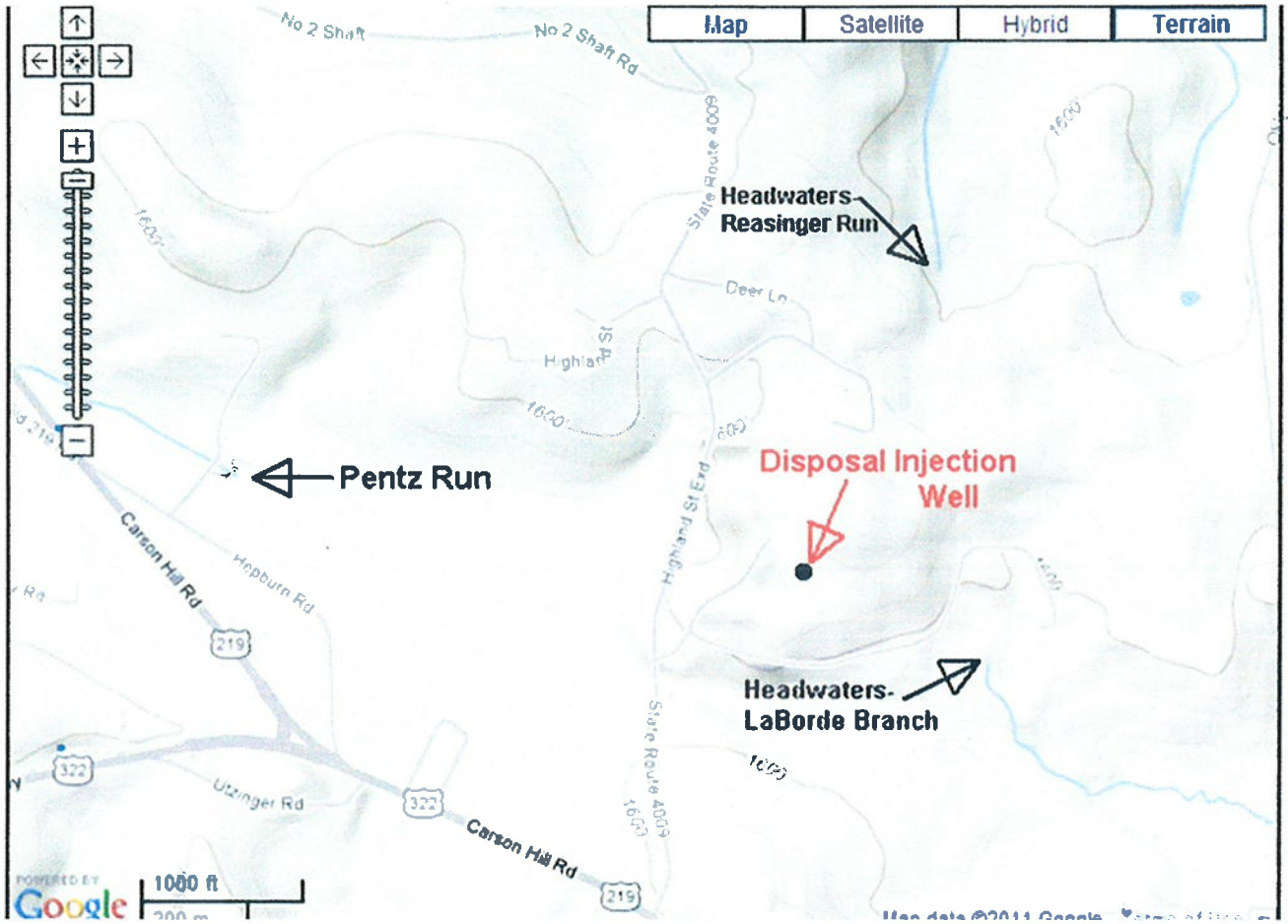
Headwaters


Map
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Headwaters-
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Disposal Injection
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Uzzinger Rd
Headwaters-
LaBorde Branch
1000 ft
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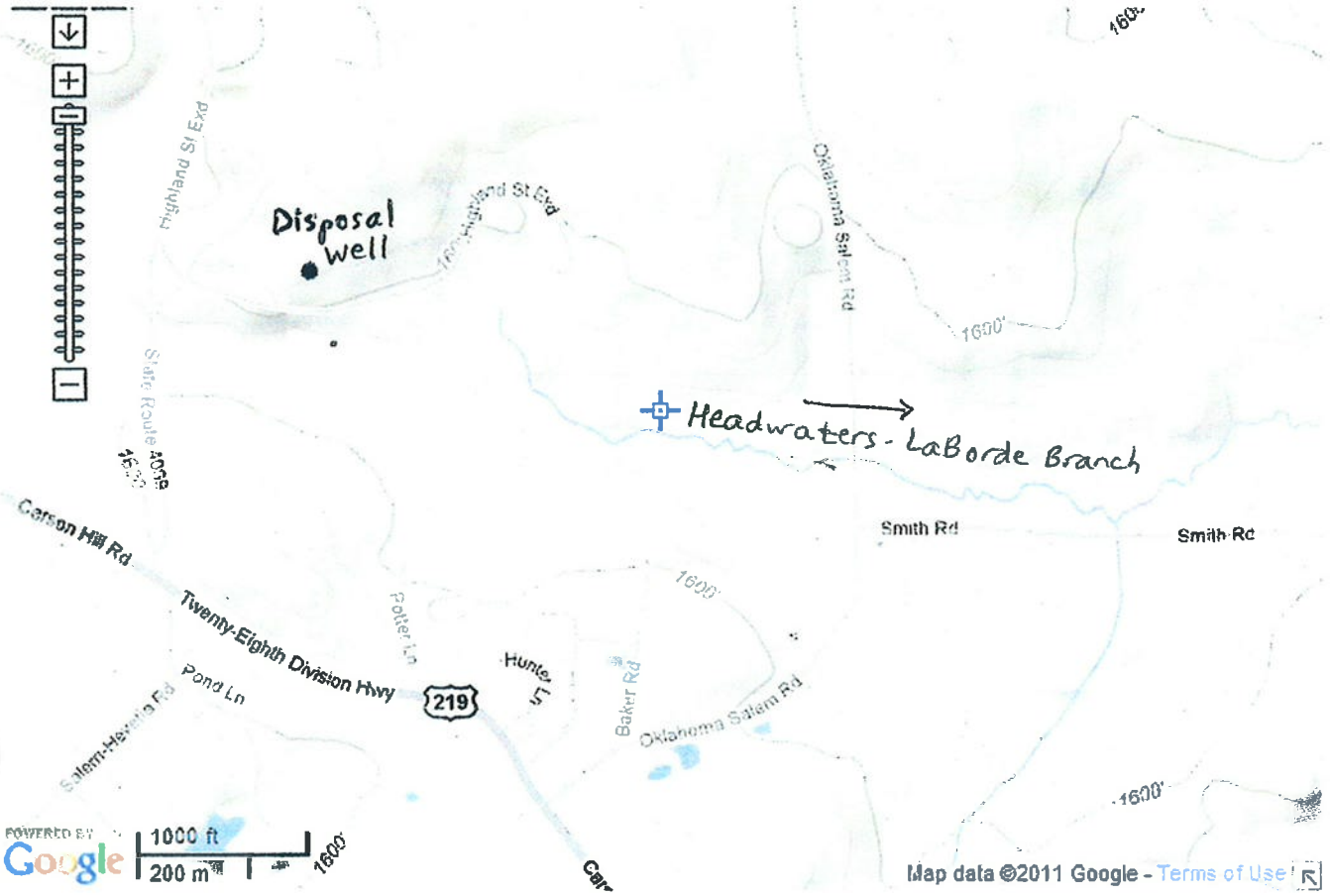
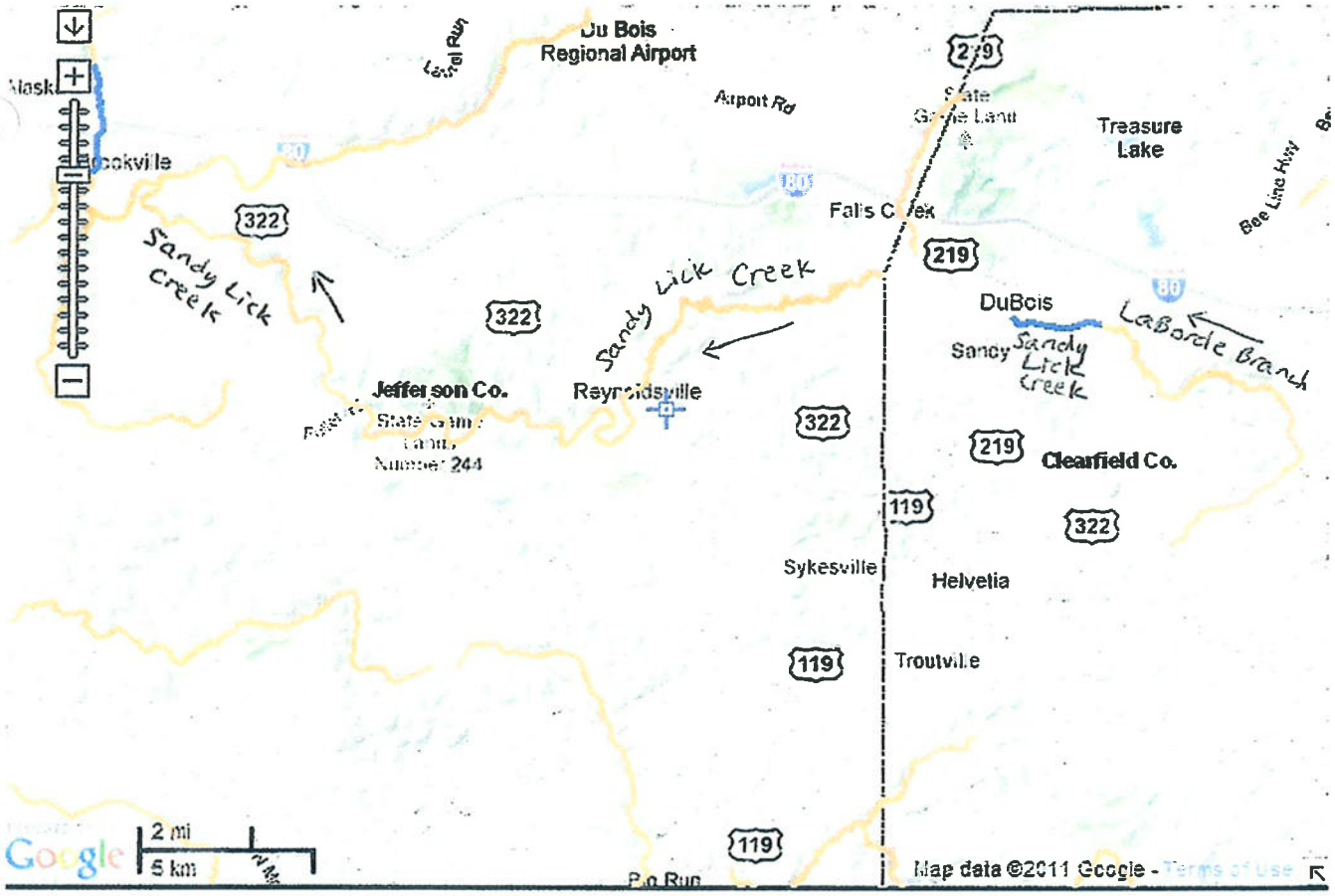


- ☐ Approved Trout Streams
- ☐ Approved Trout Lakes
- ☐ Approved Trout Year-Round Streams
- Refresh Map
- ☐ Approved Trout Year-Round Lakes
- ☐ Special Reg Streams


Du Bois
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DuBois
LaBorde Branch
Sandy
Sandy Lick Creek
Jefferson Co.
Reynoldsville
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Clearfield Co.
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Troutville
119
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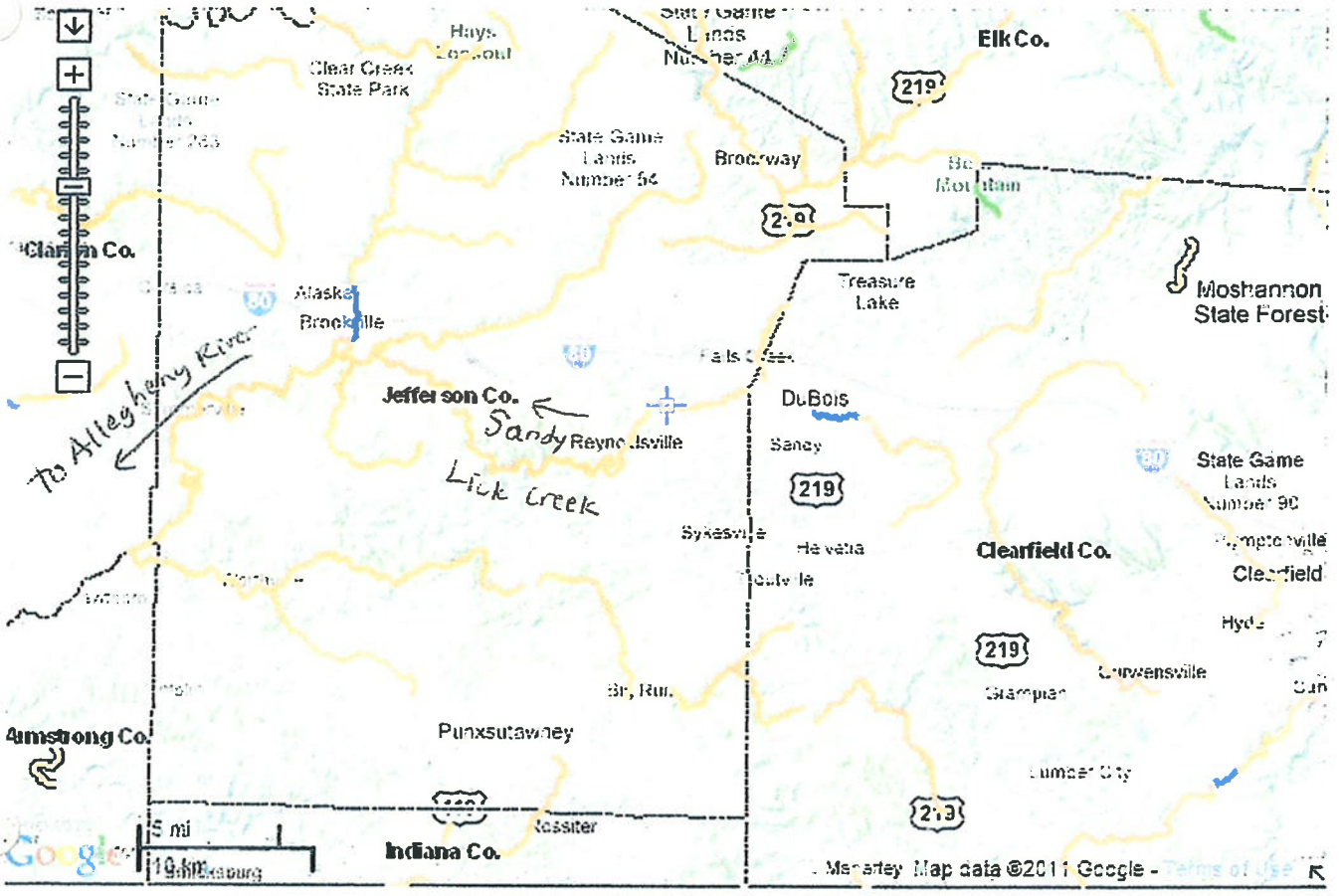
Google
Map data ©2011 Google - Terms of Use


Elk Co.
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State Park
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Lands
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Treasure
Lake
Moshannon
State Forest
Clarion Co.
Alaska
Brockville
To Allegheny River
Jefferson Co.
Sandy
Reynoldsville
DuBois
Sandy
Lick Creek
219
State Game
Lands
Number 90
Sykesville
Helvetia
Troutville
Clearfield Co.
Clearfield
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Punxsutawney
Armstrong Co.
Indiana Co.
213
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10 km
Google
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Gas Well Field Map

P 10

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OIL AND GAS FIELDS OF PENNSYLVANIA

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF
CONSERVATION AND NATURAL RESOURCES
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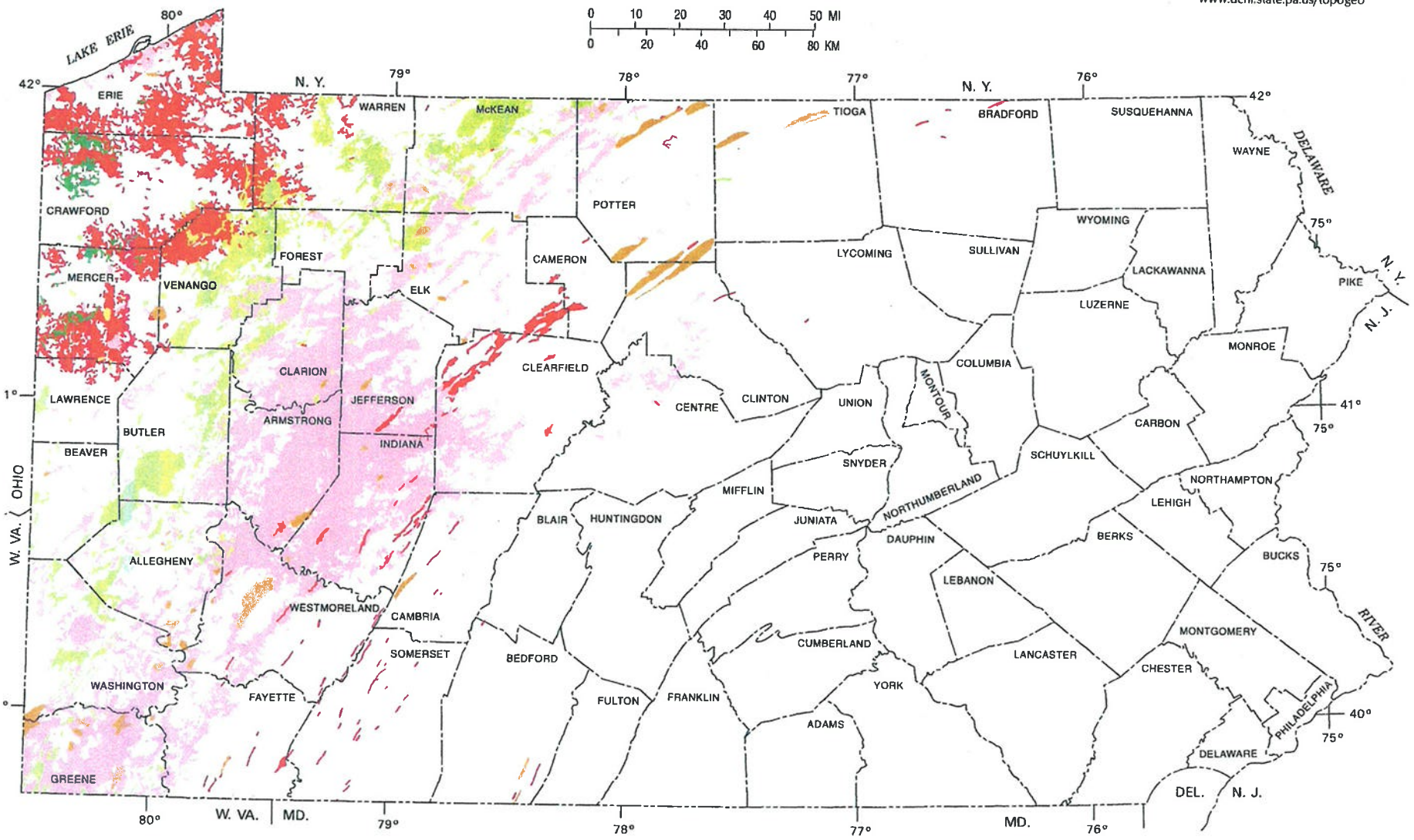

EXPLANATION

- Shallow oil field
- Deep oil field
- Shallow gas field
- Deep gas field
- Gas storage area

d by K. L. McCoy and Zachary Schmitt.
dition, 2007.

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House of Representatives
COMMONWEALTH OF PENNSYLVANIA
HARRISBURG

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RULES COMMITTEE

Nov. 27, 2012

Stephen Platt, EPA Region III
Ground Water & Enforcement Branch
Office of Drinking Water & Source Water Protection (3WP22)
1650 Arch St.
Philadelphia, PA, 19103

RE: UIC Permit PAS2D020BCLE (Windfall/Zelman 1)

Dear Mr. Platt:

Please accept the dual intent of this letter: 1) to request a public hearing on the Zelman #1 Class 2 Disposal Injection Well proposed for Brady Township, Clearfield County, PA.; and 2) as my comments for the record on the Zelman 1 injection well proposal.

I will not dwell on the public hearing, tentatively scheduled for 7 p.m. Dec. 10 at the Brady Township Community Center in Luthersburg, Pa. The intense public interest in the meeting and the issue is evident from the July 23 EPA Information Sharing meeting on the issue that was attended by two of my staff members.

My comments on the Brady Twp. injection well proposal focus on the threat to public and private water supplies. Simply put, geologic and hydrological conditions in the area make the proposed site an egregiously poor one for such a well.

As the state representative from the adjacent district and longtime chair of the Pa. House of Representatives' Environmental Resources & Energy Committee, I have great familiarity with the area's incredibly complex geology. As a state geologist said of Clearfield County, "the geology was not as difficult as you thought it... It was worse!" It is infamous for its high pyrite and sulfur concentrations, which have had local ramifications. An environmental assessment omitted for an Interstate 99 construction project in adjacent Centre County has cost taxpayers tens of millions of dollars for remediation as the disturbed pyrite ruined water resources.

In the 1972 Pa. Department of Environmental Resources report, "Subsurface Liquid Waste Disposal and Its Feasibility in Pennsylvania," it was noted, ***"It cannot be overstressed that the introduction of waste liquids into the subsurface is a permanent alteration of the subsurface environment... "The magnitude of these changes may be small, but they are cumulative."***

Brady Township is strategically situated near two watersheds – the Susquehanna and Ohio river basins. The injection well is perilously close to the DuBois Reservoir, the main water source for

the city, and the supply for Brady Township and the Borough of Troutville. Many private water wells are located within two miles of the proposed injection well. Old, deep gas wells have been drilled in the area, abandoned gas wells are very close to the proposed site and abandoned mines are significantly close to the proposed site. Springs, water wells and headwaters also are close to the proposed disposal injection well.

Earthquakes in Ohio have been linked to injection wells. Underground injection of wastewater produced by hydraulic fracturing and other energy technologies has a higher risk of causing such earthquakes, according to a June report from the National Research Council. Clearfield County straddles known faults and it does not receive the highest rating for storage of carbon dioxide, never mind fracking wastewater.

A May 2012 study by the Nicholas School of the Environment at Duke University spotlighted the "Geochemical evidence for possible natural migration of Marcellus Formation brine to shallow aquifers in Pennsylvania." It "suggests that these areas could be at greater risk of contamination from shale gas development because of a preexisting network of cross-formational pathways that has enhanced hydraulic connectivity to deeper geological formations."

Knowing all this, I believe the EPA must reject the Windfall Oil and Gas permit application.

However, I believe the economic anomalies presented by this permit application also must be considered. The federal Economic Development Administration is providing a $1.2 million grant for a demonstration plant in Johnstown to treat Marcellus wastewater. The project, being pursued by Aspen Johnstown LLC, would reportedly employ hundreds.

Another wastewater treatment facility is proposed by Reserved Environmental Services in Pine Creek Township, Clinton County. RES has two such facilities already operational, including one in Westmoreland County, which is the largest such water treatment facility in the state.

Eureka Resources LLC is building a facility in Standing Stone Township, Bradford County, to treat Marcellus wastewater. It, like the plant proposed in Johnstown, plans for beneficial reuse of valuable byproducts that can be extracted from the wastewater.

Given the dubious environmental, hydrological and geological underpinnings of the well proposed in Brady Township, permit approval of it would subvert private and public investments being made across the state. Injection wells may be convenient and profitable for their owners, but the benefits, if any, to future generations of Commonwealth citizens is highly suspect.

Thank you for your consideration of these comments.

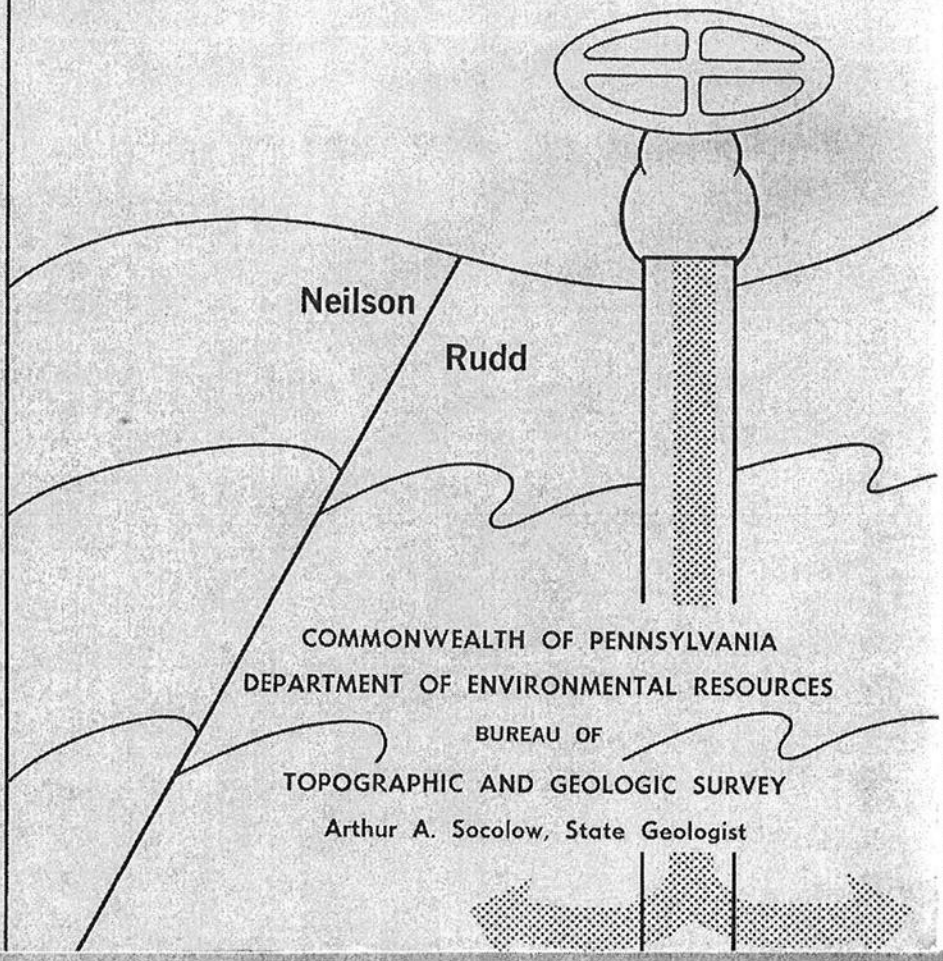
Sincerely,

Camille "Bud" George
STATE REPRESENTATIVE
D-74 of Clearfield County, and chair (D)
Pa. House of Representatives'
Environmental Resources &
Energy Committee

Environmental Geology Report 3

1972

Subsurface Liquid Waste Disposal and Its Feasibility in Pennsylvania



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TOPOGRAPHIC AND GEOLOGIC SURVEY

Arthur A. Socolow, State Geologist

Extended Effects

The area of effect of an injection operation is considered to be defined by the extent of the effluent in its reservoir. While this area may be difficult to define, the area of pressure effect is even greater and more difficult to predict.

The periodic operation of a water-supply well at a cannery is detectable in a gas storage field almost ten miles away. Water-flooding injection in one pool is reflected in pressure responses in another pool twelve miles distant within a few days. Salt water from ruptured casing in an oil well is detected in a water well two miles away within two months.

Oil field and ground-water experience shows too many examples of far-ranging and unpredictable displacement and pressure responses to justify confidence in simplistic calculations based upon idealized conditions.

SUMMARY

It cannot be overstressed that the introduction of waste liquids into the subsurface is a permanent alteration of the subsurface environment.

The magnitude of these changes may be small, but they are cumulative. For this reason, attention must be given to the density of disposal projects and to the cumulative volumes injected. Just as raw sewage from one town may not pollute a large lake or river, one disposal project may not cause undesirable changes in the subsurface. However, the cumulative effects of large scale disposal of raw sewage can be disastrous, as would be unrestricted subsurface disposal of large volumes of waste by many projects within an area.

Most subsurface liquids are heavily saturated solutions of sodium chloride and other salts. These subsurface brines are undesirable if displaced into the near-surface environment. Many aquifers charged with fresh water at the surface are brine-filled where deeply buried. The long-term injection of large volumes of waste must eventually result in the upward displacement of the brine intraformationally or through fractures into the fresh-water zone. The concentration of subsurface brines is so great, up to the order of 300,000 parts per million, that the intermixing of even one gallon will render several thousands of gallons of fresh water unfit for human use.

Clearly it is important to discriminate between "disposal" and "storage." True disposal and isolation of an effluent for a prolonged period of time may be difficult to accomplish. Storage for a finite period of time may be accomplished by compressibility and by the slow rate of dispersal at increasing distances from the injection site. In either case, it will be seen that it is difficult to predict where an injected liquid will be at any given point of time. Yet, prudence demands that such predictions be made and confirmed.

Subsurface liquid waste disposal is a useful concept of considerable potential benefit to society. It is, however, an endeavor requiring careful planning and foresight, together with careful operation and observation, to prevent ultimate environmental damage which outweighs the immediate benefit. The planners of subsurface disposal projects must think in terms of the whole rock-fluid system, in terms of tectonism, regional stratigraphic relationships, structural discontinuities and stresses, hydrodynamics, and interractive chemistry between all components of the systems, not just in terms of the immediate problems of fluid flow and storage in the vicinity of the injection site.

Figure 19. Seismic potential in Pennsylvania and adjacent states.

known fault zones, however, because of the possibility of vertical migration of fluid through channels in addition to the danger of initiating seismic action.

The Effects of Earthquakes on Disposal Operations

A more important consideration in Pennsylvania is the potential effect of seismic activity upon disposal operations. Figure 19 indicates the seismic risk in Pennsylvania and adjacent states. The area of greatest potential damage from earthquakes is adjacent to Lake Erie.

Dangers from earthquakes are of two kinds: 1) structural damage to the mechanical equipment of wells; and 2) alteration of the rock/fluid system.

It is not uncommon for distant earthquakes to have significant effects upon fluid pressures in subsurface reservoirs. Often such effects are

transient, appearing or disappearing within a matter of minutes or hours. Occasionally, significant effects may persist for years or permanently. The Good Friday earthquake of 1964 in Alaska resulted in permanent alteration of several feet in the fluid height of a gas storage well in northern Illinois. Instances have been reported where water columns have varied by 80 feet, representing pressure changes of more than 30 pounds per square inch.

Under normal circumstances, such small changes relative to the total fluid pressures in a reservoir, would have negligible effect. However, the possibility of a seismically induced pressure change is an additional reason for conservative design in disposal operations.

The danger of mechanical disruption of injection facilities from earthquakes should be minimized by proper engineering design. These considerations should not be overlooked in the design phase.

CONCLUSIONS

Within Pennsylvania there are no known reservoirs of truly good disposal quality.

As a basis for comparison one may consider the Mt. Simon Sandstone of north-central Illinois which contains nearly 2000 feet of sand with porosity of the order of 15 percent, permeability to gas of the order of hundreds of millidarcies, and permeabilities to water which average approximately 50 millidarcies. This reservoir is continuous over thousands of square miles.

The well-known reservoirs of Pennsylvania are exceedingly restricted both vertically and laterally, their thickness measured in tens of feet and their lateral extent in tens or hundreds of square miles. Porosities are generally lower by half and permeabilities, even to gas, are characteristically a tenth as great.

It is very important that the full extent of this comparison be recognized since there is a strong tendency for non-geologists to assume that the rocks of the subsurface are generally similar from state to state and that what is done in one area may be done equally well in another.

The subsurface is a very real element of our environment and we must manage it wisely.

There are severe geological and man-made limitations on the use of the subsurface for disposal of liquid wastes in Pennsylvania. It is unlikely that subsurface liquid waste disposal will be widely employed in the near future due to the very high costs of adequate evaluation, operation, and observation which must be required if such injection is to be done efficiently and safely. Nevertheless there are opportunities,

now and in the future, for the disposal of industrial effluents in relatively small volumes where the need justifies the cost.

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