POLLUTION CONTROL HEARINGS BOARD
STATE OF WASHINGTON

WASHINGTON STATE DAIRY FEDERATION, the WASHINGTON FARM BUREAU, PUGET SOUNDKEEPER ALLIANCE, COMMUNITY ASSOCIATION FOR RESTORATION OF THE ENVIRONMENT (CARE), FRIENDS OF TOPPENISH CREEK, SIERRA CLUB, WATERKEEPER ALLIANCE, CENTER FOR FOOD SAFETY, and RE SOURCES FOR SUSTAINABLE COMMUNITIES Appellants, v. STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY, Respondent.	PCHB No. 17-016c FINDINGS OF FACT, CONCLUSIONS OF LAW AND ORDER

I. INTRODUCTION

This appeal involves the Concentrated Animal Feeding Operation (CAFO), National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit (Combined Permit), and the CAFO State Waste Discharge General Permit (State Only Permit) issued by the Department of Ecology (Ecology) on January 18, 2017, (collectively, the Permits). The Pollution Control Hearings Board (Board) received, and consolidated for hearing, two separate appeals of the Permits. Appellants Puget Soundkeeper Alliance, Community Association for the Restoration of the Environment (CARE), Friends of Toppenish Creek, Sierra

Club, Waterkeeper Alliance, Center for Food Safety and Resources for Sustainable Communities (collectively PSA) were represented by Attorneys Charles M. Tebbutt, Daniel C. Snyder and Sarah A. Matsumoto of Law Offices of Charles M. Tebbutt, PC, Andrea K. Rogers and Andrew M. Hawley of Western Environmental Law Center, and Katelyn J. Kinn of Puget Soundkeeper Alliance. Appellants Washington State Dairy Federation and the Washington Farm Bureau (collectively Dairy Federation) were represented by Attorneys Elizabeth E. Howard and Virginia R. Nicholson of Schwabe Williamson and Wyatt, PC. Assistant Attorney General Phyllis J. Barney represented Respondent Ecology.

The Board conducted a hearing May 21-25, 2018, and June 5-7, 2018, in the Board's office in Tumwater, Washington. The Board was comprised of Chair Joan M. Marchioro and Members Kay M. Brown and Neil L. Wise. Administrative Appeals Judge Heather C. Francks presided for the Board. Andrea Clevenger and Laura Stewart of Capitol Pacific Reporting Inc. of Olympia, Washington provided court reporting services.

The issues identified in the Amended Consolidation and Prehearing Order, which proceeded to hearing were as follows:[1]

2. Whether the permits violate the federal Clean Water Act, 33 U.S.C. § 1251 et seq., Washington water pollution control laws (including but not limited to RCW 90.48 and 90.64), and implementing regulations by failing to require adequate surface water monitoring by permittees.

3. Whether the permits fail to control and monitor discharges to groundwater in violation of the federal Clean Water Act and Washington water pollution control laws (including but not limited to RCW 90.48 and 90.64), and implementing regulations.

[1] Prior to the hearing Ecology and PSA moved for partial summary judgment. The Board dismissed Issues 1, 11, 12, 13, 17 and 18. Order on Motion for Partial Summary Judgment, May 10, 2018. PSA withdrew Issue 15. The remaining twelve issues proceeded to hearing.

4. Whether the permits' soil monitoring requirements and standards are invalid under the federal Clean Water Act and Washington water pollution control laws (including but not limited to RCW 90.48 and 90.64), and implementing regulations.

5. Are the soil sampling requirements of S4.I contrary to best available science and research, unattainable, impracticable, and, thus, arbitrary, capricious and unlawful?

6. Does the failure to account for variances in location, crops, weather, and other conditions in the Fall Soil Test Nitrate Ranges as reflected in Table 3 of the CAFO Permits render the standard unattainable, unsupported by agronomic science and research, arbitrary, capricious and unlawful?

7. Whether the permits fail to require permittees to install and implement all known, available, and reasonable methods of preventing, controlling and treating pollutants prior to discharge as required under the Washington water pollution control laws with respect to: (a) composting; (b) land application of manure; (c) manure storage; (d) animal pens and corrals?

8. Whether the permits fail to establish technology-based effluent limitations and standards as required under the federal Clean Water Act with respect to: (a) composting; (b) land application of manure; (c) manure storage; (d) animal pens and corrals?

9. Whether Ecology illegally relied upon an adaptive management approach that authorizes residual nitrate and phosphorus levels in the soil that are known to result in discharges to waters of the state and fails to sanction permittees for violating the terms of the permit by applying manure in excess of agronomic rates for nitrogen and phosphorus.

10. Whether the permits authorize discharges of pollutants to surface and groundwaters in the state of Washington in violation the federal Clean Water Act, Washington water pollution control laws (including but not limited to RCW 90.48, RCW 90.64) and applicable implementing regulations.

14. Is the permits' failure to establish numeric water quality based effluent limitations or standards for nitrate and phosphorus invalid?

16. Whether the permits violate the federal Clean Water Act, Washington water pollution control laws (including but not limited to RCW 90.48, RCW 90.64) and applicable implementing regulations for Nutrient Management Plans ("NMP").

19. Are the requirements related to lagoons in Conditions S4.B and S7.B inconsistent with NRCS standards, impracticable, lacking a basis in applicable research and science, presented only in the final version and, as such, preventing public comment, and unlawful and wholly disproportionate to the pollution reduction benefits?

Twice during the hearing, PSA made a motion pursuant to Civil Rule 50(a) for judgment as a matter of law on the issue of whether Ecology had determined all known, available, and reasonable methods of preventing, controlling and treating pollutants for existing manure lagoons pursuant to WAC 173-200-100(3). Each time, after deliberation, the Board denied PSA's motion. Based on its full consideration of the eight days of sworn testimony of witnesses, numerous exhibits admitted into the record, argument from counsel representing each of the parties, and supplemental authorities filed by Ecology and PSA, the Board enters the following:

II. SUMMARY OF THE DECISION

The Board concludes that the Permits, taken as a whole, comply with the federal Clean Water Act (CWA) and Washington state water pollution control laws, and are protective of water quality. PSA did not present sufficient evidence to convince the Board that surface water monitoring and groundwater monitoring should be required in the Permits.

The Board affirms the provisions of the Permits that provide for soil sampling and adaptive management of land application fields depending upon nitrate levels revealed by the sampling. The Board concludes that the emergency land application allowed by the Permits avoids a worse alternative outcome from the overtopping of a lagoon and is sufficiently limited by the remaining Permit terms.

The Board concludes that implementing a lagoon assessment program using the National Resource Conservation Service (NRCS) guidelines is appropriate and reasonable with the caveat that measurement of the two foot vertical separation from the water table should also follow the NRCS guidelines and begin from the top of the liner inside the lagoon. The Board remands the Permits to Ecology to revise Conditions S4 and S7 consistent with this decision.

III. FINDINGS OF FACT

1.

CAFOs are agricultural facilities where animals are confined and fed for a total of 45 days or more during a 12 month period in an area that does not support growth of vegetation. 40 C.F.R. §122.23(b). CAFO operations, including their land application areas, animal confinement areas and other production related areas that discharge to surface water are point sources of pollution under the CWA, and therefore subject to regulation under the NPDES permit regulations. 40 C.F.R. §122.23(a). The state Water Pollution Control Act (WPCA), ch. 90.48 RCW, regulates CAFO discharges to both surface and ground waters.

2.

"Potential sources of pollution from CAFOs include manure and litter generated by livestock as well as process wastewater generated from animal product production by the CAFO." Ex. R-3 at 10. Many CAFOs land apply manure, litter, and process wastewater to agricultural fields as crop fertilizer. Manure, litter, and process wastewater generated by CAFOs include nitrogen and phosphorous. In appropriate quantities, nitrogen and phosphorus are beneficial to the growth of crops. However, if discharged to water in elevated concentrations,

nitrogen and phosphorus can have significant consequences to human health and the environment. Jennings Testimony; Ex. R-3 at 13-16.

3.

Nitrate, a form of nitrogen found in manure and also produced from the organic breakdown of manure that is land applied, is of particular concern. When consumed by humans, nitrate is converted to nitrites within the body. Nitrites bind with blood hemoglobin and prevent it from carrying oxygen. Nitrates themselves are not directly toxic to most people and are consumed daily, mostly in vegetables. Nitrates do pose health risks to vulnerable populations. Noted vulnerable populations include pregnant or nursing women and infants under six months old. High nitrate intake in these populations is more likely to cause Methemoglobinemia, or "blue-baby syndrome". Ex. R-3 at 14. Washington's groundwater quality standard for nitrate (as nitrogen) is 10 mg/L. WAC 173-200-040(3).

4.

Increased levels of nitrates and phosphorus in surface water bodies can lead to algae and macrophyte growth. Decomposition of those aquatic plants reduces dissolved oxygen in the water body. This process can cause harm or death to aquatic organisms, including fish, and lead to the loss of the water body through eutrophication. Ex. R-3 at 14, 16.

5.

PSA contends that the Permits do not protect water quality. Although PSA presented evidence of water quality issues related to dairies around the state, the evidence focused primarily on the Yakima Valley and the Sumas-Blaine aquifer in Whatcom County.

6.

PSA presented the testimony of Helen Reddout and David Erickson concerning nitrate contamination of the groundwater aquifer in the Lower Yakima Valley. Ms. Reddout, the President of CARE and a longtime resident of the Lower Yakima Valley, testified regarding her experience with nitrate contaminated groundwater and litigation initiated by CARE against local dairies to address that contamination. Ms. Reddout testified that water from her groundwater well contains nitrates in excess of ten parts per million and she has installed a reverse osmosis system in her kitchen sink to treat her water. Ms. Reddout testified that the litigation brought by CARE against local dairies, referred to as the "dairy cluster"[2] resulted in consent decrees establishing a clean drinking water program for local residents and the requirement that the cluster dairies study groundwater contamination in the Lower Yakima Valley aquifer. Reddout Testimony.

7.

Mr. Erickson, a Principal Hydrogeologist with Water & Environment Technologies, PC, testified regarding groundwater monitoring in the Lower Yakima Valley conducted under the consent decrees from the CARE litigation. As part of a quality assurance plan in the dairy cluster consent decrees, Mr. Erickson and his team performed monitoring of groundwater wells and collected soil samples in and near the dairy cluster. They collected soil samples (10 feet in depth) from 10-12 of the land application fields, as well as the dairies' pens and corrals. Under

[2] The dairies that comprise the dairy cluster are the Cow Palace Dairy, Bosma Dairy, DeRuyter Dairy, Liberty Dairy and D&A Dairy. Erickson Testimony.

the compost area they took samples (20 feet in depth). Mr. Erickson testified that his assessment of nitrogen loading sources prepared for the Cow Palace Dairy litigation showed that the dairy cluster contributed 99.9% more loading than any of the other sources in that area. Erickson Testimony. Mr. Erickson participated in the installation of double-lined lagoons with leak detection systems at the Cow Palace Dairy. Soil samples collected from one of the lagoons showed high organic nitrogen and very high ammonia concentrations at approximately 12-15 feet below the bottom of the lagoon. *Id.*

8.

The dairy cluster dairies were not permittees under the previous CAFO general discharge permit, were not following their nutrient budgets, and were not properly maintaining their lagoons. Erickson Testimony. The dairy cluster operations had high levels of land application of manure. Harrison Testimony.

9.

The northwestern portion of Whatcom County is an area of high-intensity agricultural production. The main agricultural businesses in Whatcom County are dairy farming and berry production. Whatcom County has the second highest number of dairy cows in the state. Ex. R-15 at xxi.

10.

Groundwater supply in this area is derived almost exclusively from the Sumas-Blaine aquifer, an unconfined aquifer occurring in the unconsolidated glacial deposits that blanket the region. "Over the last 30 years, this area has had one of the highest percentages of water supply

wells in the state failing to meet the drinking water standard for nitrate (29% of wells tested had concentrations greater than 10 mg/L as nitrogen). Groundwater is the only source of drinking water for residents living in the northern, rural part of the county. As of 2010, the population living over the Sumas –Blaine aquifer not on city water systems was 18,000 to 27,000 people." Ex. R-15 at xiii.

11.

Factors that make groundwater in Whatcom County particularly sensitive to water quality impacts from intensive agricultural production include:

- Shallow depth from land surface to groundwater.
- Relatively permeable character of the aquifer deposits.
- Long periods of heavy rainfall each year.

Combined with the high mobility of nitrate in the environment, these characteristics enable rapid transport of nitrate from surface soils to the water table. *Id.*

12.

Sue Joerger, Field Director for PSA, testified that she had observed and photographed dairy practices in Whatcom County that she believed were negatively impacting water quality in the area. Joerger Testimony; Exs. A-33, A-43, A-47 and A-50.

13.

Ecology and the Washington State Department of Agriculture (WSDA) jointly administer programs related to protecting water quality from livestock activities under the authority of the state WPCA, ch. 90.48 RCW, the Dairy Nutrient Management Act, ch. 90.64 RCW, and under

an inter-agency Memorandum of Understanding (MOU) that identifies the responsibilities of each agency.

14.

Under the MOU, Ecology is responsible for administering, developing and processing CAFO discharge permits; WSDA inspects unpermitted dairies and permitted CAFOs and provides technical support to the operators of CAFOs. Harrison Testimony. Dairies are inspected approximately every 18 months. *Id.* The previous CAFO general discharge permit developed by Ecology was issued in 2006 (2006 CAFO Permit). Ex. R-18.

Permit Development and Relevant Provisions

15.

Pursuant to ch. 173-226 WAC, Ecology elected to develop general discharge permits for the CAFO industry. General permits are designed to meet the applicable requirements of the CWA (33 U.S.C. § 1251) and WPCA (ch. 90.48 RCW). When developing general permit conditions, Ecology shall apply and ensure compliance with "all known, available, and reasonable methods of prevention, treatment, and control" (AKART). WAC 173-226-070(1).

16.

The Permits were developed by an internal Ecology permit team using the 2006 CAFO Permit as a starting point. Jennings Testimony; Ex. R-18. Ecology's lead permit writer was Jonathan Jennings. *Id.* Melanie Redding, a Licensed Hydrogeologist with Ecology, performed a literature review of peer reviewed journals to research the science for the Permits. Redding Testimony; Ex. R-4 (Manure and Groundwater Quality Literature Review). In August 2015,

Ecology issued a preliminary draft permit and solicited comments from the public. Jennings Testimony; Ex. A-11. In 2016, Ecology issued formal draft permits and solicited public comments, receiving approximately 4,600 comments. Jennings Testimony. Both the Dairy Federation and PSA submitted comments on the formal drafts. Exs. R-16, A-8, A-69. The United States Environmental Protection Agency reviewed the Permits. Jennings Testimony.

17.

On January 18, 2017, Ecology issued the final Permits regulating discharges from CAFOs. Exs. R-1, R-2. The Permits took effect on March 3, 2017, and will expire in five years on March 2, 2022. Exs. R-1 at 1, R-2 at 1.

18.

For purposes of determining which operations must obtain permit coverage, the Permits separate CAFOs into two groups. CAFOs that stable or confine more than a defined number of animals and discharge to surface or ground water are required to obtain Permit coverage. Small CAFOs, which stable or confine a smaller number of animals and have been designated by Ecology as significant contributors of pollutants to surface or groundwater, must also obtain coverage under the appropriate Permit. Exs. R-1 at 6, R-2 at 6.

19.

The threshold number of animals for a CAFO or small CAFO varies depending upon the type of animals stabled or confined. Exs. R-1 at 6 (Table 2), R-2 at 6 (Table 2). For example, for mature dairy cows, a CAFO contains 200 cattle or more. *Id*. A small CAFO of swine contains less than 750 swine of 55 pounds or more. *Id.* Most, but not all, CAFOs in Washington

are dairies. There are 377 dairies in Washington. Wood Testimony. In 2018, between 200 and 250 dairies had more than 200 mature dairy cows and therefore satisfied the size criteria of a CAFO. Jennings Testimony. At the time of the Board hearing there were 23 CAFOs covered under the Permits. Jennings Testimony; McGowan Testimony. These included four non-dairy beef operations, one heifer raising operation and one poultry operation. In addition, approximately 10-12 CAFOs were in the permit application process. Jennings Testimony.

20.

General discharge permit conditions are intended to prevent permittees from exceeding discharge limits and violating water quality standards. WAC 173-226-070. The Permits accomplish this through the use of technology-based requirements for preventing and controlling discharges. The Permits' technology-based requirements include the implementation of AKART and best management practices (BMPs). Jennings Testimony; Ex. R-3 at 39. Under the Permits, discharges from a CAFO must not cause or contribute to an exceedance of the state surface or ground water quality standards. Ex. R-3 at 39-40.

21.

Ecology chose to issue two permits because some CAFOs may have discharges to both surface and ground water, while other CAFOs may only discharge to groundwater. Jennings Testimony. The Combined Permit regulates discharges from CAFOs to both surface and ground water under the NPDES program and the WPCA. Ex. R-1. The State Only Permit regulates discharges to groundwater under the WPCA. Ex. R-2.

22.

The Combined Permit is a statewide general permit for handling manure, litter, process wastewater and organic by-products resulting from operating a CAFO. Ex. R-1 at 6. The Combined Permit conditionally authorizes the discharge of pollutants to both surface and ground water from the production area[3] and land application fields.[4] Ex. R-1 at 7.

23.

Discharges conditionally authorized by the Combined Permit must not cause or contribute to a violation of water quality standards. Ex. R-1 at 12 (Condition S3). With one exception, the Combined Permit prohibits all discharges to surface water. A discharge to surface water is permitted in the event of an overflow from the production area from a waste storage facility designed, maintained and operated to contain runoff and precipitation from a 25-year, 24-hour rainfall event. Such discharge is only allowed if the production area is otherwise in compliance with the Combined Permit. Ex. R-1 at 12 (Condition S3.C.1).

24.

Discharges from land application areas are prohibited unless the discharge meets the definition of agricultural stormwater. Ex. R-1 at 13 (Condition S3.D). A precipitation related discharge is agricultural stormwater only where the discharge was due to precipitation, was not

[3] The Permits define "production area" as "[t]he locations making up a CAFO facility that are used for animal confinement, manure, litter, feed, and process wastewater storage, product processing facilities (e.g. milking parlor, egg washing, feed mixing), and other areas used for the storage, handling, treatment, processing, or movement of raw materials, products, or wastes. This includes manure stockpiled on fields." Exs. R-1 at 49, R-2 at 45.

[4] The Permits define "land application fields" as "[a]n area of land, including management units, under the control of the CAFO (excluding the production area) to which manure, litter, process wastewater, or other organic by-products are added as a fertilizer or soil amendment." Exs. R-1 at 48, R-2 at 43.

from the production area, was not caused by human activities, and the permittee is in compliance with all permit conditions and has land applied nutrients in accordance with site specific field nutrient budget and other relevant permit conditions. Ex. R-1 at 45. Congress explicitly exempted agricultural stormwater from the definition of point source. *See* 33 U.S.C. §1362 (14). Therefore, a discharge meeting the definition of agricultural stormwater is not regulated by the Combined Permit.

25.

The State Only Permit is a statewide general permit for handling manure, litter, process wastewater, and other organic by-products from the operation of a CAFO. Ex. R-2 at 6. The State Only Permit conditionally authorizes the discharge of pollutants to groundwater from the production area and land application fields, provided that the permittee is operating in compliance with the Permit. Ex. R-2 at 7 (Condition S1.A). The State Only Permit does not authorize any discharges to surface water from the CAFO. Ex. R-2 at 12 (Condition S4).

Nutrient Management Plan/Manure Pollution Prevention Plan

26.

Federal water quality regulations contain permit requirements for specified categories of NPDES Permits. 40 C.F.R. § 122.42. The regulations identify specific requirements that must be included in NPDES permits for CAFOs (federal CAFO Rule). 40 C.F.R. § 122.42(e). Federal regulations require, as part of the NPDES permit application process for CAFOs, that permit applicants must develop and submit a Nutrient Management Plan (NMP) for Ecology's

review, public comment, and approval. The NMP is required to contain nine elements identified in 40 C.F.R. § 122.42(e)(1). Ex. R-3 at 40-41.

27.

Under the 2006 CAFO Permit, Ecology required applicants to submit a NMP with their Notice of Intent requesting permit coverage. Once Ecology approved the NMP, permit coverage was granted. Jennings Testimony. Ecology found that the iterative process for review and approval of NMPs was time consuming and inefficient. To address this issue, through Conditions S4 and S5, Ecology incorporated the federal regulatory requirements for NMPs into the Permits as enforceable effluent limits. Jennings Testimony; Exs. R-1 at 13-33, R-2 at 12-30. As described in the Permits' Fact Sheet, Ecology incorporated the federal CAFO Rule requirements, including the nine elements of 40 C.F.R. § 122.42(e)(1), into the Permits as enforceable conditions. Jennings Testimony; Ex. R-3 at 41-43.

28.

Under the current Permits, once coverage has been obtained, permittees must prepare Manure Pollution Prevention Plans (MPPP). MPPPs are site specific plans documenting how the Permits' effluent limitations, Conditions S4.A-Q, are being met at a permitted facility. Ex. R-3 at 59. MPPPs are expected to be updated as the facility makes changes. Jennings Testimony; Exs. R-1 at 28, R-2 at 25 (Condition S4.Q).

29.

Permit Condition S4.J.1 requires each permittee to submit yearly field nutrient budgets for each field they own, operate, lease or otherwise control based on spring soil and manure

sample nutrient analysis, planned crops and other factors. Exs. R-1 at 20, R-2 at 19. The nutrient budgets include measurement of nitrogen and phosphorus levels. *Id*. This information will be used by Ecology for future permit development. Ex. R-3 at 54.

Lagoon Permeability and Assessment

30.

One source of nitrate in groundwater is seepage from CAFO manure lagoons. A lagoon is a "structure designed for storage of liquid manure, process wastewater, other organic by-products, or other liquids or slurries." Ex. R-1 at 48. Earthen lagoons are composed of compacted earth and clay. Jennings Testimony. Some lagoons have synthetic liners and leak detection systems. Erickson Testimony. "All lagoons have a seepage rate based upon the structure's permeability. This rate is how much liquid and dissolved materials escape out of containment during a period of time per unit area." Ex. R-3 at 32. The seepage rate is dependent upon the engineering properties of the materials used to construct the lagoon as well as lagoon maintenance activities and the presence of preferential flow paths. *Id*., at 32-33. Lagoon construction is variable, which leads to variable seepage rates and variable impacts to groundwater. *Id*., at 68.

31.

Limiting seepage from a storage lagoon has two primary goals. The first is to prevent any virus or bacteria from migrating out of the storage lagoon to an aquifer or water source. The second is to prevent the conversion of ammonia to nitrate in the vadose zone. Exs. I-6 at 41, R-6 at 10D-2. The vadose zone is the area between the ground surface and the water table which is

in a predominantly unsaturated condition. Lindsey Testimony. In a saturated condition, all the spaces between the soil particles are filled with water. *Id.* In an unsaturated state, there is also air in the spaces. *Id.* In Eastern Washington, the vadose zone will be comprised of sands and gravels and intermixed fine grain deposits. *Id.* Western Washington has silty, sandy, gravelly and clay vadose zones. *Id.*

32.

Seepage from a lagoon is calculated using Darcy's Law. Ex. R-3 at 33.[5] Assuming steady state conditions, the amount of seepage will vary based upon head pressure (depth of liquid, which varies) soils, compaction and permeability. Ex. R-3 at 33-34. Conditions that allow greater seepage will increase the risk of discharge. Ex. R-3 at 34.

33.

NRCS is an agency of the United States Department of Agriculture responsible for providing technical assistance to farmers. One aspect of the technical assistance provided by NRCS is lagoon construction. Ex. I-6 at 35. NRCS's most current guidance on the subject is included in Part 651 of the agency's Agricultural Waste Management Field Handbook as "Appendix 10D Design and Construction Guidelines for Waste Impoundments Lined with Clay or Amendment-treated Soils" (Appendix 10D). Exs. R-6, I-6 at 29-30. Based on its review of NRCS's guidance and calculations using Darcy's Law, Ecology concluded that manure lagoons built consistent with the standards of Appendix 10D would still have a seepage rate. Ecology

[5] The Darcy's law equation in Ecology's implementation guidance is incorrect because the units used do not match. Lindsey Testimony; Ex. R-5 at 27. If the equation is not corrected, seepage from a lagoon would be overestimated. Lindsey Testimony. Ecology agreed that there is a typographical error in the equation. Redding Testimony.

further concluded that "[t]his seepage rate along with other risk factors indicate that those covered under either of the permits have a discharge to groundwater based on a preponderance of the evidence." Ex. R-3 at 68; Redding Testimony.

34.

Ecology also determined that available information did not support a conclusion that seepage from all lagoons was resulting in the contamination of groundwater. Ex. R-3 at 68. To address this information gap, Permit Condition S7 requires permittees to conduct an assessment of their existing manure lagoons using Washington NRCS Engineering Technical Note 23 (NRCS Assessment Procedure for Existing Waste Storage Ponds). Exs. R-1 at 35-36, R-2 at 32-33.

35.

Among other requirements, permittees are to determine the vertical separation between the bottom of the lagoon liner and the water table.

> If the lagoon assessment determines that there less than two feet of vertical separation from the bottom of the lagoon liner (as measured from the outside of the liner) and the water table (including seasonally high water tables), the Permittee has six months from completion of the lagoon assessment to develop a plan to address this deficiency.

Exs. R-1 at 36, R-2 at 33. The plan shall include a description of how the permittee will ensure the two foot vertical separation, timelines for work required to address the deficiency, and a groundwater monitoring plan. *Id.*

36.

The Permits also include requirements for permeability and proximity to the water table for new and modified lagoons. Condition S4.B establishes permeability and vertical separation requirements for lagoons and other liquid storage structures built, expanded, or undergoing a major refurbishment after issuance of the Permits. Such structures "must achieve a permeability of $1x10^{-6}$ cm/s without consideration for manure sealing and there must be a minimum of two feet of vertical separation between the bottom of the lagoon (measured from outside of the earthen liner) and the water table, including the seasonal high water table." Exs. R-1 at 13, R-2 at 13. With manure sealing, lagoons constructed according to this condition will have a permeability of $1x10^{-7}$ cm/s. Redding Testimony. Vertical separation is defined as the distance between the bottom of the lagoon liner and the top of the water table, at its highest level during the season. Ex. R-4 at 70. Maintaining a two foot aerobic unsaturated environment beneath the lagoon is important to the attenuation and destruction (inactivation) of bacteria and viruses. Redding Testimony; R-4 at 70.

37.

PSA argued that the Permits' standards for lagoon liners was insufficient to protect groundwater and was not AKART. Mr. Erickson opined that earthen lagoons with a permeability of $1x10^{-7}$ cm/s are designed to leak. Because earthen lagoons, even those built to NRCS's standards, will leak, there is no need to perform the assessment required by the Permits. According to Mr. Erickson, the only way to protect groundwater is to install a liner that is designed not to leak. Mr. Erickson testified regarding his experience installing synthetic double-

liners in lagoons at Cow Palace Dairy. The cost of the liners, including installation, was $400,000 to $600,000. Mr. Erickson testified that, in his opinion, AKART for lagoons is a synthetic double liner or a two-foot clay liner with a geosynthetic top. Erickson Testimony.

38.

The Dairy Federation argued that the Permits' lagoon conditions conflict with NRCS's construction standards. The Dairy Federation contended that the point from which to measure the two foot vertical separation from the water table is contrary to NRCS's Conservation Practice Standard (CPS) 313, pursuant to which many dairies have constructed their lagoons. Harrison Testimony. According to the Dairy Federation, under NRCS CPS 313 the appropriate point from which to measure the two foot vertical separation is from inside the lagoon liner. Exs. I-6 at 67, R-9 at 313-CPS-3, I-13 at 313-4. Dr. Harrison testified that, contrary to Ecology's assertion, the additional amount of separation provided by measuring from the outside of the liner is not needed for the attenuation of pathogens or viruses. Harrison Testimony.

39.

The Dairy Federation contended that by including the measurement location only in the final Permits, Ecology failed to provide the public the opportunity to review the condition and submit comments. Dan Wood, Executive Director of the Washington State Dairy Federation, testified that he participated in several meetings with Ecology during development of the Permits. Requiring the measurement of vertical separation from the water table to be from the bottom of the liner was never discussed. Wood Testimony.

40.

The Dairy Federation also asserted that the lagoon conditions are contrary to AKART because they require actions that are not economically reasonable. For purposes of the lagoon assessment, measuring the depth to the water table from the outside of the liner could require modification of lagoons that had been constructed consistent with NRCS's standards. Wood Testimony. The cost of lagoon repair or replacement could be several hundred thousand dollars. Ex. I-10 at 10. The costs associated with installation of synthetic liners as recommended by Mr. Erickson were far in excess of what dairy farmers could afford. Neibergs Testimony; Ex. I-10. Many farmers obtain funding from NRCS to make improvements to their facilities. Haggith Testimony. NRCS imposes a lifetime cap of $450,000 on its lending to farmers. *Id.* Dr. Neibergs testified that dairies currently face financial pressures and this additional cost could cause dairies to close down. Neibergs Testimony; Ex. I-10.

41.

Appendix C to NRCS Technical Note 716 illustrates the two different locations for measurements labeled point 1 and 2. Ex. R-7 at Appendix C. Pursuant to CPS 313, NRCS measures from the bottom of the lagoon (inside the lagoon above the liner) or the impoundment bottom at point 1. Exs. I-6 at 67, R-9 at 313-CPS-3, I-13 at 313-4. Ecology measures from point 2, which is below the outside of the liner. Ex. R-7 at Appendix C; Redding Testimony. The

Dairy Federation presented excerpts of the deposition of William Reck, NRCS's National Engineer. Mr. Reck discussed the figure in Appendix C. [6]

42.

Ecology stated that Ecology added the parenthetical "(as measured from the outside of the liner)" to Conditions S4.B and S7.B of the final version of the Permits in response to public comment on the draft Permits. Moore Testimony. Ecology contended that the parenthetical simply explains Ecology's longstanding position that measurement starts below the lagoon. Jennings Testimony; Moore Testimony.

43.

Ecology argues that the Permits do not require retrofit if a lagoon is found not to have two foot vertical separation from the water table. Under Condition S7.B, the Permits require permittees to develop a plan to address any deficiencies identified in their lagoon assessment. Exs. R-1 at 36, R-2 at 33. Mr. Jennings testified that, given the potential cost associated with addressing noted deficiencies, the Permits provide permittees with a reasonable amount of time to return a lagoon to proper condition.

44.

Ecology determined that AKART for new and modified lagoons was the construction of a liner with a permeability of $1x10^{-6}$ cm/s without consideration for manure sealing. Jennings

[6] Because Mr. Reck's testimony was provided through deposition transcript, the Board lacked the ability to fully explore the science behind the two different measurement locations. Because Mr. Reck's deposition was scheduled to occur after the discovery cutoff and shortly before hearing, PSA declined to participate in the deposition. As a result, the Board did not have the benefit of PSA's potential cross examination in the transcript.

Testimony; Redding Testimony. Because of the lack of information regarding existing lagoons, the Permits do not provide a specific AKART requirement. Rather, the lagoon assessment required by Condition S7.B will provide information on the range of impacts from existing lagoons and assist Ecology in future permit development. Jennings Testimony; Ex. R-3 at 68-69.

Soil sampling

45.

Under Condition S4.I, permittees are required to take spring and fall soil samples from all land application fields and have those samples analyzed for nutrient content. Exs. R-1 at 18-19, R-2 at 17-18. The spring soil sample is required to be taken prior to starting land application after T-SUM 200.[7] Exs. R-1 at 18, R-2 at 17. The spring soil sample provides information regarding the amount of plant-available nitrogen present in the soil at the start of the growing season. Jennings Testimony; Ex. R-4 at 40. The fall soil sample provides information or a "report card" on the effectiveness of the manure management practices of the previous season. *Id*.

46.

Under Condition S4.I.2, "[f]all soil samples must be taken by October 1st, after harvest of annual crops, and before heavy rain begins in the fall or before any irrigation water is used on the field after harvest." Exs. R-1 at 18, R-2 at 18. The timing of the fall sample, October 1st, was taken from a publication discussing the "use of post-harvest soil nitrate testing as a tool for

[7] T-SUM 200 is defined as "[a] sum of the daily heat units above zero for each day since January 1 until 200 heat units are reached. Heat units are the average of each day's low and high temperatures in degrees Celsius." Exs. R-1 at 50, R-2 at 45.

assessment of nitrogen (N) management in manured cropping systems west of the Cascade Mountains in Oregon, Washington, and south coastal British Columbia." Ex. R-12 at 1, 2.[8]

47.

The Permits dictate the depth at which a soil sample is to be taken depending on the amount of annual precipitation. Exs. R-1 at 19, R-2 at 18. In areas with less than 25 inches of annual precipitation, the sample must be taken from the 0-12 inch depth and 13-24 inch depth. In those areas with greater than 25 inches of annual precipitation, a composite sample must be taken from the 0-12 inch depth. *Id.* If a fall soil sample is taken after October 1st, the sample is required to be taken at a greater depth in order to account for nutrient leaching. *Id.*

48.

The Dairy Federation contended that the Permits' soil sampling requirements are inconsistent with AKART. David Haggith, Agricultural Consultant with N3 Consulting, testified that the spring soil samples are not supported by available science, are time-consuming and costly, and provide little useful information. Haggith Testimony; Ex. I-4. Mr. Haggith testified that the October 1st fall sample deadline is unattainable because not all crop harvests are completed by that date. *Id.* Mr. Haggith also opposed the use of T-SUM 200, testifying that it is not the best tool for minimizing the risk of early season land application. *Id.*

[8] D.M. Sullivan & C.G. Cogger, *Post-Harvest Soil Nitrate Testing for Manured Cropping Systems West of the Cascades,* Oregon State University Extension Services, May 2003.

49.

PSA argued that the depth of all soil samples should be greater. PSA asserted that samples should be taken up to three feet deep in order to evaluate whether nitrate or phosphorus has travelled below the crop root zone. Keeney Testimony. PSA also argued that the Permits should monitor phosphorus in addition to nitrate. *Id*.

50.

Under Conditions S5.B and S5.C, permittees are required to report both nitrogen and phosphorus levels in nutrient sources and post-harvest soil samples. Exs. R-1 at 31-33; R-2 at 29-31 (Conditions S5.B. C, and S6.B).

51.

T-SUM 200 is a tool used to determine when to start land application. Jennings Testimony. It is a measure of the sum of daily heat units above zero for each day since January 1 until 200 heat units are reached. Exs. R-1 at 50, R-2 at 45. Heat units are the average of each day's low and high temperatures in degrees Celsius. *Id*. When the total reaches 200 degrees Celsius, the plants will begin growing and require nutrients. Ex. R-4 at 55. Ecology added T-SUM 200 to the Permits based on comments received during permit development. Jennings Testimony. The draft permit used the term "spring green up" as the trigger for the spring soil sample. In its comments on the draft permits, the Dairy Federation stated that it did not understand the term "spring green up" and requested that Ecology replace spring green up with T-SUM 200 as it is a standard timing guideline. Wood Testimony; Ex. R-16 at 14.

52.

The Dairy Federation now contends that instead of T-SUM 200, the Permits should use Application Risk Management (ARM), a process that is currently being used in several Western Washington counties and recommended by WSDA. Haggith Testimony; Ex. I-4 at 17-18. ARM, which was designed for British Columbia and Western Washington, looks at a wider set of site specific characteristics such as weather forecast, soil conditions, and proximity to surface and ground water. *Id.* Citing results of recent water quality sampling from Whatcom County where ARM is being used, Mr. Haggith testified that that in his opinion ARM is more protective of surface and ground water than T-SUM 200. *Id.;* Ex. I-46.

Adaptive Management

53.

Under Condition S4.J.1, permittees are required to develop a yearly field-specific nutrient budget for each land application field they control and at which they plan to apply manure, litter, process wastewater, or other organic by-products. Exs. R-1 at 20, R-2 at 19. "The yearly nutrient budget specifies the maximum amount of nutrients that may be land applied to the field during the year unless "the permittee is double cropping, or growing winter cover or perennial crops. *Id*. "Yearly nutrient budgets must be developed before the first land application of the calendar year." *Id*. The yearly nutrient budget will depend upon the results of the fall soil samples. The yearly nutrient budget considers what nutrients are present in the field and the nutrients the proposed crop will require during the growing season. Jennings Testimony.

54.

Condition S4.K requires permittees to use adaptive management techniques on land application fields in order to prevent the build-up of excess nutrients. Exs. R-1 at 22-24, R-2 at 22-23. Table 3 in Condition S4.K establishes Field Risk Levels (Low, Medium, High, Very High) based upon the nitrate levels reported from the fall soil tests. For each risk level, Table 3 specifies "Required Actions" and "Required Actions Based Upon Trends". The goal of adaptive management is "to reduce land application field fall soil nitrate concentrations to a Risk Level of Medium or less." *Id.*

55.

PSA contended that the quantities of nitrate expressed in Table 3 as action triggers are too high and create a risk of nitrate leaching into groundwater. Keeney Testimony. Dr. Keeney testified that some residual nitrate in soil is acceptable for crop production but higher levels pose a problem. In his opinion, land application of manure should be discontinued on fields with nitrate levels in the High to Very High ranges until such time as those levels are in the Low or Medium ranges. Keeney Testimony.

56.

The Dairy Federation argued that the nitrate thresholds in Table 3 are inappropriate as they do not take into account the need for high nitrate levels in the fall when a cover crop or double crop is planned for the land application field. Harrison Testimony; Haggith Testimony. Winter crops frequently take up significant quantities of nitrogen over the winter. Mr. Haggith testified that the nitrate levels in Table 3 will result in less nitrogen in soil when crops need

nutrients, leading to lower yields and utilization of less nutrients during the growing season. Haggith Testimony; Ex. I-4 at 11.

57.

Ecology noted that the risk categories in Table 3 were taken from WSDA, which has been using those ranges for a number of years. The Manure and Groundwater Quality Literature Review also supported the ranges reflected in Table 3. The timeframes in Table 3 for adaptive management actions reflect changing conditions, such as a crop failure or drought, which may affect nutrient uptake by crops. Jennings Testimony; Redding Testimony. Addressing the need for higher nitrate levels in soils where a cover or double crop is planned, the Permits provide that in those instances a second nutrient budget must be calculated for the second crop. Exs. R-1 at 21, R-2 at 21 (Condition S4.J.4). Ecology asserted that Table 3 cannot be viewed in isolation, instead, all conditions of the Permits must be followed. Moore Testimony.

PSA remaining permit challenges

58.

PSA contended that the Permits are not sufficiently protective of surface and ground water quality. According to PSA, the Permits should have required surface and ground water monitoring. PSA argued that the Permits do not require AKART or establish technology-based effluent limitations and standards for composting, land application, and animal pens and corrals.

Surface water monitoring

59.

PSA challenged the Permits' failure to require surface water monitoring. Emeritus Professor Dennis Keeney, appearing on behalf of PSA, testified that surface water monitoring is necessary because runoff from agricultural fields contains nitrates from a variety of sources, including land application of manure and fertilizers, and high nitrates in drinking water pose health risks. Discharges from tile drains and runoff from fields receiving winter land applications should be monitored before reaching surface waters. According to Dr. Keeney, this monitoring will allow farmers to determine if their crop management or winter land applications are contributing to water quality violations. Keeney Testimony; Ex. A-4 at 3.

60.

Under Condition S4.J.5, the Permits allow the land application of manure, litter, process water, or other organic by-products in winter to address emergency conditions. Emergency winter land application of such materials is permitted when land application is necessary to protect public health and safety. Exs. R-1 at 22 (Condition S4.J.5), R-2 at 21-22 (Condition S4.J.5). An example of an emergency condition is when a manure lagoon is in danger of failing or overtopping. Jennings Testimony. Mr. Jennings testified that Ecology provided the option for emergency winter land application in the Permits because the threat to public health and safety is greater from lagoon overtopping than the threat from application to the land. Jennings Testimony. In the event that a permittee conducts emergency winter land application, the permittee is required to maintain records of the land application and report the application to

Ecology within 24 hours. The permittee must also account for the application in its field budget and follow all the remaining permit requirements. *Id.*; Exs. R-1 at 22, R-2 at 21-22.

61.

Mr. Jennings testified that surface water monitoring is not required under the Combined Permit because the only permitted discharge to surface water is limited to precipitation events that are difficult to predict. Jennings Testimony. Under the Combined Permit, a facility may discharge from the production area to surface water under two circumstances: (1) the facility must be operating in compliance with all permit conditions governing the production area; and (2) the production area must have been "designed, constructed, operated and maintained to contain all manure, litter, feed, process wastewater, and other organic by-products including the contaminated runoff and the direct precipitation from a 25-year, 24-hour rainfall event." Ex. R-1 at 12-13 (Condition S3.C.1).

Groundwater monitoring

62.

Through the testimony of Dr. Keeney and Mr. Erickson, PSA contended that, in order to protect groundwater from contamination as has occurred in the Yakima Valley and the Sumas-Blaine aquifer, the Permits should require groundwater monitoring. PSA argued that, absent information that can be garnered from monitoring, Ecology cannot ensure that permittees are operating in compliance with the state's anti-degradation requirement. Erickson Testimony; Keeney Testimony; Exs. A-1 at 31-33, A-4 at 3-4.

63.

Mr. Jennings testified that Ecology did not require groundwater monitoring under the Permits because the practicalities of land application do not support the investment required to install monitoring wells. Because the fields used for land applications are often leased, a permittee's ability to use the land may be of limited duration. Jennings Testimony. Responding to PSA's claims that monitoring is necessary to ensure groundwater is protected, Ecology contends that the requirements of the Permits as a whole provide the required protection. *Id.* By its very nature, groundwater monitoring is backward looking as it measures what happened at the surface some time before. *Id.* According to Ecology, groundwater monitoring does not provide feedback with sufficient time to affect surface activities. *Id.*

64.

Professor Joseph Harrison, appearing on behalf of the Dairy Federation, testified regarding the study he participated in with Ecology evaluating the Sumas-Blaine aquifer. Harrison Testimony; Ex. R-15. Dr. Harrison testified that the study demonstrated that groundwater monitoring was not necessary to be protective of groundwater and he was not aware of any scientific report or study to the contrary. According to Dr. Harrison, the Sumas-Blaine aquifer study showed that when the producer managed land so that the nitrogen loading was at crop removal levels, nitrogen in the groundwater was generally below 10 mg/L-N. Harrison Testimony; Ex. R-15 at xi.

65.

Groundwater monitoring under the Permits may be triggered by: (1) the adaptive management actions in Condition S4.K; or (2) the Existing Lagoon Assessment in Condition S7.B. Jennings Testimony; Exs.R-1 at 24, 36-37; R-2 at 23, 32-33. If triggered, Condition S5.D provides the required protocols for groundwater monitoring. Exs. R-1 at 33, R-2 at 29-30.

66.

The parties presented expert testimony concerning the costs associated with groundwater monitoring. PSA's expert, Mr. Erickson described a "simple" monitoring system of eight wells for a total installed cost of approximately $40,000 to $50,000. Erickson Testimony. Water sampling from the monitoring wells would also include laboratory and labor costs. *Id.* Professor J. Shannon Neibergs, appearing on behalf of the Dairy Federation, testified regarding the costs of permit compliance for dairies in Washington. Dr. Neibergs testified that the cost of installing groundwater monitoring wells could be a significant expense to a dairy. Such an expense may be unaffordable, especially for smaller dairies. Neibergs Testimony; Ex. I-10.

AKART and technology-based effluent limits for composting, land application, manure storage, and animal pens and corrals

67.

PSA argued that the Permits failed to require permittees to comply with AKART and did not impose technology-based effluent limits for composting, land application of manure, manure storage, and animal pens and corrals. PSA asserted that Ecology should have required the use of moisture sensors on land application fields as part of adaptive management. Keeney Testimony.

Mr. Erickson testified that management techniques should be required to prevent contaminated water leaching into groundwater from animal pens and corrals, and compost areas. He testified that with the dairy cluster operations, he has worked on reducing the permeability of the soil under the compost and lined stormwater ditches conveying water from the compost. While stating that animal pens are a potential source of pollution, Mr. Erickson did not offer any management techniques to address that potential.

68.

Mr. Jennings testified that the Permits, taken as a whole, constitute AKART and require the implementation of technology-based limitations. Mr. Jennings pointed out specific conditions implementing AKART for those CAFO features identified by PSA: (1) composting – Conditions S4.A, S4.B, S4.C, and S4.D; (2) land application – S4.H, S4.J, S4.L and S4.M; and (3) animal pens and corrals – Conditions S4.A, S4.D, and S4.E.[9] Permit conditions implementing technology-based effluent limits are: (1) composting – S4.A, and S4.D; (2) land application – S4. H, S4.I, S4.J, S4.L, and S4.M; (3) manure storage – S4.B; and (4) animal pens and corrals – S4.A, S4.B, S4.C, S4.D, S4.E and S4.F.

69.

Any Finding of Fact deemed to be a Conclusion of Law is hereby adopted as such.

[9] AKART for manure storage (lagoons) is discussed above.

IV. CONCLUSIONS OF LAW

1.

The Board has jurisdiction over the subject matter and the parties pursuant to RCW 43.21B.110 (1) (c). Findings of fact are based on a preponderance of evidence standard. WAC 371-08-485(2). Appellants have the burden of proof in this proceeding. WAC 371-08-485(3). The Board considers the matter *de novo,* while giving deference to Ecology's expertise in administering water quality laws and on technical judgments, especially where they involve complex scientific issues. *Port of Seattle v. Pollution Control Hearings Bd.,* 151 Wn.2d 568, 593-94, 90 P.3d 659 (2004). Similarly, Ecology's interpretations of water quality statutes and its own regulations are entitled to great weight, unless such interpretation conflicts with the statute's plain language. *Id*. at 593-94. Pursuant to WAC 371-08-540(2), "[i]n those cases where the board determines that the department issued [an NPDES] permit that is invalid in any respect, the board shall order the department to reissue the permit as directed by the Board and consistent with all applicable statutes and guidelines of the state and federal governments."

2.

The CWA was enacted with the broad policy objective of restoring and maintaining the chemical, physical, and biological diversity of the nation's waters. Congress created the NPDES permit program to further this goal. *Puget Soundkeeper Alliance v. Ecology,* 102 Wn. App. 783, 788, 9 P.3d 892 (2000). To serve those ends, the CWA prohibits the discharge of any pollutant by any person unless done in compliance with some provision of the Act and/or in compliance with an NPDES permit. 33 U.S.C. §§ 1311(a) and 1342. Pursuant to RCW 90.48.260, the

legislature authorized Ecology to implement and enforce all programs necessary to comply with the CWA, 33 U.S.C. § 1251. Such powers include the authority to administer the NPDES permit program (ch. 173-220 WAC) and to establish water quality standards for both surface water and groundwater (ch. 173-201A and ch. 173-200 WAC).

3.

Like the broad goals of the CWA, the State's Water Pollution Control Act (WPCA), ch. 90.48 RCW, declares the public policy of the State is "to maintain the highest possible standards to insure the purity of all waters of the state consistent with public health and public enjoyment thereof. . . ." RCW 90.48.010. The WPCA also makes it unlawful for any person to discharge into the waters of the state, or to permit or allow the discharge of any organic or inorganic matter that shall cause or tend to cause pollution of such waters. RCW 90.48.080. Waters of the state include both surface and ground water. RCW 90.48.020. Any commercial or industrial operation that discharges solid or liquid waste material into waters of the state is required to obtain a State Waste Discharge Permit from Ecology. RCW 90.48.160.

4.

The WPCA requires that all state and federal discharge permits incorporate permit conditions requiring AKART. RCW 90.48.520; 90.58.010; s*ee also* RCW 90.52.040 and RCW 90.54.020(3)(b). Ecology's rules define AKART as "the most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants associated with a discharge." WAC 173-201A-020. The Washington Court of Appeals has further clarified that the "reasonableness" prong of AKART limits Ecology "to requiring a system that is both

economically and technically feasible." *Puget Soundkeeper Alliance v. State of Washington*, 102 Wn. App. 783, 792-793, 9 P.3d 892, 897 (2000).

5.

Through ch. 173-226 WAC, Ecology established a state general permit program to address the discharge of pollutants, wastes and other materials to waters of the state. WAC 173-226-010. General permits developed under ch. 173-226 WAC satisfy the requirements of the CWA and the WPCA. WAC 173-226-010.

6.

Ecology has developed general permits to cover multiple dischargers rather than requiring individual permits for each discharger. WAC 173-226-030(13). General permits issued by Ecology are required to "apply and insure compliance with . . . whenever applicable . . . [t]echnology-based treatment requirements and standards reflecting all known, available, and reasonable methods of prevention, treatment, and control" or AKART. WAC 173-226-070; *see also* WAC 173-200-030(2)(c)(ii); WAC 173-201A-020.

7.

The Board recognizes each water quality discharge permit should build on the previous permit as knowledge is gained, uncertainties reduced and technology developed. *Crown Resources Corp. v. Ecology et al.*, PCHB No. 14-018 at 42 (July 30, 2015); *Port of Seattle v. Ecology*, PCHB Nos. 03-140, 03-141,03-142 at COL 6 (Oct. 18, 2004). The Board finds and concludes that terms and conditions in this iteration of the Permits is an advancement from those contained in the 2006 CAFO Permit.

Water and Soil Monitoring (Issues 2, 3, 4, 5 and 6)

8.

PSA challenged the Permit's lack of surface and ground water monitoring, and the sufficiency of the soil monitoring conditions. The Dairy Federation contested the need for spring soil sampling and the requirements for when fall and spring samples are to be taken.

9.

The Board concludes that PSA failed to prove that surface water monitoring is necessary. The only discharges to surface water allowed by the Combined Permit in Section S4.C.1 are extremely limited. The discharge is allowed only from direct precipitation from a 25-year, 24-hour rainfall event and all the other permit requirements must be met. Similarly, the Board concludes that an emergency land application is only allowed to avoid a worse public health or safety result. Ex. R-1 at 22, S4.J.5.

10.

The Board concludes that PSA failed to prove that groundwater monitoring is necessary. The Board agrees that there has been groundwater contamination in the Yakima Valley as demonstrated in the dairy cluster litigation. However, the dairies involved were not permitted under the 2006 CAFO Permit. Erickson Testimony. PSA was not able to show that groundwater contamination would have not occurred had the cluster dairies been complying with the terms of the Permits. Similarly, the Board concludes that there has been groundwater contamination in Whatcom County. Again, PSA was not able to show that the dairies were operating under the

terms of either the current or previous Permit terms. The Board concludes that the evidence presented at hearing demonstrated that the Permits as a whole are protective of groundwater.

11.

The Dairy Federation challenged the permit requirement of spring soil sampling and the adaptive management process set forth in Table 3 related to nitrate levels found in fall soil samples. The Dairy Federation claimed that the requirement to take fall soil samples by October 1st was unworkable. The Dairy Federation argued that soil sampling is not AKART because it is unreasonable and unknown. The Board concludes that there is a sufficient level of flexibility in the Permits to allow soil sampling to be accomplished if all the Permits' terms are followed. For example, the Permits require fall sampling after harvest but no later than October 1st. If a particular harvest occurs after October 1, the Permits require a deeper sample. Ex. R-1 at 19, S4.I.3 or 4. The October 1st date comes from the Sullivan and Cogger publication and is supported by the literature review. Ex. R-12 at 2; Ex. R-4 at 40-43.

12.

Dairy Federation argues that spring soil samples are unnecessary because the nitrate levels remaining in the soil in the spring result from mineralization and that field budgets take that into account in the calculations. The Board concludes that spring soil sampling is necessary to verify the nitrate levels remaining in the soil after the winter. Incorporating spring nitrate levels make nutrient budgets more accurate. The Board concludes that if the Permits are taken as a whole, the soil sampling and adaptive management process is known and reasonable and therefore AKART.

Manure Pollution Prevention Plans as Nutrient Management Plans (Issue 16)

13.

PSA argues that the Permits violate the CWA, state water quality laws and implementing regulations by not requiring permit applicants to submit a completed NMP with their Notice of Intent requesting permit coverage. According to PSA, Ecology's election to incorporate NMP requirements into the Permits as enforceable effluent limits is unlawful as it eliminated public review of and comment on the NMPs, and the permittee's site-specific NMP is not incorporated into the Permit. PSA contends that, as with the 2006 CAFO Permit, permittees should have been required to prepare NMPs for Ecology's review and approval before being granted Permit coverage.

14.

The Board concludes that Ecology's decision to incorporate the federal NMP requirements into the Permits as enforceable effluent limits is not contrary to applicable law. As Ecology explained, the MPPPs are not intended as a substitute for the previous NMPs. Rather, the MPPPs are site-specific plans intended to demonstrate how a facility will comply with the effluent limitations. Based on its prior experience, Ecology elected to incorporate the effluent limitations required by federal law into the Permits in order to avoid the time-consuming NMP approval process that the 2006 CAFO Permit entailed. The evidence presented demonstrated that the Permits' conditions address each applicable federal regulatory requirement, including the nine elements of the federal CAFO Rule, 40 C.F.R. § 122.42(e)(1). Jennings Testimony; Ex. R-3

at 41-43. The Board concludes that the Permits comply with applicable legal requirements regarding NMP contents, recordkeeping, and enforceability.

AKART, effluent limitations, discharges to ground and surface water (Issues 7, 8, 10, 14)

15.

PSA argues that the Permits fail to require AKART and to establish technology based effluent limitations and standards with respect to (a) composting, (b) land application of manure, (c) manure storage, and (d) animal pens and corrals. PSA also asserted that the Permits fail to include numeric water quality based standards and allow unauthorized discharges to surface and ground water.

16.

An effluent limitation is any restriction on timing, quantities, rates, and concentrations of pollutants discharged into the waters of the state. Exs. R-1 at 46; R-2 at 42; *see* 33 U.S.C. § 1362(11). In order to meet applicable water quality standards, permit conditions may implement technology based (AKART and/or BMPs) or water quality based limits. Ex. R-3 at 19. AKART represents the most current methodology that can be reasonably required for preventing, controlling, or abating the pollutants associated with a discharge. WAC 173-201A-020. Technology based effluent limitations are implemented through technology, which can consist of infrastructure or monitoring. Jennings Testimony.

17.

The Board finds that the Permits include conditions requiring the implementation of AKART and conditions establishing technology-based effluent limits. Permit conditions

implementing AKART for those CAFO features identified by PSA are: (1) composting – Conditions S4.A, S4.B, S4.C, and S4.D; (2) land application – S4.H, S4.J, S4.L and S4.M; and (3) animal pens and corrals – Conditions S4.A, S4.D, and S4.E. Permit conditions implementing technology-based effluent limits are: (1) composting – S4.A, and S4.D; (2) land application – S4.H, S4.I, S4.J, S4.L, and S4.M; (3) manure storage – S4.B; and (4) animal pens and corrals – S4.A, S4.B, S4.C, S4.D, S4.E and S4.F.

18.

In developing the Permits, Ecology chose not to impose numeric effluent limits because there are significant variables outside of the permittee's control, such as amount of rainfall or irrigation water available, disease, drought and weather. Jennings Testimony. The sections of the Permits that apply to water based effluent limitations are Conditions S3, S4.G, J, K and the adaptive management Table 3. *Id.* The Board concludes that, in this instance, it will defer to Ecology's expertise in administering water quality laws and its technical judgments in NPDES permit development. *Port of Seattle v. Pollution Control Hearings Bd.*, 151 Wn.2d 568, 593-94, 90 P.3d 659 (2004).

19.

The Board finds and concludes that the Permits do not permit unauthorized discharges to waters of the state. The Permits conditionally authorize discharges to groundwater when a permittee is operating in compliance with all Permit conditions. With one exception, the Combined Permit prohibits all discharges to surface water. Under the Combined Permit, a discharge to surface water is permitted in the event of an overflow from the production area from

a waste storage facility designed, maintained and operated to contain runoff and precipitation from a 25-year, 24-hour rainfall event, and only when the production area is otherwise in compliance with the Combined Permit. Ex. R-1 at 12 (Condition S3.C.1). The State Only Permit conditionally authorizes the discharge of pollutants to groundwater from the production area and land application fields, provided that the permittee is operating in compliance with the Permit. Ex. R-2 at 7 (Condition S1.A). The State Only Permit does not authorize any discharges to surface water from the CAFO. Ex. R-2 at 12 (Condition S4).

Adaptive management (Issue 9)

20.

PSA argued that the Permits' adaptive management provision allows high nitrate levels to remain in the soil for an extended period of time, thereby increasing the risk of leaching to groundwater. PSA also asserted that, in addition to nitrate, the Permits' soil sampling should include phosphorous. The Dairy Federation contended that the nitrate action levels in Table 3 did not adequately account for the need for high nitrate levels in land application fields where a fall cover crop or double crop is planned. Condition S4.J.4 of the Permits addresses double cropping, winter cover crops, and perennial crops.

21.

The Board finds and concludes that the evidence presented established that Ecology, applying its technical expertise and permitting experience, developed reasonable adaptive management conditions to address excessive nitrates in land application fields. The Board further concludes that the adaptive management provisions are not contrary to law.

Lagoon standards (Issue 19)

22.

The Dairy Federation challenged the lagoon standards set forth in Conditions S4.B and S7.B of the Permits. The Dairy Federation argued that the starting point for measuring the two foot vertical separation is contrary to NRCS standards, was not presented to the public for review and comment, and is not AKART. Requiring two-feet of vertical separation from the bottom of the lagoon liner will cause dairies to incur significant costs well beyond what they can reasonably afford.

23.

The Board concludes that Ecology's clarification of the measurement point in the final Permits was not improper. Changes in a final NPDES permit are permissible if in character with the original proposal and a logical outgrowth of the notice and comments received. *BNSF Railway Co. v. Dep't. of Ecology*, PCHB 12-062c at 12 (Order on Motions for Partial Summary Judgment, May 28, 2013.) Ecology testified that the parenthetical was added due to comments received on the formal draft permit. Jennings Testimony; Moore Testimony. When establishing this requirement, Ecology was aware that the NRCS employed a different point from which to measure the two foot vertical separation from the seasonal high water table. Redding Testimony.

24.

Although Ecology testified its long-held position was that the measurement of the two foot separation began from the outside of the bottom of the liner, the Board concludes that Ecology failed to provide sufficient evidence to support the need to measure from that point.

The Board finds that the evidence established that a two foot vertical separation measured from the top of the liner inside the lagoon to the water table is sufficient for attenuation of pathogens and viruses. Harrison Testimony. The evidence did not convince the Board that a two foot vertical separation from the outside of the lagoon liner to the water table is necessary. Based on these findings, the Board concludes that the measurement required by Conditions S4.B and S7.B.1 should follow the NRCS recommendation and commence from the top of the liner inside the lagoon or point 1 in the illustration in Appendix C of NRCS Technical Note 716. Ex. R-7 at Appendix C. On remand, the Board directs Ecology to revise the Permits to address this issue.

25.

With the exception of the measurement of the two foot vertical separation from the seasonal high water table in Condition S4.B and Condition S7.B.1, the Board affirms the Permits.

26.

Any Conclusion of Law deemed to be a Finding of Fact is hereby adopted as such.

V. ORDER

The Concentrated Animal Feeding Operation National Pollution Discharge Elimination System and State Waste Discharge Permit and the Concentrated Animal Feeding Operation State Discharge General Permit issued by Ecology January 18, 2017, are AFFIRMED with the exception of permit conditions S4.B and S7.B.1 relating to the measurement of the two foot vertical separation from the water table. The Board REMANDS the Permits to Ecology to be modified and reissued consistent with this Order, specifically: Condition S4.B and Condition

S7.B.1 shall be modified, as necessary, to make the conditions consistent with the measurement location number 1 as described in Appendix C of Natural Resource Conservation Service Technical Note 716. Ex. R-7 at Appendix C.

SO ORDERED this 25th day of October, 2018.

POLLUTION CONTROL HEARINGS BOARD

JOAN M. MARCHIORO, Board Chair

KAY M. BROWN, Member

NEIL L. WISE, Member

HEATHER C. FRANCKS, Presiding
Administrative Appeals Judge