UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION 5 77 WEST JACKSON CHICAGO, IL 60604-3590 ATTN: WU-16J

APPEAL FROM FINAL PERMIT FOR THE JORDAN DEVELOPMENT, LLC WELL IN GLADWIN COUNTY, MICHIGAN; U.S. ENVIRONMENTAL PROTECTION AGENCY PERMIT NUMBER MI-051-2D-0031

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BACKROUND I am exercising my right to petition the Environmental Appeals Board (EAB) for administrative review of Permit Number MI-051-2D-0031. I would like the EAB to review the following issues that remain unaddressed, insufficiently supported, or simply erroneous in the responses to the Public Comments, U.S. Environmental Protection Agency Underground Injection Control Permit # MI-051-2D-0031, Jordan Development, L.L.C., Gladwin County Michigan.

STANDARD OF REVIEW The Environment Protection Agencies Final Permit for the Jordan Development, LLC well in Gladwin County Michigan; U.S. Environmental Protection Agency Permit Number MI-051-2D- 0031 "is based on either a clearly erroneous finding of fact or conclusion of law, or involves an important matter of policy or exercise of discretion that warrants review." Id. (citing 40 C.F.R. § 124.19(a)). The petitioner challenging the permit decision bears the burden of demonstrating that review is warranted. Id. Here, the EPA premised its issuance of the Final Permit for the Jordan Development, LLC well in Gladwin County, Michigan US EPA permit # NI-051-2D-0031 upon clearly erroneous facts and a lack of exercise in discretion with regards to environmental impact and citizen's concerns.

1. Public Comment, EPA Response #15 (Pg. 9),

EPA Response #15 is not using discretion by issuing a Limitless Volume Permit with only suggested maximum volumes. Class II (UIC) Injection Wells permitted by the EPA have been linked to seismic activity due to the volume of fluid injected.

2. Public Comment #6, EPA Response # 6 (Pg. 5),

Public Comment #6 shows public concern over volume. The EPA Response # 6 is lacking discretion in that it admits that the volume allowed in the permit is limitless while Class II (UIC) Permitted Wells in other states are being directly linked to seismic activity due to high volume injection of waste liquids and pore space. The public concern is not over "pore-pressure". The EPA Response # 6 does not show discretion for other documented issues directly related to high volume liquid waste injection. There are other factors to consider other than "pore-pressure" when evaluating the VOLUME of injected fluids into the Earth.

3. Public Comment #5, EPA Response #5 (Pg. 4,5)

The "Area of Review" is insufficient and the EPA is not showing discretion by reviewing a radius of ¼ mile + 550 feet. Per the USGS, seismic activity does not always occur near the site of injection.

4. Public Comment #10, EPA Response #10 (Pg. 6)

EPA Response # 10 is erroneous in that it states "There is no established definition of "Toxic Waste"". Per the EPA, toxic waste is one of the four types of characteristic hazardous wastes, along with corrosive, ignitable and reactive.

STATEMENT OF REASONS

Public Comment #15 and EPA Response #15 (pg. 9,10) iterate the concern over seismic activity. Not only the effects of seismic activity on the proposed class II injection well but also the effects of the injection well on seismic activity. Effects of injection of large amounts of fluids are not included in the EPA response. According to Response #15 The EPA considered the following:

1. A known or suspected fault in the area of review 2. The history of successful disposal wells in proposed area 3. Earthquakes recorded by the USGS 4. The USGS 15 year quick probability map 5. The USGS assessment of hazard values 6. Area specific factors

before concluding "the probability of natural seismic event is negligible, as is the probability of this well causing an induced seismic event". p. 9,10 This is erroneous. In fact, it is well known within the industry itself that injection of large amounts of fluids, 300,000 barrels per month into a Class II Injection Well, has been attributed to recent earthquakes in Oklahoma and Pennsylvania. The following is taken from the Pennsylvania Independent Oil & Gas Association newsletter:

"Some recent concern with UIC disposal wells has been related to induced seismicity. Induced seismicity is seismic activity that originates from anthropogenic activity rather than from the natural movement of the Earth's plates. DEP confirmed in early 2017 that it recorded the first earthquakes in the Commonwealth related to completion of Utica wells in Lawrence County.2 The five earthquakes were tremors of 1.8 and 2.3 on the Richter scale. Earthquakes of that magnitude cause no physical surface damage and cannot be felt above ground. Oklahoma has experienced seismic activity related to its 3,200-plus injection well industry. In 2011, residents were injured and 200 buildings were damaged by a 5.7 magnitude earthquake experts say could be linked to wastewater disposal wells.3 Studies found the strongest correlation between induced seismicity and UIC disposal wells where high volumes of fluid—around 300,000 barrels a month—are injected quickly. No UIC wells permitted or pending in Pennsylvania are

permitted to inject more than 54,000 barrels a month. DEP has taken two recent steps related to seismicity concerns. First, it expanded its seismic monitoring network to thirty real time seismic stations throughout the Commonwealth, as well as five rapid response temporary stations to be deployed to events of significant interest.4 Second, the department included seismic monitoring conditions on the three most recently issued state well permits for UIC wells in Elk, Clearfield and Indiana counties. These permit conditions include the installation of a seismometer and continuous recorder at the disposal well, incorporation of the data into the Incorporated Research Institutions for Seismology network, and a seismic contingency plan with monitoring, reporting and mitigation provisions. The contingency plan includes a mandatory termination of injection if a seismic event of a magnitude 2.0 or greater occurs within three miles of the UIC well.5 Whether DEP's recent UIC permit conditions are necessary or appropriate— questions to be decided by the Environmental Hearing Board—oil and gas wastewater disposal options will continue to be a topic for creative exploration and innovation by operators, treatment facilities agencies and the public." (Pennsylvania Independent Oil & Gas Association, 2017)

The Grove #13-11 Class II Injection well permit has no upper limit for volume with the recommended maximum of 20,000 barrels per day or 600,000 barrels per month. In lieu of recent developments relating a high volume (300,000 barrels per month) Class II well injection to seismic activity, this proposed volume of fluid needs to be considered.

Public Comment #6. (pg. 5)

Comment # 6 shows the public concern over the volume of fluid being injected. EPA Response # 6 is erroneous in lieu of recent developments attributing large volume injection to seismic activity. Data from the industry's own association documents seismic activity attributable to high-volume class II pressure injection procedures. Apparently there are more factors to consider associated with the injected fluids into Class II Injection Wells. The EPA Response # 6 only considers injection pressure. The high volume of fluid needs to be considered here. EPA Response #7. EPA Response #7 (pg. 5) states, "Injection pressure is limited in the permit to avoid over pressuring the rock which could cause it to fracture. Slight changes in power pressure in the injection zone will not affect USDW's based upon the geologic setting described in #2 above."

In lieu of recent research noted above, the statement needs to be reconsidered. What classifies as" overpressuring the rock" and how predictable can this threshold be? How close can we get to this theoretical threshold before slight changes in pore pressure would be significant?

Considering that these conclusions for geologic suitability are based on the geologic study published in 1981, (Hydrology for underground injection control in Michigan Part 1) there may be a number of new variables associated with the injection of new volumes not considered at the time of publication of the study from 1981. This is far from current literature. High volume injection was not in practice during the interpretation of the data almost 40 years ago yet the EPA states in Response #2, (pg. 3) "The geologic setting is suitable for the injection of fluids". p. 3,4 The EPA quotes the hydrology study for underground injection control from 1981, "The shelves in the Traverse Group especially the Bell Shale are excellent confining layers." p. 3 Certainly science and technology has advanced since the western Michigan students collected the data for that study published in 1981 concerning underground injection control. The industry has also changed since 1981 and obviously the permitting process is fallible when it comes to the predictability of a geologic setting suitable for the injection of fluids. Class II permitted wells have indeed caused seismic activity associated with high volume injection. (Patrick McDonnell, 2017)

The potential for unintended consequences due to the volume of fluid are not being considered in the responses to public comments. Not only is the EPA not considering he volume, they are completely ignoring it by issuing a "limitless" permit with only guidelines for maximum volumes. As long as the pressure is within limits, the volume and rates of injection are limitless. Injected volumes above 300,000 barrels per month are considered high volume injection and known by the oil and gas industry to cause seismic events. (Pennsylvania Independent Oil & Gas Association, 2017). Even though the contested permit volume is limitless, the EPA recommended maximum injection volume is twice this level at 600,000 barrels per month. A limitless permit would not be prudent and should be reviewed.

Public Comment and EPA Response # 5: (pg. 4,5) Concerns over the quarter mile area of review (AOR). The EPA response states that the AOR was doubled in response to this concern. The radius is then converted to miles squared for the area and then doubled. However this area is not re-converted back to the actual increase in the radius. To describe the AOR in terms of radius being a quarter mile and not present the calculation for comparison in the same scale is purposefully misleading. As the area of a circle doubles the radius only increases by a factor of the square root of two. This appeal is not the place for a mathematical story problem however I found this representation of the facts so preposterous that I had to do the math! The radius increases approximately 550 feet. Therefore the AOR is currently one quarter mile plus 550 feet. According to the EPA Response in #15, (pg. 9,10) the EPA considered faults in the AOR. p. 9.10 I'm not sure if the EPA is aware, but according to numerous pages at the USGS website,

earthquakes induced by fluid injection are not always located near the point of injection. (USGS) USGS quotes "several kilometers" for the potential migration of injection pressure's in "horizontal and vertical directions". The citation from the USGS FAQs page is brief and to the point.

"Question: Are earthquakes induced by fluid injection activities always located close to the point of injection? Answer: No. Given enough time, the pressure increase created by injection can migrate substantial horizontal and vertical distances from the injection location. Induced earthquakes commonly occur several kilometers below the injection point." (USGS)

As expressed by the public in EPA Comment #15 (pg. 9,10) the AOR radius is insufficient and should be reviewed

Public Comment #10 & EPA Response #10 EPA Response # 10 (pg. 6) states "there is no established definition of toxic waste." p. 6 When in fact, toxicity is one of the four characteristics of "characteristic hazardous waste" as described in EPA's document, "Class I Underground Injection Control Program: Study of the Risks Associated with Class I Underground Injection Wells."

"In order for a waste to be a hazardous waste, it must not be excluded by EPA under 40 Code of Federal Regulations (CFR) 261.4(a) or through the delisting process under 40 CFR 260.22. There are two major categories of hazardous wastes: listed wastes and characteristic hazardous wastes. The listed hazardous wastes are described in Subpart D of 40 CFR 261. The second major category of hazardous wastes includes any wastewater that exhibits any or all of the four characteristics of hazardous waste (i.e., ignitability, corrosivity, reactivity, and toxicity) described in Subpart C of 40 CFR 261."

"Pg. 2 Footnote: Hazardous wastes are defined at 40 CFR 261.

"Options for Decharacterized Wastewaters Under RCRA, wastewaters that demonstrate the characteristic of ignitability, corrosivity, reactivity, or toxicity are considered to be hazardous wastes.

• Ignitable wastes are capable of causing fire through friction at standard temperature or pressure. Ignitable wastes are produced by the organic chemical production, laboratories and hospitals, paint manufacturing, cosmetics and fragrances, pulp and paper, and construction industries.

• Corrosive wastes are extremely acidic or alkaline (i.e., have a pH less than or equal to 2 or greater than or equal to 12.5). The organic chemical production, laboratories and hospitals, paint manufacturing, cosmetics and fragrances,

equipment cleaning, soaps and detergents, electronics manufacturing, iron and steel, and pulp and paper industries produce corrosive wastes.

• Reactive wastes are normally unstable wastes that react violently or form potentially explosive mixtures with water. Examples of industries that produce reactive wastes include organic chemical production and petroleum refining.

• Toxic organic wastes contain toxic constituents in excess of a regulatory level. They are produced by organic chemical production, petroleum refining, and waste management and refuse systems." (United States Environmental Protection Agency, 2001)

EPA Response # 10, p. 6-7, is erroneous. Hazardous waste that exhibits toxicity would indeed be a toxic waste. The EPA should be aware of this and acknowledge that the fluid not only exhibits toxicity but is completely incompatible with life. This misrepresentation to the public about the nature of these fluids is pervasive in the entire process. It is purposefully misleading and needs to be reviewed.

EPA response # 10 also states the potential constituents of the injection fluids. p. 7 This information has not been made available to the public. Rigorous questioning at the public hearing did not divulge these facts to the over 300 participants in attendance. In fact, slides presented by the EPA at this meeting only listed basic elements and not organic compounds as the constituents of the fluid. The EPA has fallen short on number four of its own four requirements for issuing any final EPA decisions. Number four requires the EPA to make the response to comments available to the public. Given the chance to inform the public at the public hearing, the EPA neglected to present this information. When questioned specifically as to their constituents, the EPA neglected to present this information again. Only upon issuing the permit are a small percentage of the concerned citizen's privy to this obviously concerning and misrepresented information. The EPA is not making the information available to the public. It is only making it available to the public record. The actual public remains uninformed even after attending the EPA presentation at the public hearing. Other information the public requested at this public hearing that the EPA was unwilling to divulge includes well failure rates, seismic activity data, spill frequencies, injection volumes and most disturbingly the pressure of any of the industry representatives from Jordan Development, LLC

Surprisingly, when questioned by the audience the EPA representative would not state that representatives from Jordan Development, LLC were in attendance and actually sitting right in front of her, as well as in the back of the room. When further questioned by the audience about their presence at the meeting, her eyes told the story as they darted back and forth to

the Jordan employees but her words failed to inform the audience of the facts. Shortly afterward, a Jordan employee identified himself and presented a statement referring to the fluid as simply "water".

The takeaway message from that meeting was that the EPA was "cherry picking" the facts. The EPA is withholding information from the public that they are obviously aware of and blatantly misrepresenting. This deservedly creates an aura of public mistrust of the EPA.

CONCLUSION

I am respectfully requesting that the Environment Appeals Board grant review and remand the final permit for the U. S. Environmental Protection Agency (EPA) Underground Injection Control (UIC) Permit #MI-051-2D-0031, Jordan Development, L.L. C., Gladwin County, Michigan. The volume of fluid is not being considered in this permit. There are known and unknown factors associated with high volume waste injection. One of the emerging consequences of high volume injection is not increasing "pore-pressure", but actually alleviating the pressures in the rocke. The EPA is lacking discretion by issuing a limitless permit. The industry itself is aware of the seismic consequences.

It seems unlikely that the legislation of exemptions and self-regulation will guarantee or even afford the public any protection of the underground water supply from contamination by injection waste. In fact, the opposite is certainly proving to be true. The oil and gas industry is producing this waste at an exponentially increasing rate with its only incentive being to push the limits of the rules for disposal. How effective would an employee drug policy be with self-monitoring and reporting? Exempt a whole class of drugs that will no longer be tested or reported and the drug policy is completely ineffective, as are the exemptions of the oil and gas industry hazardous waste.

The permitting process has become merely a formality of checking boxes. Checking boxes drawn in the 1980s. The UIC program cannot possibly be effective at protecting USDW's using the current barometers of success. The spirit of the clean water act has been lost by legislation of exemptions and self- monitoring/reporting. The science and evidence are accumulating that predict the current rate of hazardous fluid production to be problematic for the future. If "necessity is the mother of invention", then only by setting limits to injection well permits will the necessity be created to find new ways to deal with this form of hazardous waste. Only by enforcing limits will the impetus be renewed for research, research to eventually return this hazardous waste into the coveted resource that it truly is. The technology exists. The only missing pieces are the incentive and the willingness to learn from our past mistakes regardless of the difficulty or financial implications.

Thank you for your time and consideration in this matter.

Respectfully submitted on this 25th day of November, 2018.

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