BRITISH COLUMBIA

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DECISION NO. 2016-EMA-121(a)

In the matter of an appeal under section 100 of the *Environmental Management Act*, S.B.C. 2003, c. 53.

BETWEEN:	George E. Curtis and Kevin F. Curtis	**APPELLANTS**
AND:	Delegate of the Director, *Environmental Management Act*	**RESPONDENT**
AND:	Steele Springs Water District	**PARTICIPANT**
BEFORE:	A Panel of the Environmental Appeal Board: Robert Wickett, Q.C., Panel Chair Lorne Borgal, Member Robert Holtby, Member	
DATE:	November 23 and 24, 2016	
PLACE:	Vernon, BC	
APPEARING:	For the Appellants:	David Curtis, George E. Curtis and Kevin F. Curtis
	For the Respondent:	Elizabeth Graff, Counsel Barbara Thomson, Counsel
	For the Participant:	Brian Upper

APPEAL

[1] The Appellants, George E. Curtis and Kevin F. Curtis, appeal a pollution abatement order (the "PAO") issued to them on May 12, 2016 by the Respondent, Christa Zacharias-Homer, Delegate for the Director, Ministry of Environment (the "Ministry"). The Respondent issued the PAO pursuant to section 83 of the *Environmental Management Act*, S.B.C. 2003, c. 53 (the "*Act*"), finding that there were reasonable grounds to believe that the Appellants' agricultural operations were causing pollution through the introduction of nitrates into the groundwater in an unconfined aquifer used for drinking water. The PAO requires the Appellants to comply with a number of requirements by specified dates.

[2] The Board has the authority to hear this appeal under section 100(1) of the *Act*. The Board's powers on an appeal are set out in section 103 of the *Act* which provides that, on an appeal, the Board may:

(a) send the matter back to the person who made the decision, with directions,

(b) confirm, reverse or vary the decision being appealed, or

(c) make any decision that the person whose decision is appealed could have made, and that the appeal board considers appropriate in the circumstances.

[3] The Appellants ask the Board to reverse the PAO.

BACKGROUND

General

[4] The Appellants are owners of farm lands located in the Hullcar area near Armstrong, BC. Their lands sit above two aquifers identified as aquifer 102 and aquifer 103.

[5] Aquifer 103 (the "Aquifer") is unconfined and located above aquifer 102. Aquifer 102 is a confined aquifer and is separated from the Aquifer by a relatively continuous till deposit. Unconfined aquifers have a greater risk of contamination from activities occurring above the aquifer than do confined aquifers.

[6] In 2006, there were 46 known drinking water wells in the Aquifer, and 54 wells in aquifer 102.

[7] The Steele Springs Water District (the "Water District") takes water from the Aquifer as drinking water for the community of Steele Springs. Steele Springs has approximately 150 residents who receive water from 57 different connections. The Water District was added as a Participant to this appeal.

[8] The Aquifer is approximately 11 square kilometres in size. The majority of the wells accessing the Aquifer are located in the west-central portion of the Hullcar Valley; from the area around Parkinson Lake, extending 1,500 metres to the west. The soil deposits above the Aquifer are the deepest in this area, ranging in depth from 15 metres to 46 metres.

[9] The Appellants operate a cattle feed lot (the "Curtis Farm") located approximately 450 metres southwest of Parkinson Lake. The Appellants also farm land adjacent to the east side of Parkinson Lake. There are other farms and residential dwellings in the valley over, or immediately adjacent to, the Aquifer.

[10] Situated to the northeast of the Curtis Farm is a dairy farm owned by Jansen & Sons (the "Jansen Dairy"). East of the Jansen Dairy is an area described in the evidence as the "Field of Concern". The intake for the Water District (the "Intake") is situated approximately 150 metres south of the Field of Concern.

[11] There is little to no surface grade change between the Curtis Farm, the Jansen Dairy, and the Field of Concern. However, the Intake is at a slightly lower elevation than the Field of Concern.

[12] There are two main record sources detailing the quality of the water taken from the Aquifer. The provincial government maintains an Ambient Groundwater

Quality Monitoring Network for the Hullcar area, and the Water District monitors water quality at its Intake. In addition, water test results are referenced in this decision from wells that may not be part of the Monitoring Network.

[13] Beginning in 2014, the level of nitrate in selected wells around the Intake, and in water drawn from the Intake, has exceeded the level considered safe in drinking water.

The Nitrate Cycle and Leaching

[14] Nitrates are naturally present in the environment and can enter the soil in many ways, one of which is by the deposition of cattle manure.

[15] Similarly, nitrates are drawn out of the soil in many ways, one of which is through the growth of crops which consume nitrates as an essential part of the growing cycle.

[16] In circumstances where the concentration of nitrates deposited into the soil exceeds the concentration of nitrates withdrawn from the soil by, for example, crop growth, those excess nitrates can migrate relatively rapidly through the soil (leaching), and can create elevated nitrate levels in an aquifer.

The PAO

[17] In response to the elevated levels of nitrates noted in water tests from the Intake and selected wells, the Ministry investigated.

[18] In the winter of 2016, Stephanie Little, an Environmental Protection Officer with the Ministry, attended the property to collect water samples. Subsequently, Ms. Little and another Ministry employee observed the Curtis Farm from Parkinson Road. Large, uncovered piles of manure were observed on these occasions, some of which appeared to have sawdust or shavings on top. The Ministry officials did not see a containment system for surface runoff.

[19] According to the Respondent's submissions on the appeal, the Ministry had no information regarding the precise nature of the manure storage systems used at the Curtis Farm. To the Ministry's knowledge, the Curtis Farm did not have a nutrient management plan to guide its application of nutrients to the fields that it cultivates.

[20] In early May of 2016, the Respondent sent a draft pollution abatement order to the Appellants for their review. Thereafter, on May 12, 2016, the Respondent issued the PAO to the Appellants.

[21] It should be noted that, in addition to the PAO issued to the Appellants, the Respondent issued pollution abatement orders to the other agricultural operations situated above, and adjacent to, the Aquifer.

[22] In the PAO issued to the Appellants, the Respondent states:

> I am satisfied on reasonable grounds that pollution is being caused by the introduction into the environment of agricultural waste, including

> manure and/or manure laden effluent, from agricultural operations located on … [the Curtis Farm].

[23] The Respondent concludes that the "usefulness of the environment has been impaired due to the presence of nitrates in the groundwater, as the presence of nitrate is causing the groundwater in the unconfined aquifer that lies in part underneath the Lands … to be unfit for human consumption."

[24] Consequently, pursuant to section 83 of the *Act*, the Respondent ordered the Appellants to comply with a number of requirements. In summary, the Respondent ordered the Appellants to:

1. Submit to the Respondent for approval, the terms of reference and a work plan, prepared by a qualified professional ("QP"), for completing a comprehensive monitoring program and an environmental impact assessment for nitrates and other nitrogen compounds in the soil and groundwater on the lands.
2. Upon approval of the terms of reference and work plan, cause a QP to implement the comprehensive monitoring program and complete the comprehensive environmental impact assessment according to the work plan or terms of reference approved by the Respondent.
3. Submit the environmental impact assessment, together with the results of the comprehensive monitoring program, to the Respondent.
4. Retain a QP to prepare an action plan detailing measures to be taken to abate the environmental impacts identified in the environmental impact assessment, and submit that action plan to the Respondent for approval. The PAO provides a detailed list of the required contents for the action plan.
5. Implement the action plan, as required by the Respondent.
6. Submit a formal written summary to the Respondent within six months, and annually for the next 2 years, summarizing:
    a. the actions taken under the action plan;
    b. identifying all of the agricultural operational changes that occurred;
    c. the monitoring results;
    d. the environmental impact assessment (first year only); and
    e. recommending additional mitigation and restoration measures, if appropriate.
7. Publicly post the action plan and the annual summary required by this PAO at the Hullcar Community Hall, and post any updates to the action plan and future annual summaries at the Hullcar Community Hall annually, for the next two years.

[25] In the reasons given for the PAO during the hearing, the Respondent states that she relied on test results with elevated nitrate levels from two wells located approximately 500 metres from the east side of the Curtis Farm. It is evident from the Respondent's Record of Decision that this is a reference to the wells in "109 Sylvia West" and that "(t)hese wells are located in close proximity to the back of the Jansen Dairy barns."

[26] The two 109 Sylvia West wells disclosing elevated nitrate levels are located approximately 1,500 metres from the cattle pen on the Curtis Farm, and 5[illegible] metres from the eastern edge of a field used by the Appellants for growing crops.

The Appeal

[27] The Appellants appeal the PAO on the basis that they are not responsible for the nitrate contamination in the Aquifer. They have operated their farm for 42 years in this location, and state that they have not contributed to contamination of the Aquifer. The Appellants assert that there is no pollution in the western portion of the Aquifer, where their farm is located. Further, they assert that the ground water flow is in the opposite (south westerly) direction from the Intake, relative to the location of their lands. The Appellants state that there is no evidence that they are contributing to the contamination of the Aquifer and, therefore, the PAO ought to be reversed.

[28] The Respondent asserts that the Appellants, while not the sole source of the contamination of the Aquifer, are contributing to the contaminant load which caused the contamination of the Aquifer. The Respondent submits that the PAO is reasonable and ought to be confirmed.

ISSUES

[29] The Panel has framed the issues to be decided in this appeal as follows:

1. What is the legal and evidentiary burden required to be satisfied by the Respondent in order to give her jurisdiction to issue the PAO.
2. Is the PAO reasonable in the circumstances?

RELEVANT LEGISLATION

[30] "Pollution" is defined in section 1(1) of the *Act* as follows:

> "pollution" means the presence in the environment of substances or contaminants that substantially alter or impair the usefulness of the environment;

[31] The PAO was issued by the Respondent pursuant to section 83 of the *Act*, which provides as follows:

Pollution abatement orders

83(1) If a director is satisfied on reasonable grounds that a substance is causing pollution, the director may order any of the following persons to do any of the things referred to in subsection (2):

(a) a person who had possession, charge or control of the substance at the time it was introduced or escaped into the environment;

(b) a person who owns or occupies the land on which the substance is located or on which the substance was located immediately before it was introduced into the environment;

(c) a person who caused or authorized the pollution.

(2) An order under subsection (1) must be served on the person to whom it applies and may require that person, at his or her own expense, to do one or more of the following:

(a) provide to the director information that the director requests relating to the pollution;

(b) undertake investigations, tests, surveys and any other action the director considers necessary to determine the extent and effects of the pollution and to report the results to the director;

(c) acquire, construct or carry out any works or measures that are reasonably necessary to control, abate or stop the pollution;

(d) adjust, repair or alter any works to the extent reasonably necessary to control, abate or stop the pollution;

(e) abate the pollution;

(f) carry out remediation in accordance with any criteria established by the director.

…

(5) The powers given by this section may be exercised even though the introduction of the substance into the environment is not prohibited under this Act or is authorized under this Act.

…

[Emphasis added]

EVIDENCE AND SUBMISSIONS OF THE PARTIES

The Appellants

[32] Kevin Curtis and George Curtis both testified that they have been feeding cattle on the Curtis Farm for 42 years, and operating at the current capacity for 25 years.

[33] They testified that they farm as a background operation to support the cattle business. They buy calves and grow them until they are sold for finishing in a feedlot outside of the Hullcar Valley. Typically, calves weigh 500 to 600 pounds when they arrive on the Curtis Farm in the fall and, by the following spring when they leave the farm, they weigh 850 to 900 pounds. The average number of animals on the Curtis Farm is 1,250, rising to a peak of 2,500. The major feed ingredient is corn silage, which is grown on the farm.

[34] The Appellants note that, in support of the PAO, the Respondent relies upon her expert's calculations of the amount of nitrogen produced per day by 2,500 steers. They testified that the Respondent erred in calculating the number and type of animals on their farm and, therefore, overestimated the amount of manure produced. Further, the Curtis's testified that that they do not apply manure to their land; rather, the piles observed on the Curtis Farm are a mixture of kiln-dried wood shavings and manure. They further testified that the shavings act as a trap to retain the manure and urine produced by the cattle. The manure/shavings mix is then deposited as fertilizer to their crop land once a year.

[35] The Appellants submit that the Respondent did not have an evidentiary foundation to conclude that they contributed a substance (cattle manure, shavings mixture) to the environment which resulted in the elevated nitrate levels detected in the Aquifer. More particularly, the Appellants submit that the mere deposit of a cattle manure/shavings mixture onto their lands does not mean that the resulting nitrates leached through the soil and into the Aquifer.

[36] The Appellants produced results of tests of water samples taken from wells in proximity to their farm which showed no evidence of elevated nitrates. The Appellants also emphasized that a report issued by Golder Associates Ltd. (the "Golder Report"), tendered in evidence by the Respondent at the hearing, showed that the water in the Aquifer flowed in a direction from the Curtis Farm away from the Intake. The Golder Report is dated August of 2006, and was authored by two hydrogeologists. The report was commissioned by the Township of Spallumcheen to assess the potential for a groundwater municipal water supply within the Hullcar area.

[37] Finally, the Appellants directed the Panel to a letter from Western Water Associates dated April 21, 2016. This letter, tendered in evidence at the hearing, was authored by three hydrogeologists and addressed to the various government ministries dealing with contaminated groundwater in the Aquifer. The authors attached the water test results that they had taken from various wells in the Hullcar area, and state that they had also reviewed water test data collected by the Water District. In the letter, the authors attribute the elevated nitrate levels at the Intake to the Jansen Dairy, and to the deposit of manure on the Field of Concern. The authors of the letter do not attribute the contamination of the Aquifer to the Appellants.

The Respondent

[38] The Respondent submits that she issued the PAO because she was satisfied, on reasonable grounds, of the following:

a. nitrate is causing pollution of the Aquifer; and

b. the Appellants:

i. had possession, charge or control of nitrate at the time it was introduced or escaped into the environment; and

ii. owned or occupied the land on which nitrate was located immediately before it was introduced into the environment.

[39] In her Statement of Points at paragraph 128, the Respondent states:

> In summary, it is reasonable to conclude that nitrogen or nitrate (or any other contaminant) applied in areas directly overlying Aquifer 103 or upslope and proximal to the presently defined aquifer boundary, where not taken up by plant growth, altered or degraded by other processes, will migrate into Aquifer 103. **By extension, it is equally reasonable to conclude that agricultural operations in the Valley are all contributors, to various extents in accordance with the size of the operation, to the nitrate pollution observed in Aquifer 103**. The absence of nitrate within individual water samples taken from wells in the Valley is not determinative of either the presence or absence of a nitrate plume underlying the surface area in which the well is located, or of the contribution of nitrate from that surface area to the nitrate plume. [Emphasis added]

[40] The Respondent called two expert witnesses to testify in support of her case: David Poon and David Thomson.

[41] David Poon, M.Sc. P.Ag., was qualified as an expert in soil science. Although Mr. Poon had not visited the Curtis Farm, he testified that nitrates can enter an aquifer by leaching through the soil.

[42] Mr. Poon introduced, and adopted as accurate, a Cornell University Agronomy fact sheet detailing the basics of the nitrogen cycle in the environment. Some of the particulars of the nitrogen cycle detailed in the fact sheet, and adopted by Mr. Poon, are summarized below.

[43] The nitrogen cycle processes of fixation, mineralization and nitrification lead to an increase in nitrogen in the soil available for plant growth. By contrast, denitrification, volatilization and immobilization reduce the nitrogen available for plant growth and for leaching.

[44] In the present case, the process of immobilization is particularly relevant. Immobilization is a process whereby nitrate and ammonium are taken up by soil organisms and, therefore, become unavailable to crops. Incorporation of materials with a high carbon to nitrogen ratio (e.g., wood shavings) will increase biological activity and increase the demand for nitrogen and thus result in the immobilization of the nitrogen. This immobilization is only temporary. As the microorganisms die, the organic nitrogen contained within their cells is converted to nitrate available to plants.

[45] Soil particles do not retain nitrate well since both are negatively charged. Nitrogen in the soil in excess of that utilized by plants during their growth cycle can

leach into water through the soil depending on soil drainage, rainfall and the amount of nitrate present in the soil.

[46] As a consequence of these processes, it is well understood that the deposit of manure mixed with wood shavings into the soil will only result in the leaching of nitrate into water depending on the interplay of the factors described in the preceding paragraphs. Simply put, the deposit of manure mixed with wood shavings into soil could result in the leaching of nitrates into water, but that is not a necessary and inevitable outcome. Additional information regarding immobilization, crop uptake, soil permeability, etc., would be required before any conclusion could be drawn.

[47] Mr. Poon also testified that he had calculated an estimate of the total nitrogen production from the Curtis Farm assuming 2,500 head of cattle. He based his calculation on data that suggests that the amount of nitrogen production per day by beef cattle, in a typical feed lot operation, runs from a low of 0.02 kilograms of nitrogen per animal, per day ("kg N/animal/day"), to a high of 0.14 kg N/animal/day. His calculation for the Curtis Farm did not take into consideration the impact of wood shavings on the nitrogen balance at the Curtis Farm.

[48] In cross-examination, Mr. Poon opined that, if manure is mixed with wood shavings, about 30% of the nitrates from the cattle manure would be available to leach through the soil; the remainder would be immobilized in the shavings. Mr. Poon did not know what portion of the nitrates entering the soil from the Curtis Farm operation would be consumed by plant growth.

[49] Mr. Poon also testified that there is no evidence of surface runoff from the Curtis Farm. He further testified that he had no evidence of the soil type or permeability on the Curtis Farm. Mr. Poon acknowledged that surface runoff and soil permeability are important factors in determining the potential for leaching of nitrates into the Aquifer.

[50] David Thomson, M.Sc., P.Geo., was qualified as an expert in hydrology. He described the theory of plumes in aquifers and referred to the Golder Report's determination that water flows to the southeast and to the southwest in the Aquifer. He testified that water flow in the Aquifer is not known with certainty and can be disrupted by formations in an aquifer.

[51] Mr. Thomson also testified that nitrate levels in well water may or may not reflect nitrate levels in an aquifer. He opined that the results of the water samples tendered by the Appellants cannot be relied upon, as they were not collected in accordance with Provincial guidelines for sampling and testing water. He further opined that the presence of plumes in an aquifer may affect the detection of nitrates.

[52] The Respondent also called Stephanie Little to testify. Ms. Little is the Environmental Protection Officer with the Ministry who participated in the investigation prior to the issuance of the PAO. Ms. Little is trained in taking surface water samples. She testified that she visited the Curtis Farm during the winter months. She stated that she entered the Curtis Farm to collect samples of surface water. She testified that she observed low points on the Curtis Farm where water was collecting. She did not observe any runoff or outflow from the Curtis Farm.

[53] Ms. Little also testified that she observed piles of manure with shavings on the top. She testified that she did not know that the piles consisted of a shavings and manure mix.

[54] The Respondent, Ms. Christa Zacharias-Homer, gave evidence. She testified that, based upon a table of water testing results included in a memorandum and identified therein as "Figure 1", she concluded that there are elevated nitrate levels in the Aquifer. The memorandum, including Figure 1, was entered into evidence. Figure 1 shows the nitrate levels in water sampled at the Intake for the periods March 1987 to November 1988, and February 2011 to March 2016.

[55] Figure 1 shows nitrate levels were below 5 parts per million ("ppm") from March 1987 through November 1988 and below 6 ppm from February 2011 through September 2013[1]. (There is no data in Figure 1 for the period between November 1988 and February 2011.) Nitrate levels increased above 6 ppm in January 2014, and then increased above 10 ppm commencing in February 2014, and continuing through March 2016. There is no dispute that nitrate levels at the Intake are currently above safe drinking water standards, which is 10 ppm.

[56] The Respondent testified that her Ministry began to issue pollution abatement orders to agricultural operators in the Hullcar Valley in 2014. In particular, orders were delivered to the Jansen Dairy and to the other owner of the Field of Concern. Despite these orders, the Respondent testified that nitrate levels detected at the Intake and nearby wells have not subsequently dropped.

[57] The Respondent testified that water test results from two wells near the back of the Jansen Dairy (i.e., Sylvia west and east), showed elevated nitrate levels. This led her to conclude that nitrates originating from the manure on Curtis Farm were contributing to the presence of nitrates in the Aquifer; therefore, it was reasonable to issue the PAO.

The Participant

[58] Brian Upper, a Doctor of Veterinary Medicine, is the Chair of the Water District. He testified on behalf of the Participant.

[59] Mr. Upper submitted a table and graph of nitrate levels recorded from water samples taken by the Water District at the Intake for the period from July 1994 to December 2015. The nitrate level in ppm was 3.83 in July 1994, 6.58 in July 1997, 9.50 in March 2001, 7.1 in July 2002, 4.35 in September 2005, consistently below 4 from November 2006 to September 2011, and did not exceed 10 until March 2014.

[60] Mr. Upper testified that there was a cattle feedlot for 5,000 animals with holding pens located on the Field of Concern between 1981 and 1997. Mr. Upper testified that the holding pens on the Field of Concern were located above, and approximately 150 metres from, the Intake. Mr. Upper testified that the nitrate levels at the Intake increased after the 5,000-animal feedlot began operating,

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[1] The term "nitrate" is used contextually in evidence, and in this decision, to mean variously 'nitrate' and 'nitrate-nitrogen'. The drinking water standard for nitrate is 45 mg/L which is equivalent to 10 mg/L or 10 ppm nitrate-nitrogen.

reached a peak of 9.5 ppm in March 2001 after the feedlot had closed, and decreased steadily thereafter, reaching a level of 1.33 ppm in September 2008.

[61] Mr. Upper testified that the Jansen Dairy opened in 2007. He noted that, by 2012, nitrate levels at the Intake began to rise again, reaching a level of concern by March 2014.

[62] Mr. Upper also testified that the Water District collected water samples from wells to the west of Curtis Farm for testing. He testified that six samples were taken, and no samples showed detectable levels of nitrates.

DISCUSSION AND ANALYSIS

1. What is the legal and evidentiary foundation required to be satisfied by the Respondent in order to give her jurisdiction to issue the PAO?

[63] This appeal raises a question that has not been directly addressed by the courts, or prior decisions of the Board, with respect to the jurisdiction of a director to issue pollution abatement orders. In particular, under what circumstances may a director issue a pollution abatement order to a person who is alleged to be but one contributor to pollution.

[64] Section 83(1) of the *Act* provides that, "if a director is satisfied on reasonable grounds" that a "substance is causing pollution", the director may order any of the persons described in subparagraphs (a), (b) and (c) to abate the pollution. The analysis begins with the definition of the word "pollution" .

[65] Section 1(1) of the *Act* defines "pollution" as "the presence in the environment of substances or contaminants that substantially alter or impair the usefulness of the environment". This definition has been considered in a previous decision of the Board, *Alpha Manufacturing Inc. v. The Deputy Director of Waste Management* (Appeal No. 94/48, July 30, 1996); [1996] B.C.E.A. No. 28 (Q.L.) [*Alpha*].

[66] *Alpha* concerned the operation of a landfill in Delta, BC, which was adjacent to Burns Bog. The appellant had been authorized by permit to allow a discharge of refuse onto certain lands. Following the investigation of a complaint, the Ministry of Environment issued pollution abatement and pollution prevention orders requiring the appellant to remove the refuse that, the Ministry asserted, was outside of the boundary of the landfill permit. On appeal to the Board, the Ministry presented evidence that there was a potential danger of leachate from the landfill seeping into the groundwater, thereby causing contamination. There was no evidence of actual contamination of Burns Bog, or of the groundwater.

[67] The Board upheld the orders. It said the following with respect to the definition of pollution in the *Waste Management Act*, the same definition that is now contained in section 1(1) of the *Act*:

> The Appellant [Alpha] urged the Board to find that the definition of pollution contained in the *Waste Management Act* implied a deleterious affect rather than simply a change. Because there is no evidence of leachate having a negative effect on the surrounding environment and

> because a variety of replacement flora and fauna could use the 7 acre fill area [the land outside of the permit boundary] as described by Mr. Gebauer, it cannot be said that there has been a negative change to the environment in the area.
>
> The Board rejects this argument. The definition of pollution states that it includes 'the presence in the environment of substances that substantially **alter** (emphasis added) or impair the usefulness of the environment.' The definition of pollution includes activities which simply change the environment whether for the better or for the worse. Accordingly, simply placing a large volume of material on a natural habitat is an alteration.
>
> The Board must then consider the question of whether this is a 'substantial' alteration or impairment which is considered below. (page 8)

[68] In considering whether there had been a substantial alteration or impairment of the usefulness of the environment, the appellant in *Alpha* argued that the decision-maker was obliged to undertake scientific investigation to determine whether such alteration or impairment had occurred. The Board found as follows:

> When determining whether or not there has been pollution outside of permit area, a manager has a wide degree of discretion and need not undertake an extensive environmental impact assessment such as described by Mr. Lawrence. (page 9)

[69] The Board further determined that, in making his or her assessment of whether there is pollution, the decision-maker must:

> … assess the term 'substantially'. The term implies that the effect on the environment must not be insignificant or transitory. The term 'substantially' also implies that the effects must not be restricted to an insignificant area. (page 9)

[70] The definition of "pollution" in section 1(1) of the *Act* also requires the Board to consider the interpretation of the words "usefulness of the environment" . That phrase was considered in the 1984 decision of *R. v. Busy Bee Septic Tank and Sanitary Sewer Services Ltd.*, [1984] B.C.J. No. 514 (Q.L.), a decision of the B.C. County Court [*Busy Bee Septic*].

[71] *Busy Bee Septic* concerned a criminal charge brought against Busy Bee in relation to the unauthorized discharge of sewage onto a field adjacent to a public road with several homes nearby. There was no evidence that the deposit of the sewage caused any actual harm to the environment, or to human health and safety. The Crown tendered evidence from a medical health officer who testified that, in his opinion, it was unsafe for human health to discharge sewage in any place where it might come into contact with humans or domestic animals. The medical health officer testified that he believed that danger existed because of the deposit of the sewage onto the farmer's field adjacent to a road and residential dwellings. There was no evidence that anyone had actually come into contact with the sewage, or contracted any disease. The trial judge convicted Busy Bee of

causing pollution under section 3(2) of the *Waste Management Act*. Busy Bee appealed to the County Court.

[72] On appeal, Busy Bee argued that the charge had not been proven because the sewage on the field imposed, at worst, a potential - as opposed to an actual - danger to human health. The accused also submitted that there was no evidence of what use was being made of the field when the sewage was deposited; therefore, it was not possible to determine whether the field's usefulness was altered or impaired.

[73] The County Court found as follows in respect of the words "usefulness of the environment":

> 9. I agree that, to sustain a conviction under section 3(2) of the Act, it is necessary to prove that waste has been introduced into the environment in such a manner or quantity as to cause pollution. The definition section makes it clear that to constitute 'pollution', there must be an actual as opposed to a danger of substantial alteration or impairment of the usefulness of the environment. It is the word 'usefulness' that is the key to the definition.
>
> 10. The Shorter Oxford Dictionary defines 'useful' as:
>
> > Having the qualities to bring about good or advantage; helpful in effecting a purpose; suitable for use; serviceable.
>
> Where raw human sewage is deposited on land adjacent to dwelling houses and a short distance from a public school creating a situation that in the opinion of responsible medical health officials, places the health of children and others at risk, it is reasonable to conclude that the 'suitability' for many uses or 'serviceability' of the field must necessarily be 'altered or impaired'. The mere presence of the sewage with its potential for harm renders it unsuitable for use for many purposes. The fact that no particular current use of the field was proved is, in my opinion, not relevant.
>
> 11. The danger that the sewage could, if left, constitute a greater health hazard by becoming a breeding ground for a variety of pathogens which could be communicated to humans in a variety of ways was also described by Dr. Peck. That evidence was relevant to the issue of the degree to which the 'usefulness' of the field was altered or impaired. The trial judge was therefore right to take such evidence into consideration in assessing whether a 'substantial' alteration or impairment of the usefulness of the field had been caused by the sewage.
>
> 12. In my opinion there was evidence before the trial judge sufficient to justify him in reaching the conclusion he did in respect of Count 1. Further, I find no error in the way in which he interpreted any provisions of the Act relevant to that count.
>
> [Emphasis added]

[74] There is no mention in section 83 of the *Act* of the cumulative effect of the deposit of a substance by multiple parties. Rather, section 83 obliges the director to obtain sufficient evidence to give her reasonable grounds to conclude that a substance (here, the deposit of the manure/shavings mixture) is causing pollution. On the facts of this case, there is no dispute that the Appellants have deposited a substance (manure/shavings mixture) into the environment. The real question is whether there are reasonable grounds to believe that the substance deposited by the Appellants onto the environment "is causing" pollution, as defined in section 1(1) of the *Act*.

[75] To have reasonable grounds to believe that the manure/shavings mixture deposited by the Appellants onto their land was causing pollution, the Respondent was obliged to consider whether the substance substantially altered or impaired the usefulness of the environment.

[76] The Panel adopts the analysis of the Board contained in *Alpha* with respect to "alteration" of the environment. The Panel finds that the mere deposit of the manure/shavings mixture onto the Appellant's land constitutes an alteration of the environment. As in *Alpha* and *Busy Bee Septic*, the question here is whether the substance **substantially** altered or impaired the **usefulness** of the environment.

[77] As stated earlier, nitrates are naturally present in the environment and are required by crops to grow. To the extent that deposited nitrates are taken up in the growth of crops, they do not substantially alter or impair the usefulness of the environment. In fact, there is no dispute that, as nitrates taken up in crop growth are a benefit to that aspect of the environment, the nitrates simply maintain the usefulness of that environment (maintain its suitability).

[78] In light of the undisputed fact that the Appellants had utilized their land as a cattle feed lot for 42 years, and had been depositing manure mixed into wood shavings onto their land for 25 years, it was incumbent upon the Respondent to satisfy herself, on reasonable grounds, that nitrates in excess of those consumed in the nitrogen cycle had leached into the Aquifer and thereby caused pollution. It is only in these circumstances that the Respondent could be satisfied that the nitrates deposited onto the Curtis Farm were causing the substantial alteration or impairment of the usefulness of the environment (i.e., the Aquifer).

[79] Put differently, the Panel concludes that the Respondent was obliged to satisfy herself, on reasonable grounds, that the nitrates derived from the manure/wood shavings mixture deposited by the Appellants on their land had leached into the Aquifer and caused an elevation of the nitrate levels in the Aquifer, or contributed to the multiple sources of nitrates filtering into the Aquifer, such that it was causing "pollution". If the Respondent was able to reach this conclusion, she would have authority to issue the PAO.

[80] To lawfully justify the PAO, the Respondent was not obliged to conclude that nitrates from the manure/wood shavings mixture deposited on the Appellants' land caused the elevation of nitrate levels in the Aquifer that exceeded the applicable drinking water standards. The phrase "substantially alter or impair the usefulness of the environment" does not compel the application of a particular standard; rather, in the context of this case, the phrase required the Respondent to consider

whether the nitrates from the manure/shavings mixture deposited onto the Appellants' land substantially altered or impaired the usefulness of the water in the Aquifer. Further, while scientific certainty of causation is not required, the Respondent must be satisfied "on reasonable grounds" that the substance is causing pollution.

[81] In *Van Der Wal v. British Columbia (Ministry of Environment, Lands and Parks)*, (Appeal No. 95/32, July 18, 1996); [1996] B.C.E.A. No. 30 (Q.L.), the Board considered the meaning of "reasonable grounds" in the context section 22.2 of the *Waste Management Act*, the section then authorizing the issuance of a pollution prevention order (now found section 81(1) of the *Act*). That section has similar wording to section 83 (authorizing pollution abatement orders), except that it only requires a decision-maker to be satisfied that an activity is occurring that is "likely" to release a substance that will cause pollution, as opposed to "is causing" pollution. In *Van der Wal*, the Board found as follows:

> 35. What is meant by 'satisfied on reasonable grounds'? This phrase has been considered in numerous criminal law cases in connection with the issuance of search warrants. In *Re Bell Telephone Co. of Canada* (1947), 89 C.C.C. 196, Chief Justice of Ontario High Court McRuer said at page 198:
>
> > Before a justice may issue a search warrant, it is necessary that there be a sworn information that contains such a statement of facts as satisfies the Justice that there are reasonable grounds for believing any of the things set out in Section 629. It is not sufficient that the Justice should be satisfied -- he must be satisfied on reasonable grounds; that is, the grounds of belief set out in the information must be such as would satisfy a reasonable man. If there are not such grounds shown the Justice cannot be taken to have been satisfied on reasonable grounds.
>
> 36. In other words there is an objective standard.
>
> [Emphasis added]

[82] The Board concluded that "the test is an objective test and that the standard of proof is not the criminal law standard but a standard more akin to the civil standard of 'balance of probabilities'". It then concluded:

> 39. The manager must, on the basis of plausible evidence, objectively considered, be satisfied that there will 'likely' be release of a substance that will cause pollution of the environment.
>
> …
>
> 41. At the very least then on the basis of objective evidence the manager must come to the conclusion that the operation or activity will probably cause a contamination that will substantially alter or impair the usefulness of the environment.
>
> [Emphasis added]

[83] In the present case, section 83 requires the Respondent and, on appeal, this Panel, to be satisfied on reasonable grounds that the substance "is causing" pollution. This means that there must be "plausible evidence, objectively considered" that the manure/wood shavings mixture applied by the Appellants is leaching nitrates into the Aquifer and "is causing" pollution. The standard of proof is on a balance of probabilities.

[84] It is a question of fact whether the deposit of nitrates into water substantially alters or impairs the usefulness of the environment. In circumstances where a small deposit of nitrates is introduced into water, with no other source of nitrates impacting it, that small deposit of nitrates might not "substantially alter or impair the usefulness of the environment". However, if there are multiple sources of nitrates entering a body of water, that same small deposit of nitrates could substantially alter or impair the usefulness of the environment, by contributing to an elevated level of nitrates in the water such that it places human health or the health of the environment at risk. Consistent with the statutory test for issuing a PAO, this contribution must be based on plausible, objective evidence.

[85] With this framework in mind, we turn to the application of these principles to the evidence before the Panel.

2. Is the PAO reasonable in the circumstances?

[86] It is common ground that there are elevated levels of nitrates in water samples taken from the Intake and that these elevated levels exceed safe levels of nitrate for drinking water.

[87] It is important to understand the role of nitrates in the environment. As discussed above, plants require nitrates to grow. Nitrates are, therefore, an essential component of a healthy environment.

[88] Most, if not all, water has a background level of nitrates which does not impair the usefulness of the water. It is only when the level of nitrates is elevated such that they substantially alter or impair the usefulness of the environment that they are rightly considered a pollutant.

[89] In recognition of this variable scale for nitrates, the Canadian Drinking Water Quality Guidelines set the maximum acceptable concentration of nitrate-nitrogen in drinking water at 10 mg/L (10 ppm). Implicit in this standard is a recognition that levels of nitrate-nitrogen below 10 mg/L (10 ppm) are safe for human consumption.

[90] In the context of these facts, and as discussed above, the Panel concludes that the PAO can only be justified if there is evidence that the nitrates deposited onto the Curtis Farm in the manure/wood shavings mix exceeded the combined uptake of nitrates in the nitrogen cycle, and that those excess nitrates could have leached into the Aquifer.

[91] The Respondent submits that "agricultural operations in the Valley are all contributors, to various extents in accordance with the size of the operation, to the nitrate pollution observed in Aquifer 103." The Panel rejects this submission. The Panel finds that this reflects an assumption, rather than evidence. The Panel has

received no evidence that nitrates deposited on the Curtis Farm did, or could have, leached into the Aquifer.

[92] It is common ground that there is no evidence of water runoff from the Curtis Farm. Therefore, the only method by which nitrates from the Curtis Farm could have entered the Aquifer is by leaching through the soil.

[93] Although not a determinative factor in this appeal, the Panel notes that the only evidence of water flow direction in the Aquifer beneath the Curtis Farm is derived from the Golder Report. This evidence indicates that the water in the Aquifer is likely flowing from the Curtis Farm in a southwesterly or southeasterly direction away from the Intake. As the Curtis Farm is situated south of the Intake, even if nitrates from the Curtis Farm were leaching into the Aquifer, the Golder Report supports the conclusion that those nitrates would likely have been transported away from the Intake, not towards it.

[94] The Respondent provided water test results at the Intake for the period of March 1987 to November 1988, and the period from February 2011 to March 2016. The Water District provided water test results at the Intake for the period July 1994 to December 2015. The Panel considered nitrate levels at the Intake from the combined submissions of the Respondent and the Water District.

[95] The nitrate level from March 1987 to November 3, 1988 was at or below 4 ppm; by March 2001 the nitrate level was 9.5 ppm. The level decreased to 4.63 ppm in August 2005, and 1.33 ppm in September 2008. Nitrate levels remained below 2.0 ppm through September 2011, after which the levels started to rise until they exceeded 10 ppm in March 2014 and, for the most part, remained at or above 10 ppm through March 23, 2016.

[96] The evidence offered by the Respondent did not report on the elevated nitrate levels which peaked in March 2001. The Respondent's submissions suggest that nitrate levels were below 6 ppm from 1987 through 2013. This is simply not the full history as set out in the preceding paragraph.

[97] The combined submissions of the Water District and the Respondent demonstrate two periods of time since 1987 when nitrate levels increased to levels of concern. The evidence shows a pattern of nitrate levels from low concentrations increasing to high concentrations, then decreasing to low concentrations before increasing once again to high concentrations over a period of twenty-seven years.

[98] The Appellants have deposited a relatively consistent amount of manure/shavings mixture onto the Curtis Farm for 25 years. The evidence of the rise and fall of nitrate levels in the Aquifer prior to the most recent increase in nitrates noted in 2014, indicates that there must reasonably be other factors causing the fluctuation in nitrate levels. The Panel expresses no view on what these factors are, other than to note that the opening and closing of the feed lot on the Field of Concern, and the opening of the Jansen Dairy, may be relevant considerations. The Panel only concludes that some other source of nitrates (other than from the Curtis Farm) was, and is, causing the increase of nitrate levels in the water at the Intake and nearby wells. There was no evidence before the Respondent, and there is no evidence before the Panel, that nitrates from the Curtis

Farm reached the Aquifer and caused or contributed, in any way, to the elevated nitrate levels now recorded at the Intake and nearby wells.

[99] Mr. Poon's calculation of nitrate production on the Curtis Farm was based upon there being 2,500 animals present on the Curtis Farm, rather than the average number of 1,250 given in evidence by the Appellants. He appears to have overestimated nitrate production by a factor of two.

[100] Further, Mr. Poon did not take into account the fact that nitrates are retained in the decomposition of wood shavings and do not leach into the soil. Mr. Poon opined that only 30% of nitrates are available for leaching into soil when manure is mixed with shavings. Mr. Poon offered no estimate of the consumption of nitrates by crops grown on the soil in question, and no estimate of excess nitrates available for leaching.

[101] As a consequence, there is no evidence that the deposit of the manure/wood shavings mixture onto the Appellant's land exceeded the uptake of nitrates from crop growth, decomposition of wood shavings, and other nitrogen consumption factors, such that nitrates were available to leach into the Aquifer.

[102] The Respondent relied on water test results from two wells in close proximity to the Jansen Dairy barns in support of her decision to issue the PAO. This evidence is of limited assistance in respect of this appeal. The wells are a significant distance from the Curtis Farm where the major concentration of animals is located. The only evidence of the direction of the flow of water within the Aquifer (the Golder Report) indicates that the water likely flows from the Curtis Farm, in the opposite direction from the wells close to the Jansen Dairy barn. Evidence of elevated nitrates in the water tested from these two wells is not evidence that nitrates from the Curtis Farm have reached the Aquifer.

[103] In contrast, there is evidence that over 1,100 dairy cows are housed in the barns in close proximity to the two wells. If nitrates leached through the soil from these barns, the nitrate plume would form in the water under the wells and the direction of water flow within the Aquifer (as indicated by the Golder Report) would likely move the remaining nitrate plume in the direction of the two wells.

[104] The Panel concludes that there was, and is, no evidence upon which the Respondent could, or the Panel can, be satisfied on reasonable grounds that nitrates from the Curtis Farm have reached the Aquifer such that they have substantially altered or impaired the usefulness of the environment.

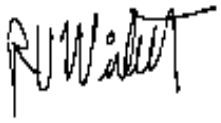
[105] For the reasons set out herein, the Panel finds that the PAO is not reasonable in the circumstances.

DECISION

[106] In making this decision, the Panel has carefully considered all of the evidence before it and the submissions and arguments made by each of the parties, whether or not they have been specifically referenced herein.

[107] For the reasons given above, the PAO is set aside.

[108] The appeal is allowed.



Robert Wickett Q.C., Panel Chair
Environmental Appeal Board

Lorne Borgal, Member
Environmental Appeal Board

Robert Holtby, Member
Environmental Appeal Board

June 1, 2017