12-2-14

Tinka Hyde

U.S. EPA Region 5 Water Division

77 W. Jackson Blvd.

Chicago, IL 60604

Dear Tinka Hyde

This letter is to inform you that I, Peter Bormuth, do intend to file a Citizen's civil action against you and the EPA, Region 5 under **42 USC §300j-8. [SDWA §1449]** for failure to perform non-discretionary action, for being in violation of **40 C.F.R. SECTION 144.12(a)** & **40 C.F.R. Section 146.22(c)(2)** and for **willful & wanton misconduct** in the course of your official duties.

By permitting Haystead #9 in Jackson County Michigan on October 1, 2014 [UIC Permit No. MI-075-SD-0010] you as administrator and the EPA Region 5 are knowingly risking the contamination of our underground sources of drinking water and endangering the health of persons.

*"In reviewing an underground injection well permit application, the Region has a regulatory obligation to consider whether geological conditions may allow the movement of any contaminant to underground sources of drinking water." In re Stonehaven Energy Management*, UTC Appeal No. 12-02 LLC Permit No. PAS2DOIOBVEN (EAB March 28, 2013).

Haystead #9 [UIC Permit No. MI-075-SD-0010] and other operating wells in the southern Michigan basin are subject to conditions which will allow for the upward movement of toxic brine into underground sources of drinking water since the upper confining zone is Anhydrite and the Salina Group Salt layers.

The transformation of anhydrite to gypsum through hydration is such a basic and accepted scientific fact that it is taught to college freshman in Geology 101. The Anhydrite conversion process takes place in the presence of water at temperatures below 104$^{o}$F. There is no volcanic activity in lower Michigan and the temperature 100 feet below the surface is 55$^{o}$F degrees. There is 1 degree of temperature increase for each 100 feet you descend so an estimate of the temperature between 2600 and 3100 feet below the surface is 80$^{o}$F to 85$^{o}$F degrees. The

conversion of anhydrite has been reported at a depth of 3500 feet below the surface. The specific depth of these wells are within that range and temperature spectrum.

The average pressure gradient in the Michigan basin is 0.43 lb/ft thus the ambient pressure at these well sites is approximately between 1150 psi and 1333 psi. The solubility of Anhydrite increases sharply with an increase in pressure. Each 0.01Pa increase in pressure results in a 3 to 5 times increase in solubility. Anhydrite rock layers have been observed to swell and increase in volume up to 60% upon exposure to water and when such swelling is prevented due to confining conditions immense swelling pressures from 1.7 up to 4.7 MPa have been monitored and recorded.

Scientific studies also show that the Michigan basin is an active, not closed system, with regard to fluid flow and that the basin has an upward flow gradient. The geochemical data supports a model involving cross-formational fluid flow from depth occurring vertically on the scale of several hundred meters since glaciation. An injection rate of 737psi will conceivably move/lift fluid 1700 feet and such a vertical lifting will endanger my underground source of drinking water.

The dissolving and leaching of anhydrite has been reported in numerous scientific studies and thus makes the Salina Group anhydrite & salt layers inappropriate for Class II oil waste injection wells as an upper confining layer.

Scientific studies also show that Sodium content will accelerates the conversion of anhydrite to gypsum. The EPA has previously described this oil field brine as “salt water” and the EPA website lists these common components of oil field brines:

**Benzene** is a “conclusively” known human carcinogen and a notorious cause of bone marrow failure. Vast quantities of epidemiological, clinical, and laboratory data link benzene to aplastic anemia, acute leukemia, kidney cancer, and bone marrow abnormalities. Benzene exposure has been linked directly to neural birth defects, spina bifida, and anencephaly.

**Ethylbenzene** exposure can irritate the eyes, nose, and throat. Very high levels can cause paralysis, trouble breathing, and death. High exposure may also damage the liver and chronic long term effects can last for months or years.

**Toluene** exposure is associated with effects such as psychoorganic syndrome, visual evoked potential, toxic polyneuropathy, optic atrophy, brain lesions, and cerebellar, congnitive and pyramidal dysfunctions. Low to moderate levels can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, and loss of appetite, hearing, and color vision.

**Xylene** is an irritant of the eyes and mucous membranes at concentrations below 200 ppm. Ingestion of xylene causes gastrointestinal distress, disturbances of liver and kidney function and

may cause toxic hepatitis. Chronic exposure may cause central nervous system depression, anemia, mucosal hemorrhage, bone marrow hyperplasia, liver enlargement, and liver necrosis.

**Naphthalene** is classified as "possibly carcinogenic to humans" and may damage or destroy red blood cells. Exposure may cause confusion, nausea, vomiting, diarrhea, cataracts, blood in the urine, and jaundice. Under California's Proposition 65, naphthalene is listed as "known to the State to cause cancer".

**Polycyclic aromatic hydrocarbons** are known for their carcinogenic, mutagenic, and teratogenic properties. Prenatal exposure is associated with lower IQ and childhood asthma. The Center for Children's Environmental Health reports that exposure to PAH during pregnancy is related to adverse birth outcomes including low birth weight, premature delivery, and heart malformations.

The potential upward migration of these injected toxic chemicals from inappropriately permitted wells in the southern Michigan basin is a serious risk to our underground sources of drinking water and to the health of persons. The EPA has full knowledge that that anhydrite and the Salina Group salt layers will ultimately dissolve upon contact with water allowing for upward migration of these toxic chemicals. I provided the EPA with scientific studies showing that massive anhydrite can be dissolved to produce uncontrollable runaway situations in which seepage flow rates increase in a rapidly accelerating manner. Even small fissures in massive anhydrite can prove dangerous….Within about 13 years the flow rate increases to a runaway situation.

The EPA has previously issued Wayne County facility Sunoco Partners UIC Permit MI-163-3G-A002 on June 5, 2006 which authorizes injection of fresh water to dissolve the F, E, D, C, and B units of the Salina Group to enlarge pre-existing natural gas storage caverns at a depth between 1150 and 1800 feet. The Michigan Basin is bowl shaped and these are the very layers that the EPA claimed would prevent upward migration of brine in response to my public comments and Petition for Review 14-66 on the Haystead #9 injection well permit. In other words, the EPA has previously acknowledged that these layers will dissolve in solution upon contact with water. This information was pre-existing in Region 5 files and shows the EPA blatantly lied in response to my comments on the Haystead #9 well. UIC Permit MI-163-3G-A002 also notes that a limitation on wellhead pressure serves to prevent injection formation fracturing and calculates the limitation using the following formula: [(0,8 psi/ft – 0.433 psi/ft (specific gravity) x depth] – 14.7 psi]. The F member of the Salina formation at 1150 feet was used as the depth, a specific gravity of 1.05 was used for the injected fluid and a fracture gradient of 0.8 psi/ft was determined from a default value for Michigan. The Region approved a maximum injection pressure of 382 psi for this well. Using this same formula previously applied by the EPA and inserting the specific depth of the Haystead well (2870 ft) and the permitted injection pressure of 737psi, the equation shows that

injection could easily produce fracturing in the anhydrite cap and other Salina Group layers, as I have previously claimed. Willful misconduct is an act, intentionally done, with knowledge that the performance will probably result in injury, or done in such a way as to allow an inference of a reckless disregard of the probable consequences. The EPA has negligently and willfully ignored the danger to our USDW from injection at the Haystead site with prior knowledge that the issuance of the permit will result in probable injury to our USDW.

The Clean Water Act treats "willful misconduct" as conduct distinct from, and more egregious than, "gross negligence." The cases interpreting "wilful misconduct" under the CWA support the conclusion that the term includes reckless conduct, such as the EPA's conduct with regard to Haystead #9. *See Tug Ocean Prince, Inc. v. United States*, 584 F.2d 1151, 1163 (2d Cir. 1978)); *Water Quality Ins. Syndicate v. United States*, 522 F. Supp. 2d 220, 229 (D.D.C. 2007); *Morissette v. United States*, 342 U.S. 246, 263 (1952).

This letter gives you fair warning of my complaint and the grounds upon which it rests. I hereby notify you that 60 days from your receipt of this letter a Complaint will be filed in Federal District Court unless the permit allowing the operation of Haystead #9 is withdrawn.

You evil jesus scum in the EPA are deliberately threatening our underground sources of drinking water in the Michigan Basin and I will see you brought to justice for this deliberate, reckless, and willful misconduct. Water is life and you have failed your responsibility to protect it.

Sincerely,

Peter Bormuth

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Jackson, MI 49201

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Dated: December 2, 2014

cc: Dan Wyant, Director MDEQ

William Horn, Counsel, West Bay Exploration Co.