BRITISH COLUMBIA

March 6, 2014 File: 76600-20 Armstrong

HAND DELIVERED

H.S. Jansen and Sons Farm Ltd
5063 Knob Hill Road
Armstrong, BC V0E 1B4

Attention: Dale Jansen, Director

COMPLIANCE ORDER

Re: Manure application concern in the vicinity of Steele Springs on Schubert Road.

Background

On January 21, 2014, M. Reiner Sr. Environmental Protection Officer attended Steele Springs, a drinking water supply source for approximately 150 residents, and the Jansen Dairy Farm on Knob Hill Road in Armstrong, BC to follow up on a report of unusual trend in nitrate levels detected in Steele Springs.

The information available to M. Reiner prior to this visit and gathered on and after January 21, 2014 is as follows.

1) H.S. Jansen & Sons Farm Ltd (henceforth "the Farm") has an Environmental Farm Plan.

2) Steele Springs originates from shallow un-confined aquifer in the area as per information provided by a ground water hydrologist with FLNRO in Penticton and documented in this report.
http://a100.gov.bc.ca/appsdata/acat/documents/r16678/Hullcar_groundwater_potential_eval_1249498672243_f7ea0679b44b73003fe49801dfed50cd9361baff77bae58099224e4b1d15397e.pdf

   A large portion of this un-confined aquifer is under the field of concern shown below.

Ministry of Environment
Environmental Protection Division
Kootenay and Okanagan Regions
102 Industrial Place
Penticton BC V2A 7C8
Telephone: (250) 490-8200
Facsimile: (250) 490-2231

Well logs also indicate the upper 50 to 100 ft of soils in and around the field are: Sand, Dry Sand and Gravel and Sandy till, all of which typically have high hydraulic conductivities i.e. groundwater in such soils can typically move horizontally at a rate of about 2 m/day.

3) The results of most recent water samples collected from Steele Springs during December 2013 and January 2014 and analyzed for nitrates show that nitrates have risen to significantly higher levels this fall and winter as compared to the levels detected in previous years. The previous winters saw nitrate levels peak at 5 to 6 mg/L in October and November and drop as the year progressed. This winter's results exceeded 6.5 mg/L in early January. Subsequent results from later samples collected in January show nitrate levels increased to 7.8 mg/L (Enclosure 1 encompasses the last 18 months or so of Steele Springs data). The undersigned also sampled Steel Springs on January 21, 2014 and that sample was analyzed by another accredited laboratory. That sample showed 8.8 mg/L for Nitrate as N (Enclosure 2). The Canada-Wide drinking water limit for Nitrate is 10 mg/L as N.

4) A director for Jansen Farms indicated to M. Reiner on January 21, 2014 and in subsequent communications that in the fall of 2013, 20,000 gallons/acre of liquid manure was applied by the Farm staff to a field located immediately up gradient of Steel Springs. The Farm director also stated that there was no cover crop on that field and the application was intended to supply 120 lb of Nitrogen/acre (equivalent to 120 kg of Nitrogen/hectare) for a corn crop that will be planted in spring of 2014.

5) M. Reiner assessed the Farm Director's statements against the Reference Guide for Environmental Farm Plans. That assessment has determined that liquid manure slurries from Dairy cattle likely contain 1.6 Kg of nitrogen per cubic meter (m^3) of slurry as per Table 6.7 of the Reference Guide.

Table 6.7 Assumed Annual Manure Nitrogen Excretion Values and Manure Nitrogen Concentrations in Storage for Various Animal Types★

Type of Animal		Use with Worksheet #4, Box 3	Use with Worksheet #5, Box 3
		Assumed Annual Manure N Excretion (kg N/animal)	Average Manure N Concentration (kg N/m^3)
Beef Cattle	Cows and Bred Heifers	73	3.4
	Feeder 340 to 500 kg	52	3.4
	Yearling 230 to 340 kg	35	3.4
	Calves 50 to 230 kg	17	3.4
Dairy Cattle	Milking cow including associated replacements	200	1.6 (watery)
			2.8 (medium slurry)
			4.0 (thick slurry)

Even when one uses 1 kg of N /m^3 of liquid manure, the amount of manure applied appears to be in excess of 120 lb of N/acre or 120 kg of N/hectare application. i.e.

20,000 Gallons/acre approximately equals 190 m^3/hectare of manure

Using 1 kg of Nitrogen/m^3 of manure indicates the application rate may have been as high as 190 kg of N/ hectare.

Table 6.10 of the Reference Guide (attached) further suggests that no manure, at all, should be applied to any fields in the interior of BC from September thru to the end of March unless a cover crop is in place.

Table 6.10 Percentage Manure to Apply at Various Times of the Year in Interior Regions

Crop	Typical Annual Nitrogen Uptake [a] (kg N/ha)	Suggested Manure Application as a Percentage of Annual Crop Uptake [b]				
		Feb & March	April & May	June to Aug	Sept & Oct	Nov to Jan
Perennial Grass [c]	200 to 400	up to 5 %	up to 100 %	up to 75 %	up to 50 %	0 %
Silage Corn	150 to 200	0 %	up to 100 %	20 %	0 %	0 %
Cereals (Spring Planted)	50 to 150	0 %	up to 100 %	0 %	0 %	0 %
Cereals (Fall Planted)	50 to 150	up to 5 % [d]	up to 100 %	up to 100 %	0 %	0 %
Berries, Tree Fruits and Grapes	50 to 100 [e]	0 %	up to 100 %	0 % [f]	0 %	0 %
Vegetables	80 to 185 [e]	0 %	up to 100 %	up to 100 %	0 %	0 %
Cover Crop [g]						
Emerged before Aug 15	100 to 140	0 %	0 %	up to 60 %	up to 100 %	0 %
Emerged before Sept 1	40 to 60	0 %	0 %	0 %	up to 100 %	0 %

[a] For high yielding crop – better estimates of actual uptake can be obtained by completing a Nutrient Management Plan
[b] Maximum total nitrogen (from manure and chemical fertilizer) applied to the soil not to exceed the crop's annual uptake (i.e., the sum of percent applied for each time period through the year not to exceed 100%).
[c] For grass legume mixes reduce the application of nitrogen in proportion to legume content
[d] Feb & March application in the year following planting
[e] Maximum nitrogen application depends on crop type (i.e. raspberries vs. blueberries or potatoes vs. broccoli)
[f] For new plantings up to 100% of that year's nutrient need
[g] Includes relay crops – post-harvest nitrate test should be below 20 µg/g (0-30 cm) if fertilizing a fall-planted cover crop

6) the Agricultural Waste Control Regulation states:

13 *Agricultural waste must not be applied to the land if, due to meteorological, topographical or soil conditions or the rate of application, runoff or the escape of agricultural waste causes pollution of a watercourse or groundwater.*

14 *Agricultural wastes must not be applied*

(a) on frozen land,

(b) in diverting winds,

(c) on areas having standing water,

(d) on saturated soils, or

(e) at rates of application that exceed the amount required for crop growth,

if runoff or escape of agricultural waste causes pollution of a watercourse or groundwater, or goes beyond the farm boundary.

Compliance Order:
Based on the above information, relative to sections 13 and 14 of the Agricultural Waste Control Regulation, I have reasonable grounds to believe that the Farm has contravened of the sections 13 and 14 of the Agricultural Waste Control Regulation.

Under section 112 of *Environmental Management Act*, when an inspector has reasonable grounds to believe a contravention has occurred, the inspector may order a person to do anything the officer considers necessary to stop the contravention *or prevent another contravention.*

Therefore, pursuant to *section 112 of the Environmental Management Act,* I hereby order, H.S. Jansen & Sons Farm Ltd to comply with the followings:

1) Cease any further nutrient (manure or fertilizer) applications to the field of concern identified above in the 2014 calendar year. Additional applications of nutrients may only be considered if deemed necessary based on sampling conducted by and recommendations provided by a Qualified Professional. The application of additional nutrients also requires the approval of the director in writing prior to the application of additional nutrients. The recommended application rate must also consider nitrate levels in Steele Springs. Based on data available to us at this time, applications exceeding 200 to 220 kg/ hectare /year would be considered excessive by a number of other jurisdictions as well as the Environmental Farm Plan Reference Guide Recommendations

2) Retain a Qualified Professional to compile and fully assess the Farm's recent nutrient application rates for the field of concern and their potential linkages to nitrate levels in Steel Springs for the past three years. This assessment would include review of available manure, soil and groundwater sampling results, crop rotation patterns, and manure application rates for the last three years. In addition, the Qualified Professional should conduct additional soil and groundwater sampling as necessary to determine present soil nitrogen levels in the in the 0-6, 6-12 and 12 to 24 inch soil horizons prior to March 10, 2014 and again in mid to late April. A report of the QP's findings, recommendations and conclusions relative to mitigating nitrate levels to less than 6 mg/L in Steel Springs must be submitted to the Director by no later than **July 15, 2014.**

3) Develop and submit a comprehensive nutrient management plan for the approval of the director using a Qualified Professional for the entire farm in keeping with the recommendations in the Environmental Farm Plan Reference Guide and specifically including:

   a) a detailed contingency plan to deal with unforeseen incidents which result in the farm entering or finishing any given growing season with 20% more nutrients than normally expected.

   b) a monitoring plan for soils, surface waters and groundwater on and around the farm and the lands it farms.

   The submission of these plans is required on or before **September 1, 2014** and the plan should consider the findings and recommendations from the assessment in requirement #2 above.

4) Submit an annual summary on and before February 28, of 2015, 2016 and 2017 calendar years, fully documenting the nutrient content of the manure applied the previous year, the nutrients applied to each specific field and when, as well the results of soil, surface water and groundwater sampling as per the comprehensive nutrient management plan.

Right to Appeal:
This decision and the specific conditions it contains may be appealed to the Environmental Appeal Board in accordance with Part 8 of the *Environmental Management Act*. An appeal must be delivered within 30 days from the date that notice of this decision is given. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

This compliance order and the associated requirements are without prejudice to whatever enforcement action the Conservation Officer Service may be considering in response to this incident at the present time or in the event that nitrate levels exceed the 10 mg/L as N drinking water limit.

Should H.S. Jansen and Sons require further information or clarification, please contact M. Reiner or S. Barlas at 250-490-8200.

Yours truly,

M Reiner

Mike Reiner. P.Ag.
Sr. Environmental Protection Officer

MR/ch

Cc: Janelle Kwan Interior Health, Vernon BC.
J Lockwood – COS Supervisor N. Okanagan
G Tegart – Agriculture, Vernon

Enclosure 1 (emailed separately on Feb 24, 2014)

nitrates.pdf

Enclosure 2

Maxxam

Maxxam Job #: B405523
Report Date: 2014/01/29

MINISTRY OF ENVIRONMENT

Site Location: E286210 STEEL SPRING OFF SCHUBERT R
Sampler Initials: MR

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		IM8758		
Sampling Date		2014/01/21 16:00		
COC#		50206387		
	UNITS	REG/1	RDL	QC Batch
Field Parameters				
Sample End Date	N/A	20140121	0	7358854
Sample End Time	N/A	16:00	0	7358854
Sample Start Date	N/A	20140121	0	7358854
Sample Start Time	N/A	16:00	0	7358854
Temperature at Arrival	C	1		7358850
Calculated Parameters				
Filter and HNO3 Preservation	N/A	LAB	N/A	7358597
Nitrate (N)	mg/L	6.80	0.020	7358852
Misc. Inorganics				
Dissolved Hardness (CaCO3)	mg/L	368	0.50	7358400
Anions				
Dissolved Chloride (Cl)	mg/L	16	0.50	7362000
Nutrients				
Total Kjeldahl Nitrogen (Calc)	mg/L	<0.20	0.20	7358855
Nitrate plus Nitrite (N)	mg/L	6.80	0.020	7358914
Nitrite (N)	mg/L	<0.0020	0.0020	7359201
Total Nitrogen (N)	mg/L	6.48	0.20	7359231
Physical Properties				
Conductivity	uS/cm	716	1.0	7359214

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		IM8758		
Sampling Date		2014/01/21 16:00		
COC#		50206387		
	UNITS	REG/1	RDL	QC Batch
Dissolved Metals by ICPMS				
Dissolved Sodium (Na)	mg/L	11.0	0.050	7358401

N/A = Not Applicable
RDL = Reportable Detection Limit