SEM ANALYSES
OF FOUR CORE CHIPS,
NORTH SLOPE, ALASKA

Sohio #1 Long Island

Exxon #F-1 Alaska State

U.S. Navy #1 Topagoruk Test Well

Sinclair #1 Colville

SEM Analysis of North Slope Core Chip Samples

The attached SEM micrographs illustrate features observed during SEM analysis of four core chip samples. The samples examined are listed below:

Sohio #1 Long Island - 9,071 ft
Exxon #F-1 Alaska State - 12,601 ft
U.S. Navy #1 Topagoruk Test Well - 2,095 ft
Sinclair #1 Colville - 2,374 ft

The features encountered in each of these samples are described below. These descriptions are keyed to micrographs in Figures 1 and 2.

Sinclair #1 Colville, 2374 ft
This sample is a very fine-grained sandstone in which much of the intergranular pore network has been plugged by randomly oriented platelets of clinoptilolite (Figures 1A and 1B).

Sohio #1 Long Island, 9071 ft
This sample is a fine-grained sandstone in which scattered pores are plugged by clusters of kaolinite books 5 to 10 micrometers in width (Figure 1C). The surfaces of most framework grains are covered by a very thin coating of clay whose individual flakes are generally subparallel to the underlying grain surface (Figure 1D).

U.S. Navy #1 Topagoruk Test Well, 2095 ft
This sample is a fine-grained sandstone in which significant amounts of intergranular porosity have been destroyed by plastic deformation of ductile grains (Figures 2A and 2B). Minor reduction of intergranular porosity has been lost by quartz overgrowth cementation (Figure 2A) and kaolinite infill (Figure 2B).

Exxon #F-1 Alaska State, 12601 ft
This sample is a fine-grained sandstone in which extensive intergranular porosity loss has been produced by plastic deformation of ductile grains, primarily phyllite fragments (Figure 2C). A few scattered interganular pores have been clogged by tightly packed clusters of kaolinite books (Figure 2D).

FIGURE 1

A. **Sinclair #1 Colville, 2374 ft**
Randomly oriented platelets of clinoptilolite plug intergranular pores. Individual crystals range from 3 to 5 micrometers to 15 micrometers in length. View B is an enlargement of the area in the upper right portion of this view. Scale bar at lower right is 25 micrometers in length.

B. **Sinclair #1 Colville, 2374 ft**
This view represents an enlargement of a portion of View A. The clinoptilolite platelets shown are randomly oriented. These platelets have thicknesses of 1 to 2 micrometers and lengths of 3 to 10 micrometers. Scale bar is 10 micrometers in length.

C. **Sohio #1 Long Island, 9071 ft**
A cluster of loosely packed kaolinite books plugs the center of an intergranular pore. The books have widths of 4 to 7 micrometers and lengths of 5 to 15 micrometers. Only a few scattered pores contain such kaolinite. Scale bar has a length of 10 micrometers.

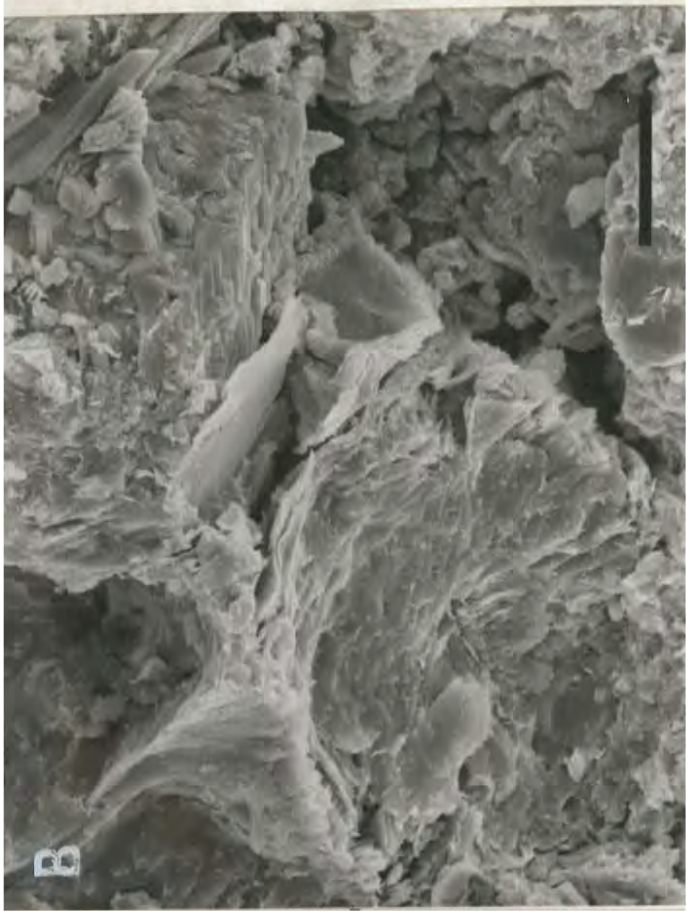
D. **Sohio #1 Long Island, 9071 ft**
High magnification view of the surface of a framework grain. The surface of this grain is covered by a very thin clay coat. Individual flakes forming the clay coat are oriented subparallel to the framework grain surface, though locally the edges of some flakes project at high angles to this surface. Scale bar is 10 micrometers in length.


B

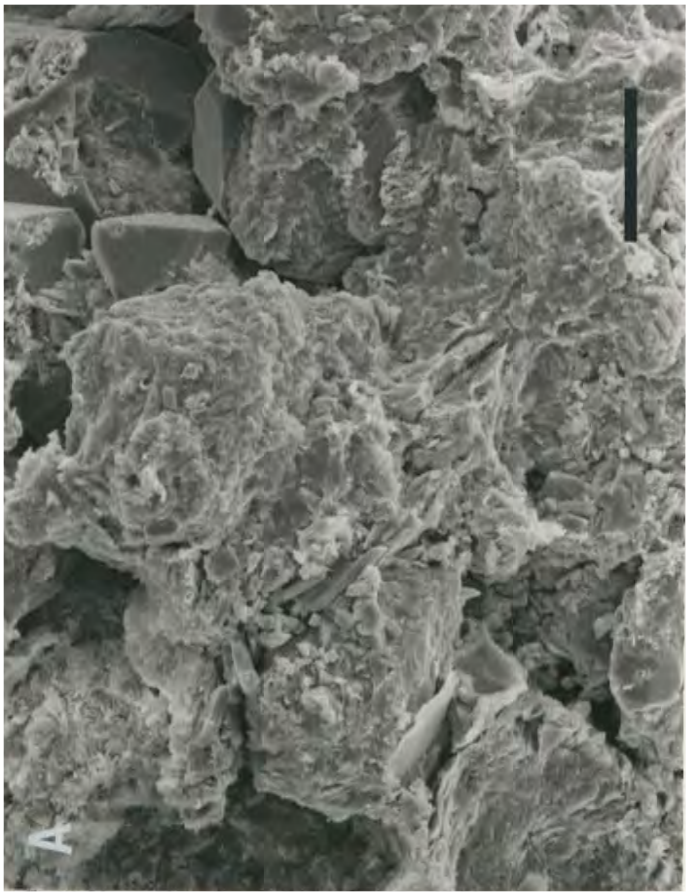

D


A


C


B


D


A


C

FIGURE 2

A. **U.S. Navy #1 Topagoruk, 2095 ft**
Low magnification view showing intergranular pores in the central portion of the view destroyed by plastic deformation of ductile grains. Moderate sized quartz overgrowths (smooth facets) partially fill pores at the upper right. Scale bar is 50 micrometers in length.

B. **U.S. Navy #1 Topagoruk, 2095 ft**
High magnification view of lower left portion of View A. A ductile grain has been deformed into the pore at the center of this view. Kaolinite books 5 to 10 micrometers in length partially clog pores at the right side of this view. Scale bar is 25 micrometers in length.

C. **Exxon #F-1 Alaska State, 12601 ft**
A plastically deformed phyllite(?) fragment has been deformed to fill the intergranular pore at the center of this view. Scale bar is 25 micrometers in length.

D. **Exxon #F-1 Alaska State, 12601 ft**
Tightly packed kaolinite books 5 to 10 micrometers in length plug an intergranular pore. Only a few scattered pores contain such clays. Scale bar is 10 micrometers in length.