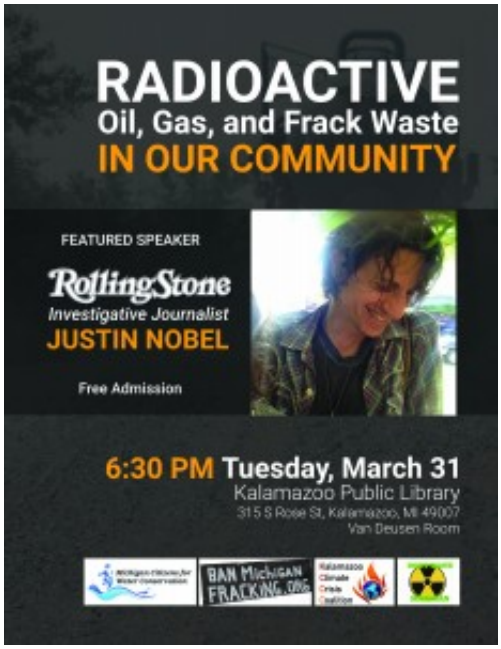
Waste, Brine, Radioactive

Resources about Frack Waste, Brine, and Radioactive Oil, Gas and Frack Waste

"Radioactive Oil, Gas, and Frack Waste in Our Community" presentation by Justin Nobel, *Rolling Stone* investigative reporter, to a Michigan audience on March 31, 2020:



Video recording of the presentation

Audio recording of the presentation

Justin Nobel's slide presentation:

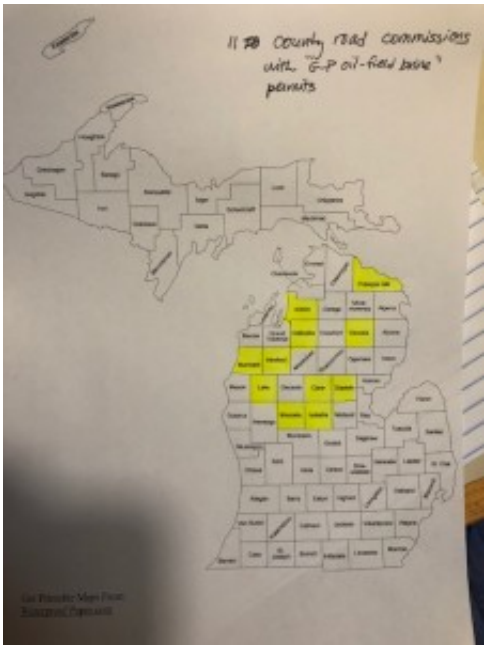
Kalamazoo Michigan Talk, March 31 2020_Justin Nobel

Justin Nobel's article in Rolling Stone Magazine: "**America's Radioactive Secret**" January 2020.

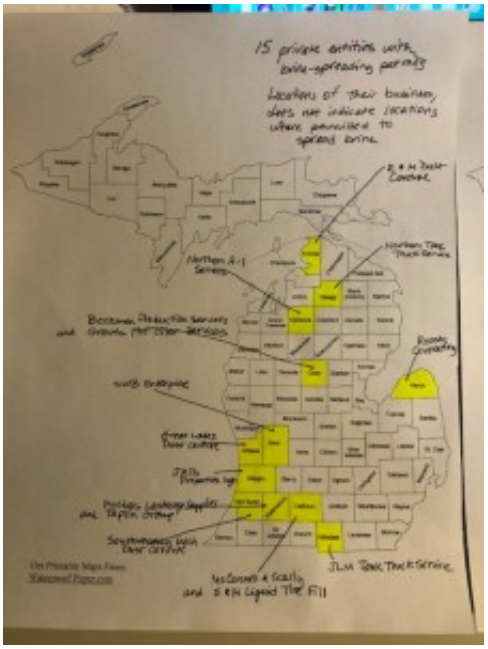
Sources on Brine in Michigan:

Brine Permit Holders in Michigan (A spreadsheet of current brine permit holders as of 2019 obtained through Michigan Department of Environment, Great Lakes and Energy) active_2215-5_brineapp-4

Map of County Road Commissions that hold brine permits in Michigan



Map of private firms that hold brine permits in Michigan



Brine Disposal Is Oilmen's Headache

SALTS OF THE EARTH

W. L. DAOUST, Geological Survey Division

THAT MICHIGAN PRODUCES CRUDE oil in significant amounts is rather well known. Not as well known, however, is the fact that considerably more brine water is produced than crude oil in the process of extracting the latter from the earth.

Except for early oil exploratory efforts dating back to the 1860's, Michigan's crude oil and gas production may be said to have begun in 1925 with the discovery in and around Saginaw of oil in the Berea Formation at a depth of some 1,800 feet. The Saginaw discovery gave the state its first examples of the hazards and disappointments of so-called "town lot" drilling. More than two hundred wells were drilled on less than 1,500 acres of city and adjacent area. Many of the closely spaced wells soon became exhausted and were plugged and abandoned. Some 20 wells in the Saginaw Field still are productive and to date the field has produced more than a million and a half barrels of crude oil.

The Saginaw development uncovered salt-water from the nearby oil and gas producing sands and was followed by discovery of oil and gas in the Traverse Formation at a depth of 1,600-plus feet near the city of Muskegon. Anyone having "lived through" the Muskegon development will attest to the fact that the combination of town lot drilling and oil production from the Traverse and Dundee Formations provided the most hazardous conditions which have existed during the development of any of the oil or gas pools in the state. Some 500 wells were drilled on about 3,000 acres in this field.

Fortunately neither the Saginaw nor Muskegon Field oil production was accompanied by brine waters of consequence, and no additional problems which probably would have caused serious surface and underground damage did not develop.

The Vernon Dundee Formation Pool of Isabella County, discovered in 1930 at a depth of 3,800 feet, offered the first serious brine disposal problem to Michigan oil producers and to persons interested in and responsible for keeping the surface and underground resources of the state undamaged. Brine waters which in many places are associated with crude oil are highly concentrated solutions of salts and other minerals which when undiluted can do severe damage to animal, aquatic, and vegetable life and to fresh water supplies.

At the time of the Vernon Pool discovery no satisfactory method of brine disposal had been found. Surface brine ponds built in every manner which seemed to provide confinement were tried. When it became possible to build ponds that would hold brine they filled up and the

brine escaped over the tops. As ponds became larger and the number of failures increased, controlled discharge from the ponds into streams at times of high water was tried. The use of lakes for brine storage when no other disposal was available received consideration. All plans involving surface storage or controlled discharge of brine wastes proved unsatisfactory. Ground waters in the vicinity of brine-producing oil fields became polluted and unfit for private or public use. Surface vegetation including shrubs and trees was destroyed. Property damage near the brine ponds and down water courses resulted in numerous law suits. Damage to fish life followed the polluting of streams and lake waters. Several cities, towns and industries became alarmed at possible permanent damage to their water supplies because of the escape of sizable amounts of oil field brines. Some farm owners were forced to deepen old or drill new water wells.

The brine oil operators soon realized that regardless of the cost the only practical and satisfactory method of brine disposal is to return the brine waters to some underground formation. In 1934 the oil operators with the encouragement of and the assistance from the state Supervisor of Wells and his representatives began an intensive campaign to learn about the possibilities of subsurface disposal. Many problems confronted the operators at the outset. Wells drilled for oil but found dry were the first to be considered as brine disposal wells. However, some of these were too far from the brine producing wells or had been drilled in formations which were not sufficiently porous to receive brine. Most of the problems related to subsurface brine disposal were overcome and satisfactory methods of return to the formations were worked out by the early 1940's.

These methods of underground disposal of brine have been followed in Michigan: 1) non-productive oil wells have been used for brine disposal by returning brine to zones where the rock formation was porous enough to take additional brine; 2) producing wells have been used for disposal by returning the brine waters between casings to zones capable of taking it; 3) wells have been drilled expressly for brine input to formations known to be capable of taking brine.

The method which disposes of brine without causing damage, and at least cost, is the one usually followed. Since 1925 almost 350 million barrels of crude oil have been produced from wells in the state. During the same period of time an estimated 900 million barrels of brine waters have been produced with the oil. It costs as much or more to raise a barrel of brine to the surface as it does oil. The brine must be separated from the oil before the oil can be marketed. The brine then must be returned to an underground formation where it can do no damage. Realizing all this, it can be appreciated that Michigan oil producers have done an exceptional job in solving the brine disposal problem in a period of less than 10 years.

"Salts of the Earth: Brine Disposal is Oilmen's Headache," by W. L. Daoust, Geological Survey Division, Michigan Conservation, Jan-Feb, 1953, pp. 23-24.

Lawsuit permitting brine spreading in Michigan, from 1985. Various county road commissions sued the Michigan Department of Natural Resources over the Supervisor of Wells' order that tried to protect Michigan's water from the practice of brine spreading. The case, entitled "In the Matter of Supervisor of Wells Order 1-85," was settled out-of-court allowing of brine spreading under certain conditions.

Brief on Appeal 1.

Brief on Appeal 2.

Circuit Court Filing.

Order of Dismissal and Letters.