

Geologic structure of the base of the New Albany Shale Group in Illinois

D. L. Stevenson
L. L. Whiting
R. M. Cluff

ILLINOIS PETROLEUM 121
1981

ILLINOIS STATE GEOLOGICAL SURVEY
Natural Resources Building
615 East Peabody Drive
Champaign, IL 61820

*Reprinted from: ISGS Circular 518, The New Albany Shale Group of Illinois, 1981, 83 p., and plate 4.
Robert M. Cluff, Mark L. Reinbold, and Jerry A. Lineback*

Geologic structure of the base of the New Albany Shale Group in Illinois

The New Albany Shale Group structure map (plate 1) is a revised version of the Hunton Limestone Megagroup map published by Stevenson and Whiting (1967). The top of the Hunton Megagroup (Swann and Willman, 1961) is generally the same horizon as the base of the New Albany Shale and has been used previously by Weller (1936) and Bell (1943) in mapping the structure of Illinois. In a study of Devonian and Silurian rocks in central and western Illinois, Whiting and Stevenson (1965) presented a structure map contoured on the top of the Hunton Megagroup; this map was subsequently expanded into their 1967 map.

The northern limit of the mapped area (plate 4) is the northern edge of the top of the New Albany Shale. Although the Hunton Limestone extends some distance north of this line, over most of the area its top is a surface beveled by pre-Pennsylvanian and pre-Pleistocene erosion; therefore, it is unsuitable for structure mapping. The structure contours along the Indiana state line have been matched with a map prepared by the Indiana Geological Survey (Bassett and Hasenmueller, 1979).

The eastern boundary of the mapped area is the Illinois-Indiana Border. The western boundary follows the Mississippi River, except for those places where the New Albany has been removed by erosion (E) or is absent due to non-deposition (A). In extreme southern Illinois, the map extends from a line formed by the Ste. Genevieve Fault and the eroded edge of the New Albany Shale Group to the Ohio River and eastward to the west edge of the Dixon Springs Graben. The southeasternmost portion of Illinois has not been mapped because of the complex faulting and the lack of drill holes penetrating the base of the New Albany Shale (only two exist). The location of these holes and the elevation on the base of the New Albany are shown on the map.

About 4300 data points were used on Stevenson and Whiting's original work map (1967), which was drawn to a scale of 1:250,000. In areas of dense drilling, the control was limited to one point per section. Plate 4 has a scale of 1:500,000, which precludes exact location of data points with symbols of suitable size; therefore, no data points are shown except the two in extreme southern Illinois.

In the area of Hamilton, White, Saline, and Gallatin Counties, the control points are too sparse to provide adequate data for structural interpretation. In these counties, the elevation of the base of the New Albany was estimated by combining maps of the structure of the middle "massive" member (Scottsburg Member) of the Menard Limestone (Siever, 1951; Swann, 1951) and a thickness map of the Menard to Hunton interval (unpublished map).

The sparsely drilled and complexly faulted area south of T. 10 S. in extreme southern Illinois was mapped by relying heavily on structure mapping on shallower horizons (Weller, 1940). The faults shown in this area are essentially the same as those shown on the geological map of Illinois (Willman et al., 1967), with modifications based on work by Ross (1963) and Kolata, Treworgy, and Masters (1981).

Major revisions of Stevenson and Whiting's 1967 map have been made in four areas. The first of these areas is in Lawrence and Crawford Counties, where anticlinal axes along the La Salle Anticlinal Belt were inadvertently shown 6 miles east of their actual location on Stevenson and Whiting's (1967) map. The second area is in the Silurian reef area of southwestern Illinois, which Bristol (1974) mapped in detail, including additional data acquired by drilling since 1967. The third area is in White and Gallatin Counties. Here, detailed mapping of the Wabash Valley Faults by Bristol and Treworgy (1979) resulted in the reinterpretation of the location and extent of several faults. A recent deep test on the Omaha Dome structure (T. 8 S., R. 8 E.) also revealed that the shallow structure is largely the result of igneous intrusions in Mississippian sediments; apparently no structural high exists on the Devonian. The fourth area is in western Franklin County, where the position of the steep flank of the DuQuoin Monocline was shown 4-5 miles east of its actual position on the 1967 edition of this map.

There are a few other minor changes based on scattered deep drilling done for the exploration of oil and gas for gas storage sites (e.g., one at Brubaker Field in Sec. 31, T. 3 N., R. 3 E., Marion County). Most of these changes are not worth noting, since only slight modifications of the 1967 map were required.

REFERENCES

- Bassett, J. L., and N. R. Hasenmueller, 1979, Map showing structure on base of New Albany Shale (Devonian and Mississippian) and equivalent strata in Indiana: U.S. Dept. of Energy, Morgantown Energy Technology Center, EGSP Series no. 800, 1:500,000.
- Bell, A. H., 1943, Subsurface structure of the base of the Kinderhook-New Albany Shale in central and southern Illinois: Illinois State Geological Survey, Report of Investigations 92, 13 p.
- Bristol, H. M., 1974, Silurian pinnacle reefs and related oil production in southern Illinois: Illinois State Geological Survey, Illinois Petroleum 102, 98 p.
- Bristol, H. M., and J. D. Treworgy, 1979, The Wabash Valley Fault System in southeastern Illinois: Illinois State Geological Survey, Circular 509, 19 p.
- Kolata, D. R., J. D. Treworgy, and J. M. Masters, 1981, Structural framework of southern Illinois: Illinois State Geological Survey, Circular 516, 38 p.
- Ross, C. A., 1963, Structural framework of southernmost Illinois: Illinois State Geological Survey, Circular 351, 27 p.
- Siever, Raymond, 1951, The Mississippian-Pennsylvanian unconformity in southern Illinois: American Association of Petroleum Geologists Bulletin, v. 35, p. 542-581; reprinted as Illinois State Geological Survey Report of Investigations 152, 40 p.
- Stevenson, D. L., and L. L. Whiting, 1967, Geologic structure of the Devonian-Silurian Hunton Limestone Megagroup in Illinois: Illinois State Geological Survey, Illinois Petroleum 87, 5 p.
- Swann, D. H., 1951, Waltersburg Sandstone oil pools of the Lower Wabash area, Illinois and Indiana: American Association of Petroleum Geologists Bulletin, v. 35, p. 2561-2581; reprinted as Illinois State Geological Survey Report of Investigations 160, 21 p.
- Swann, D. H., and H. B. Willman, 1961, Megagroups in Illinois: American Association of Petroleum Geologists Bulletin, v. 45, no. 4, p. 471-483.
- Weller, J. M., 1936, Geology and oil possibilities of the Illinois Basin: Illinois State Geological Survey, Illinois Petroleum 27, 19 p.
- Weller, J. M., 1940, Geology and oil possibilities of extreme southern Illinois: Illinois State Geological Survey, Report of Investigations 71, 71 p.
- Whiting, L. L., and D. L. Stevenson, 1965, The Sangamon Arch: Illinois State Geological Survey, Circular 383, 20 p.
- Willman, H. B., and others, 1967, Geologic map of Illinois: Illinois State Geological Survey, 1 plate, 1:500,000.

