FOR CONSIDERATION IN SUPPORT OF AMARGOSA CITIZENS FOR THE ENVIRONMENT'S PETITION TO THE NEVADA STATE ENVIRONMENTAL COMMISSION FOR A DECLARATORY ORDER AND ADVISORY OPINION RE GROUNDWATER MONITORING

Prepared by:

Charles M. Tebbutt *
tebbutt@westernlaw.org
Western Environmental Law Center
1216 Lincoln Street
Eugene, Oregon 97401
Tel: (541) 485-2471, Fax: (541) 485-2457

***With the assistance of Christina Stephenson and Casey Sanders**

I. INTRODUCTION

Amargosa Citizens for the Environment ("ACE") is comprised of residents of Amargosa Valley. ACE members have lived and worked in Amargosa for decades. ACE members are some of the many citizens concerned about the impacts of Concentrated Animal Feeding Operations (CAFOs). See *Notice of Decision Permit Number NV 0023027*, Division of Environmental Protection, (Oct. 25, 2007)(recording numerous citizen concerns about the Ponderosa Dairy in the Amargosa Valley).

CAFOs are a known source of groundwater contamination. Based on the information contained herein and other information available to the Commission on the threat to groundwater posed by CAFOs, ACE requests that the Commission issue a declaratory order on each of the issues set forth below:

I. The Director of the Department of Conservation and Natural Resources should use the powers allocated to the Director in NAC 445A.250(1) to "reasonably require" that all existing wells in close proximity to Ponderosa Dairy, a confined animal feeding operation ("CAFO"), be monitored for pollutants and degradation of water quality.

II. The Director of the Department of Conservation and Natural Resources should use the powers allocated to the Director in NAC 445A.250(1) to "reasonably require" that a groundwater monitoring program should be instituted at Ponderosa Dairy in a manner so as to detect the movement of contaminants from the operation of the dairy.

III. Sewage as defined in NAC 445A.107 includes dairy feedlots.

ACE further requests that the Commission issue an advisory opinion that:

I. In accordance with the duties described in the Nevada Water Pollution Control Act, comprehensive groundwater monitoring is the only way to adequately protect groundwater because it allows regulators to track pollution from the entire facility and assures that "best management practices" are in fact working.

The information presented in this petition is also intended to provide comments in response to the proposed change to the definition of groundwater proposed by the Nevada Division of Environmental Protection. (Regulation R181-08: Ground Water, hearing scheduled for February 11, 2009)

II. BASIS FOR REQUEST

In accordance with N.R.S. § 233B.120, the State Environmental Commission (SEC or Commission) states in its general overview that, "[a]ny member of the public may petition the Environmental Commission for a declaratory order or an advisory opinion as to the applicability of any statutory provision, commission regulation, or decision." Nev. Rev. Stat. § 233B.120 (2008).

III. REGULATORY DUTY

The Nevada Water Pollution Control Act states that it is the policy of the state of Nevada to, "maintain the quality of the waters of the State consistent with the public health and enjoyment, the propagation and protection of terrestrial and aquatic life, the operation of existing industries, the pursuit of agriculture, and the economic development of the State…" Nev. Rev. Stat. § 445A.305 (2) (2008). In accordance with this mandate, the Commission has the power and duty to "[a]dopt regulations carrying out the provisions of NRS 445A.300 to 445A.730, inclusive, including standards of water quality and amounts of waste which may be discharged into the waters of the State." Nev. Rev. Stat. § 445A.425 (1)(a) (2008).

As discussed below, CAFO practices are likely to lead to groundwater contamination. In accordance with its statutory mandate, the state has instituted a permitting system that applies to CAFOs, such as the Ponderosa Dairy. The petitioner seeks that the state ensures the effectiveness of the system by monitoring the groundwater. In order to supplement the shortcomings of the permitting scheme, the Director of the Department of Conservation and Natural Resources should use the power allocated to "reasonably require" all existing wells in close proximity to Ponderosa Dairy be monitored for pollutants and degradation of water quality. In the case of Ponderosa Dairy, that would require the very minimum of monitoring wells that already exist. In order to assure the most meaningful results, the monitoring should also include wells that would be placed both up and down gradient from the facility in a manner that would detect the movement of contaminants due to the dairy's operations.

In addition to the duty to maintain the water quality of the state, N.R.S. § 445A.525 requires that, "Effluent limitations shall be established and enforced for point sources…which require the application of the best practicable control economically achievable." CAFOs are point sources under NRS 445A.395, thus CAFO dairies are required to apply the best practicable control technology available for their discharges. Nev. Rev. Stat. § 445A.525 (2008).

The Ponderosa Dairy has already polluted the groundwater, a fact that was identified through groundwater monitoring. Because of this pollution, the dairy was required to change its waste treatment lagoon liners. As the Ponderosa Dairy's experience illustrates, and many similar situations around the country confirm, groundwater monitoring is the only way to determine whether the best practicable control practices are in fact working. One method of ensuring that dairy waste does not contaminate groundwater is through nutrient management plans, which specify the level at which nutrients will be applied to the land. However, nutrient management plans alone are not sufficient. Without effective groundwater monitoring, there is no way to know whether these plans are in fact protecting groundwater.

IV. THE PROBLEMS WITH CAFOs

Manure from livestock contains, among other things, nitrogen, phosphorus, pathogens, salts, arsenic, carbon dioxide, methane, hydrogen sulfide, ammonia, antibiotics, pesticides, and hormones.[1] Of the over 150 pathogens found in livestock manure, six account for over 90

[1] Ryan Alan Mohr, *Waterkeeper Alliance v. EPA: A Demonstration in Regulating the Regulators.* 10 Great Plains Nat. Resources J. 17, 24-25 (2006).

percent of food and water borne diseases in humans.[2] In addition, the pollution from CAFOs has been linked to spontaneous abortions, methemoglobinemia in infants (blue-baby syndrome) and unsafe drinking water.[3]

Indeed it is no secret that waste from CAFOs is a significant contributor to water pollution. Robert M. Hirsch, Associate Director for Water, U.S. Geological Survey, U.S. Department of the Interior stated before a 2007 Senate hearing on CAFOs, "[t]he USGS has found CAFOs to be a source of nutrient, pharmaceutical, and metal contaminants in nearby waters and lands receiving wastes."[4] In addition, Benjamin Grumbles, Assistant Administrator for Water, U.S. Environmental Protection Agency also testified at the hearing that, "[i]mproperly managed manure has caused acute and chronic water quality problems and is a significant component of waterbody impairments. Manure and wastewater from CAFOs can contribute pollutants such as excessive amounts of nitrogen and phosphorus, organic matter, sediments, pathogens, heavy metals, hormones, and antibiotics to the environment." *Id.*

In identifying the source of these CAFO contaminants, Grumbles further pointed out that, "animal waste and wastewater can enter waterbodies from spills or breaks of waste storage structures (due to accidents or excessive rain), and over-application of manure to crop land." *Id.*

Given the groundwater quantity problems identified by the State of Nevada in recent years,[5] there should be concern not only for the water withdrawals by large CAFOs such as Ponderosa Dairy, but also the likelihood of continuing contamination of the already imperiled aquifers. Contaminating aquifers already at risk of depletion will only lessen the availability of clean groundwater.

V. EFFECTS OF CAFOS ON GROUNDWATER NATIONWIDE

A. The Environmental Protection Agency

According to the Environmental Protection Agency, "improper management of manure from CAFOs is among the many contributors to remaining water quality problems. Improperly managed manure has caused serious acute and chronic water quality problems throughout the United States."[6] The EPA has recognized that CAFOs threaten both surface and ground water sources.[7]

---

[2] *Id.*

[3] *Id. CARE v. Washington Department of Ecology* Hrg. Transcr. 104:6-25, 105:1-8, 1047:4-9 (April 30-May 4, 2007).

[4] *An Examination of the Potential Human Health, Water Quality, and Other Impacts of the Confined Animal Feeding Operation Industry* Hearing Before the U.S. Senate Committee on Environment and Public Works, 110th Cong. (2007)

[5] See, e.g., Letter from Charles Pettee, Chief, Water Rights Branch, U.S. Dept. of Interior to Mary Jo Rugwell, BLM, dated August 20, 2008.

[6] National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations (CAFOs), 68 Fed. Reg. 7176 (Feb. 12, 2003) (codified at 40 C.F.R. pts. 122, 412, effective Apr. 14, 2003).

[7] *Id.*

Further the EPA has recently observed, "despite more than 25 years of regulation of CAFOs, reports of discharge and runoff of manure and manure nutrients from these operations persist.... The continued trend toward fewer but larger operations, coupled with greater emphasis on more intensive production methods and specialization, is concentrating more manure nutrients and other animal waste constituents within some geographic areas. These large operations often do not have sufficient land to effectively use the manure as fertilizer. Furthermore, there is limited land acreage near the CAFO to effectively use the manure. This trend has coincided with increased reports of large-scale discharges from CAFOs, as well as continued runoff that is contributing to the significant increase in nutrients and resulting impairment of many U.S. water bodies."[8]

The CAFO industry has a persistent history of noncompliance with regulations. One study showed that from 1999-2001, 81 percent of major facilities exceeded their Clean Water Act effluent permits.[9] Over a 15-month period, an estimated 30 percent of major facilities were in *significant* noncompliance.[10] Most of the information on impaired waterbodies involves surface waters. The problems evidenced in surface waters are a bellweather for underground water contamination.

B. Groundwater Studies

While there is a lack of rigorous scientific study on of the effects of CAFOs on the groundwater of Nevada in particular, numerous studies done at other CAFOs around the country show unequivocally the groundwater contamination attributable to large CAFOs.[11] A study done by the United States Geological Survey in the state of Washington showed nitrogen seepage of roughly 2000 lbs (1 ton) of nitrates into groundwater from an earthen lagoon in a single year.[12] A study conducted in New Mexico showed that while concrete or synthetic lagoon liners did reduce nitrate and ammonia groundwater contamination, these liners did not prevent all leakage. The same study also demonstrated an increasing trend toward nitrate contamination of groundwater over the study's five year period.[13] Both government agency and outside studies link various

---

[8] *Id.*

[9] Terence J. Centner, *Enforcing Environmental Regulations: Concentrated Animal Feeding Operations*, 69 Mo. L. Rev. 697 (2004).

[10] *Id.*

[11] See, e.g., California Regional Water Quality Control Board Santa Ana Region, Dairies and Their Relationship to Water Quality Problems in the Chino Basin, (1990); William J. Andrews, Department of the Interior, U.S. Geological Survey, Reconnaissance of Water Quality at Nine Dairy Farms in North Florida, 1990-1991 (1992); The United States Environmental Protection Agency, Office of Wastewater Enforcement and Compliance, The Report of the EPA/State Feedlot Workgroup (1993); Centers for Disease Control and Prevention, Report to the State of Iowa Department of Public Health on the Investigation of the Chemical and Microbial Constituents of Ground and Surface Water Proximal to Large-Scale Swine Operations (1998); University of Minnesota, Environmental Quality Board, Generic Environmental Impact Statement on Animal Agriculture: A Summary of the Literature Related to the Effects of Animal Agriculture on Water Resources; U.S. Envtl. Prot. Agency, Emergency Administrative Order Pursuant to Section 1431(a) of the Safe Drinking Water Act, Docket No. SDWA-06-2001-1239 (2001).

[12] Stephen E. Cox & Sue C. Kahle, *Hydrology Ground-Water Quality, and Sources of Nitrate in Lowland Glacial Aquifers of Whatcom County, Washington, and British Colombia, Canada*, at 102.

[13] Stephen D. Arnold, Ph.D. and Edward A. Meister, Ph.D. *Dairy Feedlot Contributions to Groundwater Contamination (*Environmental Health 1999), at 18.

CAFO practices, such as lagoon leakage and land application of manure, to groundwater contamination.[14]

Numerous scientific studies have documented groundwater contamination caused particularly by wastewater seepage from both lined and unlined lagoons.[15] For example, researchers in Kansas found that the four clay-lined swine lagoons they studied leaked between 0.05 and 0.08 inches a day, which translates to between 0.99 million and 4.35 million gallons per year, or 19.8 to 87.1 million gallons of waste over the twenty-year life of the lagoons.[16] A study in Washington by the U.S. Geological Survey similarly found nitrogen seepage of almost 2,000 pounds per year from an average earthen dairy manure lagoon.[17]

Waste storage lagoons themselves are point sources of water pollution. Groundwater quality would be enhanced by imposing a zero-discharge groundwater effluent standard or by phasing out the use of lagoons altogether.

In addition to the threat posed to groundwater by lagoon leakage, land application of waste can threaten groundwater. A study of crop uptake of nitrogen, commissioned by the Washington State Department of Ecology, found that even with applications under well-managed conditions at agronomic rates, nitrogen leaching can occur, and that excess water in the soil moves nitrates through the root zone into the groundwater.[18] It is generally expected that during irrigation, 10%-15% of irrigation water, even when properly applied, still travels below the root zones and eventually reaches groundwater. Because nitrates are water soluble they will travel with the water into the groundwater table.

The nitrogen leeching that occurs as a result of land application and lagoon leakage is well documented. For instance, a 1999 study estimated that in one Washington county alone approximately 1.6 million pounds of nitrates as nitrogen annually enters the ground water

---

[14] See, e.g., Denis Erickson, Washington State Department of Ecology, Edaleen Dairy Lagoon Ground Water Quality Assessment: February 1990 to February 1991, i (1991) (elevated nitrate and fecal coliform in groundwater down gradient from lagoon in Washington); Dave Garland & Denis Erickson, Washington State Department of Ecology, Ground Water Quality Survey Near Edaleen Dairy, Whatcom County, Washington: January 1990 to April 1993, 19 (1994) (lagoon leakage and application of dairy wastes to the land were contaminating the groundwater); Denis Erickson, Washington State Department of Ecology, Effects of Leakage From Four Dairy Waste Storage Ponds on Ground Water Quality, Final Report 45 (1994) (three out of the four dairy waste lagoons studied contributed to groundwater contamination); Ronald Herman, et al, Washington State University and Washington State Department of Ecology, Nitrogen Use and the Fate of Nitrogen in the Soil and Vadose Zone, 5-2 (2001); Denis Erikson & Wym Matthews, Washington State Department of Ecology, Effects of Land Application of Dairy Manure and Wastewater on Groundwater Quality: Pre- and Post-Animal Waste Holding Pond Monitoring, 45-46 (2002) (in three out of four fields monitored, the average level of nitrates was above the maximum contaminant level for drinking water, both before and after use of the lagoon).

[15] See generally Robbins Marks, *Cesspools of Shame: How Factory Farm Lagoons and Sprayfields Threaten Environmental and Public Health* (National Resources Defense Council and the Clean Water Network, 2001).

[16] See Craig Volland, QEP, "Critique of the Kansas State University Lagoon Research Project," Spectrum Technologies, Kansas City, Kansas (August 7, 1998), p. 1, *available at* http://www.ukansas.edu/~hazards/lagoon/lagcrit.html.

[17] Stephen E. Cox and Sue C.Kahle, *Hydrogeology, Ground-Water Quality and Sources of Nitrate in Lowland Glacial Aquifers of Whatcom County, Washington, and British Columbia, Canada*, at 102. See Table 17.

[18] Herman, *supra* note 14 at 5-1 - 5-3.

system.[19] Of this amount, 1.2 million pounds of nitrogen in the groundwater stems from field application of manure.[20] That amount constitutes 30 percent of the nearly 4 million pounds of nitrogen annually applied to fields in the county.[21] Transport to groundwater was even more direct for nitrogen deposited in waste lagoons. Out of an estimated 492,000 pounds of nitrogen in the waste lagoons, the study determined that approximately 418,000 pounds found its way to the groundwater.[22] At 85 percent, waste deposition in lagoons was determined to have the highest efficiency of nitrogen migration to groundwater of any of the studied land-use activities.

This groundwater impairment attributable to CAFO activities in Washington has also consistently led to nitrate levels that exceed the EPA's standards for contamination.[23] California has also experienced groundwater contaminated with salts and nitrates in California's Chino Basin. This Basin flows into the Santa Ana River, which is used as a recharge source for the drinking water aquifer in Orange County.[24] A 1990 report found dairies contributed up to 88 percent of the agricultural salt load in the basin.[25]

The findings in these and other studies that CAFO's present a significant threat to waters of the state are consistent with the conclusions reached by courts that have considered these issues. See *CARE v. Bosma*, 305 F.3d at 955 ("The very nature of a CAFO and the amount of animal wastes generated constitute a large threat to the quality of the waters of the nation.").

VI. REGULATORY ACTIONS

Groundwater contamination occurs as a result of pollutant infiltration from field-applied manure and wastewater, designed and unintended lagoon leaks, and other parts of the production areas such as pens, feed storage areas, and on-ground storage and composting of manure. Despite this, according to the Nevada Division of Environmental Protection's Fact Sheet on Ponderosa dairy, "CAFOs are regulated based primarily on nutrient application rates, NMP compliance, not the number of animals at the facility."[26]

In addition, in response to comments about the Ponderosa Dairy suggesting upgradient and downgradient groundwater monitoring, the reply was, "The Bureau does not require groundwater monitoring at sites that receive process wastewater and/or manure in accordance

---

[19] Stephen E. Cox and Sue C.Kahle, *Hydrogeology, Ground-Water Quality and Sources of Nitrate in Lowland Glacial Aquifers of Whatcom County, Washington, and British Columbia, Canada*, at 103. See Table 18.
[20] *Id.*
[21] *Id.*
[22] *Id.*
[23] Ron Sell & L. Knutson, Valley Institute for Research and Education, Quality of Ground Water in Private Wells in the Lower Yakima Valley: 2001-2002 (2002); Benny Alsonso, et al., Heritage College, Sunnyside Groundwater Study Final Report (2003).
[24] Marla Cone, *State Dairy Farms Try to Clean Up Their Act*, Los Angeles Times (April 28, 1998).
[25] California Regional Water Quality Control Board, Santa Ana Region, *Dairies and Their Relationship to Water Quality Problems in the Chino Basin* (July 1990).
[26] Bruce Holmgren, *Fact Sheet Permit Number NV 0023027*, Division of Environmental Protection, (Feb. 2007) at 1.

with an NMP/CNMP."[27] However, there is no way to know whether compliance with the Nutrient Management Plan is protecting groundwater without groundwater monitoring.

There is no doubt that lagoons leak and cause groundwater contamination. The current permit sets no standards for lagoon leak detection, and, in fact, leaves it up to the regulated community to decide how to develop a system to account for leakage beyond that which is part of the designed leakage. Waste storage lagoons without synthetic liners leak potentially millions of gallons of wastewater per year into the ground and subsequently into the ground water.

The Notice of Decision reflects the Bureau's flawed plan to protect groundwater: "[t]he Bureau has determined that groundwater monitoring is not necessary at CAFOs that have process wastewater and manure storage facilities lined to current State standards and land apply these materials in accordance with an NMP." [28] While a New Mexico study has demonstrated that synthetic liners are a vast improvement in protecting groundwater over soil or concrete liners, the study still demonstrated that synthetically lined lagoons still had significant nitrate leakage.[29] Ponderosa Dairy has replaced three unlined ponds with a lined pond at Dairy 2 due to increased nitrate levels, acknowledging the failure of unlined ponds to adequately protect the groundwater.[30] Synthetic liners are a good step forward but do not entirely alleviate the problem of lagoon leakage. Only through required monitoring of groundwater in areas close to lined lagoons can the Bureau insure that the liners are creating an adequate seal and are effectively protecting the groundwater from further contamination.

However, the Bureau does not deny that lagoons will leak saying, "there is going to be leakage through those liners, yes."[31] The Bureau acknowledges that it is possible that the leakage will get to groundwater. (response "it will leak through. Will it get to groundwater… It's going to depend on the [leakage] rate, soil permeability, depth to groundwater, and other factors.") [32]

When asked why the Bureau does not require monitoring such that lagoon leakage could be identified, the response was "[b]ecause we [the bureau] did not feel that that [it] was necessary [to regulate CAFOs the same as wastewater treatment plants] for a dairy facility."[33] This is an arbitrary decision directly contradicted by real-life evidence.

To determine the applicable NRCS guidance, the lagoons used by CAFOs must be identified as either waste storage or waste treatment facilities. This is an open question and

---

[27] *Notice of Decision Permit Number NV 0023027*, Division of Environmental Protection, Response 42.10 at 25. (Oct. 25, 2007).

[28] *Id.*

[29] Stephen D. Arnold, Ph.D. and Edward A. Meister, Ph.D., *Dairy Feedlot Contributions to Groundwater Contamination (*Environmental Health 1999), at 18.

[30] Bruce Holmgren, *Fact Sheet Permit Number NV 0023027*, Division of Environmental Protection, (Feb. 2007) at 2.

[31] *Notice of Decision Permit Number NV 0023027*, Division of Environmental Protection, Response 22.4 at 14. (Oct. 25, 2007).

[32] *Id.* at Response 22.5 at 14.

[33] *Notice of Decision Permit Number NV 0023027*, Division of Environmental Protection, Response 22.8 at 14. (Oct. 27, 2007).

lagoons can operate in either a storage or treatment capacity, or both. CAFOs are not allowed to store their waste indefinitely- it is invariably being treated or stored in preparation for land application. NRCS standards, while slightly different for the two types of facilities, have identical language in relation to lagoon seepage that, "the lagoon shall be located in soils with an acceptable permeability that meets all applicable regulations, or the lagoon shall be lined. Information and guidance on controlling seepage from waste impoundments can be found in the Agricultural Waste Management Field Handbook (AWMFH), Appendix 10D."[34]

Reference to the AWMFH reveals "no soil or artificial liner, even concrete or a geomembrane liner, can be considered impermeable....A criterion often used for clay liners is that the soils at grade in the structure, or the clay liner if one is used, must have a permeability of 1 x 10-7 centimeters per second or less."[35] In one recent CAFO case, environmental engineer Dr. Bruce Bell estimated that, using NRCS allowable lagoon leakage, a 10 million gallon capacity lagoon would leak about 2.7 million gallons per year.[36]

Dairy waste has contaminated groundwater around the nation. The Ponderosa Dairy in particular has been shown to have contaminated groundwater.[37] CAFOs should be regulated at least as strictly as wastewater treatment plants. CAFOs produce both waste and wastewater and so should be required to assure that the sewage that is produced be dealt with in a way that does not threaten valuable groundwater resources.

VII. "SEWAGE" INCLUDES DAIRY FEEDLOTS

NAC 445A.107 defines sewage as "the water-carried human or animal waste from residences, buildings, industrial establishments, feedlots or other places, together with such groundwater infiltration and surface water as may be present." It is petitioner's position that dairy wastewater which undoubtedly infiltrates into groundwater constitutes "sewage" as per NAC 445A.107.

Nevada is more than willing to regulate the waste products from residences and feedlots which produce far less waste than a large scale CAFO as sewage, yet it allows massive amounts of dairy waste to be stored without treatment or an appropriate level of groundwater monitoring. CAFO's are feedlots and thus include CAFO dairies. According to studies conducted by the Environmental Protection Agency, an average dairy cow produces up to 23 times the solid waste as an average human.[38]Given that Ponderosa Dairy consists of an estimated 8200 animals, it produces as much solid waste as the entire human population of Nye County four times over. To

---

[34] Natural Resources Conservation Service Conservation Practice Standard, "Waste Storage Facility," Code 313 (2003) at 313-3; Natural Resources Conservation Service Conservation Practice Standard, "Waste Treatment Lagoon," Code 359 (2003) at 359-1.

[35] Agricultural Waste Management Field Handbook, Appendix 10D, "Geotechnical, Design, and Construction Guidelines." P 10D-6.

[36] *CARE v. Washington Department of Ecology* Hrg. Transcr. 712:1-11 (April 30-May 4, 2007).

[37] Bruce Holmgren, *Fact Sheet Permit Number NV 0023027*, Division of Environmental Protection, (Feb. 2007) at 5.

[38] Ltr. from Karen Hudson, Consultant to the GRACE Factory Farm Campaign (June 7, 2004) (available at *www.farmweb.org/Articles/Dairy%20Facts.doc)*

allow such massive amount of untreated waste to be stored without groundwater monitoring is a violation of the letter and spirit of Nevada law.

VIII. PONDEROSA DAIRY IN PARTICULAR

The Ponderosa Dairy began operation in 1993. Since that time it has expanded to three facilities. The Bureau's own fact sheet states, "The facility has an *extensive* history of compliance issues due primarily to elevated nitrate concentrations at the Dairy 2 pond system, MW-2, and to exceeding the flow limitations at Dairies 1 & 2 and Dairy 3." [39](emphasis added)

This history of noncompliance has been mirrored by the industry throughout the country. According to the fact sheet, "Due to increasing nitrate concentrations in the groundwater at monitoring well MW-2, the three Dairy 2 compacted soil lagoons, 14.5 MG total capacity, were replaced in 2005 by a 10.0 MG, with a 2.75-foot freeboard, 60-mil HDPE lined pond."[40] Despite this, "Monitoring wells are not required for pond systems constructed to current lined pond standards."

Ponderosa Dairy has a long history of noncompliance which has indisputably led to groundwater contamination and may threaten nearby domestic water wells. Yet the Bureau is willing to rely on lined lagoons which by their own admission will leak in order to assure the protection of groundwater. It is not just the lagoons that are potential sources of contamination: manure application presents an almost certain source of contamination, even using best management practices. This policy is a clear abandonment of both the letter and spirit of the Water Pollution Act. If the Bureau continues to maintain this policy it amounts to an abject failure in the mission of Water Pollution Bureau: to protect the waters of the State of Nevada.

Ponderosa Dairy lies within a critical watershed. The Office of the State Engineer has increasingly regulated the water basin due to increased groundwater depletion. This depletion would grow exponentially worse if the groundwater were contaminated by increased nitrates and ammonia from a CAFO dairy.

IX. EFFECTIVE GROUNDWATER MONITORING

Groundwater monitoring is the most complete form of monitoring, and tells both regulators and CAFO operators about the entire facility and possible sources of groundwater contamination.

Monitoring is an essential protection for groundwater. Only groundwater monitoring can adequately assess the groundwater quality impact of lagoon leakage, field application and other sources. In order to be effective, all CAFOs utilizing lagoons, waste storage ponds, or manure storage tanks, or land applying manure or wastewater- should be required to install at least one up-gradient and two down-gradient monitoring wells at a depth which the agency considers

---

[39] Bruce Holmgren, *Fact Sheet Permit Number NV 0023027*, Division of Environmental Protection, (Feb. 2007) at 5.

[40] *Id.* at 2.

appropriate, based on site-specific ground water levels and lagoon depth, around the waste storage facility in order to monitor for seepage of waste from the lagoon.[41] Land application does little to prevent groundwater contamination. A study by Tufts University Global Development and Environment Institute showed that most industrial farms stress the surrounding soils'agronomic capacity. The result of this pattern of land abuse is contamination of both surface water and groundwater and then the burden of cleanup falls to the surrounding community, not the industrial farm.[42] Monitoring parameters must include ammonia, nitrate, fecal coliform, total coliform, total chlorides, and total dissolved solids (TDS). Monitoring results must be reviewed regularly by facility staff. CAFOs in vulnerable areas must conduct additional groundwater monitoring.

In many areas of the country, the level of the groundwater table fluctuates in response to rainfall and irrigation practices and varies with the seasons such that certain times during the year the groundwater table can be much higher than other times of the year.[43] During these periods when the groundwater table is high, risk of groundwater and surface water contamination from the production area can be significant. The ability of shallow groundwater tables to act as waste conduits, often to nearby surface waters, are prevalent during high irrigation activity. More frequent groundwater sampling must be performed in order to ensure that groundwater, surface water, and drinking water supplies are protected.

CAFOs must be required to monitor the groundwater beneath the production area as well as groundwater beneath the land application area on at least a bi-monthly basis and submit these results to the permitting authority. The production areas represent another unlined area where manure contaminants can reach the vadose zone and eventually the groundwater as well.

All CAFOs should be required to monitor groundwater to prevent contamination of groundwater that is hydrologically connected to surface water. Only groundwater monitoring can present an accurate picture of the extent of contamination that is undoubtedly occurring.

No CAFOs should be exempt from regular groundwater monitoring, which is necessary to provide long-term protection to our surface waters. Surface waters across the country are impaired due to CAFO discharges to groundwater.

---

[41] Karla A. Raettig, *Improvements Needed in Permitting CAFOs under the Clean Water Act* (National Commission on Industrial Farm Animal Production 2007) at 5. ("The placement of monitoring wells should be based on the site-specific hydrogeology of the area surrounding the CAFO. At a minimum, groundwater monitoring wells should be placed upgradient and downgradient of the facility and upgradient and downgradient of each waste storage structure. The results of the monitoring will help the facilities and the permitting agency to identify leaking structures and to determine when waste has been over-applied on cropland.")

[42] Pew Commission On Industrial Farm Animal Production, *Putting Meat On The Table: Industrial Farm Production In America* (Pew Charitable Trusts and Johns Hopkins Bloomberg School of Public Health 2008) at 59.

[43] William J. Andrews, *Reconnaissance of Water Quality at Nine Dairy Farms in North Florida*, 1990-91. U.S. Geological Survey Water-Resources Investigations Report 92-4058, Tallahassee, Florida 1992.

X. COSTS OF MONITORING

Compliance monitoring is the responsibility of the discharger. Given their gross income, large CAFOs would have little difficulty bearing the cost of compliance with groundwater monitoring requirements. At Ponderosa Dairy, for example, there are already twelve wells, including three that have been used as monitoring wells.

While there will be some initial costs of groundwater monitoring to CAFOs, as with any industry that has an environmental impact, compliance should be calculated into their cost of doing business. A Union of Concerned Scientist Report on CAFO's estimated that the costs of soil contamination under dairy and hog CAFO's in the state of Kansas was roughly $56 million.[44] The same study recommended "strong enforcement of the Clean Water Act as it pertains to CAFOs, including improved oversight at the state level" as well as "more inspectors and inspections, better monitoring and enforcement of manure-handling practices, and measurement of the effectiveness of pollution prevention practices."[45]

Based on calculations from the 1999 penalty phase from a similar industrial dairy, an average production cow will generate $3,800 per year in revenue.[46] Based on this estimate and the population figures (approximately 8,200 production cows) made public, Ponderosa Dairy is generating roughly $31,160,000 per year without adjustment for inflation. While the cost of increased groundwater monitoring may increase the operating costs of the dairy, the revenue stream from an industrial-sized dairy of over 8,000 cows should more than be able to offset the monitoring costs.

Additionally, it should be noted that Rockview Farms, the parent corporation of Ponderosa Dairy, is reported to be the 55th largest private company in the Los Angeles area by revenue.[47] Rockview has shown steady growth, with revenues increasing from roughly $200 million in 2004[48] to $250 million in 2007.[49] Given the strong growth of Rockview's revenues, increased groundwater monitoring would present minimal costs.

---

[44] Doug Gurian-Sherman, *CAFOs Uncovered: The Untold Costs of Confined Animal Feeding Operations* (Union of Concerned Scientists 2008) at 42-51.

[45] *Id.* at 68.

[46] Expert Report of William V. Mason, *CARE v. Henry Bosma* Dairy (October 22, 1999). Revenue estimate from page 8, Population at 2. Formula for revenue per production animal is as follows: Revenue ($15.6 million)/Population Production Animals (4,100)=Revenue Per Production Animal ($3,804.87)

[47] David Nushbaum, *L.A.'S 100 largest private companies: ranked by 2007 revenues* (Los Angeles Business Journal Oct. 20, 2008) (available at http://www.allbusiness.com/electronics/electronics-overview/11679177-1.html).

[48] David Nushbaum, *L.A.'S 100 largest private companies: ranked by 2004 revenues* (Los Angeles Business Journal Oct. 24, 2005) (available at http://www.allbusiness.com/business-planning/612429-1.html).

[49] David Nushbaum, *L.A.'S 100 largest private companies: ranked by 2007 revenues* (Los Angeles Business Journal Oct. 20, 2008) (available at http://www.allbusiness.com/electronics/electronics-overview/11679177-1.html).

XI. CONCLUSION

As one commentator has aptly noted, "...the lack of compliance with existing regulations is part of the problem...facilities are presently allowed to violate permit conditions with impunity."[50] The responsibility to protect the waters of the state is not a matter of discretion.

The only effective way to protect the groundwater and drinking water of the residents of the Amargosa Valley from contaminants emanating from dairy discharges is through mandatory monitoring of all existing wells at Ponderosa Dairy. In addition, the state should require a comprehensive program of groundwater monitoring on the CAFO site in order to track the movement of contaminants emanating from dairy discharges.

Increased monitoring would ensure that water quality would not be adversely impacted, thereby benefiting all residents of the Amargosa Valley and the State of Nevada. Increased monitoring would also encourage dairy compliance by ensuring that discharges are avoided by implementing best management practices and that such best management practices are working.

[50] Centner, *supra* Note 9.