

**EXPERT REBUTTAL  
OF  
DAVID J. ERICKSON**

**TO THE EXPERT REPORT  
OF  
DAVID P. TRAINOR**

*Community Association for Restoration of the Environment, Inc.  
and Center for Food Safety, Inc.*

v.

*Cow Palace, LLC, The Dolsen Companies, and Three D Properties, LLC*

Docket No. 2:13-cv-3016-TOR

**Prepared for:**

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*This Expert Report contains information designated by Defendants as  
“CONFIDENTIAL” under the Stipulated Protective Order (ECF No. 82)*

1. I, David J. Erickson, have been retained by Plaintiffs in the above-captioned matter to provide expert testimony about the manure management and storage practices of Defendant Cow Palace Dairy, LLC (“Cow Palace” or “Defendant”), including whether these activities have caused contamination of soils and groundwater. As part of this role, I have been asked by Plaintiffs to review, and rebut portions of, the expert report of David P. Trainor (the “Trainor Report” or “Report”). The Report contains many statements with which I disagree and/or which require correction.

2. The Cow Palace has approximately 10,000 head of dairy cattle, not several thousand. Trainor Report at 1.

3. While the Cow Palace has earthen lagoons, the current industry trend is to use a synthetic liner to minimize seepage. The difference between soil liners and synthetically lined lagoons has been recognized in Mr. Trainor’s industry since the 1980’s. Lined or double-lined waste impoundments using current construction practices and relevant construction quality assurance/quality control practices are the current state-of-industry for handling of wastes that may impact soil and ground water.

4. While the Cow Palace claims Lagoon 4 meets “standards,” one remolded laboratory permeability test is not sufficient to conclusively or confidently state that the lagoon even meets the permeability requirement in the standard. Remolded laboratory permeability tests involve removal of a soil sample from the site, transport to the lab where they take the disturbed soil and pack it into a permeameter, essentially remolding and compacting the sample according to the owner’s specifications. The aquifer in the area is a source for domestic water supply; the lagoons should be synthetically lined.

5. Mr. Trainor makes reference to concrete or synthetic liners by stating “...those alternatives alone are incapable of providing this secondary attenuation protection.” Trainor Report at 2. The goal of synthetic liners or any liner is to prevent any seepage and not rely on the vadose zone or ground water dilution to attenuate contamination.

6. Current literature and requirements indicate synthetic liners should be required for these liquid manure ponds, given that the depth of the ponds is greater than eight feet and there is no evidence that any liner, let alone a one foot thick soil

liner exists at any Cow Palace lagoon (USDA-SCS, 716, Page 8 - Recommended Design Limits (Revision 1, 1993)).

7. Mr. Trainor spends considerable time and discussion on the NRCS standard with respect to permeability requirements. See, e.g., Trainor Report at 2-3, 6. The remolded permeability test is highly suspect. A remolded permeability test is an order of magnitude estimate only, where the soil is disturbed, sent to a laboratory, compacted into a sampler, and tested. Field permeability testing is more accurate and more representative of actual liner conditions.

8. This standard accounts for, recognizes and allows seepage from the wastewater lagoons; however, the NRCS is not a regulatory agency that enforces any lagoon design or construction standards. While the document has guidelines, these are not enforceable or regulated and verification of compliance with the guideline is not required. As such, the Cow Palace does not have any data that supports the position that these lagoons were designed or constructed to meet any guidelines.

9. This statement is supported by our site visit. The Cow Palace reconstructed the NW Catchment basin without any soil testing to verify compaction or

permeability. The lack of testing by Cow Palace provides direct evidence that the Cow Palace does not follow NRCS guidance.

10. The NRCS was formed as a soil conservation effort and is not regulatory in any way. “NRCS provides America’s farmers and ranchers with financial and technical assistance to voluntarily put conservation on the ground, not only by helping the environment but agricultural operations, too.” NRCS website at <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/about/>. Self-regulation and voluntary regulation has not worked in the history of environmental regulations in the United States. (Miller, 2012, Taylor Publishers).

11. Mr. Trainor continues to discuss soil type, depth to ground water, lack of connection between waste lagoons and ground water, and soil sample results. Trainor Report at 7-10. He then concludes that Lagoon 4 meets NRCS standards, that there is no connection between the waste lagoons and ground water, and that the lagoons show no apparent leakage. *Id.* at 11-13. There are several problems with these conclusions as discussed below.

a. The air rotary drilling method injects a large volume of air at high pressure to lift cuttings from the borehole. As a result, soil samples are highly

disturbed and moisture is compromised, not allowing the field geologist to accurately describe soil structure, pathways for migration, or soil moisture conditions; Lagoon 4 has never been investigated to determine if seepage is occurring. While the Cow Palace opposed investigation by EPA and the Plaintiffs, they did not spend the time or the effort to investigate the lagoon in any manner. Instead of proving their position, they just conclusorily dispute the data that has been collected.

b. Determining leakage into the subsurface is not possible through a visual inspection of the lagoon. Without proper physical coring and sampling, no one can tell from a visual inspection if a lagoon is leaking or sealed. Since neither Cow Palace nor Mr. Trainor has collected any physical data to determine leakage, in addition to the fact that Darcy's Law results in leakage that Mr. Trainor does not dispute, this conclusion has no merit.

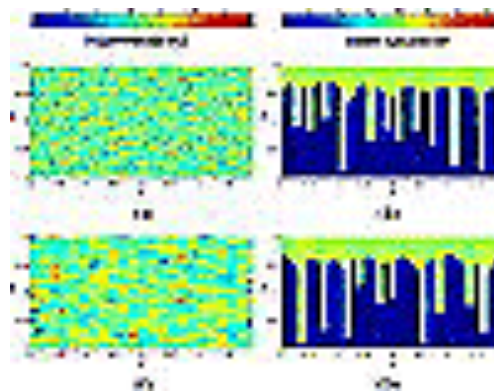
c. Samples collected in the Haak Dairy lagoon indicate multiple perched layers and infiltration consistent with literature data and expected seepage patterns. Expert Report of David J. Erickson at 78-79. Since Haak is the only lagoon we were allowed to sample, this is the best data currently available. While we were

only allowed to core one location, the information gathered is significant. These data indicate seepage through the liner, conversion of ammonium to nitrate under oxidizing conditions and migration of nitrate into the subsurface.

12. In the type of geologic environment found beneath Cow Palace, unsaturated flow occurs in ganglia or fingers along preferential paths (see Figure 1), as shown by the green vertical fingers representing moisture movement in the subsurface.

These pathways transport liquid and contaminants into the subsurface until ground water or a lower permeable material is encountered. This lower permeability material ponds or perches the water on top and the liquid then migrates along the perched layer while or until it migrates deeper into the subsurface through more permeable (preferential) pathways and encounters ground water.

Figure 1. Infiltration under unsaturated conditions (note fingering along preferential pathways).



*Cueto-Felgueroso, 2009, Water Resource Research*

13. A video that further illustrates unsaturated flow in the subsurface is provided by Washington State University, Water movement in Soil, 1950. The video is instructive with respect to both infiltration in the application fields and seepage from beneath the lagoons.

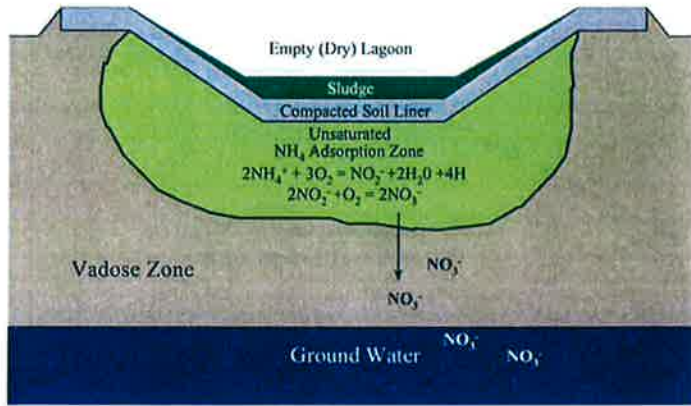
14. While it is highly unlikely you could encounter these fingers through borings, the presence of the perched layers and moisture in the subsurface indicate that infiltration is occurring.

15. During transport, the anoxic wastewater undergoes oxidation, converting the ammonium-rich, positively charged wastewater into negatively charged nitrate-rich wastewater, through natural biological process. Absorption and saturation of ammonium occurs within a few feet of the liner; however, as nitrification occurs, the highly soluble nitrate migrates within the soil moisture without attenuation, as evidenced by a partitioning coefficient reported as 0 or in some cases negative.

While soil samples below the liner and ammonium zone show low concentrations of nitrate, significant nitrate migration is occurring in the soil moisture, which comprises approximately 5-15% of the soil content by weight.



Figure 2. Chemical Characteristics from Lagoon Seepage



*Ham, 1999, Kansas State University.*

Dated: October 20, 2014

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President and Hydrogeologist  
Water & Environmental Technologies, PC

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