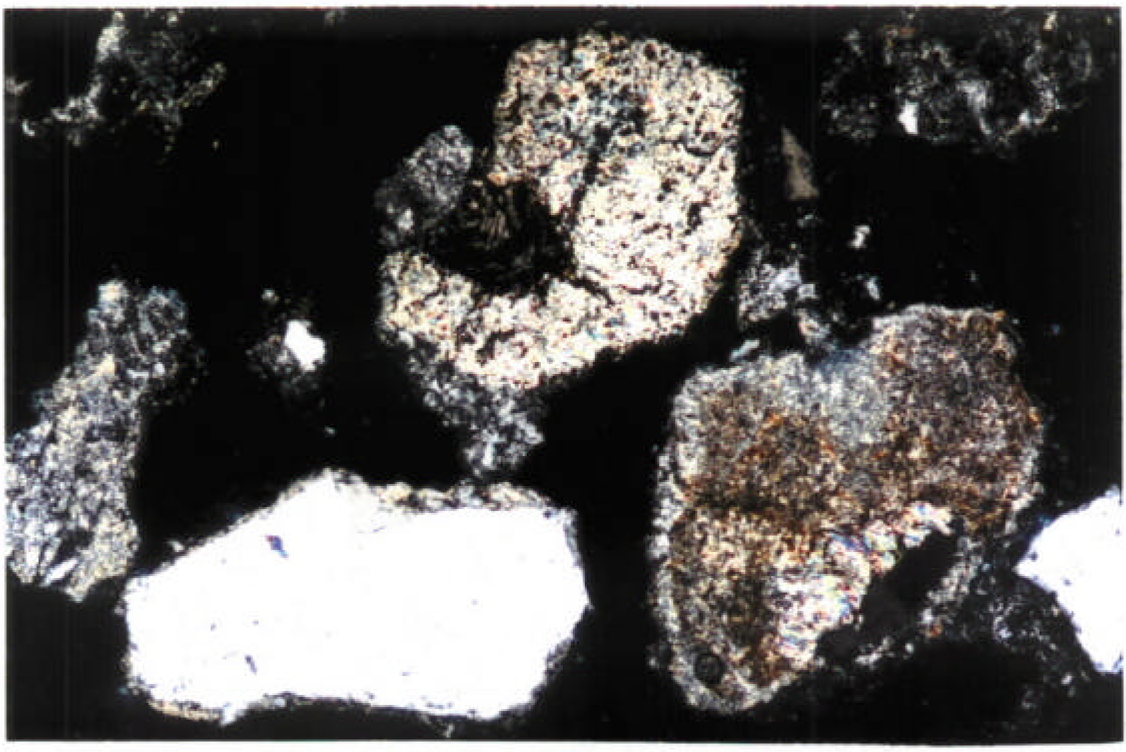


Figure 48
These cuttings indicate the highly altered nature of the ?granite at this depth. Feldspars and mica have been replaced by illite. Crossed nicols. Horizontal field of view 3.37mm.

TABLE 2 POINT COUNT DATA

Well No.	4	4	4	27	27	29	29	29
Depth (ft)	9790	9799	9808	9490.5	9498.5	9660.35	9665	9667.7
Lithology	sublitharenite	sublitharenite	quartzarenite	sublitharenite	sublitharenite	conglomerate	sublitharenite	conglomerate
Framework grains								
Quartz - mono	59.0	58.0	69.6	64.6	65.8	41.8	37.2	39.6
- poly	9.8	8.8	5.4	5.8	4.4	11.4	7.2	12.2
Feldspar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lithics - schist	2.4	0.4	0.8	0.2	0.6	0.0	0.0	0.0
- quartzite	2.2	1.8	1.0	2.6	3.6	5.0	0.6	6.0
- shale	5.2	1.6	0.4	0.0	2.2	2.2	4.4	3.2
- siltstone	1.0	1.0	0.8	2.4	2.2	0.0	0.0	0.0
- sandstone	0.0	0.6	0.0	0.2	0.4	0.0	0.0	0.0
- chert/chalcedony	0.4	0.2	0.4	1.0	0.8	0.0	1.0	0.0
- volcanics	1.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0
- granite	0.0	0.0	0.0	0.0	0.0	0.8	0.0	0.4
Mica - muscovite	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
- biotite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- expanded/hydrated	0.0	0.0	0.0	0.0	0.0	11.6	20.4	15.8
Accessory - zircon	0.4	0.4	0.4	0.2	0.2	0.2	1.6	0.4
- tourmaline	0.0	0.0	0.4	0.2	0.0	0.0	0.2	0.0
- opaques	0.0	0.2	0.0	0.2	0.0	0.0	0.4	0.2
- others	0.0	0.2	0.2	0.0	0.2	0.0	0.4	0.0
Matrix								
Clay	0.6	0.0	0.0	0.0	0.0	0.0	1.8	0.8
Organic matter	0.2	0.2	0.0	0.0	0.0	0.6	1.6	0.2
Authigenic minerals								
Quartz	1.2	1.4	1.6	12.6	7.4	0.8	0.0	1.0
Kaolin - replace	1.6	5.2	0.6	0.0	0.0	10.2	5.2	7.8
- fill pores	0.6	3.0	0.4	0.2	0.0	1.6	0.4	0.4
Chlorite - replace	4.8	6.0	8.6	2.6	0.8	0.0	0.0	0.4
- fill pores	3.8	4.0	6.0	0.2	0.0	0.0	0.0	0.0
Illite - laths	2.8	1.4	1.8	3.6	4.6	2.8	9.8	6.4
- wormy texture	1.6	3.0	0.6	1.8	1.8	8.6	7.4	2.8
Carbonate - replace	0.2	0.8	0.2	0.2	1.0	1.6	0.0	0.6
- fill pores	0.0	0.0	0.2	0.0	1.4	0.2	0.0	0.0
Anatase/sphene	0.4	0.2	0.2	0.0	0.0	0.0	0.2	0.0
Pyrophyllite	0.2	0.2	0.0	0.2	0.4	0.0	0.0	0.2
Porosity								
Intergranular	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0
Intragranular	0.0	0.0	0.0	0.4	1.0	0.0	0.0	0.0
Dissolution	0.0	1.0	0.2	0.4	0.6	0.0	0.0	0.6
Fracture	0.4	0.0	0.0	0.0	0.0	0.6	0.2	1.0
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 2 POINT COUNT DATA continued

Well No.	31	31	31	31	31	31	31	31
Depth (ft)	9961.92	9975.75	9987.67	10193.96	10195.25	10206.19	10218.17	10224.71
Lithology	sublitharenite	sublitharenite	sublitharenite	sublitharenite	conglomerate	sublitharenite	sublitharenite	sublitharenite
Framework grains								
Quartz - mono	62.6	63.0	67.8	68.0	33.4	60.4	63.6	64.0
- poly	8.8	7.0	4.0	3.4	7.0	5.8	5.2	4.4
Feldspar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lithics - schist	1.6	1.2	0.8	0.4	0.0	2.6	0.4	2.4
- quartzite	1.8	2.4	4.0	1.6	0.0	5.6	1.6	3.6
- shale	3.4	2.2	6.2	4.2	0.2	7.0	5.8	7.0
- siltstone	1.2	1.2	1.6	1.0	0.0	1.4	0.2	1.2
- sandstone	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- chert/chalcedony	1.2	0.6	0.4	0.4	0.2	1.0	0.6	1.0
- volcanics	0.0	0.0	0.0	0.6	0.4	0.0	0.0	0.0
- granite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mica - muscovite	0.0	0.6	0.4	0.0	0.0	0.2	0.4	0.2
- biotite	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
- expanded/hydrated	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0
Accessory - zircon	0.2	0.0	0.2	0.0	1.2	0.2	0.2	0.2
- tourmaline	0.2	0.2	0.2	0.2	0.0	0.0	0.2	0.2
- opaques	0.2	0.0	0.0	0.0	0.2	0.0	0.2	0.0
- others	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Matrix								
Clay	0.0	0.0	0.4	0.0	1.0	0.0	0.2	0.2
Organic matter	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0
Authigenic minerals								
Quartz	7.2	3.4	6.0	10.4	0.0	4.8	11.0	6.0
Kaolin - replace	2.4	10.2	0.6	0.0	21.4	0.4	0.0	0.0
- fill pores	1.6	2.2	0.2	0.0	0.0	0.0	0.0	0.0
Chlorite - replace	0.2	0.0	0.0	2.2	0.0	2.2	5.4	1.6
- fill pores	0.0	0.0	0.4	0.8	0.0	0.4	1.2	0.6
Illite - laths	4.6	3.0	2.2	2.2	15.4	2.4	0.4	3.0
- wormy texture	0.6	2.2	1.2	1.2	6.4	3.0	1.2	2.8
Carbonate - replace	0.6	0.4	1.4	0.4	0.4	1.8	0.2	0.2
- fill pores	0.6	0.0	0.6	1.4	0.0	0.4	0.0	0.0
Anatase/sphene	0.2	0.2	0.2	0.0	0.0	0.2	0.2	0.2
Pyrophyllite	0.0	0.0	0.6	0.4	0.0	0.2	0.4	0.4
Porosity								
Intergranular	0.0	0.0	0.0	0.2	0.0	0.0	0.4	0.2
Intragranular	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dissolution	0.2	0.0	0.0	0.8	0.8	0.0	0.8	0.6
Fracture	0.0	0.0	0.0	0.2	0.4	0.0	0.2	0.0
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 2 POINT COUNT DATA continued

Well No.	32	32	32	32	32	32	32	32
Depth (ft)	9359.11	9361.21	9374.21	9375.92	9390.67	9399.83	9406.04	9410
Lithology	conglomerate	conglomerate	sublitharenite	sublitharenite	sublitharenite	sublitharenite	sublitharenite	sublitharenite
Framework grains								
Quartz - mono	49.0	26.0	67.8	59.0	67.6	58.0	69.0	68.0
- poly	7.6	6.4	6.0	5.8	3.2	5.4	5.8	3.8
Feldspar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lithics - schist	1.0	3.6	0.0	0.6	0.0	0.6	0.6	0.2
- quartzite	9.4	9.4	2.0	2.8	3.2	3.6	2.4	1.8
- shale	2.6	6.0	3.4	2.6	1.8	6.0	1.4	0.4
- siltstone	4.0	1.6	0.8	1.2	1.6	1.8	2.4	1.4
- sandstone	3.6	6.8	0.4	3.4	0.0	0.0	0.2	0.0
- chert/chalcedony	2.2	6.8	0.4	0.8	1.8	1.8	0.8	1.0
- volcanics	0.4	1.2	0.2	0.0	0.4	0.8	0.2	0.2
- granite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mica - muscovite	0.0	0.2	0.4	0.2	0.2	0.0	0.0	0.0
- biotite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- expanded/hydrated	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Accessory - zircon	0.4	1.2	0.2	0.4	0.2	0.0	0.2	0.2
- tourmaline	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0
- opaques	0.0	1.4	0.2	0.2	0.2	0.2	0.0	0.0
- others	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
Matrix								
Clay	1.4	3.2	1.4	2.2	0.8	0.2	0.2	0.0
Organic matter	0.0	1.2	0.2	0.2	0.2	0.0	0.0	0.2
Authigenic minerals								
Quartz	0.4	0.4	3.4	3.4	10.6	6.4	6.4	7.8
Kaolin - replace	5.0	8.0	6.6	6.8	2.0	3.6	4.0	3.0
- fill pores	3.6	1.6	1.6	1.8	1.2	2.6	2.0	2.4
Chlorite - replace	1.2	0.0	0.0	1.4	0.4	0.0	0.0	0.6
- fill pores	0.8	0.0	0.0	0.4	0.4	0.0	0.0	1.4
Illite - laths	2.8	7.2	2.4	2.6	1.8	1.8	1.0	2.4
- wormy texture	1.6	4.8	0.8	0.8	0.2	1.2	0.2	0.6
Carbonate - replace	0.6	0.0	0.4	1.6	1.0	2.4	0.8	0.8
- fill pores	0.6	0.0	0.4	0.0	0.2	1.6	0.4	0.4
Anatase/sphene	1.0	1.6	0.4	0.2	0.0	0.2	0.2	0.2
Pyrophyllite	0.0	0.8	0.2	0.0	0.0	0.2	0.2	0.2
Porosity								
Intergranular	0.0	0.0	0.0	0.2	0.4	0.6	1.0	2.0
Intragranular	0.0	0.0	0.0	0.6	0.0	0.2	0.0	0.0
Dissolution	0.2	0.0	0.2	0.6	0.4	0.2	0.4	1.0
Fracture	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 2 POINT COUNT DATA continued

Well No.	32	33	33	33	34	34	34	34
Depth (ft)	9415.5	10076.21	10088	10090.33	9814.71	9820.69	9822.04	9827.86
Lithology	sublitharenite	sublitharenite	sublitharenite	sublitharenite	sublitharenite	litharenite	sublitharenite	litharenite
Framework grains								
Quartz - mono	59.8	67.4	68.4	73.6	67.2	55.4	62.8	46.6
- poly	3.2	3.6	3.0	4.8	2.6	5.4	3.2	5.6
Feldspar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lithics - schist	1.0	0.4	0.8	0.8	0.2	1.2	0.4	1.4
- quartzite	3.6	2.4	2.8	2.4	2.2	5.8	3.8	2.2
- shale	5.8	9.8	4.6	5.6	5.0	10.2	8.2	9.8
- siltstone	1.4	1.2	0.4	0.0	0.0	1.2	1.6	3.8
- sandstone	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4
- chert/chalcedony	0.4	1.6	0.8	0.2	0.4	0.6	0.2	0.4
- volcanics	0.0	0.0	0.2	0.2	0.0	0.6	0.0	0.6
- granite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mica - muscovite	0.2	0.0	0.2	0.2	0.4	0.0	0.2	0.0
- biotite	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
- expanded/hydrated	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
Accessory - zircon	0.2	0.4	0.2	0.2	0.8	0.6	0.0	0.4
- tourmaline	0.4	0.2	0.2	0.2	0.6	0.4	0.4	0.0
- opaques	0.2	0.2	0.2	0.2	0.4	0.2	0.0	0.0
- others	0.0	0.0	0.2	0.2	0.2	0.0	0.0	0.2
Matrix								
Clay	1.2	2.8	0.2	0.2	0.0	1.2	0.0	0.6
Organic matter	0.8	0.0	0.0	0.0	0.0	0.4	0.0	0.2
Authigenic minerals								
Quartz	3.2	4.4	9.8	3.8	10.8	2.8	8.8	0.8
Kaolin - replace	7.6	0.2	0.4	0.4	0.6	3.8	0.6	10.0
- fill pores	4.4	0.0	0.0	0.0	0.2	2.8	0.2	6.2
Chlorite - replace	0.0	1.0	2.2	2.8	2.4	3.6	2.0	0.0
- fill pores	0.0	1.2	0.8	2.0	0.8	1.6	2.0	0.0
Illite - laths	2.8	0.6	0.8	0.2	2.0	0.6	1.4	1.8
- wormy texture	1.4	0.2	1.8	1.0	1.0	0.6	0.4	1.8
Carbonate - replace	1.0	1.2	0.2	0.2	0.2	0.2	0.2	2.0
- fill pores	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.4
Anatase/sphene	0.4	0.2	0.4	0.4	0.4	0.4	0.2	0.4
Pyrophyllite	0.2	0.0	0.2	0.2	0.2	0.4	0.4	0.0
Porosity								
Intergranular	0.0	0.0	0.4	0.0	0.6	0.0	1.4	0.0
Intragranular	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
Dissolution	0.0	0.2	0.8	0.2	0.2	0.0	1.0	0.0
Fracture	0.6	0.6	0.0	0.0	0.6	0.0	0.0	0.4
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 2 POINT COUNT DATA continued

Well No.	34	52	52	52	52	52	52	52
Depth (ft)	9830.83	9412	9412.8	9432	9435	9454.1	9464	9466
Lithology	sublitharenite	conglomerate	sublitharenite	sublitharenite	sublitharenite	sublitharenite	sublitharenite	sublitharenite
Framework grains								
Quartz - mono	61.8	26.4	62.4	64.0	63.2	61.0	67.4	62.4
- poly	3.8	8.6	2.4	5.0	4.2	7.2	2.8	5.6
Feldspar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lithics - schist	1.4	3.8	0.4	0.4	0.0	0.4	0.2	0.0
- quartzite	1.0	14.4	2.4	2.0	3.0	6.6	2.2	3.0
- shale	4.8	16.2	2.4	3.8	2.6	2.4	5.6	3.0
- siltstone	1.2	4.8	0.6	0.2	1.8	1.2	0.8	0.2
- sandstone	0.0	3.6	0.0	0.0	0.0	0.6	0.0	0.0
- chert/chalcedony	0.2	0.8	1.8	1.8	1.2	1.4	0.6	0.6
- volcanics	0.0	1.2	0.0	0.2	0.0	0.2	0.0	0.0
- granite	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Mica - muscovite	0.2	1.4	0.2	0.2	0.0	0.2	0.2	0.2
- biotite	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
- expanded/hydrated	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Accessory - zircon	0.2	0.2	0.0	0.0	0.2	0.0	0.2	0.2
- tourmaline	0.2	0.0	0.2	0.2	0.0	0.0	0.2	0.4
- opaques	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
- others	0.2	0.2	0.2	0.0	0.0	0.2	0.0	0.0
Matrix								
Clay	0.4	0.8	0.0	0.0	0.0	0.0	0.2	0.0
Organic matter	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Authigenic minerals								
Quartz	6.8	0.6	9.6	8.8	3.4	4.6	8.8	10.8
Kaolin - replace	2.0	5.6	4.4	2.2	5.6	5.0	0.0	0.0
- fill pores	5.2	2.8	5.4	2.2	4.0	3.2	0.0	0.0
Chlorite - replace	3.0	0.8	0.4	0.6	1.2	0.6	1.2	3.4
- fill pores	1.4	0.0	0.0	0.6	0.4	0.6	1.2	2.4
Illite - laths	2.0	1.4	4.2	2.6	5.2	1.0	6.6	6.6
- wormy texture	0.6	2.6	0.8	0.8	1.2	0.8	0.4	0.2
Carbonate - replace	1.2	0.8	1.0	1.6	1.4	1.8	0.0	0.2
- fill pores	1.6	0.0	0.4	0.8	0.0	0.4	0.0	0.0
Anatase/sphene	0.0	1.0	0.2	0.2	0.4	0.0	0.4	0.2
Pyrophyllite	0.6	0.6	0.2	0.0	0.0	0.0	0.4	0.2
Porosity								
Intergranular	0.0	0.0	0.0	0.4	0.4	0.0	0.0	0.0
Intragranular	0.0	0.2	0.0	0.6	0.0	0.4	0.4	0.0
Dissolution	0.0	0.4	0.2	0.2	0.2	0.0	0.2	0.0
Fracture	0.2	0.2	0.2	0.6	0.2	0.2	0.0	0.4
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 3 GRAIN SIZE ANALYSES

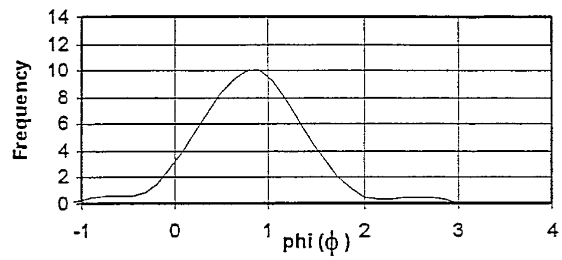
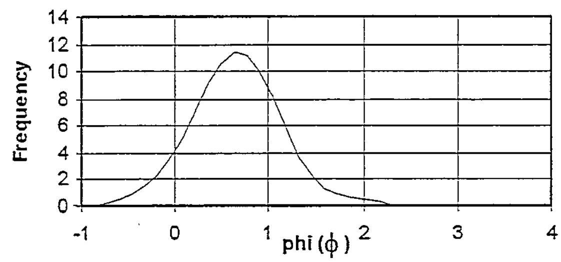
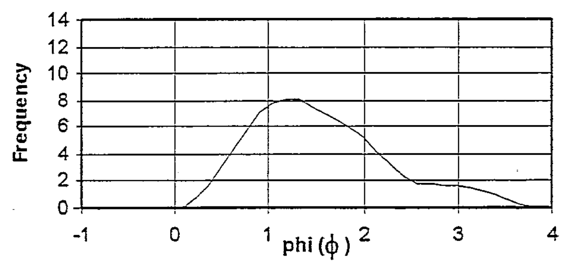
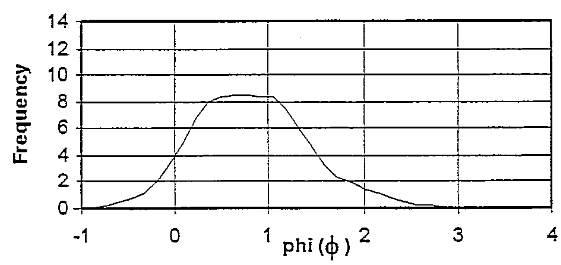
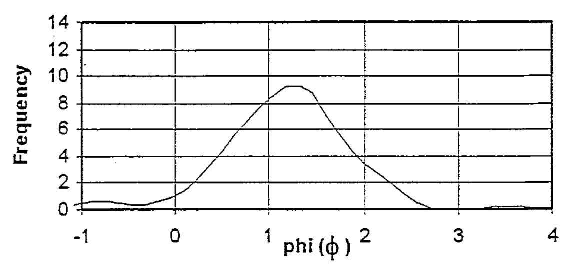
Well Depth (m)	Thin Section Statistics Mean Diameter mm	 ϕ	 Standard Deviation mm	 ϕ	Frequency Distribution
4 9790	0.61 min: 0.16 max: 1.60 coarse sand	0.81	0.25 moderately well sorted	0.57	
4 9799	0.71 min: 0.24 max: 3.10 coarse sand	0.61	0.38 moderately well sorted	0.54	
4 9808	0.38 min: 0.10 max: 0.80 medium sand	1.55	0.16 moderately well sorted	0.70	
27 9490.5	0.61 min: 0.17 max: 1.50 coarse sand	0.81	0.23 moderately well sorted	0.57	
27 9498.5	0.50 min: 0.09 max: 1.80 medium-coarse sand	1.17	0.28 moderately well sorted	0.67	

TABLE 3 GRAIN SIZE ANALYSES continued

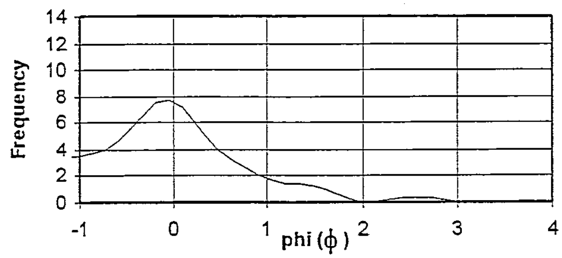
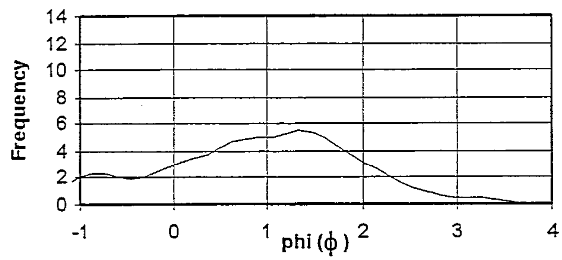
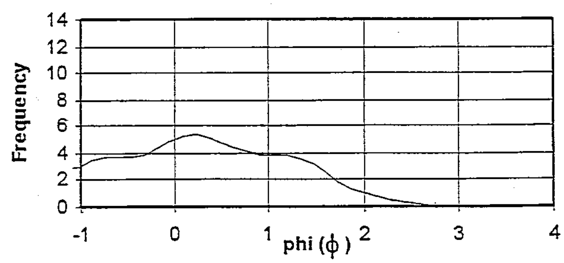
Well Depth (m)	Thin Section Statistics Mean Diameter mm	 ϕ	 Standard Deviation mm	 ϕ	Frequency Distribution
29 9660.35	1.49 min: 0.15 max: 7.02 very coarse sand	-0.23	1.19 moderately sorted	0.99	
29 9665	0.72 min: 0.10 max: 3.00 coarse sand	0.86	0.57 poorly sorted	1.04	
29 9667.7	1.20 min: 0.18 max: 7.58 very coarse sand	0.13	1.04 poorly sorted	1.04	

TABLE 3 GRAIN SIZE ANALYSES continued

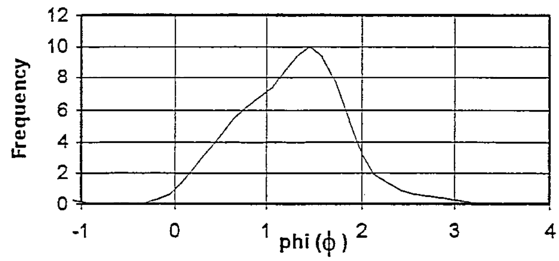
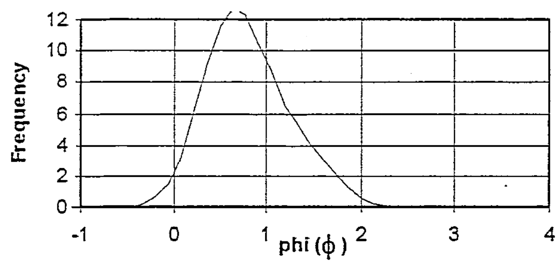
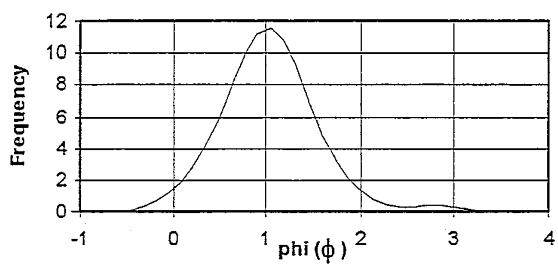
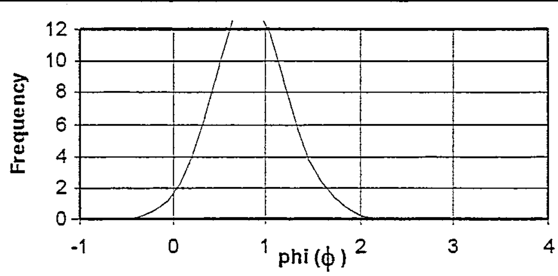
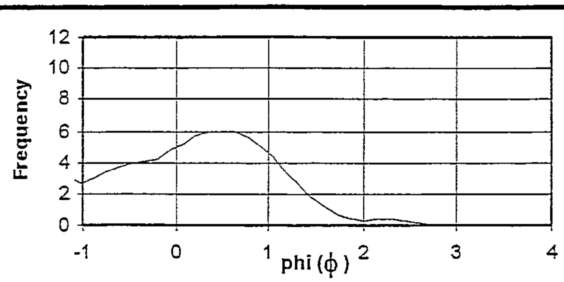
Well Depth (m)	Thin Section Statistics: Mean Diameter mm	ϕ	Standard Deviation mm	ϕ	Frequency Distribution
31 9961.92	0.50 min: 0.14 max: 3.40 medium-coarse sand	1.19	0.39 moderately well sorted	0.66	
31 9975.75	0.59 min: 0.28 max: 0.97 coarse sand	0.81	0.15 well sorted	0.40	
31 9987.67	0.52 min: 0.14 max: 1.00 coarse sand	1.03	0.16 well sorted	0.49	
31 10193.96	0.57 min: 0.27 max: 0.95 coarse sand	0.84	0.13 very well sorted	0.34	
31 10195.25	1.30 min: 0.20 max: 7.78 very coarse sand	0.01	1.20 poorly sorted	1.01	

TABLE 3 GRAIN SIZE ANALYSES continued

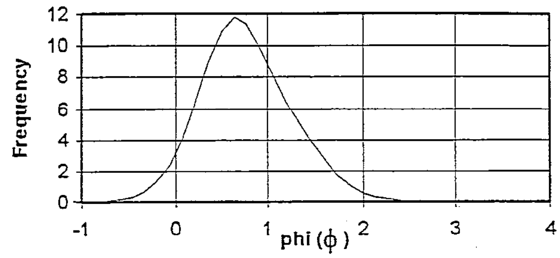
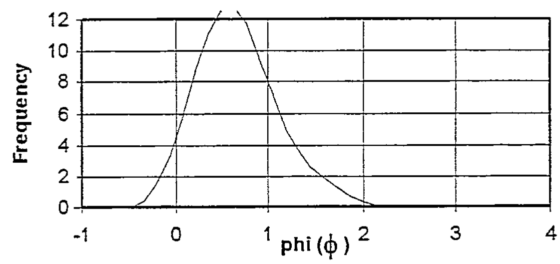
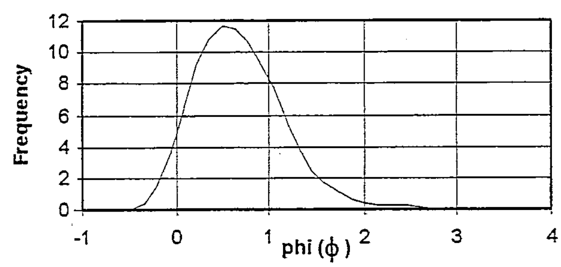
Well Depth (m)	Thin Section Statistics Mean Diameter mm	ϕ	Standard Deviation mm	ϕ	Frequency Distribution
31 10206.19	0.64 min: 0.22 max: 2.80 coarse sand	0.74	0.28 well sorted	0.48	
31 10218.17	0.65 min: 0.30 max: 0.98 coarse sand	0.67	0.16 well sorted	0.38	
31 10224.71	0.65 min: 0.19 max: 1.05 coarse sand	0.69	0.17 well sorted	0.43	

TABLE 3 GRAIN SIZE ANALYSES continued

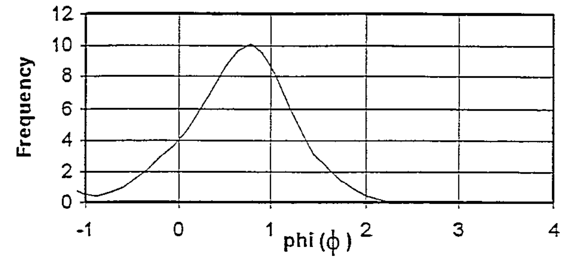
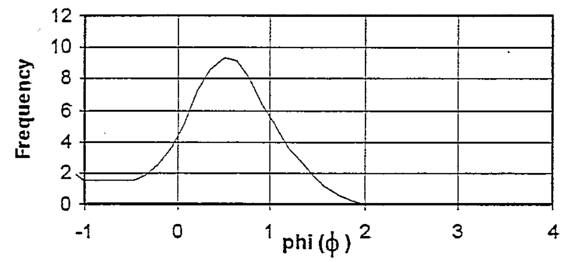
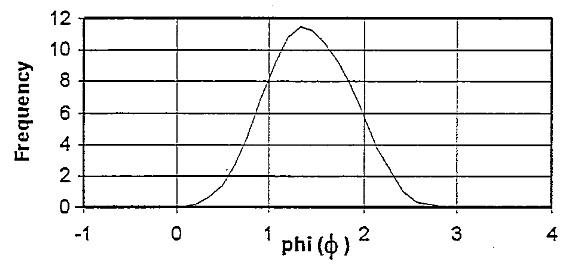
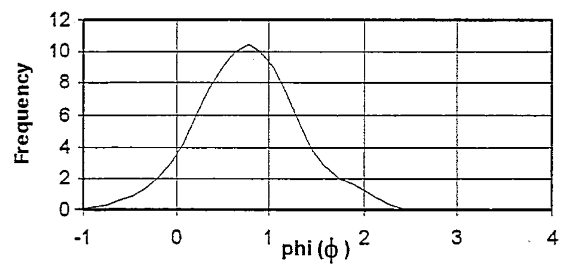
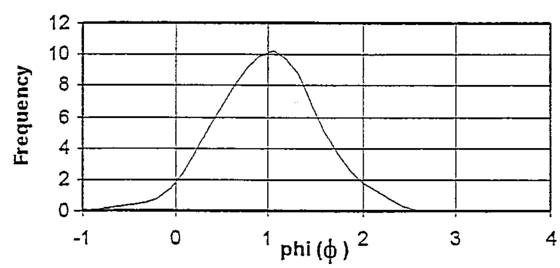
Well Depth (m)	Thin Section Statistics: Mean Diameter mm	Mean Diameter ϕ	Standard Deviation mm	Standard Deviation ϕ	Frequency Distribution
32 9359.11	0.84 min: 0.29 max: 6.35 coarse sand	0.53	0.83 moderately sorted	0.76	
32 9361.21	1.38 min: 0.35 max: 13.50 very coarse sand	0.09	1.85 poorly sorted	1.08	
32 9374.21	0.39 min: 0.18 max: 0.72 medium sand	1.42	0.11 well sorted	0.41	
32 9375.92	0.63 min: 0.24 max: 1.52 coarse sand	0.77	0.23 moderately well sorted	0.52	
32 9390.67	0.54 min: 0.22 max: 1.43 coarse sand	0.98	0.20 moderately well sorted	0.51	

TABLE 3 GRAIN SIZE ANALYSES continued

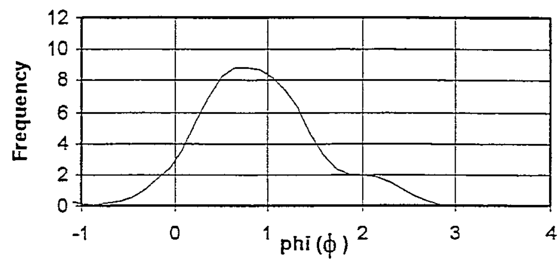
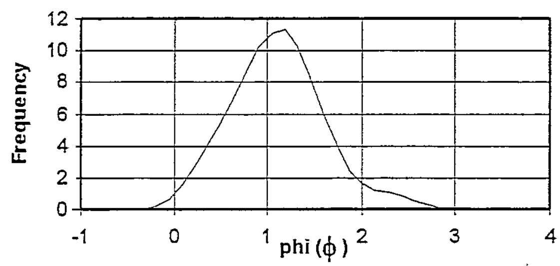
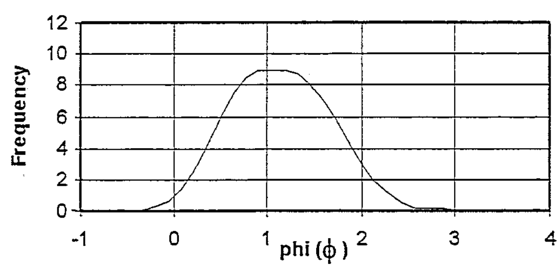
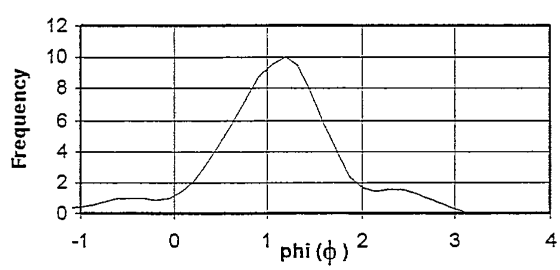
Well Depth (m)	Thin Section Statistics Mean Diameter mm	 ϕ	 Standard Deviation mm	 ϕ	Frequency Distribution
32 9399.83	0.64 min: 0.17 max: 5.00 coarse sand	0.86	0.52 moderately sorted	0.71	
32 9406.04	0.49 min: 0.18 max: 0.90 medium sand	1.11	0.15 well sorted	0.47	
32 9410	0.53 min: 0.16 max: 5.10 coarse sand	1.11	0.49 moderately well sorted	0.61	
32 9415.5	0.57 min: 0.16 max: 4.46 coarse sand	1.05	0.49 moderately sorted	0.75	

TABLE 3 GRAIN SIZE ANALYSES continued

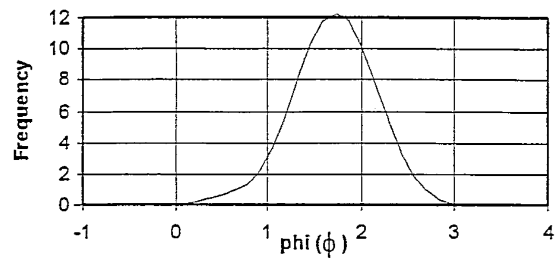
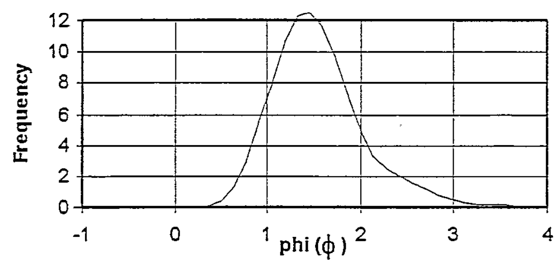
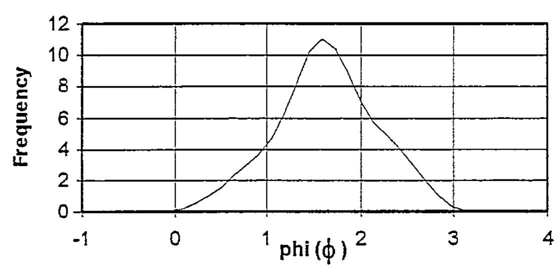
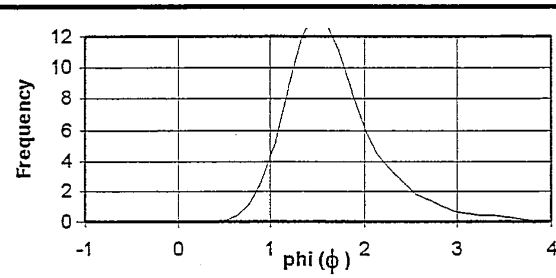
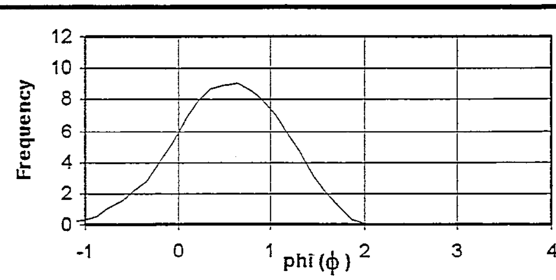
Well Depth (m)	Thin Section Statistics: Mean Diameter mm	Mean Diameter ϕ	Standard Deviation mm	Standard Deviation ϕ	Frequency Distribution
33 10076.21	0.32 min: 0.17 max: 0.81 medium sand	1.69	0.10 well sorted	0.41	
33 10088	0.36 min: 0.10 max: 0.60 medium sand	1.55	0.10 well sorted	0.46	
33 10090.33	0.34 min: 0.15 max: 0.80 medium sand	1.63	0.13 moderately well sorted	0.52	
34 9814.71	0.33 min: 0.09 max: 0.54 medium sand	1.67	0.09 well sorted	0.46	
34 9820.69	0.74 min: 0.32 max: 1.95 coarse sand	0.54	0.30 moderately well sorted	0.54	

TABLE 3 GRAIN SIZE ANALYSES continued

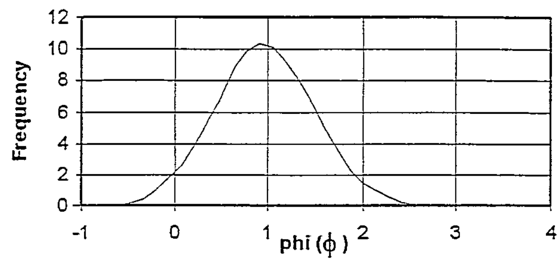
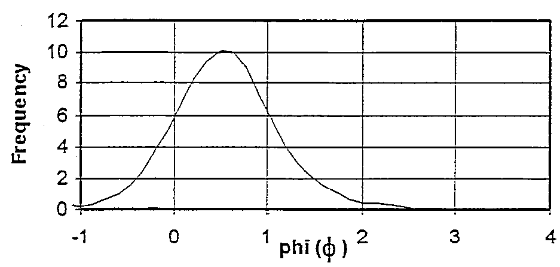
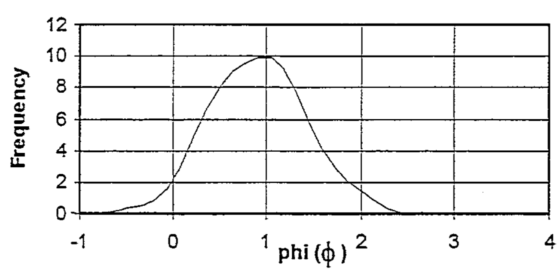
Well Depth (m)	Thin Section Statistics: Mean Diameter mm	ϕ	Standard Deviation mm	ϕ	Frequency Distribution
34 9822.04	0.54 min: 0.23 max: 1.03 coarse sand	0.96	0.18 well sorted	0.48	
34 9827.86	0.88 min: 0.23 max: 6.50 coarse sand	0.45	0.84 moderately sorted	0.74	
34 9830.83	0.59 min: 0.24 max: 3.35 coarse sand	0.88	0.34 moderately well sorted	0.55	

TABLE 3 GRAIN SIZE ANALYSES continued

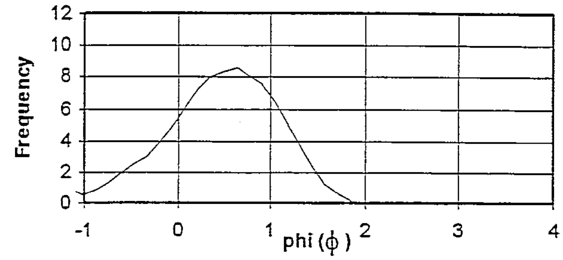
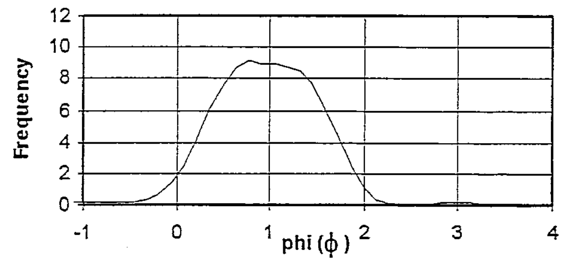
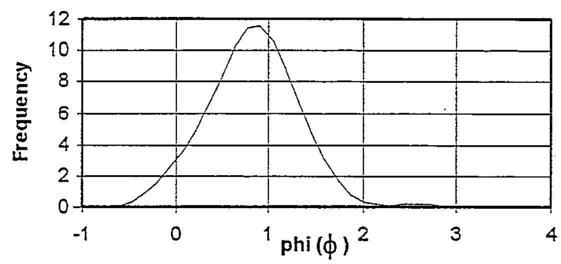
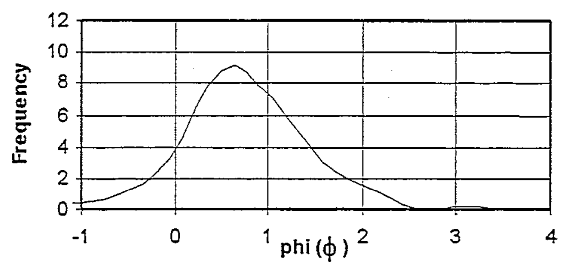
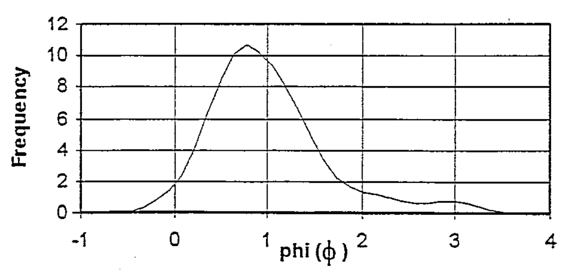
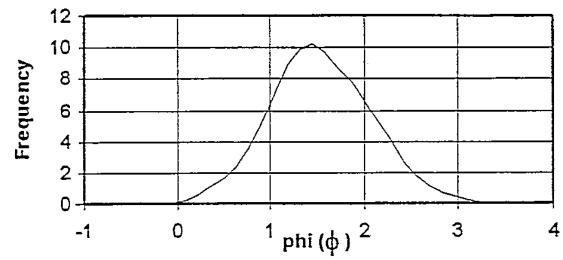
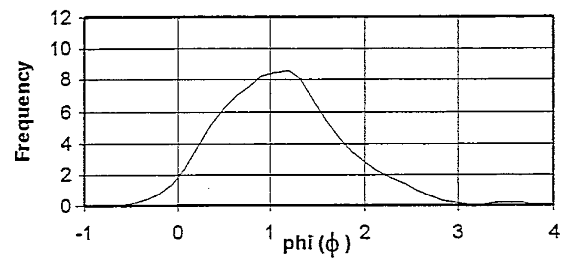
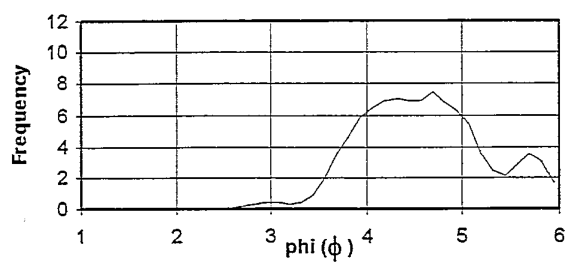
Well Depth (m)	Thin Section Statistics: Mean Diameter mm	Mean Diameter ϕ	Standard Deviation mm	Standard Deviation ϕ	Frequency Distribution
52 9412	1.12 min: 0.35 max: 8.65 very coarse sand	0.27	1.43 moderately sorted	0.91	
52 9412.8	0.55 min: 0.13 max: 2.07 coarse sand	0.96	0.24 well sorted	0.54	
52 9432	0.59 min: 0.17 max: 1.20 coarse sand	0.83	0.18 well sorted	0.45	
52 9435	0.67 min: 0.12 max: 2.45 coarse sand	0.74	0.36 moderately well sorted	0.69	
52 9454.1	0.54 min: 0.12 max: 1.03 coarse sand	1.01	0.19 moderately well sorted	0.61	

TABLE 3 GRAIN SIZE ANALYSES continued

Well Depth (m)	Thin Section Statistics: Mean Diameter mm	Thin Section Statistics: Mean Diameter ϕ	Thin Section Statistics: Standard Deviation mm	Thin Section Statistics: Standard Deviation ϕ	Frequency Distribution
52 9464	0.37 min: 0.13 max: 0.75 medium sand	1.53	0.13 well-moderately well sorted	0.50	
52 9466	0.50 min: 0.09 max: 1.22 medium-coarse sand	1.12	0.20 moderately well sorted	0.63	
52 9482	0.05 min: 0.01 max: 0.14 coarse silt	4.58	0.02 moderately well sorted	0.65	

4. X-RAY DIFFRACTION

All the XRD results are summarised in Tables 4 and 5 below. The XRD traces for each sample are also presented below (Figs 49-67). To facilitate between-sample comparisons of relative abundance for the same mineral, the results in each table are given in counts of peak height. These figures are based on the strongest line for each mineral detected. Caution should be used in assessing relative abundance from these figures since peak height is also significantly affected by factors such as crystal size and crystallinity. For these reasons, the figures are even more unreliable when comparing different minerals in the same sample. For example, based on peak height alone carbonate minerals will always appear less abundant than similar proportions of quartz because of differences in crystallinity. Clay minerals will also appear to be less abundant than quartz in a bulk XRD trace because of differences in crystal size. Furthermore, comparison should not be made between peak heights given for bulk samples and those for the clay fractions because results have been influenced by the sampling and preparation methods. XRD will not detect minerals that represent less than approximately 5% of the total rock composition.

Dickite is the dominant kaolin mineral present and there are minor amounts of kaolinite. Dickite is well ordered in those samples where it is abundant (eg Big Lake-31, depth 10195.25ft). Where kaolinite has been identified in the cuttings samples it is probably not representative of the lithology at this depth. Thin section descriptions do not record the presence of kaolinite in the weathered granites. Illite is the next most abundant clay mineral; it is present as a discrete mineral and interstratified with smectite in the mixed layer clay rectorite. Illite as a discrete mineral is abundant in the deepest core sample from Big Lake-31 at a depth of 10224.71 ft. Smectite is present in trace to minor amounts in most samples as both a discrete mineral and regularly interstratified with either illite or chlorite. The highest percentage of smectite is recorded in the cuttings sample from Big Lake-51 where the smectite is a 21 Angstrom montmorillonite. Elsewhere the smectite tends to be a 19 Angstrom montmorillonite. Smectite is also a major component of the cuttings from Big Lake-46, -49 and Moomba-82. The least amount of smectite is evident in samples from Big Lake-32 and -34. Regularly interstratified chlorite-smectite (corrensite) is typically present in trace amounts in this suite of samples. The greatest abundance is evident in Big Lake-31 at 9987.67ft and Big Lake-49 at 10660 ft. Trace to minor amounts of discrete chlorite is present in all samples, with a maximum in Big Lake-52 at 9466 ft. The chlorite is an Fe rich variety. The only other clay mineral detected was trace amounts of pyrophyllite.

Quartz is the dominant silicate mineral present in all samples. Minor amounts of feldspar, in particular microcline, have been noted in the cuttings from Big Lake-46 and Moomba-82. Traces of feldspar may also be present in Big Lake-31 at 10224.71 ft and Big Lake-32 at 9361.21 ft. Siderite is the dominant carbonate mineral in this suite of samples and there are traces of calcite. Barite is considered a contaminant from the drilling mud.

TABLE 4. BULK MINERALOGY

Well	Depth (ft)	Smectite	Chlorite	Illite/ Muscovite	Dickite/ Kaolinite	Quartz	Microcline	Siderite
		Strongest peak height in counts						
Big Lake								
4	9799	?	364	261	464	17599	-	-
27	9490.5	438	325	281	292	17934	-	-
31	9961.92	?	-	277	588	16846	-	106
	9975.75	343	-	258	982	13975	-	-
	9987.67	?	-	410	302	18410	-	205
	10195.25	544	382	338	1877	8729	-	-
	10224.71	-	?	483	-	15701	-	-
32	9361.21	309	-	502	929	6379	-	-
	9410	-	347	275	467	21847	-	449
	9415.5	365	?	270	1099	16528	-	160
33	10090.33	-	310	296	231	14159	-	-
34	9822.04	?	341	283	360	20413	-	-
	9827.86	332	-	314	1030	14941	-	132
46*	9900	358	-	471	-	18731	1520	277
49*	10660	597	502	508	672	12180	-	659
51*	10870	314	386	419	276	20572	-	142
52	9432	424	353	293	502	16384	-	191
	9466	?	454	335	-	16684	-	-
Moomba								
82*	9910	-	-	455	173	35269	247	215

TABLE 5. CLAY MINERALOGY

Well	Depth (ft)	Smec	Rec	Cor	Chl	Ill	Pyro	Kaol	Qtz	Feld	Carb
				Strongest peak height in counts							
Big Lake											
4	9799	631	-	511	530	1721	tr	d8644	2655	-	-
27	9490.5	611	702	512	488	2156	-	d882	6359	-	-
31	9961.92	529	764	-	387	1515	tr	d5577	4056	-	s337
	9975.75	646	753	584	492	1385	-	d7418	2785	-	s292
	9987.67	666	-	952	506	2381	-	d3325	4520	-	s299
	10195.25	670	823	734	692	1371	tr	d7222	1760	-	-
	10224.71	855	-	683	503	4357	tr	-	4515	314	?c309
32	9361.21	537	680	521	427	2280	tr	d3353	2761	323	-
	9410	-	-	461	380	1331	-	d5772	2600	-	s312
	9415.5	475	tr	439	398	1025	-	d5159	3464	-	s280
33	10090.33	635	tr	593	741	1545	252	d2214	6164	-	-
34	9822.04	582	685	493	501	2070	-	d7477	3066	-	s327
	9827.86	433	365	491	420	1193	tr	d6561	3223	-	s257
46*	9900	1138	575	-	578	1589	-	k641	3396	746	-
49*	10660	904	618	838	840	1828	-	k1991	3732	-	barite
51*	10870	6274	-	-	942	3071	-	k2197	3471	tr	barite
52	9432	705	401	521	496	2462	tr	d5535	5024	-	s315
	9466	518	-	526	1259	1370	-	-	7345	-	-
Moomba											
82*	9910	800	912	-	574	3267	471	k546	2661	533	?c tr

Smec = smectite, Rec = rectorite (interstratified illite-smectite), Cor = corrensite (regularly interstratified chlorite-smectite), Chl = chlorite, Ill = illite, Pyro = pyrophyllite, Kaol = kaolin (dickite or kaolinite), Qtz = quartz, Feld = feldspar, Carb = carbonate (calcite or siderite).

* cuttings samples

Only the strongest peaks for each mineral identified have been labelled on the XRD traces below. The horizontal axis on each trace represents the angle in degrees two theta and the vertical axis is the peak height in counts. Clay samples were air dried, Mg and glycerol saturated (see methods). The following abbreviations have been used on the traces:

S	=	smectite
R	=	rectorite (interstratified illite-smectite)
C	=	corrensite (regularly interstratified chlorite-smectite)
Ch	=	chlorite
I	=	illite
I/M	=	illite/muscovite
P	=	pyrophyllite
D	=	dickite
K	=	kaolinite
Q	=	quartz
F	=	feldspar
Si	=	siderite
Ca	=	calcite
B	=	barite (contaminant from the drilling mud)
N	=	machine noise

Sample: Big Lake-4, core, depth 9799ft.

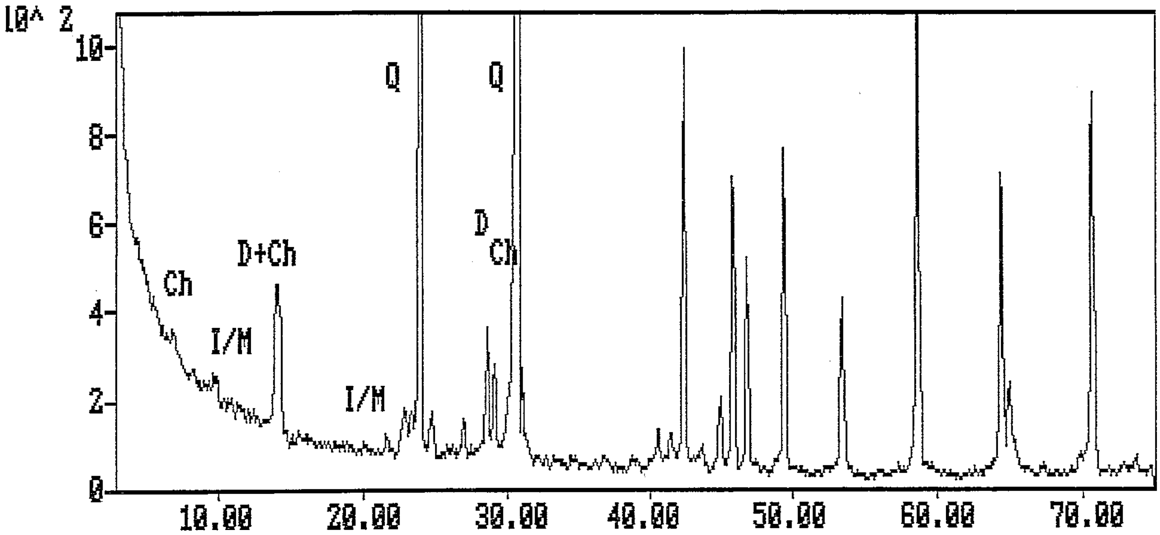


Figure 49a. Bulk XRD trace.

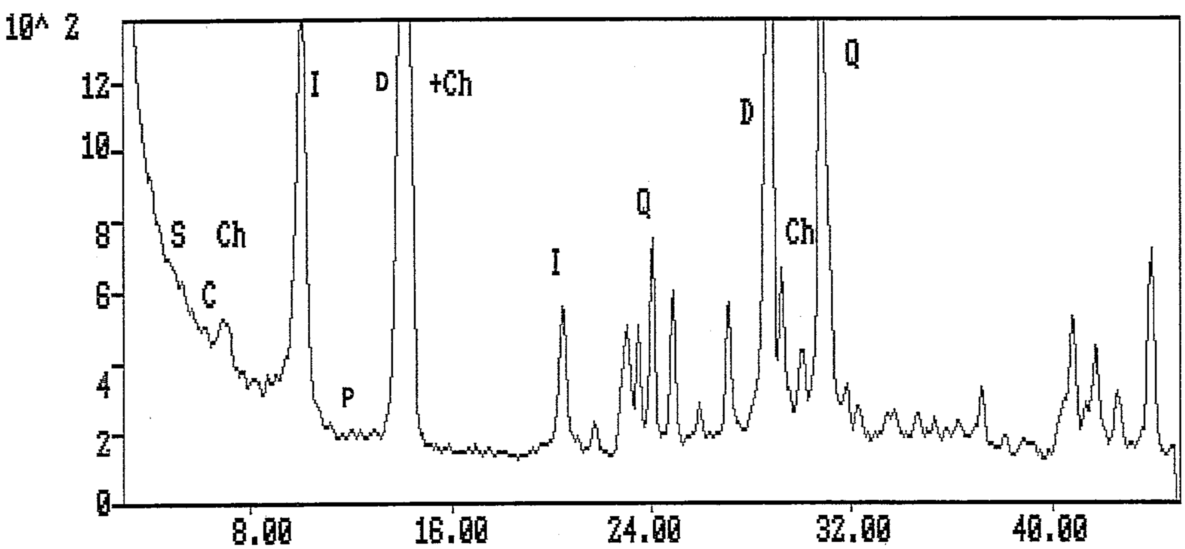


Figure 49b. Clay XRD trace.

Sample: Big Lake-27, core, depth 9490.5ft.

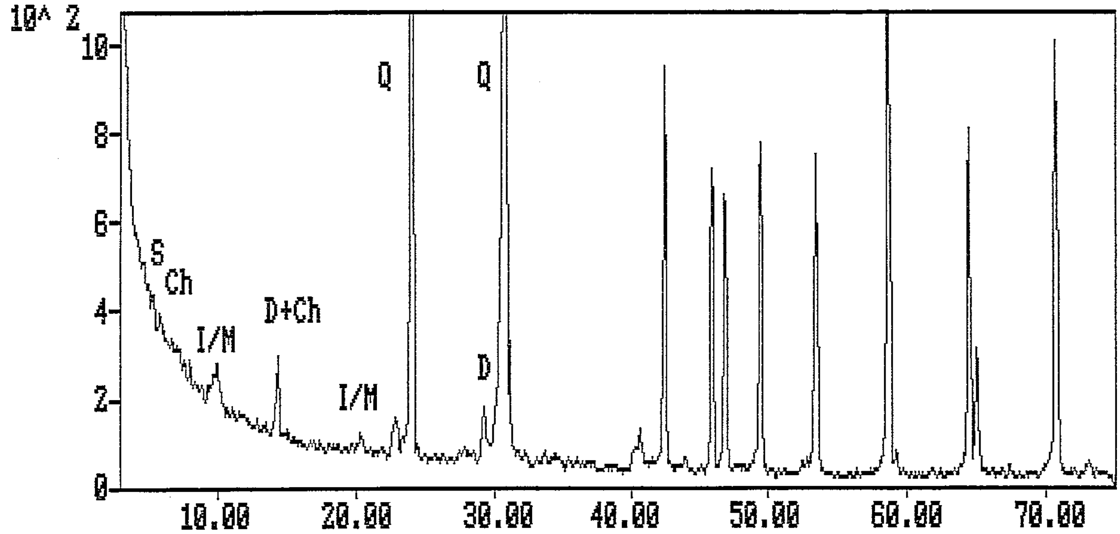


Figure 50a. Bulk XRD trace.

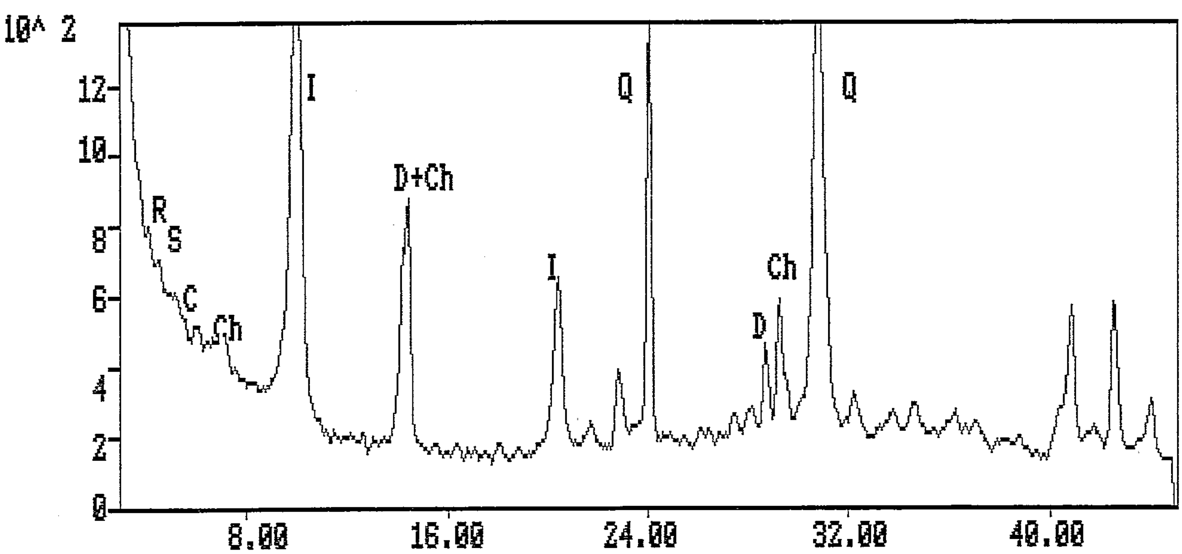


Figure 50b. Clay XRD trace.

Sample: Big Lake-31, core, depth 9961.92ft.

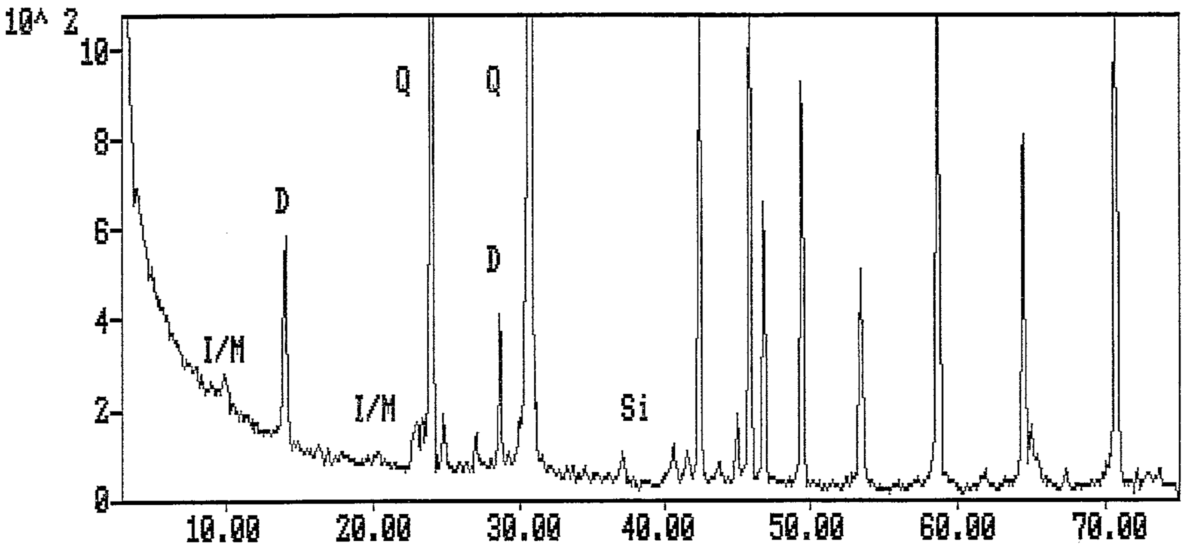


Figure 51a. Bulk XRD trace.

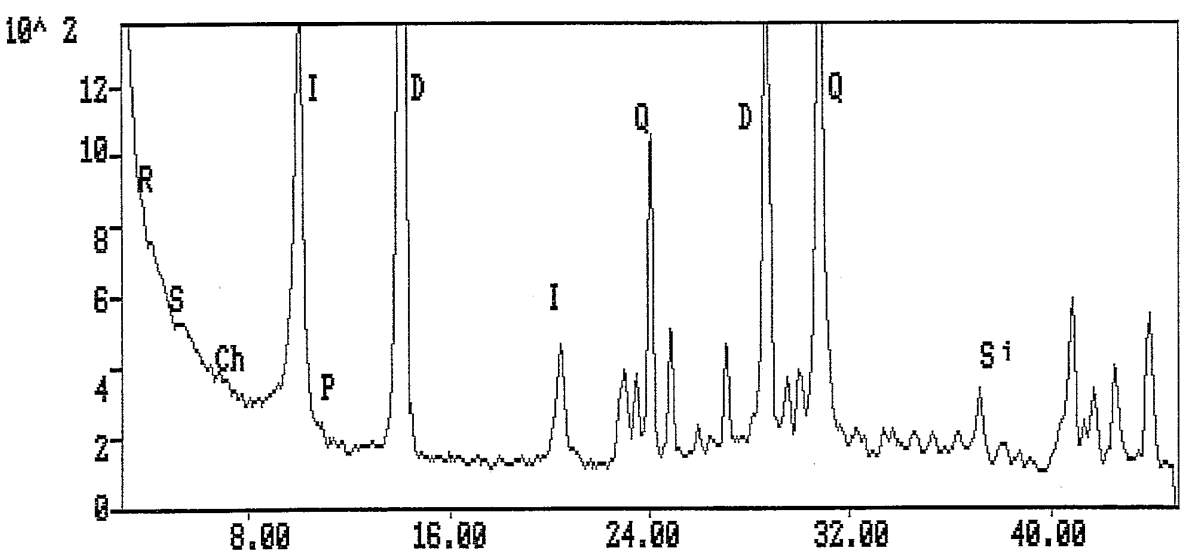


Figure 51b. Clay XRD trace.

Sample: Big Lake-31, core, depth 9975.75 ft.

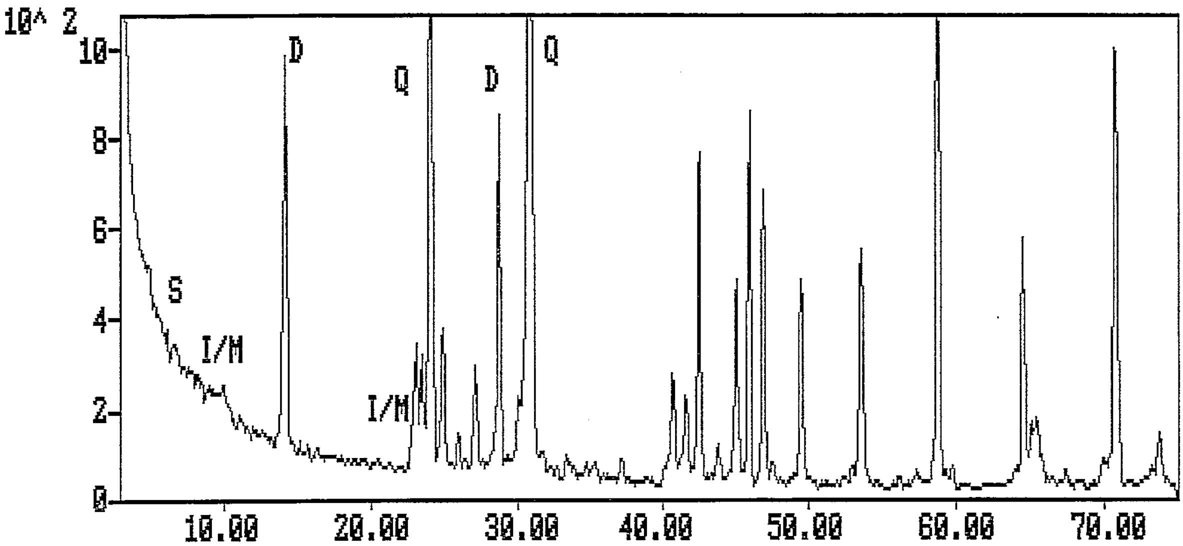


Figure 52a. Bulk XRD trace.

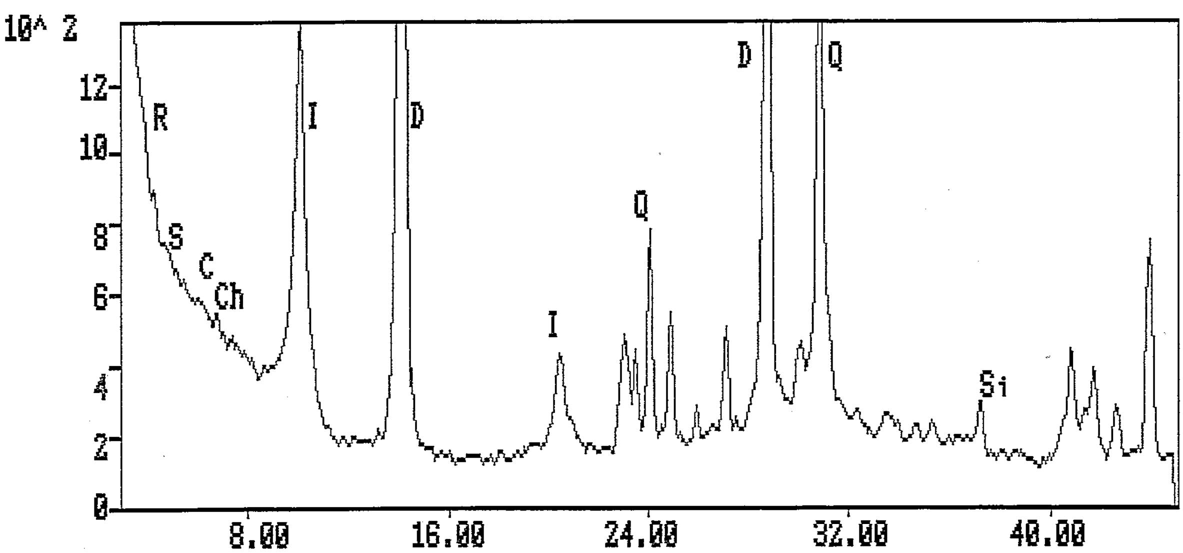


Figure 52b. Clay XRD trace.

Sample: Big Lake-31, core, depth 9987.67ft.

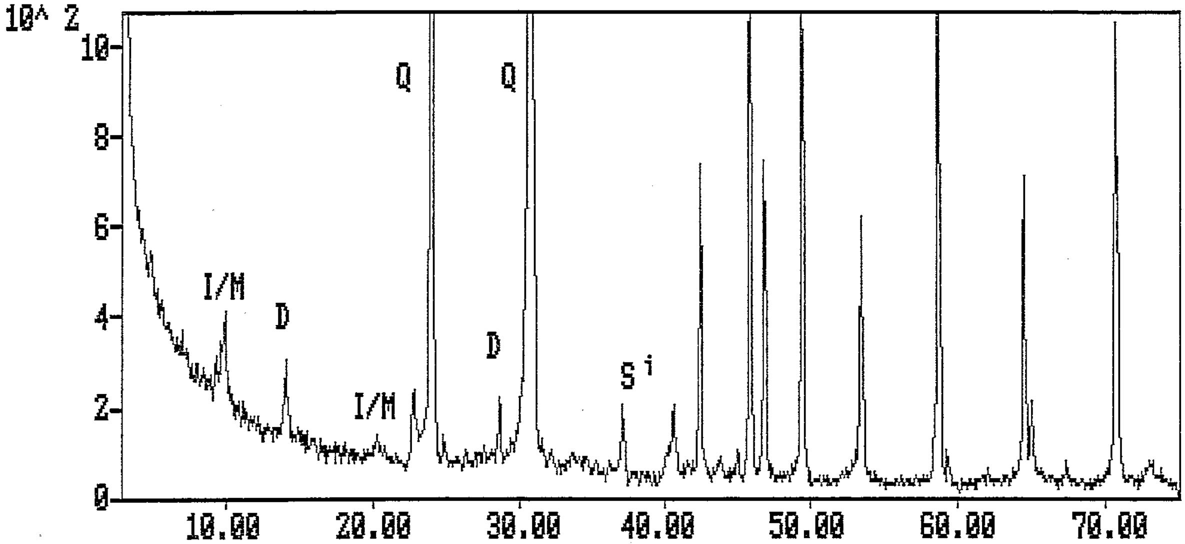


Figure 53a. Bulk XRD trace.

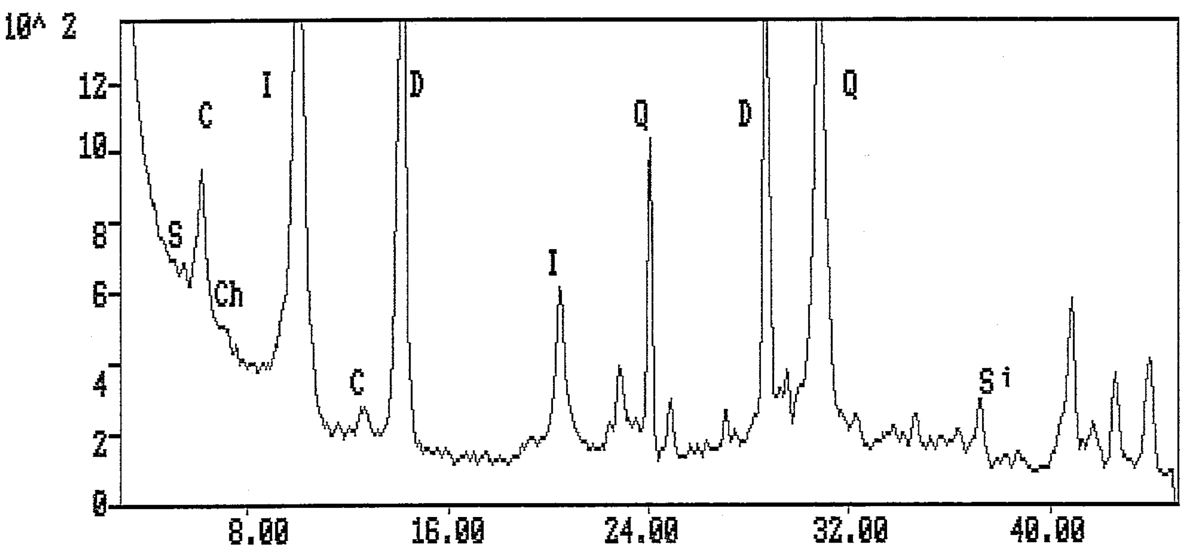


Figure 53b. Clay XRD trace.

Sample: Big Lake-31, core, depth 10195.25 ft.

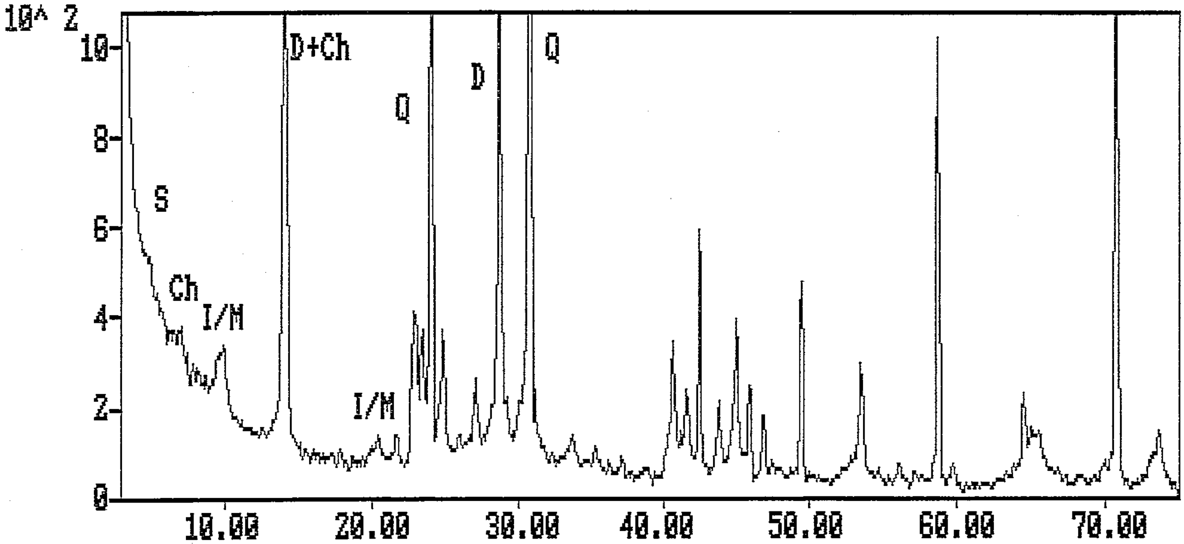


Figure 54a. Bulk XRD trace.

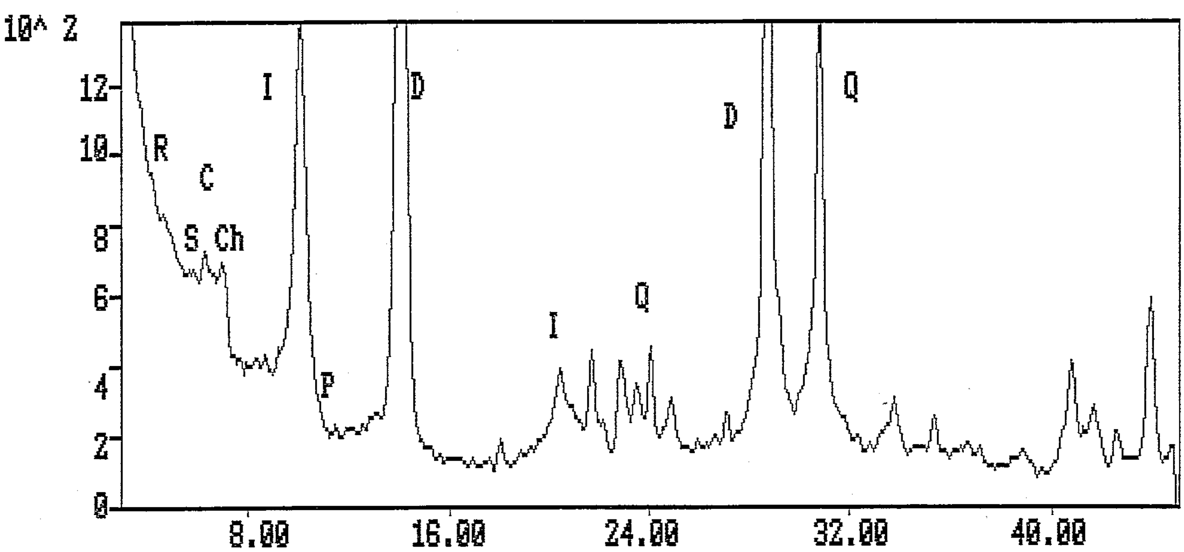


Figure 54b. Clay XRD trace.

Sample: Big Lake-31, core, depth 10224.71 ft.

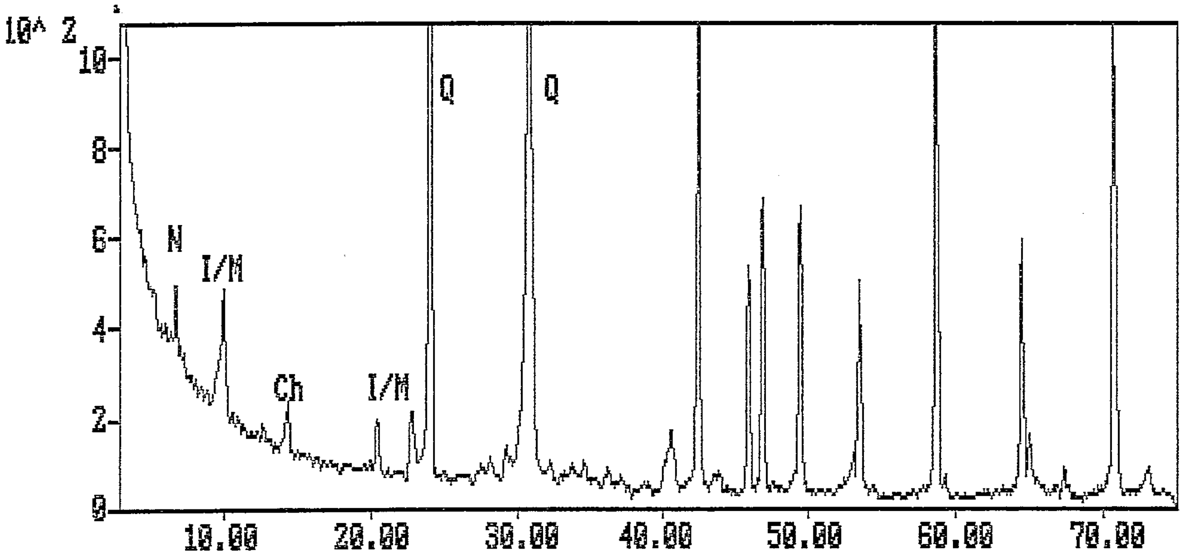


Figure 55a. Bulk XRD trace.

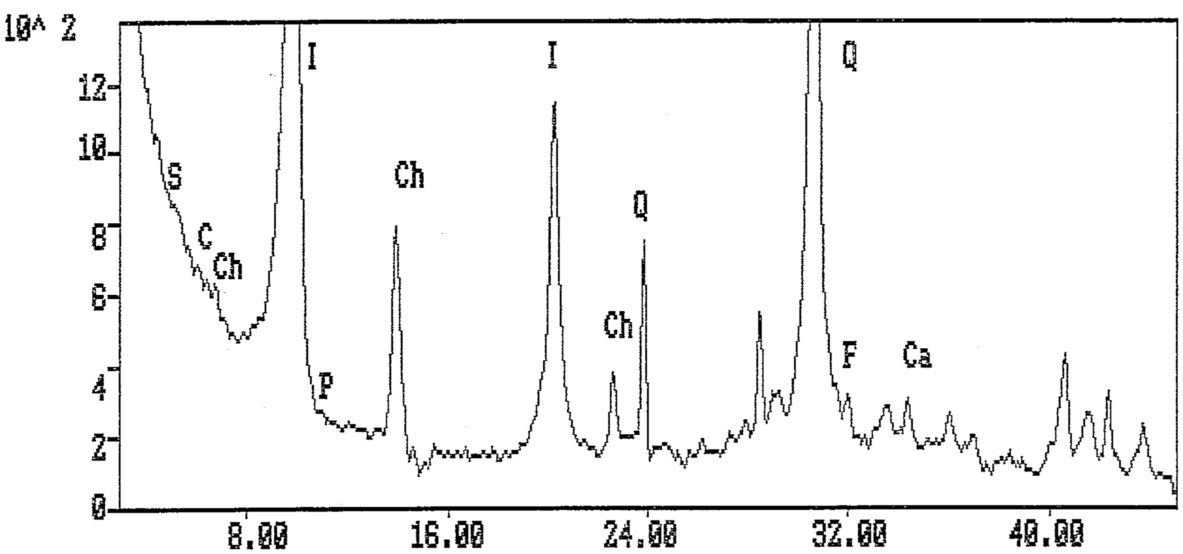


Figure 55b. Clay XRD trace.

Sample: Big Lake-32, core, depth 9361.21 ft.

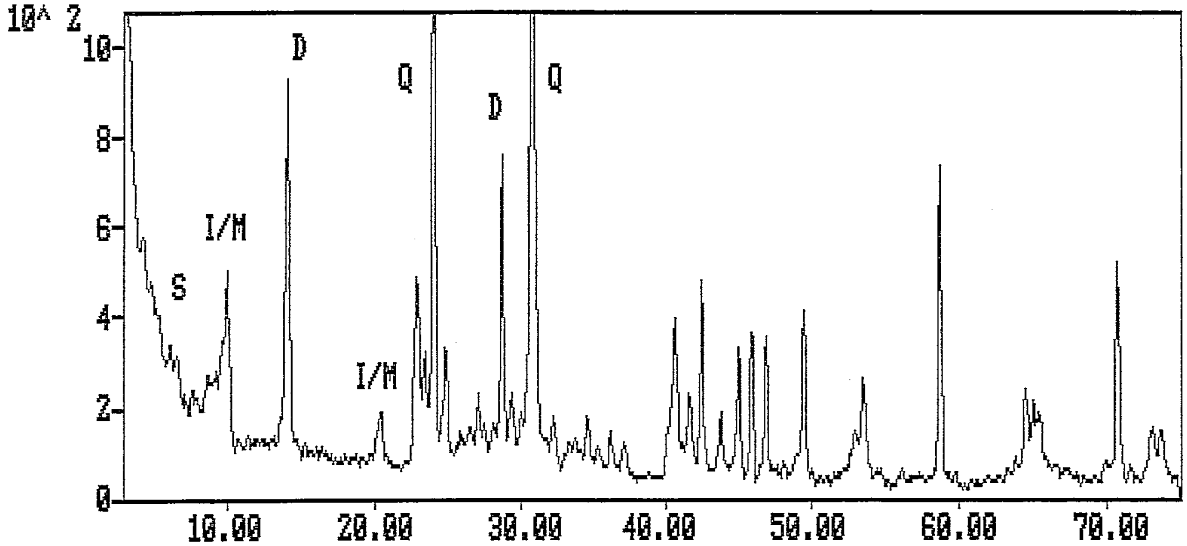


Figure 56a. Bulk XRD trace.

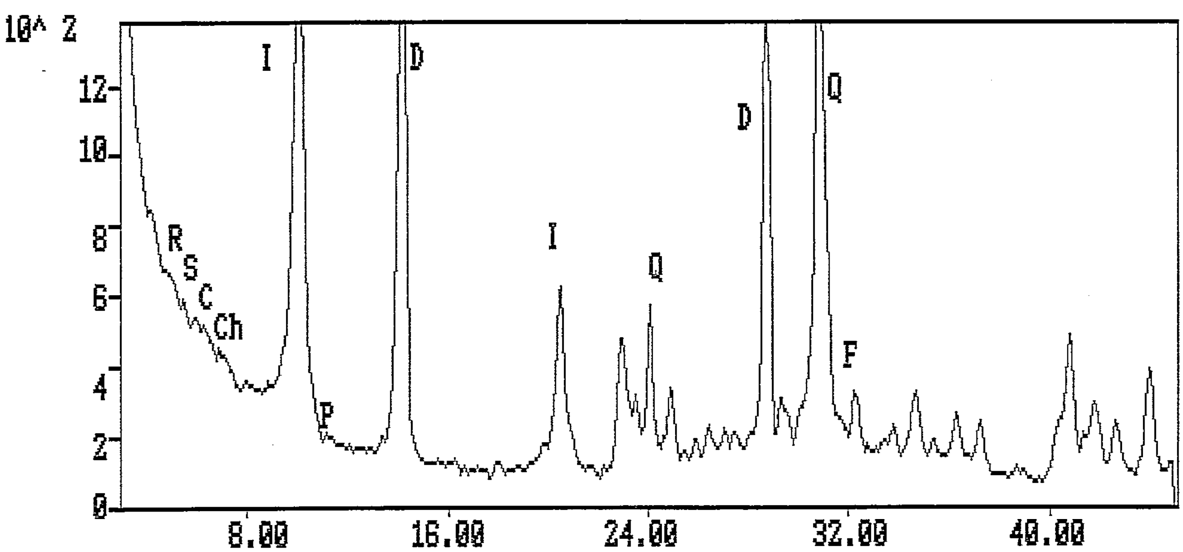


Figure 56b. Clay XRD trace.

Sample: Big Lake-32, core, depth 9410 ft.

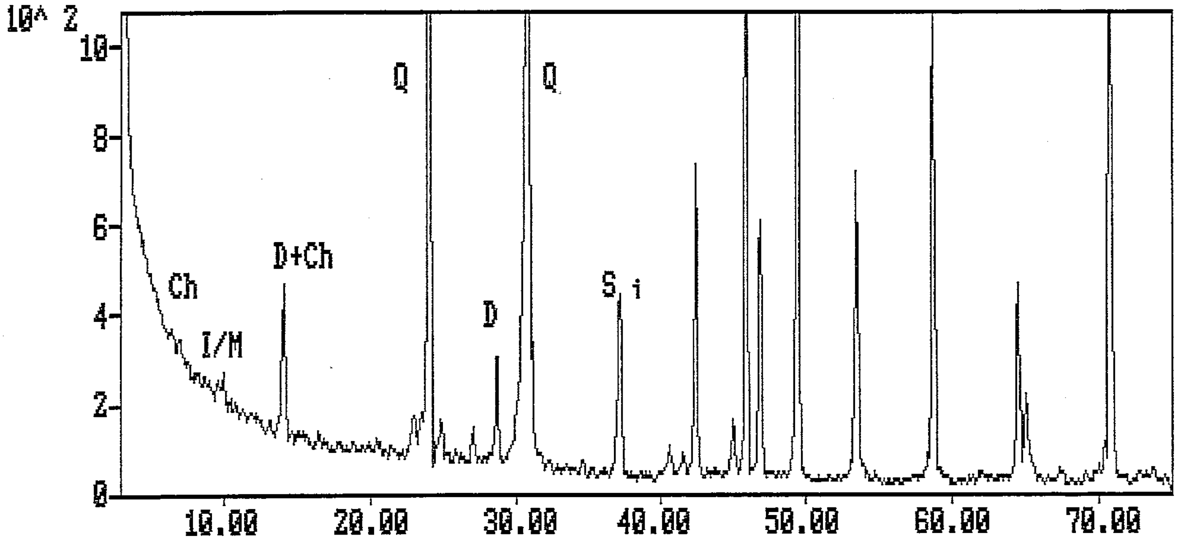


Figure 57a. Bulk XRD trace.

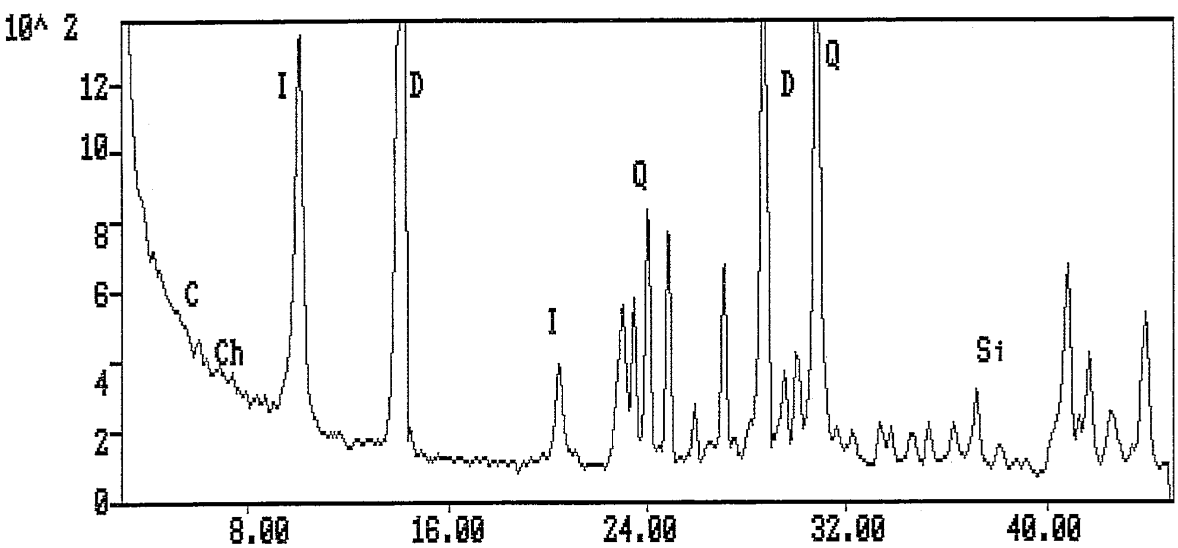


Figure 57b. Clay XRD trace.

Sample: Big Lake-32, core, depth 9415.5 ft.

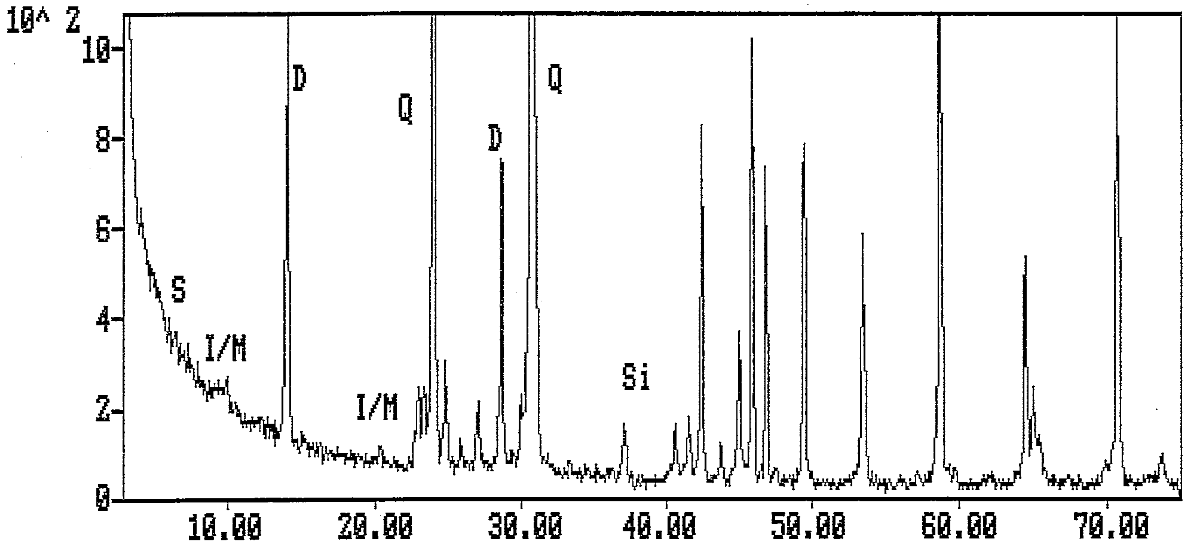


Figure 58a. Bulk XRD trace.

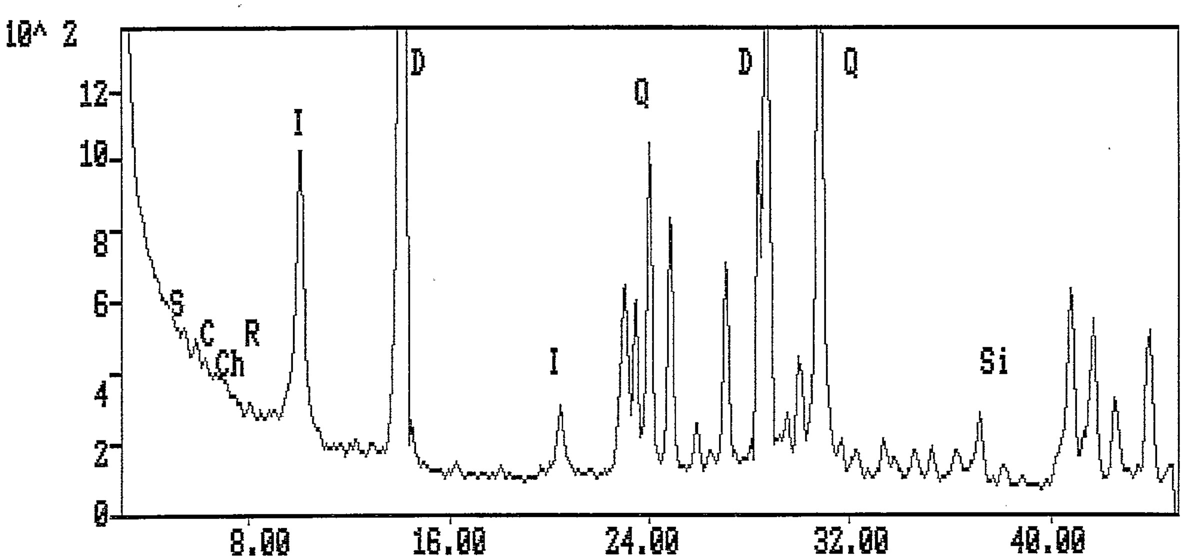


Figure 58b. Clay XRD trace.

Sample: Big Lake-33, core, depth 10090.33 ft.

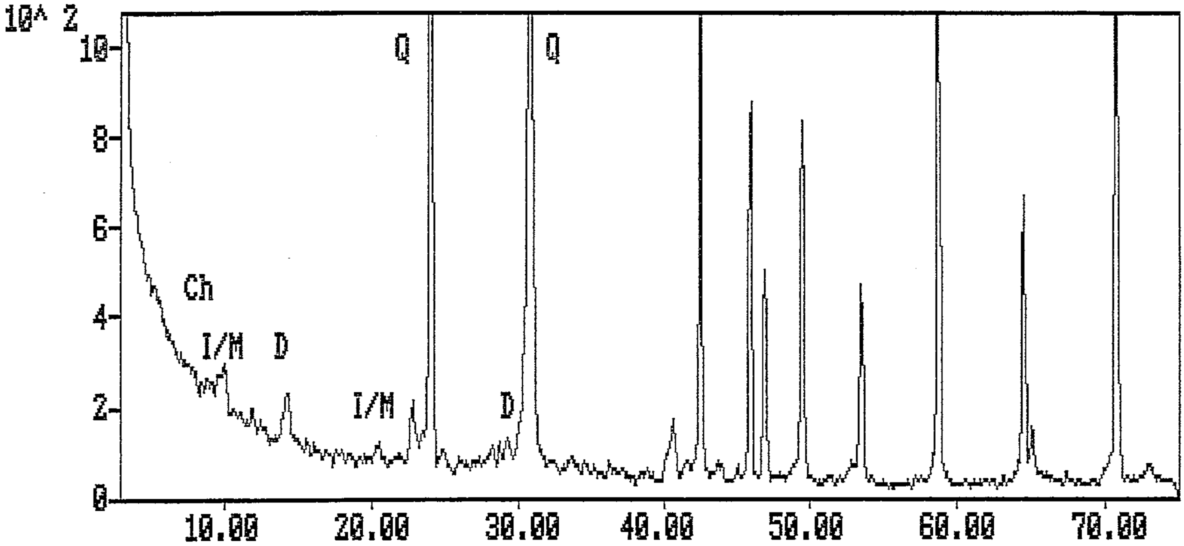


Figure 59a. Bulk XRD trace.

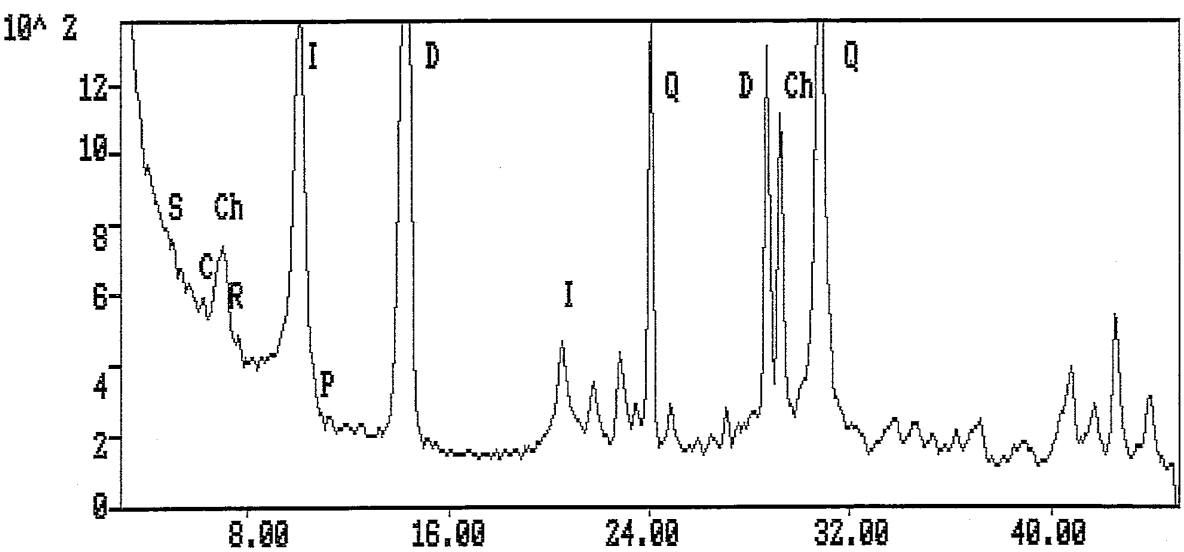


Figure 59b. Clay XRD trace.

Sample: Big Lake-34, core, depth 9822.04 ft.

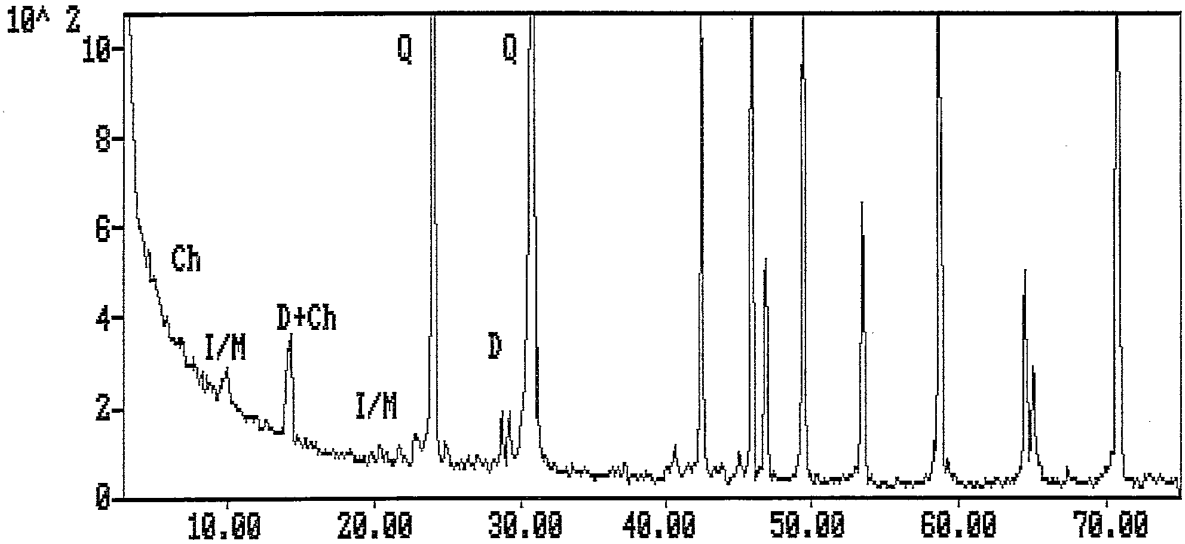


Figure 60a. Bulk XRD trace.

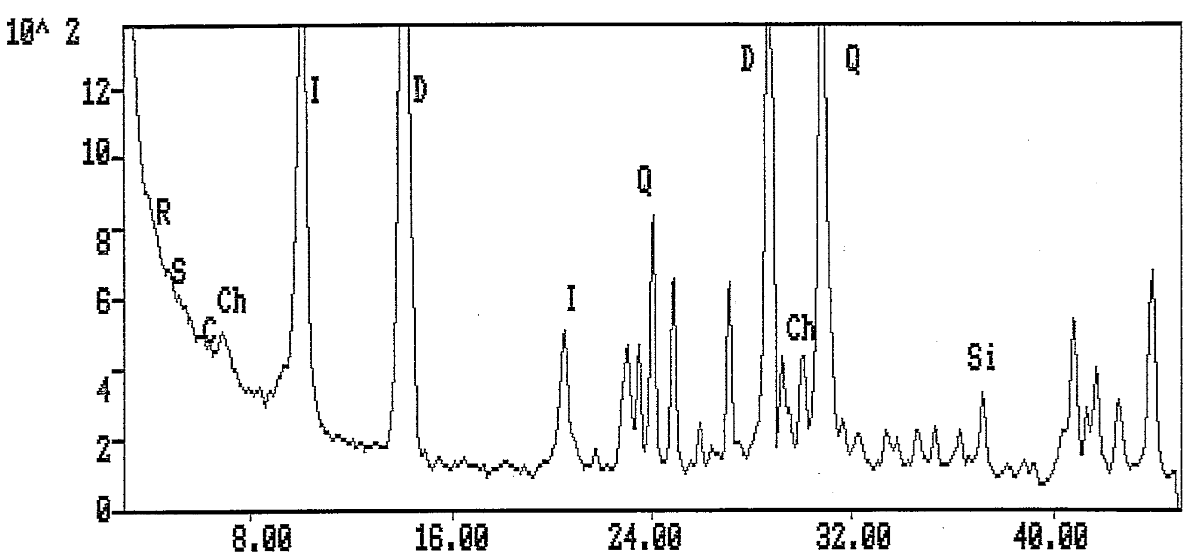


Figure 60b. Clay XRD trace.

Sample: Big Lake-34, core, depth 9827.86 ft.

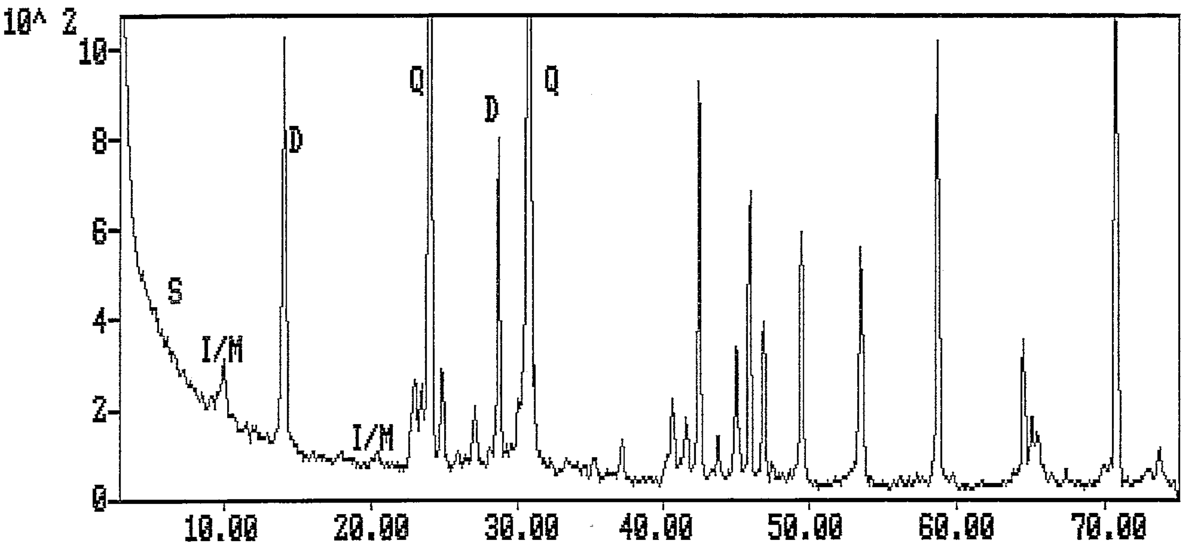


Figure 61a. Bulk XRD trace.

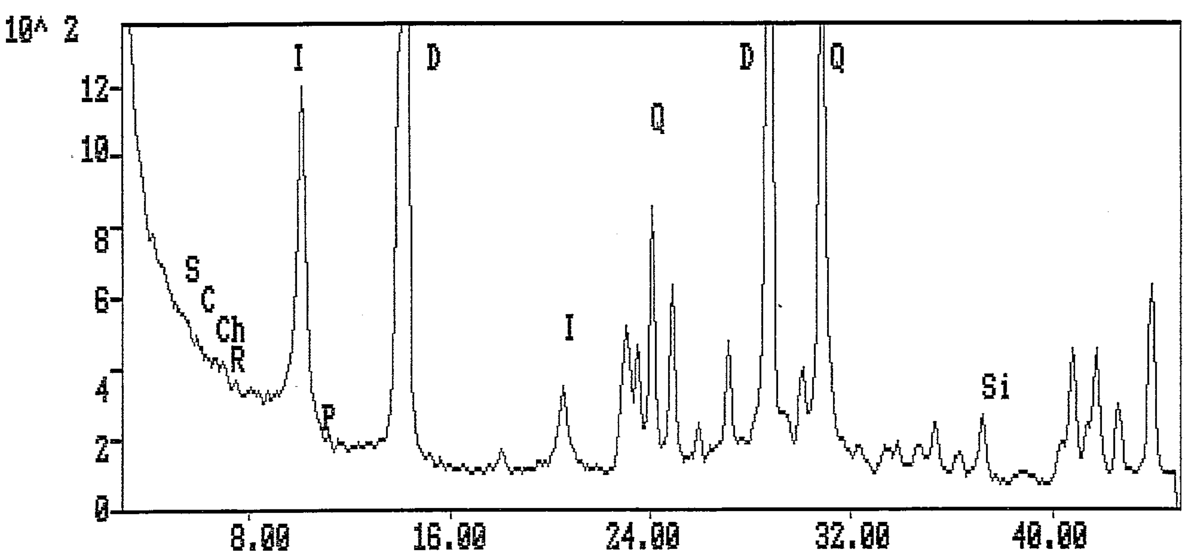


Figure 61b. Clay XRD trace.

Sample: <u>Big Lake-46, cuttings, depth 9900 ft.</u>

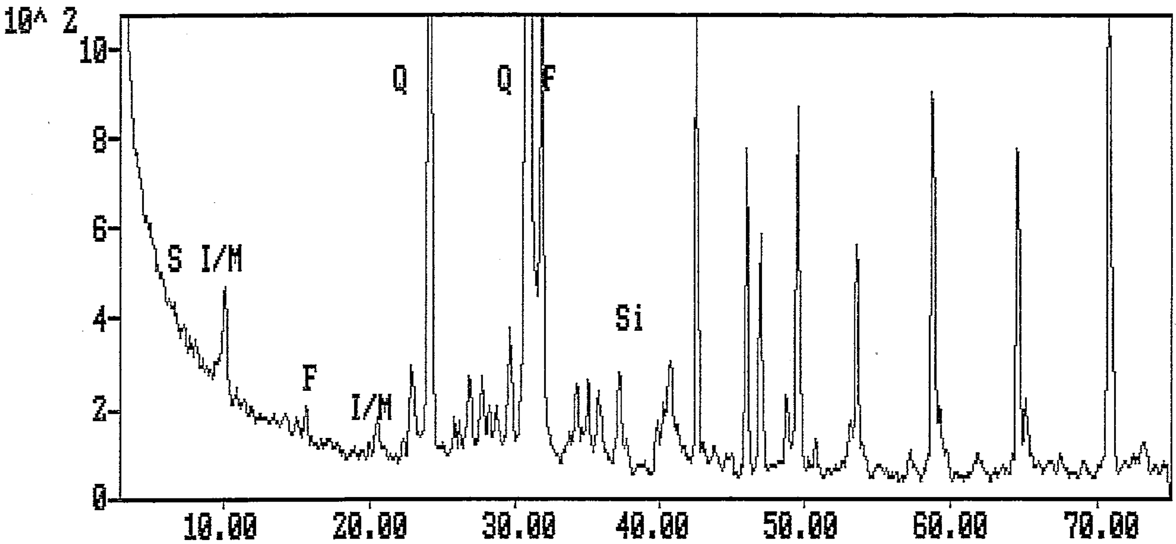


Figure 62a. Bulk XRD trace.

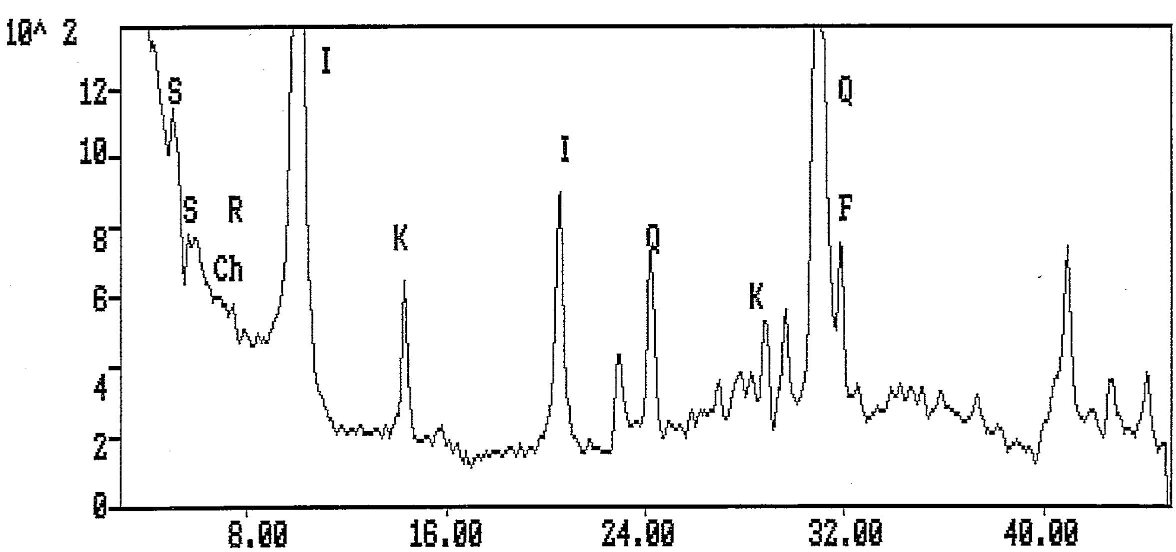


Figure 62b. Clay XRD trace.

Sample: Big Lake-49, cuttings, depth 10660 ft.

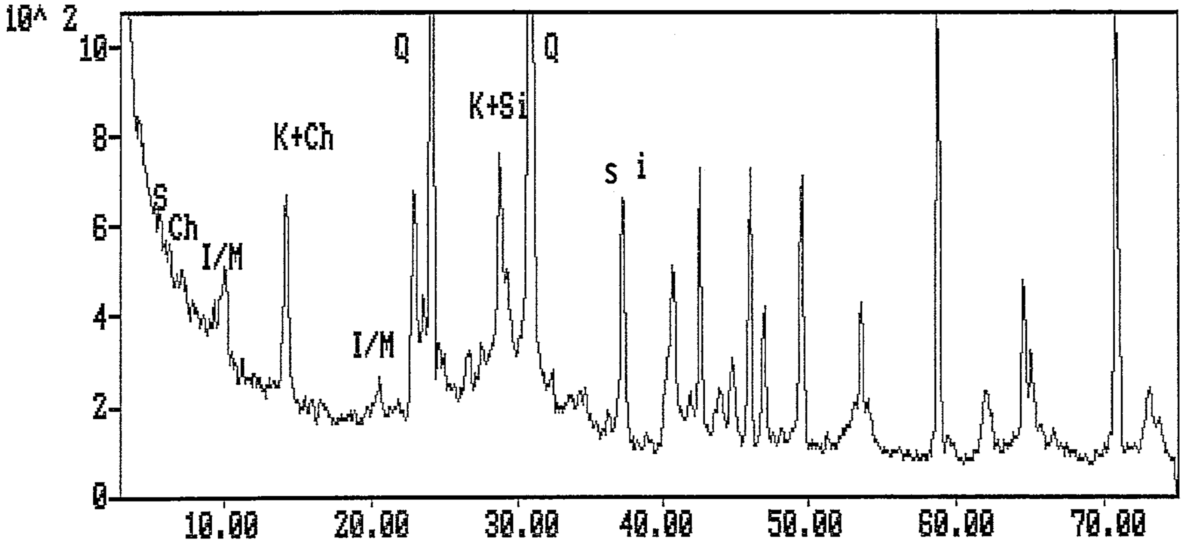


Figure 63a. Bulk XRD trace.

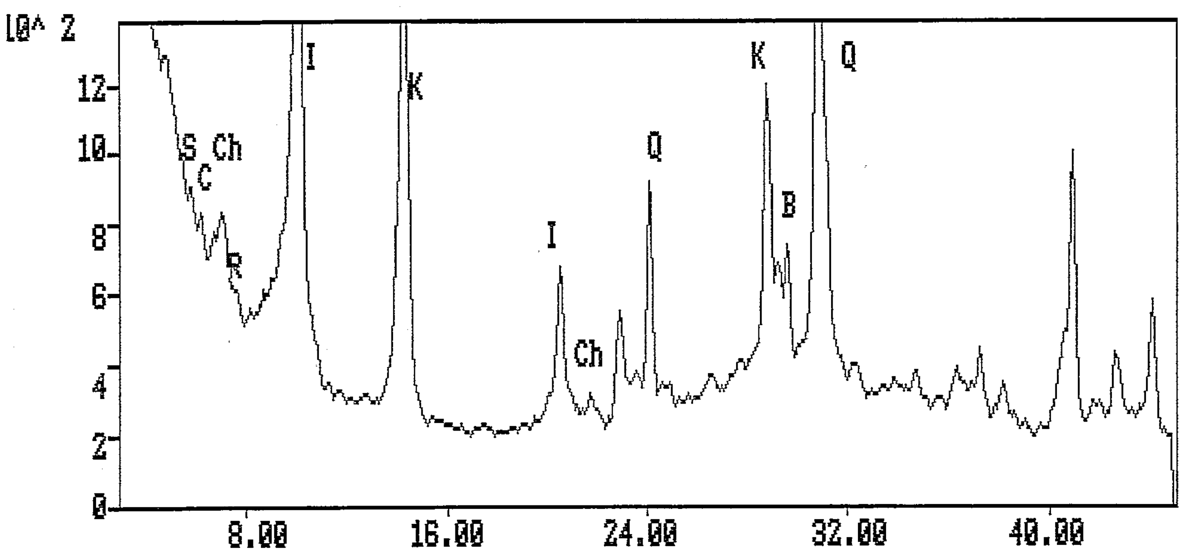


Figure 63b. Clay XRD trace.

Sample: Big Lake- 51, cuttings, depth 10870 ft.

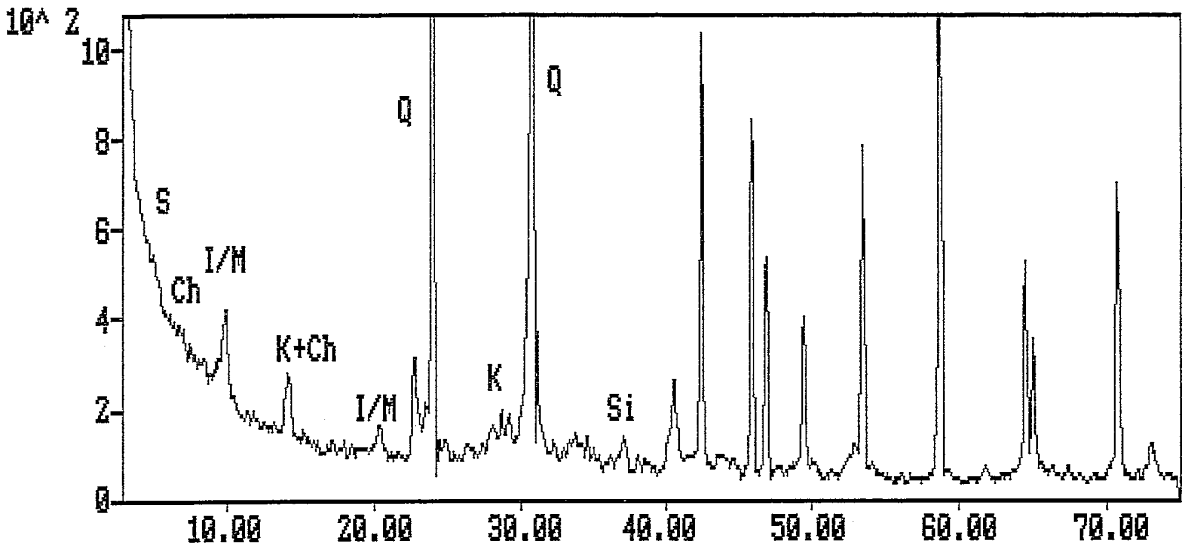


Figure 64a. Bulk XRD trace.

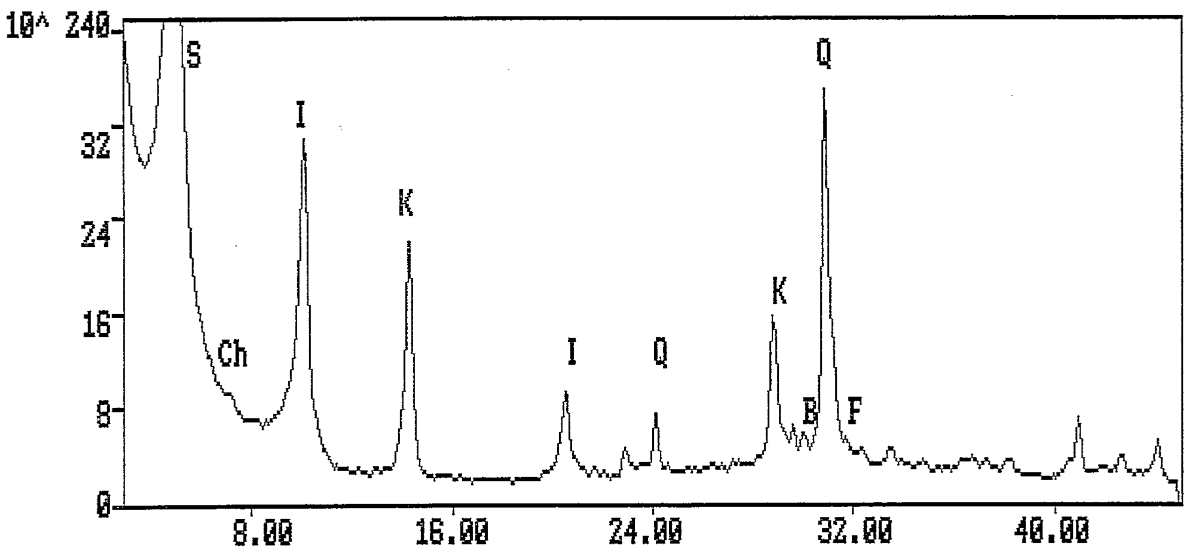


Figure 64b. Clay XRD trace. Note change of scale to illustrate the abundance of smectite.

Sample: Big Lake-52, core, depth 9432 ft.

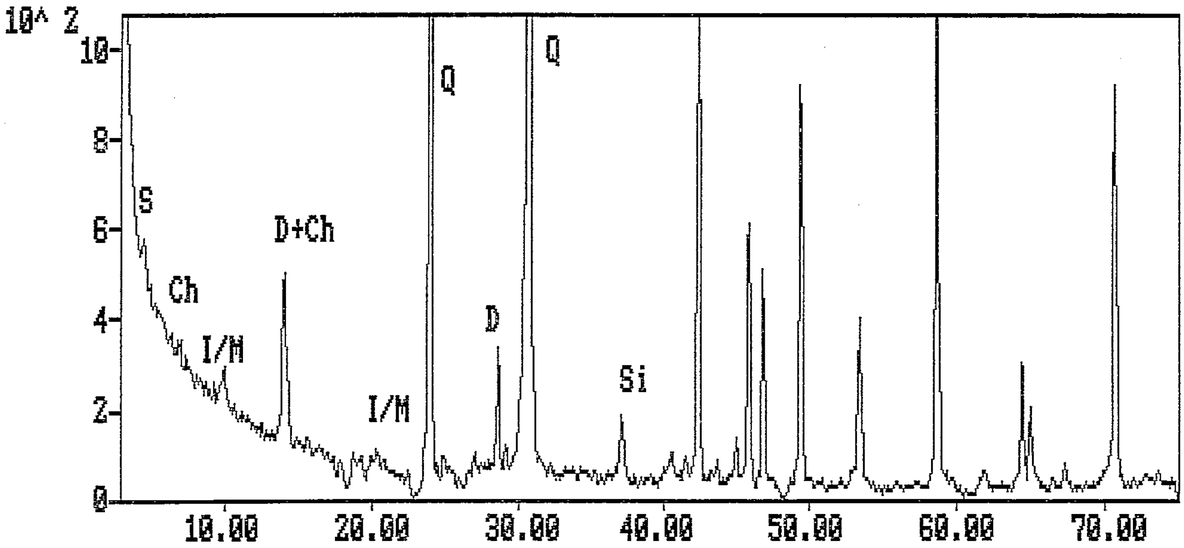


Figure 65a. Bulk XRD trace.

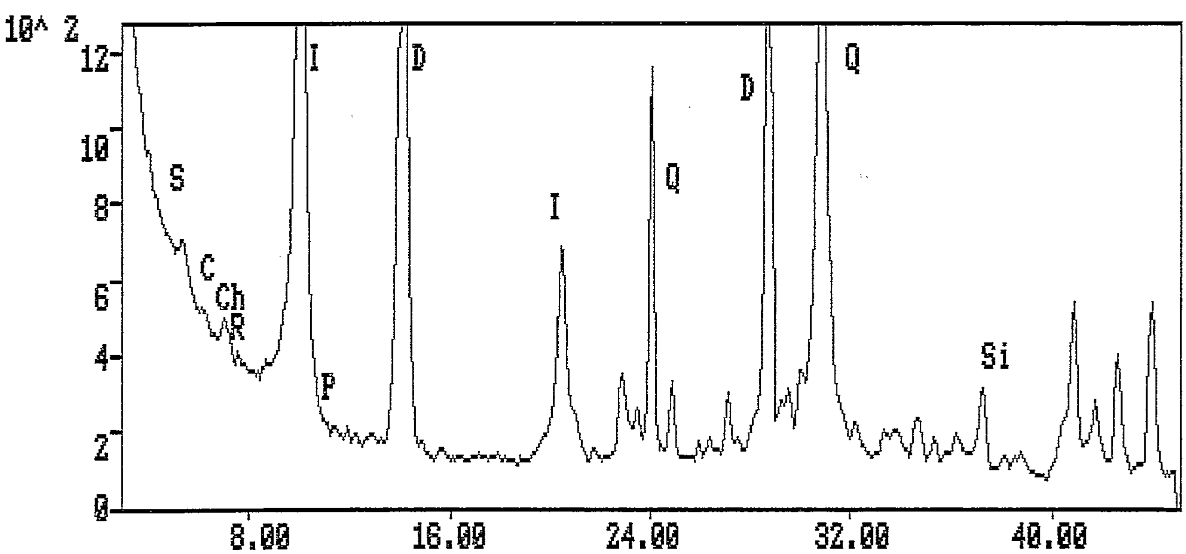


Figure 65b. Clay XRD trace.

Sample: Big Lake-52, core, depth 9466 ft.

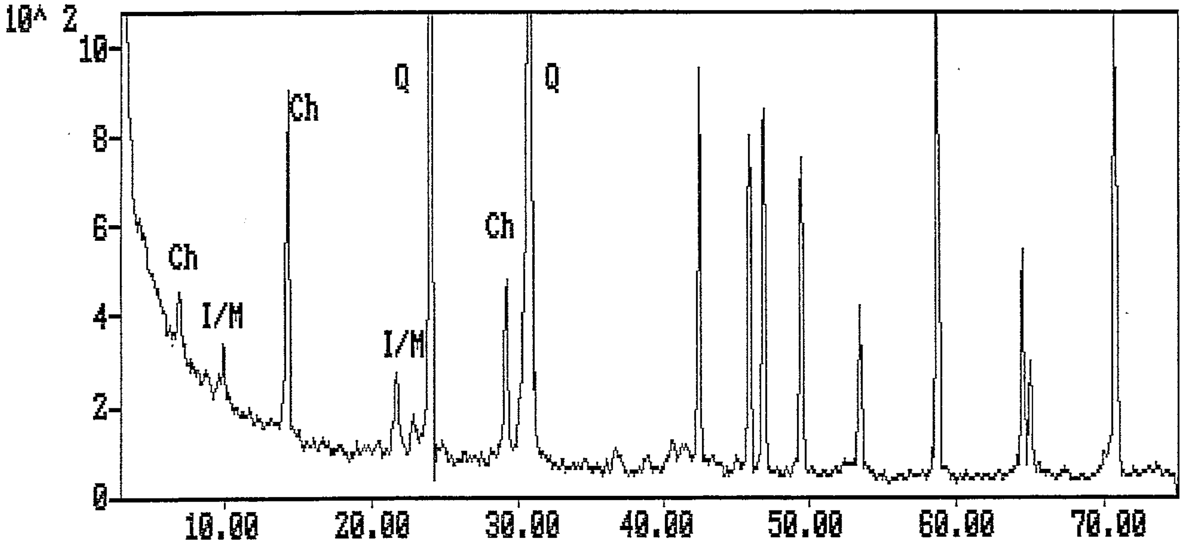


Figure 66a. Bulk XRD trace.

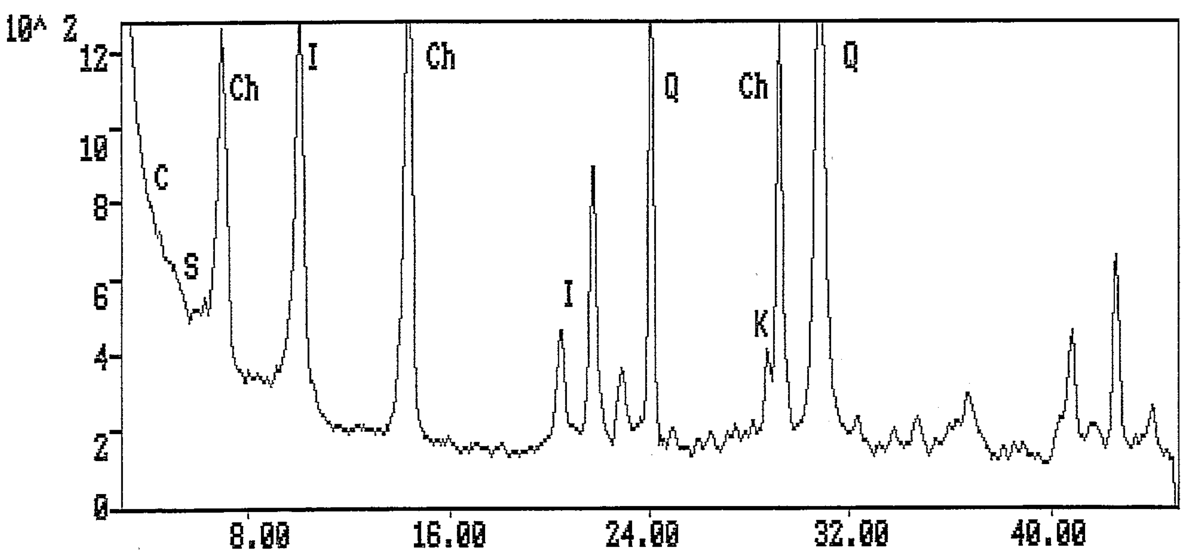


Figure 66b. Clay XRD trace.

Sample: Moomba-82, cuttings, depth 9910 ft.

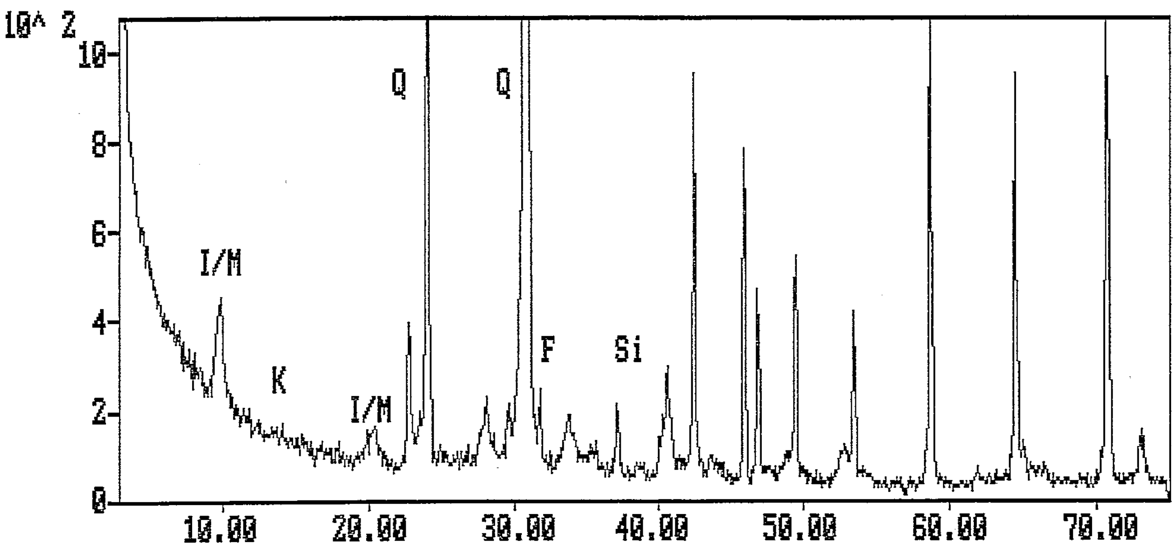


Figure 67a. Bulk XRD trace.

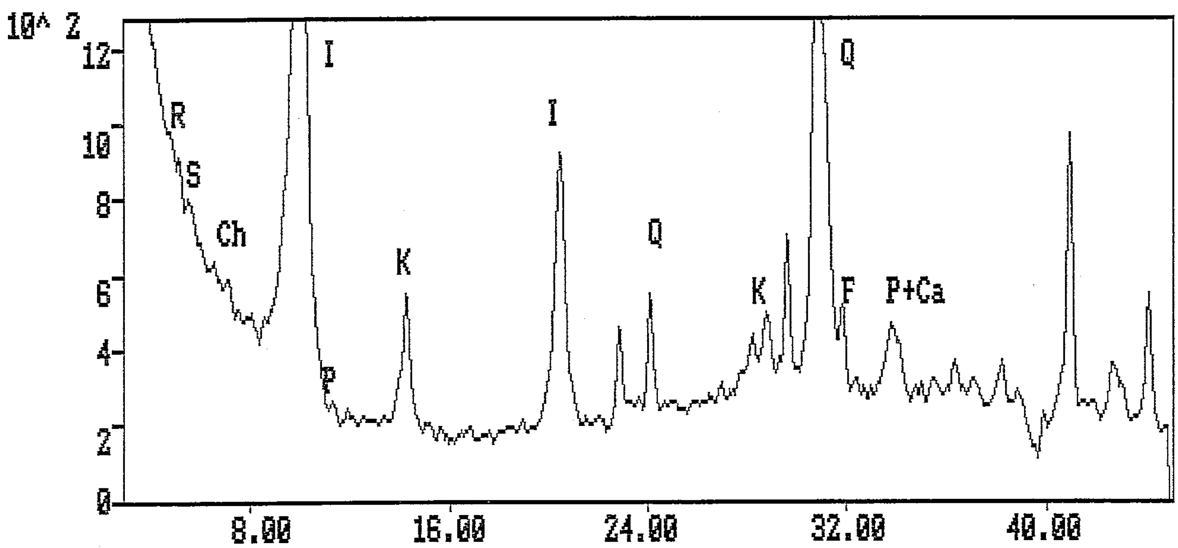


Figure 67b. Clay XRD trace.

5. WELL LOGS

6. ROUTINE CORE ANALYSIS

WELL NAME	CORE NUMBER	DEPTH DRLR	HORIZONTAL PERMEABILITY	VERTICAL PERMEABILITY	POROSITY	WATER SATURATION	GRAIN DENSITY	REMARKS
BIG LAKE 4	1	9790	0		6.04	54	2.64	
BIG LAKE 4	1	9791	0		5.97	36.1	2.64	
BIG LAKE 4	1	9792	0		4.9	31.4	2.65	
BIG LAKE 4	1	9794	0		5.25	30.6	2.61	
BIG LAKE 4	1	9795	0		5.65	50	2.61	
BIG LAKE 4	1	9796	0		6.25	45.3	2.64	
BIG LAKE 4	1	9797	0		5.24	66.6	2.66	
BIG LAKE 4	1	9798	0		0.79	99.99	2.61	
BIG LAKE 4	1	9799	0		6.11	68.5	2.63	
BIG LAKE 4	2	9808	0		2.53	78.5	2.63	
BIG LAKE 4	2	9809	0		5.44	40.6	2.63	
BIG LAKE 4	2	9810	0		5.66	62.5	2.66	
BIG LAKE 4	2	9811	0		4.31	50.6	2.69	
BIG LAKE 4	2	9812	0		5.28	25.8	2.67	
BIG LAKE 4	2	9813	0		6.1	0	2.67	
BIG LAKE 27	7	9481	<0.21		1.7	36.9	2.66	
BIG LAKE 27	7	9481.67	0.36		3.1	40.9	2.64	
BIG LAKE 27	7	9482.67	<0.19		5.5	27.2	2.63	
BIG LAKE 27	7	9483.67	<0.23	<0.13	7.1	34.8	2.66	
BIG LAKE 27	7	9487.67	<0.23		4.4	45.5	2.63	
BIG LAKE 27	8	9490.5	0.68		4.9	46.3	2.67	
BIG LAKE 27	8	9492.83	<0.23		5.8	34.4	2.65	
BIG LAKE 27	8	9494.08	<0.22		3.2	47.5	2.66	
BIG LAKE 27	8	9496.33	<0.23	<0.18	5.2	42.9	2.65	
BIG LAKE 27	8	9497.42	<0.22		7.5	29.2	2.65	
BIG LAKE 27	8	9498.5	<0.23		10.3	28.5	2.65	
BIG LAKE 27	8	9499.5	<0.22		5.2	33.3	2.63	
BIG LAKE 27	8	9501.17	<0.18		9.6	28.8	2.63	
BIG LAKE 27	8	9502.25	<0.23	<0.15	5.7	35.2	2.62	
BIG LAKE 27	8	9503.25	<0.23		6.2	36.4	2.65	
BIG LAKE 27	8	9504.58	<0.23		4.8	42.1	2.64	
BIG LAKE 27	8	9507.08	<0.22		5.8	43.9	2.59	
BIG LAKE 27	8	9507.83	<0.23		6.4	43	2.66	
BIG LAKE 27	8	9509.5	<0.22	<0.13	7.1	37.1	2.64	
BIG LAKE 27	8	9510.5	0.38		7.5	48.3	2.64	
BIG LAKE 27	8	9511.67	0.51		5.2	34	2.67	
BIG LAKE 31	2	9961.92	0.49		8.8	53.5	2.66	
BIG LAKE 31	2	9963.71	2.7		7.3	44	2.65	FRAC
BIG LAKE 31	2	9965.75	0.32		8.1	51.3	2.67	
BIG LAKE 31	2	9966.88	0.71		8.5	61.9	2.76	
BIG LAKE 31	2	9969.92	1.1	0.5	8.1	51	2.67	
BIG LAKE 31	2	9972.17	0.26		6.9	41.6	2.64	
BIG LAKE 31	2	9974.5	0.3		5.8	55.8	2.71	
BIG LAKE 31	2	9975.75	0.03		3.2	37.1	2.64	
BIG LAKE 31	2	9978.25	0.6		8.5	50	2.66	
BIG LAKE 31	2	9980.19	2	0.34	8.7	61.1	2.67	FRAC
BIG LAKE 31	2	9982.25	0.25		7.4	45.5	2.65	
BIG LAKE 31	2	9983.69	0.58		8.9	55	2.66	
BIG LAKE 31	2	9985.88	0.31		7.4	48.9	2.66	
BIG LAKE 31	2	9987.67	1.6		9.4	54.5	2.66	
BIG LAKE 31	2	9990.42	0.9	0.6	9.3	57.3	2.66	
BIG LAKE 31	3	10191	0.63		2.9	45.3	2.66	
BIG LAKE 31	3	10193.88	0.51		8.1	49	2.67	
BIG LAKE 31	3	10193.96	0.76		8.8	42.1	2.67	
BIG LAKE 31	3	10195.25	0.8		1.4	58	2.66	
BIG LAKE 31	3	10197.75	0.01		1.6	36.5	2.66	
BIG LAKE 31	4	10203.92	4	1.4	3	54.1	2.66	
BIG LAKE 31	4	10206.19	17		3.5	61.3	2.67	FRAC
BIG LAKE 31	4	10207.08	0.06		1.6	33.2	2.67	
BIG LAKE 31	4	10208.5	0.55		1.1	56	2.64	
BIG LAKE 31	4	10211.08	0.91	0.68	7.5	45.3	2.67	
BIG LAKE 31	4	10212.08	0.08		4.3	52.6	2.67	
BIG LAKE 31	4	10213.79	0.64		7.6	37.7	2.67	
BIG LAKE 31	4	10216.13	1.7		9	50.3	2.66	
BIG LAKE 31	4	10217.5	1.2		8	35.8	2.67	
BIG LAKE 31	4	10218.17	1.4	0.62	9	44.4	2.67	

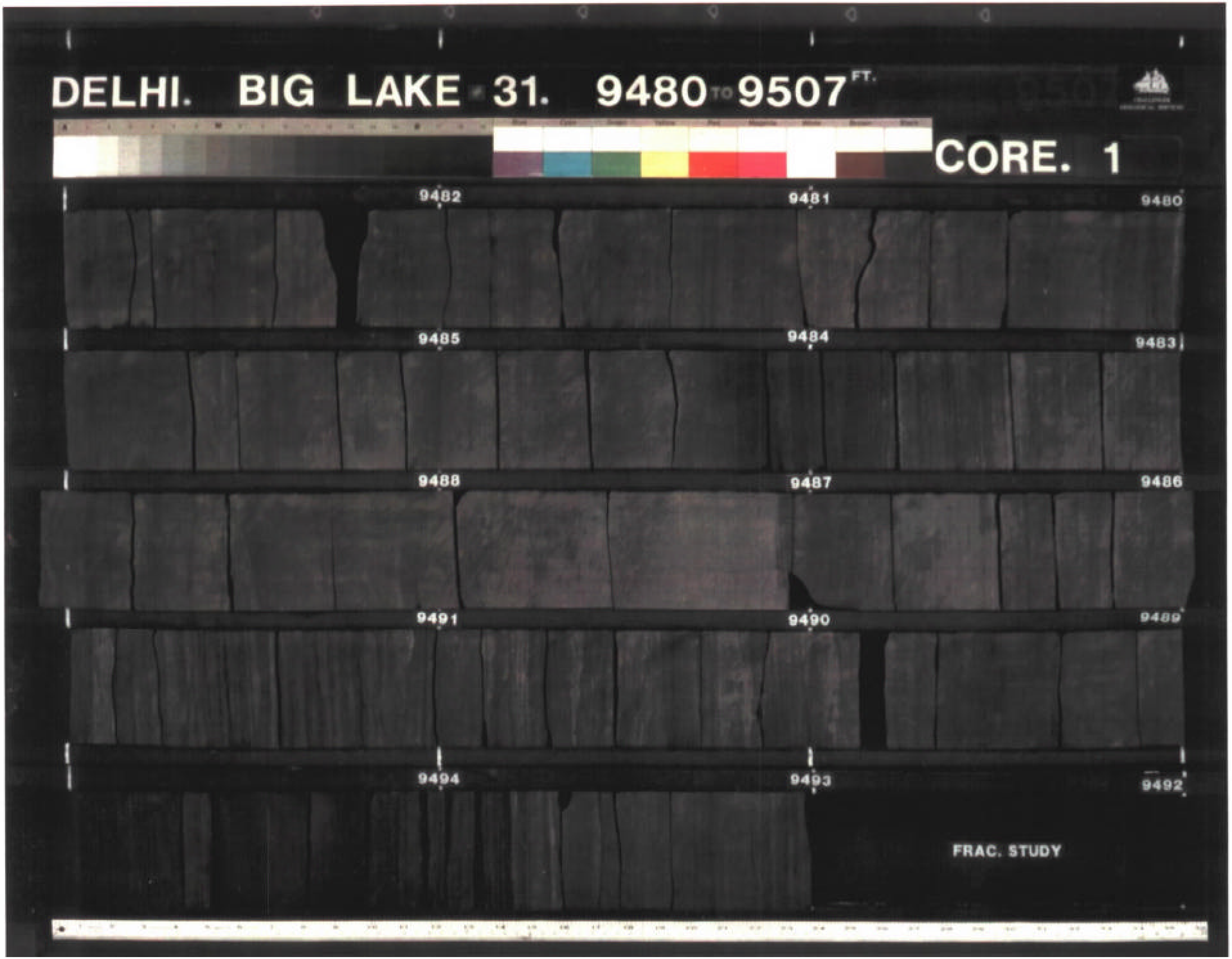
WELL NAME	CORE NUMBER	DEPTH DRLR	HORIZONTAL PERMEABILITY	VERTICAL PERMEABILITY	POROSITY	WATER SATURATION	GRAIN DENSITY	REMARKS
BIG LAKE 31	4	10219.78	1.5		6.4	55.4	2.67	FRAC
BIG LAKE 31	4	10221.29	0.22		5.7	50.1	2.66	
BIG LAKE 31	4	10222.46	3.6		8.1	43.3	2.67	FRAC
BIG LAKE 31	4	10224.71	0.7		9.1	45.9	2.66	
BIG LAKE 31	4	10225.92	0.56	0.39	10.5	43	2.67	
BIG LAKE 32	1	9356.28	132		6.2	35.5	2.64	FRAC
BIG LAKE 32	1	9357.53	1.5		9	68.6	2.67	
BIG LAKE 32	1	9359.11	0.75		7.5	64.7	2.66	
BIG LAKE 32	1	9360.46	0.48		6.5	57.2	2.67	
BIG LAKE 32	1	9361.21	0.08	0.2	1.7	56.4	2.66	
BIG LAKE 32	1	9363.63	0.71		9.3	70.5	2.67	
BIG LAKE 32	1	9365.11	12		13.1	59.1	2.66	
BIG LAKE 32	1	9366.54	7.8		5.5	64.2	2.66	
BIG LAKE 32	1	9368.71	11		12	67	2.65	FRAC
BIG LAKE 32	1	9369.92	0.31	0.26	7.2	60.3	2.70	
BIG LAKE 32	1	9370.38	0.31		5.5	51.7	2.67	
BIG LAKE 32	1	9372	7.6		13.6	51.1	2.68	
BIG LAKE 32	1	9373.25	4.9		12.9	53.2	2.70	
BIG LAKE 32	1	9374.21	0.2		7.1	55.5	2.68	
BIG LAKE 32	1	9375.92	2.4		11.4	59.8	2.66	
BIG LAKE 32	1	9377.08	7.7		13.6	58.6	2.69	
BIG LAKE 32	1	9377.88	5		11.4	49.7	2.76	
BIG LAKE 32	1	9379.31	3.1		5.5	45.8	2.69	
BIG LAKE 32	1	9380.83	6		11.8	63.1	2.66	FRAC
BIG LAKE 32	1	9381.92	1.6	0.68	9.8	61	2.69	
BIG LAKE 32	1	9382.58	3.1		11.3	62.1	2.68	
BIG LAKE 32	2	9387.81	6.3		13.1	44.6	2.67	FRAC
BIG LAKE 32	2	9389.19	8.3		11.3		2.67	FRAC
BIG LAKE 32	2	9390.67	5.1		12.5		2.66	
BIG LAKE 32	2	9391.69	4.8	0.3	4.3		2.69	FRAC
BIG LAKE 32	2	9392.96	6.9		13.7		2.68	
BIG LAKE 32	2	9395.58	4.4		13.1		2.66	
BIG LAKE 32	2	9397.53	3.4		10		2.67	
BIG LAKE 32	2	9399.83	3.9		11.2		2.67	
BIG LAKE 32	2	9401.5	2.4	0.59	10.7		2.66	
BIG LAKE 32	2	9402.64	3.9		11.5	39.2	2.66	
BIG LAKE 32	2	9404.54	1.6		9	48.3	2.66	
BIG LAKE 32	2	9406.04	1.3		9.5	42.1	2.65	
BIG LAKE 32	2	9407.08	4.9		12.2	44.6	2.66	
BIG LAKE 32	2	9408.69	2.3	0.89	11.2	38	2.66	
BIG LAKE 32	2	9410	12		13.8	43.9	2.67	
BIG LAKE 32	2	9411.33	0.39		4.3	50.8	2.67	
BIG LAKE 32	2	9413.78	9.2		14.2	50.4	2.68	
BIG LAKE 32	2	9415.5	1.3		5.9	42.6	2.68	FRAC
BIG LAKE 33	1	10075.28	0.1		6	49.6	2.68	
BIG LAKE 33	1	10076.21	0.05		5.5	49.7	2.67	
BIG LAKE 33	1	10078.13	0.02		2.4	52.4	2.68	
BIG LAKE 33	1	10082.78	0.13		9.3	56.6	2.67	
BIG LAKE 33	1	10085.54	0.05	0.04	6.8	48.8	2.66	
BIG LAKE 33	1	10086.29	0.18		7.1	57.2	2.67	
BIG LAKE 33	1	10088	0.08		8.4	55.3	2.67	
BIG LAKE 33	1	10088.92	0.11		7.7	56.8	2.67	
BIG LAKE 33	1	10090.33	0.14		8.2	51.5	2.68	
BIG LAKE 33	1	10091.5	0.03	0.02	5.9	58.2	2.66	
BIG LAKE 33	1	10093.61	0.02		2.9	27.3	2.67	
BIG LAKE 33	1	10098.33	0.01		1.6	25.1	2.67	
BIG LAKE 33	1	10100.42	0.01		3.2	66.5	2.67	
BIG LAKE 33	1	10101.79	0.05		3.75	44.4	2.68	
BIG LAKE 34	2	9806.38	78		5.4	45.7	2.65	FRAC
BIG LAKE 34	2	9808.5			6.5	43.2	2.66	FRAC
BIG LAKE 34	2	9811.5	0.07		5.1	34.7	2.66	
BIG LAKE 34	2	9812.58	1.2		6.8	39.7	2.65	
BIG LAKE 34	2	9814.71	2.1	0.88	8.7	23.2	2.65	
BIG LAKE 34	2	9816.25			8.1	42.5	2.65	FRAC
BIG LAKE 34	2	9817.75	1.9		5.5	36.5	2.66	
BIG LAKE 34	2	9818.69	8.1		6.8	39.4	2.66	FRAC

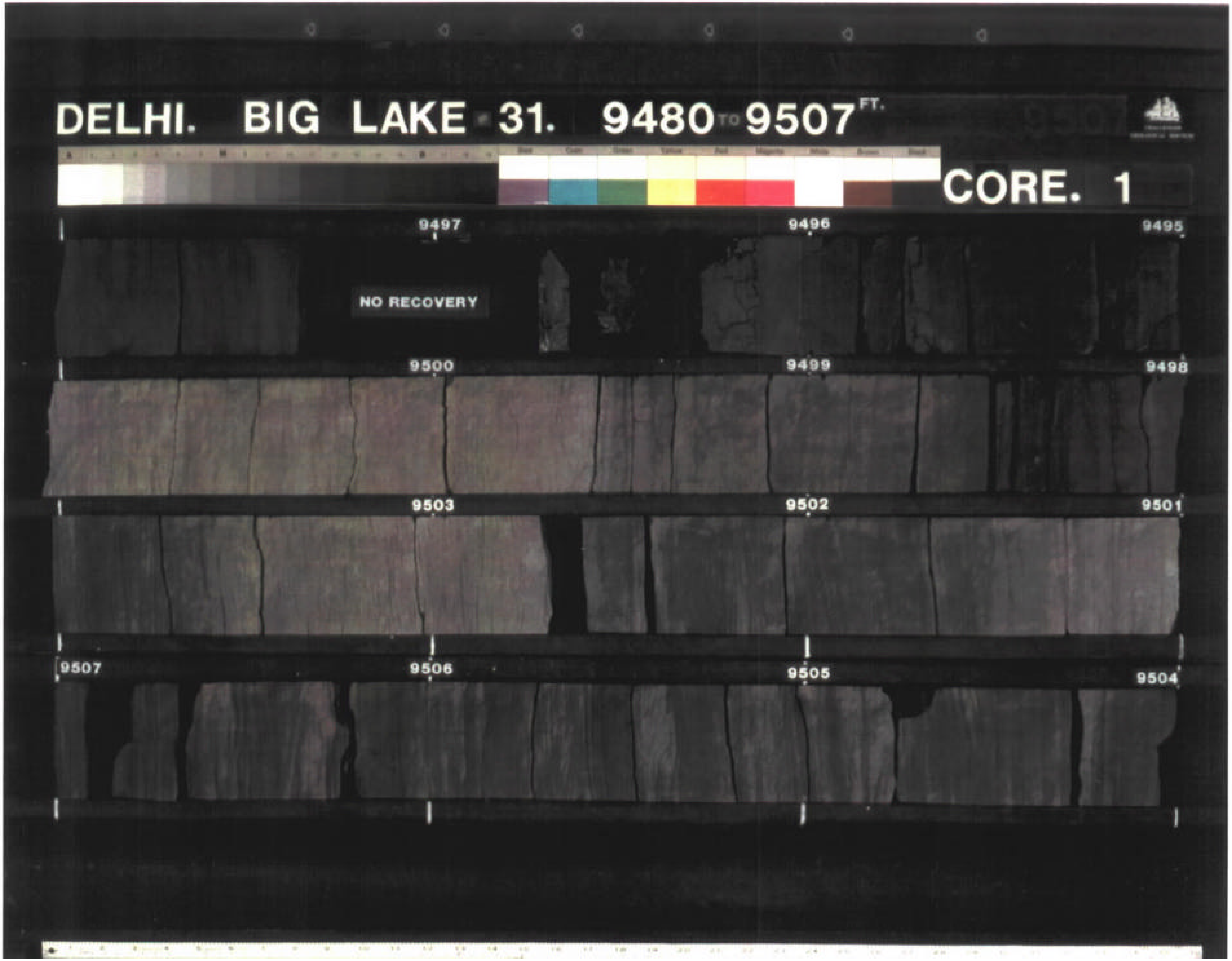
WELL NAME	CORE NUMBER	DEPTH DRLR	HORIZONTAL PERMEABILITY	VERTICAL PERMEABILITY	POROSITY	WATER SATURATION	GRAIN DENSITY	REMARKS
BIG LAKE 34	2	9820.69	1.1		7.6	39.4	2.66	
BIG LAKE 34	2	9822.04	2.7	1.9	9.7	43	2.65	
BIG LAKE 34	2	9825.17	0.45		5.7	44.7	2.67	
BIG LAKE 34	2	9827.86	0.47		4.5	48.1	2.67	
BIG LAKE 34	2	9829.61	0.99		7.8	36.7	2.66	
BIG LAKE 34	2	9830.83	1.2		8.7	44.1	2.67	
BIG LAKE 52	1	9405	2.3		7.1	69.8	2.70	
BIG LAKE 52	1	9406	0.58		4.5	79.9	2.85	
BIG LAKE 52	1	9407.1	0.1	0	4.6	60.1	2.65	
BIG LAKE 52	1	9408	0.48		4.1	68.6	2.68	
BIG LAKE 52	1	9408.5					0.00	
BIG LAKE 52	1	9409	2.8		4.9	72.8	2.72	
BIG LAKE 52	1	9410	0.06	0.13	4.9	54.4	2.67	
BIG LAKE 52	1	9411	0.44		5.8	61.2	2.66	
BIG LAKE 52	1	9412	0.2		4.2	34.8	2.67	
BIG LAKE 52	1	9412.8	0.19	0.13	6.8	73.3	2.65	
BIG LAKE 52	1	9414	3.8		10.4	70.3	2.66	
BIG LAKE 52	1	9415.1	2.5		12.6	71.4	2.65	
BIG LAKE 52	1	9416	0.08	0.38	3.7	57.7	2.69	
BIG LAKE 52	1	9417	4.2		9.2	77.6	2.65	
BIG LAKE 52	1	9418	5.2		13.7	70.4	2.66	
BIG LAKE 52	1	9419	5.3	2.1	12.5	62.5	2.67	
BIG LAKE 52	1	9420	1.8		10.5	75.4	2.67	
BIG LAKE 52	1	9420.9	0.51		9	63.8	2.65	
BIG LAKE 52	1	9422.1	0.1	0.06	4.5	69.2	2.67	
BIG LAKE 52	1	9423	6.4		8.5	69.2	2.66	
BIG LAKE 52	1	9424	1.7		10.8	70.7	2.66	
BIG LAKE 52	1	9425	0.72	0.25	11.3	71.7	2.66	
BIG LAKE 52	1	9426.1	1.4		10	66.2	2.66	
BIG LAKE 52	1	9427	2.8		9.1	70.6	2.70	
BIG LAKE 52	1	9427.9	1.9	0.65	9.9	67.2	2.67	
BIG LAKE 52	1	9429	3.1		11.8	71.8	2.68	
BIG LAKE 52	1	9430.1	0.05		5.5	68.2	2.65	
BIG LAKE 52	1	9431	0.87	0.09	6.6	67	2.66	
BIG LAKE 52	1	9432	1.1		9.8	68.8	2.66	
BIG LAKE 52	1	9433	3		6.4	74.8	2.66	
BIG LAKE 52	1	9434	1.3	0.07	6.6	73.8	2.66	
BIG LAKE 52	1	9435	0.03		4.6	57.9	2.66	
BIG LAKE 52	1	9436	3.6		8.2	81.8	2.66	
BIG LAKE 52	1	9437	0.1	0.07	6.7	62.3	2.65	
BIG LAKE 52	1	9438	7.4		7.4	74.7	2.67	
BIG LAKE 52	1	9438.9	0.3		3	68.8	2.69	
BIG LAKE 52	1	9440	0.12	0.03	6.4	67.5	2.66	
BIG LAKE 52	1	9441	0.85		8.6	70.3	2.69	
BIG LAKE 52	1	9442	4.8		7	69.3	2.67	
BIG LAKE 52	1	9442.9	0.04	0.01	3.3	63.8	2.67	
BIG LAKE 52	1	9444	0.07		5.5	73.3	2.68	
BIG LAKE 52	1	9445	0.1		6	63.3	2.66	
BIG LAKE 52	1	9445.9	2.1	0.98	12	68.7	2.67	
BIG LAKE 52	1	9447	1.7		9.7	69.5	2.67	
BIG LAKE 52	1	9447.9	2.1		11.2	65.7	2.68	
BIG LAKE 52	1	9449.1	0.27	0.22	5.7	54.3	2.66	
BIG LAKE 52	2	9451	0.02		2.8	56.6	2.68	
BIG LAKE 52	2	9451.8	0.05		2.5	58	2.66	
BIG LAKE 52	2	9452.9	0.03	0.02	2.9	44.9	2.65	
BIG LAKE 52	2	9454.1	0.18		4.6	49.1	2.66	
BIG LAKE 52	2	9455	0.31		5.2	66.6	2.66	
BIG LAKE 52	2	9456	0.81	0.08	3.8	71	2.65	
BIG LAKE 52	2	9457.2	2.2		6	68.7	2.65	
BIG LAKE 52	2	9458	0.12		7.2	67.7	2.67	
BIG LAKE 52	2	9458.9	0.2	0.15	8	55.8	2.66	
BIG LAKE 52	2	9460	0.41		8.7	59.2	2.66	
BIG LAKE 52	2	9461	0.54		8.2	47.4	2.65	
BIG LAKE 52	2	9462	0.05	0.04	5	56	2.65	
BIG LAKE 52	2	9463.1	0.16		7.8	49.8	2.66	
BIG LAKE 52	2	9464	0.17		8.3	46.7	2.66	

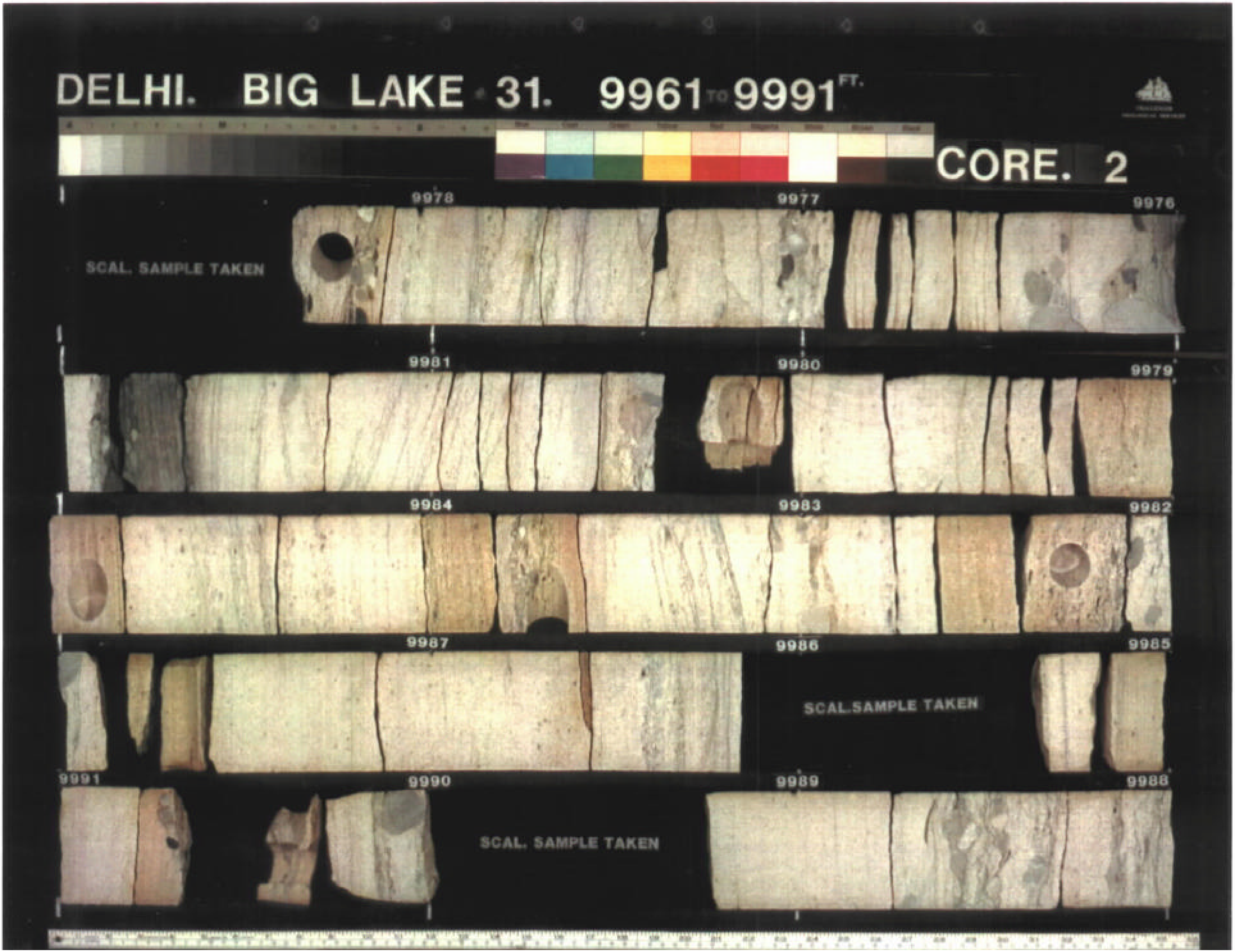
WELL NAME	CORE NUMBER	DEPTH DRLR	HORIZONTAL PERMEABILITY	VERTICAL PERMEABILITY	POROSITY	WATER SATURATION	GRAIN DENSITY	REMARKS
BIG LAKE 52	2	9464.9	0.08	0.04	6.7	54.2	2.66	
BIG LAKE 52	2	9466	0		1.7	62.4	2.70	
BIG LAKE 52	2	9466.9	0.01		0.8	76.8	2.72	
BIG LAKE 52	2	9467.9	0	0	0.4	77	2.68	
BIG LAKE 52	2	9471	1.5		0.5		2.68	
BIG LAKE 52	2	9476	21		0.9		2.69	
BIG LAKE 52	2	9481	0		0.9		2.72	

sourced from Santos database

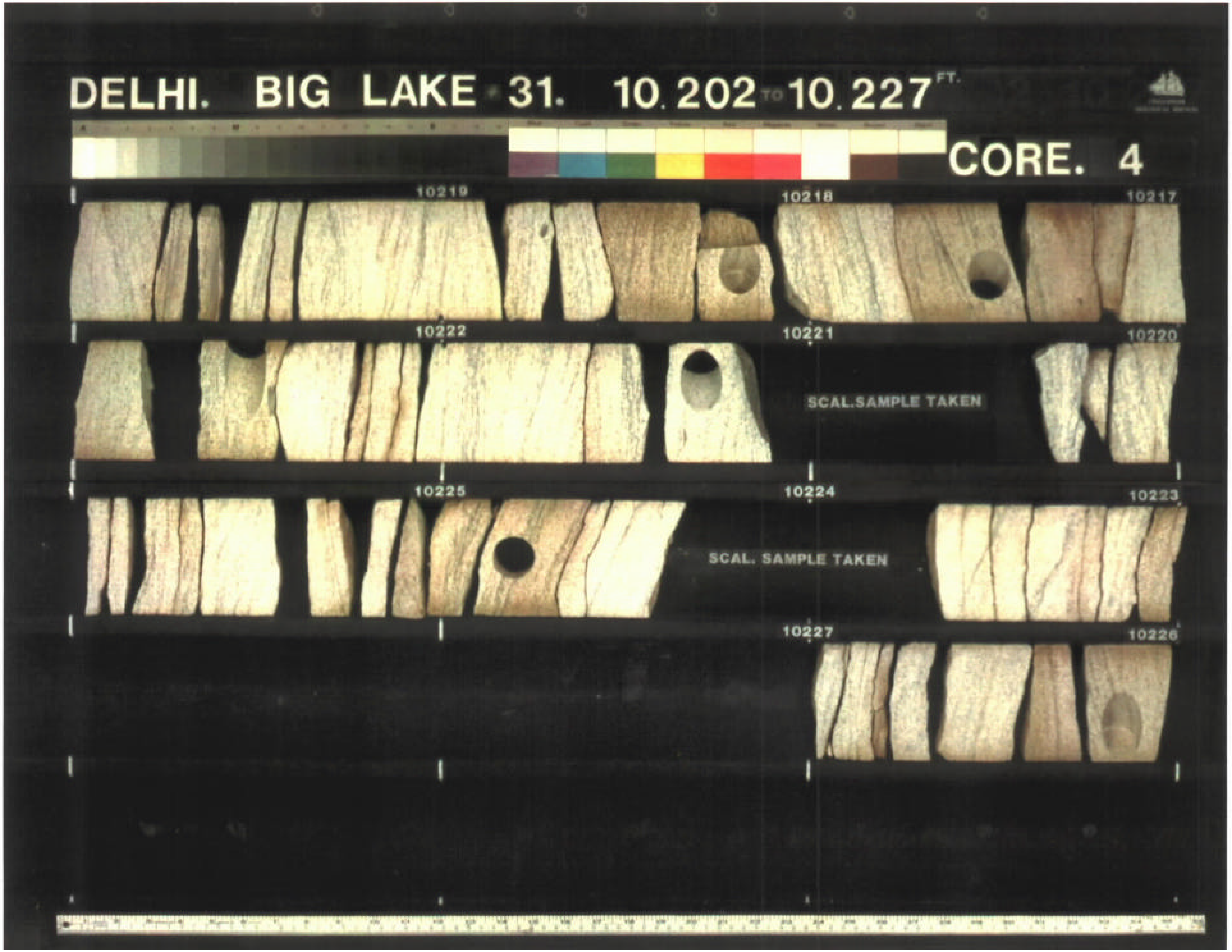
7. CORE PHOTOGRAPHS


DELHI. BIG LAKE 31. 9480 TO 9507 FT.
CORE. 1
9482
9481
9480
9485
9484
9483
9488
9487
9486
9491
9490
9489
9494
9493
9492
FRAC. STUDY


DELHI. BIG LAKE 31. 9480 TO 9507 FT.
CORE. 1
9497
9496
9495
NO RECOVERY
9500
9499
9498
9503
9502
9501
9507
9506
9505
9504

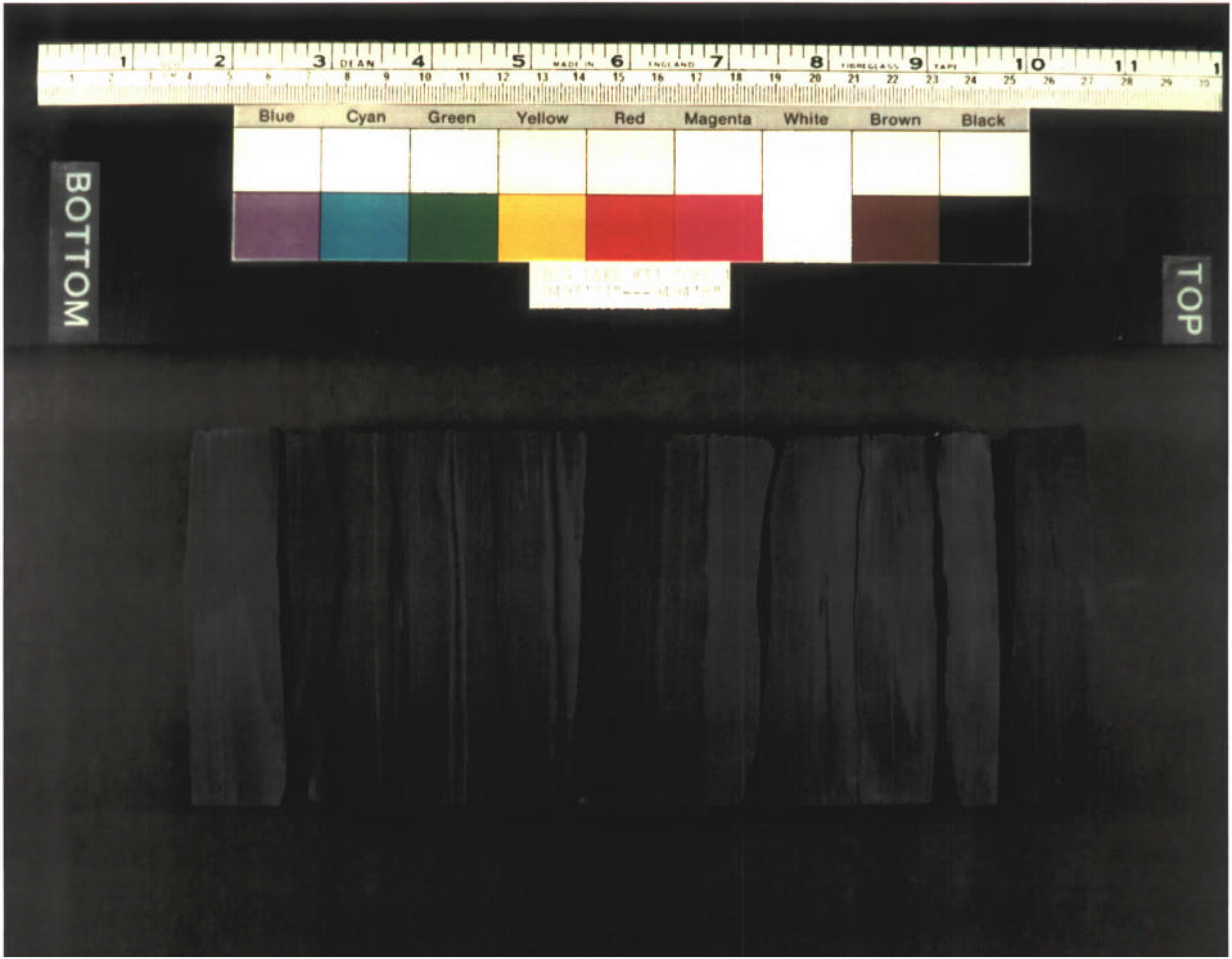

DELHI. BIG LAKE 31. 9961 TO 9991 FT.
CORE. 2
9978
9977
9976
SCAL. SAMPLE TAKEN
9981
9980
9979
9984
9983
9982
9987
9986
9985
SCAL.SAMPLE TAKEN
9991
9990
9989
9988
SCAL. SAMPLE TAKEN


DELHI. BIG LAKE # 31. 10.190 TO 10.199 FT.
CORE. 3
10192
10191
10190
SCAL. SAMPLE TAKEN
10195
10194
10193
10198
10197
10196
SCAL.SAMPLE TAKEN



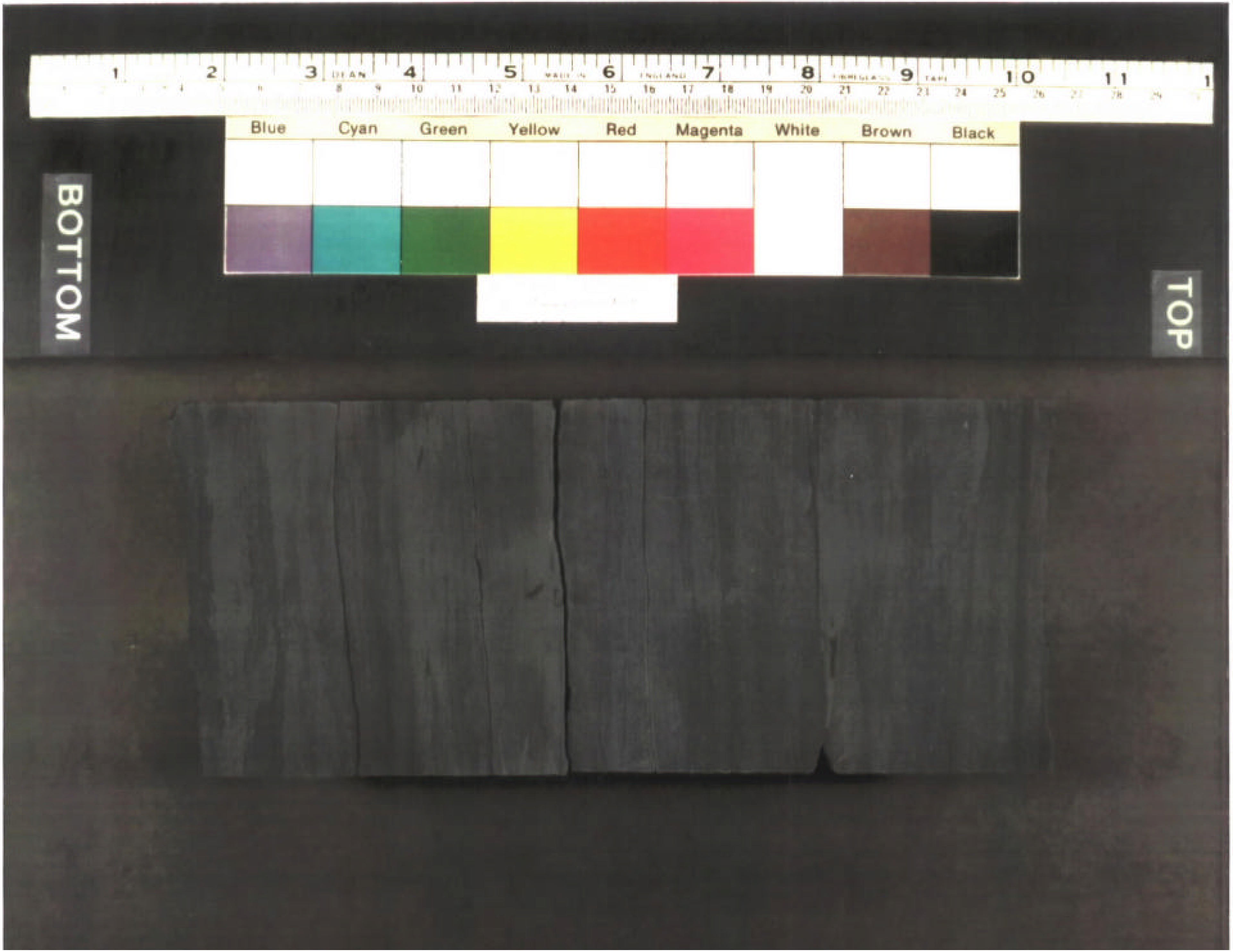
DELHI. BIG LAKE 31. 10.202 TO 10.227 FT.
CORE. 4
10219
10218
10217
10222
10221
10220
SCAL.SAMPLE TAKEN
10225
10224
10223
SCAL. SAMPLE TAKEN
10227
10226


DELHI. BIG LAKE 31. 10.202 TO 10.227 FT.
CORE. 4
10204
10203
10202
SCAL. SAMPLE TAKEN
10207
10206
10205
10210
10209
10208
SCAL. SAMPLE TAKEN
10213
10212
10211
10216
SCAL.SAMPLE TAKEN
10215
10214


Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BOTTOM
TOP


Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BIG LAKE #31 CORE 2
9961'9"---9962'7"
BOTTOM
TOP

DEAN
MADE IN
ENGLAND
FIBREGLASS
TAPE
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BOTTOM
TOP
BIG LAKE #31 CORE 2
9975'2"---9975'10"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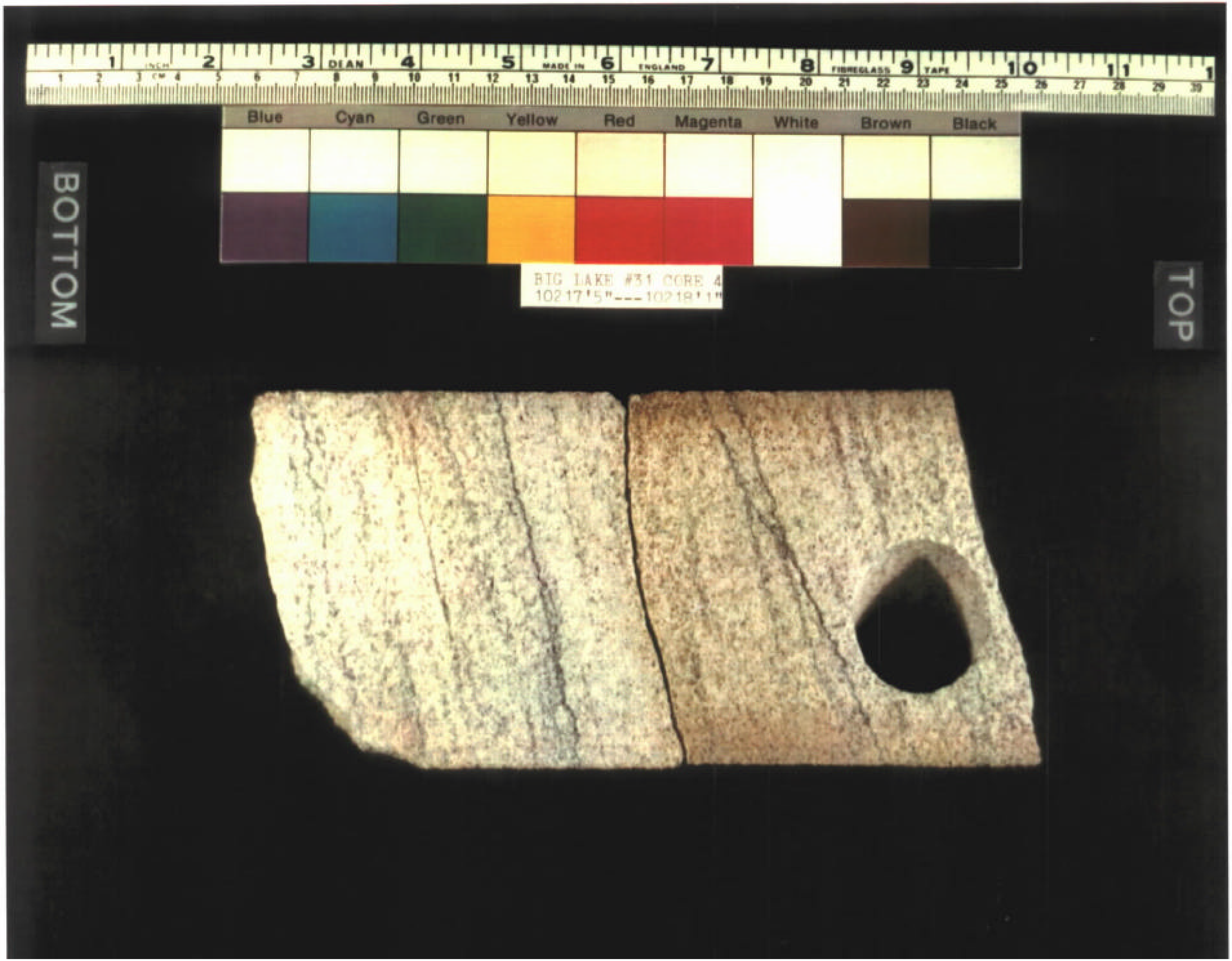
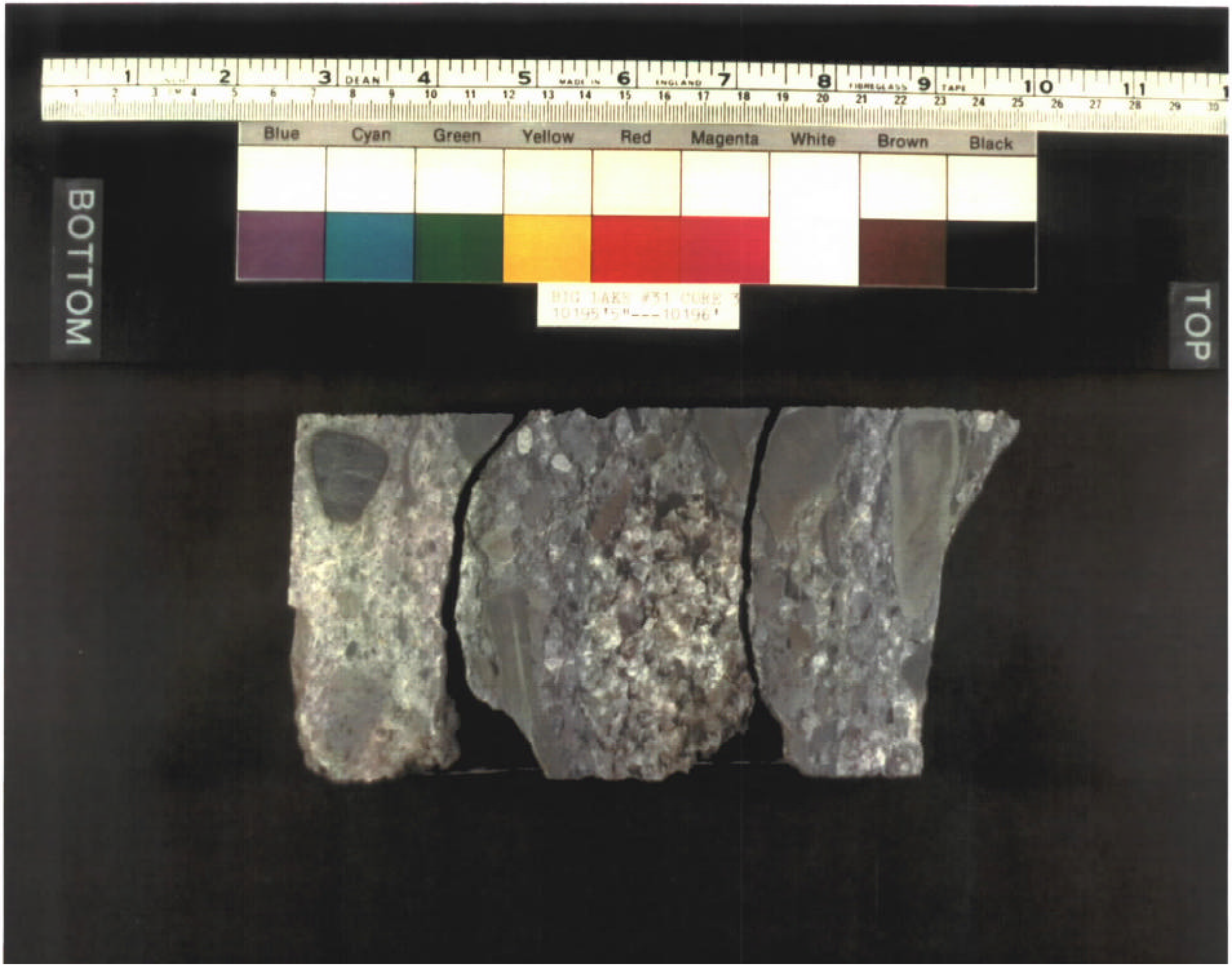
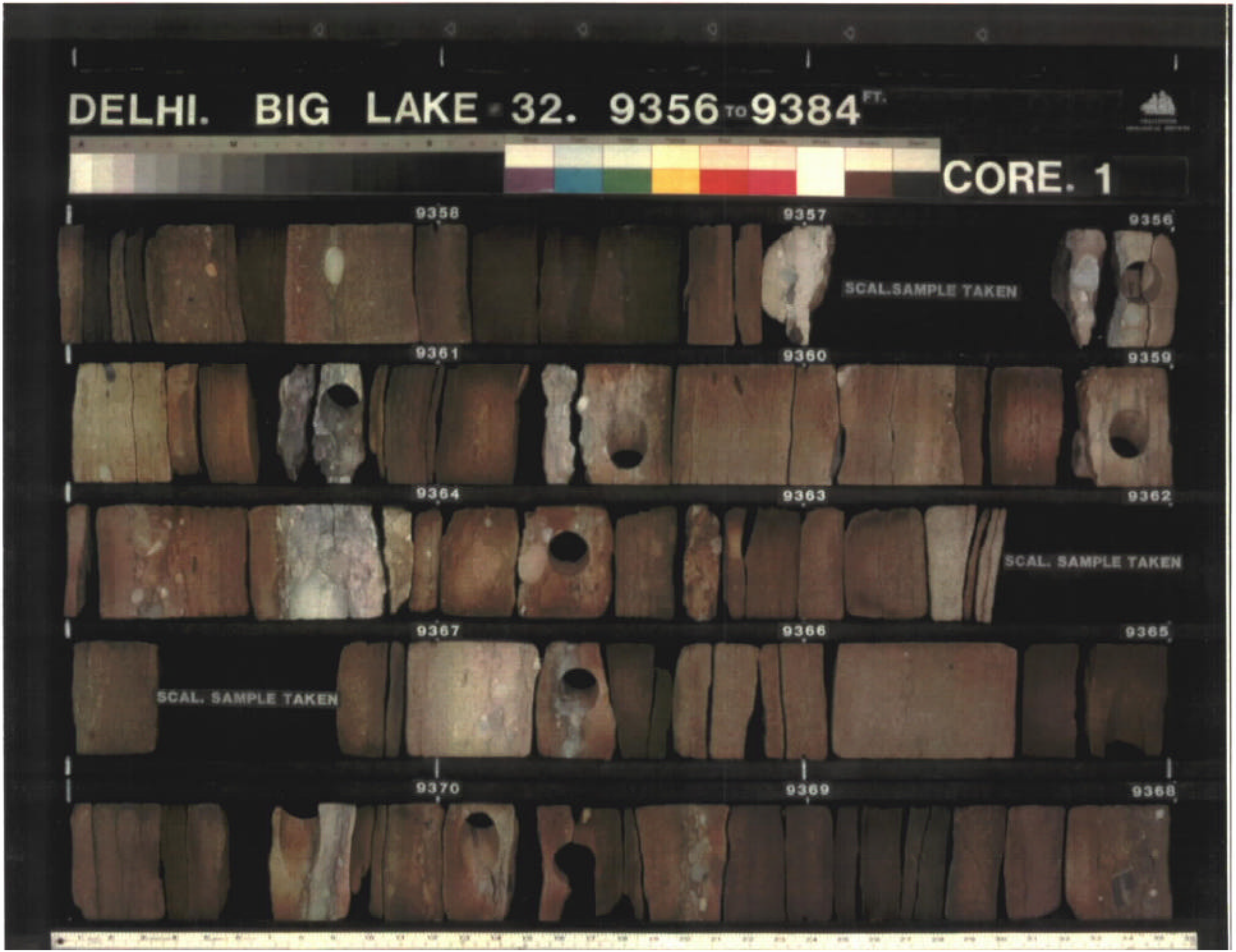
Green
Yellow
Red
Magenta
White
Brown
Black
BOTTOM
TOP


BOTTOM
TOP
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BIG LAKE #31 CORE 4
10217'5"---10218'1"


BIG LAKE #31 CORE 3
10194'5"---10195'
BOTTOM
TOP
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
DEAN
MADE IN
ENGLAND
FIBREGLASS
TAPE

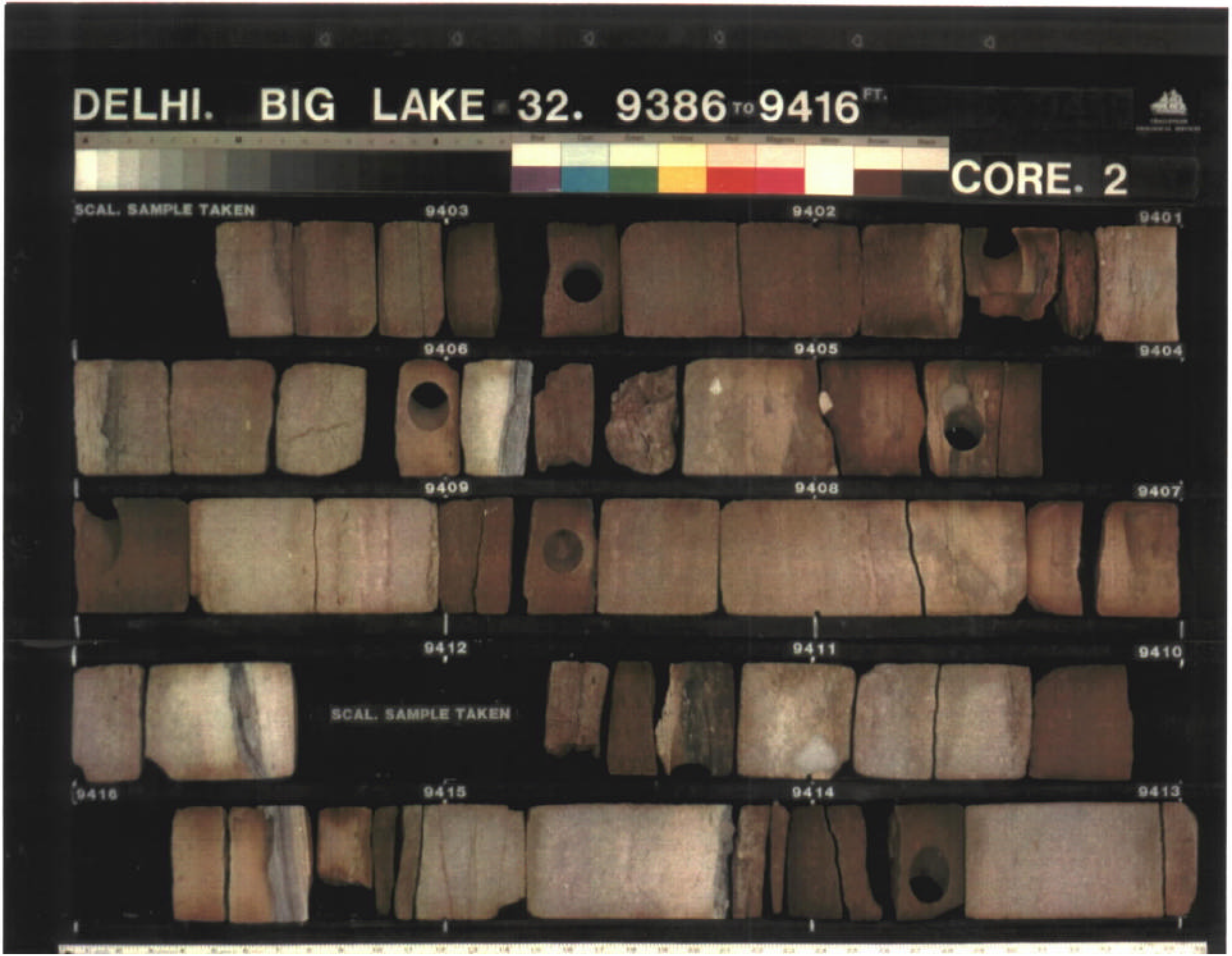

BOTTOM
TOP
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BIG LAKE #31 CORE 3
10195'5"---10196'


BOTTOM
TOP
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BIG LAKE #31 CORE 4
10203'4"---10204'

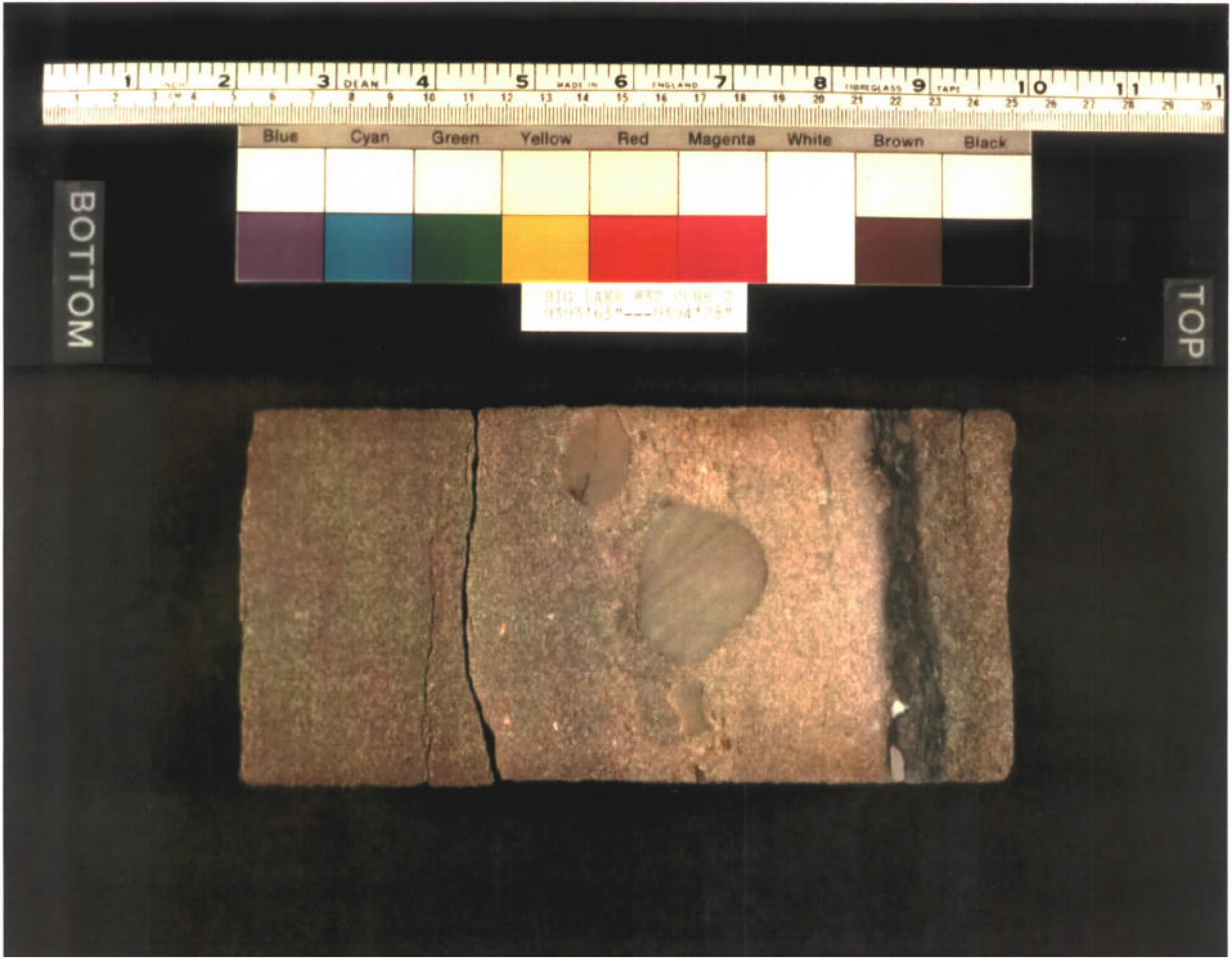

DELHI. BIG LAKE 32. 9356 TO 9384 FT.
CORE. 1
9358
9357
9356
SCAL.SAMPLE TAKEN
9361
9360
9359
9364
9363
9362
SCAL. SAMPLE TAKEN
9367
9366
9365
SCAL. SAMPLE TAKEN
9370
9369
9368


DELHI. BIG LAKE 32. 9356 TO 9384 FT.
CORE. 1
9373
9372
9371
SCAL. SAMPLE TAKEN
9376
9375
9374
SCAL. SAMPLE TAKEN
9379
9378
9377
9382
9381
9380
9384
9383
SCAL. SAMPLE TAKEN


DELHI. BIG LAKE 32. 9386 TO 9416 FT.
CORE. 2
9388
9387
9386
SCAL. SAMPLE TAKEN
9391
9390
9389
9394
9393
9392
SCAL.SAMPLE TAKEN
9397
9396
9395
9400
9399
9398
SCAL. SAMPLE TAKEN

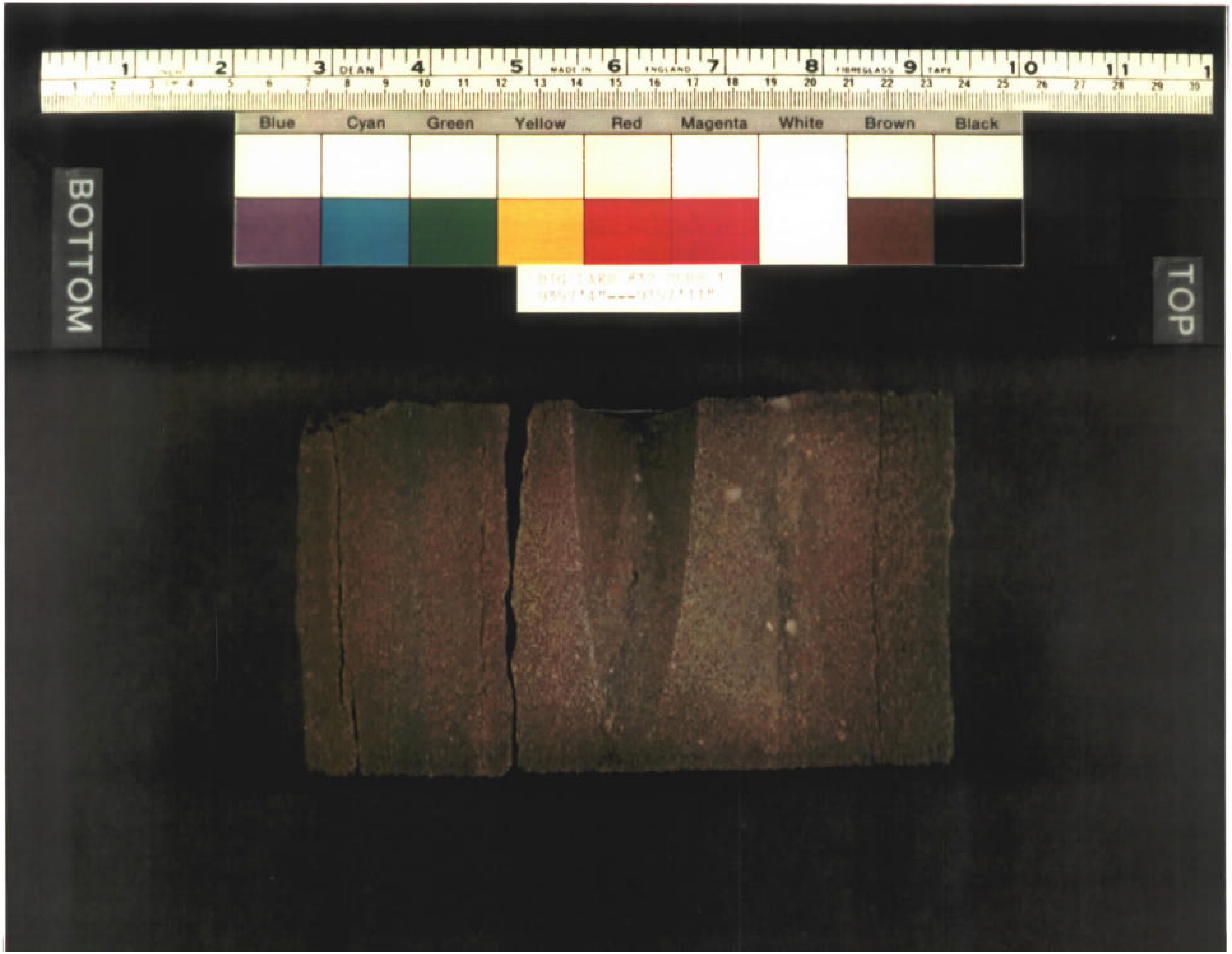

DELHI. BIG LAKE 32. 9386 TO 9416 FT.
CORE. 2
SCAL. SAMPLE TAKEN
9403
9402
9401
9406
9405
9404
9409
9408
9407
9412
9411
9410
SCAL. SAMPLE TAKEN
9416
9415
9414
9413


BOTTOM
TOP
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
DEAN
MADE IN
ENGLAND
FIBREGLASS
TAPE

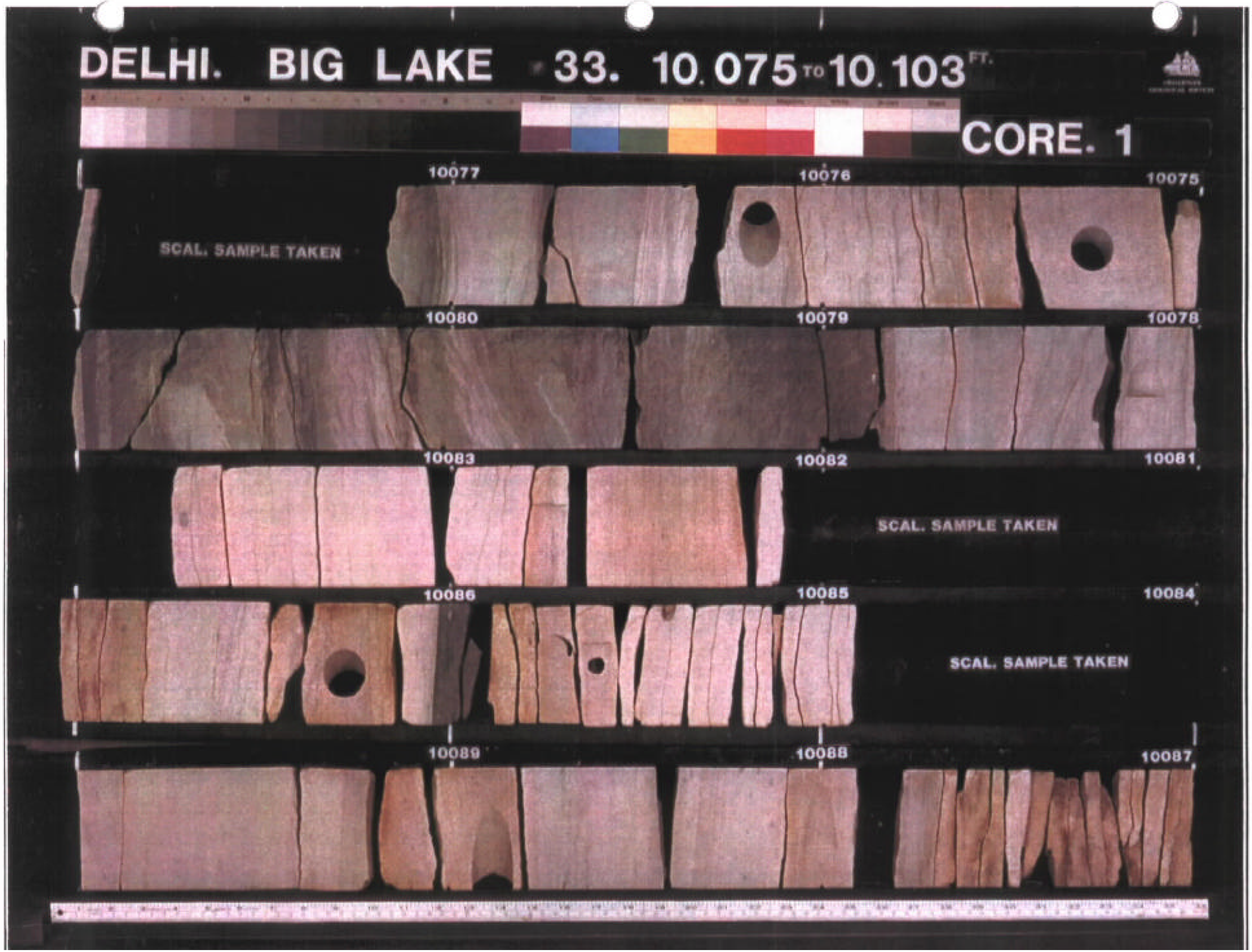

BOTTOM
TOP
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BIG LAKE #32 CORE 2


DEAN
MADE IN
ENGLAND
FIBREGLASS
TAPE
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BOTTOM
TOP

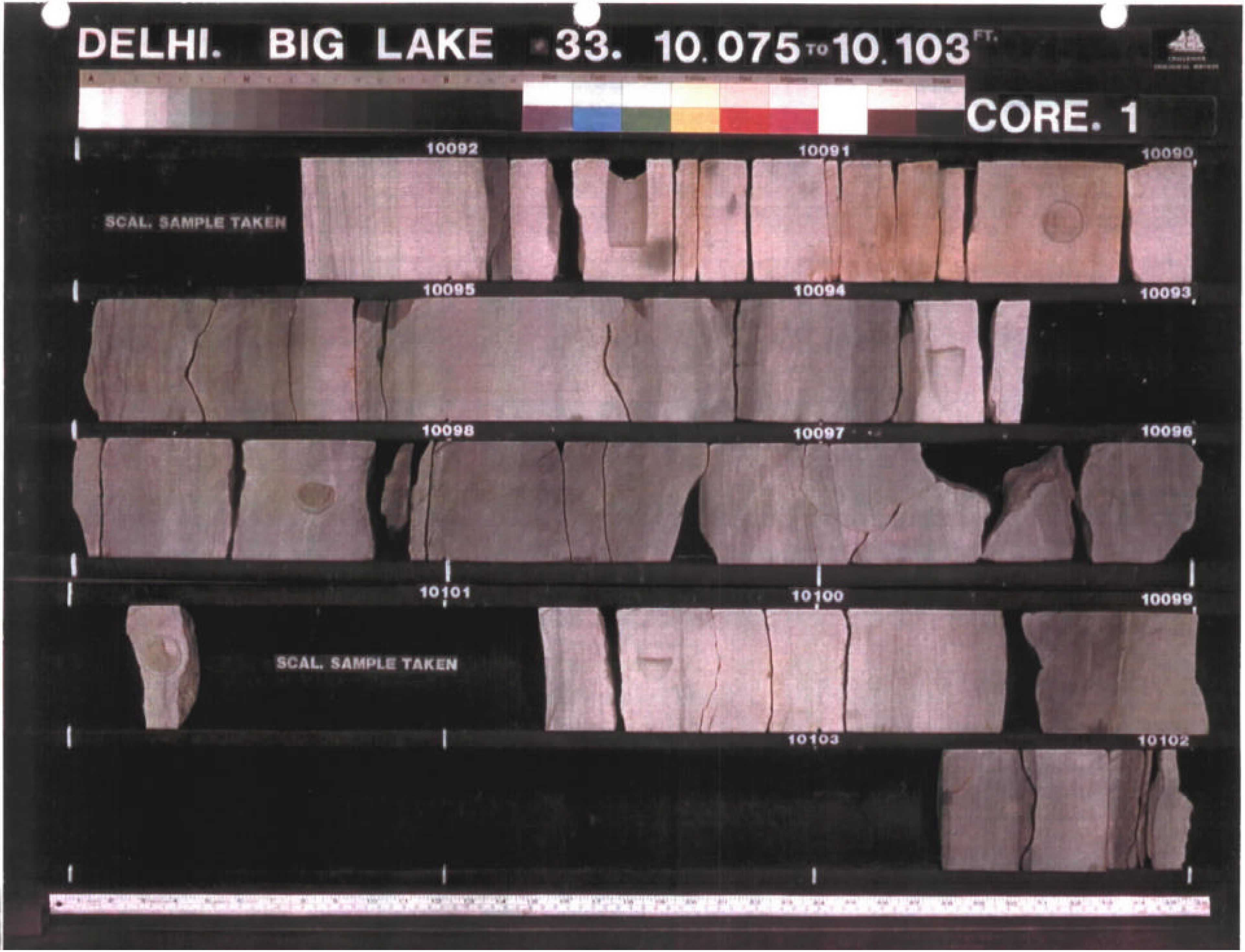

DEAN
MADE IN
ENGLAND
FIBREGLASS
TAPE
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BOTTOM
TOP

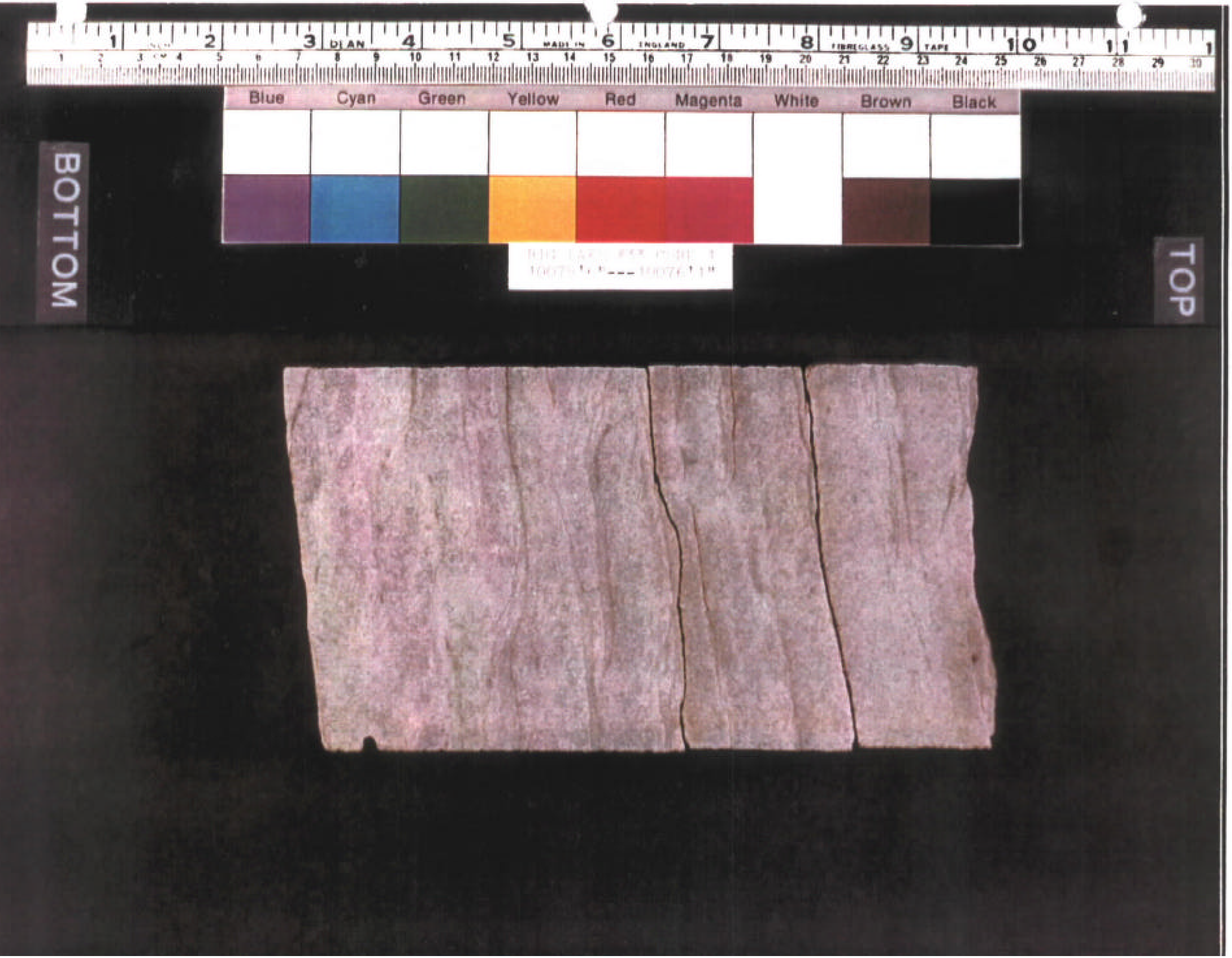


DEAN
MADE IN
ENGLAND
FIBREGLASS
TAPE
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BOTTOM
TOP

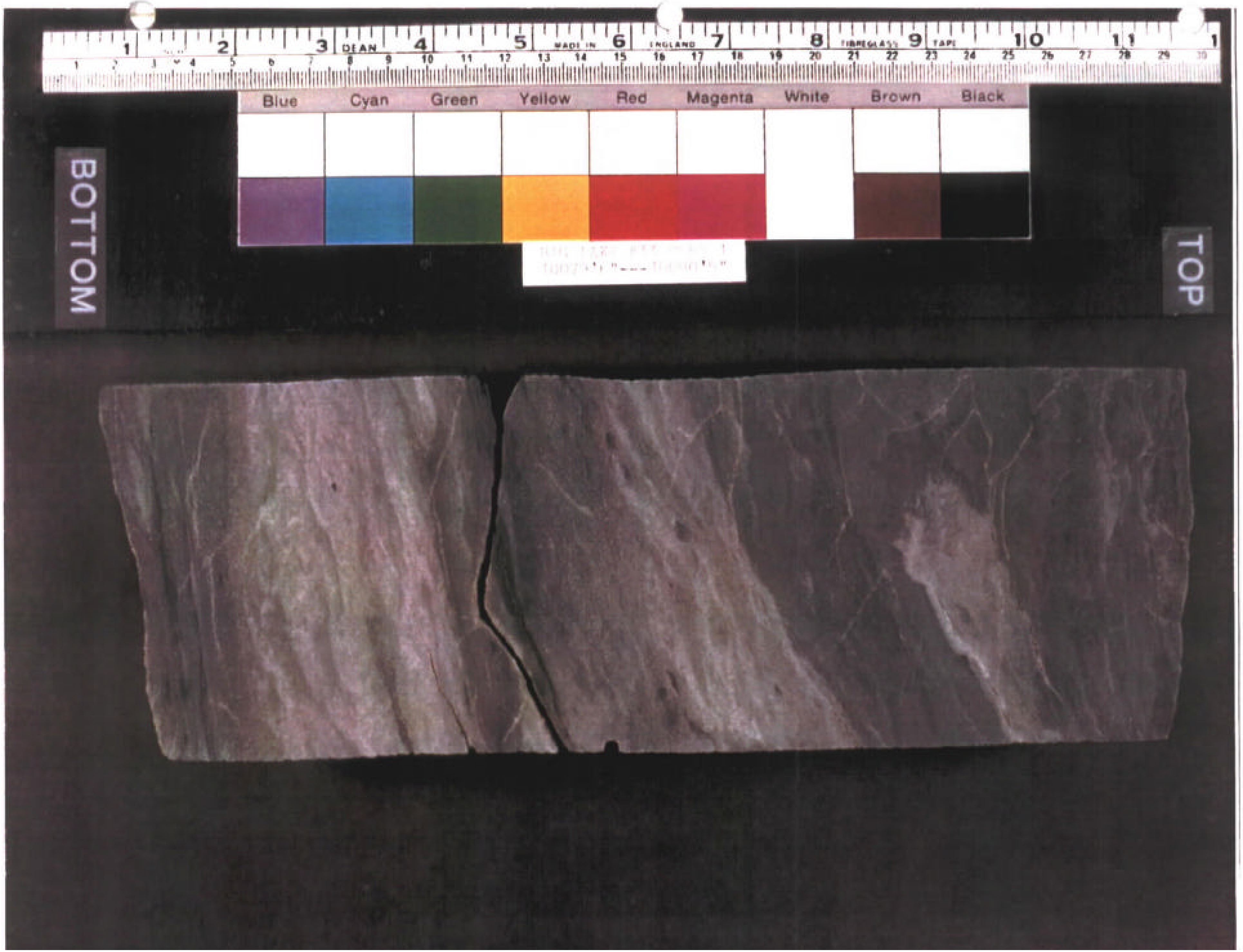


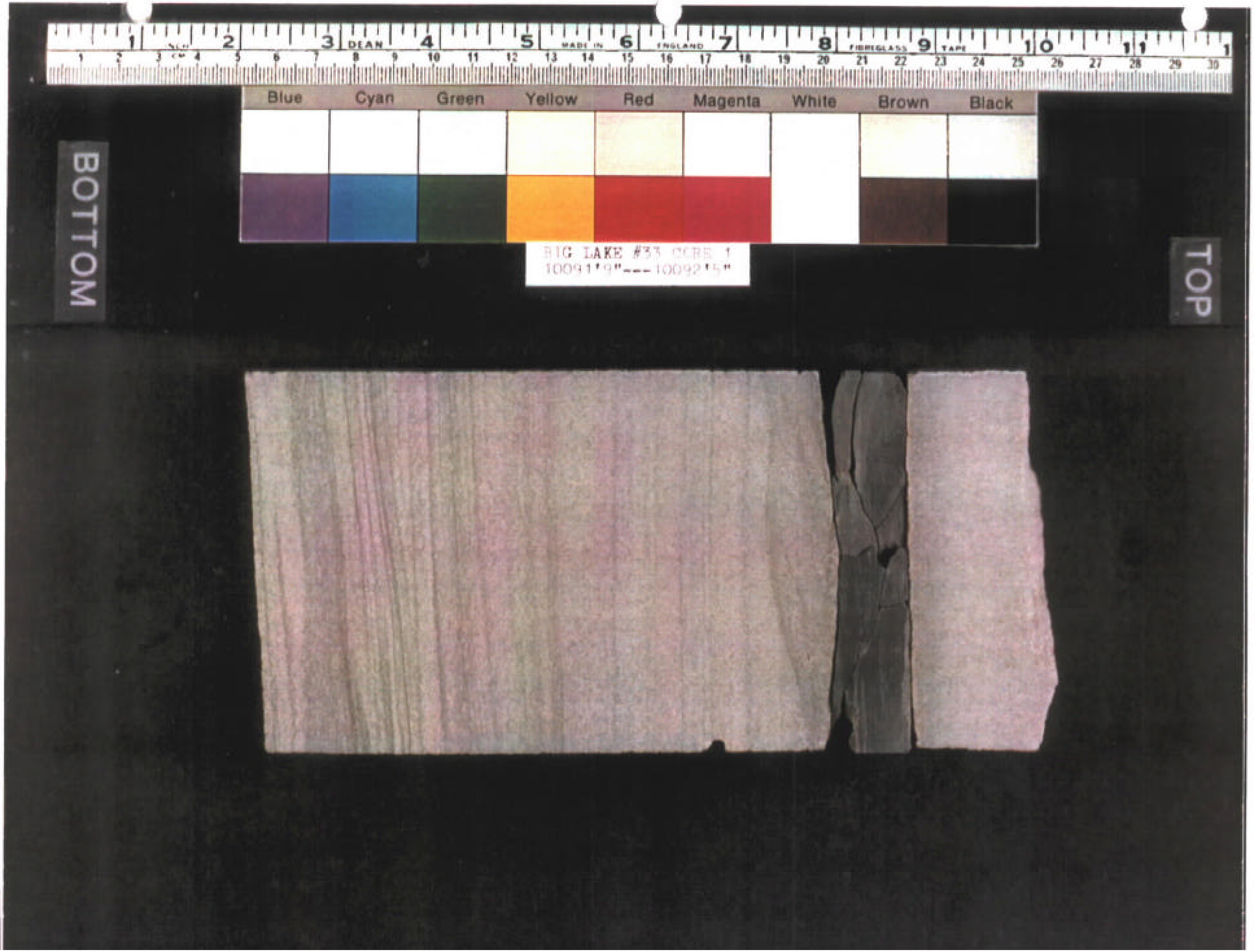
DELHI. BIG LAKE 33. 10.075 TO 10.103 FT.
CORE. 1
10077
10076
10075
SCAL. SAMPLE TAKEN
10080
10079
10078
10083
10082
10081
SCAL. SAMPLE TAKEN
10086
10085
10084
SCAL. SAMPLE TAKEN
10089
10088
10087

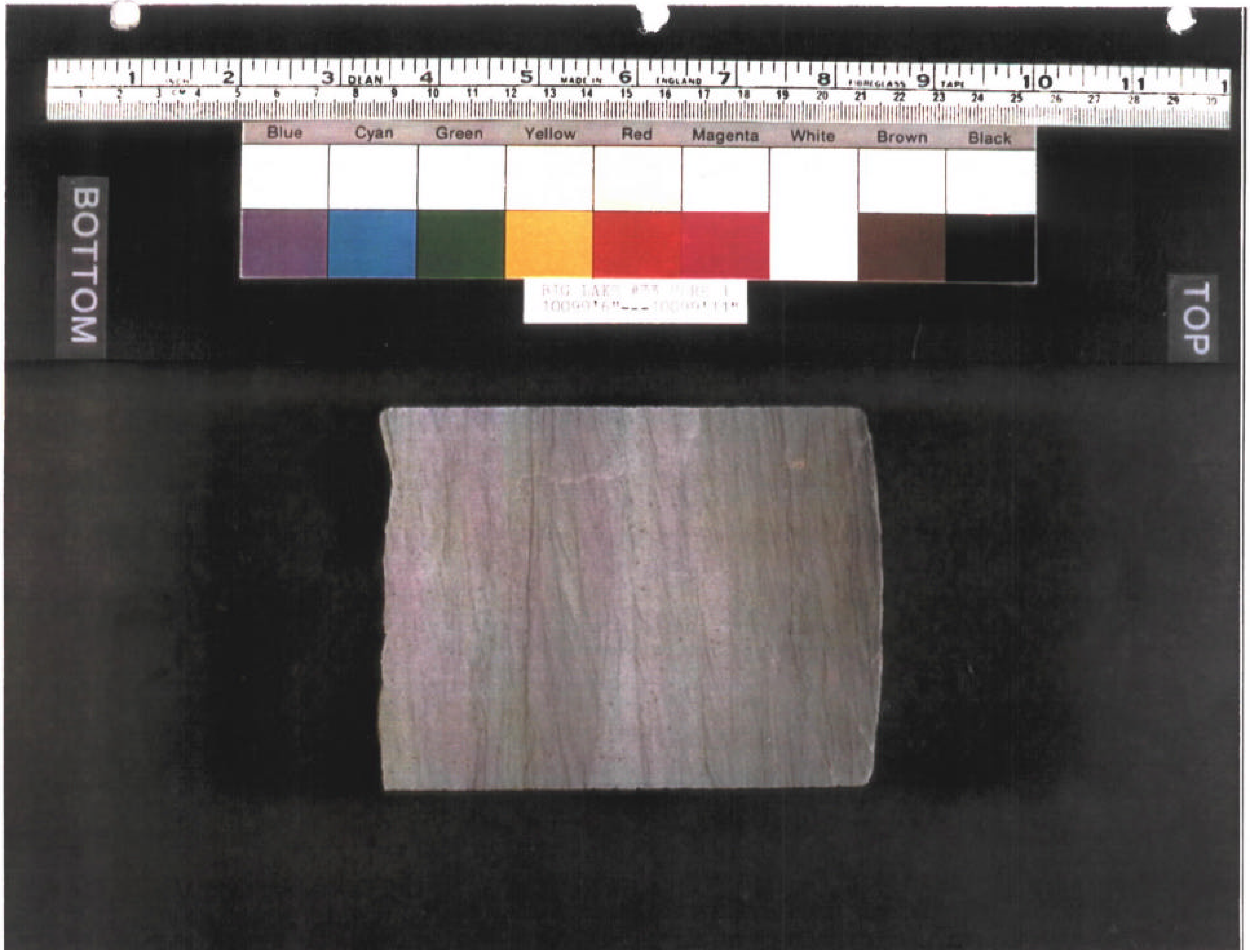

DELHI. BIG LAKE 33. 10.075 TO 10.103 FT.
CORE. 1
10092
10091
10090
SCAL. SAMPLE TAKEN
10095
10094
10093
10098
10097
10096
10101
10100
10099
SCAL. SAMPLE TAKEN
10103
10102



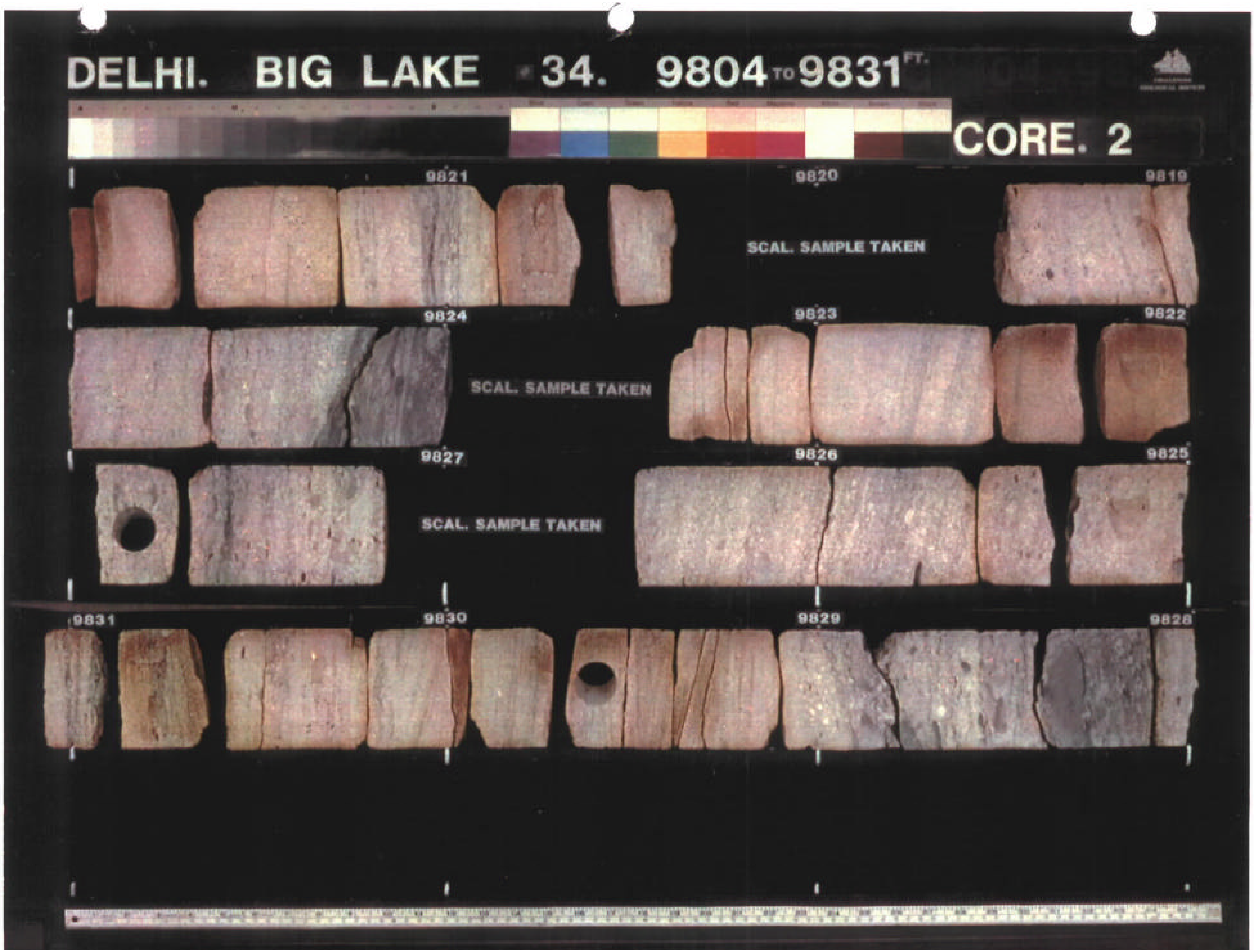
MADE IN ENGLAND
FIBREGLASS TAPE
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BOTTOM
TOP


DEAN
MADE IN
ENGLAND
FIBREGLASS
TAPE
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BOTTOM
TOP

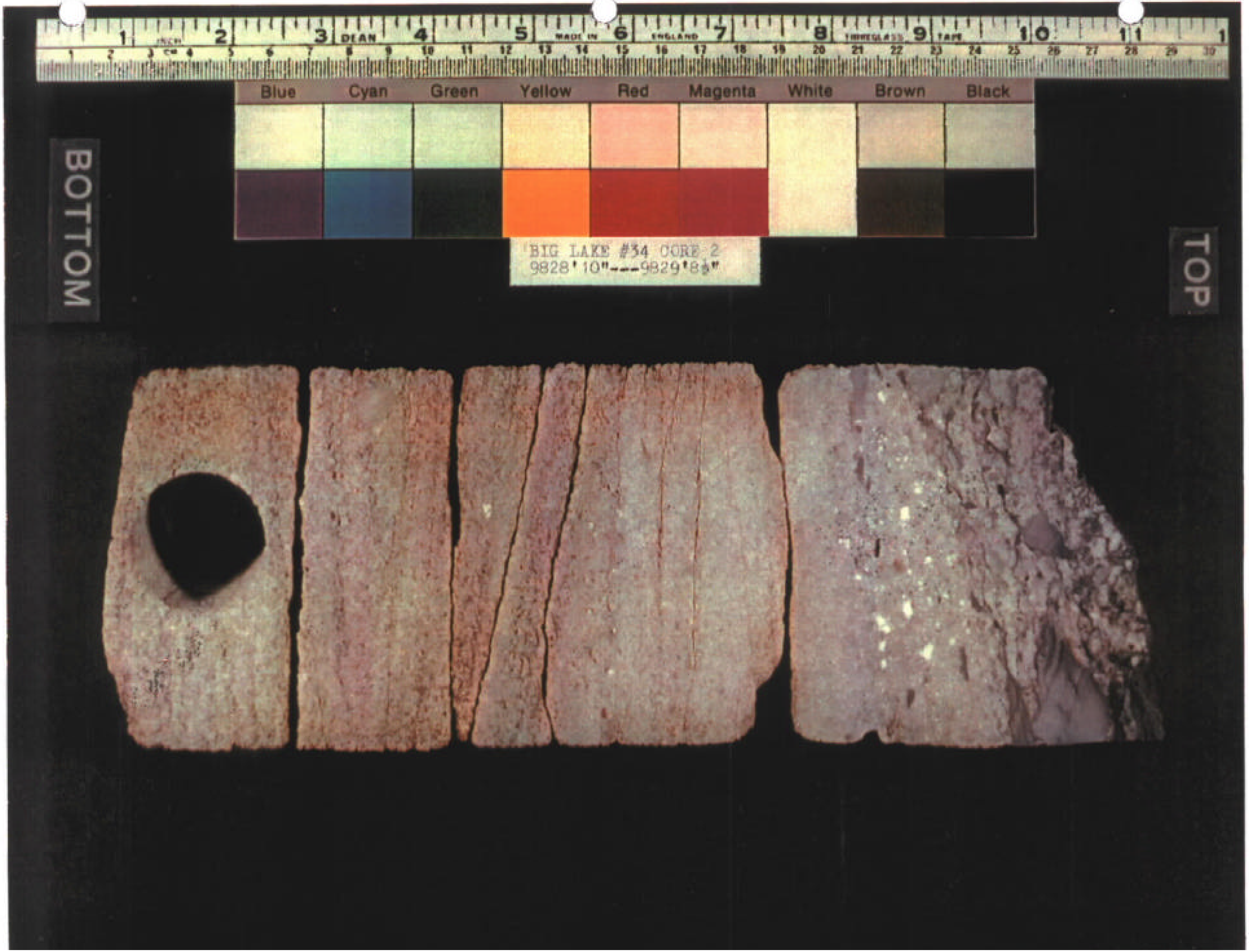

BOTTOM
TOP
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BIG LAKE #33 CORE 1
10091'9"---10092'5"



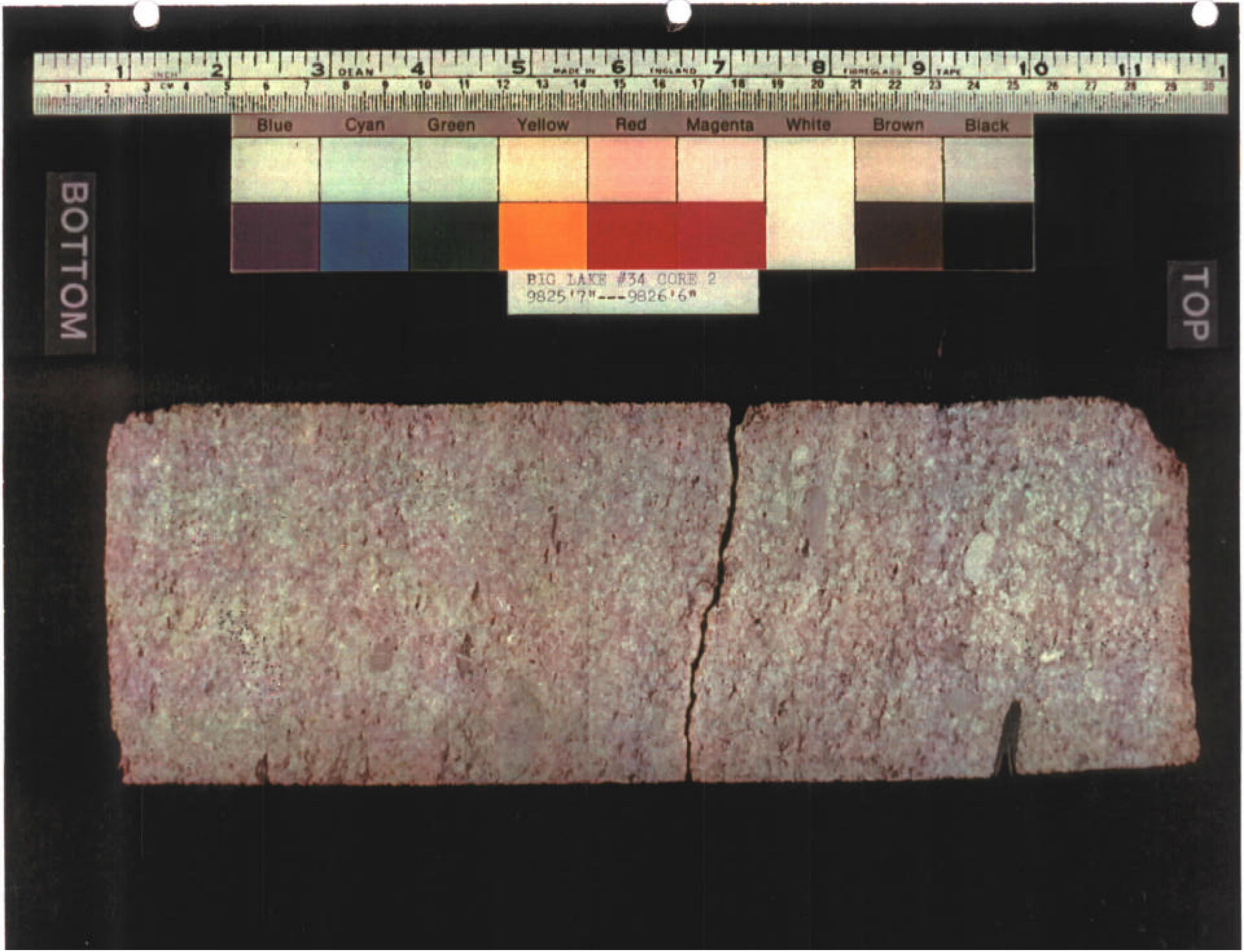
Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BOTTOM
TOP
BIG LAKE
10090'6"---


DELHI. BIG LAKE 34. 9804 TO 9831 FT.
CORE. 2
9821
9820
9819
SCAL. SAMPLE TAKEN
9824
9823
9822
SCAL. SAMPLE TAKEN
9827
9826
9825
SCAL. SAMPLE TAKEN
9831
9830
9829
9828


DELHI. BIG LAKE 34. 9804 TO 9831 FT.
CORE. 2
9806
9805
9804
SCAL.SAMPLE TAKEN
9809
9808
9807
SCAL. SAMPLE TAKEN
9812
9811
9810
9815
9814
9813
9818
9817
9816



Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BIG LAKE #34 CORE 2
9828'10"---9829'8½"
BOTTOM
TOP



Blue
Cyan
Green
Yellow
Red
Magenta
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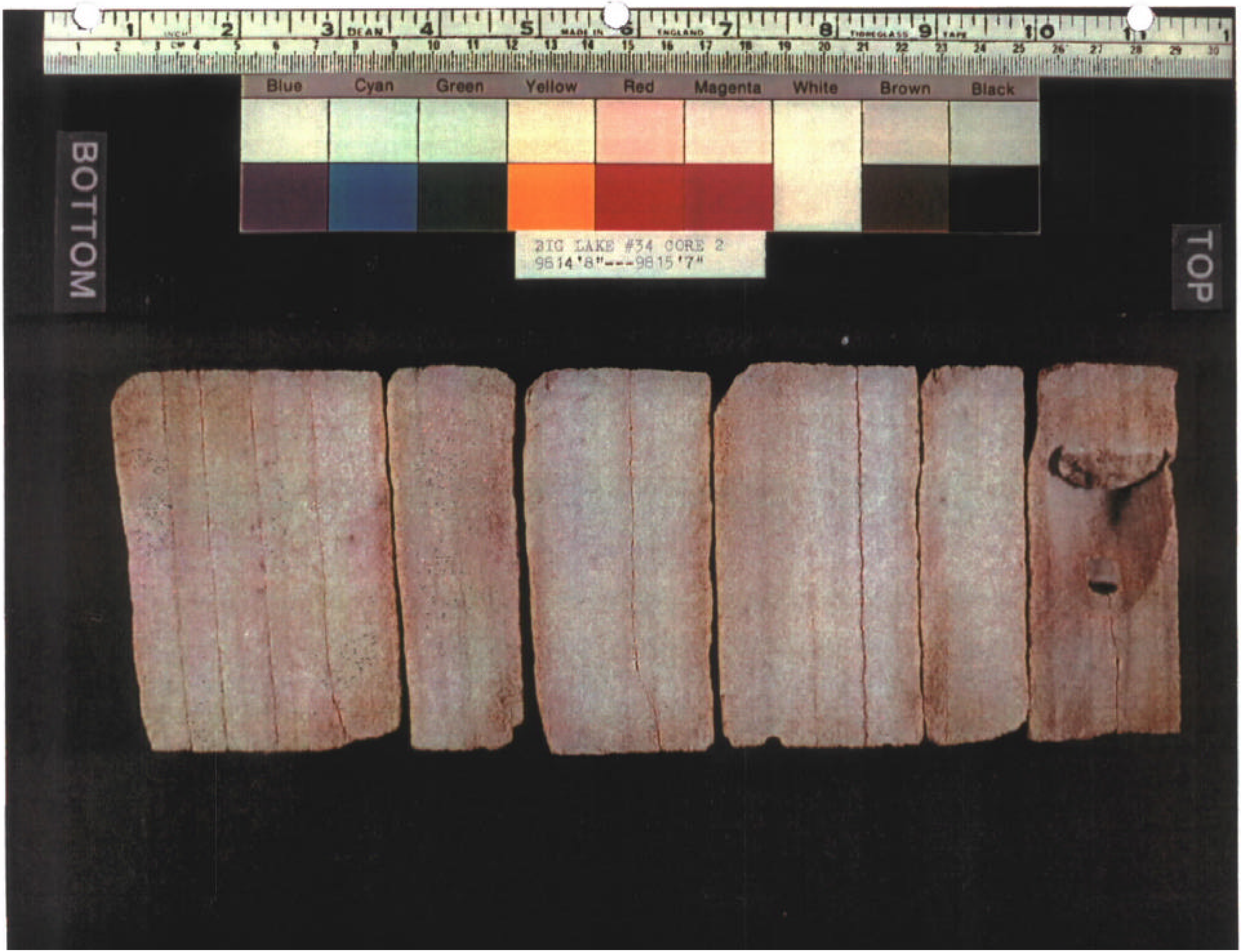
Brown
Black
BIG LAKE #34 CORE 2
9825'7"---9826'6"
BOTTOM
TOP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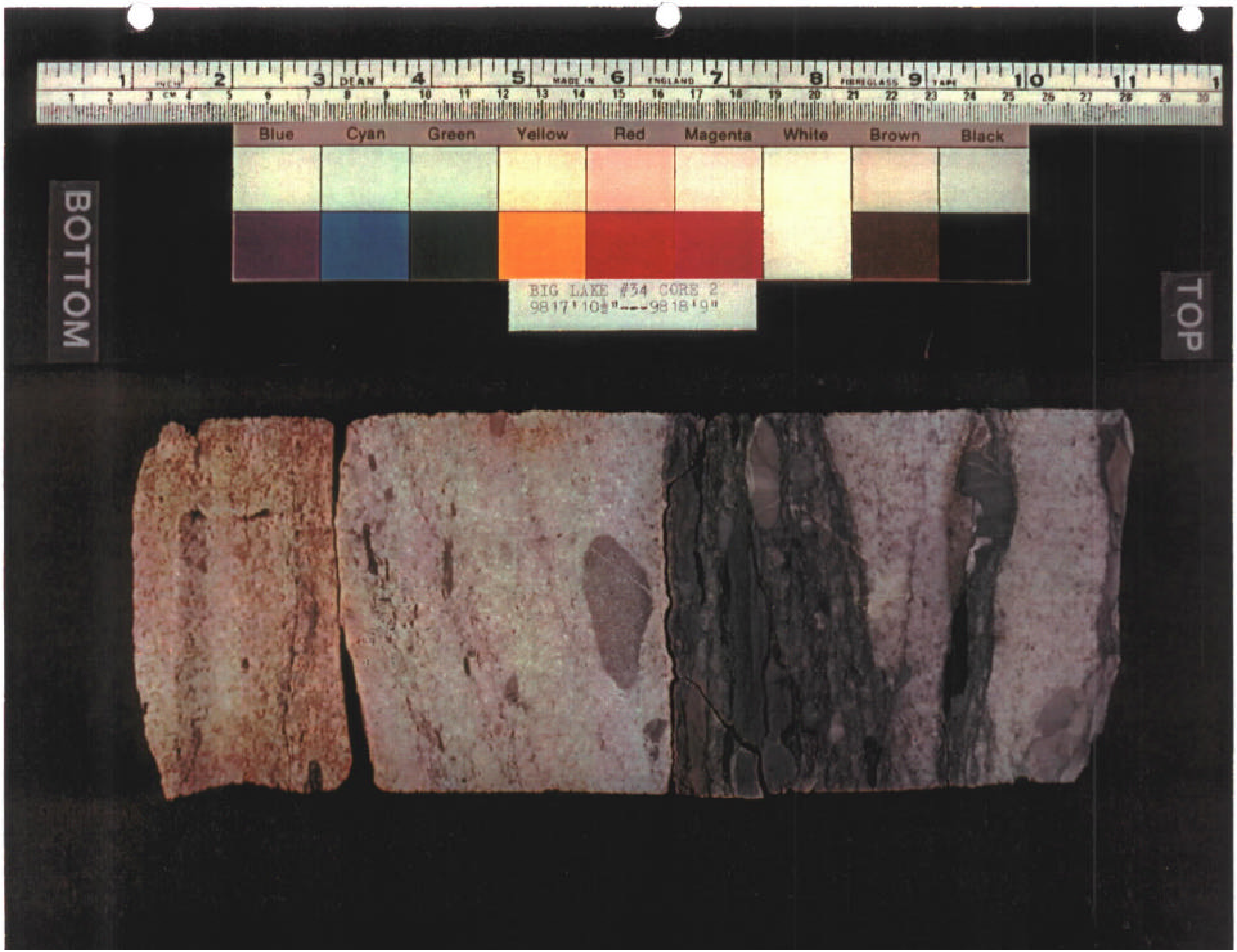
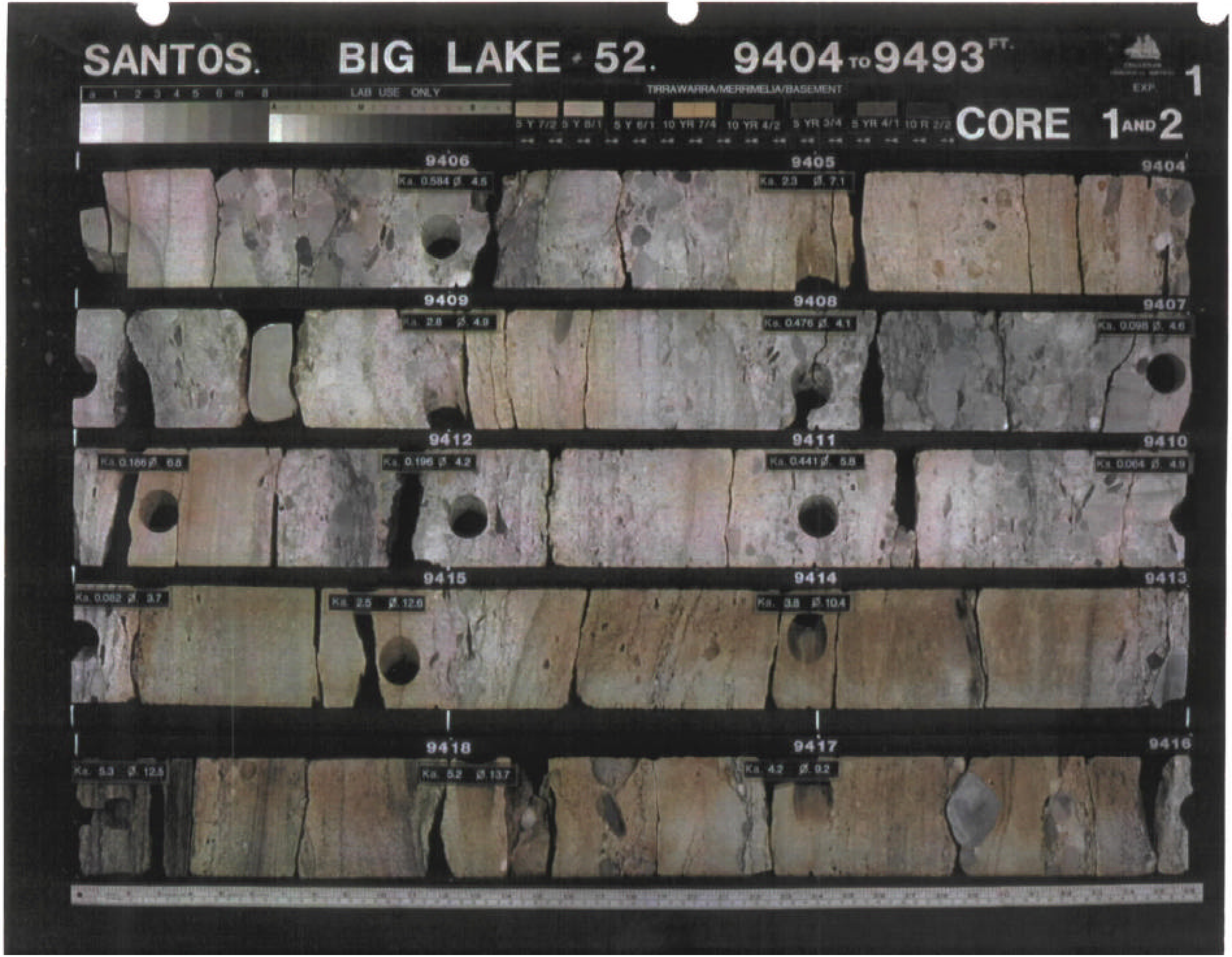
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BOTTOM
TOP
BIG LAKE #34 CORE 2
9814'8"---9815'7"

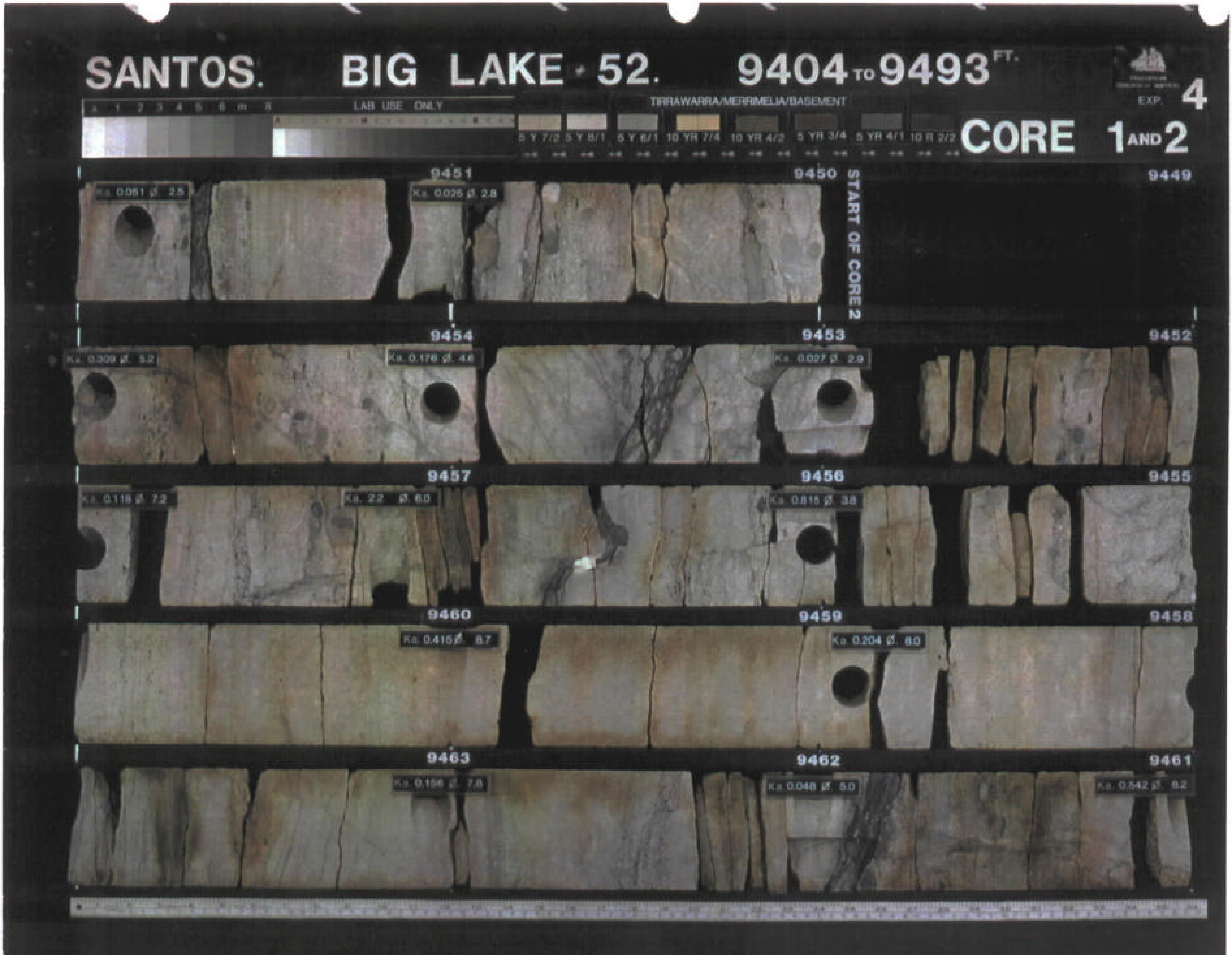


Blue
Cyan
Green
Yellow
Red
Magenta
White
Brown
Black
BOTTOM
TOP
BIG LAKE #34 CORE 2
9817'10½"---9818'9"

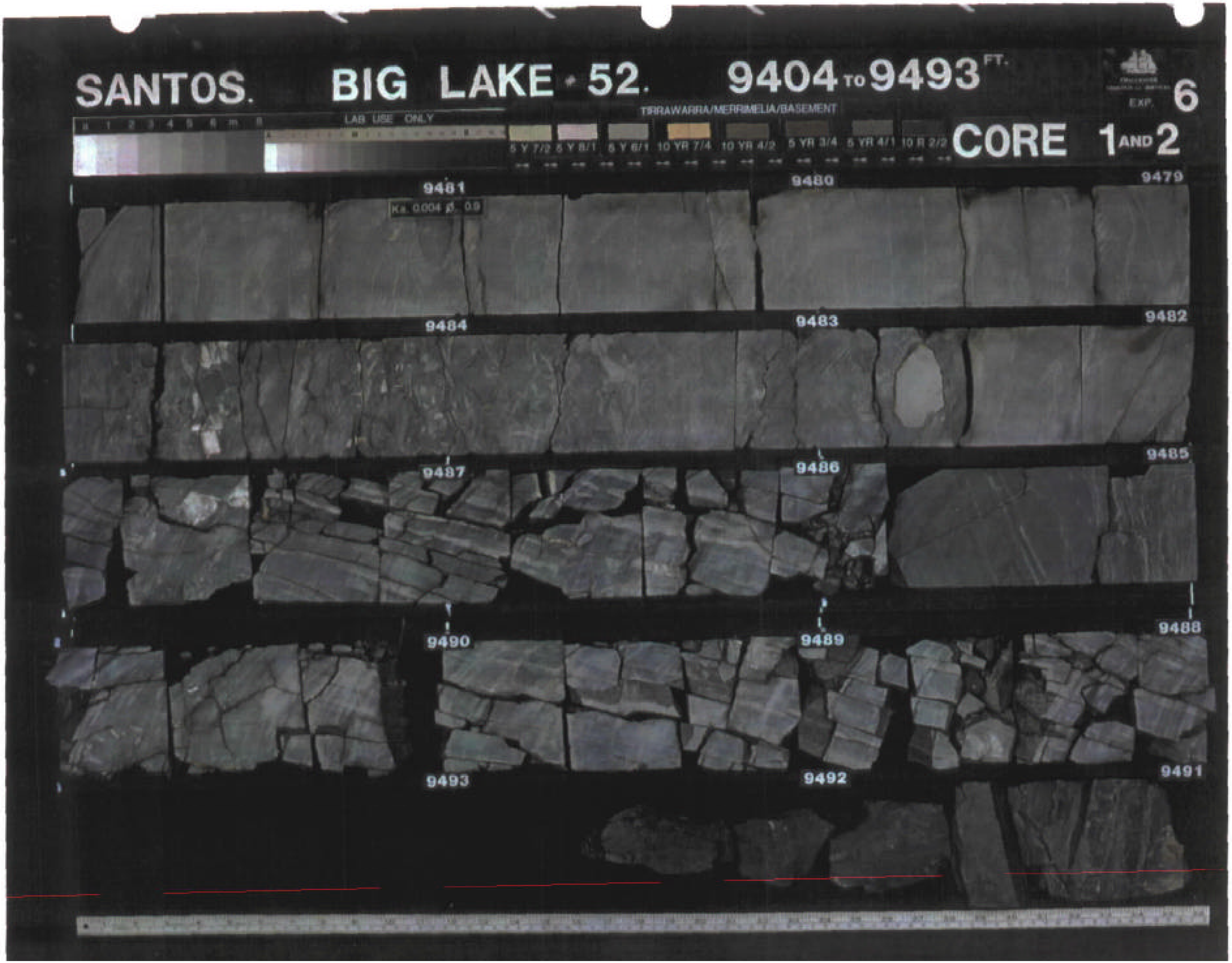

SANTOS. BIG LAKE - 52. 9404 TO 9493 FT.
1
EXP.
LAB USE ONLY
TIRRAWARRA/MERRIMELIA/BASEMENT
5 Y 7/2
5 Y 8/1
5 Y 6/1
10 YR 7/4
10 YR 4/2
5 YR 3/4
5 YR 4/1
10 R 2/2
CORE 1 AND 2
9406
9405
9404
Ka. 0.584 Ø. 4.5
Ka. 2.3 Ø. 7.1
9409
9408
9407
Ka. 2.8 Ø. 4.9
Ka. 0.476 Ø. 4.1
Ka. 0.098 Ø. 4.6
9412
9411
9410
Ka. 0.186 Ø. 6.8
Ka. 0.196 Ø. 4.2
Ka. 0.441 Ø. 5.8
Ka. 0.064 Ø. 4.9
9415
9414
9413
Ka. 0.082 Ø. 3.7
Ka. 2.5 Ø. 12.6
Ka. 3.8 Ø. 10.4
9418
9417
9416
Ka. 5.3 Ø. 12.5
Ka. 5.2 Ø. 13.7
Ka. 4.2 Ø. 9.2

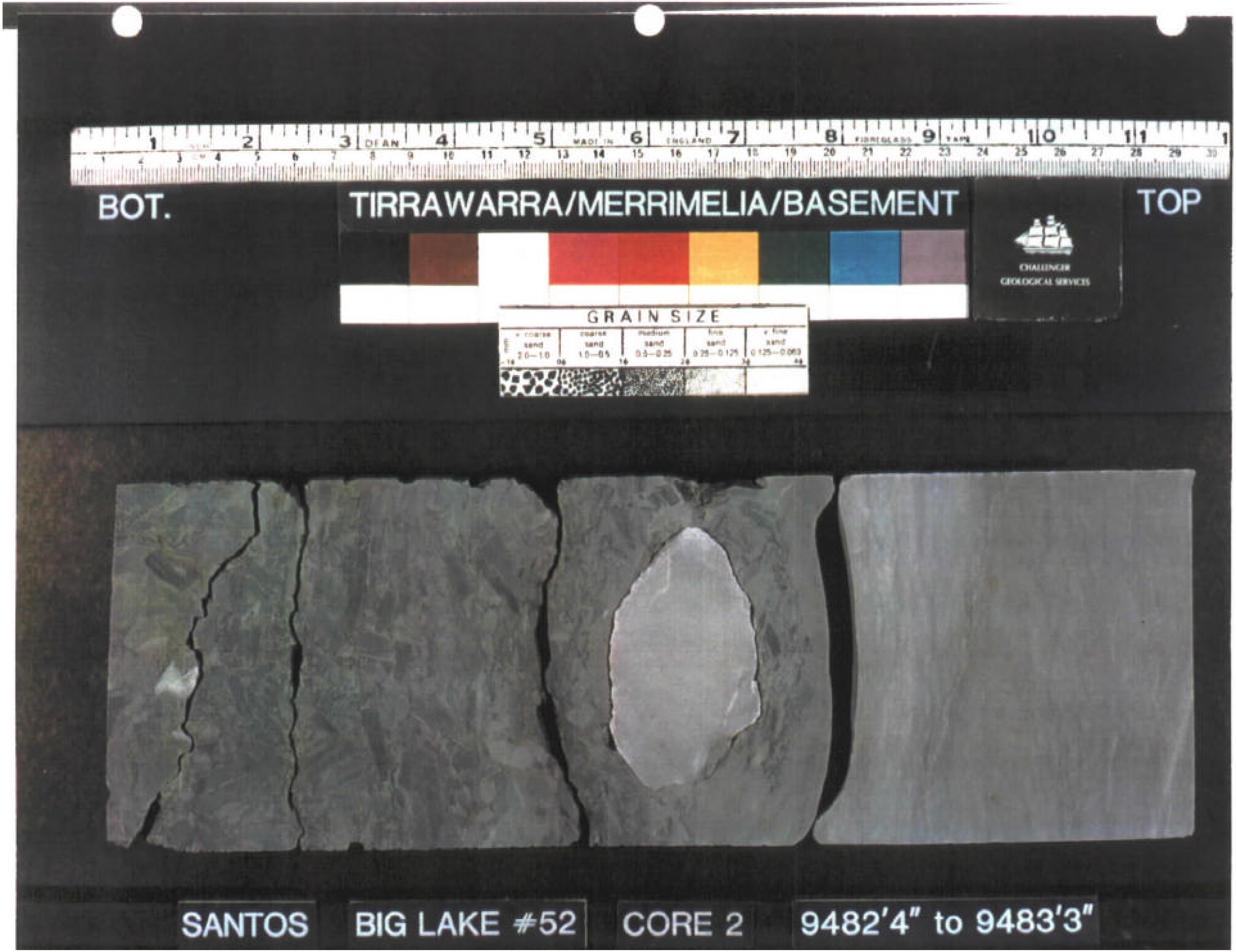

SANTOS.
BIG LAKE • 52.
9404 TO 9493 FT.
EXP. 2
LAB USE ONLY
TIRRAWARRA/MERRIMELIA/BASEMENT
5 Y 7/2
5 Y 8/1
5 Y 6/1
10 YR 7/4
10 YR 4/2
5 YR 3/4
5 YR 4/1
10 R 2/2
CORE 1 AND 2
9421
9420
9419
Ka. 0.514 Ø. 9.0
Ka. 1.8 Ø. 10.5
9424
9423
9422
Ka. 0.718 Ø. 11.3
Ka. 1.7 Ø. 10.8
Ka. 6.4 Ø. 8.5
Ka. 0.098 Ø. 4.5
9427
9426
9425
Ka. 2.8 Ø. 9.1
Ka. 1.4 Ø. 10.0
9430
9429
9428
Ka. 0.873 Ø. 6.6
Ka. 0.064 Ø. 5.5
Ka. 3.1 Ø. 11.8
Ka. 1.9 Ø. 9.9
9433
9432
9431
Ka. 1.3 Ø. 6.6
Ka. 3 Ø. 6.4
Ka. 1.1 Ø. 9.8

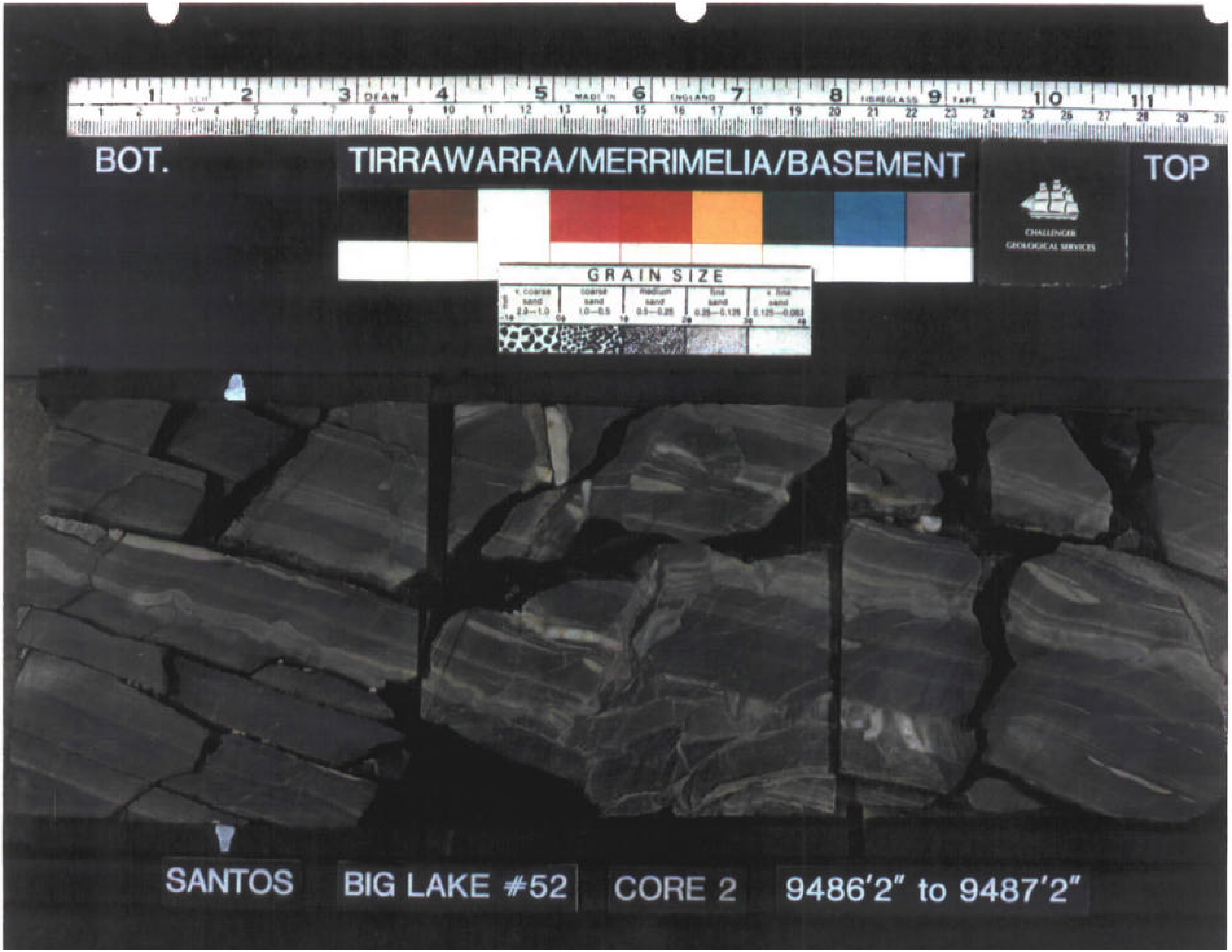

SANTOS. BIG LAKE 52. 9404 TO 9493 FT.
EXP. 3
LAB USE ONLY
TIRRAWARRA/MERRIMELIA/BASEMENT
5 Y 7/2
5 Y 8/1
5 Y 6/1
10 YR 7/4
10 YR 4/2
5 YR 3/4
5 YR 4/1
10 R 2/2
CORE 1 AND 2
9436
9435
9434
Ka. 0.103 Ø. 6.7
Ka. 3.6 Ø. 8.2
Ka. 0.035 Ø. 4.6
9439
9438
9437
Ka. 0.298 Ø. 3.0
Ka. 7.4 Ø. 7.4
9442
9441
9440
Ka. 0.040 Ø. 3.3
Ka. 4.6 Ø. 7.0
Ka. 0.650 Ø. 8.6
Ka. 0.123 Ø. 6.4
9445
9444
9443
Ka. 2.1 Ø. 12.0
Ka. 0.096 Ø. 6.0
Ka. 0.074 Ø. 5.5
9448
9447
9446
Ka. 0.287 Ø. 5.7
Ka. 2.1 Ø. 11.2
Ka. 1.7 Ø. 9.7
END OF CORE 1

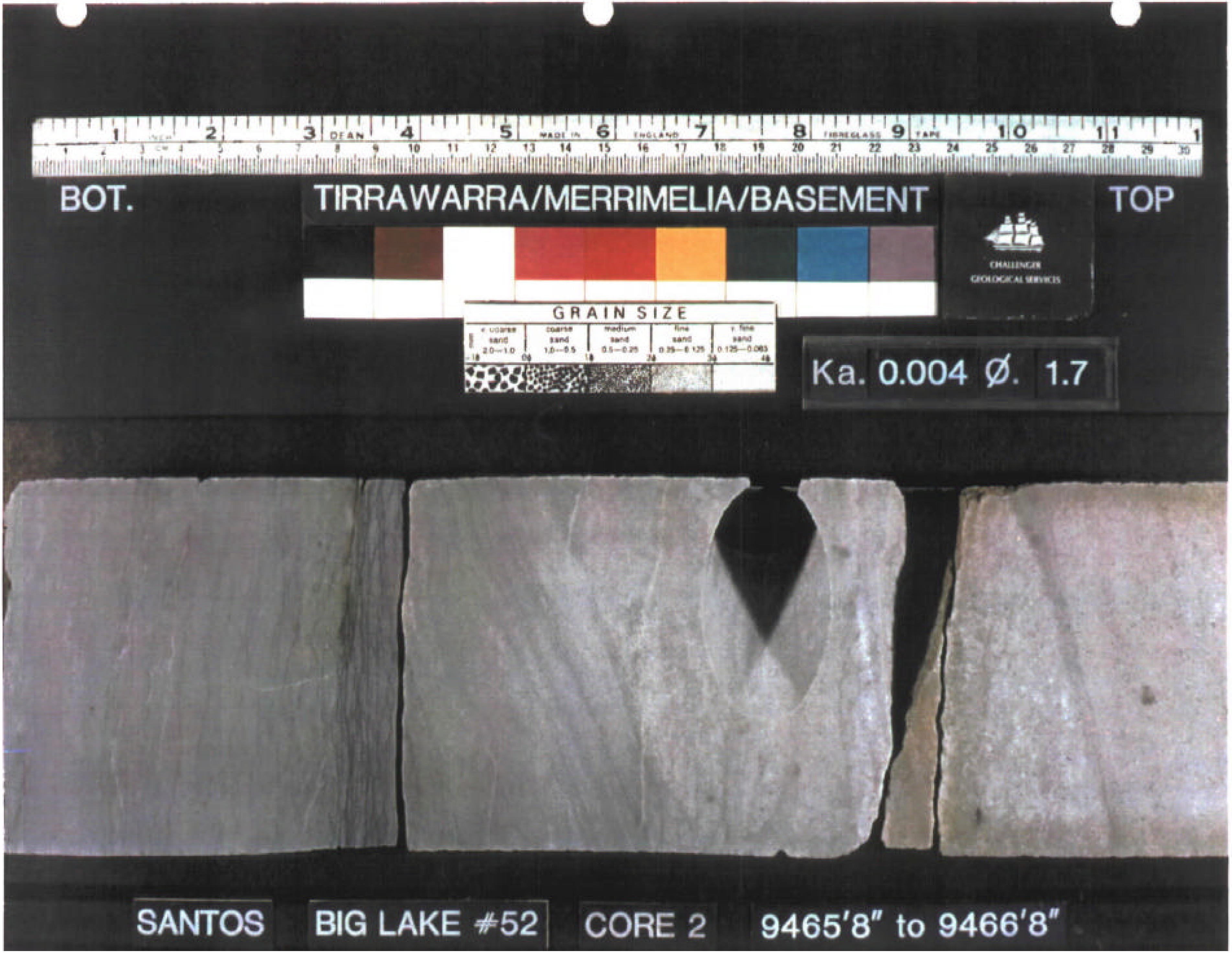

SANTOS.
BIG LAKE 52.
9404 TO 9493 FT.
EXP. 4
LAB USE ONLY
TIRRAWARRA/MERRIMELIA/BASEMENT
5 Y 7/2
5 Y 8/1
5 Y 6/1
10 YR 7/4
10 YR 4/2
5 YR 3/4
5 YR 4/1
10 R 2/2
CORE 1 AND 2
9451
9450
9449
START OF CORE 2
Ka. 0.051 Ø. 2.5
Ka. 0.025 Ø. 2.8
9454
9453
9452
Ka. 0.309 Ø. 5.2
Ka. 0.176 Ø. 4.6
Ka. 0.027 Ø. 2.9
9457
9456
9455
Ka. 0.118 Ø. 7.2
Ka. 2.2 Ø. 6.0
Ka. 0.815 Ø. 3.8
9460
9459
9458
Ka. 0.415 Ø. 8.7
Ka. 0.204 Ø. 8.0
9463
9462
9461
Ka. 0.156 Ø. 7.8
Ka. 0.048 Ø. 5.0
Ka. 0.542 Ø. 8.2

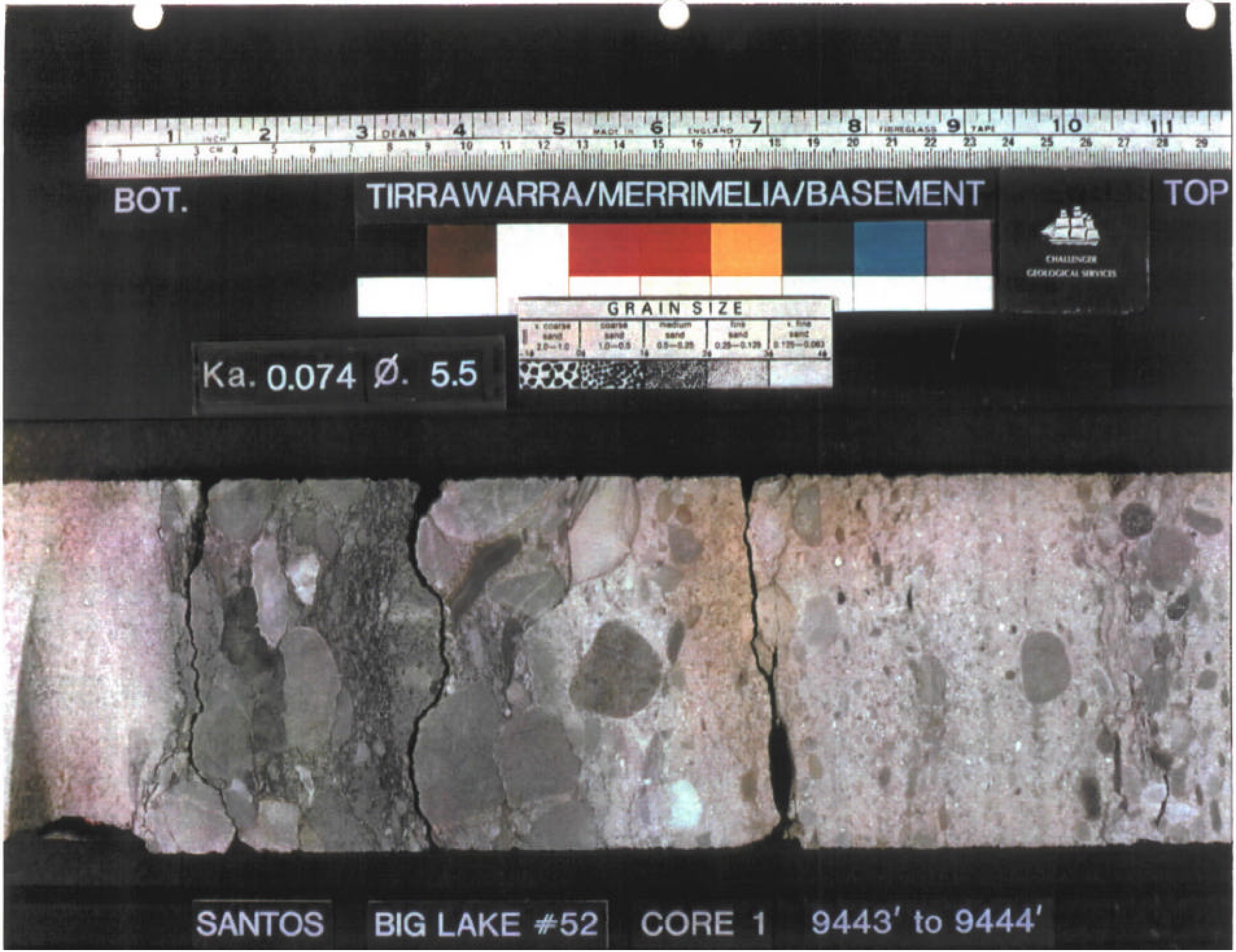

SANTOS. BIG LAKE # 52. 9404 TO 9493 FT.
EXP. 5
CORE 1 AND 2
LAB USE ONLY
TIRRAWARRA/MERRIMELIA/BASEMENT
5 Y 7/2
5 Y 8/1
5 Y 6/1
10 YR 7/4
10 YR 4/2
5 YR 3/4
5 YR 4/1
10 R 2/2
9466
9465
9464
Ka. 0.012 Ø. 0.8
Ka. 0.004 Ø. 1.7
Ka. 0.084 Ø. 6.7
Ka. 0.170 Ø. 8.3
9469
9468
9467
Ka. 0.004 Ø. 0.4
9472
9471
9470
Ka. 1.5 Ø 0.5
9475
9474
9473
9478
9477
9476
Ka. 21 Ø 0.9


SANTOS.
BIG LAKE 52.
9404 TO 9493 FT.
EXP.
6
TIRRAWARRA/MERRIMELIA/BASEMENT
LAB USE ONLY
5 Y 7/2
5 Y 8/1
5 Y 6/1
10 YR 7/4
10 YR 4/2
5 YR 3/4
5 YR 4/1
10 R 2/2
CORE 1 AND 2
9481
9480
9479
Ka. 0.004 ø 0.9
9484
9483
9482
9487
9486
9485
9490
9489
9488
9493
9492
9491


BOT.
TIRRAWARRA/MERRIMELIA/BASEMENT
TOP
CHALLENGER
GEOLOGICAL SERVICES
GRAIN SIZE
SANTOS
BIG LAKE #52
CORE 2
9482'4" to 9483'3"


BOT.
TIRRAWARRA/MERRIMELIA/BASEMENT
TOP
CHALLENGER
GEOLOGICAL SERVICES
GRAIN SIZE
SANTOS
BIG LAKE #52
CORE 2
9486'2" to 9487'2"


BOT.
TIRRAWARRA/MERRIMELIA/BASEMENT
TOP
CHALLENGER GEOLOGICAL SERVICES
GRAIN SIZE
Ka. 0.004 Ø. 1.7
SANTOS
BIG LAKE #52
CORE 2
9465'8" to 9466'8"


BOT.
TIRRAWARRA/MERRIMELIA/BASEMENT
TOP
CHALLENGER GEOLOGICAL SERVICES
GRAIN SIZE
v. coarse sand 2.0—1.0
coarse sand 1.0—0.5
medium sand 0.5—0.25
fine sand 0.25—0.125
v. fine sand 0.125—0.063
Ka. 0.074
Ø. 5.5
SANTOS
BIG LAKE #52
CORE 1
9443′ to 9444′