Exhibit P

Expert Opinion of David J. Erickson, PG CPG

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David J Erickson, PG CPG
Idaho CAFO General Permit

Introduction

I, David J. Erickson, have worked in the Hydrogeology/Geology field for 35 years. I am currently the Principal/Founder of Water & Environmental Technologies (WET), a 130-person engineering firm started in 2000 that provides engineering, environmental, and remediation services in a 10-state region to a wide variety of clients including private, industrial, and State agencies based in Butte, Montana. I previously served as President of WET for 20 years. I am a registered Professional Geologist in Utah and Wyoming and a Certified Professional Geologist with the American Institute of Professional Geologists.

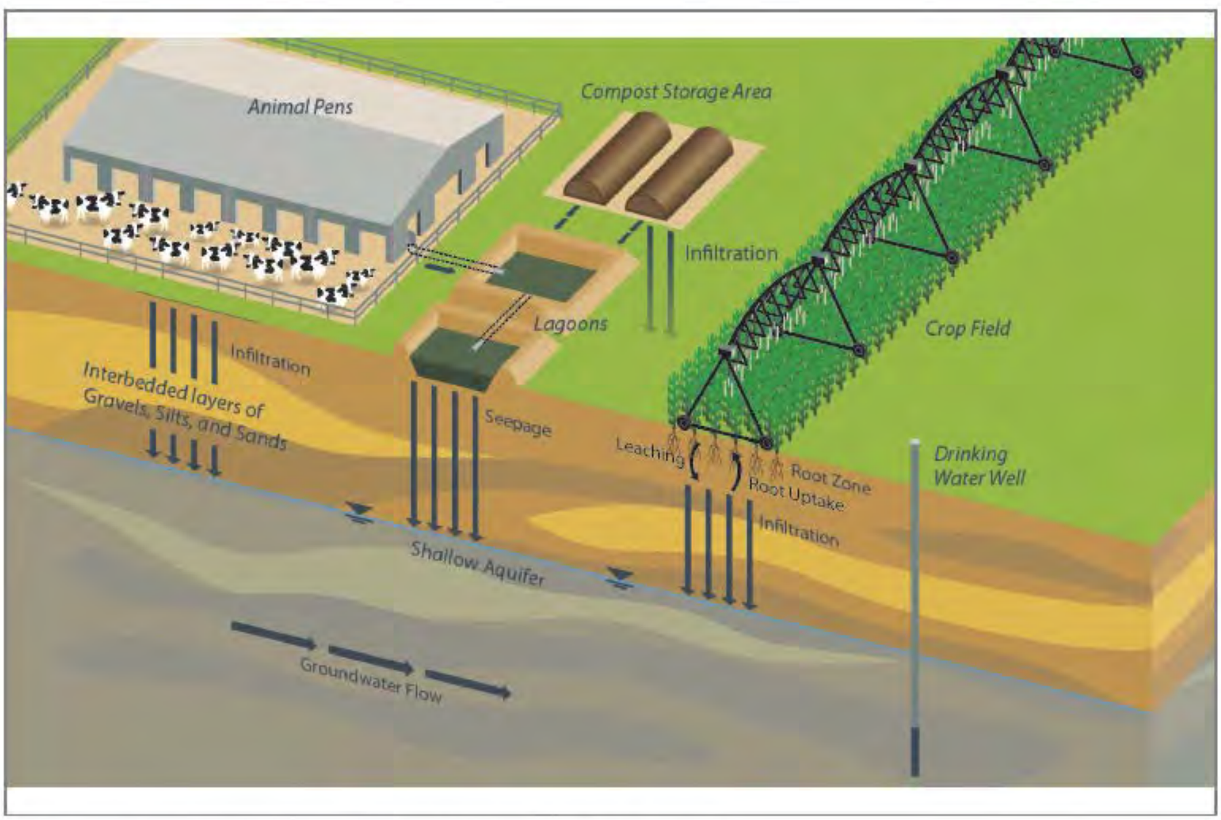
I received my Geological Engineering degree from Montana Tech in 1988. I worked in the petroleum industry in Houston for 1 year and later in the engineering consulting field. My technical focus has been on water related issues: investigation, development, remediation, permitting, litigation, and compliance. I serve as lead expert on several litigation issues as well as Project Manager/ Principal Hydrogeologist on complex remediation and investigation projects in the region including management of waste and water related environmental issues at coal fired generation facilities in Wyoming and Utah.

I have worked on more than 30 Concentrated Animal Feeding Operations (CAFOs) across the nation. I have successfully implemented long-term monitoring programs, lagoon lining projects, and management of CAFO facilities to minimize water quality impacts. Many of these projects are a result of litigation where I provided recommendations for the CAFO to achieve and maintain compliance. My full CV is attached as Attachment 1.

I started working CAFOs in the early 2000's in Montana and in 2013 in the Yakima, Washington area and currently work in several States investigating, characterizing and remediating the impacts to ground water, soil and surface water from these facilities. The principles, pathways and science behind the discharge of pollution by CAFOs is both simple and proven throughout industry. After completing an environmental investigation of more than 30 of these facilities, the sources of contributing contamination to the ground water and surface water include:

1. Lagoons designed to the standards mandated by the draft modified Idaho CAFO Permit (seepage rate of 1×10^{-6} cm/sec) leak and seep substantial volumes of process wastewater.
2. Manure applications to fields are both imprecise and often overapplied, intentionally and unintentionally.
3. Other sources, such as underground piping, compost areas, silage storage, cattle pens, and manure applications are potential sources of contamination.
4. Seepage, leaching, and surface discharges from these sources negatively impact water quality.
5. CAFO contaminated ground water flows toward and causes detrimental impacts to surface water.
6. Pollutants discharging from all areas of CAFOs are a significant threat to human health and the environment.

Figure 1, below, illustrates some of the ways that CAFO pollutants infiltrate or seep into ground water and then discharge to surface waters. Once in groundwater, pollutants will migrate in whatever direction the ground water flows.



EX3

Monitoring of groundwater, surface water, and soil conditions to assess a CAFO's pollution discharges does not require new or innovative technologies. These types of monitoring activities have been a well-established practice for decades. The only scientifically sound method of ensuring that a CAFO is not unlawfully discharging into jurisdictional waters is to: 1) monitor the places where the facility may discharge to surface water, and 2) monitor both groundwater contamination and migration. Such monitoring data are also essential to assessing the effectiveness of CAFO waste management practices and the relationship between precipitation, infiltration, ground water amount and quality, and surface water amount and quality.

CAFO monitoring plans must be tailored to individual facilities and land application areas, similar to how nutrient management plans are facility specific. These site-specific plans must be designed by a professional engineer or geologist with experience in monitoring methodology, systems, and analytical requirements (hereinafter, a "qualified professional"). All monitoring methodologies and systems must be documented in a Discharge Monitoring Plan and all resulting data must be included in publicly available reports, such as Discharge Monitoring Reports or their equivalent. The monitoring plan should be included as part of a CAFO's permit application and made available for public review and comment to ensure it can generate high-quality, representative data capable of demonstrating whether the CAFO has complied with the Permit's discharges restrictions.

Opinions specific to the modified Idaho CAFO General Permit

I. The construction and pollution management requirements in the Permit are not sufficient to prevent or detect discharges from CAFO production areas to surface water through ground water.

The water cycle is well documented and well understood throughout the world. Ground water almost always flows toward a surface water body, whether it be a stream, lake or the ocean. Many States have recognized this interconnection and limit ground water rights because it depletes surface water volumes.

Starting with the lagoon permeability allowance that is deemed protective by EPA, a simple analysis using Darcy's Law proves this position false. Darcy's Law is used to calculate the water movement through soil of a specific permeability. It is expressed as:

$$Q=Kia$$

Where:

Q= water flow (gallons)
K = liner permeability (cm/sec)
i = hydraulic gradient through the material (ft/ft)
a = cross sectional area where flow occurs (ft^2).

The table below provides a range of allowed seepage rates and volumes out of a CAFO lagoon that meets the requirements of the Idaho general permit because it does not exceed the permit's maximum seepage rate of 1 x 10^{-6} cm/sec. Per NRCS guidelines, the majority of lagoons hold approximately 9 feet of liquid manure. Most CAFOs have 2 to10 acres of lagoons, depending on several operational factors. Each 1-acre lagoon on a typical CAFO releases approximately 3,000,000 gallons of contaminated seepage per year or 8,313 gallons per day to the subsurface, clearly neither insignificant nor protective.

The table below uses the CAFO permit's allowed seepage rate times the different gradients based on the liquid level in the lagoon and calculates the seepage rate over a 1-acre lagoon. The highlighted row shows the seepage rate for the common allowed 9-foot depth of a lagoon. To summarize, the general permit allows 8,313 gallon of seepage per day or over 3,000,000 gallons of seepage per year per acre of CAFO lagoon.

Table 1. Typical Lagoon seepage rates

Permeability		Gradient	Q =Seepage per Acre per Day (Gallons)	Q =Seepage per Acre per Year (Gallons)
K (cm/sec)	K (ft/day)	i (ft/ft)		
1.00E-06	2.84E-03	1	923.7	337,159
		2	1847.4	674,319
		3	2771.2	1,011,478
		4	3694.9	1,348,638
		5	4618.6	1,685,797
		6	5542.3	2,022,957
		7	6466.1	2,360,116
		8	7389.8	2,697,276
		9	**8313.5**	**3,034,435**
		10	9237.2	3,371,595
		11	10161.0	3,708,754
		12	11084.7	4,045,914
		13	12008.4	4,383,073
		14	12932.1	4,720,233
		15	13855.9	5,057,392

Nitrate, the main contaminate from CAFO lagoons, has a very low partitioning coefficient, which causes nitrate to migrate quickly in the water and not sorb or diffuse into the soil. As a result, nitrate migrates very quickly through ground water and forms large ground water contamination plumes traveling long distances that can and do reach surface water.

CAFOs discharge contaminants from several areas of the operation; however, lagoon seepage and leakage cause large pollutant contamination including nitrate plumes in ground water that have a high likelihood of impacting surface water.

Construction requirements do not substitute for a leak detection system. Construction issues or mistakes result in leaks and the operator does not know if there is an impact to ground water or surface water without routine monitoring. Routine monitoring can be a set of monitoring wells downgradient of the system or a designed leak detection sump. These systems must be sampled on a routine basis to establish background conditions and sampled for the correct analytes to identify a wastewater discharge.

The Permit also requires visual inspections and routine cleaning. I have reviewed years of inspection data forms for lagoons in several States, and an inspector cannot visually see a leak below the liquid. The liquid is opaque and the leak rate would have to be catastrophic to be visible. As a result, these inspections are not effective in determining if a lagoon is leaking or seeping to a degree that will impact surface waters.

Also, the routine cleaning of manure solids results in excavation, erosion and liner damage over the life of the lagoon. A lagoon that meets the Permit requirement most likely will fail the requirements after the first cleaning. In addition, erosion of an earthen liner at the inlet is well documented and causes a liner breach resulting in a much higher leak rate than is documented above.

II. The liquid manure waste generated by CAFOs has a mix of contaminants that can cause impacts to human health and the environment. Pollution from CAFO wastewater harms the environment and endangers public health.

In addition to nitrogen contamination from lagoons, I have detected fecal coliform, hormones, bovine antibiotics, growth hormones, phosphorus, and chloride in the seepage and in the receiving ground water. These are all problematic contaminants in the environment; however, nitrate is the most mobile contaminant since it does not sorb to soil. These contaminants have known and recognized health effects to humans. Nitrate causes blue baby syndrome and other health effects, while the pharmaceuticals are known endocrine disrupters. Fecal coliform can cause severe gastrointestinal distress.

Data collected by EPA and WET in Washington State show a variety of contaminants are present.

The following table provides average concentration in CAFO wastewater from the Yakima Valley, Washington. These data were collected from sampling conducted by the EPA and WET.

Table 2. Contaminant concentrations in CAFO Wastewater

.pH	TDS	Chloride	Ammonia	TKN	Phosphorus	Calcium	Potassium
s.u.	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L

7.6	3100	230	330	1600	358	122	80

The following list of contaminants is directly from an EPA study of the Dairy Cluster in Yakima, Washington. These compounds have been detected in the drinking water aquifer and are a result of leaking lagoons and overapplication of dairy wastewater.

Table 3. Contaminants found in CAFO Lagoons and Drinking Water Wells, Yakima Washington

Nutrients & Minerals	**Antibiotics**
Nitrate Nitrite Ammonia TKN Chloride	Tylosin Enthromycin Lincomycin Sulfamethazine Tiamulin Virginiamycin Monensin Chlortetracycline Tetracycline
Hormones	**Pesticides & Herbicides**
Estradiol Androsterone Testosterone 7-a-estradiol Androstadienedione 17- β-trenbolone Epitestosterone	Atrazine Alachlor DEHP DEET Bentazon

These compounds are all linked to animal wastes and fall into the general categories of nutrients, antibiotics, and growth hormones. All compounds were detected in both the dairy lagoons and in the drinking water aquifer serving hundreds of residents in the Lower Yakima valley.

III. Pollution from CAFO impoundments and land application areas can reach surface water through ground water due to the hydrological connection between surface water and ground water.

Based on years of performing remedial investigations at industrial facilities and over a decade of investigating CAFOs, the contaminant migration pathway from the source to ground water beneath the facility, with migration to or toward surface water is almost always complete (*i.e.*, ground water almost always flows toward and recharges surface water). It is a natural part of the water cycle. While dilution changes the discharge concentration, the migration pathway is easily characterized using standard ground water investigation techniques. The disturbing data from these facilities is that the nearby neighbor's drinking water well can be as high as 200 ppm nitrate and have a mix of bacteria and other contaminants.

Since nitrate is very conservative, as discussed above, ground water plumes from CAFO operations have been documented to travel several miles. An investigation I completed in Wisconsin showed nitrate traveling in ground water over two miles from the dairy CAFO and impacting Lake Petenwell with concentration above drinking water standard in many of the private drinking water wells along the flowpath. In Washington, hundreds of private water supply wells over a mile downgradient from the CAFO facility are contaminated above drinking water standards. Similarly in California, nitrate has migrated over 2 miles downgradient. Nitrate, the primary contaminant from CAFO waste, moves unattenuated with ground water, migrating to the next receptor: ground water withdrawal or nearby surface water discharge.

Since the Wisconsin site mentioned above was a detailed investigation, cross sections of the site are attached for reference as Attachment 2. These cross sections and data clearly show impacts from a manure lagoon constructed to NRCS standards with a concrete bottom and impacts from overapplication of both manure and chemical fertilizer to the land application areas. They also show a complete contaminant pathway to human exposure and discharge to surface water.

Given the conservative nature of nitrate contamination, a minimal setback from any surface water (100 to 300 feet) is not protective of surface waters. Both the mobility of nitrate and the size and volume of the sources easily cause plumes to migrate more than 300 feet. The Wisconsin site has nitrate migration in excess of 8000 feet through ground water.

Similar to other States, Idaho CAFO density is focused on large alluvial valleys where there is abundant water and large areas favorable for agriculture. These alluvial aquifers are permeable with relatively shallow water tables and fertile soils for crop growth. The areas around the CAFOs are generally rural, relying on ground water wells for drinking water supply.

Due to low precipitation, most of the facilities are open pen facilities that generate large amounts of stormwater runoff, pen scrapings and compost. Compost is a mix of wet manure and bedding that is windrowed in specific areas until the composting process is complete. The compost is moved out of the pens at >50% plus moisture and turned until the moisture is reduced to approximate 30-40% when it starts to heat up and compost. This material drains 40% of the moisture from the manure mix into the ground or the stormwater collection system, if one exists. In my experience, these compost areas are a significant source of soil and ground water contamination where the areas were not managed properly.

IV. Pollution from CAFO land application areas can directly discharge to surface water through a variety of pathways.

CAFO pollution from land application areas can reach surface water directly in several ways in addition to transport via ground water. If CAFO waste is overapplied it can runoff into nearby surface water features such as ditches, canals, rivers, and streams. Also, If CAFO waste is applied on frozen ground or prior to a precipitation event there is a much higher probability of direct discharge to surface water. If waste application equipment malfunctions, for example if an irrigation center pivot malfunctions during application, CAFO waste can reach surface waters as runoff or directly. CAFO waste can also reach surface waters if an operator improperly conducts waste application, such as not observing setbacks, mis-calibrating application equipment, applying to saturated soil, or overapplying.

V. Effective and feasible monitoring techniques are available.

As stated above, the types of monitoring activities sufficient to determine a CAFO's water pollution impacts have been a well-established practice for decades. Below I outline select monitoring options that can be effective and feasible if implemented properly.

A. Ground water monitoring

Purpose: To determine if a CAFO has discharged pollution to surface waters via groundwater.

Available monitoring methodology/system: Groundwater monitoring is a simple and well-established process. Monitoring wells are placed upgradient and downgradient of the field or lagoon to be monitored. Typically, 1-2 upgradient monitoring well(s) and 2-5 downgradient monitoring wells are installed using standard drilling technology. If ground water flow direction and seasonality are already understood at the site, fewer wells can be used to effectively monitor each area (*i.e.*, upgradient wells for 1 field can be downgradient wells for the next field). Sampling is conducted quarterly or semiannually according to the SAP to establish seasonal fluctuation in ground water quality or quantity, to collect representative data, and to establish statistically significant background data. Semiannual sampling is typically sufficient for detection monitoring, with sampling occurring a high ground water and low ground water conditions or prior to application in the spring and after harvest in the fall. If other fluctuations that directly affect ground water flow and transport are identified, more frequent monitoring may be required.

Well drilling, sampling and analysis protocols are documented in both Idaho and EPA documents.[1] Data analysis requires statistical evaluation of the data to determine if upgradient water quality is different than downgradient water quality. A statistically significant delta between these two data sets establishes that the monitored area is contributing pollutants to groundwater.

Multiple regulations have been promulgated that are examples of effective groundwater monitoring regulations, such as 40 CFR 257.90-.98, which applies to Coal Combustion Residuals

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[1] *E.g.* 40 C.F.R. §§ 257.91–.95; Idaho Dept. of Env't Quality, Statistical Guidance for Determining Background Ground Water Quality and Degradation (Mar. 2014), https://www2.deq.idaho.gov/admin/LEIA/api/document/download/4807.

("CCR") in landfills and surface impoundments. These regulations are relevant for CAFO waste management because they provided the basis for ground water monitoring and data analysis documenting the facilities impact to ground water. These regulations also detail construction standards to prevent discharges and corrective measure to remediate those discharges, if they occur. For example, 40 C.F.R. § 257.91(a)-(c) should inform monitoring of CAFO lagoons, silage storage, and manure composting areas and potentially land application areas:

> The groundwater monitoring system must include the minimum number of monitoring wells necessary to meet the performance standards specified in paragraph (a) of this section, based on the site-specific information specified in paragraph (b) of this section. The groundwater monitoring system must contain:
>
> **(1)** A minimum of one upgradient and three downgradient monitoring wells; and
>
> **(2)** Additional monitoring wells as necessary to accurately represent the quality of background groundwater that has not been affected by leakage from the CCR unit and the quality of groundwater passing the waste boundary of the CCR unit.

Groundwater monitoring system should be progressively more rigorous depending on the type of waste impoundment liner used.

1. Earthen liners with a constructed seepage rate of 1 x 10^{-6} require a full groundwater monitoring plan with 2 upgradient and 3 downgradient wells and routine sampling;
2. Synthetic liners with 2' compacted clay subbase require an abbreviated monitoring scenario (1 upgradient and 2 downgradient) and routine sampling; and
3. Double synthetic liner with leak detection or a sump and pump design would not require a groundwater monitoring system.

The monitoring well network in the monitoring plan must be developed by a qualified professional with knowledge of well network design and sampling programs.

The Sample analyte list for groundwater should be, at a minimum:

- Major Mineral: Alkalinity, Calcium, Chloride, Magnesium, Potassium, Sodium, Sulfate
- Nutrients: Nitrate, Ammonia, TKN, Phosphorous
- WQ Parameters: pH, Temp, SC, DO, TDS, total coliform bacteria.

B. Soil monitoring at land application areas

1. Soil sampling

Purpose: Detect nutrient migration through the soil column to identify nutrient leaching to groundwater.

Available monitoring methodology/system: Soil collected with hand auger or mechanical soil probe and analyzed for nutrient and other characteristics.

In order to obtain quality data that are representative, soil samples will be collected at a density of at least 1 per 20 acres of crop. Larger fields of 220-640 acres or fields with consistent soil types could be decreased. The table below presents a recommended sampling density. A minimum of 4 locations should be sampled across each application field. Samples must be collected in each soil type present in the field and should not be composited with other soil types. Together these data provide a representative dataset for the entire application area. The samples will be collected at depth intervals of 0-1', 1-2', and 2-3'.[2] Soil core collection methodology can include hand auger or mechanical soil probe.

Field Acreage	Samples Required
0-20	4
20-40	6
40-160	8
160-640	12

Soil samples should be taken before each application to facilitate proper nutrient application; sampling soil only annually or every three years is not representative and does not enable an operator to make responsible application decisions.

Analysis of the soils should include:

- Ammonia
- Nitrate as N
- Phosphorus
- Potassium
- pH
- Electrical conductivity
- Soil Organic Matter

2. Soil moisture monitoring

Purpose: To determine if soils are saturated above field capacity and causing nutrients to leach to groundwater.

[2] The additional depths allow determination of plant uptake of nutrients versus nutrients leaching past the root zone and contaminating groundwater.

Available monitoring methodology/system: Soil moisture probes are a simple but readily available technology that are easier to operate than lysimeters and provide faster, continuous monitoring.

A soil moisture monitoring program is easily implemented with existing data that the CAFO facility already should have in its Nutrient Management Plan (“NMP”). These can be simple devices that indicate when the soil moisture is above field capacity and leaching of nutrients is occurring. The soil moisture data, combined with routine soil nutrient sampling described above, provide a more accurate assessment of a field’s ability to receive and retain CAFO waste. This data collection provides the operator with the information necessary to identify whether nutrients are leaching to groundwater.

Current soil moisture probe technology has data logging capabilities so the monitoring can continue without operator attention and the data can be downloaded at any time during the year to prevent overapplication that results in discharges to surface waters.

For each field that receives CAFO waste, each soil type present in the application area should contain 1 to 3 soil moisture probes as necessary to collect a representative sample of soil moisture. Operators must identify low lying areas of fields where liquid may pond and install at least 1 soil moisture probe in such areas.

Soil Type Acreage	Soil Moisture Probes Required
0-20	1
20-40	2
40-160	3
160-640	4

C. Above ground discharge monitoring for land application areas

Purpose: To identify surface water features and potential discharge points and monitor the quantity and quality of surface water discharges from a specific CAFO.

Available monitoring methodology/system: Visual monitoring that is representative of the land application area; in stream water quality sampling (up and down stream of a discharge point); and grab sampling of effluent discharges. Surface water sampling technology can be very simple, with grab samples collected by a sampling professional or a trained operator if a discharge point is accessible safely. The grab sample location should be permanently marked to allow collection in the same location over the monitoring period.

Surface water sampling can also be more complex. For example, an ISCO automatic flow proportionate sampling device could be considered, but these devices require experienced operators. Similarly, an operator could use time- or event-controlled samplers such as Isco 6712 or 6712c.

Surface water sampling requires identifying monitoring locations that ensure collection of representative data. It is important to establish minimum requirements and standards, but due to the variability in where such monitoring locations will be for a given CAFO, a qualified professional should determine the correct location for representative sample collection to provide the necessary flexibility. The professional should also provide a monitoring plan that describes monitoring locations during and immediately following applications near surface water features. This assessment must be included in the facility's monitoring plan. This qualified professional must certify that the details contained in the monitoring plan are appropriately tailored to the specific CAFO and will generate representative data.

As discussed above, land application events can result in discharges to nearby surface water features. Land application often occurs over many acres, sometimes via largely automated systems such as pumps that deliver CAFO waste via pipes to irrigation center pivot systems.

Surface water monitoring must include, at a minimum,

- Frequency:
    - Visual monitoring to identify all pollutant discharges must occur during and after each land application event.
    - When a discharge occurs, analytical monitoring of both the effluent discharge and receiving water during the discharge event.
- Location:
    - For visual monitoring, operators must choose locations that are designed to produce data representative of the entire application area. This may require monitoring along the length of a downgradient edge of field, monitoring at the four corners of a field, or other set of locations tailored to the specific field's discharge potential. Visual monitoring must monitor for conduit discharges (e.g., tile drains) and sheet flow.
    - Grab sample at the point of discharge, if accessible safely.
    - For waters immediately adjacent to production or land application areas, 1 monitoring location immediately upstream of the CAFO and 1 monitoring location immediately downstream of the CAFO. If there are multiple discharge points, a monitoring plan may be able to collect representative data with 1 upstream and 1 downstream monitoring location, but if non-CAFO contributions are present operators should choose monitoring locations as close to the discharge point(s) as is practical to isolate the CAFO's impacts to the receiving water's quality.
    - Tile drain outfalls.
    - Furrows or other topographical features likely to discharge liquid from a field.
    - Application equipment must be inspected by a trained operator prior to each land application event.

The analyte list for CAFOs is provided below but EPA may require additional analysis to better characterize the surface water seasonality or local surface water variation.

Analyte List

- Major Mineral: Alkalinity, Calcium, Chloride, Magnesium, Potassium, Sodium, Sulfate
- Nutrients: Nitrate, Ammonia, TKN, Phosphorous
- WQ Parameters: pH, Temp, SC, DO, TDS, TSS, total coliform bacteria (e-coli P/A).

VI. The operation of multiple CAFOs in one concentrated area aggravates the impact of CAFO pollution on water quality.

Several States recognize cumulative effects from multiple facilities that discharge pollutants. This was especially evident in the Dairy Cluster Investigation completed by the EPA in the Yakima Valley (Lower Yakima Valley Groundwater | US EPA). The dairy cluster investigation identified leaking lagoons, overapplication in the fields and a general nitrate plume increasing from no detect to over 200 ppm nitrate in ground water. It also identified contamination of private drinking water supply wells above EPA Maximum Contaminant Levels (MCL) above which health effects are known and recognized in humans.

The increasing trend in nitrates along ground water flowpath are a direct result of cumulative effects from the multiple sources of soil and water contamination at the CAFO. In many investigations, the application fields are the major contributor to cumulative effects since they represent a constant nutrient load over each application field. The constant flux of nutrients from multiple sources at a single CAFO to ground water results in increasing concentrations along the ground water flowpath. Multiple CAFOs in the same area only increase the number of contaminant sources and result in increasing contaminant concentration along the ground water flowpath and subsequently in surface water.

The current knowledge base in the science of hydrogeology, hydrology and contaminants in the environment make clear that the Permit is not precluding the discharge of CAFO pollution to Idaho's surface waters. As these CAFOs continue to increase in size, the volume of manure generated becomes overwhelming and the facility is forced to become a waste handling operation. CAFO waste represents a highly mobile mixture of contaminants with known and recognized detrimental effects on human health and the environment, typically placed in an area with many human and environmental receptors.

To further illustrate this point, each dairy cow produces an estimated 140 pounds per day of waste and 22 pounds of produced milk per day per dairy cow. The waste to milk ratio is 6.36 lbs waste/ 1 lb of milk. At the same time the trend in the industry is less facilities confining greater numbers of animals. These data indicate that waste management issues at the CAFO are growing faster than actual milk production.

Dated August 23rd, 2023.

__*s/ Dave Erickson*______________________________
David J. Erickson

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Education

- Bachelor of Science, Geological Engineering, Montana College of Mineral Science & Technology 1988
- Continuing Education Credits – 1990, 1991

Professional History

- *Water & Environmental Technologies*; Butte, MT, Founder/Principal Hydrogeologist, August 2019 to present
- *Water & Environmental Technologies*; Butte, MT, President/Principal Hydrogeologist, August 2000 – August 2019
- *Atlatl, Inc*., Butte; MT, Principal Hydrogeologist/Project Manager, May 1994 – August 2000
- *Special Resource Management, Inc.;* Butte, MT, Geological Engineer/Hydrogeologist, 1990-1994
- *Woodward-Clyde Consultants;* Houston, Texas, Staff Geological Engineer/Hydrogeologist, 1989-1990
- *Petroleum Testing Service;* Houston, Texas, Geological Technician, 1988-1989

Representative Experience

Project Manager and Hydrogeologist responsible for the characterization and remediation of a dissolved solvent plume from a county landfill. Remediation consists of in-situ air sparging and a funnel-and-gate capture and in-situ treatment system. The sites complex fractured bedrock and extremely complex ground water flow characteristics required innovative investigation technology to understand the water and contaminant interaction between the bedrock and the alluvial aquifers and ground water and surface water. Project highlights include:

- The use of geophysical method to characterize the bedrock topography and the connection and interaction between aquifers,
- The use of direct push subsurface investigation methods to characterize site conditions and identify contaminant transport pathways,
- Ground water flow and contaminant transport modeling to describe site conditions and test remedial options,
- The installation of source specific remedial methods to control landfill leachate impacts,
- Long term responsibility for all surface water, ground water, remediation, and reporting requirements for the site, and

- Presentation of site characteristics, model results, and site remediation costs in District Court.

Project Hydrogeologist and Lead Expert for the investigation and characterization of geologic, hydrogeologic, and contaminant migration characteristics of solvent and fuel contamination impacting a residential neighborhood. The goal of the investigation work was to determine the source of contamination and identify the responsible party. Geophysical methods (soil conductivity logging) and depth specific profile sampling was used to identify perchloroethylene migration and degradation in multiple production zones within the alluvial aquifer. This subsurface investigation established a connection between historical lagoon leakage and residential supply wells.

Lead Expert and Project Hydrogeologist on litigation against five large Dairy CAFOs in Washington. The dairies had all expanded over the past 10 years and the excess waste and wastewater production resulted in overapplication to the fields, large leaky storage lagoons and excess storage of waste material on the properties. Litigation ended with a Consent Decree outlining corrective measures to address each issue. Subsequently, Mr. Erickson was hired by one of the Dairies to line the waste lagoons, address the composting issues and aid the Dairy in compliance with the CD and the EPA.

Project Manager and Lead Expert conducting a site investigation to assess the impact of historical mining and milling activities on ground water and stream water quality. Dissolved metals concentrations impacting a small town public water supply system prompted a complaint against the Mining Company. Tailings investigations and in stream tracer testing established a direct connection between stream water contamination and spring contamination.

Project Hydrogeologist/Manager for the investigation and remediation of many UST and Hazardous Waste Sites. Contaminants include fuels, solvents, wood treating compounds, metals, pesticides, herbicides, fungicides, and fertilizers.

Project Manager/Hydrogeologist responsible for the design, installation, and monitoring of various types of remedial technologies or remedial methods including (air stripping, air sparging, vapor extraction, bioventing, bio-cell treatment, biostimulation (ORC), NAPL recovery, in-situ & ex-situ bioremediation, natural attenuation, excavation & off-site disposal).

Project Manager responsible for the investigation and remediation of 29 sites in Montana and North Dakota where pesticides, herbicides, fungicides, fuels and fertilizers were spilled.

Project Manager and Hydrogeologist for extensive study and ground water modeling of contaminant effects from ash disposal ponds on an arid Wyoming drainage. The study involved:

- Prediction of contaminant transport,
- Simulation of remedial options,

- Design, installation, optimization and operation of remediation system,
- Upgrades to recovery system using horizontal wells,
- Geophysical investigation of preferential pathways for contaminant migration,
- Permitting of facility expansion,
- Extensive presentations and negotiations with regulatory agencies, and
- Dispute resolution between the facility and potentially affected parties.

Project Engineer responsible for the design and permitting of a double-lined hazardous and non-hazardous repository with leachate collection and ground water relief system.

Project Engineer and Project Manager responsible for the design of ground water monitoring systems and subsurface geological, hydrogeological, and geotechnical investigation.

Project Hydrogeologist studying ground water fluctuations at a RCRA Part B TSD (Hazardous Waste Disposal Facility) in Oregon. Both hydrogeologic and contaminant transport characteristics were very complex.

Project Hydrologist responsible for sediment transport and stream water quality modeling for mine tailing disposal project in Malaysia.

Project Hydrogeologist responsible for re-permitting several industrial landfills for large coal-fired electric generating plants in Wyoming. Projects involved investigation of water quality degradation from fly ash disposal activities and characterization of the potential health risks. A statistical evaluation of the water quality was completed to identify potential impacts.

Project Hydrogeologist for evaluation water chemistry changes resulting from the use of wastewater for irrigation at a research farm in Utah.

Project Hydrogeologist for yearly monitoring data analysis at several industrial plants with ponds or landfills in Wyoming and Utah.

Project Hydrogeologist performing final phase of landfill siting study for new RCRA Subtitle D Municipal Solid Waste Landfill

Project Hydrogeologist/Manager for the investigation and remediation of many UST and Hazardous Waste Sites. Contaminants include fuels, solvents, wood treating compounds, metals, pesticides, herbicides, fungicides, and fertilizers.

Project Manager/Hydrogeologist responsible for the design, installation, and monitoring of various types of remedial technologies or remedial methods including (air stripping, air sparging, vapor extraction, bioventing, bio-cell treatment, biostimulation (ORC), NAPL recovery, in-situ & ex-situ bioremediation, natural attenuation, excavation & off-site disposal).

Principal Expert and Hydrogeologist for the investigation, characterization and Consent Decree negotiation for a seventeen (17) CAFOs in Washington, California, Georgia and Wisconsin. The projects involved investigation of application fields, compost areas, animal pens, waste lagoons and underground utilities to determine the nutrient and contaminant contribution from each potential source area. In most cases, the projects have reached settlement agreement that result in long-term review and consulting on mitigation methods and implementation of engineering controls to reduce contaminants released to the environment. Several cases involve discussions and negotiations with State or Federal agencies to obtain solutions to the contamination issues.

Expert Witness/Litigation Support Experience

- *Park County v. Burlington Northern Santa Fe Railway Company, Montana Sixth Judicial District Court, Park County, Cause No. DV 97-75, July, 1999.*
- *C&P Packing v. Burlington Northern Santa Fe Railway Company,* Park County, January 2001.
- *Hepp v. Conoco Inc. et. al.,* ADV-2003-14
- *Town of Sunburst v. Texaco et. al.,* CDV-01-179 (a)
- *Town of Superior v. Asarco Incorporated,* US District Court, Missoula Division
- *Aguiar v. Burlington Northern, United States District Court, Great Falls Division*
- *Schammel et. al. v.CR Kendall Corporation, United States District Court, Great Falls Division.*
- *Van Haur v. CR Kendal Corp United States District Court, Great Falls Division*
- *Weiss et. al. v. HCI Dyce Chemical Company, CV-00-123-BLG-JDS*
- *Sieben Livestock Company v. Harp Line Contractors.*
- *Friends of the Little Bitterroot v. Commissioners of Flathead County Cause No.: DV-06-560*
- *Mapleton City Corporation v. The Ensign-Bickford Company,* Case No. 020404933
- *Bergren v. BNSF*: CV-03-120-BLG-RFC
- *Devries v. BNSF:* CV-03-121-BLG-RFC
- *Outlook Enterprises v. BNSF*: CV-03-139-BLG-RFC
- *Hallett Minerals v. BNSF* Cause No. CV-03-161-BLG-RFC
- *Ruggles Excavation v. BNSF* Cause No. CV-03-160-BLG-RFC
- *Burley, Nelson, Meridith v. BNSF*
- *Anderson et. al. v. BNSF Cause No. ADV-2008-101*
- *Kerfoot v. Texaco et. al. Cause No BDV-08-1276*
- *City of Livingston et. al. V. BNSF, Cause No. DV07-141*
- *CARE, Inc. and Center for Food Safety, Inc. v. Cow Palace, LLC, Docket No. 2:13-cv-3016-TOR*
- *DeVries v. N&M Dairy #1 & #2 (E.D. Cal. No. CV-14-00395-JGB-SPx)*
- *Community Association for Restoration of the Environment, Inc. and Center for Food Safety, Inc. v. Cow Palace, LLC, Docket No. 2:13-cv-3016-TOR*
- *Washington State Dairy Federation, Puget Sound Keepers v. State of Washington Dept of Ecology. Consolidated case no. 07-016(c).*

Professional Development

- Hazardous Waste and Geotech Sampling Seminar
- Monitoring Well Installation Seminar
- Analytical Laboratory Seminar (ENSECO)
- Design & Construction of R/C Final Covers
- Enhanced Bioremediation (EPA)
- Ground Water Pollution & Hydrogeology, Princeton
- Geostatistical Analysis in Hazardous Waste Site Evaluation
- Ground Water Summit 2008
- Hydrogeology of Fractured Bedrock NGWA 2017
- Agrochemical Transport and Fate in Soil, Surface Water and Ground Water. June 2022
- Montana Water Law Conference 2007
- Landfill Gas Extraction & Ground Water Corrective Measures (presenter)
- National Ground Water Association Annual Conference – heterogeneity
- Environmental Geochemistry of Metals
- Environmental Isotopes in Ground Water Resource and Environmental Contamination
- Environmental Forensics: Methods & Applications
- 2004 NGWA Water & Environmental Law Conference

Certifications

Professional Geologist, Wyoming PG-3101
Professional Geologist, Utah PG-2250
Certified Professional Geologist, American Institute of Professional Geologists, CPG#9402
OSHA 29 CFR 1910.120 Health & Safety
OSHA 29 CFR Certified Waste Site Supervisor
Certified Monitoring Well Constructor

Affiliations

Association of Ground Water Scientists & Engineers
National Ground Water Association
American Institute of Professional Geologist
American Chemical Society
International Society of Environmental Forensics
International Association of Hydrogeologists

Officer Positions

Board of Directors - Montana Tech Foundation
Board of Directors – Port of Montana
Board of Directors – United Way of Butte and Anaconda
President – SepticNET
President – Real Estate Holding Companies

Awards

Montana Tech Distinguished Alumni Recognition Award, 2003

Montana Ambassador, Montana Entrepreneur of the Year, 2019

Exhibit A, Attachment 2

Results of Investigation into a Wisconsin Dairy CAFO
Conducted by David J. Erickson, PG CPG

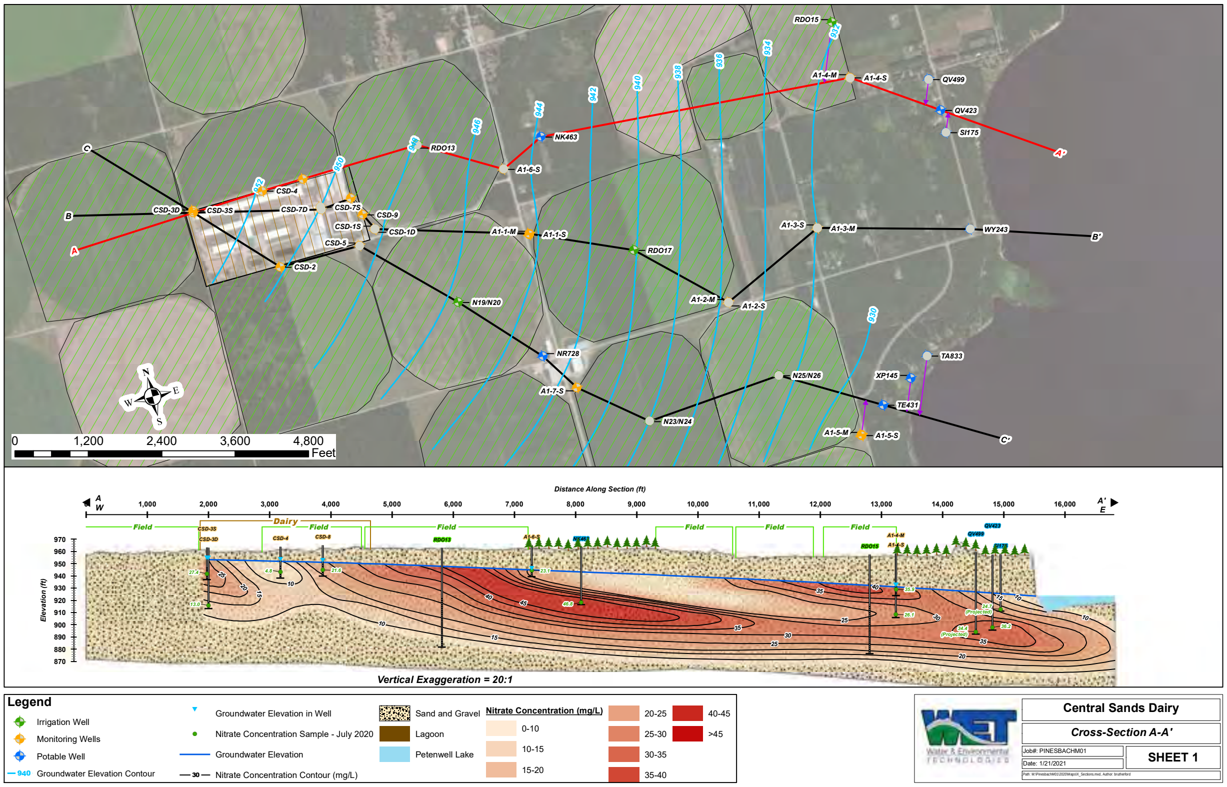

Fig. 1. Nitrate pollution pathways from the CAFO to nearby surface waters are shown in red.