

Frequently Asked Questions and Answers

Hullcar Aquifer Water Quality

Please Note this document will be updated regularly to ensure current information is provided.

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General Questions

What was the province's initial response to elevated nitrate levels in the aquifer?

- January 21, 2014, Ministry of Environment (ENV) staff, responding to a complaint of high nitrates in Steele Springs drinking water overflow, had inspected the area including H.S. Jansen dairy farm.
- February 2, 2014, ENV staff initiates pre-investigative referral to Conservation Officer Service for H.S. Jansen Dairy.
- February 3, 2014, ENV staff received water sample results from SSWD overflow and provided them to IHA staff, Dr. Upper, co-chair SSWD and Conservation Officer Service.
- February 11-13, 2014, ENV staff corresponds with IHA staff regarding the Guidelines for Canadian Drinking Water Quality for Nitrates and the health impact for high nitrate levels.
- February 13, 2014, ENV staff requests assistance from several AGRI staff regarding soil trend analysis provided by Okanagan Fertilizer. As well, requested advice and recommendation regarding types of crops planted.
- March 2014, Steele Springs Water District (SSWD) in Spallumcheen issued a Water Quality Advisory (WQA) to their water users.
- March 6, 2014, the Ministry of Environment issued a Compliance Order, prescribing manure application practices to the H.S. Jansen dairy farm. The order required the dairy to hire a qualified professional to conduct regular soil and water sampling, provide annual sampling reports to the ministry, prepare an annual nutrient management plan and restrict the application of dairy effluent to the 'field of concern'. Jansen was in compliance with the order.
- March 6, 2014, the Ministry also issued an Information Order to Doug Regehr Feedlots which required the feedlot to hire a qualified professional to assess the feedlot's nutrient application rates, and submit to the ministry a comprehensive nutrient management plan and an annual summary report. Doug Regehr is in compliance with the order.
- On July 14, 2014, the Interior Health Authority issued a Water Quality Advisory to all residents of the Township of Spallumcheen that reside within the designated area of the Hullcar Aquifers (102 and 103). This Advisory was in addition to the Advisory issued by the SSWD in March 2014.

How is liquid and solid manure from agricultural operations regulated?

Ministry of Environment (ENV) regulates agriculture waste through the Agriculture Waste Control Regulation. The regulation requires all agricultural operators to follow the requirements of the Code of Agricultural Practice for Waste Management (Code). The Code identifies how agriculture waste should be stored and applied to land, requirements for agriculture boiler/heater emissions, on-farm disposal of mortalities, feeding areas and access to water, and use and storage of agricultural products (i.e., management of chemical fertilizers). There is no requirement to prepare and utilize nutrient management plans. There is no registration process: it is expected all agricultural operators will abide by AWCR.

ENV staff work closely with Ministry of Agriculture (AGRI) staff in the review of the H.S. Jansen Dairy NMP and supporting soil samples. AGRI staff collaborate with ENV staff providing advice and recommendations as AGRI are the experts in nutrient management planning and soil specialists.

ENV staff continue to be involved in this issue and are the management lead and other ENV staff are active participants on the Hullcar Aquifer inter-ministry working group.

What has the response been to the s. 112 compliance order and the information order issued in March 2014?

H.S. Jansen Dairy

Status: The order was cancelled on May 12, 2016 and it has been replaced with a Pollution Prevention Order. Jansen Dairy was in compliance with the s.112 Order.

The H.S. Jansen Dairy Farm has complied with the S. 112 Compliance Order which included hiring a qualified professional to conduct regular soil and water sampling, and provide annual sampling reports to the ministry.

March 6, 2014 - S.112 Inspection Order issued restricting applications of dairy effluent to the field of concern.

- 2014 dairy effluent application requests
 - April 14, 2014 – Approval granted for 15,000 gallons per acre
 - August 27, 2014 – Approval granted for 12,000 gallons per acre
- 2015 dairy effluent application requests
 - June 12, 2015 – Request denied for 8,000 gal/acre
 - July 15, 2015 – Approval granted for 6,000 gal/acre
 - Aug 31, 2015 – Approval granted for 6,000 gal/acre

The s.112 Inspection Order also required completion and implementation of annual nutrient management plans, submission of annual reports and submission of a report with findings, recommendations and conclusions relative to mitigating nitrate levels to 6mg/L in Steele Springs. The order was cancelled and replaced with a Pollution Abatement Order issued May 12, 2016.

Doug Regehr Feedlot

Status: The Information Order is still in effect and D. Regehr is in compliance with the Order.

March 2014 [Information Order \(107156\)](#)

What are the pollution abatement orders and who were they issued to?

Pollution abatement orders (PAOs) are a tool under s. 83 of the *Environmental Management Act* that allow a director to take immediate action to manage risks to human health and the environment. Ministry of Environment staff use PAOs where it is necessary to compel parties to take timely action to ensure human health and the environment are protected. PAOs are used to stop or contain pollution that is already occurring.

PAOs were issued to agricultural operators above the Hullcar aquifer that have the possession and control of agricultural waste at the time it was introduced into the environment. The requirements within the PAOs are specific to the type and size of authorization and were issued to the following:

- Canyon Road Farms Ltd.
- Curtis Feedlots
- Darlene Huxley
- Grace-Mar Farms Ltd.
- H.S. Jansen & Sons Dairy Ltd.
- Haambuckers Dairy
- Kenneth Regehr Holdings Ltd.
- Purple Springs Nursery
- Rhoda Friesen

The Hullcar water quality situation will continue to be monitored into the future, and there may be a need to issue further orders.

What are the penalties for failing to comply with an order?

Under EMA, a person can be fined up to \$300,000 or sentenced to up to 6 months of jail (not both) for contravening an order.

Failure to comply with the requirements of the order may also result in an administrative penalty of up to \$40,000.

If pollution abatement orders are being issued, then why not just put a moratorium on spraying manure for the entire area?

A moratorium does not address the issue of sustainable management of all agricultural wastes while ensuring a vibrant agriculture sector. We need the benefits of agriculture to feed our communities.

Spraying manure is one of several possible sources of pollution. The inter-ministry working group is developing a monitoring study that will look at direction of flow and recharge rate within Hullcar aquifer 103, and which will assist in identifying the sources of nitrates.

What is an Area Based Management Plan?

EMA section 89 enables the Minister of Environment, for the purposes of environmental management of an area, to designate a geographical area for the purpose of developing an area based plan. The minister may identify who is to participate in preparing the plan, establish the terms of reference for the plan, identify the process for consultation and establish the timeline for completion of the plan.

What actions is government taking?

Ministry of Environment staff are continuing to provide information to agricultural operations that may impact the aquifers to ensure they are aware of the regulatory requirements under the Agricultural Waste Control Regulation. As well, staff are continuing to verify compliance of these agricultural operations with applicable agricultural waste management legislation, namely the Agricultural Waste Control Regulation and the *Environmental Management Act*. Ministry of Environment staff have been asked to expand the area of focus to all agricultural operations above the Hullcar aquifer with the intention of ensuring that all contributing sources of nitrates are managed to protect the environment and human health.

Staff from the Ministries of Environment, Agriculture, and Forests, Lands and Natural Resource Operations and the Interior Health Authority have re-established an inter-ministry working group which was originally initiated by Greg Taggart, Ministry of Agriculture in 2015. The working group has developed an integrated action plan, including a joint monitoring plan, to resolve the issue.

The Ministry of Environment will continue to test and monitor water quality from the Steele Springs drinking water overflow.

Information can also be found on the Ministry of Environment website at:

<http://www.env.gov.bc.ca/epd/regions/okanagan/envman/hullcar-aquifer.html>. The website will continue to be updated as information becomes available.

Water Quality Information

What are the current details of the water quality advisory?

The most up to date water quality advisory can be found at

<http://spallumcheentwp.bc.ca/files/%7BB974A5B9-3C45-4475-9596-2BBF398A21DE%7DSteele%20Springs%20Neighborhood%20Notification-Nitrates.pdf>

MOE shares the sampling results with SSWD and IHA. IHA will consider all information when making future decision about WQ advisories and any other notifications to the community.

I am located inside of the drinking water quality advisory area, should I be concerned?

The Interior Health Authority water quality advisory currently includes the residents of Steele Springs Water District and independent drinking water wells above the Hullcar aquifer. For more information see <https://www.interiorhealth.ca/YourEnvironment/InspectionReports/Pages/WaterNotifications.aspx>.

Health Canada suggests a maximum acceptable concentration of nitrate in drinking water of 10mg/L⁻¹. The BC Water Quality Guideline for Nitrogen (Nitrate, Nitrite, and Ammonia) concurs with the Health Canada Guideline limit for concentration of nitrate in drinking water as well states:

For drinking water, high nitrate concentrations have been identified as a problem for infants. Nitrate can be converted to nitrite, which combines with hemoglobin in the blood to form methemoglobin, which does not absorb oxygen. With reduced capacity of the blood to absorb oxygen, death from lack of oxygen can result.

Interior Health is advising that pregnant women, babies under 6 months of age, the elderly, and individuals with weakened immune systems, or chronic heart, lung and blood conditions should take precautions and use an alternative source of water (ex. bottled water) at this time. For bottle fed infants, use an alternate source of water to mix infant formula for infants less than 6 months of age.

The Province, including the Ministry of Agriculture, Ministry of Forests, Lands and Natural Resources, Interior Health Authority and the Ministry of Environment are working closely to protect human health and the environment.

What water quality sampling is being done?

Ministry of Environment Compliance staff and Steele Springs Water District co-chair have been taking monthly water quality samples from the Steele Springs drinking water overflow. Monthly sampling will continue until the water advisory is lifted.

All samples are immediately sent to a qualified lab, and the sample results are reviewed by ENV staff as soon as possible after the Ministry has received them.

The ENV staff provides the sample results to Interior Health officials for review and assessment per the terms of the *Health Act*.

What water quality parameters are being tested for?

Environmental Compliance staff are taking water quality samples for nitrates from the Steele Springs Water Board drinking water outlet on a monthly basis.

Please see <http://www.env.gov.bc.ca/epd/regions/okanagan/envman/hullcar-aquifer.html> for the most up to date results and for a map of the water quality sampling locations.

The sampling results are compared to the [Health Canada Water Quality Guideline for Nitrates-Nitrite](#) which identifies the drinking water standard of 10 mg/L.

How is water quality sampling data shared amongst the different government ministries/agencies?

The British Columbia Ministry of Health establishes province-wide goals, standards and performance agreements for health service delivery by the health authorities. Interior Health Authority (IHA), Health Protection is responsible for regulating and monitoring many public facilities and those aspects of the environment that have a direct impact on public health including drinking water safety. IHA regulates through the Drinking Water Protection Act and the Public Health Act, and is the responsible agency for issuing public notifications.

ENV staff also work closely with IHA staff for drinking water quality concerns. Regarding the Hullcar aquifer water quality, in January 2014, ENV engaged IHA staff to make them aware of the water quality sample results at the Steele Springs Water District (SSWD) drinking water overflow. ENV and IHA keep regular communication to ensure both are aware of steps being taken regarding the drinking water supply. (i.e. IHA kept apprised of status of the s.. 112 Inspection Order and the Information Order to the farm and feedlot, as well as coordination of which agency would sample SSWD overflow, status of drinking water advisory, etc). IHA staff continue to be involved in this issue to assist in determination of pollution source, and are active participants on the Hullcar Aquifer inter-ministry working group.

What long-term water quality monitoring will be put in place?

An inter-agency working group is currently developing an integrated monitoring plan to protect human health and the environment. The submitted plan will be shared with First Nations to ensure the plan addresses expectations. The plan will be posted on the Ministry of Environment, Hullcar aquifer water quality web page at <http://www.env.gov.bc.ca/epd/regions/okanagan/envman/hullcar-aquifer.html>, when it is completed.

Do provisions in the Water Sustainability Act have any influence on this issue?

The WSA provides authority to establish water objectives to support a more consistent approach to considering water in natural resource decisions and local government planning. Water objectives can potentially help reduce impacts to and help sustain water quantity, water quality and aquatic ecosystems.

In addition, the Act provides for the development of water sustainability plans to protect watersheds and address conflicts between users, risks to water supply and quality and risks to aquatic ecosystem health.

Both water objectives and water sustainability plans are longer-term tools requiring additional regulations and policy that will be developed after the WSA and groundwater regulation is brought into force early this year.

What is MoE doing to monitor for potential contamination of aquifers elsewhere in the Province?

Since 1994, MOE has classified aquifers based on their level of use and vulnerability to contamination. This inventory of over 1,100 classified aquifers allows vulnerable aquifers to be identified and prioritized for management actions, such as monitoring.

The MOE and FLNR monitor water quality in priority aquifers on an on-going basis. Monitoring has shown higher levels of nitrate in a few of the vulnerable aquifers that are heavily used (e.g., aquifers in Abbotsford, Osoyoos, and Grand Forks). Follow-up actions for these aquifers have included working with the responsible ministries to develop best practices guides for the various industry sectors, water suppliers and private well owners to help mitigate effects on aquifers.

Monitoring is conducted for provincial observation wells and, in some locations, private water supply wells. Provincial observation well data are publicly available at <http://www.env.gov.bc.ca/emswr/>. Results from private well monitoring are shared with the well owner and local health officials.

Water supply systems throughout BC (systems that supply drinking water to the public) are required under the *Drinking Water Protection Act* to regularly monitor and report on their water quality.

What are potential sources of Nitrates?

Aside from land application of nitrogen sources like manure or fertilizers, other agricultural sources include but are not limited to manure collection areas (e.g., feedlots) or manure storages (e.g., temporary field storage for solid manure, or permanent storages for liquid manure). Septic tanks and lawn fertilizers may also be nitrate contributors to the aquifer.

Nutrient Management Planning Information

What is the role of the Ministry of Agriculture?

Ministry of Agriculture (AGRI) works to enhance agrifood sector growth, competitiveness, sustainability and adaptability. Provides expertise and support for: innovation, domestic and international marketing, management practices that promote agrifood systems that are environmentally sustainable and productive, and creating and maintaining a positive regulatory climate with local government.

The AGRI supports the efforts of industry to develop innovative products, tools and processes to reduce environmental impact through enabling the adoption of Beneficial Management Practices. AGRI provides oversight to the Environmental Farm Plan Program. This is a voluntary educational program that promotes best management practices for agriculture operations. [Nutrient Management Plan](#) (NMP) development is a part of this program.

What is an Environmental Farm Plan (EFP)? What is a Nutrient Management Plan (NMP)?

An EFP is a voluntary environmental risk assessment. In B.C., planning advisors visit a farm operation, and together with the farmer or rancher, confirms the things that are being done well to minimize risks to the environment and identifies opportunities to improve. Various aspects are covered from fuel storage to feedlots to determining manure storage capacities. The opportunities to improve are turned into an action plan. The action plan might include development of an NMP or other more detailed risk assessments.

In the EFP Program in B.C., the NMP may be thought of as a sort of a land application plan. In other places, a nutrient management plan might address manure storage as the more general EFP would. However, NMPs have similarities no matter where you go. One common goal would be to minimize the risk of nutrient losses, including nitrate leaching. Another common feature is that the plan is only the first step in an iterative process of 'adaptive management' (Fig. 1):

- with an NMP, a farmer gets a rough idea of "what is to be done next" by estimating nutrient credits and crop nutrient needs, similar to a budgeting exercise with revenues and expenses
- the rest is largely up to the farmer, to implement the plan or change it as circumstances dictate, including the soil test monitoring (akin to checking how much is in the bank account at the end of the budgeting period)
- no one can predict exactly what will happen, but monitoring and keeping good records is part of embracing this uncertainty and making better decisions about what's to be done next.

To date, key principles of the EFP program (including the NMP subcomponent) are that they are voluntary and confidential. The possibility to have mandatory limits does not exist in a voluntary program, but such limits are a possibility in environmental regulations currently under review.

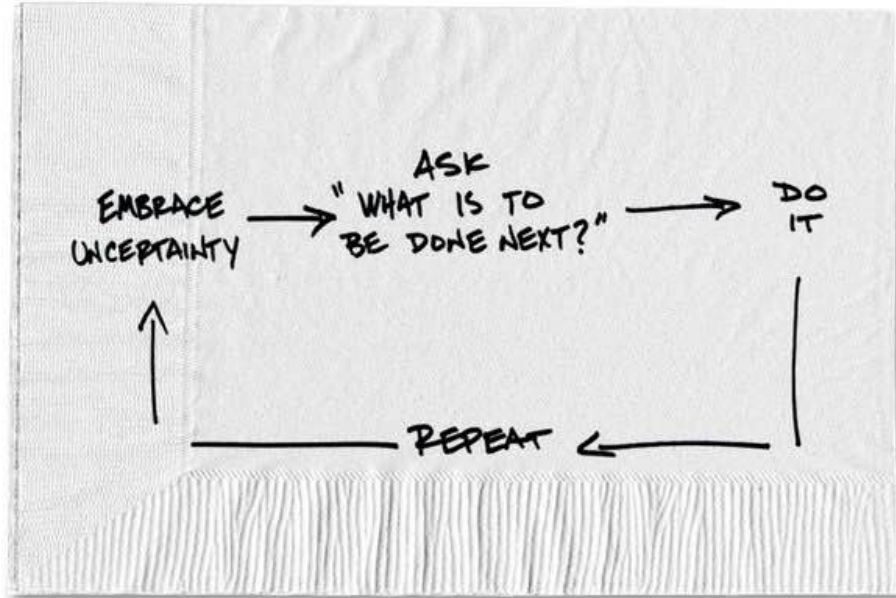


Figure 1. Conceptual diagram of adaptive management. Source unknown.

What is the professional reliance model? What level of accreditation is required for creating nutrient management plans?

The Ministry of Agriculture identifies the desired qualifications for NMP Advisor to be:

- a **Professional Agrologist** in good standing with the BC Institute of Agrologists (<http://www.bcia.com/>) or
- a **Certified Crop Advisor**, registered with the American Society of Agronomy (<https://www.certifiedcropadvisor.org/>)
 - A NMP Advisor who is a PAG or CCA should have a minimum of 2 years relevant field experience (e.g. as a soil or crop advisor, nutrient management research, extension worker, etc).

OR

- A NMP Advisor should have a recognized University degree in a related field and have seven years related field experience
- A NMP Advisor must take the BC Nutrient Management Planning training course and successfully complete all course requirements

Recognized NMP Advisors must attend all NMP update courses offered by the Ministry of Agriculture.

AWCR does not require nutrient management plans or agricultural waste management plans, and therefore does not identify the level of accreditation for NMP. The regulation requires that agricultural practices be carried out in compliance with the Code for Agricultural Practice for Waste Management.

MoE verifies QP credentials by looking up members through the applicable professional association online database. If a QP cannot be found or database cannot be accessed, staff can either contact the professional or the association directly to verify.

What is Ministry of Agriculture's role in the Hullcar aquifer water quality issue?

Ministry of Environment staff works closely with Ministry of Agriculture staff in the review of the H.S. Jansen Dairy NMP and supporting soil samples. AGRI staff collaborate with ENV staff providing advice and recommendations as they are the experts in nutrient management planning. AGRI staff continue to be involved in this issue and are the technical co-lead and others are active participants on the Hullcar Aquifer inter-ministry working group.

Where can I find the nutrient management plans and soil samples for H.S. Jansen?

The Jansen Dairy nutrient management plan and supporting soil samples have not been posted publicly as the release of this information would violate the federal Copyright Act.

The information from the Jansen Dairy was provided to the Ministry of Agriculture by Ministry of Environment when seeking professional advice on the Jansen applications for nutrient application. All information has been forwarded to the appropriate experts to ensure informed determinations.

How are soil tests conducted?

The BMP for a conventional soil test is to take a 'composite' made of at least 15 cores collected at random locations from an area no greater than 25 acres. The area can be greater than 25 acres if the characteristics and management of the field are known to be uniform.

When the s. 112 Inspection Order for H.S. Jansen Dairy Farm was in effect, soil samples and manure samples are taken for each application request, as well as included in the annual summary. The soil testing within the growing season of perennial forages exceeds standard best management practices. The test can be used to account for soil N for plants for the next harvest ('cut') and to monitor for nitrate moving down the soil profile from precipitation or over-irrigation.

What did the H.S. Jansen Dairy soil testing show?

Soil testing during the growing season showed that nitrates did not move down past a 2 foot depth towards the aquifer.

How do you plan for adequate manure storage?

Manure for storage

- Planning for adequate manure storage involves a process similar to the guidelines described in Worksheet #2, EFP Reference Guide. The worksheet specifies 180 days (October to March inclusive) as a target guideline for days of liquid storage for the area in question, without specifying where the storages to meet that target should be.
- In a given year, there may be days from October to March when some manure application may be appropriate, so the October to March period is not a 'no-spread period' per se.
- Looking back in time, the lack of unwanted escape of the liquid manure from the storage facilities would be a good sign that there was adequate storage capacity.

Reference material

- Table 3.3, EFP Reference Guide: Average Daily Livestock Waste Production and Suggested Storage

How do you ensure safe application of manure to land?

To plan to minimize nitrate leaching risks from cropped fields, two questions in simple terms may include:

- How much nitrates will there be for plants from manure?
- How much nitrates will be required for crop growth?
 - Animal densities relative to crop types (e.g. Worksheets 4 and 5 in the EFP Reference Guide) indicate whether an NMP is recommended in the voluntary EFP program; however, an NMP and not animal densities answer the two questions above.

An NMP that involves a manure test, but not the worksheets, could show that it takes 2 or 3 times the amount of dilute manure to supply the same amount of plant available N as a thicker manure. The volume (i.e. number of gallons) of nutrients is not significant as long as the soil isn't being saturated (no leaching of nitrate) and the N amounts are responsible.

Looking back in time, a low amount of nitrate in the soil combined with expected crop yields and quality would be an indication that N management was appropriate (i.e. minimized nitrate leaching risks). A best management plan is to conduct annual post-harvest nitrate testing to improve the estimates in an NMP.

Reference material

- Table 6.7, EFP Reference Guide: Assumed Annual Manure Nitrogen Excretion Values and Manure Nitrogen Concentrations in Storage for Various Animal Types
- Soil Sampling for Nutrient Management. Revised 2010. Nutrient Management Factsheet – No. 2 in Series.

Is transporting effluent, via pipelines, a common farming practice?

Manure application practices continue to evolve. For many years, almost all liquid manure was applied to land using a tractor and tanker. With consolidation of farms, larger operations have been shifting to systems where manure is pumped through flexible hoses directly to an applicator device attached to a tractor. This system is often referred to as an umbilical or drag line system. Where fields are in close proximity to the manure storage facility, the hoses are placed on the surface of the ground. Where fields are further away, it is not uncommon for farmers to install pipeline systems for transport of liquid manure from the manure storage facility to the field where it will be applied. The benefits of this system are efficiency, as manure can be pumped continuously. Another benefit is reduced soil compaction. There is also less wear and tear on roads from heavy manure application equipment. Often, the same system is also used for irrigation purposes.

What permits are required for the insulation of effluent pipelines? What level of government is responsible for issuing permits?

MoE does not require permits for installation of effluent pipelines on private lands. Effluent piping installed across farm properties will need to be in compliance with Agricultural Waste Control Regulation s. 11 which states agricultural waste must not be directly discharged into a watercourse or groundwater, and s.12 which states agricultural waste must be applied to land only as fertilizer or a soil conditioner.

In this circumstance, the installation of pipes across municipal roadways/right of ways are subject to the Township of Spallumcheen Development Permit, and provincial roadways/right of ways are subject to the BC Ministry of Transportation permits. All developers must apply for and receive a permit from the Ministry of Transportation before constructing or maintaining a work or structure or pipe on roads or land controlled by the Minister of Transportation, according to Section 62 of the *Transportation Act*.

The Township of Spallumcheen's Highway and Traffic Regulation Bylaw regulates uses and activities in the Township's highway rights of way. A highway use permit is required for underground pipes to cross a highway right of way. A copy of the bylaw can be found here:

<https://spallumcheen.civicweb.net/filepro/documents/7?preview=2124>.

What are the requirements for an authorization to pipe manure across Deep Creek?

Relevant requirements of the *Water Sustainability Act* Section 11 must be met:

According to the Water Sustainability Regulation, an "Authorized Change" will apply to the construction or maintenance of a pipeline crossing of a stream, if "the pipeline and associated works are installed in a dry stream channel at a depth so that the top of the pipe is at least 1 metre below the lowest elevation of the bed of the stream".

A person proposing to make an "Authorized Change" must submit a Notice to a habitat officer.

If the stream is wet all year around, the construction or maintenance of a pipeline crossing of a stream will need a "Change Approval".

Who is responsible for reporting a pipeline failure? And who is responsible if the pipeline fails and a spill occurs?

Per Section 2 of the *Environmental Management Act* Spill Reporting Regulation, “a person who had possession, charge or control of a substance immediately before its spill shall immediately report the spill to PEP by telephoning 1-800-663-3456.” However, this does not preclude a member of the public from calling PEP if they come across a spill. Responsibility for pipeline failure is dependent on the situation, however, per the *Environmental Management Act*, typically it is the party who had possession, charge and control of the pollution substance at the time of introduction into the environment.

If the spill is under a roadway or in Deep Creek and it is reported to the PEP reporting line, it would be forwarded to the Ministry of Environment, [Environmental Emergencies Program](#) who would respond to the incident. Further information on the roles of the responsible party, role of the province of BC and other levels of government is located on the Ministry of Environment web page located at: <http://www2.gov.bc.ca/gov/content/environment/air-land-water/spills-environmental-emergencies/roles-responsibilities/role-of-the-responsible-party>.

Regulatory Review

The regulatory review of the Agricultural Waste Control Regulation is continuing. The results of the latest intentions paper process can be found on the ministry website at: <http://www2.gov.bc.ca/gov/content/environment/waste-management/industrial-waste/agriculture>.