Recent Gulf exploration efforts in the Williston basin have resulted in the discovery of a major new field, Little Knife, with multiple reservoir potential in a relatively untested area of the basin. The 70 producing wells drilled have been completed in the Mission Canyon Formation, but potential Devonian Duperow production has also been established in restricted areas of the field.

The dominant factor in entrapment appears to be a north-plunging structural nose, though stratigraphic contribution to entrapment has not been fully evaluated.

The Mission Canyon can be divided into five zones (A to E) based on lithologic and sonic log data. Zone B is the principal producing zone and was deposited in a wide variety of shore and nearshore environments. The depositional environments and diagenetic settings associated with zone B are responsible for an intricate pattern of carbonate deposition and porosity development.

Little Knife, now 2 years old, has already produced 3,675,000 bbl of oil (January 1, 1979) even though during much of that time many wells capable of much higher production were restricted to 100 BOPD. Little Knife now vies for position as North Dakota's largest oil producer, as a gas treatment plant became operational in late 1978 and allowed daily field capacity to increase to approximately 15,000 BOPD.

AAPG EASTERN SECTION MEETING
October 15-17, 1978
Cleveland, Ohio

Abstracts of Papers

BIRCH, MICHAEL J., and WILLIAM C. MACQUOWN, Univ. Kentucky, Lexington, Ky.

Petroleum Production from Basal Greenbrier Formation in Hyden West Pool, Eastern Kentucky

The Hyden West pool of northeastern Leslie County in eastern Kentucky produces from the Mississippian "Big Lime" (Greenbrier or Newman Limestone). The pool includes approximately 7,000 acres (2,800 ha.), with more than 60 wells which range in depth from 1,900 to 2,400 ft (570 to 720 m). Production in the pool is primarily gas, with small amounts of oil, from the basal Greenbrier.

Drill cuttings from 10 wells within the pool and on its margins were studied using a binocular microscope. The thickness of the Greenbrier was determined throughout the pool from gamma-ray logs and samples. Drillers' logs have been used cautiously, and only if other sources of data were unavailable. These thicknesses, as well as intervals within the Greenbrier and structural data from the logs, were used to construct maps and cross sections of the pool.

The Greenbrier has a thickness of between 160 and 250 ft (48 and 75 m) in this pool, and consists of limestone and dolomite, with minor amounts of shale. Evidence suggests that the sequence was deposited in a shallow epicontinental sea that was transgressing across low-lying, exposed surfaces of the Maccrady siltstone.

The dolomite present in the basal part of the Greenbrier is mainly a secondary replacement of limestone. Porosity and permeability in the dolomite provide the pay zone of the Hyden West pool.

CEMEN, IBRAHIM, Pennsylvania State Univ., University Park, Pa.

Structure of San Cayetano and Oak Ridge Thrust Faults, East-Central Ventura Basin, California

The central Ventura basin, containing at least 20,000 ft (6,000 m) of Pliocene and Pleistocene sedimentary rocks, has been long recognized as bounded by thrust faults—the north-dipping San Cayetano fault (SCF) on the north and the south-dipping Oak Ridge fault (ORF) on the south. Field investigations and synthesis of available surface and subsurface data show that the three strands of the SCF, here named the Main, Goodenough, and Piru, join at depth to form a single fault plane. The SCF shows a 30,000-ft (9,000 m) maximum separation in the Fillmore area where a possible structural downstep is stepped to the left along the Goodenough strand. The SCF loses the separation progressively eastward and within about 14 mi (22 km) the fault apparently disappears in the north flank of the Santa Clara Valley syncline. The ORF, exposed within the southeastern part of the study area, also loses its separation eastward and disappears along the axis of the syncline. The Main strand of the SCF was initiated during the deposition of the "Pico." West of Hopper Canyon, the fault involves movement during and after the deposition of the Pleistocene Saugus Formation. The SCF cuts late Quaternary deposits and should be considered as potentially active. Most of the folds in the upper (north) block, and all the folds in the lower (south) block of the SCF, were contemporaneous with fault movement.

CORRE, PIERRE, and GILDAS OMNÈS, CGG, Houston, Tex., and Denver, Colo.

Shallow Seismic Reflection in Appalachian Basin with Mini-Sosie

The Mini-Sosie is a digital seismic system developed by Barbier and Viallix. The source is a 130- or 220-pound (59 or 99 Kg) tamper identical with those used for earth compaction. By acting on the throttle, the operator obtains a series of random impulses at an average rate of 10 per second. The digital recorder is connected to a normal 12- or 24-trace seismic reflection array and to a sensor set up on the tamper base plate. Each pulse from the sensor activates a register for each trace; thus, each repeatable seismic event corresponding to the impact which created the pulse is stored in the registers at a constant time interval after the activation of the register. Therefore, seismic events occurring at a constant time interval after the surface impulse will add up when the contents of a group of registers are stacked. Other events due to preceding or subsequent impulses behave as random noise and their sum decreases as more register contents are stacked. The operation amounts to a real-time correlation between the series of random pulses and the input from the geophones. The Mini-Sosie method is in fact a product of the microprocessor revolution. For two-way times of 1 second, decoding in