RESPONSE TO COMMENTS

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
UNDERGROUND INJECTION CONTROL (UIC) PERMIT # MI-107-2D-0013
WB OSBORN OIL & GAS OPERATIONS, SMITH 1-17 WELL
MECOSTA COUNTY, MICHIGAN

Introduction

This response is issued in accordance with Section 124.17(a), (b), and (c) of Title 40 of the Code of Federal Regulations, 40 C.F.R. § 124.17(a), (b), and (c), which requires that at the time any final EPA permit decision is issued, the Agency shall: (1) briefly describe and respond to all significant comments raised during the public comment period; (2) specify which provisions, if any, of the draft decision have been changed and the reasons for the change; (3) include in the administrative record any documents cited in the response to comments; and (4) make the response to comments available to the public.

Background

A public comment period for this permitting decision began on October 6, 2015, and ended on November 9, 2015, for a total of 35 days. Under 40 C.F.R. § 124.10(b), EPA shall allow at least 30 days for public comment. EPA mailed public notices on October 6, 2015 to: (1) interested parties who had contacted EPA to be placed on the mailing list and to the required federal and state agencies; and (2) residents within a one-quarter mile radius of the proposed WB Osborn Oil & Gas Operations’ Smith 1-17 injection well (Smith 1-17 well). In addition, EPA mailed public notices to the Mecosta County Board of Commissioners’ office and the Fork Township Trustees listed on the Township’s website. EPA also provided the Smith 1-17 well draft permit to the Big Rapids Community Library and posted the public notice and draft permit on EPA’s website for public viewing.

After reviewing public comments received, including requests that a public hearing be held, a second comment period was opened starting December 22, 2015, and ending January 28, 2016, for a total of 38 days. EPA published a public notice for a hearing and the second public comment period on December 22, 2015, in the Pioneer, a newspaper printed, published and circulated in Mecosta County, Michigan, and additionally mailed public notices on December 18, 2015 to: (1) interested parties who had contacted EPA to be placed on the mailing list and to the required federal and state agencies; (2) people who had commented during the earlier public comment period or requested a hearing for this draft permit; and (3) residents within a one-quarter mile radius of the proposed Smith 1-17 well. EPA also posted the public notice and draft permit on EPA’s website for public viewing.

During the comment period, EPA held a public hearing at Chippewa Hills High School in Remus, Michigan, on January 21, 2016. Before the hearing started EPA staff answered questions related to the Smith 1-17 well proposal. Approximately 175 people attended, with 37 participants providing verbal comments on the record and 4 attendees submitting their written statements. Over the course of the comment periods, EPA received 32 letters through the U.S. Postal Service, and 26 emails. Subsequently, EPA reviewed the comments made by the public,
documented information necessary to clarify those issues, and developed this response to comments document.

Final Determination

The Agency has determined that the public comments submitted did not demonstrate deficiency of the application based on UIC Program requirements for approval, and did not raise issues with the draft permit which would alter EPA’s basis for determining that it is appropriate to issue WB Osborn Oil & Gas Operations (WB Osborn) a permit to convert and operate the proposed injection well. Therefore, EPA is issuing a final permit for the Smith 1-17 well to WB Osborn.

General and Out of Scope Comments

EPA regulations at 40 C.F.R. Parts 144 and 146 state the requirements and standards that a permit applicant must meet to have a UIC permit application approved. Those regulations define the general scope of EPA’s authority and review process. Federal regulations require EPA to briefly describe and respond to significant comments received on UIC draft permits.

This document describes and responds to the written and verbal comments that EPA received during the public comment periods and at the January 21, 2016 public hearing. This document paraphrases comments by topic, as in some instances multiple parties submitted comments addressing the same topic.

EPA greatly values public input and appreciates the time all commenters took to express their concerns related to the proposed Class II permit for the Smith 1-17 well. EPA received several general comments and comments directed at matters outside the scope of the UIC program’s purview.

Comments falling into the “out of scope” category focus on topics including:

- General introductory statements to specific concerns
- General definitions
- Excerpts from a ProPublica report about injection wells
- Allegations of impropriety or incompetence by EPA and Michigan Department of Environmental Quality (MDEQ)
- Issues raised about other permits
- Waste dump sites
- Property values
- Economic considerations
- Background information on the commenters
- Other federal, state and local laws and requirements
- Requests to change laws
- Background information about EPA and MDEQ
- Flint drinking water crisis
- Other wells outside the area of review
- Hydraulic fracturing where other than diesel is used
- Surface facilities
- Brine transportation and truck traffic or accidents
- Surface spills
- Pipelines
- Air pollution and climate change
- Energy policy
- Noise, odors
- Sewage disposal
- Oil and gas companies and their consultants
- Requirements for oil and gas production wells

EPA acknowledges the submittal of these comments and clarifies that because they raise matters that are not addressed by the UIC regulations and are outside the scope of the UIC permit process for this well, EPA does not respond to them specifically in this document.

Specific comments that address topics that are within the scope of this permitting decision, with responses, follow in subsequent sections. In a few limited cases, EPA did respond to out of scope comments in instances where it was believed that further clarification would be helpful to the commenter. Although EPA is not directly responding to general statements of support and opposition to the permit individually, it did consider them in making its decision to issue the final permit.

**Significant Comments**

**Comment 1**
There should be a formal public hearing on the permit where all citizens are notified. There should be an informational hearing on the planned well that is advertised to the public.

**Response 1**
After reviewing comments received requesting a public hearing during the first public comment period, EPA published a new public notice scheduling a public meeting and formal public hearing which were held on January 21, 2016.

**Comment 2**
Concerned about the adequacy of notification of the public and public officials regarding the draft permit and public hearing. Citizens of Mecosta County were not openly, publicly and clearly informed of the proposed permit.

**Response 2**
EPA followed the notification procedures required in accordance with 40 C.F.R. § 124.10 and § 124.12. Please see the “Background” section at the beginning of this document for specific details about the notification of the public and public officials, which exceed the federal requirements.
Comment 3
EPA wasn’t trying hard to inform the people.

Response 3
Please see the response to Comment 2 above.

Comment 4
The permit should be put to a public vote.

Response 4
The Safe Drinking Water Act (SDWA) is the main federal law that establishes the authority and responsibility for EPA to regulate underground injection of fluids through wells so that underground sources of drinking water are protected. Federal regulations at 40 C.F.R. Parts 144 and 146 state the requirements and standards that a permit applicant must meet to obtain a UIC permit. The opportunity for public review and input to determine whether the proposed permit meets the applicable requirements is during the public comment period.

Comment 5
EPA could have saved us a lot of time informing the public that without factual information, the permit could be approved.

Response 5
The purpose of the public notice period is to provide the public with the opportunity to provide comments on the draft permit. This was mentioned in the public notices, the notice published in the local newspaper, and at the public meeting and hearing.

Comment 6
County residents were not informed of the environmentally sensitive nature of Class II injection wells.

Response 6
The public notices contained general information about the proposed permit including relevant facts about the proposed well location, depth and injection fluid. A name, phone number and email address for an EPA contact person was provided. For more specific information about the proposed permit, the notification informed the public that a copy was available for viewing at the Big Rapids Community Library or at the EPA website address provided. In addition, each recipient was directed to an EPA website address to learn more about the SDWA, the UIC program, and Class II injection wells.

Comment 7
MDEQ failed to provide adequate and sufficient public notice under the requirements of the Safe Drinking Water Act.

Response 7
EPA has the authority under the SDWA to regulate injection wells in Michigan and is required to follow the public notice regulations at 40 C.F.R. § 124.10 and § 124.12. This is because the State
of Michigan chose not to seek the SDWA authority to implement the federal UIC program in the state. While MDEQ does regulate injection wells under Michigan law, their requirements are different and are not part of this proposed EPA action. The federal and state permit processes are separate and different.

Comment 8
Many commenters were concerned about the potential for the well to contaminate their present and future sources of drinking water, and frequently asked how the aquifer will be protected.

Response 8
The purpose of the UIC program is to protect underground sources of drinking water (USDWs) from endangerment by underground injection practices. The UIC regulations are designed to protect USDWs from contamination by: (1) identifying drinking water sources for protection; (2) making sure the geological siting is suitable for injection; and (3) applying standards for well construction, operation, and reporting.

The UIC program protects current and future sources of drinking water by defining a USDW broadly. USDWs, by definition, include fresh water aquifers in current use as well as those that meet certain criteria indicating they could be used as drinking water, even if they aren’t currently used. USDWs are defined based on quantity, current usage, and the concentration of dissolved solids in the aquifer. The concentration of dissolved solids is an indicator as to whether an aquifer has the potential to be potable, even if it is not currently used for drinking water.

Specifically, UIC regulations (40 C.F.R. §§ 144.3 and 146.3) define a USDW as any aquifer which is currently being used as a drinking water source or which is of sufficient volume and adequate quality to be a source for a public water system. An aquifer or portion of an aquifer which contains less than 10,000 milligrams per liter (mg/L) of total dissolved solids is considered a potential drinking water source and is therefore protected even if it is not being used. Potable water generally contains less than 500 mg/L of total dissolved solids. By protecting water supplies that have more dissolved solids than normal drinking water, the UIC program also protects USDWs that could potentially be treated for use in the future.

Based on the Michigan Hydrogeologic Atlas, and drilling and formation records for the existing Smith 1-17 well and wells in the vicinity (i.e., MDEQ permitted wells numbers 60879, 60146 and 60899), the lowermost USDW has been identified as the Glacial Drift. The base of the Glacial Drift is located approximately 566 feet below ground surface at this location. The Glacial Drift is considered a USDW in the county because the aquifer currently provides potable drinking water of sufficient volume to serve a public water system. According to the United States Geologic Survey (USGS) Summary of Hydrogeologic Conditions by County for the State of Michigan, the unconsolidated glacial deposits aquifer ranges in thickness from approximately 200 feet to 800 feet within Mecosta County. Bedrock below the glacial deposits does not supply drinking water in the area.

The geologic siting of the Smith 1-17 well is suitable for underground injection. MDEQ well records show that the proposed injection zone, the Dundee Formation, is present between 3,860 and 4,098 feet below ground surface. The Dundee Formation, or Dundee Limestone, is a thick
formation that underlies much of the Southern Peninsula of Michigan, consisting of a fossilized limestone that is locally dolomitized. Dolomitized rock is very porous and highly permeable, making it suitable for injection. The *Michigan Hydrogeologic Atlas* indicates that Dundee Formation rock in this area is dolomitized, and is therefore a suitable injection formation for brine. The Dundee Formation pressures are low where they have been measured in wells in the nearby Fork oil field. It is expected that no surface pressure pumping would be needed to force the brine down the well for disposal since the Dundee Formation should readily absorb the brine.

The top of the injection zone is separated from the bottom of the USDW by approximately 3,294 feet of rock formation layers. Above the Dundee Formation is a confining zone which caps the top of the injection zone formation and prevents the upward movement of fluids from below. This confining zone is the lower Traverse Group which includes the Bell Shale (immediately overlying the Dundee Formation) and the Traverse Limestone (overlying the Bell Shale). MDEQ well records show that the confining zone is present between 3,262 and 3,860 feet below ground surface. According to the *Michigan Hydrogeologic Atlas* the shales in the Traverse Group, especially the Bell Shale, are excellent confining layers, being impermeable and having very low effective porosity. The limestone layers within the Traverse Limestone are relatively impermeable, preventing movement of fluids between rock layers.

The geology above the confining zone provides additional protection to the USDW in that many of the rock layers between the top of the confining zone and the base of the lowermost USDW in this area are impermeable shales. These impermeable formations would also act as excellent confining layers, each would prevent injection fluid from moving upward and entering the USDW. Shale formations acting as additional confining layers above the above-named confining zone include the Antrim Shale, Ellsworth Shale, Sunbury Shale, and Coldwater Shale formations. The MDEQ well record for the Smith 1-17 well and well records for the nearby number 60146 and 60899 wells, show that these layers are present and that the Coldwater Shale alone is approximately 844 feet thick in the area, separating the additional listed shale formations from the USDW. A fixed radius of one-quarter mile from the proposed injection well (area of review) was investigated to determine whether any wells were present that penetrated the confining zone. EPA determined that only one well was located within the area of review, and it is properly constructed to protect the integrity of the confining layers and therefore prevent the movement of fluids into the USDW.

In addition to the Smith 1-17 well being sited in an area in which the geological formations are appropriate for injection, injection wells must be constructed and operated to prevent the injection fluid from contaminating a USDW. The Smith 1-17 well was drilled to approximately 4,098 feet below the ground surface, and was constructed with three casing strings (steel pipes). The outermost casing extends from the ground surface to 508 feet deep and the casing is cemented to the Glacial Drift from the base to the surface. Inside this casing is an intermediate layer of casing set from the surface to a depth of 1,218 feet which is cemented in place from the base to the surface. These layers of steel casing and cement separate the interior of the well from the glacial drift formation to protect this USDW. Inside this intermediate casing is an innermost casing that extends from the surface to a depth of 4,015 feet which is cemented to the rock formations from the base up through the confining formations to prevent the movement of fluids out of the injection zone.
The proposed injection will take place through steel tubing which is set within the innermost casing. The fluids approved for injection will only be permitted to flow through the inside of this tubing. A device called a packer will be set at the bottom of the tubing to seal off the space between the casing and tubing. This space, called the annulus, will be filled with a liquid mixture containing a corrosion inhibitor, and the pressure of the annulus liquid in this space will be monitored to detect any changes in pressure which could indicate a leak in either the tubing, packer or casing. This annulus space between the tubing and casing will be tested under high pressure initially after the well is converted to an injection well to ensure that the well has mechanical integrity and then monitored weekly thereafter to ensure that the well maintains mechanical integrity. No injection fluids will be allowed to be injected through this monitored annulus space. Because injection fluids will only be injected through the tubing, they will not be in contact with the well casing.

Any loss of annulus fluid is reported to EPA at least quarterly. If monitoring indicates a leak or if the well should fail a mechanical integrity demonstration, then the permit requires the well to be shut down and a report to be submitted to EPA. Any repairs or corrective actions taken to bring the well back into compliance with the permit and any work performed on the well that requires the moving and/or removal of the tubing or packer must be reported to EPA and followed by a mechanical integrity test before authorization to resume injection will be given. Under permit conditions, the injection pressure will be limited to ensure the safe operation of the well and monthly reports of pressure and flow rates must be submitted to EPA for review.

Following review of the permit application, EPA has determined that the well injection will not impact drinking water supplies. The geologic siting, engineering and construction, and operating and monitoring standards applied to the Smith 1-17 well are sufficient to protect the USDW.

**Comment 9**
The Martiny Township Board in Mecosta County is opposed to issuing any permits for Class II injection wells.

**Response 9**
EPA bases final approval on whether a proposed well meets the technical and safety requirements under these regulations and does not have the authority under the SDWA to deny a permit on the basis of community opposition. Under the SDWA, EPA can issue a permit for injection wells that have adequately demonstrated their ability to operate in accordance with the regulations set forth within 40 C.F.R. Parts 144 and 146. EPA considers Class II injection wells a safe method for the disposal of brine and production fluids. Specifically, the Smith 1-17 permit for underground injection conveys permission to inject waste water based on EPA's finding that the geologic siting, construction, and operation of the well are such that injection will be environmentally safe. Returning waste fluids to a confined formation below the lowermost USDW through a properly constructed and operated injection well is an environmentally sound procedure.

**Comment 10**
A “Petition to Oppose the Toxic Waste Injection Well in Fork Township, Mecosta County” containing 125 signatures, states their opposition to granting a permit because if its potential
negative impact on the groundwater and calls for an Environmental Impact Study on the injection wells in the Township.

Response 10
EPA regulations at 40 C.F.R. Parts 144 and 146 set the requirements and standards that a permit applicant must meet to be issued an UIC permit. These regulations deal primarily with the geologic siting, well engineering, operating, closure, and monitoring standards for deep well injection. EPA requires each proposed UIC well/facility to perform a comprehensive review which includes siting, well construction, operational, and financial requirements to ensure the protection of all USDWs. EPA reviews all UIC permit applications on a case-by-case basis, verifying their completeness and technical soundness prior to preparing a draft permit for comment. EPA bases final approval on whether a proposed well meets the technical and safety requirements under these regulations and does not have the authority under the SDWA to deny a permit on the basis of community opposition.

Federal Environmental Impact Statements, or EIS documents, are described under the National Environmental Policy Act (NEPA), which is the federal law that compels all federal agencies to consider environmental impacts in their decision-making process. According to 40 C.F.R. § 124.9(b)(6), UIC permits are not subject to the EIS provision of NEPA. Courts have consistently recognized that EPA’s procedures and environmental reviews under enabling legislation (such as the SDWA) are functionally equivalent to the NEPA process (See *Western Nebraska Resources Council v. US EPA*, 943 F.2d 867, 871–72 (8th Cir. 1991). This means that EPA is not required to prepare separate EIS documentation for permits (except for certain surface water discharge permits). The existing UIC permit review process undertaken by EPA includes considerations under certain federal laws (40 C.F.R. § 144.4) including the Wild and Scenic Rivers Act, National Historic Preservation Act, Endangered Species Act, Fish and Wildlife Coordination Act, and the Coastal Zone Management Act. EPA also considers applicable Executive orders, such as those dealing with environmental justice and tribal consultation. Therefore, an EIS is not necessary for the injection wells in the township.

Comment 11
The well is located at the headwaters of the Chippewa River Watershed, which provides drinking water and benefits thousands of people. The proposed well is located in area with a massive aquifer and is rich in wildlife, lakes, potholes, wetlands and streams, with an economy dependent on water for tourism, agriculture and water bottling. How can the environment and economic base be sustained if the injection well is permitted and it damages the environment and community health?

Response 11
The purpose of the UIC program is to protect USDWs from being contaminated by underground injection practices. Regulations at 40 C.F.R. Parts 144 and 146 state the requirements and standards that a permit applicant must meet to have a UIC permit application approved and a draft permit prepared. The UIC regulations are designed to protect USDWs from contamination by: (1) identifying drinking water sources for protection; (2) making sure the geological siting is suitable for injection; and (3) applying standards for well construction, operation, and reporting.
Since UIC permit requirements are intended to protect the USDW (i.e., freshwater in the unconsolidated Glacial Drift aquifer), they will also help protect the surface waters that may be connected to the USDW and prevent upward movement of injected fluids. A watershed’s connection with aquifers is limited to the aquifers that have connections with surface bodies of water. While area creeks, streams and rivers, including the Chippewa River, may be in hydraulic communication with shallow groundwater or depend on shallow groundwater for flow, they are not deeper than the base of the lowermost USDW and there is no hydrologic connection with the injection zone. Similarly, wetlands, lakes and potholes or kettle lakes are also shallower than the lowermost USDW. The geologic siting, construction, operation and monitoring of this particular well are sufficient to prevent upward movement of the injected fluid into USDWs. EPA therefore anticipates that injection at this site will not adversely affect human health, the environment, or the local economy. For more information, please see the response to Comment 8.

Comment 12
EPA can’t guarantee the protection of the drinking water aquifer in the area from underground injection. Injecting anything into the ground has consequences.

Response 12
The purpose of EPA’s UIC program is to protect USDWs from endangerment by underground injection practices. A USDW is in part defined in the UIC regulations (40 C.F.R. §§ 144.3 and 146.3) as an aquifer or its portion which contains less than 10,000 milligrams per liter (mg/L) of total dissolved solids. Potable water generally contains less than 500 mg/L of total dissolved solids. By protecting ground water that is far saltier than regular drinking water, the UIC program is also protecting those aquifers that are not currently being used for drinking water purposes but with appropriate treatment could be in the future. Also by protecting ground water, surface waters that are connected to the shallow aquifer are protected.

The regulations at 40 C.F.R. Parts 144 and 146 specify the geological siting, engineering, construction and operation and maintenance requirements which injection wells must meet in order to prevent contamination of USDWs. Because of the protectiveness provided by the UIC requirements as applied to the Smith 1-17 well through the permitting process, EPA has a high level of confidence that these safeguards will prevent the well from contaminating a USDW.

Comment 13
Water is our most precious resource and we have a right to its protection from contamination.

Response 13
Please see the response to Comment 8.

Comment 14
With 2 schools within a mile of the injection well site, need assurance that the children will not be subjected to toxic waste in their drinking water.

Response 14
Please see the response to Comment 8.
Comment 15
Do not feel their private water well should be subjected to the potential of being polluted by benzene and other toxic wastes to be stored in the injection well.

Response 15
Please see the response to Comment 8.

Comment 16
Residents of Fork Township rely on private wells for drinking water and warrant full protection of their groundwater.

Response 16
Please see the response to Comment 8.

Comment 17
There needs to be a process to determine when contamination has occurred and assign resources for remediation.

Response 17
Because of the protectiveness provided when the UIC requirements were applied to this well through the permitting process, the design, engineering, construction, operation and maintenance requirements and the experience of the UIC program, we have a high level of confidence that these safeguards will prevent the well from contaminating a USDW. Since EPA began regulating them, there has not been a documented case of an injection well contaminating a USDW. In the extremely unlikely event that contamination from any aspect of the company’s operation affects the aquifer that supplies the drinking water wells, under Section 1431 of the SDWA, EPA can require the company to supply alternative water supplies to affected parties and clean up contamination of the USDW. MDEQ, under Act 307, can also require operators to clean up any contamination due to injection, and/or supply alternative water supplies to affected parties. Furthermore, EPA has additional programs that could utilize regulatory tools (e.g. the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and the Resource Conservation and Recovery Act) to clean up sites in an emergency and to compel responsible parties to perform cleanups or reimburse the government for EPA-lead cleanups.

Comment 18
Why allow companies to endanger our water and health?

Response 18
Congress enacted the SDWA to include the protection of USDWs from endangerment from underground injection practices. Regulations at 40 C.F.R. Parts 144 and 146 state the requirements and standards that a permit applicant must meet to have a UIC permit application approved and a draft permit prepared. The UIC regulations are designed to protect USDWs from contamination by identifying drinking water sources for protection, making sure the geological siting is suitable for injection, and applying standards for well construction, operation, and reporting. Because the lowermost USDW will be protected, drinking water and human health will also be protected. For more information, please see the response to Comment 8.
Comment 19
EPA’s mission statement says that federal laws protecting human health and the environment are enforced fairly and effectively, but feels little or no protection with an approval of the injection well permit.

Response 19
Congress enacted the SDWA to protect USDWs from endangerment from underground injection practices, thereby protecting human health and the environment. The UIC regulations at 40 C.F.R. Parts 144 and 146 specify the geological siting, engineering, construction, and operation and monitoring requirements which injection wells must meet in order to prevent contamination of USDWs. Parties that wish to use an injection well must obtain a UIC permit showing that they satisfy those requirements. For the Smith 1-17 well permit, EPA has determined that there will be no impact to the drinking water aquifer as a result of injection into this well. The next step in the protection of a USDW is to be in compliance with the permit, which includes monitoring and reporting requirements. EPA reviews monthly operating reports and reports on periodic testing in a fair and effective manner. Self-monitoring and self-reporting are consistent with the SDWA and are fundamental elements of the UIC permit program and other federal regulatory programs such as those under the Clean Water Act, Resource Conservation and Recovery Act, and Clean Air Act. EPA inspections and oversight verify the accuracy of the facility’s self-monitoring and reporting, and the facility is subject to penalties and sanctions for failure to comply with its obligations. Failure to comply fully with permit conditions is a violation and may subject an owner/operator to an action under the enforcement provisions of the SDWA, 42 U.S.C. § 300h-2. Violations of the SDWA and UIC regulations are subject to Administrative Orders which may include penalties of up to $273,945, civil penalties of up to $54,789 per day of violation and criminal penalties of up to 3 years imprisonment and fines in accordance with Title 18 of the United States Code.

Comment 20
Studies have shown that people living near injection wells have a much higher incidence of serious diseases, including cancer.

Response 20
The commenter did not provide any information about the studies referred to in the comment. The UIC regulations are designed to protect USDWs from contamination by identifying drinking water sources for protection, making sure the geological siting is suitable for injection, and applying standards for well construction, operation, and reporting. Because the lowermost USDW will be protected, drinking water and human health will also be protected. For more information, please see the response to Comments 8 and 18.

Comment 21
Do not see that any statistical information has been provided on the risk that is going to be assumed by the residents of Mecosta County and those close to the well. EPA should have to provide that statistical data to us so we fully recognize what risks are associated.
Response 21
EPA regulations at 40 C.F.R. Parts 144 and 146 state the requirements and standards that a permit applicant must meet to have a UIC permit application approved. These regulations deal primarily with the geologic siting, well engineering, operating, and monitoring standards for deep injection wells. WB Osborn has met these requirements and standards in this situation and EPA therefore issues a permit for the Smith 1-17 well. Please see the response to Comment 8.

There are several safeguards established to prevent the well from contaminating a USDW. For example, EPA requires well casings to be cemented within the USDW and injection takes place through separate tubing set within the innermost casing, creating an annulus space that is monitored. The company is required to conduct and pass a mechanical integrity test, in accordance with 40 C.F.R. § 146.8, before authorization to inject is granted, and after the well is completed. This test is required at least once every 5 years thereafter. The UIC monitoring and testing requirements are designed to detect pressure changes between the tubing and annulus, thereby promptly detecting a leak. If a leak is detected, the permit requires the operator to immediately cease operating the well and inform EPA. When a leak is fixed and the repair is confirmed to EPA’s satisfaction through testing, injection may be authorized to resume.

EPA followed the notification procedures required in accordance with 40 C.F.R. §§ 124.7, 124.9 and 124.10(d) to provide information about the proposed permit, opportunities to comment, and how to seek more information. EPA also elected to set up an information repository at the Big Rapids Community Library in Big Rapids, Michigan, posted the draft permit and other information on the EPA website, and held a public meeting prior to the public hearing to give the public additional information to evaluate the draft permit.

Comment 22
Would like a statement from EPA that the risk has truly been considered when we look at what is being gained.

Response 22
Please see the response to Comments 8, 18 and 21.

Comment 23
A complete environmental impact statement should be done, including the potential risks to the health, public safety and water supply for Fork Township and the likely changes that will occur should the permit be approved.

Response 23
Please see the response to Comment 10.

Comment 24
43 percent of the Fork Township community is low income and residents rely on private wells as their only source of drinking water. The permit decision could create a risk to the drinking water and be in conflict with Executive Order 12898, requiring federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs on low income populations.
Response 24
EPA’s decision to issue a UIC permit is not in conflict with Executive Order 12898. EPA screened the area within a 3-mile radius of the proposed Class II injection well to evaluate the percent of the population that is linguistically isolated, the level of education of the residents, and the percent of the population that is considered low-income, among other factors. The screening is primarily utilized for public notice and outreach purposes, in consideration of any need for extra efforts to ensure equal access to the decision making process. The UIC permitting process is designed to protect USDWs from being contaminated by injection wells. The construction, operation, and geological siting criteria, require the fluid to be injected into a zone that will accept and retain the fluid and be underneath formations that will prevent the fluid from moving into USDWs. The Smith 1-17 permit meets these conditions, protecting all populations in the area equally from adverse human health or environmental effects.

Comment 25
Activities should not be allowed to affect their neighbor’s property.

Response 25
According to Part I(A) of the injection well permit, “[i]ssuance of this well permit does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other property rights, or any infringement of state or local law or regulations.”

Comment 26
Request that EPA not allow Osborn Oil to dump waste on land behind their house. Concerned about water.

Response 26
The Smith 1-17 permit was issued exclusively for deep well injection of brine and produced fluids. The approved operations are to take place through a properly constructed injection well between the depths of 3,860 and 4,098 feet below surface. The Smith 1-17 well meets the construction requirements for a Class II injection well, isolating injected fluids from the USDW and the surface.

Comment 27
Concerned about this because the well is adjacent to our property by about a hundred feet. I'm worried that it's going to leak. Don't know the longevity of the well.

Response 27
The operational life of an UIC well is variable. When determining a well’s “longevity,” maintenance, geological conditions, fluid composition and injection operations are among the crucial factors that affect its performance. Since these conditions do not allow for reliable well-life timeline estimations, EPA requires Class II well operators to monitor wells to ensure each well remains in proper operational condition. The Smith 1-17 well permit, like all Class II permits, requires the operator to monitor and report injection and annulus pressure weekly, as well as perform mechanical integrity testing on a permit specified schedule. The EPA mandated
weekly monitoring and/or testing requirements are designed to detect pressure changes between the tubing and annulus, thereby promptly detecting a leak. If a leak is detected, the permit requires the operator to immediately cease operating the well until the leak is fixed and the repair is confirmed through testing.

Comment 28
Talked to one of the geologists at a major oil company and explained what's going on here. He would not want that in his backyard because 40 years down the road we're all in trouble.

Response 28
The permit for the Smith 1-17 well conveys permission to inject produced fluids based on EPA's finding that the geologic siting, construction, and proposed operation of the well are such that injection will be environmentally safe. Returning the produced water to a confined formation below the lowermost USDW through a properly constructed and operated injection well is an environmentally sound procedure. Please also see the response to Comment 8 above.

The permit also includes a plugging and abandonment plan for an environmentally protective well closure when injection well operations cease. This plan meets 40 C.F.R. §§ 146.10 and 146.24(d) requirements which includes plugging the well with cement to prevent the movement of fluids into the USDW.

Comment 29
Structural failure of a deep injection well offers the possibility of contaminating an aquifer, rendering it unusable for drinking water, especially in Michigan which claims the most drinking water wells in the U.S.

Response 29
Please see the response to Comment 27.

Comment 30
Many such wells have leaked. Will the company be required to guarantee that the well will not leak or contaminate the ground water if there was a leak?

Response 30
The design, engineering, construction, operation and maintenance requirements provide a high level of confidence that a leak will not occur. There are several safeguards established to prevent the well from contaminating a USDW. EPA requires well casings and cement to protect the USDW. Injection takes place through tubing set within the casing. The space between the tubing and casing is monitored to maintain mechanical integrity and detect any leaks. If a leak is detected, the operator is required to immediately cease injection until the leak is fixed and the repair is confirmed to EPA’s satisfaction through mechanical integrity pressure testing of the well. Please also see the response to Comment 27 above.

Comment 31
EPA could not guarantee that the brine in the Smith 1-17 injection well would not contaminate the drinking water aquifer. Will EPA supply bottled water to all the residents of Fork Township?
Response 31
Because of the protectiveness provided when the UIC requirements were applied to this well through the permitting process, the design, engineering, construction, operation and maintenance requirements and the experience of the UIC program, we have a high level of confidence that these safeguards will prevent the well from contaminating a USDW. Since EPA began regulating them, there has not been a documented case of an injection well contaminating a USDW. In the extremely unlikely event that contamination of the aquifer occurs from any aspect of the company’s operation, under Section 1431 of the SDWA, EPA can require the company to supply alternative water supplies to affected parties and clean up contamination of the USDW.

Comment 32
Osborn Oil & Gas has no ability to participate in the long-term expensive contamination cleanup and water remediation for the citizens of Fork Township. Trusting that no major problems will occur is not a strategy for protection of groundwater.

Response 32
The purpose of the UIC program is to protect USDWs from being contaminated by underground injection practices. The regulations at 40 C.F.R. Parts 144 and 146 specify the geological siting, engineering, construction and operation and maintenance requirements which injection wells must meet in order to prevent contamination of USDWs. The Smith 1-17 well permit includes monitoring and testing requirements throughout the operating lifetime of the well. In addition, EPA must review the permit every 5 years to determine whether it should be modified, revoked and reissued or terminated.

The Class II well owner is responsible for any potential contamination which occurs on or from the site. Under the SDWA Section 1431, EPA can require owners to clean up any contamination of a USDW due to injection and/or supply alternative water supplies to affected parties. An operator is required to prevent or correct environmental damage. Such an action could be to prevent and contain any surface spills, remediate groundwater contamination, replace any degraded component of the well, and so forth. WB Osborn will remain responsible for ensuring that the groundwater is protected from contamination due to injection. In addition, EPA has other programs that could utilize regulatory tools (e.g. the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and the Resource Conservation and Recovery Act) to clean up sites in an emergency and to compel responsible parties to perform cleanups or reimburse the government for EPA-lead cleanups.

Comment 33
EPA is trying to push through this permit to have millions of gallons of saltwater contaminated with Benzene, Toluene, Ethylbenzene, Xylene and many, many other poisonous and cancer-causing chemicals dumped in our water.

Response 33
As a general matter, EPA’s permitting rules in 40 C.F.R. Part 124 outline an orderly process by which parties may apply for and receive a UIC permit decision. It also includes the process for notifying the public to obtain comments. While these rules do not establish any absolute
deadlines by which a UIC permit must be issued or denied, the general understanding is that permit applications will be acted upon in a timely fashion. WB Osborn submitted a permit application to EPA for the Smith 1-17 well on August 7, 2014, and the second of two public comment periods on the draft permit closed on January 28, 2016.

The purpose of the Smith 1-17 well permit is to protect the USDW from the injection of brine originating from the company’s production wells. The brine will be injected into the Dundee Formation at depths between 3,860 and 4,098 feet underground, with approximately 3,294 feet of rock layers between the top of the injection zone and the bottom of the USDW. Please see the response to Comment 8.

Comment 34
Read a report from DEQ that they have over 280 orphaned contaminated sites and water contamination has occurred. These are abandoned sites by companies leaving the cost to the people. None of these sites are in Mecosta County. Do not want the County to become a toxic waste dump like the State wants.

Response 34
The commenter did not provide the MDEQ report. Considering the number of sites mentioned, it is believed that these are not EPA permitted activities. WB Osborn has provided a state bond in the amount of $250,000 to cover the estimated $33,444 cost to plug and abandon the Smith 1-17 well in an environmentally protective manner.

Comment 35
We must have a manifest record stating the origin of the produced water, including the dates and places and specific transportation routes.

Response 35
The Smith 1-17 EPA permit states “The injection shall be limited to noncommercial brine disposal from production wells owned or operated by WB Osborn Oil & Gas Operations.” This requirement prohibits the disposal of fluids from other sources, ensuring a consistent source of produced water. During the permit application review process, the source and chemical analysis of the proposed injection fluid is submitted. EPA verifies whether the injection fluid is compatible with the proposed injection operations, and determines permit operational requirements, accordingly. Additionally, the operator is required to submit an annual injection fluid chemical analysis. This analysis ensures proper injection operations, verifies consistency of the waste stream, and detects potential fluid source changes.

Comment 36
Concerned that there are no mechanisms in place to ensure that only brine is injected. Without testing, other chemicals not associated with oil and gas production could be injected, posing a risk to groundwater resources.

Response 36
EPA requires all permittees to submit operating data with the permit application, including source and analysis of the physical and chemical characteristics of the injection fluid. The permit
restricts the WB Osborn well to the disposal of brine, or fluids brought to the surface in connection with conventional oil or natural gas production from wells owned or operated by the company. The permit also requires the company to submit an annual chemical composition analysis of the injection fluid, specifying particular analytes that allow EPA to determine if the results are consistent with oil or gas production related brine. The Director can also require the company to sample and analyze the injection fluid at any time. In addition, an EPA inspector can collect a sample during an inspection of the well for analysis. In any case, the design, engineering, construction, operation, and maintenance requirements, and geologic setting provide a high level of confidence that the well will not pose a risk to groundwater resources.

Comment 37
Need assurance that only produced brine from existing wells can be injected into the Smith well.

Response 37
The permit restricts the WB Osborn well to the disposal of brine, or fluids brought to the surface in connection with conventional oil or natural gas production from wells owned or operated by the company. The UIC regulations do not limit a company’s injection to produced brine from only wells in existence at the time of the permit application. Please see the response to Comment 35.

Comment 38
The company should be required to provide a public list of all the chemicals and other ingredients contained in the “brine” to be injected.

Response 38
EPA requires all permittees to submit operating data with the permit application, including source and analysis of the physical and chemical characteristics of the injection fluid. The company submitted a representative brine sample analysis for sodium, calcium, magnesium, potassium, barium, iron, chloride, sulfate, carbonate, bicarbonate, sulfide, total dissolved solids, pH, specific conductance, resistivity, and specific gravity. EPA has determined that the applicant has provided sufficient information, including a representative brine analysis, to allow EPA to make a permitting decision.

Furthermore, the permit requires WB Osborn to submit an annual chemical composition analysis of the injection fluid. According to attachment A of the permit, the analysis shall include but is not limited to the following: sodium, calcium, magnesium, barium, total iron, chloride, sulfate, carbonate, bicarbonate, sulfide, total dissolved solids, pH, resistivity and specific gravity. This list contains sufficient analytes to allow EPA to determine if the results are consistent with oil or gas production related brine. This information is available to the public.

Comment 39
Benzene is one of the contaminants that's found in the brine waste being considered for injection storage in this well. Benzene is a deadly cancer-producing compound. The brine must be considered a toxic waste.
Oilfield brines, or “produced water,” may commonly contain various amounts of hydrocarbons, such as benzene, ethylbenzene, toluene, xylene, naphthalene, and polycyclic aromatic hydrocarbons. These compounds occur naturally in fluids that are separated from oil and gas. Brine has been exempted from the definition of hazardous waste under the Resource Conservation and Recovery Act under 40 C.F.R. § 261.4(b)(5), which specifically exempt drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas or geothermal energy.” This means that the fluid coming out of the production well, which is called brine but may also include drilling fluids among other things, can be injected into a Class II well, regardless of its constituents.

Comment 40
The well owner could haul brine from other wells around the state to the Fork Township well.

Response 40
The permit allows the company to inject brine related to oil and natural gas generated by their own production wells only. The UIC regulations do not require a noncommercial Class II injection well applicant or owner/operator to provide the locations of its production wells.

Comment 41
Brine from all over the country could be injected.

Response 41
Please see the response to Comment 40.

Comment 42
Brine water or saltwater or calcium chloride is prone to the very aggressive eating of steel pipe; this pipe or well was made out of steel. How long does it take to eat through the pipe to destroy our drinking water?

Response 42
The well is designed so that the brine or salt water being injected will not be in contact with the well’s steel pipe or casing. Injection will take place through tubing set within the casing. A packer set at the bottom of the tubing will seal off the space between the casing and the tubing. This sealed-off space between the casing and tubing, called the annulus, will be filled with a liquid mixture containing a corrosion inhibitor. This design prevents the injected brine from coming into contact with the well casing. If a leak occurs in the tubing or casing, monitoring equipment will detect a change in the pressure. The injection must be immediately stopped until the leak is repaired, the well passes an annulus pressure test to EPA’s satisfaction, and EPA authorizes injection to resume.

Comment 43
The Smith 1-17 well was originally drilled to produce oil. Are standards for oil wells as safe as standards for injection wells?
Response 43
Although MDEQ originally issued a permit for the Smith 1-17 well according to state standards, EPA conducted a completely separate review to determine whether the well met the federal standards for an injection well. EPA determined that the injection well construction standards applied to the Smith 1-17 well are sufficient to protect the USDW.

Comment 44
Concrete will crack or disintegrate over time and will not safely contain the poisons. Even the best containment structure of any material cannot withstand the ravages of time.

Response 44
EPA has imposed requirements on the permittee for monitoring and testing the mechanical integrity of a well. Under the regulations “an injection well has mechanical integrity if: (1) there is no significant leak in the casing, tubing, or packer; and (2) there is no significant fluid movement into an USDW through vertical channels adjacent to the injection well bore” [40 C.F.R. § 146.8(a)]. The space between the tubing and casing is monitored to maintain mechanical integrity and detect any leaks. If a leak is detected, the operator is required by their permit to immediately cease injection until the leak is fixed and the repair is confirmed to EPA’s satisfaction through mechanical integrity pressure testing of the well. If the well cannot be repaired to achieve mechanical integrity the well may not be used, while all permit conditions still remain in effect. Finally, the permit includes a plugging and abandonment plan for the permanent plugging of the well that has been approved to protect the USDW.

Comment 45
EPA discounts the premise that the poisonous brine could escape through cracks, crevices, faults or weakened areas in the rock surrounding it. Even though they don’t know the composition of the brine, they refuse to believe that it could corrode the 3,860 feet of pipes and concrete that feed it into the earth or that it could eat through the rock that encases it.

Response 45
EPA reviewed the geologic information for the Smith 1-17 well and determined its siting is suitable for underground injection. The geology of the proposed site is clear of any known faults or fractures. EPA has determined that the permitted well injection will not impact drinking water supplies. EPA reviewed the geologic siting, engineering and construction information, and operating and monitoring standards applied to the Smith 1-17 well and determined that they are sufficient to protect the USDW. For more information, please see the response to Comment 8.

According to the Michigan Hydrogeologic Atlas, the injection zone, the Dundee Formation, is not known to have fractures or other faults in this area. In addition, the MDEQ’s GeoWebFace Mapping Application online database map of structural lineaments show that there are no known faults in the area.

The well is designed so that the brine being injected will not be in contact with the well’s pipe or casing. Injection will take place through tubing set within the casing. A packer set at the bottom of the tubing will seal off the space between the casing and the tubing. This sealed-off space between the casing and tubing, called the annulus, will be filled with a liquid mixture containing a corrosion inhibitor. This system prevents the injected brine from coming into contact with the
well casing and the cement and rock surrounding it. If a leak occurs in the system, monitoring equipment will detect a change in the pressure. The injection must be immediately stopped until the leak is repaired, the well passes an annulus pressure test to EPA’s satisfaction, and EPA authorizes injection to resume.

Comment 46
Can chemicals intended to break up the rocks that contain oil also break up the concrete that is supposed to keep the poisoned water from contaminating our earth?

Response 46
The well is designed so that the fluid being injected will not be in contact with the well’s pipe or casing. Injection will take place through tubing set within the casing. A packer set at the bottom of the tubing will seal off the space between the casing and the tubing. This annulus space between the casing and tubing, will be filled with a liquid mixture containing a corrosion inhibitor. This system prevents the injected brine from coming into contact with the well casing and the cement behind it. If a leak occurs in the system, monitoring equipment will detect a change in the pressure. The injection must be immediately stopped until the leak is repaired, the well passes an annulus pressure test to EPA’s satisfaction, and EPA authorizes injection to resume.

Comment 47
There could be failures in a hundred years or even just 50 years. That is not taken into consideration when this is happening because we got to get rid of these fluids now.

Response 47
There are several safeguards established to prevent the well from contaminating a USDW. EPA requires well casings and cement to protect the USDW. Injection takes place through tubing set within the casing. The space between the tubing and casing is monitored to maintain mechanical integrity and detect any leaks. If a leak is detected, the operator is required to immediately cease injection until the leak is fixed and the repair is confirmed to EPA’s satisfaction through mechanical integrity pressure testing of the well. If the well cannot be repaired to achieve mechanical integrity the well may not be used, while all permit conditions still remain in effect. The permit also includes a plugging and abandonment plan for an environmentally protective well closure when injection well operations cease. This plan meets 40 C.F.R. §§ 146.10 and 146.24(d) requirements which includes plugging the well with cement to prevent the movement of fluids into the USDW.

Comment 48
A blowout preventer should be considered due to the anticipated pressures. The Apollo ball valves are only designed for 600 pounds per square inch (psi). They need to be replaced with quality valves rated at 900 ANSI.

Response 48
A blowout preventer is only necessary when the well is being drilled. In this instance, the Smith 1-17 well has already been drilled and constructed as an oil well, so there is no risk of a blowout.
Comment 49
Before issuing a permit, does EPA consider the opinions and studies offered by various organizations raising serious concerns about the environmental and health effects of well drilling, fracking and fracking waste disposal activities?

Response 49
EPA does consider the opinions and studies offered by various organizations when they are provided during the public comment period. In the case of the Smith 1-17 well, the well was drilled and completed as an oil/gas production well in 2014. EPA does not have regulatory authority for drilling of oil and gas in the State of Michigan.

EPA regulations at 40 C.F.R. Parts 144 and 146 set the requirements and standards that a permit applicant must meet to have a UIC permit application approved. These regulations deal primarily with the geologic siting, well engineering, operating, and monitoring standards for injection wells. The geologic siting, construction, operation and monitoring of this particular well are sufficient to prevent upward movement of the injected fluid into USDWs. EPA therefore anticipates that injection at this site will not affect human health or the environment.

Comment 50
Hydrogen sulfide sour gas is not addressed by this permit.

Response 50
MDEQ has the authority to regulate hydrogen sulfide as it relates to oil and gas production in the State.

Comment 51
Concerned about how use of the injection well could affect nearby plugged and abandoned wells, causing movement of fluids up through old wells. What will be done to ensure this will not occur?

Response 51
In accordance with 40 C.F.R. §§ 144.55, 146.6 and 146.7, WB Osborn researched the one-quarter mile fixed-radius area of review surrounding the Smith 1-17 well to locate any wells which penetrate the injection zone. They reported that there were no known plugged and abandoned wells in this area. EPA also reviewed historical well records from various sources, including those hosted on MDEQ’s GeoWebFace Mapping Application online database, and also found no plugged or abandoned wells in this area.

The permit application describes the geology at the Smith 1-17 well, along with the Dundee oil wells in the Fork oil field, as having good porosity and permeability. In addition, the permit application describes how this well has been designed to have no surface pressure pumping to force the brine down the well for disposal since the Dundee Formation is expected to readily absorb the brine, with the formation pressure calculated to rise only less than or equal to 10 psi. Thus, even in the unlikely case that there are nearby unknown abandoned wells that penetrated the injection zone, any fluids entering the well from any unplugged wells would still move
downward under the weight of gravity on the column of fluid and into the porous and permeable Dundee Formation, away from any USDWs.

For these reasons any unknown orphan wells would not be able to serve as a conduit for brine to move upward to the surface. Even if that were to occur, WB Osborn would be required to plug or re-plug the abandoned well and remediate the surface.

**Comment 52**
Concerned about the documented number and quality of plugged wells within the one-quarter mile area of review for the proposed Smith 1-17 injection well.

**Response 52**
Please see the response to Comment 51 above.

**Comment 53**
Research at the Clarke Library (Central Michigan University, Mt. Pleasant) turned up 88 drilling sites in Fork Township from 1942-1968. No record of how these wells were plugged was provided. The drillings pose migration entrances for brine to poison the aquifer.

**Response 53**
Please see the response to Comment 51 above.

**Comment 54**
Re-plugging must fully be considered for the old drill units to comply with safety standards. These are the ones that are shown in the draft permit that they say they're not out there. They are out there, according to the record. One should be within 200 feet. Check permit number 60879.

**Response 54**
Please see the response to Comment 51 above. MDEQ permit number 60879 is the number assigned to the Smith 1-17 well.

**Comment 55**
Should locate a plugged, former production well near well #60879 should be located within 200 feet of the current Smith 1-17 wellhead.

**Response 55**
MDEQ permit number 60879 is the number assigned to the Smith 1-17 well. Please see the response to Comment 51.

**Comment 56**
Should locate a plugged well near well #60146, near the existing Tillman 1-17 production well and adjacent to the Central Production Facility for the Smith 1-17 well.

**Response 56**
MDEQ permit number 60146 is the number assigned to the Tillman 1-17 production well. The Tillman 1-17 well is the only other well that penetrates the injection zone within the area of
review for the Smith 1-17 well. EPA reviewed the construction of the Tillman 1-17 well and determined that it is properly constructed to prevent the movement of fluids into the USDW. The closest known plugged well to the Tillman 1-17 production well is the Smith 1-17 well.

Comment 57
Concerned about plugged well #60878 on the Slebodnik property, due west of the Smith 1-17 facility. There may be escaping H2S gas from the top of the Dundee formation.

Response 57
MDEQ permit number 60878 is the number assigned to the proposed Slebodnik 1-17 well, which has not yet been drilled. EPA does not have regulatory authority for oil and gas production in the State of Michigan, except when diesel fuels are used in hydraulic fracturing fluids. Concerns about hydrogen sulfide gas from oil and gas production should be referred to the MDEQ.

Comment 58
The plugged well #60356 on the Alan Pitt Jr. property is listed as “other” according to the MDEQ. This should be investigated since it was not permitted by WB Osborn.

Response 58
Records available to the public on the MDEQ website show that WB Osborn applied for and obtained a permit from the state for this well, the Pitt 1-17, which was drilled as an oil/gas production well. The well was later plugged according to the state records. This plugged well is located outside the one-quarter mile area of review for the Smith 1-17 well.

Comment 59
EPA is looking at producing, abandoned and plugged wells within one-quarter mile from the injection well. Why not look for the many plugged wells in a wider area?

Response 59
EPA applied a one-quarter mile radius area of review to search for and evaluate the condition of wells surrounding the Smith 1-17 well, as proscribed by regulations under 40 C.F.R. § 147.1155(a), which pertain to Michigan. “Notwithstanding the alternatives presented in § 146.6 of this chapter, the area of review for Class II wells shall be a fixed radius as described in § 146.6(b) of this chapter.” 40 C.F.R. § 146.6(b) describes a one-quarter mile area of review. EPA followed these requirements and did not search for or evaluate the construction or plugging of wells that are located well outside the designated area of review.

Another option for determining a permit area of review is to model the zone of influence using a modified version of the Theis equation found in the UIC regulations at 40 C.F.R. § 146.6. The Theis equation is a way to calculate the distance that increases in pressures in the injection zone resulting from brine injection would cause the movement of fluids away from the well. Conservative values for the injection fluid and injection zone’s physical characteristics were used in the equation with the intent of maximizing the distance of pressure effect. Although the pressures would increase in the formation, the higher pressures would be near the well with a rapid decrease in pressure further from the well. In addition, the pressure effect being calculated does not mean that the injected fluid would move the same distance, only that it could partially
displace the brine already existing naturally in the formation. The injection rate used, 3.5 barrels per minute, is the maximum anticipated disposal rate from the company’s permit application. According to the calculations, injected fluid could travel much less than the radius of the pressure effect in the injection zone which is a distance of about 685 feet from the well, if the well injects continuously at 5,040 barrels per day for 30 years. This is a smaller distance than the regulatory default area of review used during the review of the Smith 1-17 well permit application, which was one-quarter mile radius, or 1,320 feet from the well. Using less conservative, more realistic values for the injected fluid characteristics in the equation resulted in a pressure effect radius of about 150 feet from the well.

**Comment 60**
This quarter mile is a concern. Not sure what the basis for the quarter mile is because the disbursement is far greater than a quarter mile. Know that mineral rights are paid far greater than a quarter mile when we take stuff out of the land. Should look at what the effects are going to be.

**Response 60**
Please see the response to Comment 59 above. EPA evaluated the practices of state programs when developing the area of review standards in the federal regulations and determined that the one-quarter mile fixed radius proved satisfactory in practice to protect USDWs.

**Comment 61**
High pressure displacement within the Dundee Formation is not addressed by this permit.

**Response 61**
The permit application describes the geology at the Smith 1-17 well, and the Dundee oil wells in the Fork oil field, as having good porosity and permeability. The permit application also describes how this well has been designed to have no surface pressure pumping to force the brine down the well for disposal because the Dundee Formation would readily absorb the brine, with the formation pressure calculated to rise only less than or equal to 10 psi. Any fluids entering the Smith 1-17 well are expected to easily move downward under the weight of gravity on the column of fluid and into this relatively low pressured, porous and permeable Dundee Formation.

**Comment 62**
Such limited information and data cannot guarantee sound decision making in this permitting process.

**Response 62**
EPA regulations at 40 C.F.R. Parts 144 and 146 set the requirements and standards that a permit applicant must meet to be issued an UIC permit. These regulations include the geologic siting, well engineering, operating, closure, and monitoring standards for deep well injection. EPA requires each proposed UIC well/facility to perform a comprehensive review which includes siting, well construction, operational, and financial requirements to ensure the protection of all USDWs, to be submitted with a permit application. EPA reviews all UIC permit applications on a case-by-case basis, verifying its completeness and technical soundness prior to preparing a draft permit for comment. EPA believes that the information provided is sufficient to make a
permit decision in this case that the Smith 1-17 well can be constructed, operated and monitored in such a manner as to be protective of USDWs.

**Comment 63**
Concerned that this well is very shallow (3,800-4,098 feet below).

**Response 63**
EPA determined that the geologic siting of the Smith 1-17 well is very suitable for underground injection. The base of the USDW is located approximately 566 feet below ground surface at this location and the Dundee Formation or injection zone is present between 3,860 and 4,098 feet below ground surface. The top of the injection zone is separated from the bottom of the USDW by approximately 3,294 feet of rock formation layers, including a confining zone which caps the top of the injection zone formation and prevents the upward movement of fluids from below. All the information gathered from the *Michigan Hydrogeologic Atlas*, driller’s logs and formation records indicate that at this depth the injection zone is capable of receiving injected brine and the confining zone and overlying strata will effectively prevent injected fluid from contaminating the USDW.

**Comment 64**
The well was drilled as an oil well which typically functions at 600 psi. Are there concerns with it being used as an injection well that functions at 976 psi?

**Response 64**
Although MDEQ originally issued a permit for the Smith 1-17 well according to state standards for an oil well, EPA conducted a completely separate review to determine whether the well met the federal standards for an injection well. EPA determined that the injection well construction standards applied to the Smith 1-17 well are sufficient to protect the USDW.

The pipe or casing used in the construction for both production and injection wells are manufactured according to established American Petroleum Institute standards. Engineering tables list a number of values associated with each size and grade of pipe, including the maximum pressure the pipe can withstand. The casings used are able to withstand pressures thousands of pounds per square inch (psi) greater than 600 psi.

Because the injection well itself is designed to handle such high pressures, EPA established its pressure limit not out of concern for the mechanical integrity of the well but instead to prevent the fracturing of the rock of the confining layer to not allow the movement of fluids from the injection zone. EPA conservatively calculated this maximum injection pressure limit to be 976 psi.

Additionally, injection will only take place through tubing which is set within the casing. The mechanically separated space between the injection tubing and the casing will be monitored to detect any pressure changes that would indicate a leak in the system. If there is a significant leak, injection must cease and the well shut down until any repairs are made and the well is tested and EPA determines that the well has mechanical integrity before injection may resume.
Finally, the permit application describes the geology at the Smith 1-17 well, along with the Dundee oil wells in the Fork oil field, as having good porosity and permeability. As a result, the permit application describes how this well has been designed to have no surface pressure pumping to force the brine down the well for disposal since the Dundee Formation is expected to readily absorb the brine, with the formation pressure calculated to rise only less than or equal to 10 psi.

Comment 65
In the calculations of the maximum pressure that can be injected, it's stated that it's based on the specific gravity of 1.255 for the material that's going in. There's nothing that supports that that is going to be the maximum specific gravity. Small differences in specific gravity result in large differences in safe injection pressure limits. There should be information provided that nothing will ever exceed that specific gravity for the material.

Response 65
The specific gravity was taken from a third party analysis of the injectate that will be injected in the well. EPA requires all permittees to submit operating data with the permit application, including source and an independent analysis of the physical and chemical characteristics of the injection fluid. This includes the specific gravity used to calculate the maximum injection pressure. WB Osborn submitted an analysis with a measured specific gravity of 1.205. EPA adds a safety factor of .05 to the specific gravity, making the specific gravity used to calculate the maximum injection pressure 1.255. Attachment A of the permit for the Smith 1-17 well requires the submittal of a new lab analysis with the chemical composition of the injection fluid on an annual basis. This analysis includes specific gravity. EPA can modify the permit to decrease the maximum injection pressure if the specific gravity of the injection fluid increases.

While it is true that small variations in the specific gravity could result in a much different value in the calculation of maximum injection pressure, the actual injection pressure needed for this well is expected to be minimal. The current low pressure measured locally in the Dundee Formation and other measures are expected to result in the injection formation easily absorbing the brine rather than needing the fluid to be pumped under pressure into the formation.

Comment 66
It was pointed out that the limestone is quite porous and would readily accept the wastewater and yet the pressure limit is being defaulted to a high value. Given the concerns that are being expressed, the EPA should consider lowering the limit if this well is permitted.

Response 66
As noted, the injection formation is expected to readily accept the brine at a much lower injection pressure than the limit in the permit. Rather than set an arbitrary lower limit for injection pressure in the permit, EPA sets a maximum injection pressure that is very conservatively, scientifically based. The limit serves the specific purpose of preventing fracturing of the rock.

The maximum injection pressure was calculated using the following formula: $[\{.80 \text{ psi/ft} - (0.433 \text{ psi/ft})(\text{specific gravity})\} \times \text{depth}] - 14.7 \text{ psi}$. The maximum injection pressure is dependent upon
depth of the injection zone and specific gravity of the injected fluid. The Dundee Formation at 3,860 feet was used as the depth and a specific gravity of 1.255 was used for the injected fluid.

Comment 67
Concerned the draft permit proposes to allow injection of 5,040 barrels per day.

Response 67
According to the company’s permit application for the Smith 1-17 well, their expected maximum daily volume of fluid to be injected into the well is 5,040 barrels. The draft permit did not include a proposed allowed volume.

Instead, EPA sets a maximum injection pressure, which is set to prevent the fracturing of the rock of the confining layer and not allow the movement of fluids out of the injection zone. In this case the maximum injection pressure is limited by the permit to 976 psi, and acts as a limiting factor to daily volume. The maximum injection pressure was calculated using conservative figures for the physical properties of the injection zone and the injected fluid. Because the owner/operator cannot inject at a higher pressure, injection is limited to the amount the injection zone can receive at the permitted maximum injection pressure. EPA believes that the proposed injection zone, the Dundee Formation, is capable of receiving large volumes of produced brine. Michigan geology is consistent over a large area, meaning the injection zone is vast. If, however, the injection zone’s capacity was to decrease, that is, if it was unable to receive more fluid, the owner/operator would receive information via monitoring equipment that the zone is not accepting fluid at the permitted injection rate. In such a case, the owner/operator may not inject at a higher pressure than permitted, and thus the volume per day that could be injected would be restricted.

Comment 68
Suspect WB Osborn has filed for waste injection under false pretenses. Volume and pressure rates proposed far exceed produced water on site.

Response 68
Please see the response to Comment 67.

Comment 69
The EPA Director may consider proposed contingency plans to cope with well failures so as to prevent migration of contaminating fluids into a USDW (40 C.F.R. § 146.24 (b)). There are no assurances that EPA considered contingency planning as part of the permitting. No provision in the draft permit outlines steps to be taken to protect and clean up residential drinking water beyond plugging and abandonment of the well.

Response 69
The permit application for the Smith 1-17 well included plans for well failure (Attachment O), which outlined the procedure to be followed in the event of loss of mechanical integrity of the well. EPA finds this plan to be appropriate. Because of the protectiveness provided when the UIC requirements were applied to this well through the permitting process, as well as the design, engineering, construction, operation and maintenance requirements, EPA has concluded that
these safeguards will prevent the well from contaminating a USDW. In the unlikely event that the well fails, the Class II well owner is responsible for any potential contamination which occurs on or from the site. Under the SDWA Section 1431, EPA can require the company to clean up any contamination of a USDW due to injection and/or supply alternative water supplies to affected parties. WB Osborn will remain responsible for ensuring that the groundwater is protected from contamination due to injection. MDEQ, under Act 307, can also require owners to clean up any contamination due to injection, and/or supply alternative water supplies to affected parties. In addition, EPA has other programs that could utilize regulatory tools (e.g. the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and the Resource Conservation and Recovery Act) to clean up sites in an emergency and to compel responsible parties to perform cleanups or reimburse the government for EPA-lead cleanups.

**Comment 70**  
Monitoring once a year is appalling.

**Response 70**  
WB Osborn will be responsible for observing and recording injection pressure, flow rate, annulus pressure, and cumulative volume on a weekly basis and reporting this to EPA on a monthly basis as required by 40 C.F.R. §§ 144.54 and 146.23. The company will also be responsible for observing, recording and reporting annulus liquid loss to EPA on a quarterly basis. An analysis of the injected fluid must be submitted to EPA annually. EPA also has an active program for checking permit compliance including injection well inspections.

**Comment 71**  
The Applicant is asked to report their own casing pressure test results. Annulus pressure tests are requested just every 5 years. Neither the well construction nor the testing are adequate to provide total confidence in the integrity or safety of this waste injection well.

**Response 71**  
The five-year annulus pressure testing is not the only time that well integrity may be observed. A pressure loss can be recognized at a minimum during weekly annulus pressure monitoring and quarterly annulus liquid loss monitoring. If a significant loss of pressure or annulus liquid loss occurs, the operator is required by the permit to immediately cease injection until the well is fixed and the repair is confirmed to EPA’s satisfaction through mechanical integrity pressure testing of the well. Mechanical integrity testing is required any time the well loses mechanical integrity, the tubing is removed or replaced, the packer is reset, or at least every 5 years. Further, EPA may require a mechanical integrity test at any time. Thus, if there is a significant loss of pressure or annulus liquid, a mechanical integrity test is run more often than every 5 years. A mechanical integrity test will be run at least every 5 years, even when there is no significant pressure loss that suggests well damage. Injection cannot resume until a successful demonstration of mechanical integrity and a written authorization from EPA.

**Comment 72**  
If permitted, there is a total lack of rigorous sustained oversight of this waste injection well.
Response 72
EPA has an active program for monitoring compliance by people who have UIC permits. The program includes inspections, other forms of information collection (e.g., SDWA Section 1445 information collection orders), and review of information submitted by such persons. EPA also observes mechanical integrity tests when they are performed. WB Osborn must certify under penalty of law that documents reporting the results of tests and monitoring activities are complete, true and accurate. Per 40 C.F.R. § 144.40, permits may be terminated for noncompliance with any part of the permit, failure to disclose relevant facts, misrepresentation of facts or endangerment to human health. Self-monitoring and self-reporting are fundamental elements of the UIC permit program and other federal environmental programs. Failure to comply fully with permit conditions is a violation and may subject an owner/operator to an action under the enforcement provisions of the SDWA. Violations of the SDWA and UIC regulations are subject to Administrative Orders which may include penalties of up to $273,945, civil judicial penalties of up to $54,789 per day of violation and criminal judicial penalties of up to 3 years imprisonment and fines in accordance with Title 18 of the United States Code.

Comment 73
The casing is designed to withstand an injection pressure of 976 psi, and WB Osborn is solely responsible for reporting their pressure. Since EPA only reviews these reports, the company has an incentive to manipulate the results, preventing proper EPA oversight.

Response 73
Please see the response to Comment 72 above.

Comment 74
We need independently supervised assurance and documentation of the MIT testing.

Response 74
Self-monitoring and self-reporting are fundamental elements of the UIC permit program and other regulatory programs. Agency inspections and oversight verify the accuracy of the facility’s self-monitoring and reporting, and the facility is subject to penalties and sanctions for failure to comply with its obligations. Self-monitoring is consistent with the SDWA. After the injection well construction is completed, WB Osborn is required to conduct and pass a mechanical integrity test (MIT), in accordance with 40 C.F.R. § 146.8, before authorization to inject is granted. The company is also required to repeat the test at least once every 5 years thereafter. The UIC monitoring and testing requirements are designed to detect pressure changes between the tubing and annulus, thereby promptly detecting a leak. If a leak is detected, the UIC regulations require the operator to immediately cease operating the well until the leak is fixed and the repair is confirmed through testing. According to the permit, EPA must be notified at least 30 days prior to when a mechanical integrity test is proposed so that a field inspector may be present to witness and document the results of the test.

Comment 75
It should be technologically feasible to monitor the injection pressure, flow rate annulus pressure and cumulative injected volume as well as any other numerical indicators in real time. Need to monitor more often.
Response 75
It is technologically feasible to monitor the injection well in real-time. Many deep injection wells are monitored in this way. Although WB Osborn is not planning to monitor the Smith 1-17 well continuously, they are still responsible for observing and recording injection pressure, flow rate, annulus pressure, and cumulative volume on a weekly basis and reporting this to EPA on a monthly basis as required by 40 C.F.R. §§ 144.54 and 146.23. The company will also be responsible for observing, recording and reporting annulus liquid loss to EPA on a quarterly basis. Based on EPA’s experience with the regulation of injection wells, the current frequency of monitoring and reporting has been shown to be adequate for determining whether a well may pose a threat to USDWs.

Comment 76
We don’t know the paths of underground streams.

Response 76
The geology of the Dundee Formation is well known in the area, and underlies much of the Southern Peninsula of Michigan. The Dundee is a fossilized limestone that is locally dolomitized according to maps in the Michigan Hydrogeologic Atlas, and therefore very porous and highly permeable. In general, there is little detectable movement of formation fluids and gases throughout deep formations. Pores in these rocks are mostly saturated by these fluids. The little fluid movement that occurs within the Dundee is dependent on the pressure and rate of injection (or production) from wells and the porosity and permeability of the rock in the immediate vicinity. Although the formation is not uniform in its porosity and permeability, any fluid movement within the formation is still expected to be minimal, contained within the defined area of review and would not travel as if it were an underground stream.

Comment 77
Dundee formation is an oil production play and waste disposal formation which comingles and seems to be a poor business practice.

Response 77
The brine that will be injected into the Smith 1-17 well for disposal will come from WB Osborn’s production wells. EPA does not consider the perceived practicality of a company’s business practices as part of the UIC permitting process. It is not uncommon for a company’s injection and production wells to be in close proximity to each other.

Comment 78
The geological structure of Michigan is a perfect basin that is a really good geological structure for burying brine and may become the toxic dump of injection fluids from Ohio and Pennsylvania. Don't think that Mecosta County wants to be a dumping ground for oil and gas brine.

Response 78
EPA agrees that the geologic siting of the Smith 1-17 well is suitable for underground injection for the reasons described in the response to Comment 8. The permit allows the company to inject
brine related to oil and natural gas production generated by their own production wells only. The UIC regulations do not require a noncommercial Class II injection well applicant or owner/operator to provide the locations of its production wells.

Comment 79
Indication that the dramatic increase in the number of earthquakes in the central and eastern U.S. is due to the increased use of injection wells and fracking.

Response 79
Scientists have long recognized that human activities, such as construction of dams and water reservoirs, mining, and oil and gas production, can trigger seismic events, including those that are felt by people. Under certain conditions, disposal of fluids through injection wells has the potential to cause human-induced seismicity. However, in most areas of the country with injection wells, induced seismicity associated with fluid injection is uncommon, as additional conditions necessary to cause seismicity often are not present. Earthquakes caused by injection wells are likely to occur only when all the following conditions are present: (1) stressed faults; (2) pressure build up due to disposal activities; and (3) a pathway for increased pressure to communicate with the fault (Minimizing and Managing Potential Impacts of Injection-induced Seismicity from Class II Injection Wells: Practical Approaches (EPA 2014)). None of these conditions are known to be present in the area of review for the Smith 1-17 well.

Comment 80
Deep injection wells have been scientifically connected to earthquake activity. The May 6, 2015 earthquake with its epicenter near Kalamazoo, Michigan has been connected to an injection well in the immediate area. The only way to ensure the Smith 1-17 injection well is not associated with future earthquake activity is to deny the permit.

Response 80
Although some earthquakes have been connected to deep injection wells (see response to Comment 79), the 2015 event which was centered near Kalamazoo, Michigan, has not been determined to be connected to an injection well. The U.S. Geological Survey (USGS) website reports that the earthquake occurred on May 2, 2015 at a depth of 4.5 kilometers (about 14,765 feet) below the ground surface. This is much deeper that any potential injection formation in the area.

Federal regulations at 40 C.F.R. Parts 144 and 146 state the requirements and standards that a permit applicant must meet to obtain a UIC permit. EPA applied the decision model in Minimizing and Managing Potential Impacts of Injection-induced Seismicity from Class II Injection Wells: Practical Approaches to conclude that injection into the well is unlikely to cause earthquakes. After noting that there is an existing history of injection wells in Mecosta and surrounding counties and the injection zone is not near basement rock, EPA used geologic and seismic data to evaluate the Smith 1-17 permit application.

Stress faults are one of the key components to induced seismicity. Michigan Geology has been well documented in the Michigan Hydrogeologic Atlas and the proposed injection zone (Dundee formation) is not known to have fractures or other faults in this area. In addition, the Michigan
Department of Environmental Quality’s *GeoWebFace* online database map of faults and structural lineaments show that there are no known faults in the area.

USGS on-line tools are used to evaluate both the seismic history and probability of earthquakes within a selected area around a proposed injection well location. A search of historic seismic activity of the area using USGS’s global *Earthquake Search Application* revealed no observed earthquakes within 50 km (approximately 31 miles) of the well site during the last 200 years. Knowledge of seismic events that originated near the well is informative about whether faults exist in that location. The USGS data referenced above indicates that the selected area around the Smith 1-17 well site is not seismically active. Recorded earthquakes serve as a general indicator of seismic activity and the potential existence of a stressed fault. A record of past earthquakes would be evidence of the presence of stressed faults in the area, a common criteria taken under consideration when evaluating the potential for seismic activity and induced seismicity. The lack of seismic activity is evidence that the geologic siting is appropriate for injection, and indicates that there are no active faults in a stressed state in the area.

EPA used the USGS’s *Earthquake Probability Mapping Application* to map the probability of an earthquake within 50 km of the proposed injection well location. The results of this query indicate that there is a less than 1% chance of a 5.0 magnitude earthquake or greater occurring within 50 km of the proposed well during the next 200 years. Based on the absence of known faults and fractures under stress in the injection zone, the area’s seismic history and the extremely low probability of a future significant earthquake in the area, it is very unlikely that a seismic event would occur related to this proposed injection well.

Pressure build-up in rock formations due to injection activities is also an important factor when considering the potential to induce seismicity. Generally, as fluids are injected into a formation the pressure in that formation may increase. The ability of a formation to dissipate any pressure build-up is dependent on site-specific factors. In this situation, the company reports that wells in the Dundee formation within the Fork Field lack fracture test data because fracture pressure was unable to be reached due to good formation porosity and permeability. This ability for the formation to easily dissipate any added injection pressure during a test indicates that the formation would be unlikely to fracture under the injection conditions in the permit. EPA limits the pressure for the injection of fluids into a given formation to prevent initiating and/or propagating fractures in the confining zone (see 40 C.F.R. § 144.28 (f)(6)(ii)). This pressure limitation, or maximum injection pressure is most commonly calculated using conservative values, including adding a safety factor of 0.05 to the specific gravity of the injected fluid. The formula for calculating the injection pressure limit for this injection well can be found at 40 C.F.R. § 147.1153 (b), in Attachment A of the permit, and in the response to Comment 66. Requiring a maximum injection pressure not only prevents formations from fracturing and creating migratory pathways but also generally minimizes injection pressure. The company will be required to submit monthly monitoring reports, recorded weekly, that include: injection pressure, annulus pressure, flow rate, and cumulative volume.

The last condition needed for induced seismicity is a pathway for increased pressure to communicate with a fault. Faults associated with injection induced earthquakes have been located in crystalline formations, or basement rock. Basement rocks are the older, igneous or
metamorphic rocks that underlie the sedimentary rocks of continents. Basement rocks usually have little or no effective primary permeability or porosity. With limited opportunity for pressure to dissipate, injection into crystalline basement rock can result in induced seismicity in certain conditions. In contrast, the proposed injection zone is a much shallower, porous and permeable formation.

The existing Smith 1-17 well is proposed to be converted to an injection well in an area with relatively good well records. State completion reports for this well and wells located in and near the area of review for this injection well show the approximate depths and thicknesses of the confining and injection formation in the area. With no known stressed faults near the well site and with limitations to prevent pressure build-up or fracturing of the formation, the injection well is not expected to build up pressure to a level that would create fractures or communicate with any potential unknown faults or fractures.

After significant review, EPA concludes that the injection well lacks the conditions that can lead to induced seismicity. The geology of the area site is favorable to accepting fluids without building up pressure in the injection zone and does not have any known faults or fractures that are in such a state of stress as to potentially cause an earthquake. There is no history of seismic activity in the area of the injection well, indicating that the area is not seismically active. Limitations will also be in place to prevent any pressure building up in the injection zone. In conclusion, EPA determined that the injection well does not pose an induced seismicity threat.

**Comment 81**
There is no guarantee that an earthquake will not break injection pipes and send toxic chemicals into the watershed and aquifer.

**Response 81**
EPA permit requirements for monitoring and testing the mechanical integrity of the Smith 1-17 well are in place to detect any leaks or breaks. If a leak occurs, the operator is required by their permit to immediately cease injection until the well is fixed and the repair is confirmed to EPA’s satisfaction through mechanical integrity pressure testing of the well. If an injection well can’t be repaired, it will have to be plugged and abandoned according to the EPA-approved plan in the permit.

**Comment 82**
There is no evidence that a few inches of steel or a few feet of concrete can withstand the pressures generated in an earthquake.

**Response 82**
Please see the response to Comment 81.

**Comment 83**
There’s no way to check on leakage produced by a quake other than to drill another well nearby.
Response 83
EPA permit requirements for monitoring and testing the mechanical integrity of a well are in place to detect any leaks. An annulus pressure test could simply detect any leak following an earthquake. If a leak is detected, the operator is required by their permit to immediately cease injection until the well is fixed and the repair is confirmed to EPA’s satisfaction through mechanical integrity pressure testing of the well.

Comment 84
On May 2, 2015 a 3.5 New Madrid Fault Line earthquake hit the area around Mecosta County. No concrete well casings could protect the area below the water table.

Response 84
Please see the response to Comment 80 above. The USGS reports that the May 2, 2015 4.2 magnitude earthquake was centered near Kalamazoo, Michigan. The epicenter for this event is located about 107 miles from the proposed Smith 1-17 well. The USGS community intensity map for the earthquake shows that it was felt as a weak event that resulted in no reported damage in Mecosta County. The faults of the New Madrid seismic zone are located hundreds of miles to the southwest of the injection well.

Comment 85
WB Osborn O&G fails to explain why the concrete enclosure will not be destroyed when a point 6.1 earthquake hits the well site, or why engineers have been quiet about this issue jeopardizing the Great Lakes region.

Response 85
Please see the response to Comment 80 above. Using the USGS’s *Earthquake Probability Mapping Application*, there is a less than 1% chance of a 5.0 magnitude earthquake or greater occurring within 50 km of the proposed well during the next 200 years. In the unlikely event that an earthquake that could cause damage were to occur, EPA permit requirements for monitoring and testing the mechanical integrity of a well are in place to detect any leaks or breaks. If a leak occurs, the operator is required by their permit to immediately cease injection until the well is fixed and the repair is confirmed to EPA’s satisfaction through mechanical integrity pressure testing of the well. If an injection well can’t be repaired, it will have to be plugged and abandoned.

Comment 86
The draft permit notes a State bond for $250,000 has been established only for plugging and abandonment of the well. Osborn Oil & Gas is asking the residents of the area to trust that no contamination will occur because they have offered no financial ability to remedy any problems and can simply go out of business and leave the mess to the residents. Granting a permit to Osborn without expanding the dollar amount of the performance bond to a sufficient dollar level to cover the protection of the residents' well water places the burden of the risk of injection well failure and contamination on the residents of Fork Township. The permit should be modified to ensure the financial responsibility associated with any cleanup measures be placed solely on the company.
Response 86
The UIC regulations require the permittee to provide financial assurance for properly plugging the well. WB Osborn has a State bond of $250,000 for this purpose. There are no provisions under the SDWA which would allow the EPA to require Class II well owners to be bonded for reasons other than well plugging, including the cleanup costs of any potential contamination. The Class II well owner is responsible for any potential contamination which occurs on or from the site. Under the SDWA Section 1431, EPA can require owners to clean up any contamination of a USDW due to injection and/or supply alternative water supplies to affected parties. An operator is required to do what any reasonable person would do to prevent or correct environmental damage. A reasonable action might be to prevent and contain any surface spills, remediate groundwater contamination, replace any degraded component of the well, and so forth. WB Osborn will remain responsible for ensuring that the groundwater is protected from contamination due to injection. MDEQ, under Act 307, can also require owners to clean up any contamination due to injection, and/or supply alternative water supplies to affected parties. In addition, EPA has other programs and regulatory tools (e.g. the Comprehensive Environmental Response, Compensation and Liability Act of 1980, and the Resource Conservation and Recovery Act) to clean up sites in an emergency and to compel responsible parties to perform cleanups or reimburse the government for EPA-lead cleanups.

Comment 87
Will the operator have to post a bond large enough to cover any contingency?

Response 87
The UIC regulations require the permittee to provide financial assurance for properly plugging the well. WB Osborn has a State bond of $250,000 for this purpose. There are no provisions under the SDWA which would allow the EPA to require Class II injection well owners/operators to be bonded for other reasons, including the cleanup costs of any potential contamination. For more information, please see the response to Comment 86.

Comment 88
Osborn Oil & Gas posted a bond that provides the MDEQ and the EPA easy access for fines and/or penalties in the event of failure on the part of the company to properly operate and seal this well.

Response 88
The purpose of the bond is to provide the funds to properly plug the well in an environmentally protective manner in the event the owner is unable to do so. The bond is not for any other purposes. For more information, please see the response to Comment 86.

Comment 89
The permit was purchased by WB Osborn O&G Operations and the EPA.

Response 89
EPA collects no fee for permits.
Comment 90
EPA said if all the stipulations are met, there's no room for commonsense and the permit will have to be approved. That’s bothersome.

Response 90
Regulations at 40 C.F.R. Parts 144 and 146 state the requirements and standards that a permit applicant must meet to have a UIC permit application approved and a draft permit prepared. The UIC regulations are designed to protect USDWs from contamination by identifying drinking water sources for protection, making sure the geological siting is suitable for injection, and applying standards for well construction, operation, and reporting. If all requirements are met for a permit, a draft permit is prepared and a public notice is issued for a public comment period. This provides an opportunity for public review and input to determine whether the proposed permit meets the applicable requirements. In the case of the Smith 1-17 well, a careful review of the public comments submitted did not demonstrate any deficiency of the application based on UIC Program requirements for approval, and did not raise issues with the draft permit which would alter EPA’s basis for determining that it is appropriate to issue WB Osborn a UIC permit for this well.

Comment 91
The taxpayers deserve answers to the fundamental purpose of EPA’s decision regarding permitting the injection well in Fork Township/Mecosta County.

Response 91
Congress enacted the SDWA to protect USDWs from endangerment from underground injection practices. If a company decides they would like a permit for an injection well, they must prepare and submit a permit application. The UIC regulations specify the technical construction and operational standards which injection wells must meet to prevent contamination of USDWs and to receive a permit. The purpose of the UIC program is to protect USDWs from being contaminated by underground injection practices. UIC regulations (40 C.F.R. §§ 144.3 and 146.3) define a USDW as any aquifer which is currently being used as a drinking water source or which is of sufficient volume and adequate quality to be a source for a public water system. In the case of the Smith 1-17 well, all regulatory standards were met for EPA to prepare a draft permit and public comments did not demonstrate any deficiency or raise issues with the draft permit which would alter EPA’s basis for determining that it is appropriate to issue WB Osborn a UIC permit for this well. Therefore, EPA has issued a permit for this well.

Comment 92
Trust that EPA will make an ethical and moral decision to ensure domestic tranquility and promote the general welfare of the community.

Response 92
EPA’s decision in this action is consistent with the applicable statutes and regulations which permit underground injection subject to EPA regulations. Congress enacted the SDWA to include the protection of USDWs from endangerment from underground injection practices, thereby protecting human health and the environment. The UIC regulations at 40 C.F.R. Parts 144 and 146 specify the requirements which injection wells must meet in order to prevent
contamination of USDWs. By issuing a UIC permit, EPA has determined that there will be no impact to the drinking water aquifer as a result of injection into the Smith 1-17 well. This decision took into consideration the comments and concerns of the community provided during the public comment period.

**Comment 93**
The GAO has identified 23 communities where the drinking water aquifers were polluted by brine injection wells. EPA could not guarantee that the brine in the Smith 1-17 injection well would not contaminate the drinking water aquifer.

**Response 93**
The commenter’s statement regarding the July 1989 U.S. General Accounting Office (GAO) study, “*Drinking Water, Safeguards Are Not Preventing Contamination From Injected Oil and Gas Wastes,*” identifying 23 known drinking water aquifer contamination cases associated with brine injection wells, has been reviewed by EPA. Since all but one of the well contamination cases began injection prior to when the federal UIC program came into effect, they were not subjected to the regulatory safeguards currently enforced by the UIC program. These contamination cases were in state-administered UIC programs only.

The GAO study highlighted the 3 primary causes of brine injection well related contamination. They found the contaminating wells were either injecting directly into drinking water aquifers, had injection well casing cracks/failures, or the brine had migrated through abandoned or improperly plugged wells in the area of the injection well. Had these injection wells been permitted and operated under current UIC regulatory standards, as are now enforced, such failures would have been prevented. Specifically, proper USDW determination and delineation would prevent injection into drinking water aquifers, proper well monitoring and testing would identify injection well mechanical integrity failures, and an evaluation of the construction of production and abandoned wells in the area of review would eliminate conduits for fluids to migrate out of the injection zone.

It should be noted that according to the GAO, actions that satisfy the intent of the report’s recommendations have been taken by EPA. The state-administered programs were not at the time of the study implementing the program according to current UIC regulations and guidance.

**Comment 94**
Concerns were raised regarding 144.19 requirements for the Smith 1-17 well, if it was a Class II enhanced recovery well injecting CO2 being converted to a Class VI CO2 storage well.

**Response 94**
The regulations at 40 C.F.R. § 144.19 apply to Class II wells that are injecting carbon dioxide (CO2) into an oil and gas reservoir. The Smith 1-17 well UIC permit is for a Class II well to inject brine for disposal. This well may inject only brine from production wells owned or operated by WB Osborn for disposal. This permit does not allow CO2 gas injection and is not approved for the injection of fluids to enhance oil and/or gas production in a neighboring production well.
If in the future the applicant wishes to inject CO2 into the Smith 1-17 well, the applicant must apply for a new permit subject to EPA review and public comment.

Comment 95
Based on the problems that people in our states have had, it seems inevitable that this poison will not be contained forever. You cannot force millions of gallons of toxins into the earth and just hope that they won't eventually kill people.

Response 95
EPA regulations at 40 C.F.R. Parts 144 and 146 set the requirements and standards that a permit applicant must meet to be issued an UIC permit. These regulations deal primarily with the geologic siting, well engineering, operating, closure, and monitoring standards for deep well injection. EPA requires each proposed UIC well/facility to perform a comprehensive review which includes siting, well construction, operational, and financial requirements to ensure the protection of all USDWs. EPA reviews all UIC permit applications on a case-by-case basis, verifying its completeness and technical soundness prior to preparing a draft permit for comment.

The EPA permit for the Smith 1-17 well conveys permission to inject produced water based on EPA's finding that the geologic siting, construction, and operation of the well are such that injection will be environmentally safe. Returning the produced water to a confined formation below the lowermost USDW through a properly constructed and operated injection well is an environmentally sound procedure.

Please also refer to the response to Comment 8 above.

Comment 96
Allowing a million pounds a year to go down this well would be way too much.

Response 96
Please see the response to Comment 95.

Comment 97
Concerns were raised about training for local responders regarding hazardous waste injection wells per 144.14.

Response 97
40 C.F.R. § 144.14 defines the requirements for Class I well facilities that inject hazardous waste. The personnel training referenced at 40 C.F.R. § 146.5(c)(8) applies only to the company or facility employees, not local responders. Class I hazardous waste injection wells inject hazardous waste fluids defined under the Resource Conservation and Recovery Act (RCRA). The Smith 1-17 well injects Class II fluids which are brought to the surface in connection with conventional oil or natural gas production and may be commingled with waste waters from gas plants which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection (see 40 C.F.R. § 146.5(b)(1)). Class II fluid has been exempted from the definition of hazardous waste under RCRA under 40 C.F.R. § 261.4(b)(5),
which specifically exempts “drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas or geothermal energy.” This exemption from RCRA hazardous waste means that the requirements stated under 40 C.F.R. § 144.14 do not apply to personnel at the Smith 1-17 well.

**Comment 98**
Saginaw Chippewa Indian Tribe requests that EPA reject the draft permit for the Smith 1-17 injection well due to its proximity to the Isabella Reservation which poses unnecessary risk to their valuable groundwater resources.

**Response 98**
EPA is empowered to protect drinking water sources from underground injection activities in state and tribal jurisdictions that do not have authorized UIC programs. In this situation the area of review for the injection well is approximately 11 miles away from the boundary of the Saginaw Chippewa Indian Tribe’s Reservation. Please refer to the response to Comment 59 concerning how far the injected fluid is expected to travel from the well within the Dundee Formation. The regulations at 40 C.F.R. Parts 144 and 146 state the requirements and standards that a permit applicant must meet to have a UIC permit application approved and a draft permit prepared. The UIC regulations are designed to protect USDWs from contamination by identifying drinking water sources for protection, making sure the geological siting is suitable for injection, and applying standards for well construction, operation, and reporting. EPA denies permit applications that do not meet these requirements. For the Smith 1-17 well permit application, the applicant met all requirements and EPA has no basis to deny the permit.

**Comment 99**
Annulus pressure tests only occur on the well every 5 years after the initial test, so there is not enough confidence in the mechanical integrity of the well. This lack of EPA oversight poses a tremendous risk to the groundwater aquifers located on or near Reservation boundaries.

**Response 99**
The EPA permit requirements for monitoring and testing the mechanical integrity of a well are in place to detect any significant leaks and prevent contamination of USDWs. A pressure loss can be recognized at a minimum during weekly annulus pressure monitoring and quarterly annulus liquid loss monitoring. If a leak occurs, the operator is required by the permit to immediately cease injection until the well is fixed and the repair is confirmed to EPA’s satisfaction through mechanical integrity pressure testing of the well. Mechanical integrity testing is required any time the well loses mechanical integrity, the tubing is removed or replaced, the packer is reset, or at least every 5 years. Further, EPA may require a mechanical integrity test at any time. When EPA says there is a loss of mechanical integrity, we are recognizing that there is a significant loss of pressure in the annulus that can indicate damage to the casing, tubing or packer. A pressure loss can also be recognized during weekly annulus pressure monitoring and quarterly annulus liquid loss monitoring. Thus, if there is a significant loss of pressure or annulus liquid, a mechanical integrity test is run more often than every 5 years. A mechanical integrity test will be run at least every 5 years, even when there is no significant pressure loss that suggests well damage. Injection cannot resume until a successful demonstration of mechanical integrity and a written authorization from EPA.
Comment 100
Saginaw Chippewa Indian Tribe would like to be informed of any and all compliance issues, not just formal enforcement actions, related to the Smith 1-17 injection well.

Response 100
The Tribe and public will receive notice of formal administrative enforcement actions as 40 C.F.R. Part 22 requires. EPA will also coordinate with the Tribe on issues raised regarding the Smith 1-17 well and other Class II wells according to the current EPA-Saginaw Chippewa Tribal Environmental Agreement for October 2015 through September 2019. EPA and the Tribe can discuss commitments for later communication in the context of a Tribal Environmental Agreement covering the period after September 2019.

Comment 101
Concerned the permit has no end date, so long as the injection well is in compliance with new or revised regulations as reviewed by EPA every 5 years. After issuance, the Saginaw Chippewa Indian Tribe’s opportunity to limit any impact to groundwater resources has ceased.

Response 101
The permit authorizes injection into the Smith 1-17 well for the life of the well per 40 C.F.R. § 144.36. After issuance of the permit WB Osborn must submit construction reports and mechanical integrity test results to EPA. If the reports meet construction and mechanical integrity standards, only then will EPA provide authorization to inject (40 C.F.R. § 146.8). The well must be operated in accordance with the permit. According to 40 C.F.R. § 144.40, EPA may terminate a permit for noncompliance with any part of the permit, failure to disclose relevant facts, misrepresentation of facts or endangerment to human health. Every 5 years the permittee must repeat the mechanical integrity testing. If the well fails the mechanical integrity test, WB Osborn must stop injection, correct the problem and ask EPA for authorization to resume injection. Additionally, under 40 C.F.R. § 144.36, EPA must review the permit every 5 years to determine whether it should be modified, revoked and reissued, or terminated. The Saginaw Chippewa Indian Tribe is encouraged to contact EPA to discuss concerns or report problems regarding any injection well and prevent any adverse impact to groundwater resources.

Comment 102
Feel our voice has no merit when it comes to the possible creation or prevention of an environmental crisis. Industry and economics has a stronger and louder voice when weighed against citizens, but it is our home and it is our health that is affected.

Response 102
As a regulatory entity, EPA was established in part to apply and ensure that industry operations meet or exceed all applicable environmental laws. This includes opportunities for public participation and input in the decision process. EPA supports public participation, comments and awareness on all of its proposed permitting actions and must consider and respond to all significant comments on the draft permit raised during the public comment period, whether the comment comes from a citizen or a company, equally.

40
Because of the protectiveness provided when the UIC requirements were applied to this well through the permitting process, the design, engineering, construction, operation and maintenance requirements and the experience of the UIC program, EPA has concluded that it is appropriate to issue a permit for the Smith 1-17 well. Returning waste fluids to a confined formation below the lowermost USDW through a properly constructed and operated injection well is an environmentally sound and permitted procedure.

Comment 103
Make sure that the laws are followed as they are written.

Response 103
Please see the response to Comment 72.

Comment 104
EPA must secure the resources to keep good, clean drinking water for the community if a Class II permit is issued.

Response 104
The resources for the operation of EPA are provided by Congress. EPA has determined that there should be no impact to the drinking water resources as a result of injection into this well. The geologic siting, engineering and construction, and operating and monitoring standards applied to the Smith 1-17 well are sufficient to protect the USDW. Only after a thorough review of the permit application, public comments, and any additional information received, did EPA determine that the proposed Smith 1-17 well met all federal requirements to protect drinking water in the area.

Comment 105
With the DEQ and EPA's poor record of protecting the environment, we cannot trust them to make a safe decision about this well.

Response 105
Modern injection well permitting actions are safe and protective of USDWs because of the geologic siting, well engineering, and operating and monitoring standards set by the federal UIC regulations.

Comment 106
Governmental regulations and testing has failed many times, most recently in Flint. Why should EPA be trusted? Why should we trust the 40 year old law based on knowledge of 40 years ago versus now?

Response 106
Although the SDWA is over 40 years old, it has been amended by Congress from time to time as needed. The most recent amendment was in 2016. Regarding the federal injection well program, EPA is not aware of any documented case of an EPA regulated injection well contaminating a USDW. Before EPA regulated underground injection wells there were several incidents where injection wells failed. A review of well failures that EPA conducted during development of the
regulations showed that the federal UIC regulations, as are now enforced, would have prevented these failures. Modern injection well permitting actions are extremely safe and have a record of proven protection of USDWs because they are constructed and operated to high standards set by the federal UIC regulations. Please see the response to Comment 93.

EPA has determined that there should be no impact to the drinking water supplies as a result of injection into this well. The geologic siting, engineering and construction, and operating and monitoring standards applied to the Smith 1-17 well are sufficient to protect the USDW. Only after a thorough review of the permit application, public comments, and other additional information received, did EPA determine that the proposed Smith 1-17 well met all federal UIC requirements.

Comment 107
WB Osborn is suspected of filing for waste injection under false pretenses because they drilled wells on the margin of an oilfield where there would be no successful oil production. Feel the company will buy waste to inject into a “dry hole.”

Response 107
Records show that MDEQ originally issued a permit for the Smith 1-17 well to be drilled, tested and completed as an oil/gas production well. EPA does not have regulatory authority for oil and gas production wells in the State of Michigan, and has no opinion on the intent of the company’s original purpose for the well. A completely separate review of the permit application for this well was conducted by EPA to determine whether the federal standards for an injection well could be met. EPA determined that the injection well standards applied to the Smith 1-17 well are sufficient to protect the USDW.

Injection into the Smith 1-17 well is limited by the permit to noncommercial brine disposal from production wells owned or operated by WB Osborn. The injection of unauthorized fluids is subject to civil penalties, fines, and other enforcement action under the SDWA.

Comment 108
Concerned Osborn Oil may turn area into a landfill to save money on disposal with no regard or compensation to anyone in the community.

Response 108
Disposal into the Smith 1-17 well is limited by the permit to the underground injection of brine from production wells owned or operated by WB Osborn into a deep, confined underground formation. It does not authorize the company to operate a landfill or any other related operation. EPA does not consider the economic decision by a company to pursue injection verses other disposal options. Nor does EPA consider the compensation provided to land owners. Our responsibility is to ensure that all applicable UIC program requirements have been met and the permitted well injection will not impact the USDW.

Appeal
In accordance with 40 C.F.R. § 124.19(a), any person who filed comments on the draft permit or
participated in the public hearing may petition the Environmental Appeals Board (EAB) to review any condition of the final permit decision. Additionally, any person who failed to file comments on the draft permit may petition the EAB for administrative review of any permit conditions set forth in the final permit decision, but only to the extent that those final permit conditions reflect changes from the proposed draft permit. Any petition shall identify the contested permit condition or other specific challenge to the permit decision and clearly set forth, with legal and factual support, petitioner’s contentions for why the permit decision should be reviewed, as well as a demonstration that any issue raised in the petition was raised previously during the public comment period (including the public hearing), to the extent required by these regulations. The petition should also state whether the permit issuer has already responded to the issue raised (including in this response to comments) and provide an explanation of why the permit issuer’s response to comments was inadequate, as required by 40 C.F.R. § 124.19(a)(4).

If you wish to request an administrative review, documents in EAB proceedings may be filed by mail (either through the U.S. Postal Service (“USPS”) or a non-USPS carrier), hand-delivery, or electronically. The EAB does not accept notices of appeal, petitions for review, or briefs submitted by facsimile.

All submissions in proceedings before the EAB may be filed electronically, subject to any appropriate conditions and limitations imposed by the EAB. To view the Board’s Standing Orders concerning electronic filing, click on the “Standing Orders” link on the Board’s website at www.epa.gov/eab.

All documents that are sent through the USPS, except by USPS Express Mail, must be addressed to the EAB’s mailing address, which is: Clerk of the Board, U.S. Environmental Protection Agency, Environmental Appeals Board, 1200 Pennsylvania Avenue, NW, Mail Code 1103M, Washington, D.C. 20460-0001.

Documents that are hand-carried in person, delivered via courier, mailed by Express Mail, or delivered by a non-U.S. Postal Service carrier (e.g., Federal Express or UPS) must be delivered to: Clerk of the Board, U.S. Environmental Protection Agency, Environmental Appeals Board, 1201 Constitution Avenue, NW, WJC East Building, Room 3334, Washington, D.C. 20004.

A petition for review of any condition of a UIC permit decision must be filed with the EAB within 30 days after EPA serves notice of the issuance of the final permit decision. 40 C.F.R. § 124.19(a)(3). When EPA serves the notice by mail, service is deemed to be completed when the notice is placed in the mail, not when it is received. However, to compensate for the delay caused by mailing, the 30-day deadline for filing a petition is extended by three days if the final permit decision being appealed was served on the petitioner by mail. 40 C.F.R. § 124.20(d). Petitions are deemed filed when they are received by the Clerk of the Board at the address specified for the appropriate method of delivery. 40 C.F.R. § 124.19(a)(3) and 40 C.F.R. § 124.19(i). The request will be timely if received within the time period described above.

For this request to be valid, it must conform to the requirements of 40 C.F.R. § 124.19 available electronically at http://www.gpo.gov/fdsys/pkg/CFR-2013-title40-vol23/pdf/CFR-2013-title40-
This request for review must be made prior to seeking judicial review of any permit decision. Additional information regarding petitions for review may be found in the *Environmental Appeals Board Practice Manual* (August 2013) and *A Citizen’s Guide to EPA’s Environmental Appeals Board* (January 2013), both of which are available at [http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/General+Information/Environmental+Appeals+Board+Guidance+Documents?OpenDocument](http://yosemite.epa.gov/oa/EAB_Web_Docket.nsf/General+Information/Environmental+Appeals+Board+Guidance+Documents?OpenDocument).

The EAB may also decide on its own initiative to review any condition of any UIC permit. The EAB must act within 30 days of the service date of notice of the Regional Administrator’s action. Within a reasonable time following the filing of the petition for review, the EAB shall issue an order either granting or denying the petition for review. To the extent review is denied, the conditions of the final permit decision become final agency action when a final permit decision is issued by the EPA pursuant to 40 C.F.R. § 124.19(1).

**Final Permit**

The final permit and Response to Comments document are available for viewing at the Big Rapids Community Library, 426 S. Michigan Avenue, Big Rapids, Michigan.

Christopher Korleski  
Director, Water Division  
U.S. Environmental Protection Agency  
Region 5

Date **5/24/17**