The American Association of Petroleum Geologists Bulletin
V. 64, No. 6 (June 1980), P. 960-963

ASSOCIATION ROUND TABLE

1980 AAPG-SEPM-EMD ANNUAL MEETING
DENVER, COLORADO
June 8-11, 1980

Additional Abstracts

CONLEY, CURTIS D., Kansas Geol. Survey, Lawrence, KS

Petrology of Arbuckle Group, Central Kansas

The Arbuckle Group (Late Cambrian and Early Ordovician) in Kansas is mostly crystalline dolomite with abundant chert in the upper part. The Arbuckle is entirely in the subsurface, and there are only scattered cores, mostly from the upper part. Depositional constituents and textures have been reported only from the chert. Study of thin sections from three cores from the Central Kansas uplift reveals abundant evidence of depositional components, as well as diagenetic features of dolomitization and porosity. Despite virtually complete dolomitization, it is often possible to identify primary grain types, fabrics, and textures, and by comparison with better preserved examples, to interpret less well-preserved features.

Identifiable grain types include oolites, pellets, intraclasts (of micrite, pellets, and oolites), and skeletal grains, including gastropods, echinoderms, and bivalves. Crenulate, laminated dolomite, interpreted as stromatolites, recurs. Depositional textures range from mudstone to packstone.

The dolomite is microcrystalline to coarsely crystalline, with porosity ranging erratically from 1 to 22%. Pore types are: (1) intercrystal (most common), supplemented and interconnected by (2) solution-enlarged fractures, (3) moldic, from solution of depositional grains, (4) fenestral, and (5) primary interparticle. Partly dissolved dolomite crystals have collapsed, compacted, and probably contributed to fracturing. Small, closely spaced fractures may be open or plugged by crystals mobilized from surrounding dolomite, thereby isolating bodies of dolomite with high intercrystal porosity. Laminae of low-porosity dolomite, presumably controlled by depositional texture, contribute also to porosity variability. Most large pores are reduced by dolomite cement. Other scarce cements are anhydrite and sparry calcite, which fills oomolds and fractures.

FEIR, J. DOUGLAS, Alsands Project Group

The Alsands Project—A Challenge in Petroleum and Mining Geology

A third mining operation in the Athabasca oil sands area of northern Alberta is planned by the Alsands Project Group, a consortium of nine petroleum companies.

The group is considering the use of large draglines to excavate oil sands from an open pit mine. This project contemplates separation of the bitumen and sand by a hot water process, followed by upgrading to synthetic crude oil. Production will begin in 1986; when design capacity of 140,000 b/d (22,250 m^3/d) is reached, this project will supply over 10% of Canada's forecast crude producibility.

The bitumen occurs in a 300 ft (90 m) sequence of unconsolidated sands and clays of the Lower Cretaceous McMurray Formation, at or near the surface. A thin veneer of Recent and Pleistocene aeolian and glacial deposits overlie the McMurray. Devonian carbonates and evaporites occur below the Cretaceous. McMurray deposition took place in a mesotidal, coastal environment. The lowermost sands are fluvial, upper delta plain, overlain by tidal channel and tidal flat sands and muds of the lower delta plain. Some marine barrier bars and beaches have been identified. The highest bitumen saturations occur in the fluvial and tidal channel sands. However, the lowermost sands are frequently water saturated under artesian conditions. The rugged paleotopography of the Devonian erosional surface has significantly influenced the depositional pattern of the overlying McMurray. This relief is, in part, due to the solution of Middle Devonian salt beds, with subsequent collapse of the overlying units.

This complex sequence of depositional patterns, varying lithologies, and fluid contents, combined with salt tectonics, has created the need for detailed geological and geotechnical studies to interface with mining engineering in developing a viable mine plan.

LENNOX, T. R., and M. M. LERAND, Alberta, Canada

Geology of In Situ Pilot Project, Wabasca Oil Sands Deposit, Alberta

The Wabasca oil sands deposit in north-central Alberta contains 24 billion bbl of bitumen in the Grand Rapids Formation (Albian, Lower Cretaceous). The 6 to 8° API bitumen has a viscosity at reservoir temperature (65°F) of 2 million cp. and a sulphur content of 4.6 wt. %. Since 1974 Gulf Canada has been experimenting with in-situ fireflood, cyclic-steam stimulation, steam flood and solvent processes in the uppermost "A" Member of the formation.

A gentle southwestward-dipping homocline in this area is locally complicated by differential compaction of Lower Cretaceous sediments over paleotopographic relief on the Paleozoic erosion surface. In the pilot area, low amplitude (10 ft), northwest oriented folds may represent compactional features or wrinkles produced by the down-dip creep and buckling of the unconsolidated sand.

The Grand Rapids "A" reservoir is entirely sand, 45 to 50 ft thick, and divisible into three members on the basis of grain size and sedimentary structures. Grain size increases upwards from very fine at the base of the Lower Member to fine sand in the Middle Member. In the Upper Member, grain size decreases upwards from granuliferous, coarse sand at the erosional base to fine