CORE ANALYSIS REPORT

FOR

INEXCO OIL COMPANY
BOOTH NO. 15 WELL
KANSAS

Inexco Oil Company
Booth No. 15 Well
CLI File 3402-10321

Procedure Page

Handling and Analytical Procedures

Diamond coring equipment was used to obtain 2.12 inch diameter cores between 736 and 759 feet.

The cores were preserved at the well site in plastic bags by client representative.

Cores were transported to Oklahoma City via motor freight.

A Core-Gamma Log was recorded for downhole E-Log correlation.

Plug analysis was made in intervals requested.

Fluid removal was accomplished using Dean-Stark extraction.

Porosity was determined by Boyle's law grain volume-mercury pump bulk volume.

Horizontal and vertical air permeability measured on plugs without Klinkenberg correction.

Selected intervals were preserved for future tests.

Cores have been shipped to Core Laboratories, Inc. in Dallas, Texas.

INEXCO OIL COMPANY
BOOTH NO. 15 WELL

KANSAS

DATE: 11/17/80
FORMATION:
DRLG. FLUID:
LOCATION:

FILE NO: 3402-103
ENGINEER: BOYLE
ELEVATION:

DEAN STARK PLUG ANALYSIS

SMP. NO.	DEPTH	PERM. TO AIR MD. PLUG H	PLUG V	POROSITY PERCENT	FLUID SATS. OIL	WTR.	GR. DEN.	DESCRIPTION
1	736.0-37.0	24.0	22.0	17.8	9.7	44.6	2.65	SD
2	737.0-38.0	2.1	0.2	14.7	29.4	39.6	2.70	SD,SL/SHY
3	738.0-39.0	1.5	0.2	13.8	14.7	59.1	2.67	SD,SL/SHY
4	739.0-40.0	4.5	0.5	17.4	18.8	56.7	2.67	SD,SL/SHY
5	740.0-41.0	23.0	1.8	19.3	20.1	50.5	2.67	SD,SL/SHY
6	741.0-42.0	56.0	4.7	20.3	26.4	38.5	2.67	SD,SL/SHY
7	742.0-43.0	282.0	123.0	29.9	26.8	27.9	2.67	SD
8	743.0-44.0	687.0	<0.1	28.1	40.7	27.9	2.67	SD
9	744.0-45.0	20.0	<0.1	18.8	34.9	43.5	2.68	SD,SL/SHY
10	745.0-46.0	538.0	213.0	27.5	59.2	26.8	2.66	SD
11	746.0-47.0	1160.0	11.0	29.8	63.2	22.9	2.66	SD
12	747.0-48.0	836.0	428.0	29.2	62.3	24.0	2.66	SD
13	748.0-49.0	0.1	<0.1	11.1	1.7	72.1	3.02	SD,PYR
14	749.0-50.0	881.0	814.0	30.0	63.7	27.7	2.66	SD
15	750.0-51.0	1633.0	876.0	31.8	66.6	22.7	2.67	SD
16	751.0-52.0	627.0	118.0	29.5	59.5	28.9	2.66	SD
17	752.0-53.0	432.0	0.4	26.7	42.1	36.4	2.66	SD
18	753.0-54.0	91.0	0.5	28.3	37.1	43.4	2.69	SD
19	754.0-55.0	171.0	296.0	25.5	65.5	24.2	2.65	SD
20	755.0-56.0	395.0	219.0	24.0	62.8	21.1	2.65	SD
21	756.0-57.0	518.0	36.0	26.3	56.5	28.3	2.64	SD
22	757.0-58.0	313.0	21.0	21.1	52.5	15.1	2.62	SD,SL/GIL
23	758.0-59.0	247.0	89.0	23.4	56.0	28.9	2.62	SD,SL/GIL

CORE SUMMARY

Company INEXCO OIL COMPANY
Well BOOTH NO. 15
Page 2 of 2 CLI File 3402-10321

Depth, Feet	Permeability, Md. Plug H	Plug V	Porosity, Per Cent	Saturation Oil	Water	Grain Density	Productivity	Comments
736-41	11	4.9	16.6	18.5	50.1	2.67	Oil	Low K - limited Ø
741-48	511	111	26.2	44.8	30.2	2.67	Oil	Good K & Ø
749-59	531	247	26.7	56.2	27.7	2.65	Oil	Good K & Ø

LAB

CORE LABORATORIES, INC.

Petroleum Reservoir Engineering

COMPANY INEXCO OIL COMPANY FILE NO. 3402-10321

WELL BOOTH NO. 15 DATE 11/21/80

FIELD FORMATION ELEV

COUNTY STATE KANSAS DRLG. FLD CORES

LOCATION

CORRELATION COREGRAPH

VERTICAL SCALE 5" = 100'

Gamma Ray

RADIATION INCREASE →

Permeability

MILLIDARCIES

1000 100 10 1

Depth Feet

Porosity

PERCENT

30 20 10 0

Total Water

PERCENT PORE SPAC

100 80 60 40 20

Oil Saturation

PERCENT PORE SPAC

0 20 40 60 80

7552

7562

7501 STEMMONS FREEWAY BOX 47547 DALLAS, TEXAS 75247 · 214/631-8270

CORE LABORATORIES, INC.
Special Core Analysis

April 9, 1981

Inexco Oil Company
1100 Milam Building
Suite 1900
Houston, Texas 77002

Attention: Mr. Dick McCauley

Subject: Enhanced Oil Recovery Tests
Booth No. 15 and No. 4 Wells
Kansas
Final Report
File Number: SCAL-310-80500

Gentlemen:

Enhanced oil recovery tests authorized by Mr. Dick McCauley were performed for Inexco Oil Company. Core samples from Booth No. 15 Well and oil samples from Booth No. 4 Well in Kansas were evaluated. Steamfloods, injectivity tests, petrographic analyses, and oil characterization tests were included in this study.

The steamfloods resulted in residual oil saturations of 22.7 to 53.3 percent pore space. Steam permeabilities did not indicate injectivity impairment. The core samples contained chlorite, kaolinite, and illite/mica--a total clay content of 3.8 to 4.8 percent. No injectivity problems were seen during the formation sensitivity tests. The light and heavy oil samples contained 0.46 and 0.75 percent sulfur, respectively. Viscosity of the heavy oil sample ranged from 895 cs at 100°F to 15.5 cs at 300°F.

A more detailed description of the experimental procedures and results is found in the attached report. If you have any questions after reviewing the data, please contact us. Thank you.

Very truly yours,

Core Laboratories, Inc.

David B. Burnett (KMH)

David B. Burnett, Supervisor
Enhanced Oil Recovery
Special Core Analysis

DBB:fm
7 cc. - Addressee

Table of Contents

Enhanced Oil Recovery Tests

A study was performed for Inexco Oil Company on core samples from Booth No. 15 Well and oil samples from Booth No. 4 Well in Kansas. Steamfloods, injectivity tests, petrographic analyses, and oil characterizations were performed as authorized by Mr. Dick McCauley. The purpose of the project was to evaluate the reservoir's susceptibility to steamflooding as an enhanced oil recovery mechanism. The presence of clays in the formation, the sensitivity of the clays to fresh water, and the residual oil saturation after steamflood were determined.

A routine core analysis was performed and the results previously reported on November 21, 1980, by Mr. Jack R. Good of Core Laboratories, Oklahoma City, Oklahoma. The core segments were received in Dallas on November 11, 1980. Oil samples were received January 21, 1981.

Results

Residual oil saturations after steamflood ranged from 22.7 to 53.3 percent pore space. The high value obtained for Sample 3B (53.3) may be an anomaly and hence should not be included in a statistical analysis of the data. Examination of the Number 3 core plugs revealed the presence of residues similar to an intractable tar. The initial water saturations of these samples was quite low (less than 0.1 mL). These conditions may have been caused by weathering of the samples and oxidation of the oil prior to testing. All steam permeability values were in the range normally seen.

Clay contents of 3.8 and 4.8 percent were detected by X-ray diffraction and consisted of chlorite, kaolinite, and illite/mica. The scanning electron microscope and thin section analyses confirmed the X-ray diffraction results. No injectivity problems were seen during the formation sensitivity tests.

Sulfur was present in both the light (0.46 percent) and heavy (0.75 percent) oil samples. The viscosity of the heavy oil sample ranged from 895 cs at 100°F to 15.5 cs at 300°F.

Experimental

Preparation of the Core Samples

Using the air permeabilities determined by routine core analysis, three different depth intervals of the core were chosen for testing. Core plug samples 1 1/2 inches in diameter and approximately 1 1/2 inches long were drilled from the specified intervals. Companion samples were drilled as close to the test cores as possible, so that their properties would be similar. The test cores were used for steamflood testing; the companion samples were used for the determination of initial oil saturations. After cleaning, the companion samples were subjected to water sensitivity tests. Additional core material from the specified depths was used for the petrographic analyses.

Preparation of the Fluids

Samples of produced water and source water were analyzed. The produced water analysis appears on Page 3. Simulated produced water and simulatd source water were prepared to match these analyses (their compositions are found on Page 4). A 50/50 mixture of the two waters was prepared for the water sensitivity tests. All waters were filtered through a 0.45 micron filter prior to use.

Steamfloods

The steamfloods were performed as follows:

1. The sample was loaded into a hydrostatic core holder.
2. A constant pressure of 370 psi and a temperature of 440°F were established.
3. Backpressure was decreased until the desired flow rate of steam was achieved.
4. The experiment was terminated at a water cut (cold water equivalent) of 0.999.
5. Residual oil saturation was determined by Dean-Stark extraction of the core sample.
6. Initial oil saturation was determined by Dean-Stark extraction of an adjacent sample.

A summary of the test data is found on Page 5.

Water Sensitivity Tests

The core tests were performed at room temperature (72°F). The test procedure was:

1. The core sample was saturated with simulated produced water and its pore volume checked.
2. The sample was loaded into a hydrostatic core holder.
3. The test solutions were injected through the core sample while maintaining a constant pressure. Each solution was injected until equilibrium was reached. The injection sequence was:

   a. Simulated produced water
   b. 50 percent simulated produced water/50 percent simulated source water.
   c. Simulated source water.
   d. Distilled water.

4. The pressure differential across the core and injection rate were recorded throughout the test and used to calculate liquid permeability. The liquid/air permeability ratio was then calculated and used for the evaluation of formation sensitivity.

The test data are shown on Page 6.

Petrographic Studies

Thin sections were prepared from the core material. With the aid of a petrographic microscope, the thin sections were examined and described in detail. These descriptions are presented on Pages 7 through 9.

Additional samples from the designated well core intervals were prepared for mineral content determinations. The total sample and clay-sized fraction (less than 4 microns in diameter) of each were analyzed separately utilizing an x-ray diffraction technique with mono-chromatic CuKα radiation. The results of these analyses are found on Page 10.

Core samples were also subjected to scanning electron microscope studies. The samples were prepared by selecting freshly broken surfaces, removing loose grains with an air jet, and sputter-coating these surfaces with a thin film (750Å) of gold-palladium. A discussion of the

features revealed in the SEM photomicrographs appears on Pages 11 through 13. The original set of the SEM photomicrographs is attached as an appendix to one copy of this report.

Oil Characterization

Light and heavy oils from Booth No. 4 Well were submitted for oil characterization tests. The sulfur content of each was determined using standard ASTM techniques. The viscosity of the heavy oil was determined at 100, 125, 150, 175, and 200°F. Its viscosity at 300°F was extrapolated from these data. Results of the oil characterization tests are shown on Page 14.

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS 75247

File SCAL-310-80500

Company Inexco Oil Company
Well Booth No. 15
Field
Formation
County
State Kansas

Identification and Description of Samples

Sample Number	Depth, feet	Lithological Description
1A	740-41	Ss, brn, fn gr, gd srt, well consol, mica, oil stained, argil
1B	740-41	Ss, brn, fn gr, well srt, well consol, sl/argil
2A	750-51	Ss, brn, med gr, gd srt, gd consol, sl/fri, oil stained, argil, tr mica
2B	750-51	Ss, brn, med gr, gd srt, gd consol, sl/fri, oil stained, argil, tr mica
3A	755-56	Ss, dk brn, fn gr, gd srt, well consol, v/oil stained
3B	755-56	Ss, dk brn, fn gr, gd srt, well consol, v/oil stained

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Core Properties

Sample Number	Length, cm	Area, cm^2	Diameter, cm	Porosity, Percent	Pore Volume, mL	Permeability to Air, md
1A	3.69	11.3	3.79	21.7	8.86	100
1B	3.55	11.2	3.77	23.9	9.37	325
2A	3.51	11.0	3.74	30.3	11.7	1210
2B	3.77	10.5	3.66	30.5	11.8	824
3A	3.11	11.2	3.78	22.4	7.81	281
3B	3.40	11.0	3.74	23.4	8.78	218

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File SCAL-310-80500

Water Analysis

Company INEXCO OIL COMPANY Well Name _____ Sample No. _____

Formation _____ Depth _____ Sampled From _____

Location _____ Field Booth Lease County _____ State _____

Date Sampled January 13, 1981 Date Analyzed January 23, 1981 Analyst J. A. Lutkenhaus

Total Dissolved Solids 25374 mg/L calculated

Sp. Gr. 1.0196 @ 74 °F

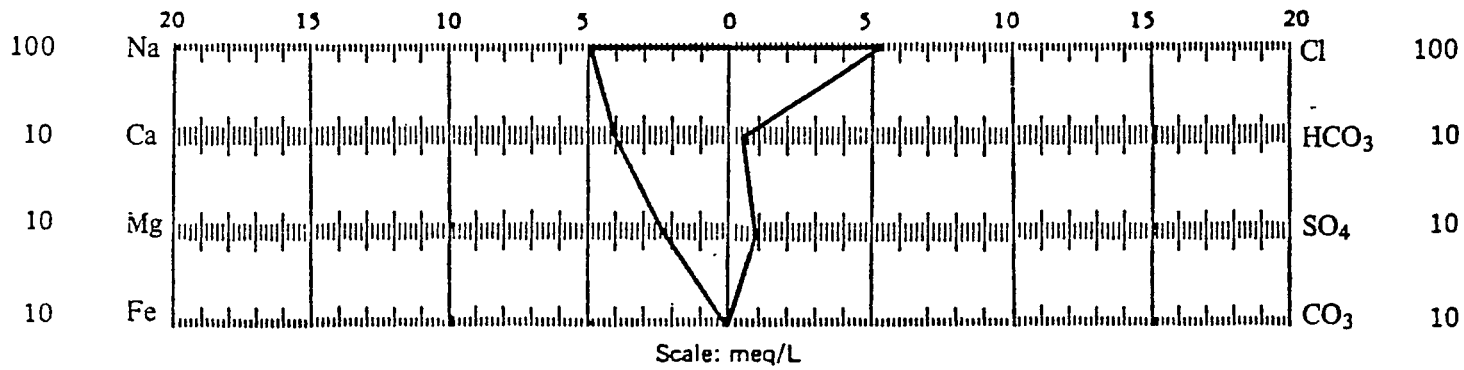
Resistivity 0.2254 ohm-meters @ 74 °F measured

1.0203 @ 20 °C (68°F)

Hydrogen Sulfide Absent

pH 7.11 @ 77 °F

Constituents	meq/L	mg/L	Constituents	meq/L	mg/L
Sodium	476.22	10948	Chloride	525.07	18613
Calcium	39.62	794	Bicarbonate	5.08	310
Magnesium	23.03	280	*Sulfate	8.85	425
Iron	0.13	3.55	Carbonate	0.0	0.0
*Barium	0.0	0.0	Hydroxide	0.0	0.0



Scale: meq/L

*Gravimetric Analysis

Simulated Water Compositions

Simulated Produced Water

Constituent	Concentration, g/L
NaCl	27.021
$CaCl_2$	2.198
$MgCl_2 \cdot 6H_2O$	2.342
$NaHCO_3$	0.427
Na_2SO_4	0.628

Simulated Source Water

$CaCl_2$	0.327
$MgCl_2 \cdot 6H_2O$	0.028
$MgSO_4 \cdot 7H_2O$	0.564
$NaHCO_3$	0.571

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Summary of Steamflood Test Results

Temperature: 440°F

Sample Number	Depth, feet	Air Permeability, Millidarcies	Porosity, Percent	Initial Oil Saturation, Percent Pore Space	Terminal Conditions		Oil Recovered,*	
					Oil Saturation, Percent Pore Space	Steam Permeability Millidarcies	Percent Pore Space	Percent Oil in Place
1B	740-41	325	23.9	-	22.7	71	13.4	37.1
1A (Companion Sample)	740-41	100	21.7	36.1	-	-	-	-
2B	750-51	824	30.5	-	24.4	110	49.4	66.9
2A (Companion Sample)	750-51	1210	30.8	73.8	-	-	-	
3B	755-56	218	23.4	-	53.3	3.9	15.2	22.2
3A (Companion Sample)	755-56	281	22.4	68.5	-	-	-	-

*Based on saturations of Companion Sample.

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Summary of Water Sensitivity Tests

Sample Number	Depth, feet	Porosity, percent	Air Permeability, millidarcies	Fluid Injected	Approximate Volume Injected, pore volumes	Liquid Permeability, millidarcies	Liquid/Air Permeability Ratio
1A	740-41	21.7	100	Simulated Produced Water	35.5	81	0.81
				50% Simulated Produced Water/ 50% Simulated Source Water	48.1	80	0.80
				Simulated Source Water	28.3	76	0.76
				Distilled Water	22.6	74	0.74
2A	750-51	30.3	1210	Simulated Produced Water	75.0	974	0.80
				50% Simulated Produced Water/ 50% Simulated Source Water	56.1	900	0.74
				Simulated Source Water	20.1	694	0.57
				Distilled Water	25.7	782	0.65
3A	755-56	22.4	281	Simulated Produced Water	24.9	239	0.85
				50% Simulated Produced Water/ 50% Simulated Source Water	19.8	229	0.82
				Simulated Source Water	23.6	215	0.76
				Distilled Water	19.2	218	0.78

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DALLAS, TEXAS 75247

Petrographic Analysis by Thin Section

Inexco Oil Company
Booth No. 15 Well
Kansas

Depth, feet: 741-42

Medium sandstone: oil impregnated, sublithic subarkose

This sample is a moderately packed, moderately sorted, moderately consolidated sandstone consisting of 86 percent quartz, 6 percent feldspar, 6 percent rock fragments and 2 percent clay. Framework grains are subangular to subrounded and subelongate, ranging from 0.05 mm to 0.40 mm in size. Grain contacts are primarily tangential and planar with occasional sutured contacts. Heavy oil partially fills pore spaces as well as coating framework grains.

Monocrystalline quartz exhibits straight or slightly undulose extinction with tourmaline, microlite and rutile inclusions. Rare polycrystalline quartz grains exhibit undulose extinction. Untwinned orthoclase, plagioclase with albite twinning and microcline with gridiron twinning constitute the feldspars present. Twinned felspars show extensive alteration to clay minerals and sericite. Dissolution is prominent along cleavage traces and twinning planes, creating some secondary porosity. Untwinned orthoclase feldspar shows little alteration and appears fresh. Chert rock fragments are composed of microcrystalline quartz and contain some clayey impurities. These fragments represent the lithic portion of the sample. Chlorite clay is found coating framework grains. Tourmaline, rutile, pore-filling dolomite, muscovite and sericite occur in trace amounts.

This sample is cemented by secondary quartz overgrowths and trace amounts of dolomite. Dolomite fills the pore spaces and encroaches upon the grains. Oil partially coats the grains and is concentrated in the pore throats.

Primary intergranular and secondary porosity accounts for 21 percent of the sample.

All percentages were obtained by point count.

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Petroleum Reservoir Engineering
DALLAS, TEXAS 75247

Petrographic Analysis by Thin Section

Inexco Oil Company
Booth No. 15 Well
Kansas

Depth, feet: 750-52

Medium sandstone: oil impregnated, sublithic subarkose

This sample is a moderately sorted, loosely packed, moderately consolidated sandstone consisting of 85 percent quartz, 9 percent feldspar, 4 percent rock fragments, 1 percent dolomite and 1 percent clay. Framework grains are subangular to subrounded, subequant to subelongate and range in size from 0.1 mm to 0.45 mm. Grain contacts are tangential and planar. Heavy oil fills pore spaces and coats grain surfaces.

Monocrystalline quartz exhibits straight or slightly undulose extinction and contains tourmaline and rutile inclusions. Rare polycrystalline quartz grains exhibit undulose extinction. Untwinned orthoclase and plagioclase with albite twinning constitute the feldspars in this sample. These feldspars show extensive alteration to clay minerals and sericite. Partial dissolution is prominent along cleavage traces and twinning planes creating minor secondary porosity. Dolomite partially replaces some of the feldspars. Chert and volcanic rock fragments compose the lithic portion of the sample. Chert is composed of microcrystalline quartz and contains some clay impurities. Volcanic rock fragments are composed of feldspar laths which have been extensively weathered to clay minerals and sericite. Chlorite platelets coat framework grains. Tourmaline, rutile, zircon, clays, muscovite and sericite occur in trace amounts.

This sample is cemented by an intermediate stage of quartz overgrowth development and a minor amount of dolomite. The quartz overgrowths are distinguished by dust rims. The secondary overgrowth is optically continuous with respect to the rest of the grain. Heavy oil partially fills the pore throats. The oil also partially coats the framework grains.

Primary intergranular and secondary porosity accounts for 26 percent of the sample.

All percentages were obtained by point count.

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Petroleum Reservoir Engineering
DALLAS, TEXAS 75247

Scanning Electron Microscope Study

Inexco Oil Company
Booth No. 15 Well
Kansas

Depth, feet: 741-42

The sample from 741 to 742 feet is a gray, moderately consolidated fine to medium grained sandstone. Photomicrograph A1 (100X) shows a moderately packed aggregate of subangular to subrounded, fine to medium sand-sized grains cemented by an early to intermediate stage of secondary quartz overgrowth development, authigenic clay present in the form of grain-coating chlorite and pore-filling kaolinite, and widely scattered patches of carbonate. These cementation elements account for a significant reduction in the primary intergranular porosity of this sample; however, remnant primary porosity and microporosity associated with the clays appears to be relatively substantial. In photomicrograph B1 (500X) euhedral terminations of secondary quartz are shown associated with platy, grain coating authigenic chlorite clay. Photomicrograph B2 (2500X) shows a more detailed view of the idiomorphic habit of the chlorite cement and the encroachment of quartz overgrowths upon pore space. Also revealed in B2 is a minor amount of pore-filling kaolinite clay occurring as pseudohexagonal platelets. Photomicrograph C1 (800X) again shows platy authigenic chlorite associated with secondary quartz overgrowths. In the left portion of C1 a feldpsar grain which has undergone partial dissolution is shown. Photomicrograph C2 (4000X) shows a detailed view of the chlorite and associated microporosity.

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DALLAS, TEXAS 75247

Scanning Electron Microscope Study

Inexco Oil Company
Booth No. 15 Well
Kansas

Depth, feet: 750-752

The sample from 750 to 752 feet is a gray, loosely consolidated, medium-grained sandstone. Photomicrograph A1 (100X) shows a well sorted, loosely packed aggregate of subangular to subrounded medium sand-sized grains cemented by authigenic, grain-coating chlorite and pore-filling kaolinite. An early stage of secondary quartz overgrowth development and widely scattered patches of carbonate play a much less prominent role in cementing this sample. Although remnant primary intergranular porosity appears to be substantial, a significant amount of microporosity associated with the clays is also evident. Photomicrograph B1 (500X) shows well the pore-lining and pore-bridging character of the chlorite. Photomicrograph B1 also shows a prominent feldspar grain which has undergone extensive dissolution and the subsequent formation of minor authigenic overgrowths. Photomicrograph B2 (2500X) shows a more detailed view of these overgrowths associated with platy, authigenic chlorite and a trace of lath-like authigenic illite clay. Photomicrograph set B1-B2 also shows trace amounts of heavy, impregnating oil which could not be removed during sample preparation.

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DALLAS, TEXAS 75247

Petrographic Analysis by Thin Section

Inexco Oil Company
Booth No. 15 Well
Kansas

Depth, feet: 755-56

Medium sandstone: oil impregnated, sublithic subarkose

This sample is a moderately packed, moderately to well sorted, moderately consolidated sandstone consisting of 86 percent quartz, 8 percent feldspar, 4 percent rock fragments and 2 percent dolomite. Framework grains are subangular to subrounded, subequant to subelongate and range in size from 0.10 mm to 0.32 mm. Grain contacts are tangential and planar. The sample is impregnated with heavy oil.

Monocrystalline quartz exhibits straight or slightly undulose extinction and contains muscovite, tourmaline and microlite inclusions. Rare polycrystalline quartz grains exhibit undulose extinction. Untwinned orthoclase, plagioclase with albite twinning and microcline with gridiron twinning are the feldspars present in this sample. These feldspars show extensive alteration to clay minerals and sericite along cleavage traces and twinning planes. Partial dissolution is also prominent along these zones of weakness creating some secondary porosity. Dolomite partially replaces some feldspars. Chert fragments and volcanic rock fragments comprise the lithic portion of the sample. Chert fragments are composed of microcrystalline quartz. Volcanic rock fragments are composed of feldspar laths contained within a fine-grained groundmass. This groundmass has weathered extensively to sericite and clay minerals. Tourmaline, chlorite clay and sericite occur in trace amounts.

This sample is primarily cemented by quartz overgrowths. The surfaces of the framework grains have also been coated with authigenic chlorite clay. Oil partially fills the pore spaces and pore throats.

Primary intergranular and secondary porosity accounts for 21 percent of the sample.

All percentages were obtained by point count.

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DALLAS, TEXAS 75247

Mineral Content Determination

(by X-Ray Diffraction)

Inexco Oil Company
Booth No. 15 Well
Kansas

Sample Number:	1C,D		2C,D		3C,D	
Particle Size of Sample Fraction:	Whole Rock	Clay	Whole Rock	Clay	Whole Rock	Clay
Estimate of Net % Clay Minerals:	3.8		4.8		4.2	
Mineral	Percent of Sample Analyzed					
Quartz	91		91		87	
Feldspars	5		4		9	
Dolomite			Trace		Trace	
Kaolinite	Trace	Trace	Trace	Trace	Trace	Trace
Chlorite (Fe-Rich)	4	91	5	91	4	89
Illite/Mica	Trace	9	Trace	9	Trace	11

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Petroleum Reservoir Engineering
DALLAS, TEXAS 75247

Scanning Electron Microscope Study

Inexco Oil Company
Booth No. 15 Well
Kansas

Depth, feet: 755-756

The sample from 755 to 756 feet is a gray, loosely to moderately consolidated, medium-grained sandstone. Photomicrograph A1 (100X) shows a loosely to moderately packed aggregate of subangular to subrounded, fine to medium sand-sized grains cemented by an early stage of secondary quartz overgrowth development, authigenic clays in the form of grain-coating chlorite and pore-filling kaolinite, and widely scattered patches of secondary carbonate. Although the presence of these cements has resulted in reduced primary intergranular porosity, significant remnant porosity, as well as microporosity associated with the clays, is present. Photomicrograph B1 (500X) shows a more detailed view of the principal cementation elements of this sample. Euhedral quartz overgrowth terminations, pore-lining platelets of chlorite and pore-filling, pseudohexagonal platelets of kaolinite have significantly reduced the pore area shown in B1. Although microporosity associated with the clay minerals is evident, a reduction in permeability is also apparent. Photomicrograph B2 (2500X) shows stacked, pseudohexagonal platelets of authigenic kaolinite and platy, idiomorphic crystals of chlorite. Only a trace amount of secondary porosity is evident in this sample. Photomicrograph set C1-C2 (800X, 4000X) focuses on a feldspar grain which has undergone extensive dissolution along cleavage planes. Platy, grain-coating chlorite and small feldspar overgrowths which formed subsequent to the dissolution are well shown in C1 and C2.

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS 75247

Summary of Oil Characterization Test Results

Sample Identification: Booth No. 4 Well

Sulfur Content, weight percent

Light Oil	0.46
Heavy Oil	0.75

Oil Viscosity Data

Temperature, °F	Viscosity, cs
100	895
125	474
150	168
175	118
200	70
300	15.5

MICROGRAPH SYMBOLS

The magnification is printed on each micrograph. A micrograph may have a particular area photographed at a higher magnification (2X, 5X, or 10X) than its mate micrograph, and this photographed area is displayed by a view-finder window on the lower magnification micrograph.

The method of giving the viewer a feel for the micrograph magnification and the method of identifying the micrograph magnification is explained below. A long scale bar and dash marks appear in the upper left of each micrograph. They only appear on the lower magnification micrograph in dual magnification cases.

The μbar represents 100μ when preceded by 3 dash marks: _ _ _ ____ *
The μbar represents 10μ when preceded by 2 dash marks: _ _ ____
The μbar represents 1μ when preceded by 1 dash mark: _ ____

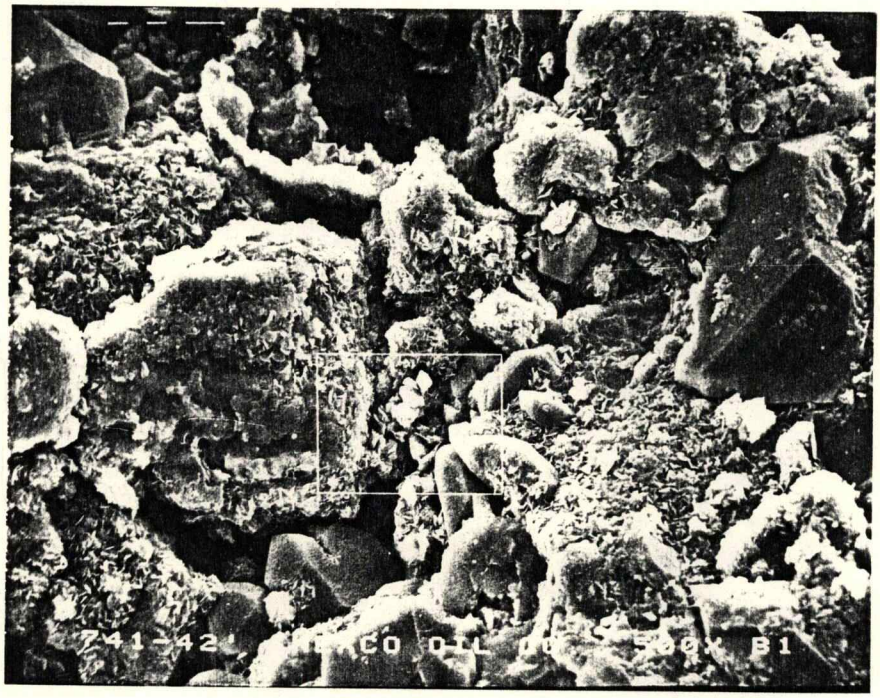
Magnification can be calculated from the micron bar by using the following relationships:

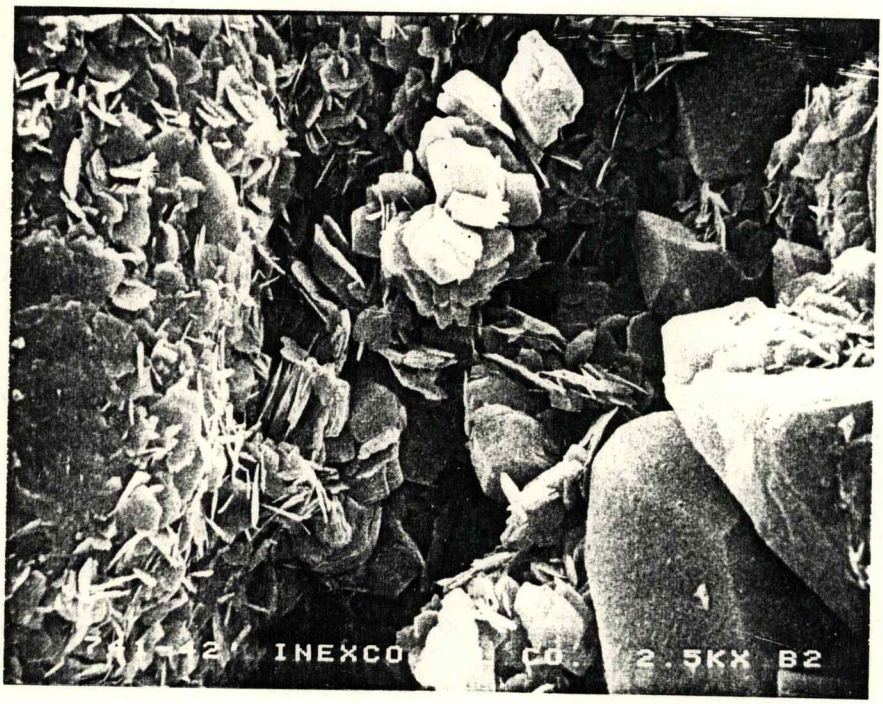
10X = a 1 mm μbar, when the bar represents 100μ
100X = a 1 mm μbar, when the bar represents 10μ
1000X = a 1 mm μbar, when the bar represents 1μ
10000X = a 1 mm μbar, when the bar represents 0.1μ

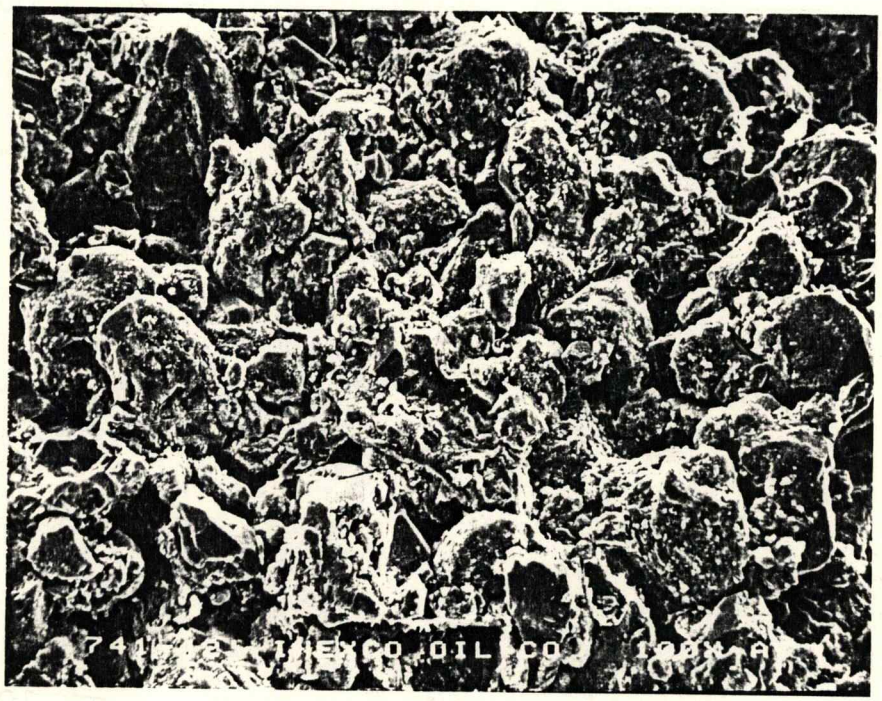
Example: If the micron bar is preceded by 2 dash marks (_ _) and is 6 mm long, the magnification is 600X.

$$\frac{\text{Actual length of μbar (mm)}}{\text{μbar representation, mm}} = \text{magnification}$$

* Micron Bar

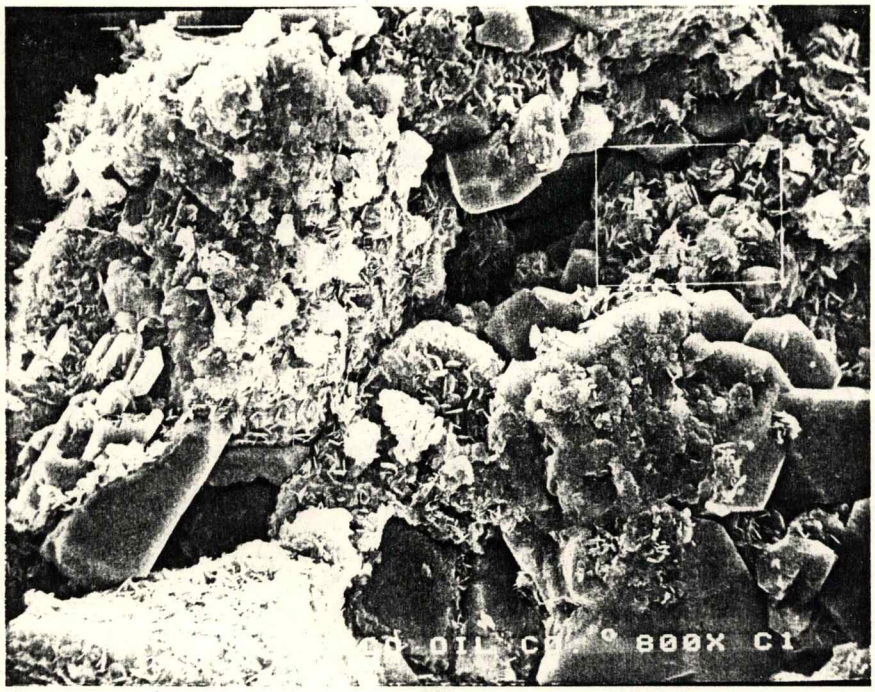


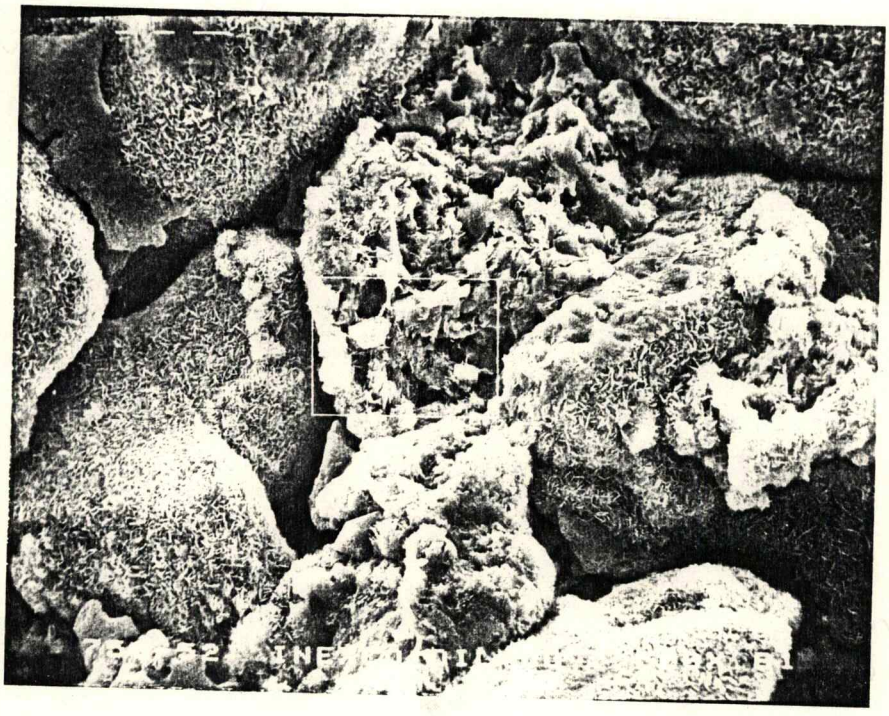

INEXCO
2.5KX B2

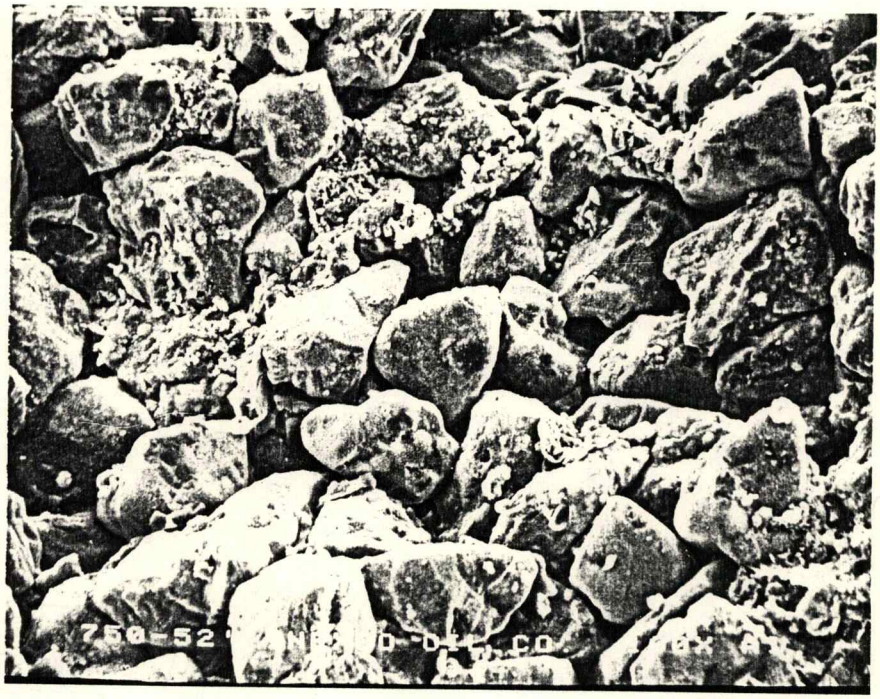


Depth, feet: 741-42

The sample from 741 to 742 feet is a gray, moderately consolidated fine to medium grained sandstone. Photomicrograph A1 (100X) shows a moderately packed aggregate of subangular to subrounded, fine to medium sand-sized grains cemented by an early to intermediate stage of secondary quartz overgrowth development, authigenic clay present in the form of grain-coating chlorite and pore-filling kaolinite, and widely scattered patches of carbonate. These cementation elements account for a significant reduction in the primary intergranular porosity of this sample; however, remnant primary porosity and microporosity associated with the clays appears to be relatively substantial. In photomicrograph B1 (500X) euhedral terminations of secondary quartz are shown associated with platy, grain coating authigenic chlorite clay. Photomicrograph B2 (2500X) shows a more detailed view of the idiomorphic habit of the chlorite cement and the encroachment of quartz overgrowths upon pore space. Also revealed in B2 is a minor amount of pore-filling kaolinite clay occurring as pseudohexagonal platelets. Photomicrograph C1 (800X) again shows platy authigenic chlorite associated with secondary quartz overgrowths. In the left portion of C1 a feldpsar grain which has undergone partial dissolution is shown. Photomicrograph C2 (4000X) shows a detailed view of the chlorite and associated microporosity.

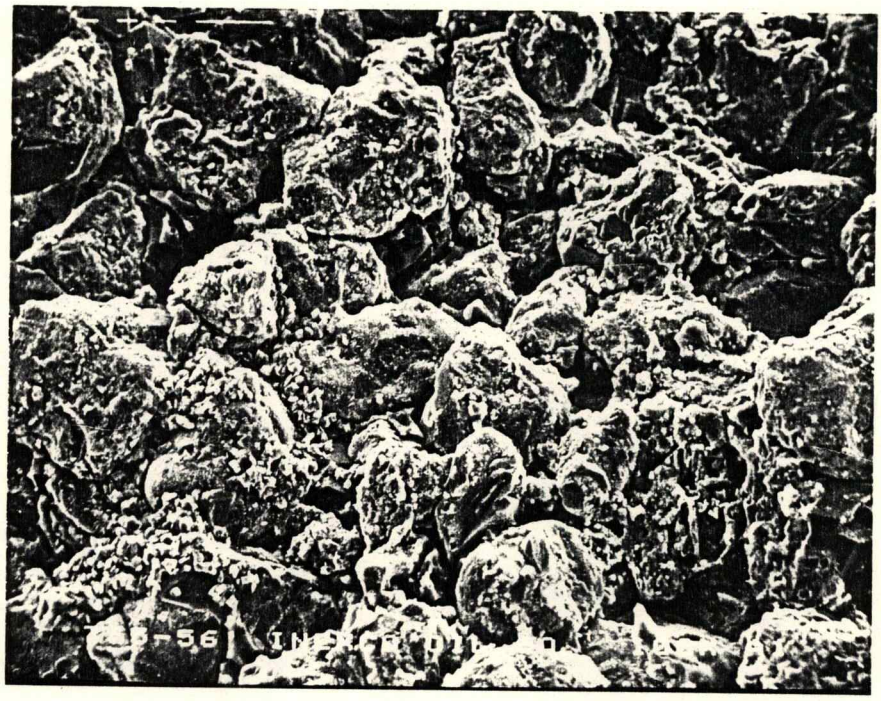

800X C1





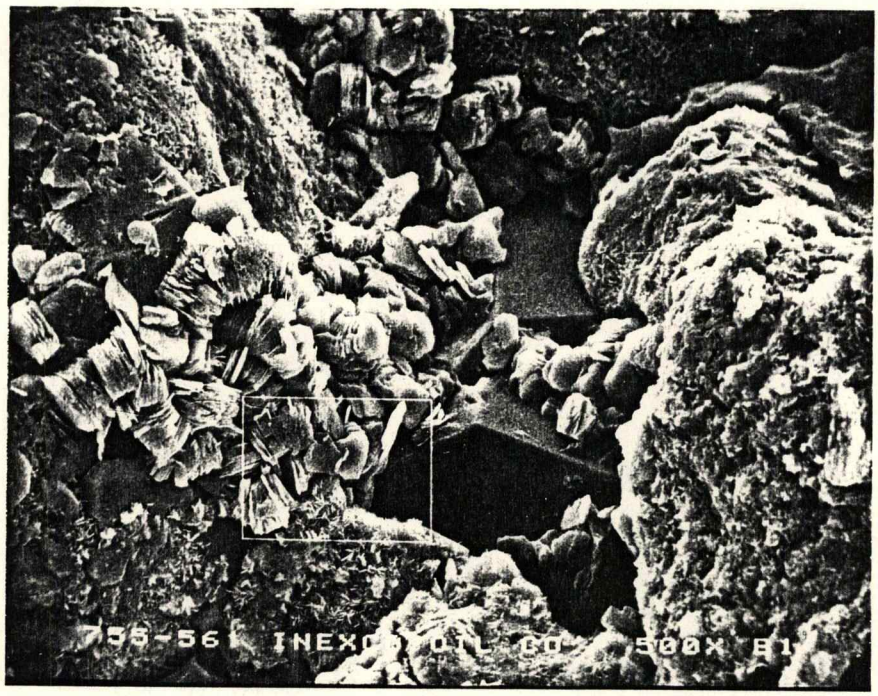
Depth, feet: 750-752

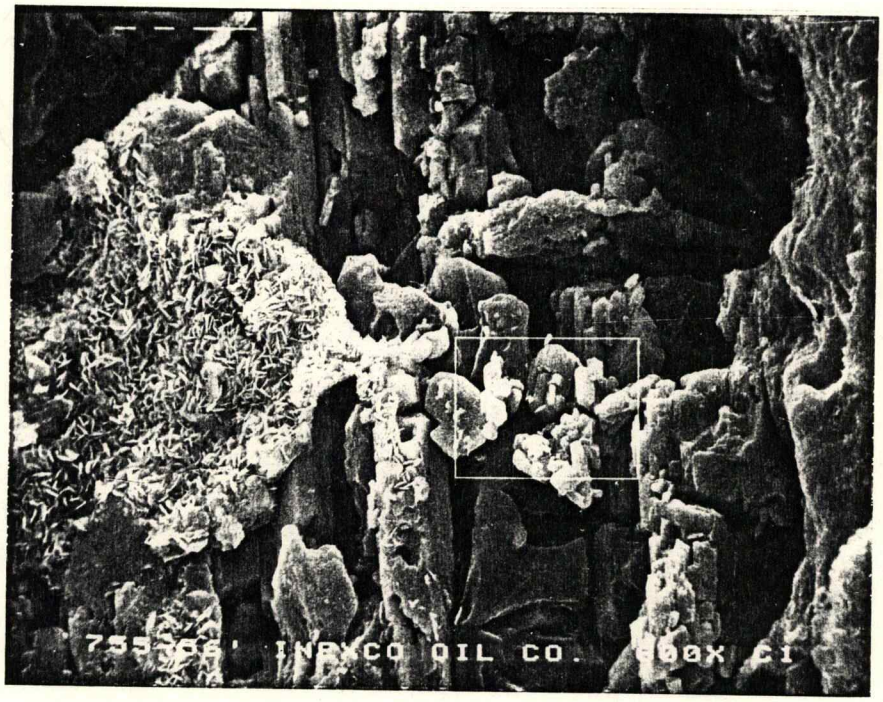
The sample from 750 to 752 feet is a gray, loosely consolidated, medium-grained sandstone. Photomicrograph A1 (100X) shows a well sorted, loosely packed aggregate of subangular to subrounded medium sand-sized grains cemented by authigenic, grain-coating chlorite and pore-filling kaolinite. An early stage of secondary quartz overgrowth development and widely scattered patches of carbonate play a much less prominent role in cementing this sample. Although remnant primary intergranular porosity appears to be substantial, a significant amount of microporosity associated with the clays is also evident. Photomicrograph B1 (500X) shows well the pore-lining and pore-bridging character of the chlorite. Photomicrograph B1 also shows a prominent feldspar grain which has undergone extensive dissolution and the subsequent formation of minor authigenic overgrowths. Photomicrograph B2 (2500X) shows a more detailed view of these overgrowths associated with platy, authigenic chlorite and a trace of lath-like authigenic illite clay. Photomicrograph set B1-B2 also shows trace amounts of heavy, impregnating oil which could not be removed during sample preparation.

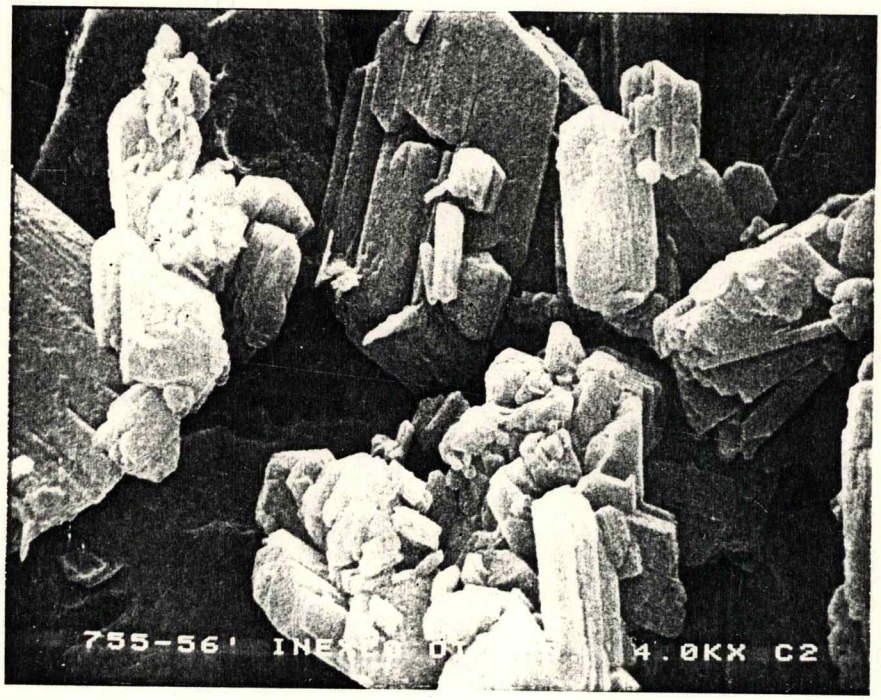


Depth, feet: 755-756

The sample from 755 to 756 feet is a gray, loosely to moderately consolidated, medium-grained sandstone. Photomicrograph A1 (100X) shows a loosely to moderately packed aggregate of subangular to subrounded, fine to medium sand-sized grains cemented by an early stage of secondary quartz overgrowth development, authigenic clays in the form of grain-coating chlorite and pore-filling kaolinite, and widely scattered patches of secondary carbonate. Although the presence of these cements has resulted in reduced primary intergranular porosity, significant remnant porosity, as well as microporosity associated with the clays, is present. Photomicrograph B1 (500X) shows a more detailed view of the principal cementation elements of this sample. Euhedral quartz overgrowth terminations, pore-lining platelets of chlorite and pore-filling, pseudohexagonal platelets of kaolinite have significantly reduced the pore area shown in B1. Although microporosity associated with the clay minerals is evident, a reduction in permeability is also apparent. Photomicrograph B2 (2500X) shows stacked, pseudohexagonal platelets of authigenic kaolinite and platy, idiomorphic crystals of chlorite. Only a trace amount of secondary porosity is evident in this sample. Photomicrograph set C1-C2 (800X, 4000X) focuses on a feldspar grain which has undergone extensive dissolution along cleavage planes. Platy, grain-coating chlorite and small feldspar overgrowths which formed subsequent to the dissolution are well shown in C1 and C2.




INEXCO OIL CO.


4.0KX C2