

Knox Dolomite and Deep Potential of Southeastern Ohio

The Knox Dolomite has recently been the subject of exploration drilling in North Central Ohio by Cabot Oil. The Knox Dolomite formation is present throughout most of Ohio, so the question of where the formation might have productive potential is a natural one to make. Second, the typical productive formations in Ohio are much shallower than those of the Texas or Colorado fields, which raises the question on whether or not the geologic picture of Ohio has been thoroughly explored. In this paper I will be discussing my results in terms of the deep potential of formations in Southeastern Ohio, as well as whether or not the Knox Dolomite has the proper trapping mechanisms to be a productively viable formation.

Evaluating the deep potential of Ohio, and specifically Southeastern Ohio, proved to be a very brief task, due to the nature of it has either been tried or it has not. Many wells have been drilled to basement rock all across Ohio, from Central to the Northeast and Northwest, to the Southeastern part as well. Once a well has been drilled to basement rock, typically granite or another form of metamorphic rock, the likelihood of finding oil or gas is not very high. This is due to what is called the oil and gas window, which is a range of temperatures in which oil and gas can form in geologic formations. If the temperature gets too high, oil and gas cannot form, and if the temperature was high enough to produce a metamorphic rock, that is a very good indication that there will be no oil or gas present. When viewing Ohio by itself, there is a distinct deepening of the formations from west to east, with a difference as big as 10,000 feet from the western side of the state to the eastern side (Hennington, W.M). Using the GIS map provided on the Ohio Division of Natural Resources, it can be found that wells have been drilled to bedrock in every place with a viable play across the entire state. Based off of this evidence, it can be reasonably concluded that the deep potential of Ohio has been adequately evaluated, so if there

are more potential plays in Ohio, they will more than likely be at a depth that has been previously explored at some point.

The Knox Dolomite is a group that has been produced with much success in Ohio, mainly around the Central parts of the state. A dolomite is a carbonate, sedimentary rock that is typically deposited in shallow, calm, ocean water. That water is also a great environment for reef growth, which tends to be a great reservoir rock for oil and gas, and for other small organisms such as stromatolites or cyanoalgae which provide great organic matter for the formation of oil or gas. There is not a concrete theory on how dolomite rocks form, however, it is widely believed that dolomite rocks, also referred to as dolostone, were once limestone or some other carbonate rock, that then underwent dolomitization, increase the porosity of the rock and converting it into what we now call dolomite. The main form of trapping is either due to structural traps, or the reservoir rock is a reef or some other form of shallow water organism that is ideal for holding oil and gas.

While the Knox Dolomite group is present in Southeastern Ohio, there is no evidence that either the structural traps or reef systems that have made this formation a very productive one in different parts of the state are present in Southeastern Ohio. One possible theory that I have for why these reef systems are not present in Southeastern Ohio is due to the extensive deepening of the basement rock that can be seen as we move across Ohio from west to east. Since reefs commonly grow on the continental shelves in shallow water environments that receive abundant sunlight, if there was a deepening in the water as we moved to the east, the water may have been too deep at the time of deposition for reefs or other organisms that are instrumental in the development of oil and gas, to have grown. As for the structural traps that are present in some of the areas where the Knox Dolomite is productive, all evidence suggests that that specific trap is

almost exclusively in West Central Ohio, due to the lack of the unconformity that caused the structural trap. Since there is no evidence of this trapping mechanism or of reef growth in Southeastern Ohio, I would conclude that the probability of producing the Knox Dolomite would be very minimal.

While my initial hopes for this project had been to find feasible areas of interest that could be further explored, it is important to recognize the importance of finding out that certain things are not present in certain areas. When viewing this research from a more broad perspective, it would be extremely valuable for a large company that is exploring in a very productive area to know where there is no oil, because they would then know to not waste their money by drilling there. Sometimes it can be equally important to realize where something is not, because it can help you pinpoint where it is.

Works Cited

Hennington, W. M. "Deep Potential of Ohio." *OnePetro*, SPE, 8 Nov. 1972,
www.onepetro.org/conference-paper/SPE-4151-MS.