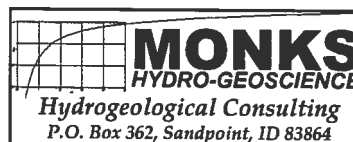


Memo



To: John F. Westra - IDWR
From: John Monks
CC:
Date: 3/13/2007
Re: COCOA-Nederend Dairy 2006 Ground Water Monitoring Annual Report

RECEIVED

MAR 15 2007

WATER RESOURCES
WESTERN REGION

Dear Mr. Westra

Enclosed are two copies of the COCOA-Nederend Dairy 2006 Ground Water Monitoring Annual Report. If you have any questions or comments, please feel free to call me at 208-263-1991 or e-mail me at monkshgs@verizon.net.

Sincerely,

John Monks, P.G.

COCOA – Nederend Dairy Groundwater Monitoring Project 2006 Annual Report

March 11, 2007

Prepared by:
John Monks, P.G.



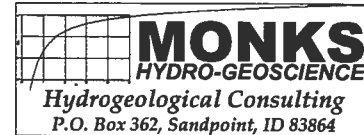
RECEIVED

MAR 15 2007

WATER RESOURCES
WESTERN REGION

11 March, 2007

John F. Westra
Western Regional Manager
Western Regional Office
Idaho Department of Water Resources
2735 Airport Way
Boise, ID 83705-5082



RE: COCOA-Nederend Dairy Ground Water Monitoring Annual Report for 2006

Dear Mr. Westra:

The Conditions of Approval and Remarks for Transfer No. 5313 of Water Right No. 57-07045 require COCOA and Nederend Dairy to jointly conduct a water quality monitoring program, and to annually report analyses and conclusions. The Transfer of Water Right was signed October 30, 1998, and water quality monitoring began in February 1999. This report summarizes the water quality monitoring activities and water quality data collected during calendar year 2006.

Area Hydrogeology

The hydrogeology of the area is described in "2001 Annual Ground Water Quality Monitoring Summary Results for Northwest Owyhee County, Idaho" (Boyles et al., 2002):

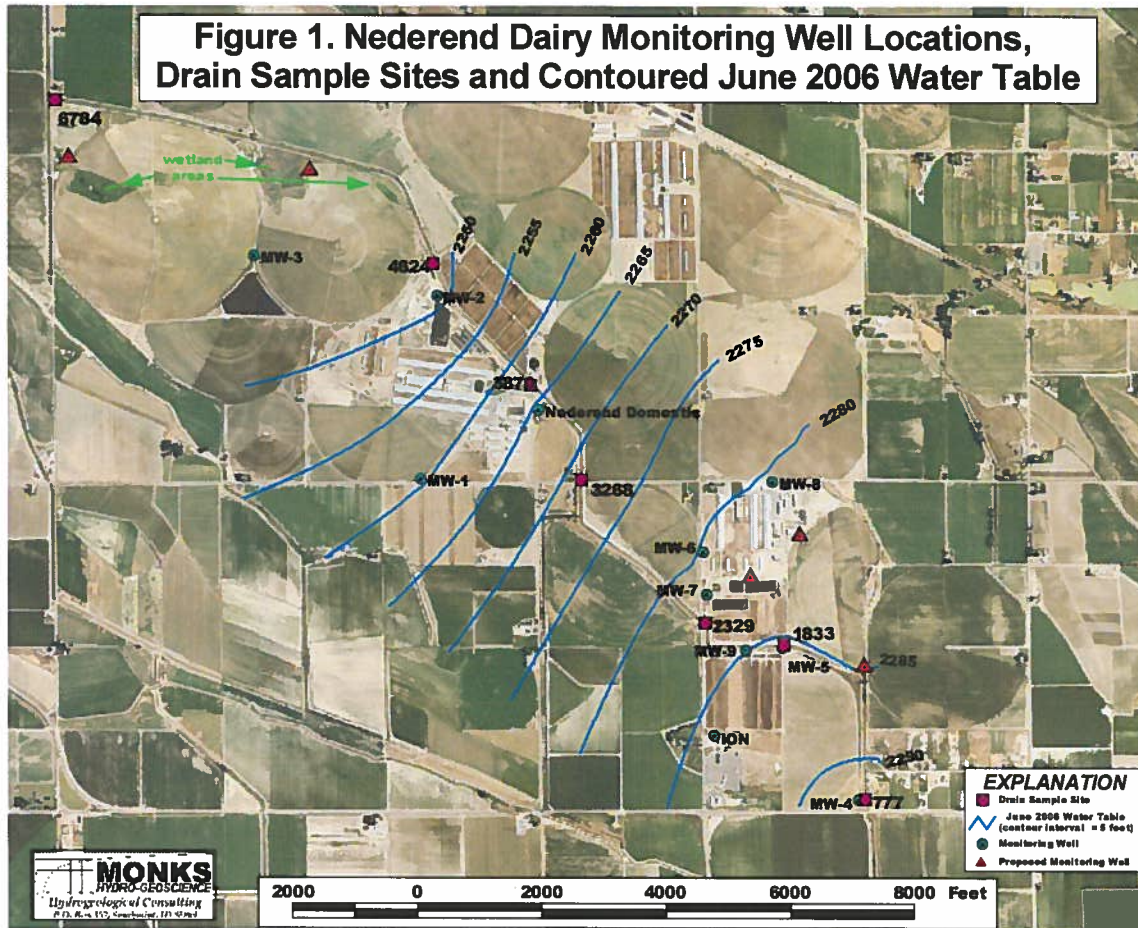
"Sediments underlying the project area are classified within the Idaho Group geologic formation (Lindholm, 1993). Sources of these sediments are believed to originate from prehistoric Lake Idaho and from more recent deposition from the Snake River. A characteristic "blue clay" is found on well drillers' reports from Idaho Department of Water Resources (IDWR) for many of the wells in the study area. These blue clays are within the Glens Ferry Formation (Othberg, 1994) and their low permeability characteristics can produce confined aquifer conditions. The blue clays also serve as an indicator of depositional anaerobic conditions.

Ground water used for domestic purposes in this project area appears to come from two sources: (1) a shallow system consisting of gravels and coarse grained sands, and (2) a deep system consisting of black sand that is separated from the shallow system by a blue-colored clay of varying thickness (Figure 2). Aquifer conditions appear to vary from unconfined to confined at different locations and different depths. Well driller reports indicate the presence of shallow ground water gravels and sands within 50 of the land surface. Well driller reports and the geologic cross section indicate the deep system is found at varying depths, generally less than 300 feet from the land surface (Figure 2 and Table 1). Static water levels are typically less than 60 feet."

Soils in the area are described in "Soil Survey of Canyon Area, Idaho" (USDA-SCS, 1972). Moderately well drained to excessively well-drained fine sands underlie much of Nederend Dairy. Lower permeability soils occur in the southwestern corner of the dairy and in lowlands along stream channels.

Quincy series soils are the most permeable soils in the area. Approximately 336 acres of Quincy Series soil underlie Nederend Dairy. The Quincy series is described as an excessively drained to somewhat excessively drained, very deep soil (USDA-SCS, 1972). The soil is comprised of alluvial deposits of fine sand reworked locally by wind. Quincy series soils are described as very rapidly permeable, with a permeability of >20.0 inches per hour.

Cencove series soils underlie approximately 250 acres of Nederend Dairy. The Cencove series consists of well-drained, moderately coarse textured fine sandy loam, sandy loam and loamy



sand. Cencove series soils are moderately deep and overlie sand and gravel. The soils are well-drained and have moderately rapid permeability of 2.0 – 6.3 inches per hour (USDA-SCS, 1972). Bahem, Marsing, Nyssaton and Garbutt series soils are described as silt loam or loam and are less permeable, with a permeability of 0.63 – 2.00 inches per hour (USDA-SCS, 1972).

Changes to Monitoring Well Network

One new monitoring well was constructed in the shallow aquifer (refer to Figure 1 for well locations). Well MW-9 was constructed in June 2006 as part of an investigation of the manure drying areas at Dairy #2. Results from the investigation of the manure drying areas at Dairy #2 were reported in the June 2006 monthly monitoring report, which is included in the appendix of this report. Well MW-9 was constructed using a hollow-stem auger drill rig. The well is 17 feet deep and located along the north end of the manure drying area, between the leachate collection ponds and the drain.

Pressure transducer/data loggers were installed in MW-6, MW-8, and Mirada #1 (production well) at Dairy #2 in January of 2006. Well Nederend Domestic was not sampled during 2006 because the pump wouldn't work. The ION well, located near the southwest corner of the manure drying yard, was sampled for nitrate in June and September.

Changes in Nutrient Management Practices & Facilities

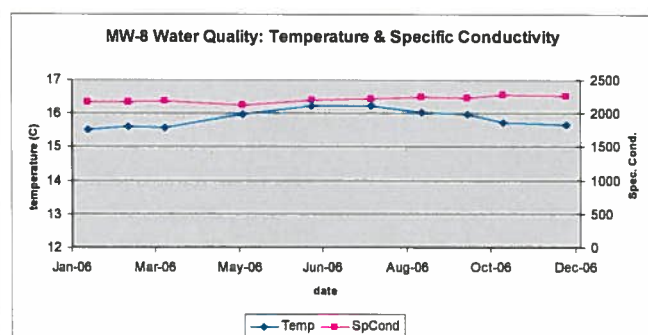
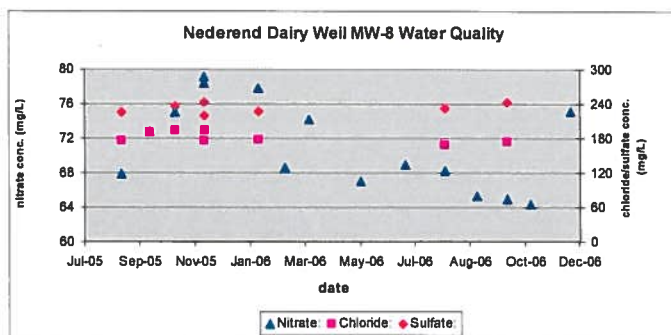
There were changes in nutrient management practices and facilities at Nederend Dairies during 2006. The leachate collection ponds at the north end of the manure drying yard were reconstructed to reduce the potential for leachate to infiltrate to the shallow aquifer. The manure drying area was added onto by converting the field to the east to manure drying area. Leachate collection ponds were constructed along the north end of the new manure drying area.

The north wastewater storage pond at Dairy #2 was taken out of commission in preparation for cleaning and evaluation of the liner. The corrals just north of the north wastewater storage pond were also reconstructed to improve drainage and eliminate areas where water pooled. Some of the wastewater that used to be collected at Dairy #2 is now diverted to the wastewater facilities at Dairy #1.

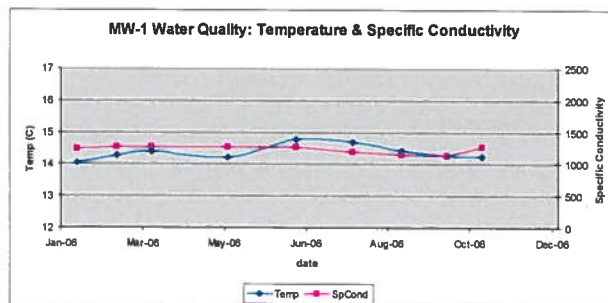
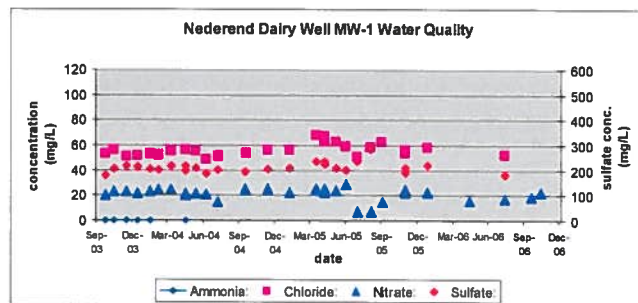
Water Quality Data

Nitrate water quality data from wells completed in the shallow aquifer are shown graphically and discussed in the following section. The average nitrate concentration at wells MW-1, MW-2, MW-3, MW-5, MW-6, MW-7, MW-8 and MW-9 exceeded the EPA mcl of 10 mg/L during 2006. The EPA mcl of 10 mg/L was exceeded at well MW-4 in October and November. The highest nitrate concentrations occur at MW-8.

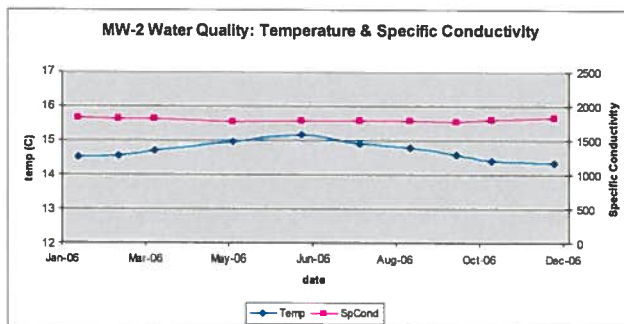
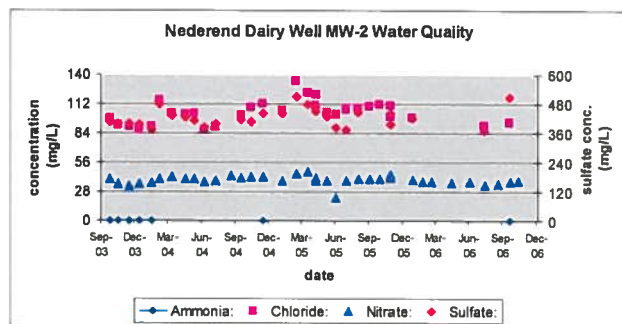
The average nitrate concentration at MW-8 in 2006 was lower than it was in 2005. This may be due to the fact that data collection at MW-8 began in August 2005 and thus the data set does not reflect the full range of seasonal variation. Long term trends in water quality at MW-8 will be easier to assess at the end of 2007. The highest nitrate levels occurred in November 2005 at 79.2 mg/L. Nitrate data from MW-8 does suggest that there may be seasonal variations, with higher concentrations of nitrate occurring during the winter months. Water temperature at MW-8 ranged from 15.5° to 16.23° C, with warmer temperatures occurring during the summer months.



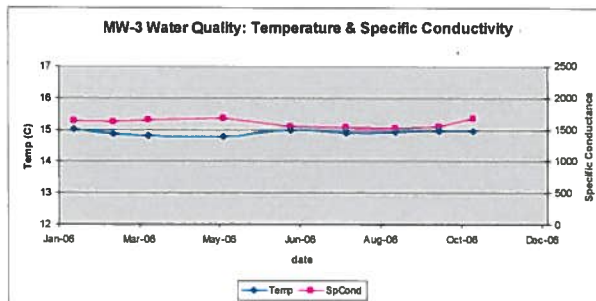
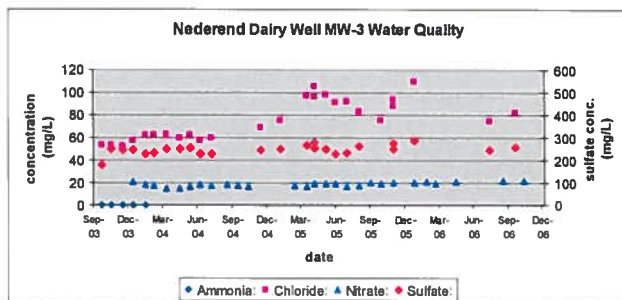
Nitrate concentrations at well MW-1 ranged from 16 mg/L in May to 22.8 mg/L in January. Average nitrate at MW-1 decreased from 20.55 mg/L in 2005 to 19.48 mg/L in 2006. Water temperature at MW-1 ranged from 14.04° to 14.78° C, with warmer temperatures occurring during the summer months.



Well MW-2 continues to have the 2nd highest nitrate concentrations. At MW-2 nitrate levels ranged from 42.3 mg/L in December to 35.1 mg/L in August. Average nitrate at MW-2 decreased from 40.02 mg/L in 2005 to 37.93 mg/L in 2006, continuing a downward trend from 40.45 mg/L in 2004. Water temperature at MW-2 ranged from 14.34° to 15.19° C, with warmer temperatures occurring during the summer months.

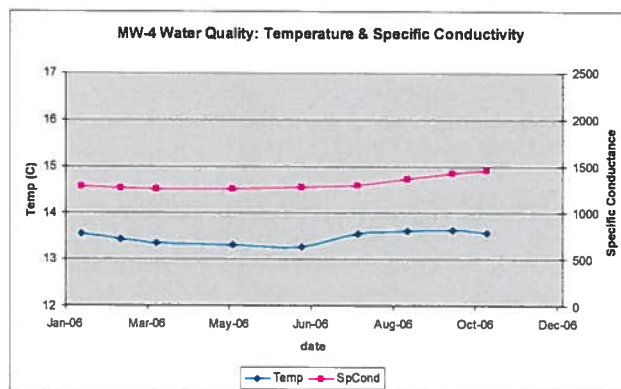
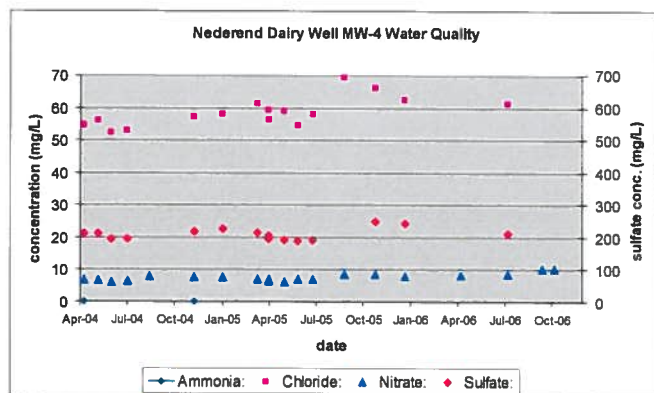


At well MW-3 nitrate concentrations ranged from 22.8 mg/L in November to 20.6 mg/L in January. Average nitrate at MW-3 increased from 19.18 mg/L in 2005 to 21.78 mg/L in 2006, continuing an upward trend from 17.32 mg/L in 2004. Water temperature at MW-3 ranged from 14.79° to 15.02° C. The seasonal water temperature variations at MW-3 are very small.

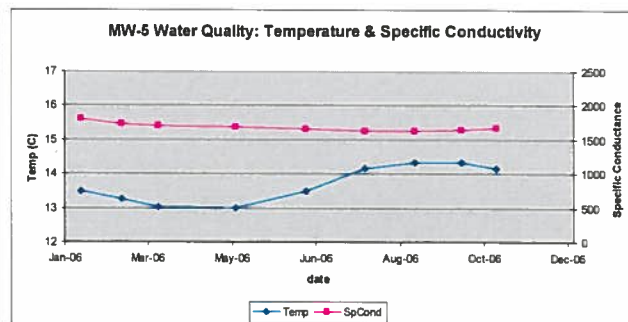
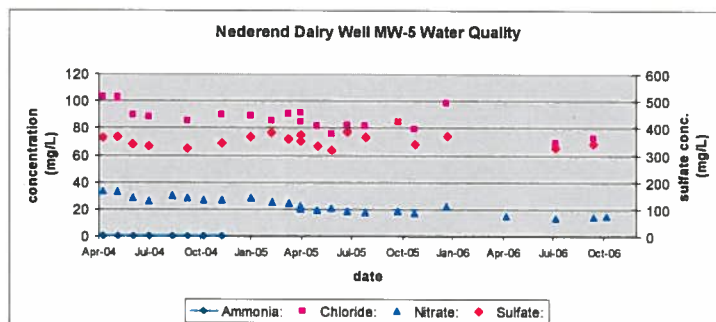


Nitrate concentrations at well MW-4 ranged from 7.73 mg/L in January to 10.2 mg/L in November. Average nitrate at MW-4 increased from 7.17 mg/L in 2005 to 8.91 mg/L in 2006.

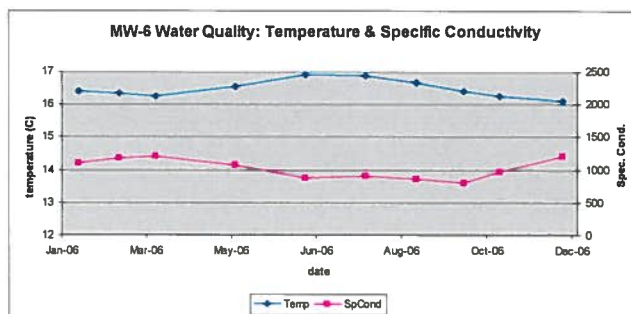
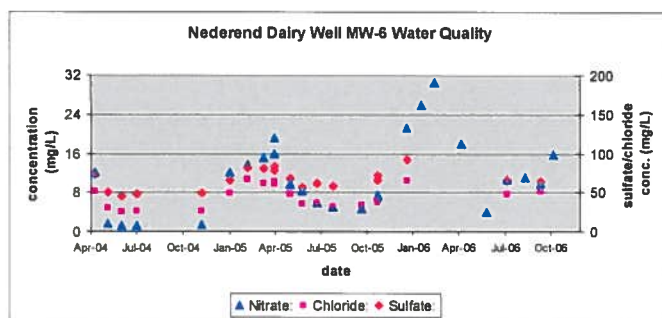
Nitrate concentrations at MW-4, upgradient of most dairy nutrient management areas, are gradually increasing over time. Water temperature at MW-4 ranged from 13.26° to 13.63° C, with warmer temperatures occurring during the winter months.



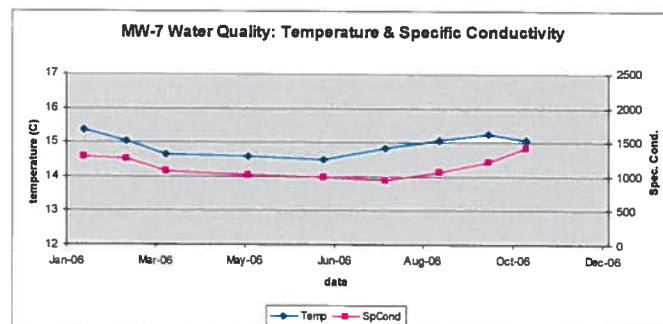
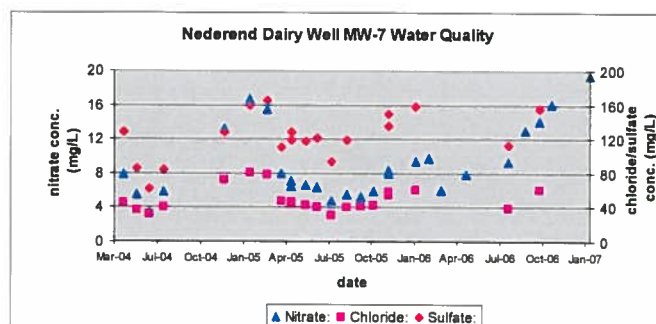
At well MW-5 nitrate concentrations ranged from 13.3 mg/L in August to 22.2 mg/L in January. Average nitrate at MW-5 decreased from 20.92 mg/L in 2005 to 15.78 mg/L in 2006. Nitrate concentrations at MW-5 have been decreasing steadily since monitoring began in April 2004. Water temperature at MW-5 ranged from 14.34° to 15.19° C, with warmer temperatures occurring during the late summer months.



Nitrate concentrations at well MW-6 ranged from 4.01 mg/L in June to 30.3 mg/L in March. Average nitrate at MW-6 increased from 10.33 mg/L in 2005 to 17.13 mg/L in 2006. The largest seasonal fluctuations in nitrate concentrations occur at MW-6. The largest increase in average nitrate concentration also occurred at MW-6. Water temperature at MW-6 ranged from 16.1° to 16.92° C, with warmer temperatures occurring during June and July.



At well MW-7 nitrate concentrations ranged from 6.04 mg/L in March to 16.1 mg/L in November. Average nitrate at MW-7 increased from 9.07 mg/L in 2005 to 10.68 mg/L in 2006. Water temperature at MW-7 ranged from 14.51° to 15.35° C, with warmer temperatures occurring during winter months.



Well MW-9 has been sampled five times since it was constructed in June 2006. Nitrate concentrations have ranged from 13.0 mg/L in October to 15.6 mg/L in June, and average 14.03 mg/L. Water temperature at MW-9 ranged from 13.41° to 15.64° C, with warmer temperatures occurring during winter months.

Table 1: 2006 Nederend Dairy Nitrate Water Quality Statistics

<i>Well Name:</i>	<i>average:</i>	<i>max:</i>	<i>min:</i>	<i>count:</i>	<i>standard deviation:</i>
MW-1	19.48 ↓	22.8	16.0	5	3.09
MW-2	39.67 ↓	46.90	21.90	11	6.47
MW-3	21.78 ↑	22.8	20.6	5	0.81
MW-4	8.91 ↑	10.2	7.73	5	1.12
MW-5	15.78 ↓	22.2	13.3	5	3.64
MW-6	10.68 ↑	19.20	4.67	10	4.81
MW-7	10.68 ↑	16.1	6.04	8	3.37
MW-8	69.48 ↓	77.80	63.6	10	4.67
MW-9	14.04	15.6	13	5	1.11

Water Level Measurements

Contoured water table elevations for June 2006 are shown in Figure 1. Groundwater flow direction in the shallow aquifer is to the northwest. The water table is closest to the land surface at MW-4, MW-5, and MW-9, all located next to the drain where the water table is ~13-14 feet below ground surface.

Seasonal variations in the water table occur in the shallow aquifer. The largest fluctuations continue to occur at MW-1 (6.66 feet), in response to pumping from well Nederend #2. The water table at Nederend Domestic fluctuated 3.90 feet, probably in response to recharge from irrigation. At MW-6 the water table has fluctuated 2.72 feet. Smaller seasonal variations occur at MW-3 (1.83 feet), MW-7 (2.09 feet), MW-2 (1.53 feet), MW-5 (1.45 feet) and MW-4 (1.41 feet).

The water table at MW-1 has gone down ~5 feet over the past three years. At MW-3 there is also a less well defined downward trend. Water use at Dairy #1 increased from 368 acre-feet in 2005 to 404 acre-feet in 2006, an increase of ~10%. The water level declines could be caused by increased production from the shallow aquifer at wells Nederend #2 and #3, more efficient irrigation practices that are reducing recharge to the shallow aquifer, or a combination of both.

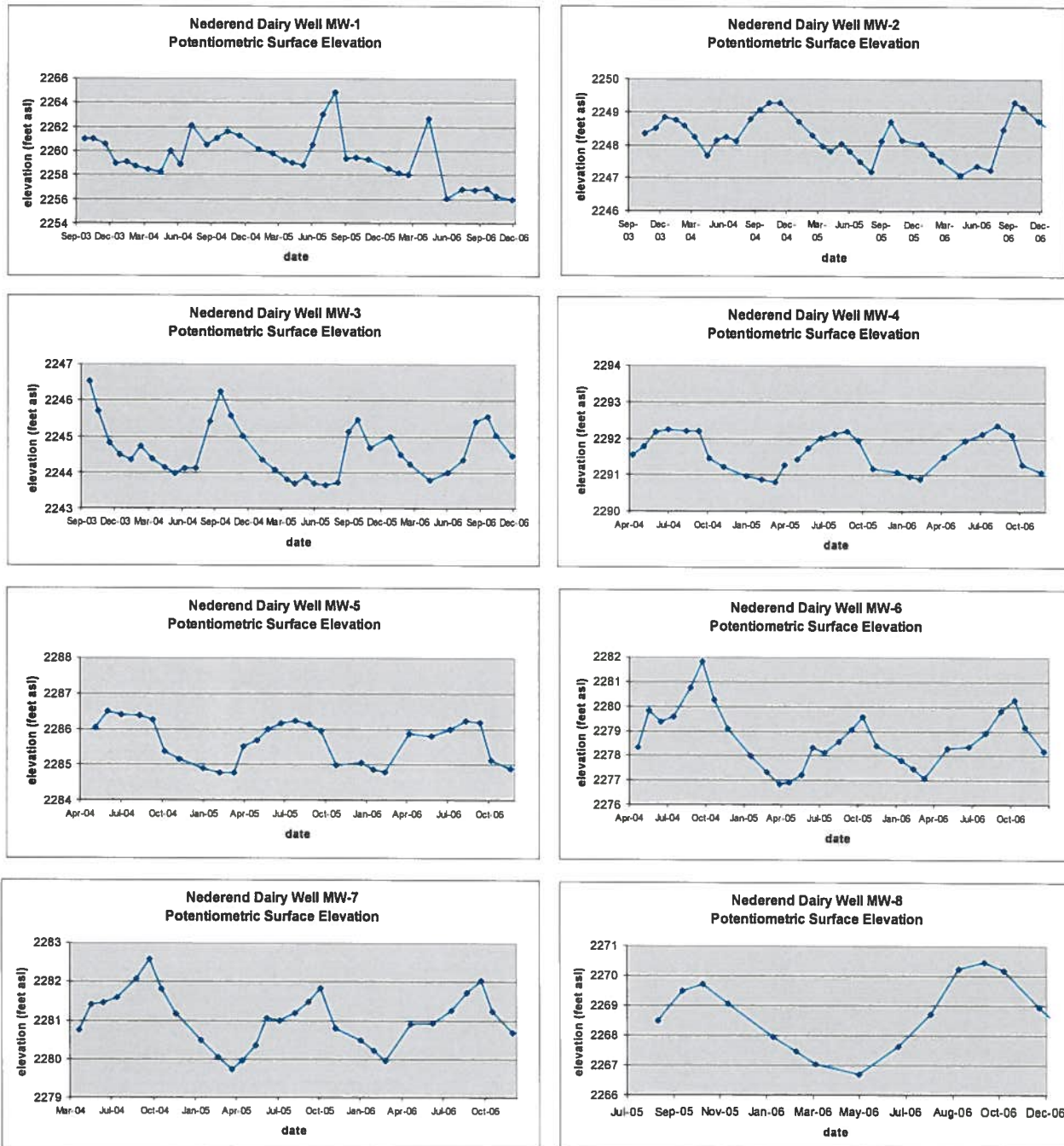


Figure 2 shows water table elevation (blue) and water temperature (red) data from the Levellogger™ installed in Mirada #1. The water table at well Mirada #1 is affected by variations in the pumping rate. During January through the beginning of April Mirada #1 was the sole source of water at Dairy #2. During this period, the water table fluctuated approximately 40 feet on a daily basis due to variations in water demand at the dairy. On March 28, 2006 water production was switched from Mirada #1 to the new well, Mirada #2. Mirada #1 remained off (with the exception of one brief period the morning of May 18th) until June 22nd. From June 22nd through October 14th Mirada #1 and Mirada #2 were both pumping at varying rates. Well Mirada #2 was shut off October 14th, and Mirada #1 provided water for the remainder of 2006. The transducer was removed

from the well November 5th because of a corroded suspension cable and returned to service December 20th

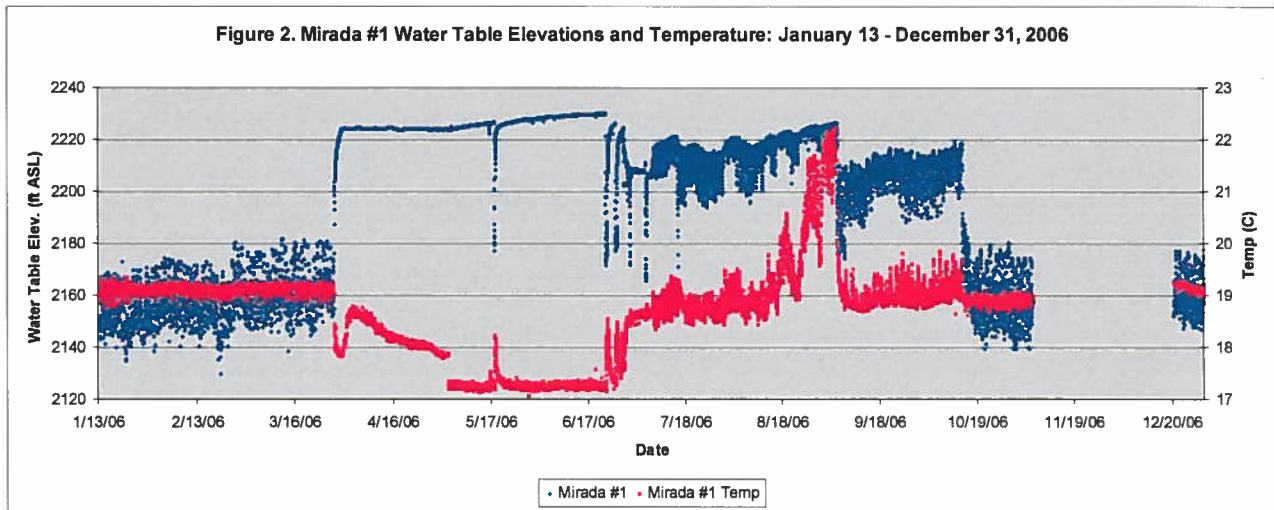


Figure 3 shows water table elevation (blue) and water temperature (red) data from the Levellogger™ installed in MW-6. The water table at MW-6 responded rapidly to the beginning of irrigation season. Water levels rose from ~2276.6' on April 20th to ~2278.8 on May 9th. Water levels then declined slowly to ~2278.2 on July 8th before rising steadily to 2280.15 on October 2nd. Water levels began a steady decline after October 2nd. Water temperature at MW-6 fluctuated from a high of ~16.7° Celsius in early January to a low of ~15.2° at the end of June.

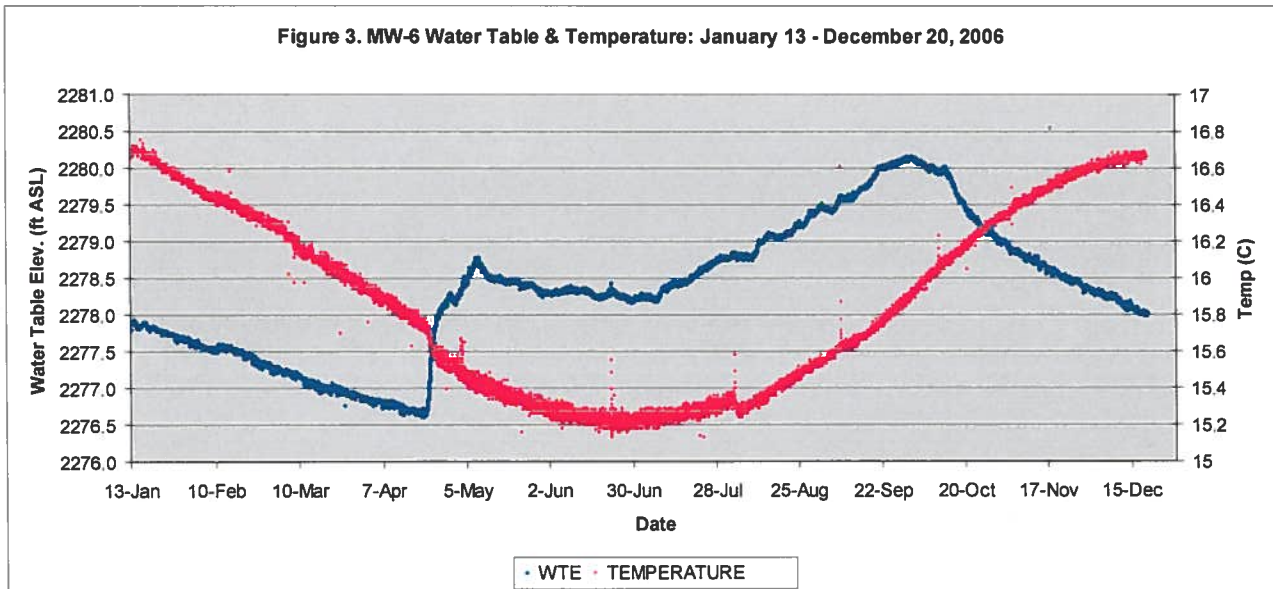
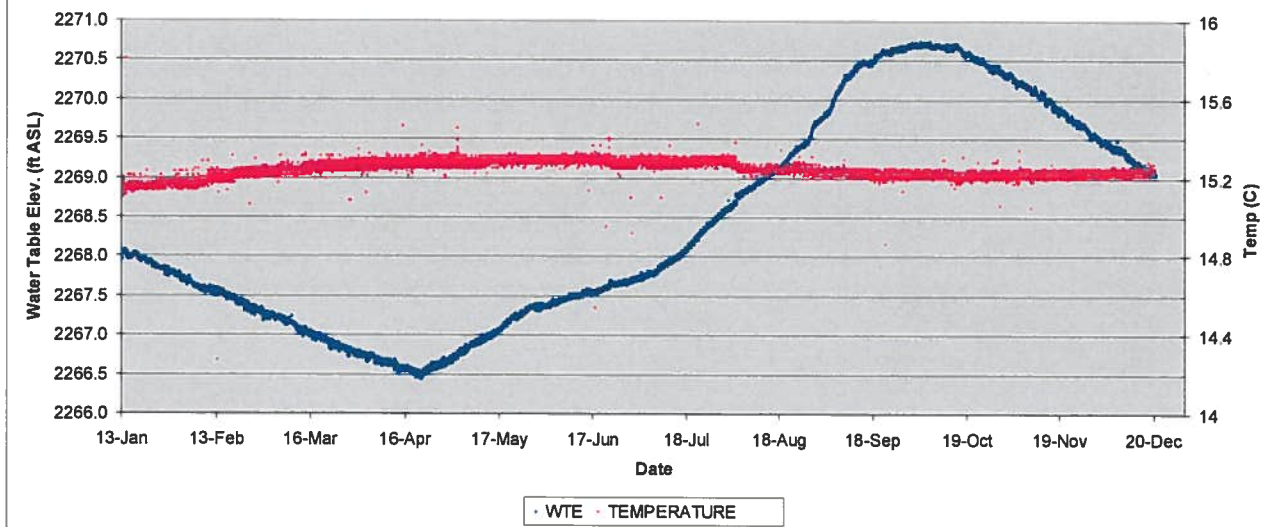
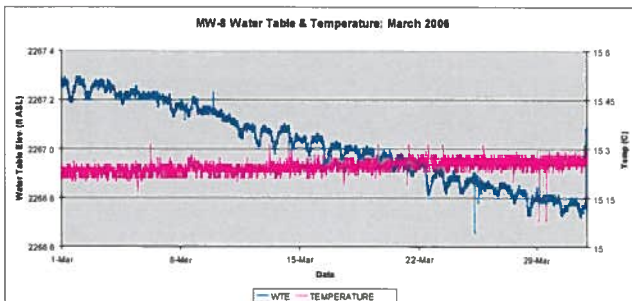
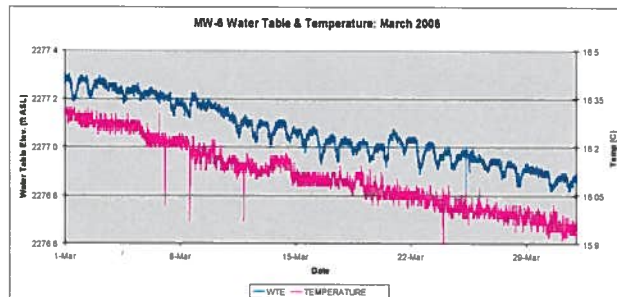
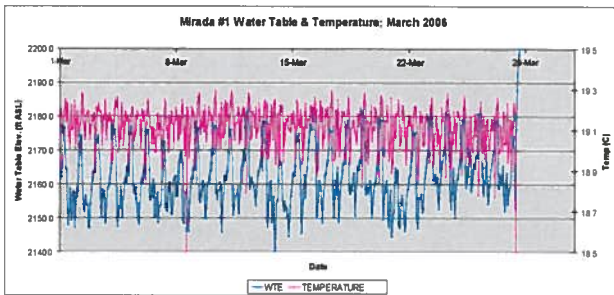


Figure 4 shows water table elevation and water temperature data from the Levellogger™ installed in MW-8. The water table at MW-8 also responds to recharge from irrigation. The lowest water level of 2266.44' occurred on April 21st. Water levels (blue) then rose steadily, reaching a maximum level of 2270.71 on October 9th. The temperature (red) variations at MW-8 were much less than those observed at MW-6. The water temperature at MW-8 only varied by ~0.2 degrees, between ~15.1° and ~15.3° Celsius.

Figure 4. MW-8 Water Table & Temperature: January 13 - December 20, 2006



Water levels at MW-6 and MW-8 also fluctuated on a daily basis, apparently in response to varying pumping rates at dairy production wells. The graphs below show water table elevations (blue) and temperatures (purple) in Mirada #1, MW-6 and MW-8. Mirada #1 was shut down in late March. When Mirada #1 was shut down, water levels rose and temperature fell, both very rapidly. The daily fluctuations at MW-6 and MW-8 continued after Mirada #1 was shut down.

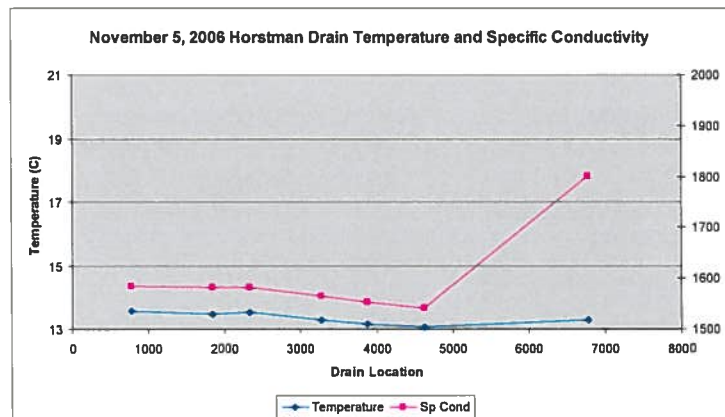
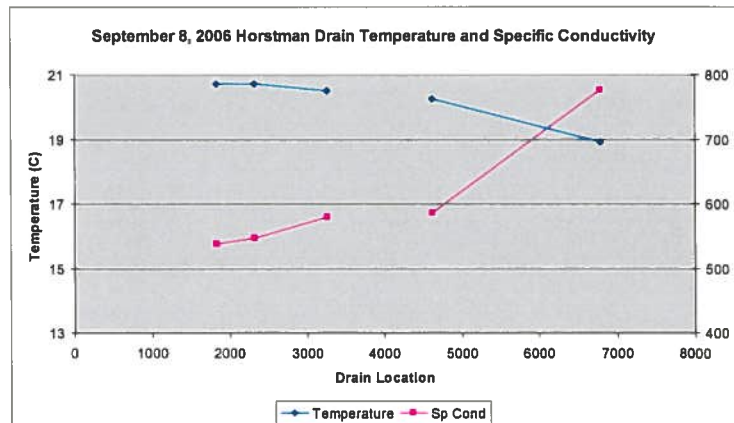
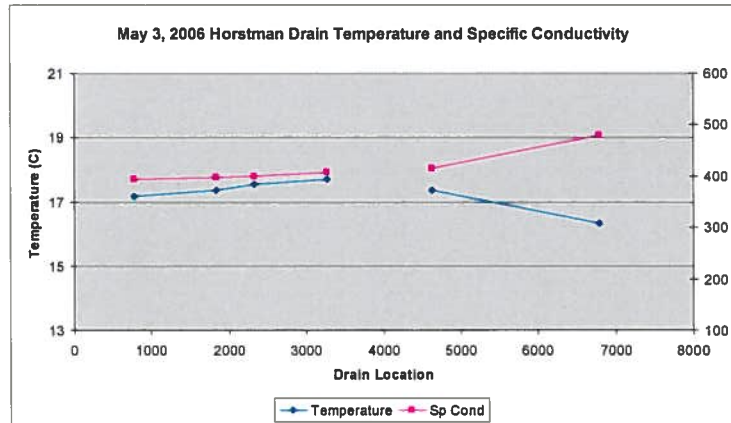


Horstman Drain Water Quality Measurements

Water quality measurements in the Horstman Drain between Highway 55 and Hogg Road began in 2006, using an YSI 556 multi-parameter water quality meter. Plots of water temperature and specific conductivity vs. distance along the drain are shown to the right. Distance along the drain is measured from the upstream end of the drain. Thus the Highway 55 sample site is located at 777 and Hogg Road at 6784.

Water temperature in the drain varies seasonally. Water temperature is high during late summer and lower during the winter. The May and September graphs show that water temperature in the drain decreases between the MW-2 area sample site and the Hogg Road sample site. In November, water temperature in the drain between the MW-2 area sample site and the Hogg Road sample site increases. In all three graphs, specific conductivity increases between the MW-2 sample site and the Hogg Road sample site. Water temperature data from wells MW-2 and MW-3 indicate that the temperature of ground water is ~15° C. Thus during the summer months ground water is colder than the surface water in the drain, and where ground water is discharging to the drain a decrease in drain water temperature would be expected to occur. During the winter months ground water is warmer than drain water, and where ground water is discharging to the drain an increase in drain water temperature would be expected to occur.

Specific conductivity in the drain also varies seasonally. During the irrigation season, when the flow in the drain is principally from irrigation return, specific conductivity is lower. During the winter months, when flow in the drain is primarily from ground water discharge to the drain, specific conductivity is higher. Specific conductivity also varies with location along the drain. The highest specific conductivity values during the irrigation season increase in the downstream direction. During the non-irrigation season specific conductivity decreases between Highway 55 and the MW-2 area, then



risers sharply at Hogg Road. Specific conductivity also rose fairly sharply between MW-2 and Hogg Road in September and to a lesser extent during May.

Discussion

Ground water monitoring at Nederend Dairies continues to increase our understanding of the hydrogeology at the dairies and the impacts various nutrient management practices have on water quality. In particular, continuous water level and temperature monitoring at wells MW-6, MW-8 and Mirada #1 have shed some light on how production wells completed in both aquifers may be affecting water quality.

Pressure transducer/data loggers were installed in wells MW-6, MW-8, and Mirada #1 in January of 2006. The data logger data soon showed that pumping rates and water levels in Dairy #2's production wells fluctuate on a daily basis in response to varying water demands at the dairy (refer to February 2006 Water Quality Report, included in Appendix). The magnitude of the daily fluctuations at Mirada #1 depends on the proportion of water the well is providing relative to Mirada #2. When Mirada #1 is the only production well operating, the daily water table fluctuations are on the order of ~35 feet. When Mirada #1 is shut off and Mirada #2 is producing all of the water for Dairy #2, the daily fluctuations are on the order of one foot. Water levels at MW-6 and MW-8 also fluctuate on a daily basis.

The well driller's report for Mirada #1 is apparently under the name "John H. Brandt". The well was drilled in 1962, is 250 feet deep, cased with 12-inch steel casing from the ground surface to 250 feet. The casing is perforated, apparently from 100 feet to 250 feet. The typewriter written entry for the "from" part of the perforation description is a double-strike and subject to interpretation. The well was drilled as a 20-inch diameter hole, and is gravel packed from the ground surface to 250 feet, with no surface seal.

The land surface at Mirada #1 is ~2300', so if the perforations do start at 100 feet below ground surface, they begin at an elevation of ~2200'. Depth to water at Mirada #1 on May 3rd was 58.56' below casing top, and on June 22nd 51.90' below casing top, above the level of the perforations. The Levellogger™ hangs ~150' below casing top, within the perforated interval. Water temperature in the deep aquifer at Mirada #2 on August 3rd (when Mirada #1 was off) was ~24° C. Water temperature at MW-8 on that day was 16.2° C.

Water temperatures at Mirada #1 fluctuate depending on production rate. From January 13th to March 22nd, when the well was producing an average of about 89 gpm, the water temperature was fairly static at ~19.1 C. This "static" water temperature was apparently the result of a mixture of water from two sources: cooler water from the shallow aquifer and warmer water from the deeper aquifer. Well Mirada #1 had been in continuous operation for several years until it was shut off on March 22nd. When the well was shut off, the water temperature dropped to ~17.3° C from mid-May to mid-June. The temperature spiked up briefly when the well was run for a short period around May 18th. The well was put back into production in late June. Both production wells were in use from late June until mid October. Water temperature began to rise as soon as the well went back into production, reaching a peak of ~22.3° C on September 4th. Production increased at MD-1 around September 4th, the water level dropped, and the water temperature dropped rapidly down to ~19° C.

The variations in water temperature at Mirada #1 appear to be related to the water table elevation in the well and the elevation of the perforations. Refer to the Mirada #1 water level and temperature graph on page 3 of the September water quality report, attached in the appendix.

During the early part of August the water level in Mirada #1 fluctuated around elevation 2200'. Around August 15th production from Mirada #1 decreased, and the water table in the well rose to above 2200' elevation and water temperature began to rise. On about September 4th production at Mirada #1 increased, the water table dropped below 2200', and water temperature dropped precipitously.

A possible explanation for this behavior is that when the water level in the well drops below the elevation of the top of the perforations, cooler water from the shallow aquifer flows down through the gravel packed annular space between the 12" diameter casing and the 20" diameter borehole and enters the well, lowering the water temperature. When the water table is above the perforations, cooler water from the shallow aquifer does not flow into the well, or flows into the well in smaller volumes, and the water temperatures rises.

Nitrate levels at MW-6 and MW-7 continue to rise. At both wells, the highest nitrate levels occur during the winter months when recharge to the shallow aquifer from the drain is minimal. The seasonal variations in nitrate levels, along with water level responses to the arrival of irrigation water in the drain, suggests that the seasonal variations in nitrate levels at MW-6 and MW-7 are caused by a constant source of ground water with high nitrate levels that is diluted by recharge from the drain during the irrigation season. The manure drying area, directly upgradient of wells MW-6 and MW-7, is the most likely source of nitrate.

Water quality data from Horstman Drain suggests that ground water may be discharging to surface water in the drain between the MW-2 area and Hogg Road. Wetland areas along this section of the drain also may indicate that ground water is very close to or discharging at the land surface in this area.

Conclusions

Water quality at wells MW-1, MW-2 and MW-5 has improved slightly, while at other wells it has deteriorated. As the time period over which water quality and water level data has been collected grows, seasonal patterns are beginning to emerge. These patterns indicate that nutrient management practices at Nederend Dairies are affecting water quality in the shallow aquifer. Specific conclusions are that:

- Average nitrate concentrations at 8 of 9 monitoring wells exceed the EPA mcl of 10 mg/L.
- Average nitrate concentrations have increased at 4 wells (MW-3, MW-4, MW-6, and MW-7), and decreased at 4 wells (MW-1, MW-2, MW-5 and MW-8).
- The lack of a surface seal at well Mirada #1 interconnects the shallow and deeper aquifers and provides a pathway for high nitrate water from the upper aquifer to enter the deeper aquifer.
- There is a downward head gradient between the shallow aquifer at MW-8 and the deeper aquifer at Mirada #1.
- The water level in the shallow aquifer in the vicinity of MW-1 and production well Nederend #2 is declining.

Recommendations

Monks Hydro-Geoscience recommends that monthly water quality and depth to water data continue to be collected at wells as outlined in the matrix below. Quarterly sampling will take place during the months of January, April, July and October. More frequent nitrate analyses may occur at some wells. For instance, monthly sampling at MW-5 should begin as soon as manure composting begins at the new composting area. It is hoped that ISDA will continue the semi-annual sampling of Nederend Dairy's shallow aquifer monitoring wells.

Nederend Dairy 2007 Water Quality Monitoring Program Proposed parameter measurement Frequency				
Well Name:	Water level measurements:	pH, T, TDS, Conductivity, Ox-Red potential, Dissolved O2:	Nitrate:	Sulfate, chloride, coliform bacteria:
MW-1	Continuous	Monthly	Quarterly	ISDA semi-annually
MW-2	Monthly	Monthly	Quarterly	ISDA semi-annually
MW-3	Continuous	Monthly	Quarterly	ISDA semi-annually
MW-4	Monthly	Monthly	Quarterly	ISDA semi-annually
MW-5	Monthly	Monthly	Quarterly	ISDA semi-annually
MW-6	Monthly	Monthly	Quarterly	ISDA semi-annually
MW-7	Monthly	Monthly	Quarterly	ISDA semi-annually
MW-8	Monthly	Monthly	Quarterly	ISDA semi-annually
MW-9	Monthly	Monthly	Quarterly	ISDA semi-annually
Nederend Domestic	Monthly	Monthly	Quarterly	ISDA semi-annually

Additional activities designed to help improve the understanding of the hydrogeology at Nederend Dairies and the impacts on water quality from nutrient management practices are recommended for 2007. These activities include:

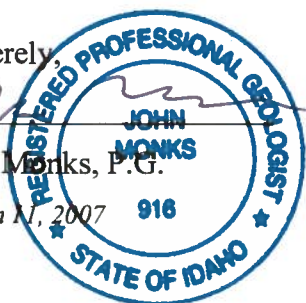
- Water level measurements at production wells Nederend #2, Nederend #3, and Nederend #1 at Dairy #1, and at Mirada #2 at Dairy #2. None of these wells currently have water level measurement capabilities.
- Construct three new monitoring wells at Dairy #2 and two new wells at Dairy #1 at the locations shown on the map below.
- Conduct a water balance study of the manure drying area to determine if manure drying/composting activities are a potential source of recharge to the shallow aquifer.
- Continue water quality monitoring in Horstman Drain with a focus on determining if ground water is discharging to the drain between MW-2 and Hogg Road.

If you have any questions or comments, please give me a call at 208-263-1991.

Sincerely,

John Monks, P.G.

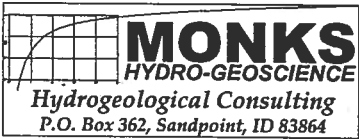
March 11, 2007



Cc: Hans Nederend - Nederend Dairy, Ilene Dobbin – COCOA, Craig Tesch – ISDA

APPENDIX – 2006 Monthly Monitoring Reports

2 February, 2006
Hans Nederend
Nederend Dairy
4998 Hogg Road
Homedale, ID 83628



RE: January 2005 water quality report

Dear Hans:

This letter reports water quality data collected at Nederend Dairies #1 and #2 on January 12, 2006. I measured depth to water in all of the monitoring wells in January, and sampled all of the wells except Nederend Domestic.

Water Quality

Water quality data from January 2006 is summarized in table 1. Field measurements of water temperature, pH, specific conductivity, dissolved oxygen, total dissolved solids (TDS) and oxidation/reduction potential with a YSI-556 multi-parameter water quality meter began in January. Field measured water quality parameters are summarized in Table 2. Table 3 is a summary of ISDA water quality data from April and November 2005.

Table 1. January 2006 Water Chemistry Analytical Results

Well name:	Date:	Chloride (mg/L):	Nitrate (mg/L):	Sulfate (mg/L):	Coliform Bacteria
Nederend Domestic	1/12/06	NS	NS	NS	NS
MW-1	1/12/06	58.3	22.8↓	220	absent
MW-2	1/12/06	99.7	39.7↓	421	absent
MW-3	1/12/06	110	20.6↑	287	absent
MW-4	1/12/06	62.4	7.73↓	244	absent
MW-5	1/12/06	98.3	22.2↑	373	absent
MW-6	1/12/06	65.4	21.2↑	91.3	absent
MW-7	1/12/06	60.6	9.36↑	158	absent
MW-8	1/12/06	179	77.8↓	228	absent

Table 2. January 2006 Field Measured Water Quality Parameters

Well#	Temp C	SpCond (uS/cm)	DO Conc (mg/L)	pH	TDS (g/L)	ORP (mV)
MW-1	14.02	1232.72	1.97	7.26	810.91	157.44
MW-2	14.57	1855.97	0.95	7.35	1206.38	133.84
MW-3	14.96	1635.93	0.35	7.29	1063.35	121.51
MW-4	13.50	1283.88	0.55	7.37	834.52	96.33
MW-5	13.47	1773.51	0.14	7.05	1152.78	117.79
MW-6	16.38	1053.90	0.72	7.38	685.03	104.68
MW-7	15.32	1300.09	0.06	7.03	845.06	102.13
MW-8	15.48	2199.80	0.05	7.15	1429.87	40.86
Nederend #2	15.84	1068.01	2.29	7.34	694.20	81.08

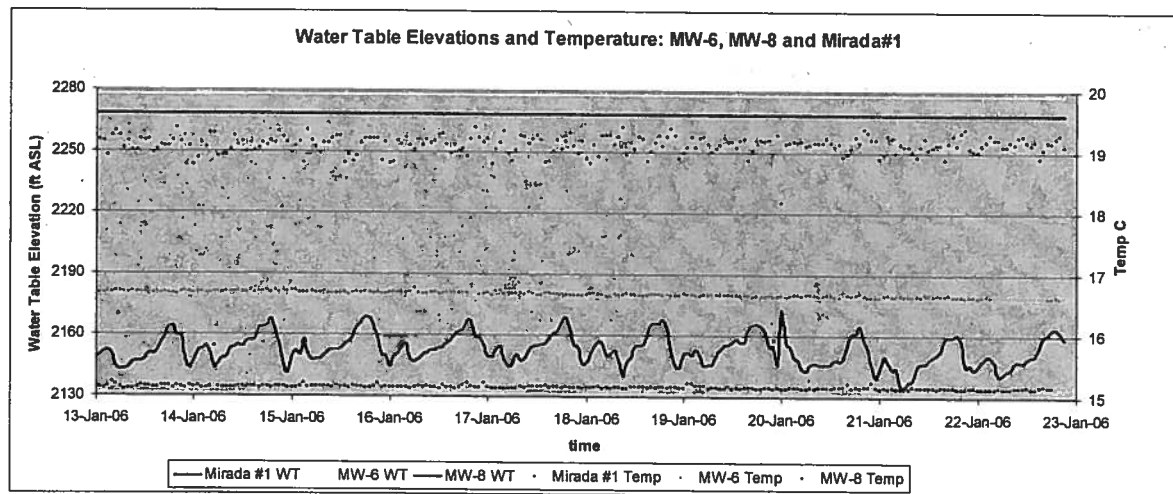
Table 3. 2005 ISDA Water Quality Data Summary

ISDA Well ID:	Date:	Temp	pH	SpecCond	TDS	Nitrate	Chloride	Sulfate	Ammonia
8501901 Ned #2	4/19/05	17.7	7.46	812	406	9.08	46.3	200	0.963
8501901 Ned #2	4/19/05	17.7	7.46	812	406	8.64	47	204	1.02
8501901 Ned #2	11/15/05	14.6	7.17	1248	615	12.2	53.9	232	0.369
850MW1	4/19/05	14.5	7.41	917	459	22.3	62.8	225	ND
850MW1	11/15/05	13	7.18	1171	569	24.9	54.2	192	ND
850MW2	4/19/05	14.7	7.46	1350	677	39.1	111	452	ND
850MW2	11/15/05	13.4	7.32	1805	911	44.8	100	399	ND
850MW3	4/19/05	14.7	7.47	1091	553	16.9	96.7	255	ND
850MW3	11/15/05	13.5	7.25	1522	765	19	88.1	252	ND
850MW4	4/19/05	14	7.53	854	426	6.25	56.4	195	ND
850MW4	11/15/05	12.5	7.13	1311	656	8.48	66.2	248	ND
850MW5	4/19/05	13.2	7.32	1193	597	19.7	84.8	352	ND
850MW5	11/15/05	13.8	7.04	1657	833	16.9	79.2	341	ND
850MW6	4/19/05	16.8	7.56	704	353	15.9	59.9	78.2	ND
850MW6	11/15/05	15.6	7.41	763	381	7.19	37.9	65.7	ND
850MW7	4/19/05	15.3	7.31	690	344	6.55	45	119	ND
850MW7	11/15/05	14.8	6.94	1200	599	8.03	55.2	136	ND
850MW8	11/15/05	15.3	6.96	2120	1070	78.4	177	220	0.509

Water Level Measurements

January depth to water measurements for the shallow aquifer wells are summarized in the table below. Solinst Levellogger pressure transducer/data loggers were installed in MW-6, MW-8 and well Mirada #1 at Dairy #2 on January 13, 2006. The Levelloggers are recording water level and water temperature data hourly. I downloaded the first ten days worth of data from them on January 23rd while I was on site with IDWR to calibrate water meters. The water table at all of the wells except MW-3 and MW-5 went down.

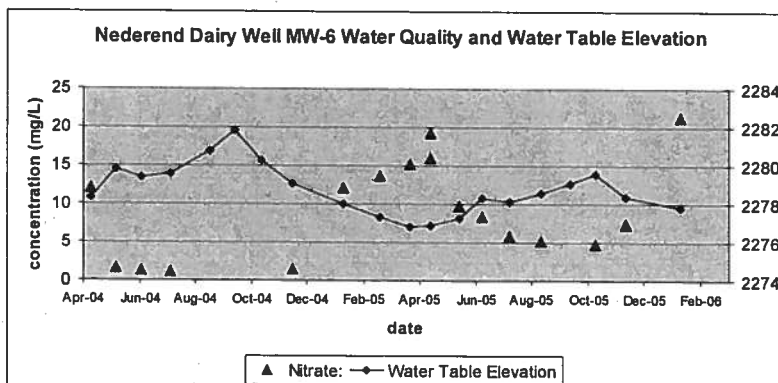
Well Name:	Measuring point elevation:	Depth to Water:	Water Table Elevation:	Change from Previous month:
Nederend Domestic	2290.13	26.46	2263.67	-0.89
MW-1	2294.59	36.07	2258.52	-0.79
MW-2	2276.31	28.27	2248.04	-0.11
MW-3	2265.33	20.34	2244.99	0.30
MW-4	2305.73	14.66	2291.07	-0.11
MW-5	2298.90	13.85	2285.05	0.06
MW-6	2300.41	22.62	2277.79	-0.59
MW-7	2300.23	19.74	2280.49	-0.30
MW-8	~2306	38.05	2267.95	-1.10
Mirada #1	~2305	150.4	2154.6	+2



Discussion

Nitrate levels went up in MW-3, MW-5, MW-6 and MW-7 and down at MW-1, MW-2, MW-4 and MW-8. Nitrate, chloride and sulfate at MW-8 continue to be very high. At MW-6, nitrate levels went from 7.19 mg/L in November 2005 to 21.2 mg/L in January 2006. A similar increase occurred at MW-6 at this time last year, when nitrate went from 1.34 mg/L in November 2004 to 12.1 mg/L in January 2005. Nitrate continued to climb at MW-6 to 19.2 mg/L in April 2005, and then declined to 4.67 mg/L in October. These peaks and lows in nitrate concentration coincide with water table lows and highs.

One possible explanation for the pattern developing at MW-6 is a constant source of high nitrate water upgradient of MW-6 that is diluted by seasonal recharge to the shallow aquifer from irrigation and/or increased flows in the drain. If the pattern we saw during winter 2005 repeats itself we could see fairly high nitrate levels at MW-6 this spring.

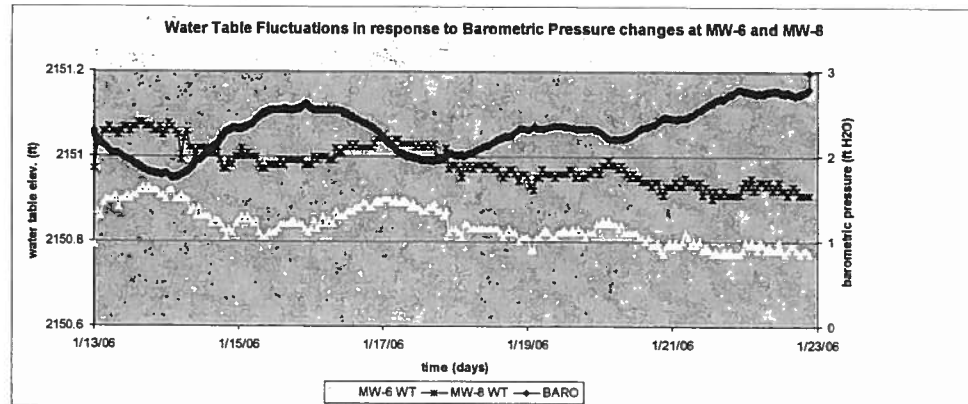


Water table elevations and temperature at MW-6, MW-8 and Mirada #1 are shown on the graph above. The water table in the shallow aquifer at MW-6 and MW-8 is considerably higher than the water table in the deeper aquifer at Mirada #1, which is drawn down by continuous pumping. At Mirada #1, the water table fluctuates about 25 feet on a daily basis in response to varying water demands at the dairy. The well is drawn down every morning starting at ~ 7:00 am, with the water level reaching its lowest level around 11:00 am. Then there is a four hour period of decreased water use during which the water level rises, before being drawn down again during a three hour period of higher water use that ends at ~6:00 pm. The water level in the well then rises through the night, reaching its highest level at ~7:00 am, when the cycle begins again.

Water levels in the shallow aquifer do not appear to be responding to the varying water levels in the deeper aquifer. I will increase the frequency of measurements at MW-6 and MW-8 to 5 or 12 readings per hour to try to see if small changes in water levels are occurring in the shallow aquifer.

Water levels in the shallow aquifer do respond to changes in barometric pressure. When the barometric pressure goes up, water levels in the wells go down, and when barometric pressure falls, water levels rise.

This aquifer response to changes in barometric pressure is known as barometric efficiency. The barometric and water level data will be useful for



calculating certain hydraulic properties of the aquifer. The barometric and water level data indicate that the shallow aquifer is under confined or semi-confined conditions. The general water level trend at MW-6 and MW-8 is downwards, $\sim 0.06'$ at MW-8 and $\sim 0.16'$ at MW-6.

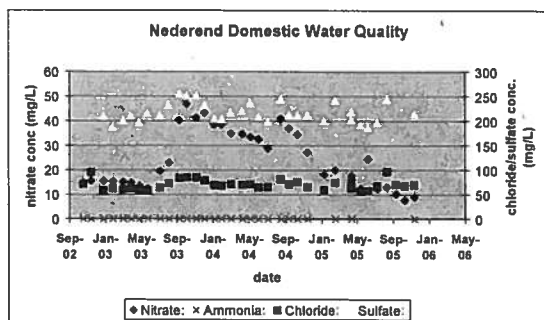
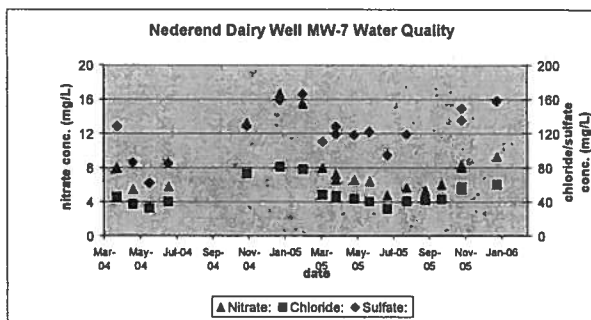
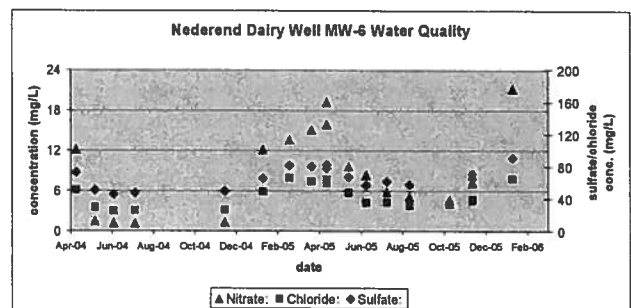
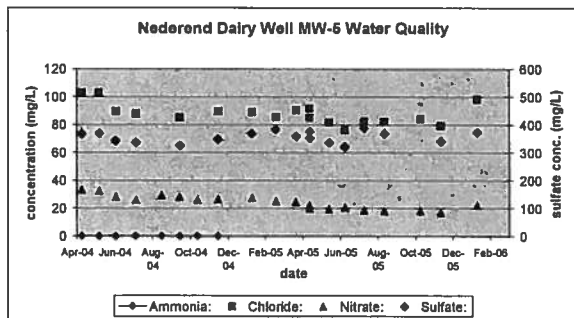
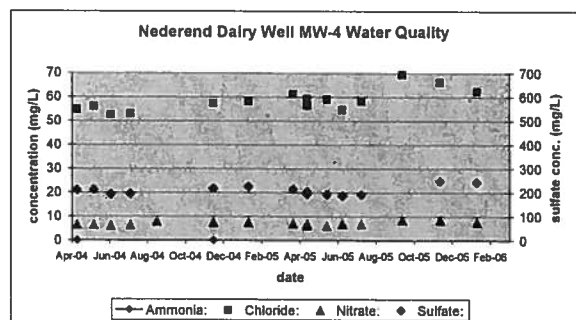
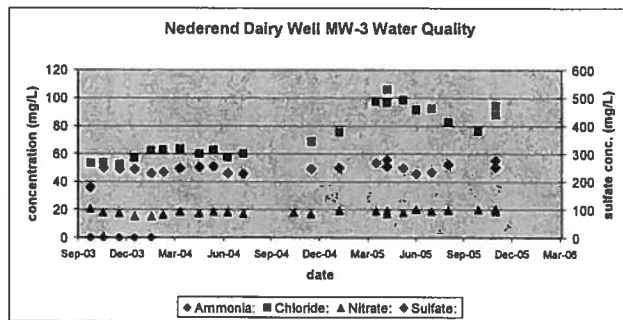
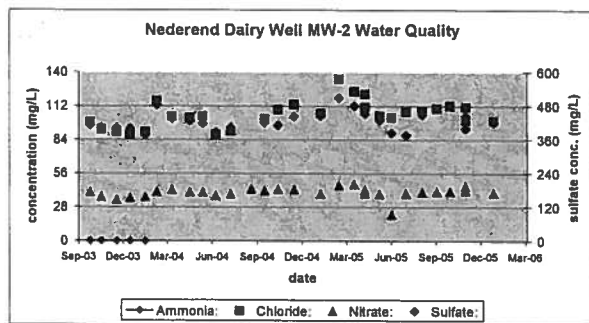
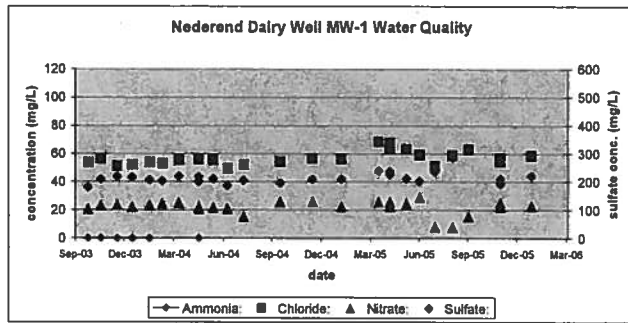
The water temperature data from the Levelloggers and field measurements shows that the deeper aquifer is warmer than the shallow aquifer. The average water temperature at Mirada #1 from the Levellogger was 19.1°C . At MW-6 it was 16.61°C , and at MW-8 it was 15.15°C . The coldest water temperatures are found at wells MW-4 and MW-5, both of which are located next to the drain. Of the wells not located next to the drain, MW-1 has the coldest water at 14.02°C and MW-6 the warmest at 16.38°C .

The temperature variations that occur in the shallow aquifer pose an interesting question: what is the source of the heat? Two possible sources of heat are: warm water from the deeper aquifer leaking into the shallow aquifer, warm water from lagoons leaking into the shallow aquifer. I will begin taking water quality measurements with the YSI-556 in the drain and lagoons in February, and would like to begin taking water quality measurements of irrigation water being applied through center pivots when the irrigation season begins.

Sincerely,

John Monks, P.G.
Hydrogeologist
January 24, 2006

Cc: Ilene Dobbin (COCOA)





**ALCHEM
LABORATORIES**

Alchem Laboratories, Inc.

104 West 31st Street
Boise, Idaho 83714

Phone (208) 336-1172
FAX (208) 336-7124

Water, Waste Water
and Soil Analysis

LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-1 / PROJ: NEDEREND DAIRY

DATE COLLECTED 01/12/2006
TIME COLLECTED 11:00
DATE RECEIVED 01/12/2006
DATE REPORTED 01/19/2006
SUBMITTED : JOHN MONKS

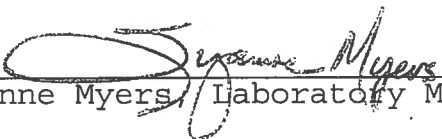
LAB SAMPLE NUMBER - 1339

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	58.3	01/13/2006	MB
NITRATE as N	22.8	01/17/2006	MB
ORTHOPHOSPHATE	0.031	01/13/2006	NH
SULFATE	220.0	01/13/2006	MB
TOTAL COLIFORM	ABSENT	01/12/2006	CE

COMMENTS:NO COLIFORM BACTERIA WERE FOUND IN SAMPLE.

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-2 / PROJ: NEDEREND DAIRY

DATE COLLECTED 01/12/2006
TIME COLLECTED 11:35
DATE RECEIVED 01/12/2006
DATE REPORTED 01/19/2006
SUBMITTED : JOHN MONKS

LAB SAMPLE NUMBER - 1340

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	99.7	01/13/2006	MB
NITRATE as N	39.7	01/17/2006	MB
ORTHOPHOSPHATE	0.046	01/13/2006	NH
SULFATE	421.0	01/13/2006	MB
TOTAL COLIFORM	ABSENT	01/12/2006	CE

COMMENTS:NO COLIFORM BACTERIA WERE FOUND IN SAMPLE.

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Suzanne Myers, Laboratory Manager





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PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-3 / PROJ: NEDEREND DAIRY

DATE COLLECTED 01/12/2006
TIME COLLECTED 12:05
DATE RECEIVED 01/12/2006
DATE REPORTED 01/19/2006
SUBMITTED : JOHN MONKS

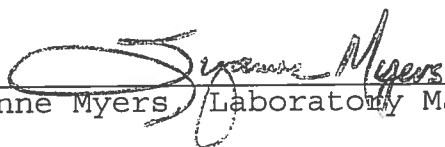
LAB SAMPLE NUMBER - 1341

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	110.0	01/13/2006	MB
NITRATE as N	20.6	01/17/2006	MB
ORTHOPHOSPHATE	0.045	01/13/2006	NH
SULFATE	287.0	01/13/2006	MB
TOTAL COLIFORM	ABSENT	01/12/2006	CE

COMMENTS: NO COLIFORM BACTERIA WERE FOUND IN SAMPLE.

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Suzanne Myers, Laboratory Manager





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PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-4 / PROJ: NEDEREND DAIRY

DATE COLLECTED 01/12/2006
TIME COLLECTED 12:30
DATE RECEIVED 01/12/2006
DATE REPORTED 01/19/2006
SUBMITTED : JOHN MONKS

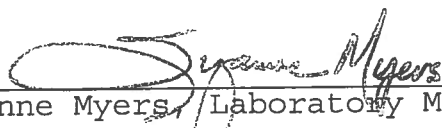
LAB SAMPLE NUMBER - 1342

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	62.4	01/13/2006	MB
NITRATE as N	7.73	01/17/2006	MB
ORTHOPHOSPHATE	0.042	01/13/2006	NH
SULFATE	244.0	01/13/2006	MB
TOTAL COLIFORM	ABSENT	01/12/2006	CE

COMMENTS: NO COLIFORM BACTERIA WERE FOUND IN SAMPLE.

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Suzanne Myers, Laboratory Manager





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HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-5 / PROJ: NEDEREND DAIRY

DATE COLLECTED 01/12/2006
TIME COLLECTED 13:00
DATE RECEIVED 01/12/2006
DATE REPORTED 01/19/2006
SUBMITTED : JOHN MONKS

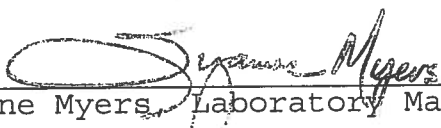
LAB SAMPLE NUMBER - 1343

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	98.3	01/13/2006	MB
NITRATE as N	22.2	01/17/2006	MB
ORTHOPHOSPHATE	0.046	01/13/2006	NH
SULFATE	373.0	01/13/2006	MB
TOTAL COLIFORM	ABSENT	01/12/2006	CE

COMMENTS: NO COLIFORM BACTERIA WERE FOUND IN SAMPLE.

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Suzanne Myers, Laboratory Manager





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PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-6 / PROJ: NEDEREND DAIRY

DATE COLLECTED 01/12/2006
TIME COLLECTED 13:30
DATE RECEIVED 01/12/2006
DATE REPORTED 01/19/2006
SUBMITTED : JOHN MONKS

LAB SAMPLE NUMBER - 1344

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	65.4	01/13/2006	MB
NITRATE as N	21.2	01/17/2006	MB
ORTHOPHOSPHATE	0.026	01/13/2006	NH
SULFATE	91.3	01/13/2006	MB
TOTAL COLIFORM	ABSENT	01/12/2006	CE

COMMENTS:NO COLIFORM BACTERIA WERE FOUND IN SAMPLE.

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-7 / PROJ: NEDEREND DAIRY

DATE COLLECTED 01/12/2006
TIME COLLECTED 13:55
DATE RECEIVED 01/12/2006
DATE REPORTED 01/19/2006
SUBMITTED : JOHN MONKS

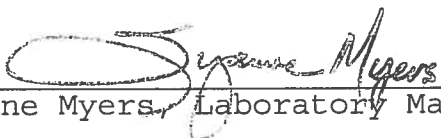
LAB SAMPLE NUMBER - 1345

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	60.6	01/13/2006	MB
NITRATE as N	9.36	01/17/2006	MB
ORTHOPHOSPHATE	0.048	01/13/2006	NH
SULFATE	158.0	01/13/2006	MB
TOTAL COLIFORM	ABSENT	01/12/2006	CE

COMMENTS:NO COLIFORM BACTERIA WERE FOUND IN SAMPLE.

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Suzanne Myers, Laboratory Manager





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PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-8 / PROJ: NEDEREND DAIRY

DATE COLLECTED 01/12/2006
TIME COLLECTED 14:25
DATE RECEIVED 01/12/2006
DATE REPORTED 01/19/2006
SUBMITTED : JOHN MONKS

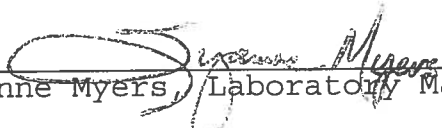
LAB SAMPLE NUMBER - 1346

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	179.0	01/13/2006	MB
NITRATE as N	77.8	01/17/2006	MB
ORTHOPHOSPHATE	0.015	01/13/2006	NH
SULFATE	228.0	01/13/2006	MB
TOTAL COLIFORM	ABSENT	01/12/2006	CE

COMMENTS: NO COLIFORM BACTERIA WERE FOUND IN SAMPLE.

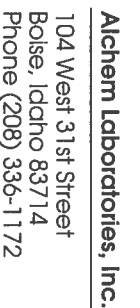
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Suzanne Myers, Laboratory Manager



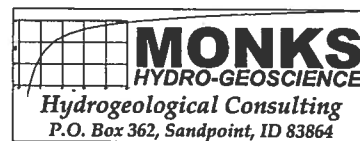
LAB NUMBER	DATE	TIME	SAMPLE IDENTIFICATION
1339	1/2/00	1100	MU-1
1340	11	1135	MU-2
1341	11	1205	MU-3
1342	11	1230	MU-4
1343	11	1300	MU-5
1344	11	1330	MU-6
1345	11	1355	MU-7
1346	11	1425	MU-8

MATRIX										TESTS (CIRCLE METHOD)
X	X	X	X	X	X	X	X	X		WATER
										SOIL
										OTHER
										TPH - (418.1 / 8015M)
										BTEX (602 / 8020 / 8260) (+N +M)
										CL. SOLVENTS (601 / 8010)
										VOC's (601-602 / 8021)
										GC-MS VOC's (624 / 8260)
										PAH's (8270)
										PHENOLS (604 / 8040 / 8270)
										PESTICIDES (608 / 8081 / 8270)
										PCB's (608 / 8081)
										SEMI-VOLATILES (625 / 8270)
										TCLP-(DESIGNATE
										8 RCRA METALS
										RBCA - NO LEAD GAS BTEX+N+M (8020 / 8260)
										RBCA - LEADED GAS EDB (8011) BTEX+N+M, EDC (8021 / 8260)
										RBCA - FUEL OILS BTEX (8020 / 8260), PAH (8270)
										RBCA - MOTOR OILS BTEX (8020 / 8260), PAH (8270) CL. SOLVENTS (8010)
										SEE ATTACHED LIST
										nitrate
										chloride
										sulfate
										bacteriology
										orthophosphate
										NUMBER OF CONTAINERS



Relinquished By (Signature)	Date/Time	Received for Laboratory By (Signature),	Date/Time	Received With Seal Intact? Label Tag, COC Agree?
	1-12-06 1600		1-12-06 400	☐ Yes ☐ No ☐ Yes ☐ No

9 March, 2006
Hans Nederend
Nederend Dairy
4998 Hogg Road
Homedale, ID 83628



RE: February 2006⁶ water quality report

Dear Hans:

This letter reports water quality data collected at Nederend Dairies #1 and #2 on February 10, 2006. I measured depth to water in all of the monitoring wells in February, and field measured water quality parameters at all of the wells except Nederend Domestic, and sampled MW-2, MW-6, MW-7 and MW-8 for nitrate.

Water Quality

Water quality data from February 2006 is summarized in table 1. Field measured water quality parameters are summarized in Table 2.

Table 1. February 2006 Water Chemistry Analytical Results

Well name:	Date:	Chloride (mg/L):	Nitrate (mg/L):	Sulfate (mg/L):	Coliform Bacteria
Nederend Domestic	2/10/06	NS	NS	NS	NS
MW-1	2/10/06	NS	NS	NS	NS
MW-2	2/10/06	NS	37.8↓	NS	NS
MW-3	2/10/06	NS	NS	NS	NS
MW-4	2/10/06	NS	NS	NS	NS
MW-5	2/10/06	NS	NS	NS	NS
MW-6	2/10/06	NS	25.7↑	NS	NS
MW-7	2/10/06	NS	9.80↑	NS	NS
MW-8	2/10/06	NS	68.6↓	NS	NS

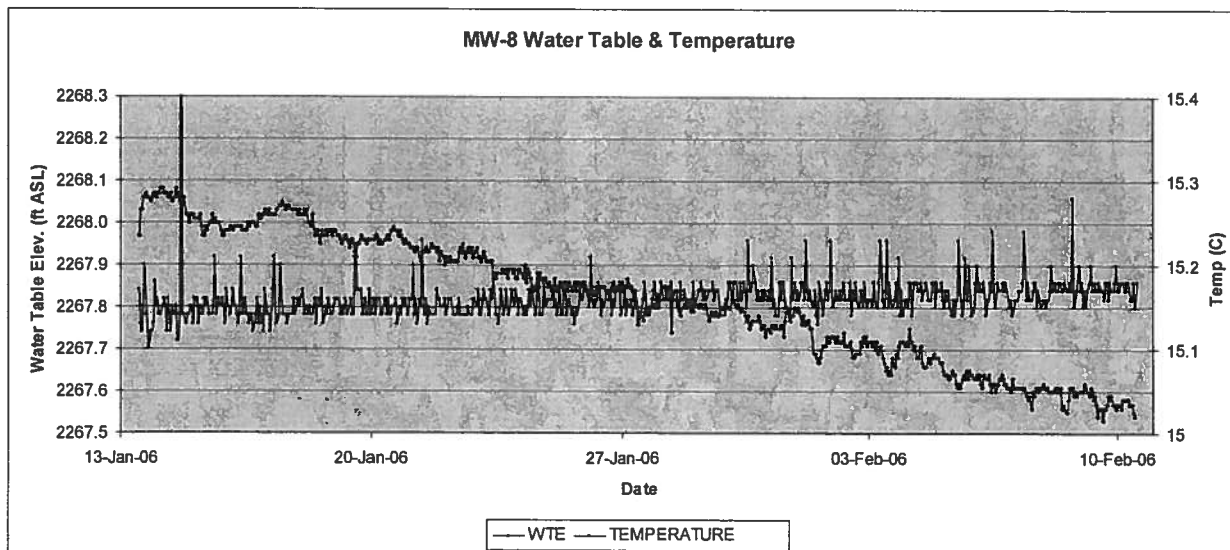
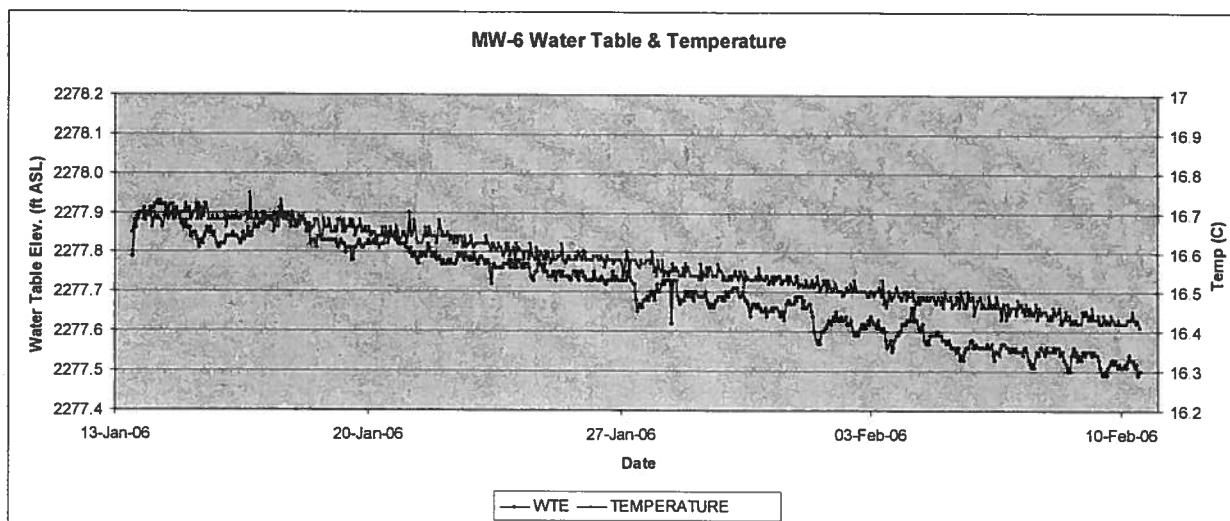
Table 2. February 2006 Field Measured Water Quality Parameters

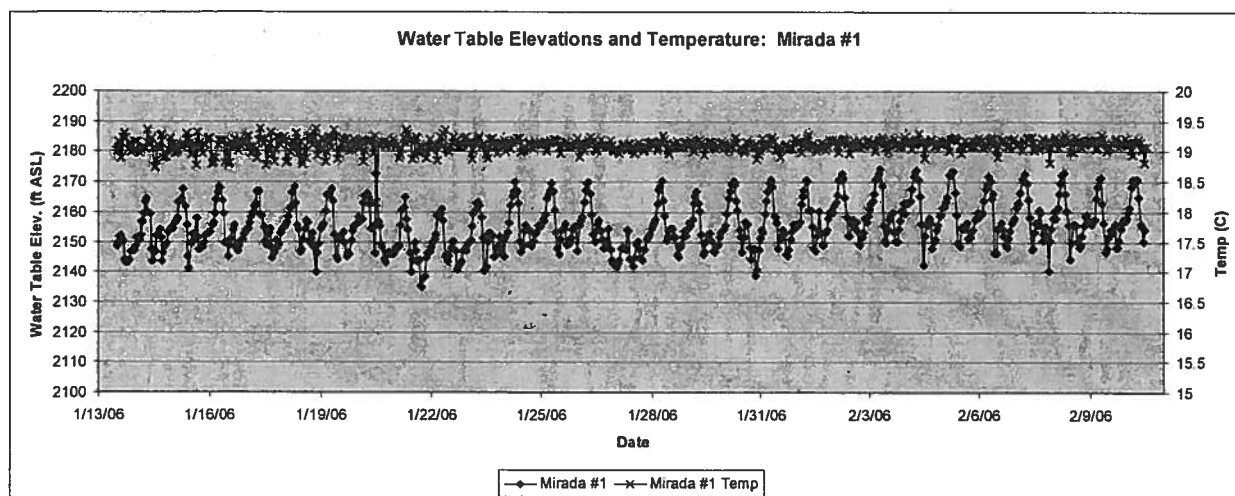
Well#	Temp C	SpCond (uS/cm)	DO Conc (mg/L)	pH	TDS (g/L)	ORP (mV)
MW-1	14.27↑	1275↑	0.80	7.30	829↑	102
MW-2	14.56↓	1830↓	1.02	7.35	1189↓	109
MW-3	14.88↓	1630↓	0.37	7.30	1059↓	51
MW-4	13.42↓	1264↓	0.52	7.39	822↓	165
MW-5	13.25↓	1723↓	0.04	7.17	1120↓	157
MW-6	16.35↓	1168↑	0.61	7.33	759↑	123
MW-7	15.05↓	1264↓	0.02	7.03	821↓	66
MW-8	15.60↑	2167↓	0.02	7.16	1408↓	73
Drain1	9.63	1721	3.20	8.46	1119	54
Drain2	8.92	1653	2.72	8.43	1074	78
Drain3	8.31	1658	2.82	8.40	1077	90

Water Level Measurements

February depth to water measurements for the shallow aquifer wells are summarized in the table below. I began measurement of well ION, an irrigation well at the ION truck stop that is completed in the shallow aquifer and is located just south of the southwest corner of the manure drying area. The water table at all of the wells went down.

Well Name:	Measuring point elevation:	Depth to Water:	Water Table Elevation:	Change from Previous month:
Nederend Domestic	2290.13	26.81	2263.32	-0.35
MW-1	2294.59	36.45	2258.14	-0.38
MW-2	2276.31	28.57	2247.74	-0.30
MW-3	2265.33	20.83	2244.50	-0.49
MW-4	2305.73	14.76	2290.97	-0.10
MW-5	2298.90	14.04	2284.86	-0.19
MW-6	2300.41	22.96	2277.45	-0.34
MW-7	2300.23	20.02	2280.21	-0.28
MW-8	~2306	38.53	2267.47	-0.48
ION shallow	~2303	19.69	2283.31	NA





Discussion

Nitrate levels went down at MW-2 and MW-8 and up at MW-6 and MW-7. Specific Conductance and TDS went up at MW-1 and MW-6, and down at all of the other wells. Water temperature went up at MW-1 and MW-8 and down at all of the other wells.

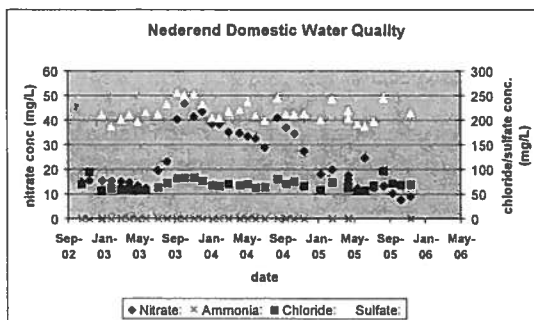
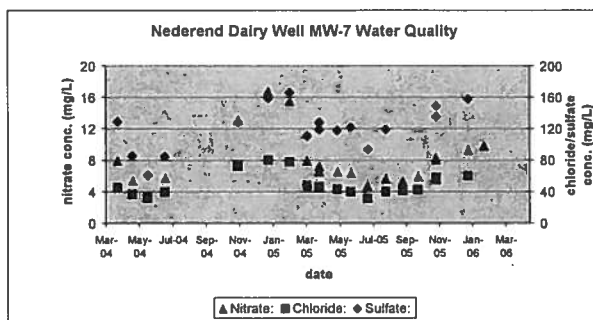
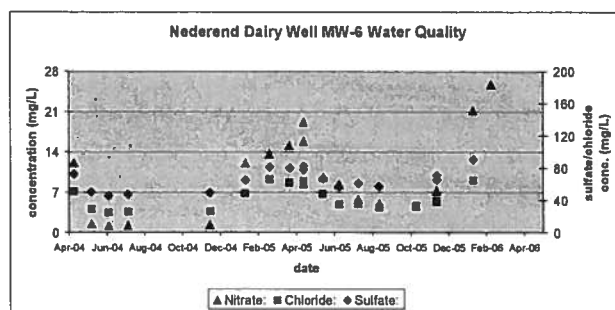
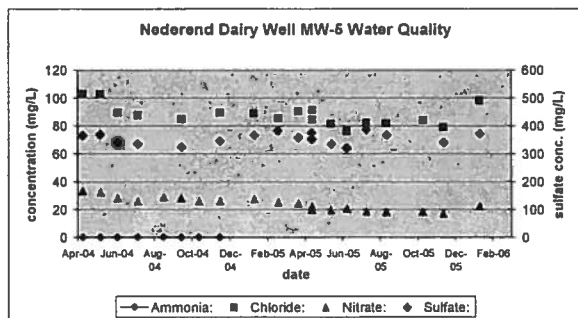
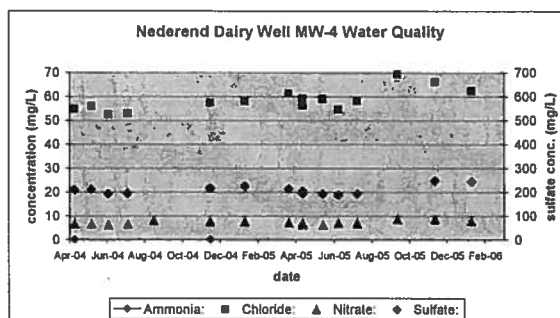
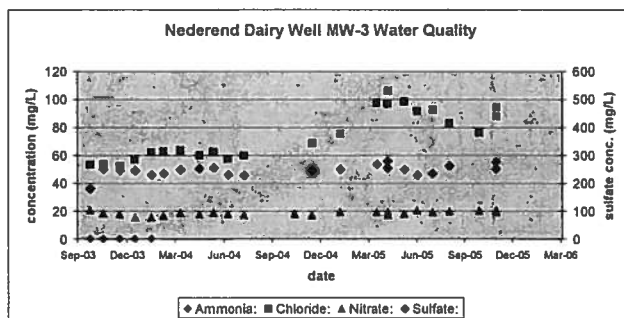
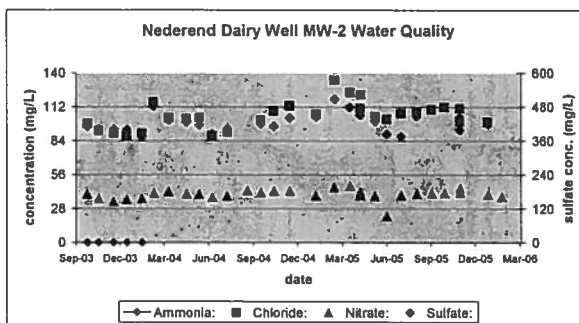
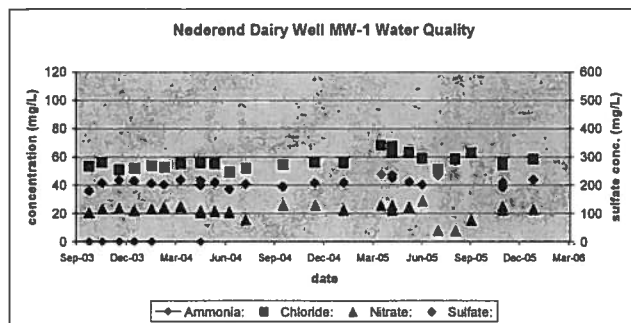
Water table elevations and temperature at MW-6, MW-8 and Mirada #1 are shown on the graphs above. The water table at Mirada #1 fluctuates about 40 feet on a daily basis in response to varying water demands at the dairy. The water table at MW-6 and MW-8 is going down, and also fluctuating on a shorter time scale. The fluctuations at both wells are very similar, indicating that both wells are being affected by the same disturbance. The water table in the shallow aquifer at MW-6 and MW-8 may be responding to the varying water levels in the deeper aquifer caused by pumping at Mirada #1. I increased the frequency of measurement of the Leveloggers in MW-6 and MW-8 from hourly readings to readings every 15 minutes to try to better define the daily water table fluctuations.

Water temperature at MW-6 decreased from ~16.7 C to 16.4 C. At MW-8 water temperature increased slightly. At Mirada #1 water temperature fluctuates hourly, probably as a result of heat generated by the pump motor, but does not seem to be changing much over time.

Sincerely,

John Monks, P.G.
 Hydrogeologist
 March 9, 2006

Cc: Ilene Dobbin (COCOA)



NAME		Monks Hwy 20 - Good Science	
ATTENTION		John Monks	
ADDRESS		PO BOX 362	
CITY		Sandport	
PHONE #		208-263-1929	FAX #
SAMPLER (S)		Monks	
PROJECT OR SITE		Heedene	
P.N./P.O. NUMBER			



ALCHEM
LABORATORIES

Alchem Laboratories, Inc.
104 West 31st Street
Boise, Idaho 83714
Phone (208) 336-1172



Alchem Laboratories, Inc.

104 West 31st Street
Boise, Idaho 83714

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FAX (208) 336-7124

Water, Waste Water
and Soil Analysis

LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-6 / PROJ: NEDEREND

DATE COLLECTED 02/10/2006
TIME COLLECTED 13:39
DATE RECEIVED 02/10/2006
DATE REPORTED 02/24/2006
SUBMITTED :

LAB SAMPLE NUMBER - 2083

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	25.7	02/23/2006	MB

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Suzanne Myers, Laboratory Manager





Alchem Laboratories, Inc.

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Boise, Idaho 83714

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FAX (208) 336-7124

Water, Waste Water
and Soil Analysis

LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 02/10/2006
TIME COLLECTED 14:00
DATE RECEIVED 02/10/2006
DATE REPORTED 02/24/2006
SUBMITTED :

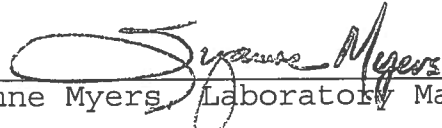
ATTENTION: JOHN MONKS
SOURCE -: MW-7 / PROJ: NEDEREND

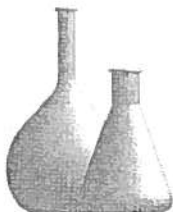
LAB SAMPLE NUMBER - 2084

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	9.80	02/23/2006	MB

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Suzanne Myers, Laboratory Manager





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Water, Waste Water
and Soil Analysis

LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-8 / PROJ: NEDEREND

DATE COLLECTED 02/10/2006
TIME COLLECTED 14:20
DATE RECEIVED 02/10/2006
DATE REPORTED 02/27/2006
SUBMITTED :

LAB SAMPLE NUMBER - 2085

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	68.6	02/24/2006	MB

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Suzanne Myers, Laboratory Manager





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Boise, Idaho 83714

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Water, Waste Water
and Soil Analysis

LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-2 / PROJ: NEDEREND

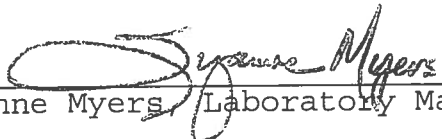
DATE COLLECTED 02/10/2006
TIME COLLECTED 11:15
DATE RECEIVED 02/10/2006
DATE REPORTED 02/24/2006
SUBMITTED :

LAB SAMPLE NUMBER - 2082

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	37.8	02/23/2006	MB

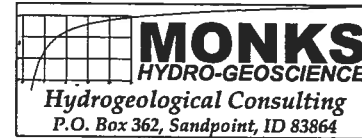
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Suzanne Myers, Laboratory Manager



February 7, 2006

Hans Nederend
Nederend Dairy
4998 Hogg Road
Homedale, ID 83628



Re: Resistivity Surveying Results

Dear Mr. Nederend:

An electrical resistivity survey was conducted at Nederend Dairy #2 November 11-14, 2005. The purpose of conducting the survey was to try to determine if the manure composting/drying area and/or lagoons at Dairy #2 are contributing to the high nitrate, chloride and sulfate levels that have been observed at well MW-8. Well MW-8 is downgradient of at least three potential sources for the high levels of nitrate, chloride and sulfate that are related to nutrient management at Nederend Dairies:

- Dairy #2's wastewater storage lagoons;
- the manure composting/drying areas at Dairy #2;
- the field just east of the dairy, where most of the wastewater from the lagoons was applied prior to Nederend Dairy taking over the operation.

Electrical resistivity surveys can be useful in mapping contaminant plumes in groundwater in two ways. First, electrical resistivity surveys can identify preferential flow paths in the subsurface. Most contaminant plume mapping is done by geophysical mapping of natural features that control contaminant migration (pathways of preferential permeability). In the shallow aquifer beneath Nederend Dairies, coarse-grained deposits of sand/gravel are the most permeable geologic features and the most likely pathways for contaminant migration.

Secondly, under the right conditions, electrical resistivity surveys can identify the extent of a conductive contaminant plume. Under ideal, homogenous conditions, contaminants dissolved in the groundwater will alter the physical properties enough to be measured. Conductivity measurements of groundwater from the shallow aquifer at Nederend Dairies range over a factor of 3, from ~700 to 2100 micro-siemens/cm. If the variations in resistivity in the subsurface due to sediment type are small, it may be possible to map conductive contaminant plumes.

Site Hydrogeology

The shallow aquifer consists of sediments that were deposited by floodwaters from the Bonneville Flood. These coarse-grained sediments were deposited on top of finer-grained lacustrine sediments of the Idaho Group. The deeper aquifer occurs in the Idaho Group. Typical stratigraphy in the

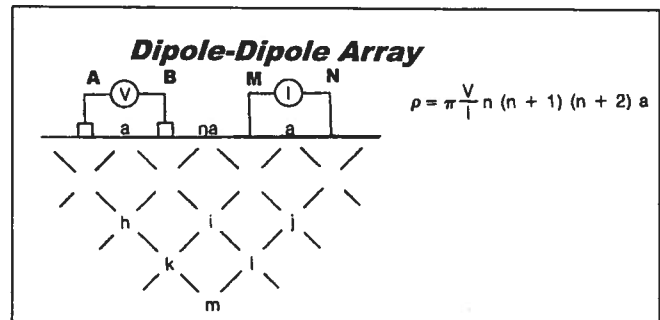
shallow aquifer consists of fine to medium grained, fairly well sorted sand that overlies coarse sand and gravel. These well sorted sands are visible in the sand pit at Dairy #1. The stratigraphy at MW-5, located at the northeast corner of the manure drying/composting area, consists of sand from 0 to 6 feet, gravel from 6 to 7.5 feet, sand from 7.5 to 10.5 feet, coarse sand and gravel from 10.5 to 24 feet, and clay from 24 to 25 feet. The coarse sand and gravel layer at 10.5 to 25 feet in MW-5 is exposed in the sidewall of the drain just north of MW-5.

At MW-6 the stratigraphy consists of sand from 0 to 6 feet, a layer of coarse sand and gravel from 6 to 7.5 feet, and then fine-grained sand with increasing clay content from 7.5 feet to 30 feet. At MW-7 the stratigraphy consists of coarse sand and gravel from 0 to 2 feet, a layer of fine grained sand from 2 to 5 feet, and then coarse sand and gravel from 5 to 29 feet.

The lack of a deeper coarse sand and gravel layer at MW-6 suggests that the coarse sand and gravel layers are not continuous.

Resistivity Survey Field Procedure and Data Processing

The purpose of electrical surveys is to determine the subsurface resistivity distribution by making measurements on the ground surface. From these measurements, the true resistivity of the subsurface can be estimated. Ground resistivity is related to various geologic parameters such as the mineral and fluid content, porosity, and degree of saturation of the rocks being surveyed (Loke, 2000).



Resistivity measurements are made by injecting current into the ground through two current electrodes (A & B), and measuring the resulting voltage difference at two potential electrodes (M & N). From the current (I) and voltage (V) values, an apparent resistivity value is calculated: $\rho_a = kV/I$ where k is the geometric factor, dependent on the arrangement of the four electrodes.

The calculated resistivity value is not the true resistivity of the subsurface, but an "apparent" resistivity value, which is the resistivity of a homogenous ground that will give the same resistance value for the same electrode arrangement. The relationship between the "apparent" resistivity and the "true" resistivity is a complex one. True subsurface resistivity can be estimated through an inversion of the apparent resistivity data using a computer model.

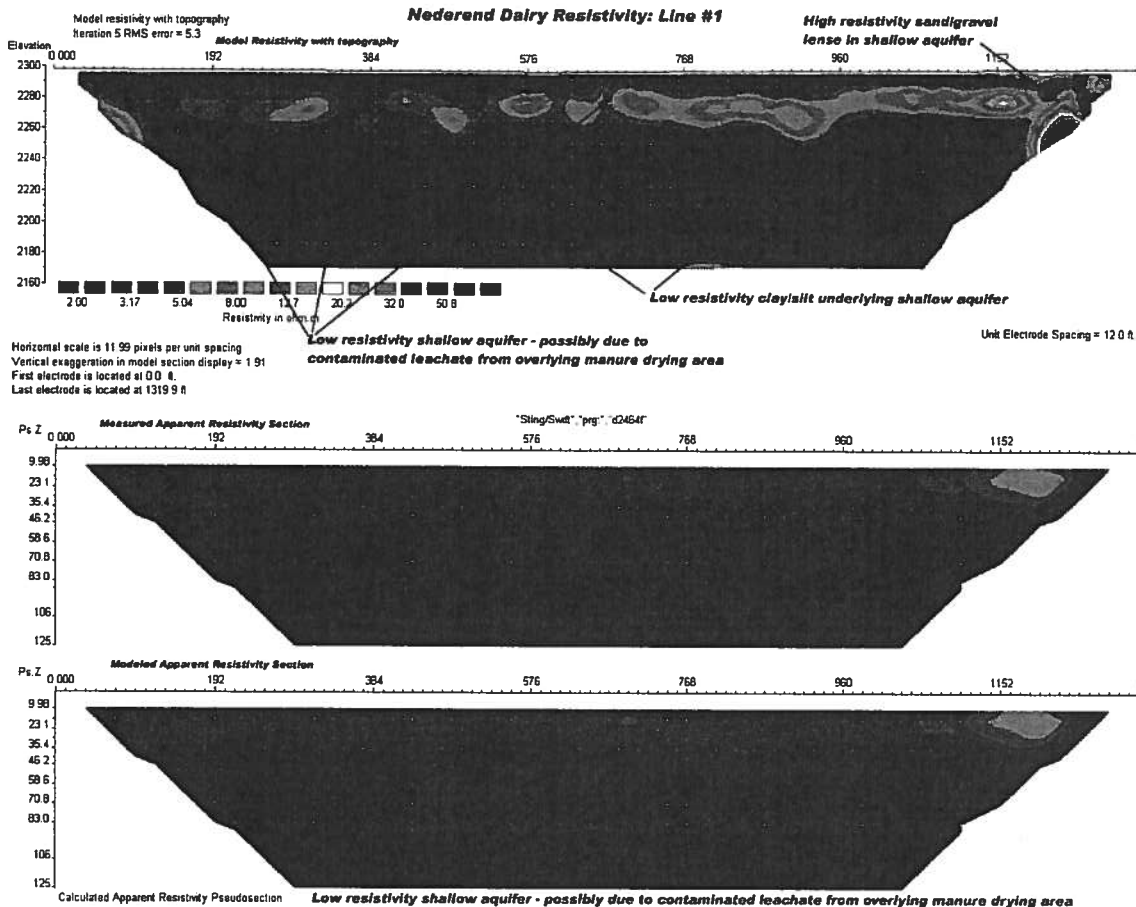
The lines were surveyed using a dipole-dipole array. The surveys were run using an Advanced Geosciences, Inc. STING R1 Earth Resistivity Meter and SWIFT Automatic Multi-Electrode System with 28 electrodes. The survey data were processed using a computer program, RES2DINV, which calculates a two-dimensional inverse resistivity model for the subsurface from the survey data and displays the data in resistivity cross-sections. The surveys were run using an electrode spacing of 24-feet.

Typical resistivity values for alluvium range from 10 to 800 ohm-meter (Loke, 2000). Clay has resistivity values that range from 1-100 ohm-meter (Loke, 2000). Fresh groundwater has resistivity values that range from 10 to 100 ohm-meter, depending on the concentration of dissolved salts.

Line #1

Line #1 was run across the south end of the manure drying area, within the manure drying area itself. The electrodes were driven through a thin layer of compressed manure and into the compacted native soil beneath the manure. When I pulled the electrodes out, they made a "Schluuurp" sound, suggesting that the shallow, near surface native soils beneath the site were nearly saturated with water. The contact resistivity measurements along Line #1 were very low, 74.23 ohm-m. This suggests that the water in the shallow, saturated zone just below the ground surface is fairly conductive. The RMS error for the model resistivity section is a low 5.3%.

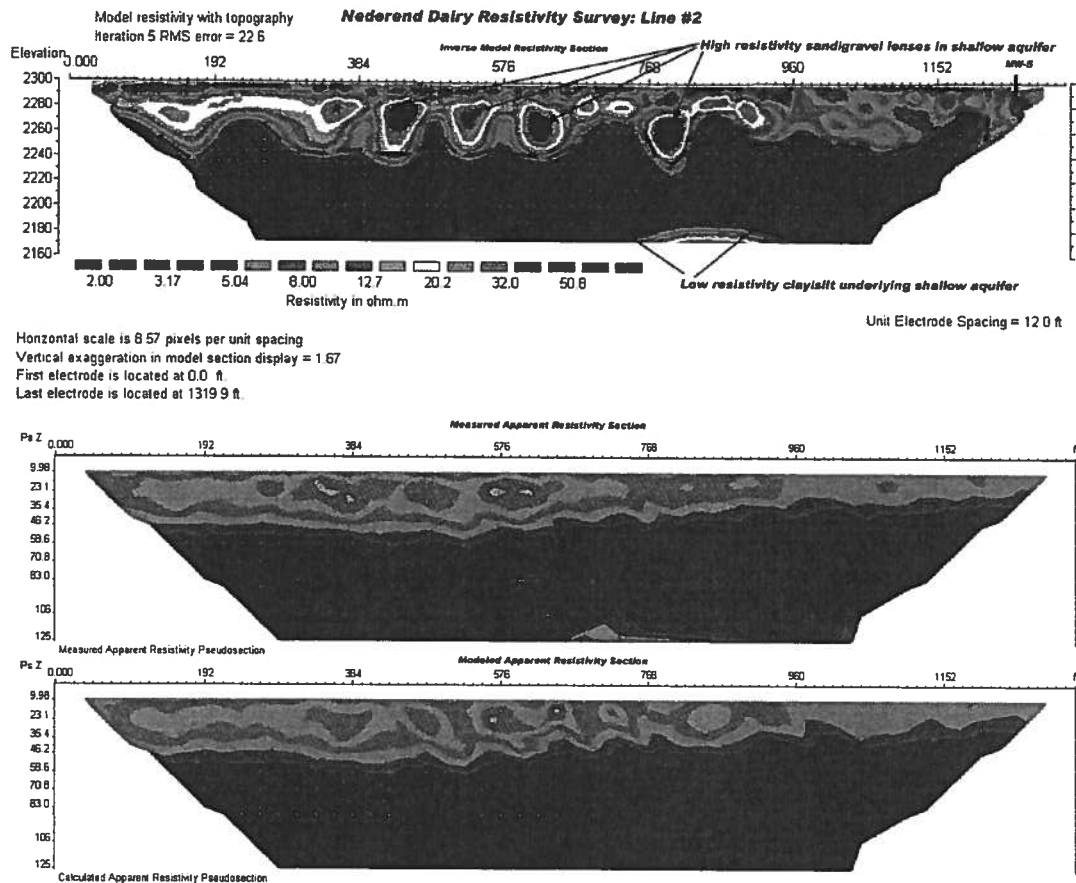
The modeled resistivity section shows very low resistivity sediments near the ground surface. Resistivity increases with depth to a depth of about 2260'. The higher resistivity sediments between elevation 2300' and ~2260' represent the shallow sand/gravel aquifer. Below ~2260' are low resistivity fine-grained silt-clay deposits. The higher resistivity area near the east end of the line may indicate the presence of coarse-grained sand/gravel.



Line #2

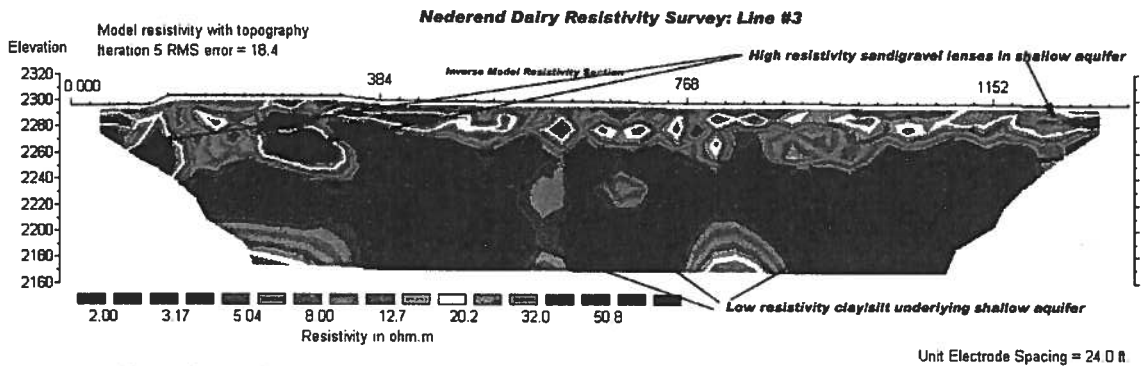
Line #2 was run at the north end of the manure drying area, along the north edge of the gravel road that runs between the drying area and the dredge tailings next to the drainage ditch. Contact resistances along line #2 were considerably higher than along line #1, 235.3 ohm-m. The near surface soils along line #2 were considerably drier than along line #1. Pulling the electrodes along line #2 didn't produce the "Schluuurp" sound that I heard along line #1. The RMS error for the model resistivity section is 22.6%.

The modeled resistivity section for line #2 shows low resistivity sediments near the surface. Higher resistivity sediments extend to a depth of ~2250'. Beneath ~2250' are low resistivity sediments. The higher resistivity sediments that are present from just below the ground surface to a depth of ~2250' are the shallow sand/gravel aquifer. The low resistivity sediments below ~2250' are the top of the finer-grained deeper aquifer.

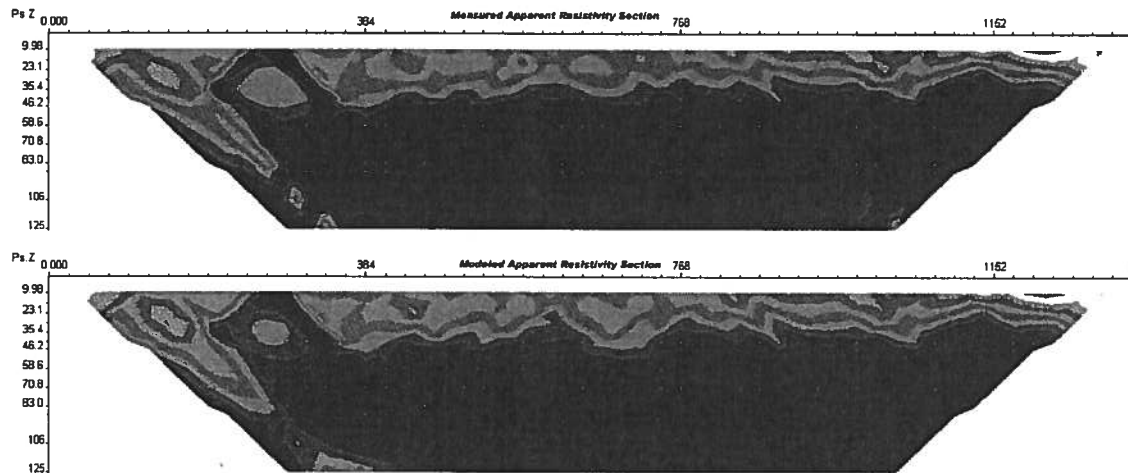


Line #3

Line #3 was run between the lagoons north of the manure drying area. Contact resistances along line #3 were 241.3 ohm-m. The RMS error for the model resistivity section is 18.4%. The modeled resistivity section for line #3 is similar to line #2. The shallow sand/gravel aquifer shows up as higher resistivity sediments. There appears to be more coarse-grained, high resistivity gravel deposits shown along this line. Monitor well MW-7 is located near the west end of the line. MW-7 encountered mostly coarse-grained sand and gravel. The line from ~96' to 384' goes over fill from construction of the lagoons. There is one area of very low resistivity at ~240'-288' that could represent low resistivity water escaping from the lagoon. There are also some higher resistivity areas showing up in the deeper aquifer.

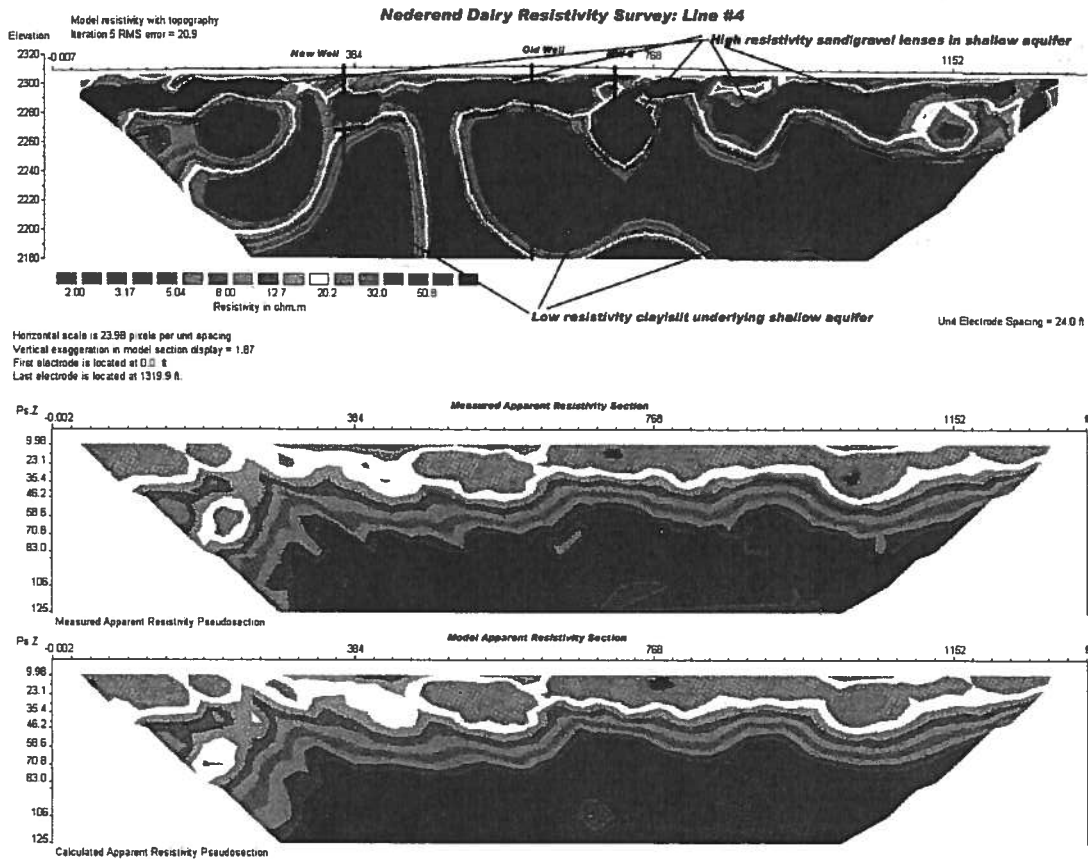


Horizontal scale is 17.15 pixels per unit spacing
Vertical exaggeration in model section display = 1.64
First electrode is located at 0.0 ft
Last electrode is located at 1319.9 ft



Line #4

Line #4 is located just north of Thompson Road, north of Dairy #2. The contact resistance along line #4 was 574.8 ohm-m. The RMS error for the model resistivity section is 20.9%. The model resistivity section for line #4 is more complicated than line #'s 1-3. The shallow sand/gravel aquifer is shown by the higher resistivity sediments present from the ground surface down to an elevation of approximately 2280'. There seems to be more sand/gravel in the shallow aquifer on line #4 than on lines 1-3. Higher resistivity materials also extend fairly deeply into the black-sand aquifer on this section. The shallow sand/gravel aquifer and the deeper black sand aquifer are both horizontal, sedimentary deposits; therefore I would expect that the general trend in the resistivity section would also be horizontal. A nearly vertical, higher resistivity feature occurs at ~480 feet on the resistivity section; possibly a fault. The higher resistivity feature that extend deeper into the section just west of the new well could be caused by a channel that was eroded more deeply into the Idaho Group by flood waters from the Bonneville Flood. Well MW-8 seems to be drilled into a coarse-grained lens of higher resistivity gravel.



Conclusions and Recommendations

There appears to be too much heterogeneity within the shallow aquifer to allow direct detection of contaminant plumes using resistivity imaging. Resistivity imaging does appear to be a suitable method for mapping coarse-grained sand/gravel deposits that act as preferential flow paths in the shallow aquifer.

My interpretation of the resistivity survey data shows coarse-grained sand-gravel lenses at the east end of line #1, in the middle portion of line #2, and at the west end of line #3. The presence of coarse-grained sands and gravels at the west end of line #3 is supported by the lithology at MW-7 where coarse-grained gravel was encountered from 5 to 29 feet below ground surface. However, the coarse-grained gravel encountered at MW-5 from 10 to 25 feet does not show up on resistivity line #2. The approximate location of the "channel" of coarse-grained gravel lenses is shown on the adjacent figure. The "channel" of coarse-grained sediments is more or less parallel with the flow direction of the flood waters that deposited the sands and gravels of the shallow aquifer.



The shallow subsurface beneath the manure drying area along line #1 was very wet, and also had very low resistivity. The low resistivity could be the result of the presence of groundwater with a high concentration of dissolved salts and/or compaction of the soil by heavy equipment. The nearly saturated conditions in the shallow subsurface beneath the manure drying area suggests that the hydraulic load being applied on the manure drying area from application of liquid manure and natural precipitation may exceed evaporation, resulting in water with a high concentration of dissolved salts recharging the shallow aquifer.

I recommend that we proceed with the next phase of the investigation of the manure drying area and wastewater lagoons by sampling ground water from the shallow aquifer using a Geoprobe. The approximate locations for sampling sites are shown on the adjacent figure by red squares. Some of the sample locations will target gravel lenses identified by the resistivity surveys. The remaining sample sites are located to collect ground water samples upgradient and downgradient of the lagoons, manure drying areas, and the field east of the lagoons. Water samples collected using the Geoprobe will be measured in the field for pH, temperature, TDS, conductivity, oxidation/reduction

February 7, 2006

potential (ORP), and dissolved oxygen using the YSI 556, and analyzed for nitrate by Alchem Laboratories, Inc.

If the Geoprobe and water quality sampling results show that the resistivity imaging method was successful in identifying coarse-grained sand/gravel deposits that act as preferential flow paths, I recommend applying the same techniques at Dairy #1's wastewater lagoons.

I also recommend soil sampling beneath the manure drying/composting area to determine the concentrations of nitrogen and phosphorous in soils, and conducting a water balance for the manure drying/composting area to determine if the hydraulic load from manure and precipitation exceeds the potential for evaporation.

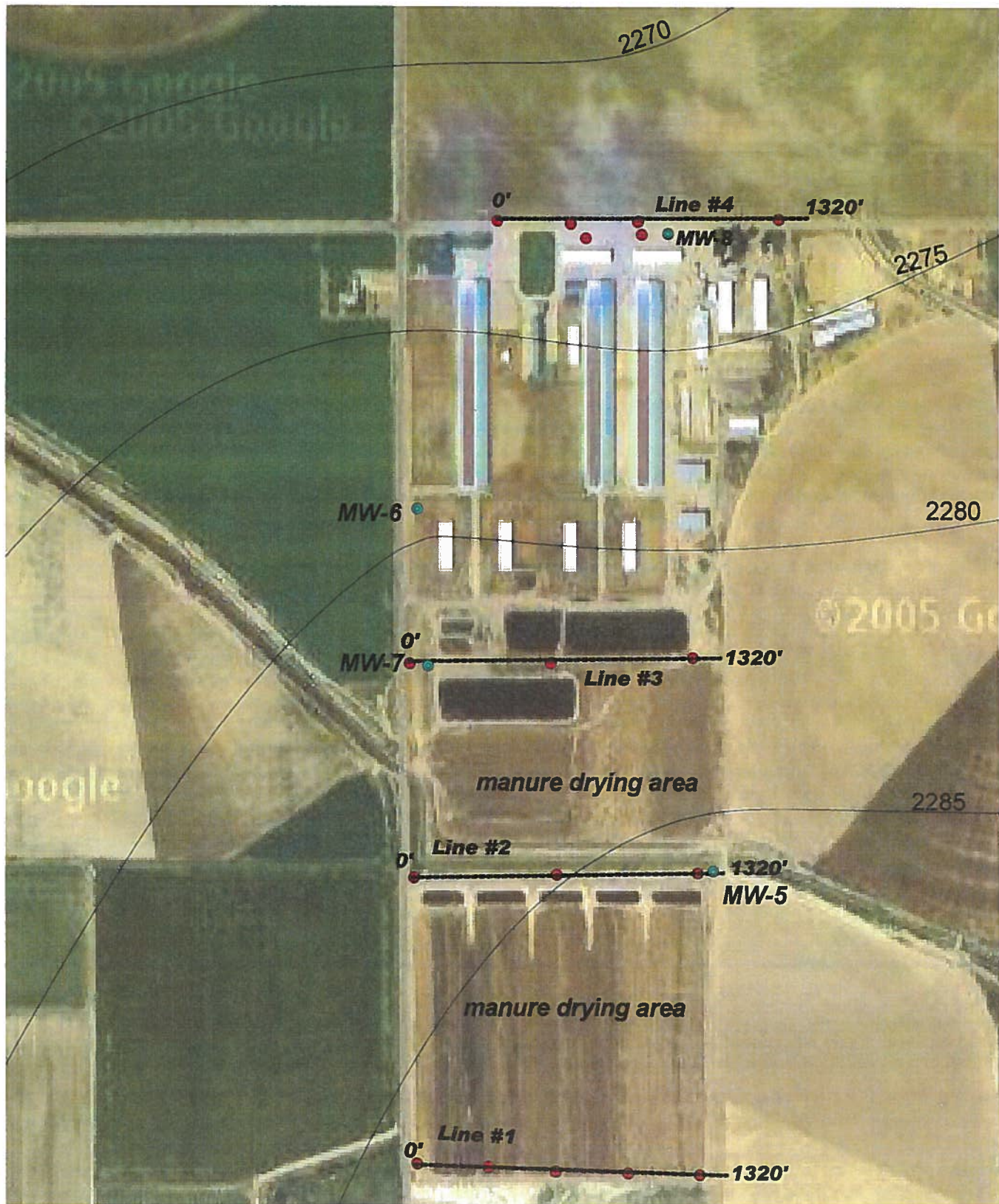
Sincerely,

John Monks, *P.G.*
Hydrogeologist
February 7, 2006

References:

Loke, M.H. 2000, Electrical Imaging Surveys for Environmental and Engineering Studies: A practical Guide to 2-D and 3-D surveys.

Nederend Dairy Resistivity Survey: Line Locations



600 0 600 1200 1800 2400 Feet



EXPLANATION

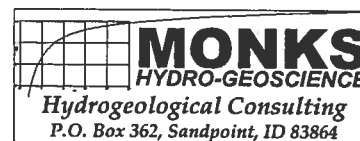
water table contour

Resistivity Lines

GPS'd Resistivity Points



10 April, 2006
Hans Nederend
Nederend Dairy
4998 Hogg Road
Homedale, ID 83628



RE: March 2006 water quality report

Dear Hans:

This letter reports water quality data collected at Nederend Dairies #1 and #2 on March 8, 2006. I measured depth to water and water quality parameters in all of the monitoring wells except Nederend Domestic, and sampled MW-2, MW-6, MW-7 and MW-8 for nitrate.

Water Quality

Water quality data from March 2006 is summarized in table 1. Field measured water quality parameters are summarized in Table 2.

Table 1. February 2006 Water Chemistry Analytical Results

Well name:	Date:	Chloride (mg/L):	Nitrate (mg/L):	Sulfate (mg/L):	Coliform Bacteria
Nederend Domestic	3/8/06	NS	NS	NS	NS
MW-1	3/8/06	NS	NS	NS	NS
MW-2	3/8/06	NS	38.1↑	NS	NS
MW-3	3/8/06	NS	NS	NS	NS
MW-4	3/8/06	NS	NS	NS	NS
MW-5	3/8/06	NS	NS	NS	NS
MW-6	3/8/06	NS	30.3↑	NS	NS
MW-7	3/8/06	NS	6.04↓	NS	NS
MW-8	3/8/06	NS	74.2↑	NS	NS

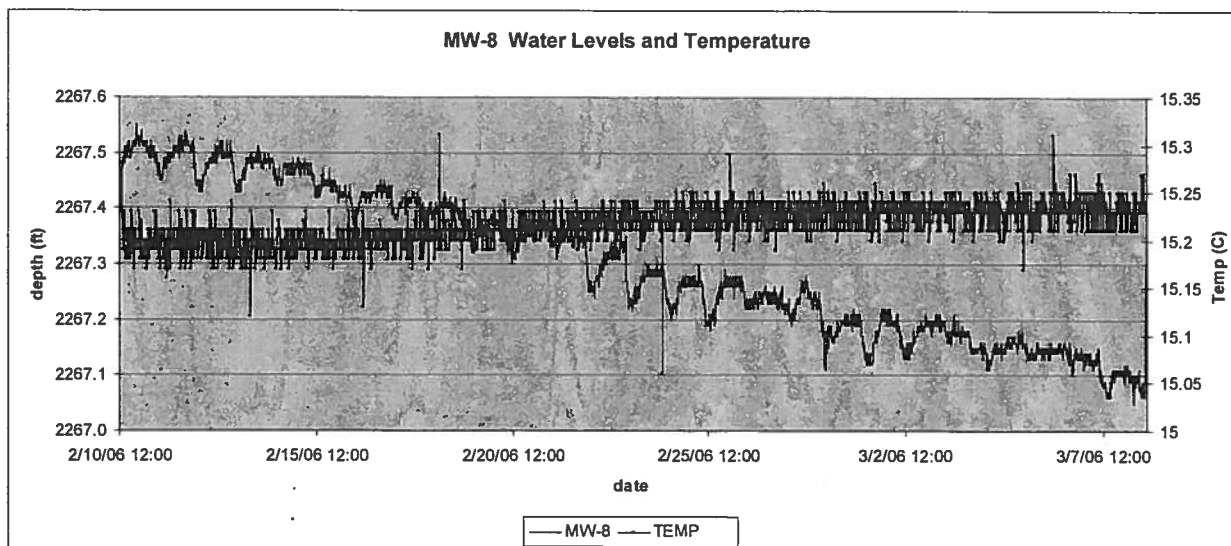
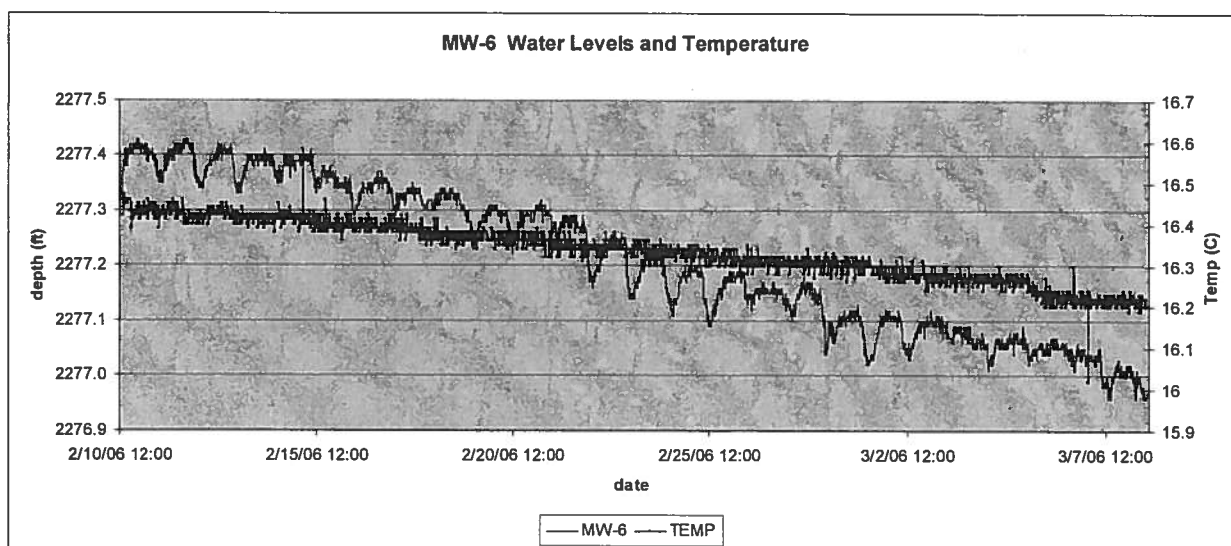
Table 2. February 2006 Field Measured Water Quality Parameters

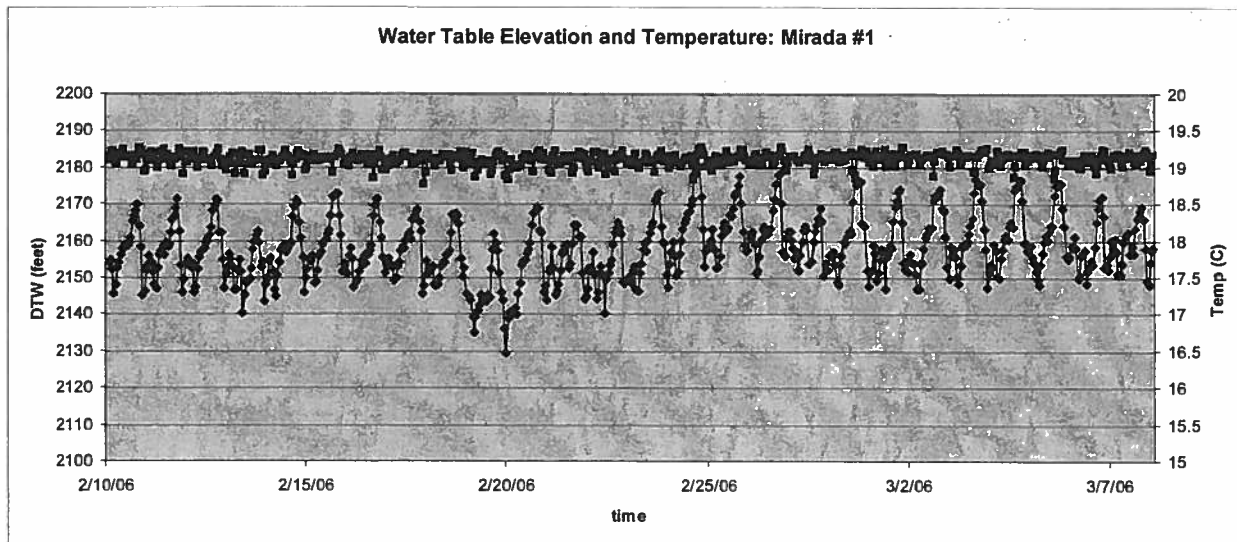
Well#	Temp C	SpCond (uS/cm)	DO Conc (mg/L)	pH	TDS (g/L)	ORP (mV)
MW-1	14.39↑	1276↑	0.82	7.35	829=	149
MW-2	14.7↑	1828↓	1.0	7.42	1188↓	137
MW-3	14.82↓	1663↑	0.37	7.37	1081↑	144
MW-4	13.35↓	1258↓	0.5	7.45	818↓	136
MW-5	13.02↑	1707↓	0.11	7.23	1109↓	141
MW-6	16.26↓	1208↑	0.62	7.41	785↑	135
MW-7	14.66↓	1085↓	0.04	7.14	705↓	149
MW-8	15.56↓	2183↑	0.02	7.25	1419↑	164
Drain1	11.13↑	1675↓	3.03	8.58	1089↓	133
Drain2	12.17↑	1583↓	3.22	8.71	1029↓	130
Drain3	11.79↑	1584↓	3.31	8.66	1030↓	140

Water Level Measurements

March depth to water measurements for the shallow aquifer wells are summarized in the table below. The water table at all of the wells went down.

Well Name:	Measuring point elevation:	Depth to Water:	Water Table Elevation:	Change from Previous month:
Nederend Domestic	2290.13	26.81	2263.32	-0.35
MW-1	2294.59	36.56	2258.03	-0.11
MW-2	2276.31	28.79	2247.52	-0.22
MW-3	2265.33	21.1	2244.23	-0.27
MW-4	2305.73	14.84	2290.89	-0.08
MW-5	2298.90	14.12	2284.78	-0.08
MW-6	2300.41	23.33	2277.08	-0.37
MW-7	2300.23	20.27	2279.96	-0.25
MW-8	~2306	38.97	2267.03	-0.44
ION shallow	~2303	19.91	2283.09	-0.22





Discussion

Nitrate levels went up at MW-2, MW-6 and MW-8 and down at MW-7. Specific Conductance and TDS went up at 3 wells and down at all of the other wells. Water temperature went up at MW-1 and MW-2 and MW-5 and down at all of the other wells. As predicted back in February, nitrate levels at MW-6 are spiking this spring.

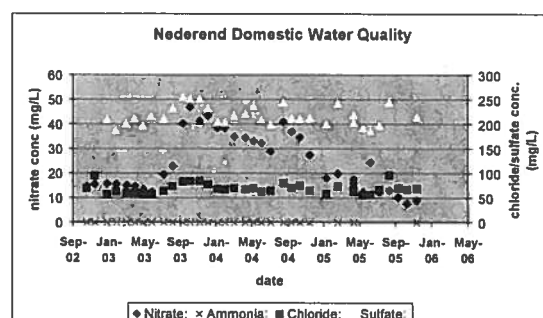
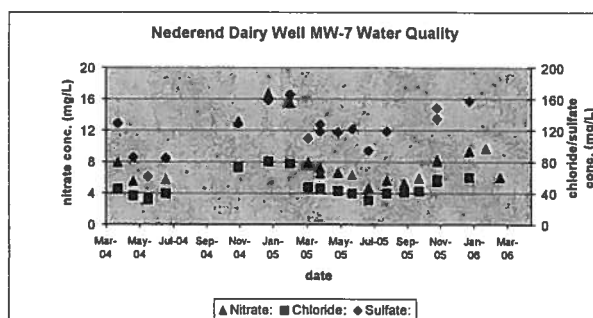
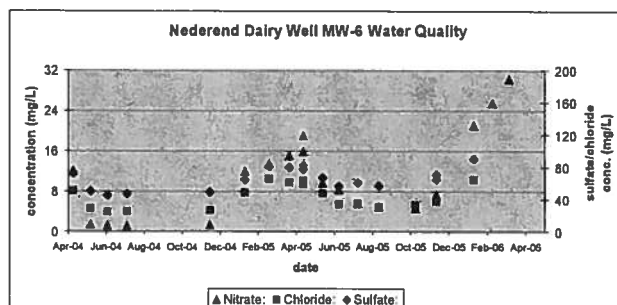
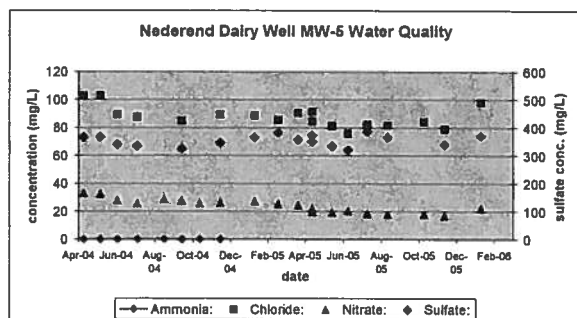
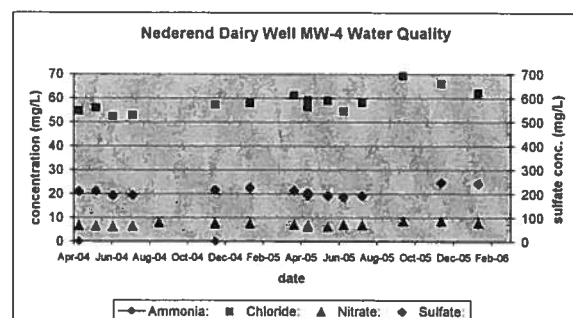
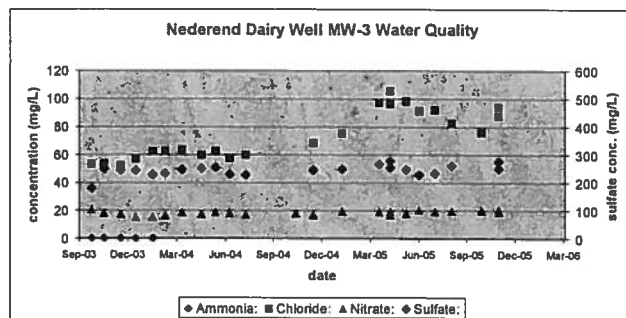
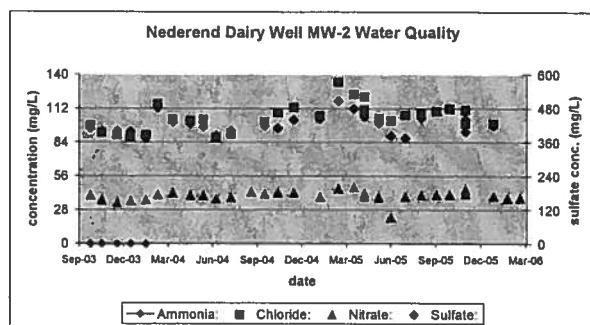
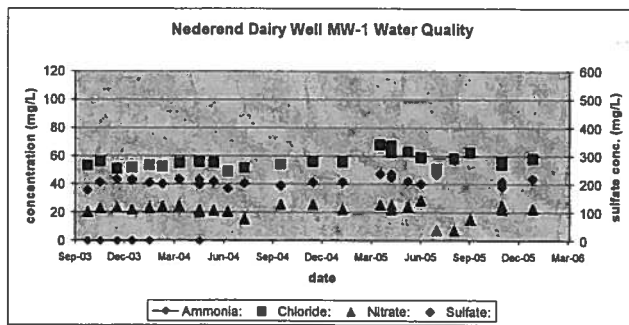
Water table elevations and temperature at MW-6, MW-8 and Mirada #1 are shown on the graphs above. The water table at MW-6 and MW-8 is continuing to go down. The water temperature at MW-6 continues to go down, while at MW-8 it continues to rise. Increasing the frequency of water level measurements at MW-6 and MW-8 has made the daily fluctuation picture much clearer. The water table in the shallow aquifer at MW-6 and MW-8 is responding to varying water levels in the deeper aquifer caused by pumping at Mirada #1.

The water level fluctuations at MW-6 and MW-8 in response to pumping at Mirada #1 are cause for concern. *The fluctuations suggest that there is a hydrologic connection between the two aquifers at Dairy #2.* I've reviewed water quality data from samples collected at Dairy #2's wells on November 1, 2005. The old well had 12.5 mg/L nitrate, while nitrate in the new well was below detection limits. This suggests that the old well is constructed similar to Nederend #2 and Nederend #3 at Dairy #1, and is drawing water from both aquifers. The new well appears to have successfully sealed out the shallow aquifer and to be drawing water only from the deeper aquifer.

Sincerely,

John Monks, P.G.
Hydrogeologist
April 10, 2006

Cc: Ilene Dobbin (COCOA)





Alchem Laboratories, Inc.

104 West 31st Street
Boise, Idaho 83714

Phone (208) 336-1172
FAX (208) 336-7124

Water, Waste Water
and Soil Analysis

LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-2 / PROJ: NEDEREND

DATE COLLECTED 03/08/2006
TIME COLLECTED 1320
DATE RECEIVED 03/08/2006
DATE REPORTED 03/29/2006
SUBMITTED : MONKS

LAB SAMPLE NUMBER - 2853

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	38.1	03/28/2006	MB

This report for the exclusive use of the client(s) to whom it is addressed. Its disclosure to others for use in advertising is not authorized. These results refer only to the specific sample tested and no interpretation is intended or implied.


Suzanne Myers, Laboratory Manager





Alchem Laboratories, Inc.

104 West 31st Street
Boise, Idaho 83714

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FAX (208) 336-7124

Water, Waste Water
and Soil Analysis

LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-6 / PROJ: NEDEREND

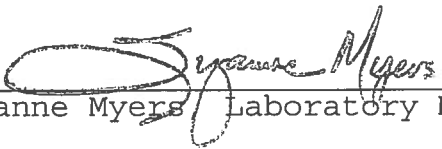
DATE COLLECTED 03/08/2006
TIME COLLECTED 1450
DATE RECEIVED 03/08/2006
DATE REPORTED 03/30/2006
SUBMITTED : MONKS

LAB SAMPLE NUMBER - 2854

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	30.3	03/27/2006	MB

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Suzanne Myers Laboratory Manager





Alchem Laboratories, Inc.

104 West 31st Street
Boise, Idaho 83714

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FAX (208) 336-7124

Water, Waste Water
and Soil Analysis

LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-7 / PROJ: NEDEREND

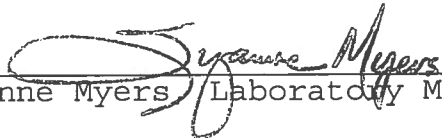
DATE COLLECTED 03/08/2006
TIME COLLECTED 1515
DATE RECEIVED 03/08/2006
DATE REPORTED 03/29/2006
SUBMITTED : MONKS

LAB SAMPLE NUMBER - 2855

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	6.04	03/28/2006	MB

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Suzanne Myers Laboratory Manager





**ALCHEM
LABORATORIES**

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104 West 31st Street
Boise, Idaho 83714

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FAX (208) 336-7124

*Water, Waste Water
and Soil Analysis*

LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-8 / PROJ: NEDEREND

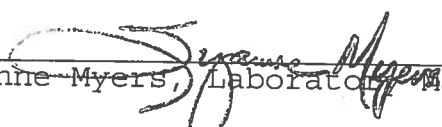
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TIME COLLECTED 1535
DATE RECEIVED 03/08/2006
DATE REPORTED 03/29/2006
SUBMITTED : MONKS

LAB SAMPLE NUMBER - 2856

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	74.2	03/28/2006	MB

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Suzanne Myers, Laboratory Manager



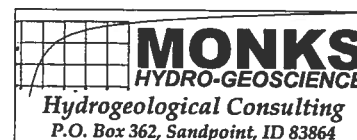
[illegible]

 **ALCHEM**
LABORATORIES

Alchem Laboratories, Inc.
104 West 31st Street
Boise, Idaho 83714
Phone (208) 336-1172

Relinquished By (Signature)	Date/Time	Received for Laboratory By (Signature)	Date/Time	Received With Seal Intact? Label Tag, COC Agree?
	3/8/14 17:05		3-8-14 17:05	☐ Yes ☐ No ☐ Yes ☐ No

17 May, 2006
Hans Nederend
Nederend Dairy
4998 Hogg Road
Homedale, ID 83628



RE: May 2006 water quality report

Dear Hans:

This letter reports water quality data collected at Nederend Dairies #1 and #2 on May 3, 2006. I measured depth to water and water quality parameters in all of the monitoring wells except Nederend Domestic. ISDA sampled Nederend Domestic and all of the monitoring wells. I will report on ISDA's water quality results when I receive them.

Water Quality

Water quality data from May 2006 is summarized in table 1. Field measured water quality parameters are summarized in Table 2.

Table 1. May 2006 Water Chemistry Analytical Results

Well name:	Date:	Chloride (mg/L):	Nitrate (mg/L):	Sulfate (mg/L):	Coliform Bacteria
Nederend Domestic	5/3/06	PENDING	PENDING	PENDING	PENDING
MW-1	5/3/06	PENDING	PENDING	PENDING	PENDING
MW-2	5/3/06	PENDING	PENDING	PENDING	PENDING
MW-3	5/3/06	PENDING	PENDING	PENDING	PENDING
MW-4	5/3/06	PENDING	PENDING	PENDING	PENDING
MW-5	5/3/06	PENDING	PENDING	PENDING	PENDING
MW-6	5/3/06	PENDING	PENDING	PENDING	PENDING
MW-7	5/3/06	PENDING	PENDING	PENDING	PENDING
MW-8	5/3/06	PENDING	PENDING	PENDING	PENDING

Table 2. May 2006 Field Measured Water Quality Parameters

Well#	Temp C	SpCond (uS/cm)	DO Conc (mg/L)	pH	TDS (g/L)	ORP (mV)
MW-1	14.24↓	1273↓	1.144	7.46	827↓	168
MW-2	14.97↑	1780↓	1.0	7.52	1157↓	147
MW-3	14.83↑	1683↑	0.34	7.45	1094↑	127
MW-4	13.33↓	1253↓	0.5	7.53	815↓	139
MW-5	12.98↓	1673↓	0.05	7.32	1087↓	154
MW-6	16.56↑	1064↓	0.61	7.52	695↓	133
MW-7	14.59↓	980↓	0.43	7.35	671↓	143
MW-8	15.96↑	2136↓	0.04	7.33	1388↓	88
Drain @HWY55	17.17↑	394↓	2.25	8.88	256↓	148
Drain @MW-4	17.37↑	400↓	2.18	8.89	260↓	148
Drain @Buntrock	17.54↑	400↓	2.14	8.88	260	165
Drain @Thompson	17.56	408	2.41	8.81	265	185
Drain @MW-2	17.35	416	2.21	8.85	271	168
Drain @Hogg Rd	16.30	481	2.13	8.66	312	190

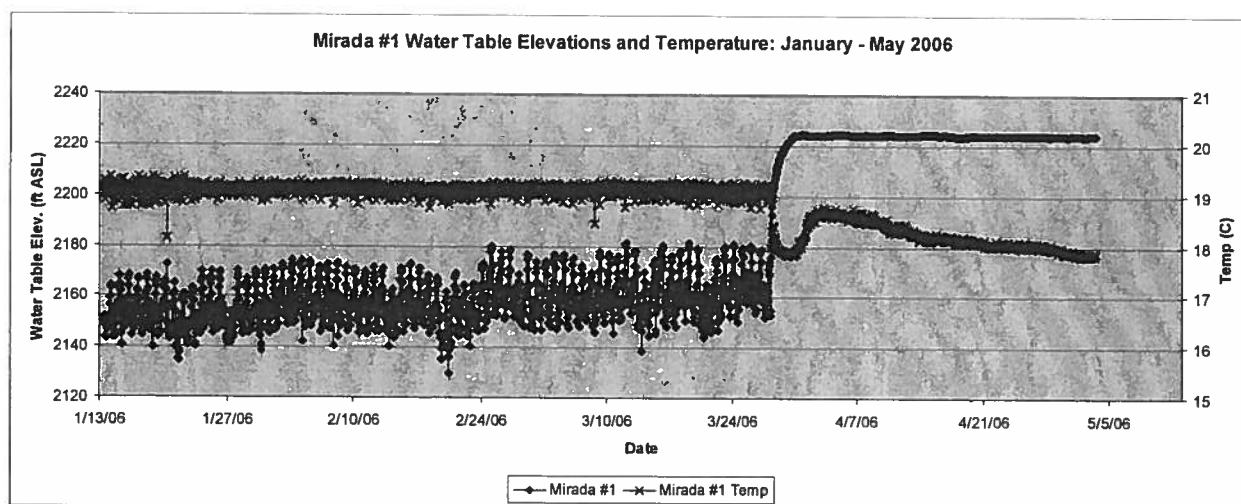
Water Level Measurements

March depth to water measurements for the shallow aquifer wells are summarized in the table below. The water table at MW-1 rose 4.62 feet in response to switching production from Nederend #2 to Nederend #3 at Dairy #1. At wells MW-4, MW-5, MW-6 and MW-7 the water table rose in response to the beginning of irrigation season and higher water levels in the drain. At MW-2 and MW-3 the water table went down, possibly in response to pumping at Nederend #3.

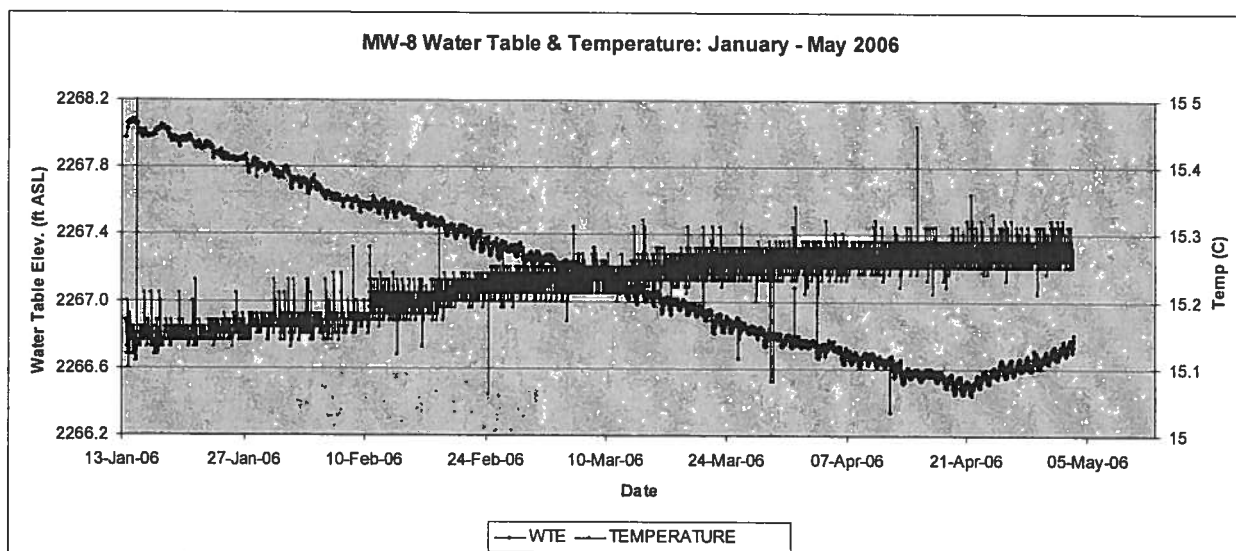
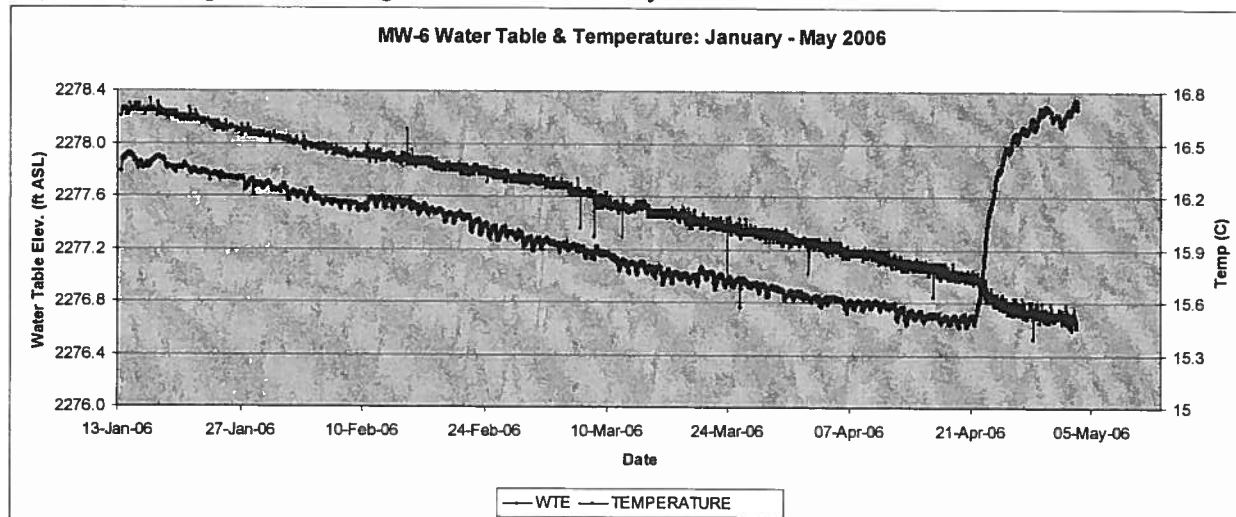
Well Name:	Measuring point elevation:	Depth to Water:	Water Table Elevation:	Change from Previous month:
Nederend Domestic	2290.13	27.66	2262.47	-0.85
MW-1	2294.59	31.94	2262.65	4.62
MW-2	2276.31	29.22	2247.09	-0.43
MW-3	2265.33	21.55	2243.78	-0.45
MW-4	2305.73	14.24	2291.49	0.60
MW-5	2298.90	13.04	2285.86	1.08
MW-6	2300.41	22.12	2278.29	1.21
MW-7	2300.23	19.34	2280.89	0.93
MW-8	~2306	39.3	2266.7	-0.33
ION shallow	~2303	20.13	2282.87	-0.22

Discussion

Water table elevations and temperature at MW-6, MW-8 and Mirada #1 are shown on the graphs below. Two events occurred that affected water levels in the shallow aquifer. On March 28th, production at Dairy #2 switched from the old well (Mirada #1) to the new well (Mirada #2). The water level in Mirada #1 recovered rapidly when the pump shut off, and has stabilized at ~58.5 feet below casing top. Water temperature decreased rapidly when the pump shut off, rose somewhat, and then began a slow, steady decrease. The rapid water level recovery and temperature fluctuations suggest that colder water from the shallow aquifer may be flowing into Mirada #1. The water level at Mirada #1 is ~20 feet lower than at MW-8, so water from the shallow aquifer may be flowing through Mirada #1 into the deeper aquifer.



The shallow aquifer at MW-6 and MW-8 does not appear to have responded to the switch from Mirada #1 to Mirada #2. The shallow aquifer did respond rapidly to the arrival of irrigation water in the drain. At MW-6, water levels rose rapidly, and water temperature fell as recharge from the drain arrived at the well on April 21st. At MW-8 water levels also began to rise beginning on April 21st, though not as dramatically as at MW-6.



The daily water level fluctuations at wells MW-6 and MW-8 were not affected by switching production wells at Dairy #2, indicating that other wells may also be affecting water levels in the shallow aquifer. This raises two questions: does the shallow aquifer fluctuate on a daily basis everywhere? And, are the daily fluctuations being caused by pumping at Nederend Dairy #1 and/or DeRuyter Dairy, where production wells are completed in both aquifers?

Field measured water quality parameters at wells MW-6 and MW-7 also reflect the arrival of irrigation water in the shallow aquifer. Specific conductivity and total dissolved solids at both wells went down from the March measurements.

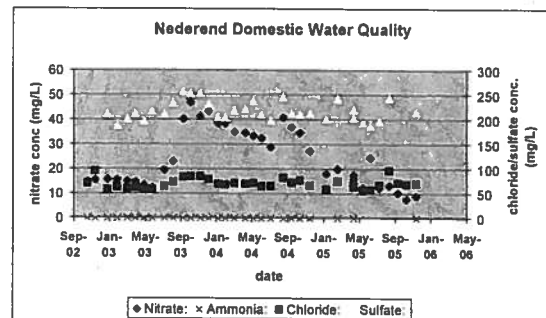
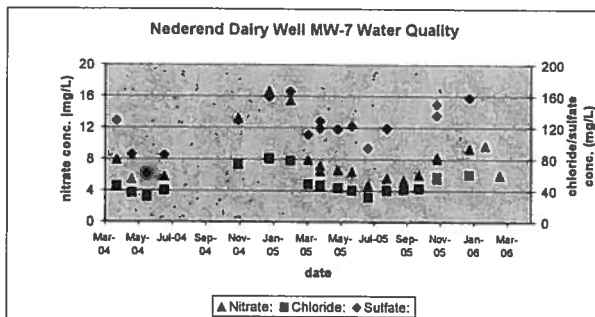
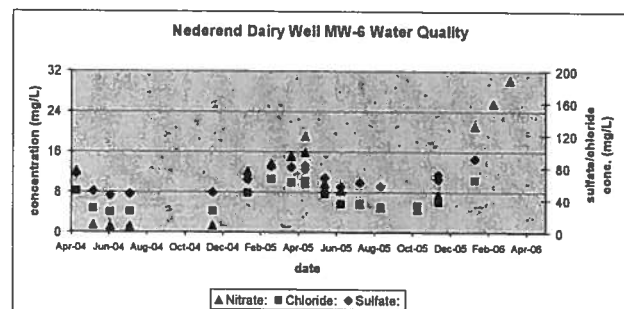
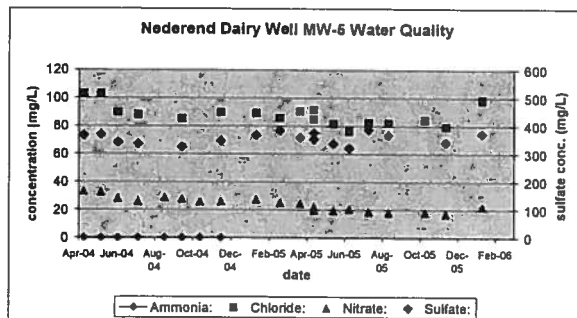
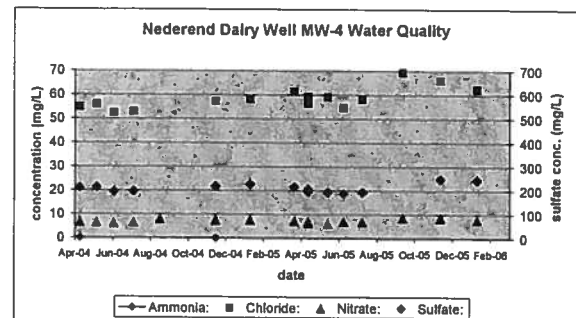
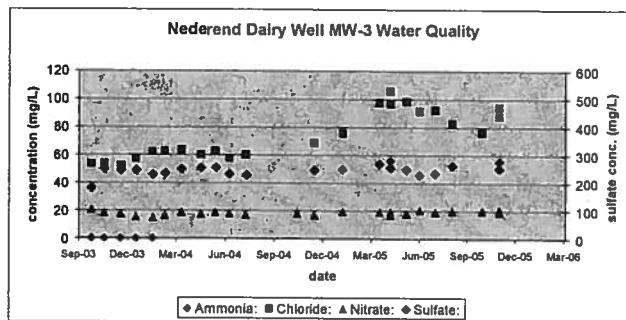
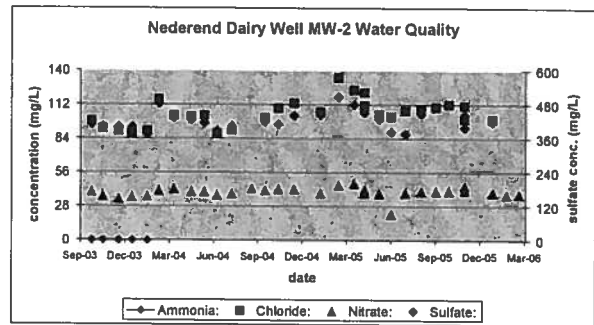
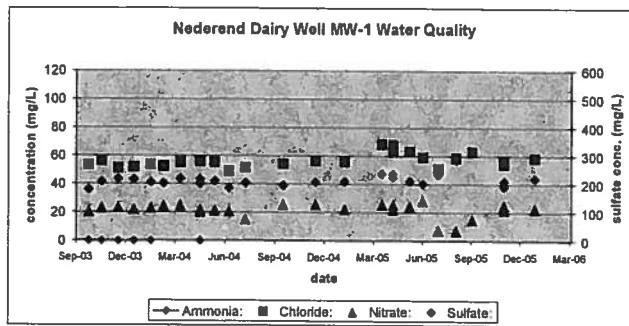
Water quality in the drain changed significantly from March. Specific conductance and TDS went down significantly, while temperature went up. Water temperature in the drain will probably go up throughout the summer due to direct heating from the sun.

I would like to get two more Levelloggers and move them around to different wells on a monthly basis to collect detailed water level data at various locations. Craig Tesch of ISDA reiterated the importance of keeping track of the timing of any changes/improvements at Dairy #2 that may affect water quality.

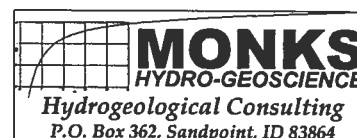
Sincerely,

John Monks, P.G.
Hydrogeologist
April 10, 2006

Cc: Ilene Dobbin (COCOA)



25 July, 2006
Hans Nederend
Nederend Dairy
4998 Hogg Road
Homedale, ID 83628



RE: June 2006 water quality report

Dear Hans:

This letter reports water quality data collected at Nederend Dairies #1 and #2 on June 21-23, 2006. I measured depth to water and water quality parameters in all of the monitoring wells except Nederend Domestic, and sampled MW-2, MW-6, MW-8, MW-9 and ION. Results from the PowerProbe sampling at Dairy #2 are also included.

Water Quality

Water quality data from May and June 2006 is summarized in table 1. Field measured water quality parameters from June 2006 are summarized in Table 2. I didn't measure water quality in the drain in June. The water flowing in the drain during irrigation season is predominantly irrigation water. I will resume drain water quality measurements when irrigation flow ends and water flow in the drain is related to ground water flow.

Field measured water quality parameters at most of the wells are remaining fairly constant from month to month. Water temperatures are going up at most of the wells. Exceptions are MW-4 and MW-7. Water temperatures in the drain are higher than at any of the monitoring wells. The temperature increases in the wells may be due to recharge from the drain.

Table 1. May/June 2006 Water Chemistry Analytical Results

Well name:	Date:	Chloride (mg/L):	Nitrate (mg/L):	Sulfate (mg/L):	Coliform Bacteria
Nederend Domestic	5/3/06		NS/NS		
MW-1	5/3/06		16/NS		
MW-2	5/3/06		37/37.2		
MW-3	5/3/06		22/NS		
MW-4	5/3/06		8.1/NS		
MW-5	5/3/06		15/NS		
MW-6	5/3/06		18/4.01		
MW-7	5/3/06		7.9/NS		
MW-8	5/3/06		67/69		
MW-9			NS/15.6		
ION			NS/8.28		

Table 2. June 2006 Field Measured Water Quality Parameters

Well#	Temp C	SpCond (uS/cm)	DO Conc (mg/L)	pH	TDS (g/L)	ORP (mV)
MW-1	14.78↑	1276	0.58	7.51	829	104
MW-2	15.19↑	1794	1.04	7.54	1166	93
MW-3	14.98↑	1506↓	0.5	7.51	1014	119
MW-4	13.26↓	1274	0.4	7.59	828	171
MW-5	13.48↑	1655	0.04	7.37	1076	89
MW-6	16.92↑	881	0.91	7.59	573	82
MW-7	14.51↓	991	0.17	7.45	644	62
MW-8	16.23↑	2207	-0.01	7.35	1435	61
MW-9	13.41	1731	0.32	7.41	1125	-143
ION	14.58	1569	0.29	7.49	1020	102

Water Level Measurements

June depth to water measurements for the shallow aquifer wells are summarized in the table below. The water table at MW-1 fell 6.6 feet in response to switching production from Nederend #3 back to Nederend #2. The water table rose in response to recharge from irrigation and higher water levels in the drain at all other wells except MW-5 and ION.

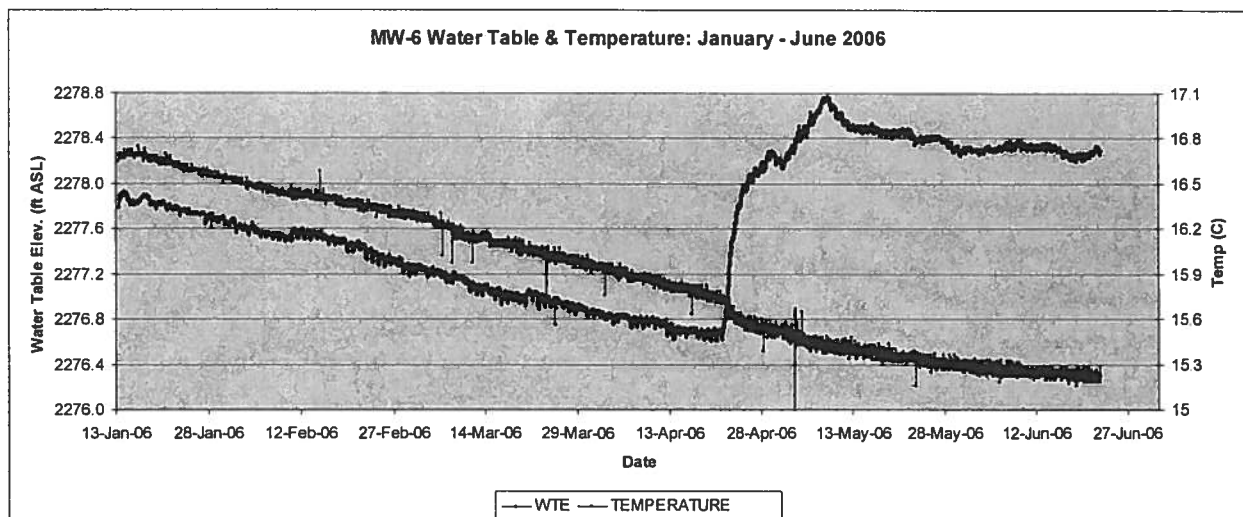
Well Name:	Measuring point elevation:	Depth to Water:	Water Table Elevation:	Change from Previous month:
Nederend Domestic	2290.13	NM	NM	NM
MW-1	2294.59	38.54	2256.05	-6.60
MW-2	2276.31	28.93	2247.38	0.29
MW-3	2265.33	21.34	2243.99	0.21
MW-4	2305.73	13.80	2291.93	0.44
MW-5	2298.90	13.10	2285.8	-0.06
MW-6	2300.41	22.05	2278.36	0.07
MW-7	2300.23	19.3	2280.93	0.04
MW-8	~2306	38.38	2267.62	0.92
MW-9	~2296	12.37	2283.63	NA
ION shallow	~2303	20.13	2282.87	-0.22

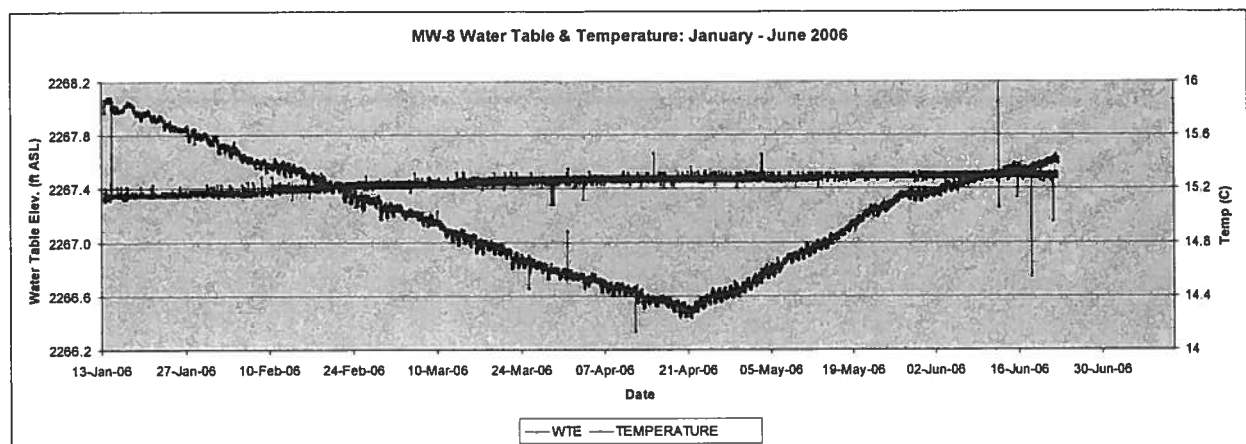
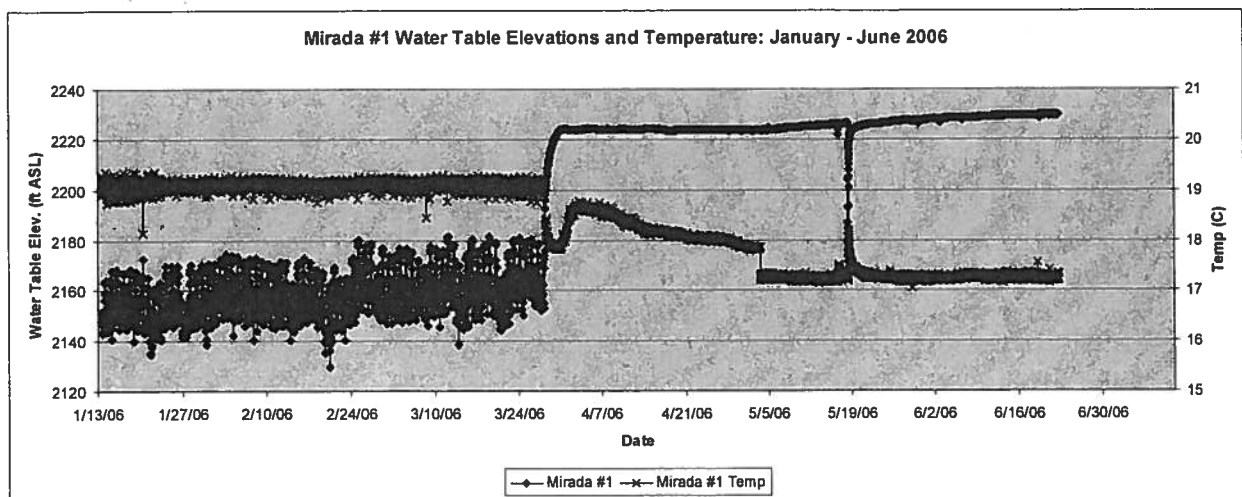
Discussion

Water table elevations and temperature at MW-6, MW-8 and Mirada #1 are shown on the graphs below. The water table at MW-6 rose to a peak level of 2278.79' on May 9, 2006 then fell ~0.5 feet over the next month. The water temperature decline occurring at MW-6 appears to have tapered off somewhat since then.

At MD-1 the water table is slowly rising and water temperature seems to have stabilized. Most of the water production at Dairy #2 has shifted to the new well. MD-1 ran for a short period of time May 18-19. The water table dropped and water temperature rose as warmer water from the deeper aquifer flowed into the well. The abrupt water temperature increase recorded at MD-1 is the result of raising the elevation of the Levellogger in the well.

At MW-8 the water table continues to slowly rise in response to irrigation and the gradual temperature increase seems to have leveled off.





PowerProbe Site Investigation Results

An investigation of potential sources for the high nitrate levels found at MW-8 was begun June 21-22, 2006. Thirteen sites were probed using Terragraphic's truck-mounted direct-push sampler. At four of the sites the sampler was not able to reach the water table due to difficult probing conditions caused by very coarse-grained gravel/cobbles. At the nine sites where we were able to sample water quality was measured using the YSI 556 water quality meter and nitrate levels were measured using an ion-specific colorimeter. Seven water samples were submitted to Alchem Laboratories and analyzed for nitrate.

The location of PowerProbe sample sites and Alchem lab nitrate results are shown on the attached map. The first five sample sites are located at the north end of the manure drying yard south of the drain. The stratigraphy at probe sites 1-5 generally consisted of ~3-5 feet of silty fill then ~5-10 feet of sand, then coarse gravel. Depth to water ranged from 12-13 feet below ground surface.

Nitrate levels at DP-1 were 9.29 mg/L. At DP-2, approximately 420 feet to the east, the nitrate level was 16.9 mg/L. At DP-3, approximately 200 feet east of DP-2 nitrate was 22.2 mg/L. At DP-4 and DP-5 water quality was measured with the YSI 556 and colorimeter but samples were not submitted to Alchem Labs.

DP-6 was located in the southeast corner of Field #19 to sample the upgradient side of the field. Depth to water at DP-6 was 14.3 feet. Nitrate at DP-6 was 31.7 mg/L. DP-7 was located on the downgradient side of field #19. The probe was unable to penetrate the coarse-grained gravel/cobble that was encountered at ~18 feet so no water sample was collected.

DP-8 and DP-9 were located in the manure drying yard. The stratigraphy at DP-8 was: 0-3' compacted silt, 3-10' sand and then wet gravel, 10-20 fine-grained clayey, wet at 20', 20-25 feet sand/gravel. Depth to water at DP-8 was ~20'. Nitrate at DP-8 was 10.3 mg/L. At DP-9 the stratigraphy consisted of 0-3' compacted silt, 3-10' sand & gravel, 8-14' wet clayey zone, 14-20 gravel. Depth to water at DP-9 was 11.9' and nitrates were 9.0 mg/L.

DP-10 was located at the base of the elevated lagoon, at the northern edge of the north manure drying area north. The stratigraphy at DP-10 was 0-5 compacted silt, 5-10 gravel & sand, 10-20 coarse gravel. Depth to water was 16' and nitrates were 19.5 mg/L.

PowerProbe YSI Water Quality Data						
Site # & nitrate conc:	Temp	SpCond (us/cm)	DO Conc (mg/L)	pH	TDS (mg/L)	ORP
DP-1 (9.29)	14.61	1208	0.86	7.51	800	102.47
DP-2 (16.9)	12.83	1769	0.63	7.40	1149	31.47
DP-3 (22.2)	13.22	1867	0.38	7.34	1200	45.03
DP-4 (NS)	14.64	1665	0.58	7.43	1100	31.25
DP-5 (NS)	14.95	1609	1.66	7.67	1030	-6.45
DP-6 (31.7)	15.20	1429	1.15	7.42	900	48.89
DP-8 (10.3)	21.37	1607	2.09	7.97	1045	278.28
DP-9 (9.0)	14.71	1552	0.71	7.46	1009	-25.97
DP-10 (19.5)	17.67	1737	0.57	7.28	1129	68.49

Analysis of Results

The results of the direct-push sampling suggest that the leachate collection ponds at the north end of the manure drying area are contributing to the nitrate contamination of the shallow aquifer. The manure drying area itself appears to be less of a contributor. The lowest nitrate levels in the shallow aquifer occur at MW-4 (8.1 mg/L) and the ION well (8.28 mg/L), both upgradient of the manure drying areas. At DP-9, in the middle of the manure drying area, nitrate levels are slightly higher, 9.0 mg/L. At DP-8, ~430 feet north of DP-9 and 140 feet south of the leachate pond, nitrate is slightly higher again at 10.3 mg/L.

On the north side of the leachate ponds nitrate levels are higher, especially at DP-2 (16.9 mg/L) and DP-3 (22.2 mg/L). The higher nitrate levels at DP-2 and DP-3 suggest that the

leachate ponds are affecting water quality more than the manure drying area. A new monitoring well (MW-9) was installed next to DP-3.

There were significant differences in water quality at DP-8 and DP-9. At DP-8 the water temperature, dissolved oxygen, and oxidation/reduction potential are all higher than at DP-9. At DP-9, the oxidation/reduction potential is negative. Depth to water at DP-8 was also much deeper, ~20 feet, compared to ~12 feet at DP-9. The stratigraphy at DP-8 and DP-9 is similar. At DP-8 there was a 10-foot thick lens of fine-grained, clayey silt present from 10 to 20 feet below ground surface, with a sand/gravel layer above it (from 3-10 feet below ground surface) and sand/gravel beneath it (20-25 feet below ground surface). At DP-9, the fine-grained, clayey silt layer is ~6 feet thick, again with sand/gravel layers above (3-8 feet below ground surface) and below (14-20 feet below ground surface).

Similar water temperature differences occur in the monitoring wells. At MW-6 water temperature in June was 16.92° C. The water temperature at MW-8 is also warmer: 16.23° C. At wells MW-4, MW-5 and MW-9 (all adjacent to the drain, water temperatures are cooler, ~13.4° C. As of now, I don't have an adequate explanation for the temperature differences that we are seeing in the shallow aquifer.

The highest nitrate level (31.7 mg/L) found during the site investigation occurs at DP-6, in the southeast corner of Field #19. Possible dairy-related sources for the high nitrates at DP-6 are Field #19 and the center-pivot irrigated field to the south. Water level measurements show that ground water flow in the area is from southeast to northwest. If the ground water flow direction at DP-6 is southeast to northwest, then it's unlikely that Field #19 or the center-pivot irrigated field to the south are the source of the high nitrate at DP-6. Possible upgradient, non-dairy related sources of nutrients are the fields to the southeast and household wastewater from drainfields or leaking sewer pipes in Marsing.

Additional Site Investigation Work

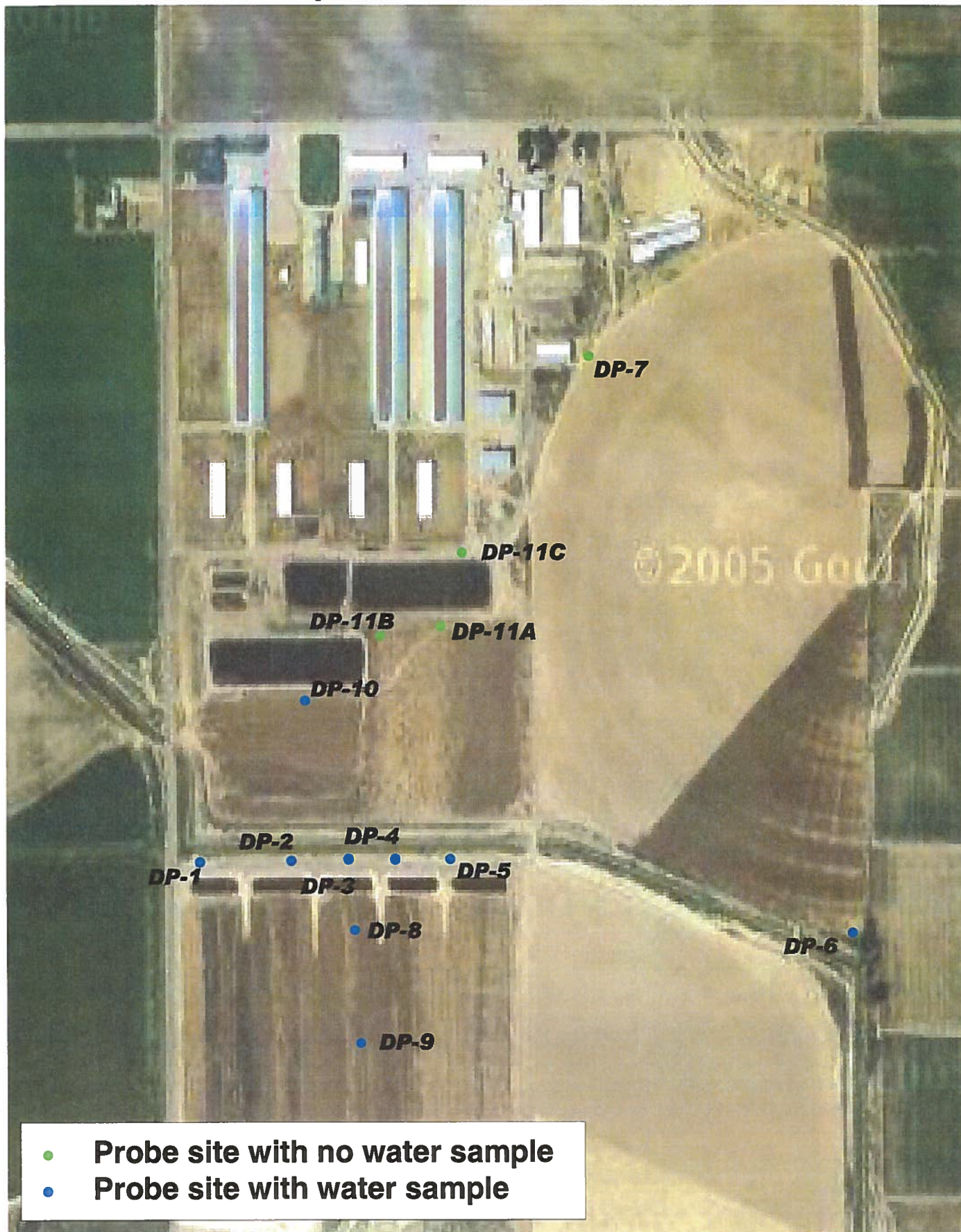
The coarse-grained gravels and cobbles encountered near Dairy #2's lagoons and along the northwest side of Field #19 prevented the water sampling tool from reaching ground water. Therefore, we still don't have any water quality data from directly down-gradient of the lagoons or Field #19. We identified three sites for new monitoring wells, two down-gradient of the lagoons, and one down-gradient of Field #19. I have contacted Terragraphics about getting on their schedule the next time they have work in southwest Idaho. They expect to be working down that way the first week of August and should be able to install the new wells then.

Sincerely,

John Monks, P.G.
Hydrogeologist
July 26, 2006

Cc: Ilene Dobbin (COCOA), Craig Tesch (ISDA)

PowerProbe Sample Locations



NAME	Monks Hwy 30-Cressene		
ATTENTION	John Monks		
ADDRESS	PO BOX 362		
CITY	San Pedro	STATE	CA
		ZIP CODE	90586
PHONE #	208-263-1991		
FAX #			
SAMPLER(S)	Monks		
PROJECT OR SITE	Monks Hwy 30-Cressene		
P.N. / P.O. NUMBER			

Chain of Custody Form

LAB NUMBER	DATE	TIME	SAMPLE IDENTIFICATION
66622	6-22-86	1525	MW-8
66623	"	1500	MW-6
66624	"	1628	MW-2
66625	6-23-86	0825	ION
66626	"	0935	MW-9

RELINQUISHED BY (Signature)		DATE
Relinquished By (Signature)	Date/Time	Received for Lat
	6/23/04 11:52	7



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Boise, Idaho 83714
Phone (208) 336-1172

[illegible]

RECEIVED BY (Signature)

TIME

DATE _____

RELINQUISHED BY (Signature)

Relinquished By (Signature) .

Date/Time

Received for Laboratory By (Signature)

Date/Time

Received With Seal Intact?
Label Tag, COC Agree?

☐ Yes ☐ No

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LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-8 / PROJ: NEDEREND

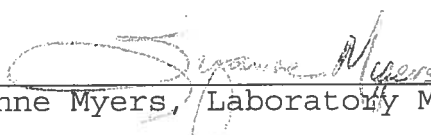
DATE COLLECTED 06/22/2006
TIME COLLECTED 15:25
DATE RECEIVED 06/23/2006
DATE REPORTED 07/17/2006
SUBMITTED :

LAB SAMPLE NUMBER - 6622

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	69.0	07/14/2006	TK

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Suzanne Myers, Laboratory Manager





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PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-6 / PROJ: NEDEREND

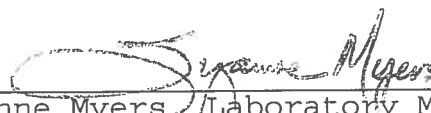
DATE COLLECTED 06/22/2006
TIME COLLECTED 15:00
DATE RECEIVED 06/23/2006
DATE REPORTED 07/14/2006
SUBMITTED :

LAB SAMPLE NUMBER - 6623

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	4.01	07/13/2006	TK

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PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-2 / PROJ: NEDEREND

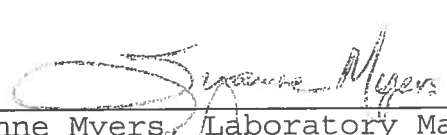
DATE COLLECTED 06/22/2006
TIME COLLECTED 16:28
DATE RECEIVED 06/23/2006
DATE REPORTED 07/17/2006
SUBMITTED :

LAB SAMPLE NUMBER - 6624

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	37.2	07/14/2006	TK

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SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: ION / PROJ: NEDEREND

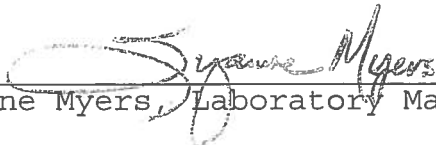
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TIME COLLECTED 08:25
DATE RECEIVED 06/23/2006
DATE REPORTED 07/14/2006
SUBMITTED :

LAB SAMPLE NUMBER - 6625

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	8.28	07/13/2006	TK

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PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-9 / PROJ: NEDEREND

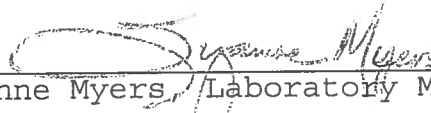
DATE COLLECTED 06/23/2006
TIME COLLECTED 09:35
DATE RECEIVED 06/23/2006
DATE REPORTED 07/17/2006
SUBMITTED :

LAB SAMPLE NUMBER - 6626

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
AMMONIA as N	0.07	07/12/2006	MB
NITRATE as N	15.6	07/14/2006	TK

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Suzanne Myers, Laboratory Manager



NAME Monks Hydro-Geoscience	
ATTENTION Tom Monks	
ADDRESS PO Box 362	
CITY Sandpoint	STATE ID
PHONE # 208-263-1961	FAX # 8384
SAMPLER(S) Monks	
PROJECT OR SITE Dary #2	P.N. / P.O. NUMBER

Chain of Custody Form

LAB NUMBER	DATE	TIME	SAMPLE IDENTIFICATION	WATER	SOIL	OTHER	TPH - (418.1 / 8015M)	BTEX (602 / 8020 / 8260) (+N +M)	CL. SOLVENTS (601 / 8010)	VOC's (601-602 / 8021)	GC-MS VOC's (624 / 8260)	PAH's (8270)	PHENOLS (604 / 8040 / 8270)	PESTICIDES (608 / 8081 / 8270)	PCB's (608 / 8081)	SEMI-VOLATILES (625 / 8270)	TCLP-(DESIGNATE	8 RCRA METALS	RBCA - NO LEAD GAS BTEX+N+M (8020 / 8260)	RBCA - LEADED GAS EDB (8011) BTEX+N+M, EDC (8021 / 8260)	RBCA - FUEL OILS BTEX (8020 / 8260), PAH (8270)	RBCA - MOTOR OILS BTEX (8020 / 8260), PAH (8270) CL. SOLVENTS (8010)	SEE ATTACHED LIST	NUMBER OF CONTAINERS
6615	6-21-06	1305	DP-1	X																				1
6616	11	1346	DP-2	X																				1
6617	11	1415	DP-3	X																				1
6618	11	1635	DP-6	X																				1
6619	6-22-06	0945	DP-8	X																				
6620	11	1646	DP-9	X																				
6621	11	1150	DP-10	X																				

RELINQUISHED BY (Signature)

DATE

TIME

RECEIVED BY (Signature)

Relinquished By (Signature)

Date/Time

Received for Laboratory By (Signature)

Date/Time

 Received With Seal Intact? ☐ Yes ☐ No
 Label Tag, COC Agree? ☒ Yes ☐ No

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SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: DP-1 / WATER / PROJ: DAIRY #2

DATE COLLECTED 06/21/2006
TIME COLLECTED 13:05
DATE RECEIVED 06/23/2006
DATE REPORTED 07/14/2006
SUBMITTED : MONKS

LAB SAMPLE NUMBER - 6615

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	9.29	07/13/2006	TK

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Suzanne Myers, Laboratory Manager





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PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 06/21/2006
TIME COLLECTED 13:40
DATE RECEIVED 06/23/2006
DATE REPORTED 07/14/2006
SUBMITTED : MONKS

ATTENTION: JOHN MONKS
SOURCE -: DP-2 / WATER / PROJ: DAIRY #2

LAB SAMPLE NUMBER - 6616

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	16.9	07/13/2006	TK

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ATTENTION: JOHN MONKS
SOURCE -: DP-3 / WATER / PROJ: DAIRY #2

DATE COLLECTED 06/21/2006
TIME COLLECTED 14:15
DATE RECEIVED 06/23/2006
DATE REPORTED 07/14/2006
SUBMITTED : MONKS

LAB SAMPLE NUMBER - 6617

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	22.2	07/13/2006	TK

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DATE COLLECTED 06/21/2006
TIME COLLECTED 16:35
DATE RECEIVED 06/23/2006
DATE REPORTED 07/17/2006
SUBMITTED : MONKS

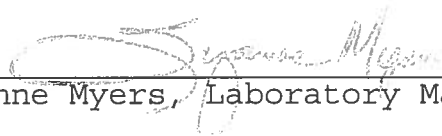
ATTENTION: JOHN MONKS
SOURCE -: DP-6 / WATER / PROJ: DAIRY #2

LAB SAMPLE NUMBER - 6618

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	31.7	07/14/2006	TK

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Suzanne Myers, Laboratory Manager





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HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 06/22/2006
TIME COLLECTED 09:45
DATE RECEIVED 06/23/2006
DATE REPORTED 07/14/2006
SUBMITTED : MONKS

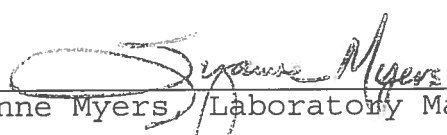
ATTENTION: JOHN MONKS
SOURCE -: DP-8 / WATER / PROJ: DAIRY #2

LAB SAMPLE NUMBER - 6619

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	10.3	07/13/2006	TK

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Suzanne Myers Laboratory Manager





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Water, Waste Water
and Soil Analysis

LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 06/22/2006
TIME COLLECTED 10:46
DATE RECEIVED 06/23/2006
DATE REPORTED 07/14/2006
SUBMITTED : MONKS

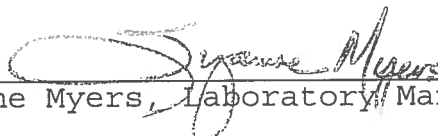
ATTENTION: JOHN MONKS
SOURCE -: DP-9 / WATER / PROJ: DAIRY #2

LAB SAMPLE NUMBER - 6620

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	9.00	07/13/2006	TK

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Suzanne Myers, Laboratory Manager





Alchem Laboratories, Inc.

104 West 31st Street
Boise, Idaho 83714

Phone (208) 336-1172
FAX (208) 336-7124

*Water, Waste Water
and Soil Analysis*

LABORATORY REPORT

HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 06/22/2006
TIME COLLECTED 11:50
DATE RECEIVED 06/23/2006
DATE REPORTED 07/14/2006
SUBMITTED : MONKS

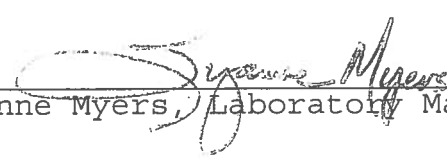
ATTENTION: JOHN MONKS
SOURCE -: DP-10 / WATER / PROJ: DAIRY #2

LAB SAMPLE NUMBER - 6621

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

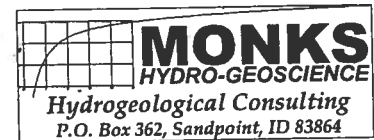
ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	19.5	07/13/2006	TK

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Suzanne Myers, Laboratory Manager



7 September, 2006
Hans Nederend
Nederend Dairy
4998 Hogg Road
Homedale, ID 83628



RE: August 2006 water quality report

Dear Hans:

This letter reports water quality data collected at Nederend Dairies #1 and #2 on August 3, 2006. I measured depth to water and water quality parameters in all of the monitoring wells except Nederend Domestic, and sampled all of the monitoring wells and had the samples analyzed for nitrate, chloride and sulfate.

Water Quality

Water quality data from August is summarized in table 1. Field measured water quality parameters from August 2006 are summarized in Table 2. I didn't measure water quality in the drain in June. The water flowing in the drain during irrigation season is predominantly irrigation water. I will resume drain water quality measurements when irrigation flow ends and water flow in the drain is related to ground water flow.

Field measured water quality parameters at most of the wells are remaining fairly constant from month to month. Water temperatures are going up at most of the wells. Exceptions are MW-4 and MW-7. Water temperatures in the drain are higher than at any of the monitoring wells. The temperature increases in the wells may be due to recharge from the drain.

Table 1. August 2006 Water Chemistry Analytical Results

Well name:	Date:	Chloride (mg/L):	Nitrate (mg/L):	Sulfate (mg/L):	Coliform Bacteria
Nederend Domestic	8/3/06				NA
MW-1	8/3/06	52.3	17.1	183	NA
MW-2	8/3/06	91.5	35.1	371	NA
MW-3	8/3/06	74.8	21.5	247	NA
MW-4	8/3/06	61.3	8.52	212	NA
MW-5	8/3/06	68.9	13.3	327	NA
MW-6	8/3/06	48.4	10.6	65.5	NA
MW-7	8/3/06	39.7	9.27	113	NA
MW-8	8/3/06	169	68.3	233	NA
MW-9	8/3/06	77.5	13.4	324	NA
ION					

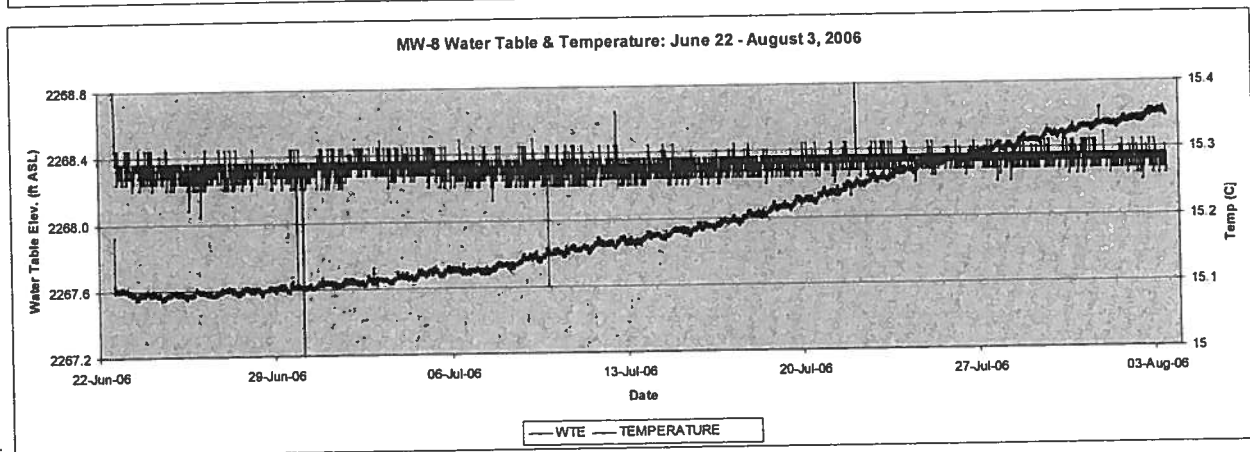
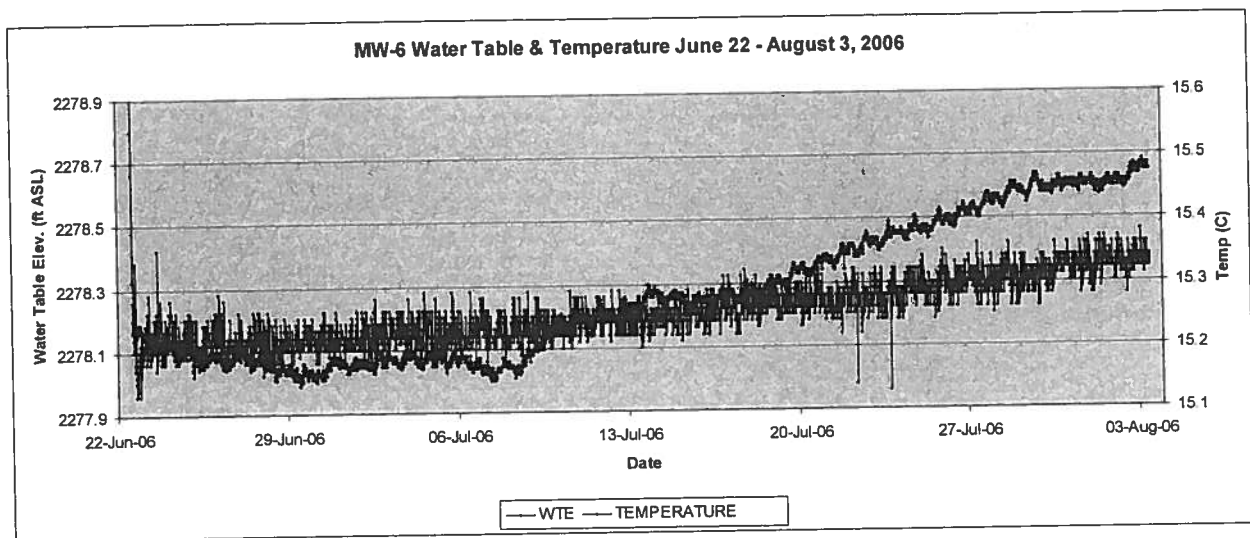
Table 2. August 2006 Field Measured Water Quality Parameters

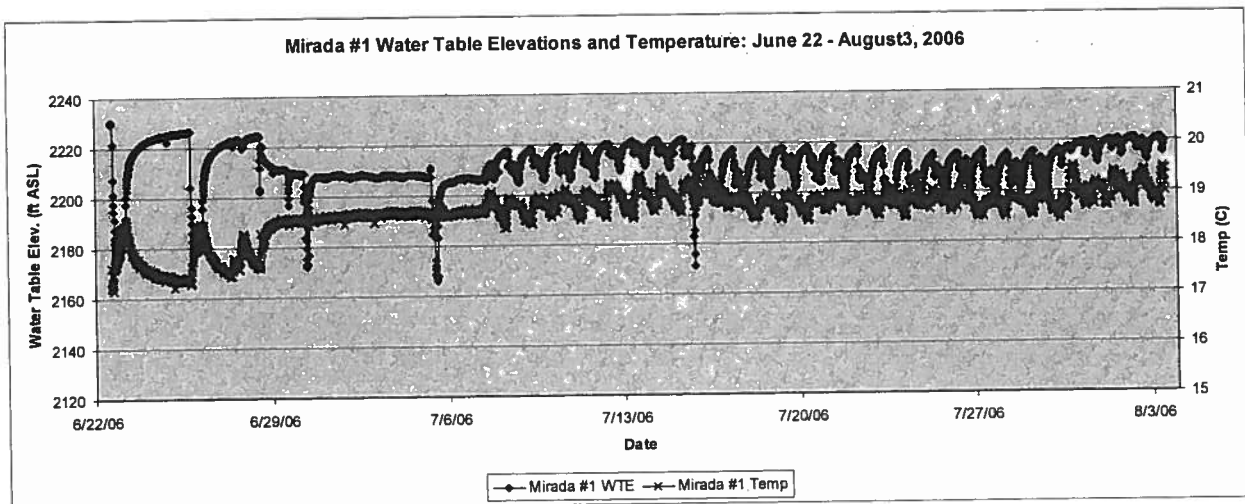
Well#	Temp C	SpCond (uS/cm)	DO Conc (mg/L)	pH	TDS (g/L)	ORP (mV)
MW-1	14.682	1196.238	0.836	7.593	777.555	196.962
MW-2	15.071	1808.926	0.831	7.622	1175.799	173.611
MW-3	14.90	1535.47	0.37	7.88	998.06	163.60
MW-4	13.57	1299.48	0.38	7.64	844.66	160.38
MW-5	14.20	1627.29	0.20	7.43	1057.73	169.68
MW-6	16.89	881.85	0.91	7.71	573.20	139.54
MW-7	14.88	950.27	0.01	7.50	617.67	152.08
MW-8	16.22	2223.81	0.00	7.43	1445.47	146.08
MW-9	14.394	1696.086	0.324	7.414	1102.457	139.464
ION						

Water Level Measurements

August depth to water measurements for the shallow aquifer wells are summarized in the table below. The water table rose in response to recharge from irrigation and higher water levels in the drain at all wells except MW-2. The water table at MW-2 may have declined due to pumping at Nederend #3.

Well Name:	Measuring point elevation:	Depth to Water:	Water Table Elevation:	Change from Previous month:
Nederend Domestic	2290.13	25.47	2264.66	2.19
MW-1	2294.59	37.77	2256.82	0.77
MW-2	2276.31	29.08	2247.23	-0.15
MW-3	2265.33	20.99	2244.34	0.35
MW-4	2305.73	13.6	2292.13	0.20
MW-5	2298.90	12.92	2285.98	0.18
MW-6	2300.41	21.48	2278.93	0.57
MW-7	2300.23	18.97	2281.26	0.33
MW-8	~2306	37.28	2268.72	1.10
MW-9	~2296	12.21	2283.79	0.16
ION shallow	~2303			





Water table elevations and temperature at MW-6, MW-8 and Mirada #1 are shown on the graphs above. The water table at MW-6 fluctuated up and down during late June and early July and then began to rise steadily. The water temperature at MW-6 is steadily increasing.

At MD-1 the water table is responding to variable production rates. Around July 8th the well was apparently put back into production, probably in concert with the new well. The daily water level fluctuations are smaller than the fluctuations that occurred earlier in the year when the well was providing all of the production. Water level and water temperature continue to show a relationship where the coldest temperatures are associated with higher water levels.

At MW-8 the water table continues to rise in response to irrigation and the temperature has remained fairly constant.

Discussion

Sulfate and chloride levels have not changed significantly at any of the wells. I was unable to sample Nederend Domestic, the pump just doesn't seem to work any more. I'd like to get Nederend Domestic setup so that we can begin water quality monitoring there again. It would be nice to eliminate the two large pressure tanks from the well and just have the well turn on and pump directly to the frost-free hydrant without the pressure tanks. As it is now, when the well does work, it cycles on and off as the tanks pressure up, and the water that gets sampled has had to pass through the tanks before reaching the faucet, resulting in unstable temperature measurements.

During the June sampling trip I marked locations for two wells on the north side of the lagoons, next to the corrals, and one site on the northeast side of Field #19. I think we should also construct a well at the southeast corner of Field #19, where we geoprobed back in June. That location had the highest nitrates (37 mg/L) of any of the geoprobe sites. If the groundwater flowing under field #19 has 37 mg/L nitrate before it flows beneath the field, that could explain the very high nitrates at MW-8, downgradient of the field. I'm fairly sure that field #19 is contributing nitrates to the aquifer as a result of over-application of manure in the past.

The water level and temperature data from MD-1 suggests that the well is acting as a conduit between the highly contaminated shallow aquifer and the deeper aquifer. I think you should begin thinking about modifying MD-1 by sealing off the lower part of the well. Wells that interconnect two different aquifers permit movement of poor quality water into aquifers of higher quality. This is almost certainly happening at MD-1, and may also be occurring at wells Nederend #2 and #3. If the deeper aquifer isn't capable of providing sufficient quantities of water to operate the dairies, then the water supply could be supplemented with water from wells completed in the shallow aquifer. If well MD-1 was plugged and sealed beneath the shallow

aquifer, it could still be used to pump water from the upper aquifer. Ideally, we should be working towards abandonment of the production wells that are completed in both aquifers and construction of wells that are completed in the upper aquifer or the lower aquifer, but definitely not both.

Sincerely,

John Monks, P.G.
Hydrogeologist
September 1, 2006

Cc: Ilene Dobbin (COCOA)

NAME		Monks Hydro-Geoscience	
ATTENTION		John Marks	
ADDRESS		PO Box 362	
CITY		Sandpoint	
PHONE #		208-263-1990	
FAX #			
SAMPLER (S)		Monks	
PROJECT OR SITE		Heejeen) Draw	
P.N. / P.O. NUMBER			

Chain of Custody Form

LAB NUMBER	DATE	TIME	SAMPLE IDENTIFICATION
8342	8/2/06	1248	MW-1
8343	11	1117	MW-2
8344	11	1136	MW-3
8345	11	1218	MW-4
8346	11	1236	MW-5
8347	11	1255	MW-6
8348	11	1315	MW-7
8349	11	1332	MW-8
8350	11	1405	MW-9

RELINQUISHED BY (Signature)	DATE

Relinquished By (Signature)	Date/Time	Received for Lat
	8/3/16 16:15	7



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LABORATORIES**

Alchem Laboratories, Inc.
104 West 31st Street
Boise, Idaho 83714
Phone (208) 336-1172

[illegible]

	TIME	RECEIVED BY (Signature)

Prepared By (Signature)	Date/Time	Received With Seal Intact? ☐ Yes ☐ No Label Tag, COC Agree? ☒ Yes ☐ No
<i>[Signature]</i>	8/3/06 16:15	



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Water, Waste Water
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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 08/03/2006
TIME COLLECTED 10:48
DATE RECEIVED 08/03/2006
DATE REPORTED 08/14/2006
SUBMITTED : MONKS

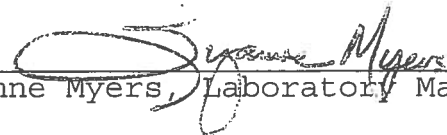
ATTENTION: JOHN MONKS
SOURCE -: MW-1 / PROJ: NEDEREND DAIRY

LAB SAMPLE NUMBER - 8342

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	52.3	08/04/2006	TK
NITRATE as N	17.1	08/04/2006	TK
SULFATE	183.0	08/08/2006	TK

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 08/03/2006
TIME COLLECTED 11:17
DATE RECEIVED 08/03/2006
DATE REPORTED 08/23/2006
SUBMITTED : MONKS

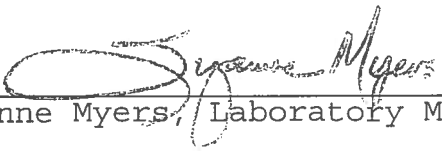
ATTENTION: JOHN MONKS
SOURCE -: MW-2 / PROJ: NEDEREND DAIRY

LAB SAMPLE NUMBER - 8343

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	91.5	08/04/2006	TK
NITRATE as N	35.1	08/22/2006	TK
SULFATE	371.0	08/08/2006	TK

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 08/03/2006
TIME COLLECTED 11:36
DATE RECEIVED 08/03/2006
DATE REPORTED 08/14/2006
SUBMITTED : MONKS

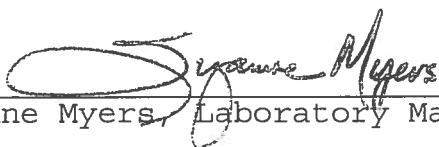
ATTENTION: JOHN MONKS
SOURCE -: MW-3 / PROJ: NEDEREND DAIRY

LAB SAMPLE NUMBER - 8344

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	74.8	08/04/2006	TK
NITRATE as N	21.5	08/04/2006	TK
SULFATE	247.0	08/08/2006	TK

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 08/03/2006
TIME COLLECTED 12:18
DATE RECEIVED 08/03/2006
DATE REPORTED 08/14/2006
SUBMITTED : MONKS

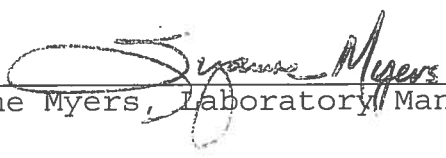
ATTENTION: JOHN MONKS
SOURCE -: MW-4 / PROJ: NEDEREND DAIRY

LAB SAMPLE NUMBER - 8345

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	61.3	08/04/2006	TK
NITRATE as N	8.52	08/04/2006	TK
SULFATE	212.0	08/08/2006	TK

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 08/03/2006
TIME COLLECTED 12:36
DATE RECEIVED 08/03/2006
DATE REPORTED 08/14/2006
SUBMITTED : MONKS

ATTENTION: JOHN MONKS
SOURCE -: MW-5 / PROJ: NEDEREND DAIRY

LAB SAMPLE NUMBER - 8346

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	68.9	08/04/2006	TK
NITRATE as N	13.3	08/04/2006	TK
SULFATE	327.0	08/08/2006	TK

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Suzanne Myers, Laboratory Manager





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Water, Waste Water
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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 08/03/2006
TIME COLLECTED 12:55
DATE RECEIVED 08/03/2006
DATE REPORTED 08/14/2006
SUBMITTED : MONKS

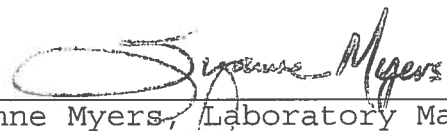
ATTENTION: JOHN MONKS
SOURCE -: MW-6 / PROJ: NEDEREND DAIRY

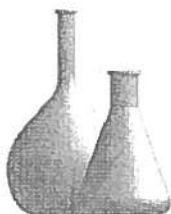
LAB SAMPLE NUMBER - 8347

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	48.4	08/04/2006	TK
NITRATE as N	10.6	08/04/2006	TK
SULFATE	65.5	08/08/2006	TK

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 08/03/2006
TIME COLLECTED 13:15
DATE RECEIVED 08/03/2006
DATE REPORTED 08/14/2006
SUBMITTED : MONKS

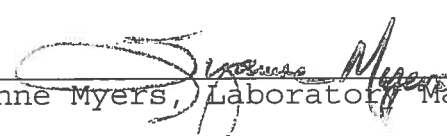
ATTENTION: JOHN MONKS
SOURCE -: MW-7 / PROJ: NEDEREND DAIRY

LAB SAMPLE NUMBER - 8348

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	39.7	08/04/2006	TK
NITRATE as N	9.27	08/04/2006	TK
SULFATE	113.0	08/08/2006	TK

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Suzanne Myers, Laboratory Manager





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MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 08/03/2006
TIME COLLECTED 13:32
DATE RECEIVED 08/03/2006
DATE REPORTED 08/23/2006
SUBMITTED : MONKS

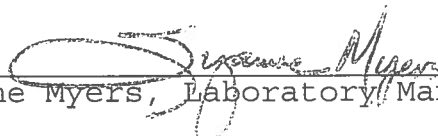
ATTENTION: JOHN MONKS
SOURCE -: MW-8 / PROJ: NEDEREND DAIRY

LAB SAMPLE NUMBER - 8349

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	169.0	08/08/2006	TK
NITRATE as N	68.3	08/22/2006	TK
SULFATE	233.0	08/08/2006	TK

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Suzanne Myers, Laboratory Manager





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PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 08/03/2006
TIME COLLECTED 14:05
DATE RECEIVED 08/03/2006
DATE REPORTED 08/14/2006
SUBMITTED : MONKS

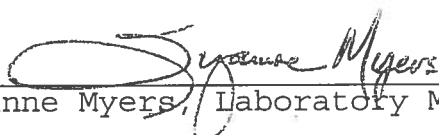
ATTENTION: JOHN MONKS
SOURCE -: MW-9 / PROJ: NEDEREND DAIRY

LAB SAMPLE NUMBER - 8350

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

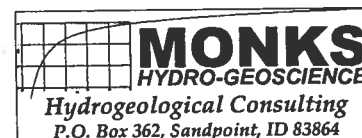
ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
CHLORIDE	77.5	08/04/2006	TK
NITRATE as N	13.4	08/04/2006	TK
SULFATE	324.0	08/08/2006	TK

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Suzanne Myers, Laboratory Manager



10 October, 2006
Hans Nederend
Nederend Dairy
4998 Hogg Road
Homedale, ID 83628



RE: September 2006 water quality report

Dear Hans:

This letter reports water quality data collected at Nederend Dairies #1 and #2 on September 8, 2006. I measured depth to water and water quality parameters in all of the monitoring wells except Nederend Domestic, and sampled MW-2, MW-6, MW-7, MW-8, MW-9, and ION and had them analyzed for nitrate.

Water Quality

Water quality data from September is summarized in table 1. Field measured water quality parameters from September 2006 are summarized in Table 2. I measured water quality in the drain in September. The water flowing in the drain during irrigation season is predominantly irrigation water. I will resume drain water quality measurements when irrigation flow ends and water flow in the drain is related to ground water flow.

Field measured water quality parameters at most of the wells are remaining fairly constant from month to month. Water temperatures are going up at most of the wells. Exceptions are MW-4 and MW-7. Water temperatures in the drain are higher than at any of the monitoring wells. The temperature increases in the wells may be due to recharge from the drain.

Table 1. September 2006 Water Chemistry Analytical Results

Well name:	Date:	Chloride (mg/L):	Nitrate (mg/L):	Sulfate (mg/L):	Coliform Bacteria
Nederend Domestic	9/8/06	NA	NS	NA	NA
MW-1	9/8/06	NA	NS	NA	NA
MW-2	9/8/06	NA	35.4	NA	NA
MW-3	9/8/06	NA	NS	NA	NA
MW-4	9/8/06	NA	NS	NA	NA
MW-5	9/8/06	NA	NS	NA	NA
MW-6	9/8/06	NA	11.0	NA	NA
MW-7	9/8/06	NA	13.0	NA	NA
MW-8	9/8/06	NA	65.3	NA	NA
MW-9	9/8/06	NA	13.4	NA	NA
ION	9/8/06	NA	8.35	NA	NA

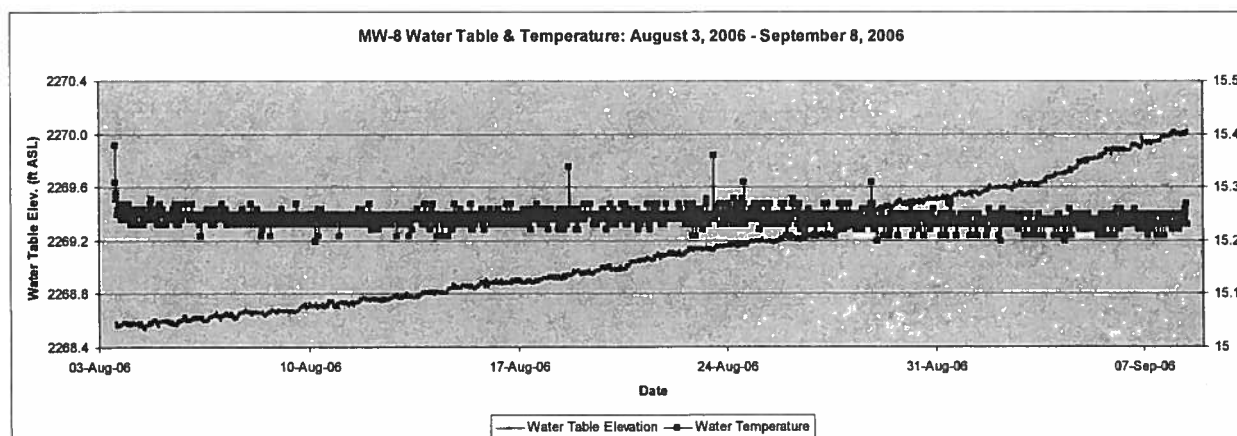
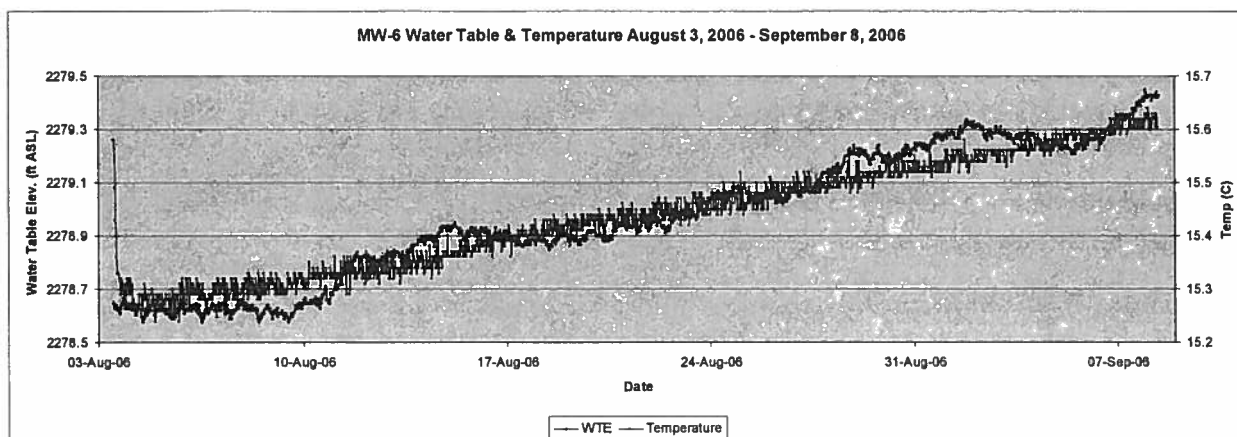
Table 2. September 2006 Field Measured Water Quality Parameters

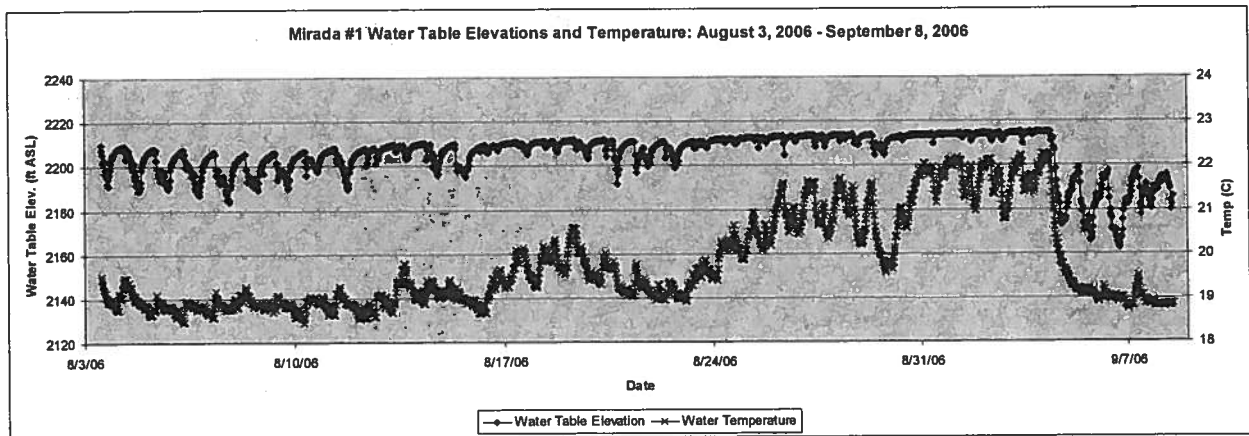
Well#	Temp C	SpCond (uS/cm)	DO Conc (mg/L)	pH	TDS (g/L)	ORP (mV)
MW-1	14.44	1146.7	0.92	7.62	745.333	218
MW-2	14.79	1792	0.96	7.67	1164.797	181
MW-3	14.93	1523.4	0.4	7.64	990.186	167
MW-4	13.6	1362.3	0.48	7.68	885.471	163
MW-5	14.34	1626.7	0.09	7.47	1057.329	172
MW-6	16.66	853.8	1.02	7.76	554.946	149
MW-7	15.08	1073	0.05	7.5	697.476	156
MW-8	16.05	2246.9	0	7.48	1460.483	127
MW-9	15.06	1636.8	0.1	7.47	1063.902	140
ION	14.22	1566.3	0.19	7.57	1018.113	111

Water Level Measurements

September depth to water measurements for the shallow aquifer wells are summarized in the table below. The water table rose in response to recharge from irrigation and higher water levels in the drain at all wells except MW-2. The water table at MW-2 may have declined due to pumping at Nederend #3.

Well Name:	Measuring point elevation:	Depth to Water:	Water Table Elevation:	Change from Previous month:
Nederend Domestic	2290.13	24.27	2265.86	1.2
MW-1	2294.59	37.82	2256.77	-0.05
MW-2	2276.31	27.84	2248.47	1.24
MW-3	2265.33	19.92	2245.41	1.07
MW-4	2305.73	13.36	2292.37	0.24
MW-5	2298.90	12.68	2286.22	0.24
MW-6	2300.41	20.59	2279.82	0.89
MW-7	2300.23	18.52	2281.71	0.45
MW-8	~2306	35.77	2270.23	1.51
MW-9	~2296	12.16	2283.84	0.05
ION shallow	~2303			





Water table elevations and temperature at MW-6, MW-8 and Mirada #1 are shown on the graphs above. The water table at MW-6 is rising steadily with an occasional leveling off or slight drop. The water temperature at MW-6 is steadily increasing.

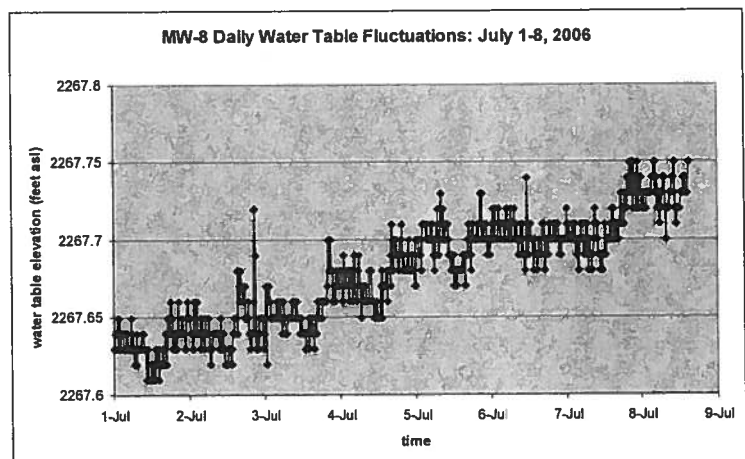
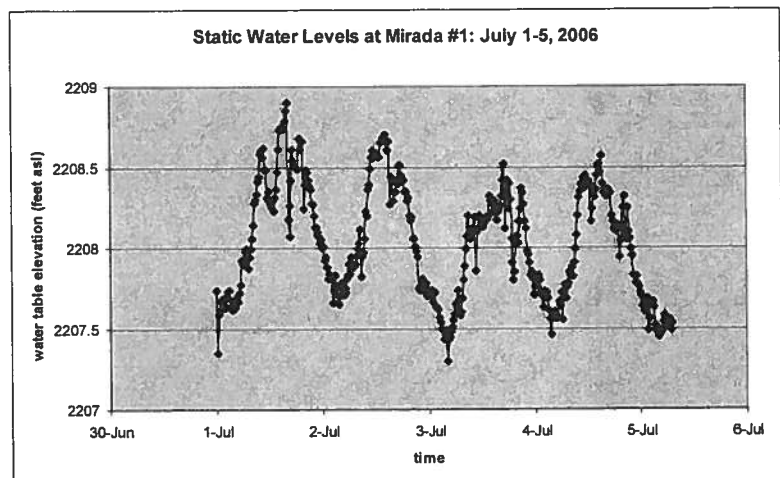
At MW-8 the water table continues to rise steadily in response to irrigation and the temperature is slowly declining.

At MD-1 the water table and temperature respond to variations in the production rate. Water level and water temperature continue to show a relationship where the coldest temperatures are associated with higher water levels.

Discussion

Water level and temperature data from MD-1 and MW-8 suggests that MD-1 is acting as a conduit between the shallow aquifer and the deeper aquifer. I analyzed water level data from July 1-5, 2006, a time period when well MD-1 was shut off and all water production was from the new well. The graph on the right shows that water levels at MD-1 fluctuated on a daily basis in response to variable pumping rates at the new well (MD-2). Water levels at MW-8 also fluctuated on a daily basis during this time period. The daily water table fluctuations at MW-8 are smaller when MD-2 is pumping than when MD-1 is pumping.

I reviewed well driller's reports to try to determine if one exists for the old well at Mirada Dairy (MD-1). I found a well driller's report (attached) for a John H. Brandt well that matches the



legal description for MD-1. According to the well driller's report, the well was drilled in 1962 to a depth of 250 feet, with 12" casing from 0 to 250 feet. The casing is perforated with torch-cut perforations from ~100(?) feet to the bottom at 250 feet, and gravel packed from 0 to 250 feet. No surface seal was installed. The ground surface elevation at MD-1 is ~2300'. If the well is perforated from 100 to 250 feet, then whenever the water level in MD-1 drops below ~2200 feet (the elevation of the top of the perforations), water from the upper aquifer should be able to flow down the gravel-packed area outside of the casing and flow into the well and deeper aquifer.

This hypothesis is supported by the data from August 3 – September 8, 2006. Production at MD-1 increased around September 3, and water levels in the well dropped below 2200 feet elevation. The water temperature dropped significantly when the water level dropped below 2200 feet, suggesting that water from the colder shallow aquifer is flowing into the deeper aquifer.

Sincerely,

John Monks, P.G.
Hydrogeologist
September 1, 2006

Cc: Ilene Dobbin (COCOA)

REPORT OF WELL DRILLER
State of Idaho

State law requires that this report shall be filed with the State Reclamation Engineer within 30 days after completion or abandonment of the well.

RECEIVED
April 30 1968
Department of Reclamation

WELL OWNER:

Name JOHN H. BRANDT (BRANDT & TIEGS)

Address 275 11th Ave. So.

Nampa, Idaho

Owner's Permit No. Q-30598

NATURE OF WORK (check): Replacement well ☐

New well ☒ Deepened ☐ Abandoned ☐

Water is to be used for: Irrigation

METHOD OF CONSTRUCTION: Rotary ☒ Cable ☐
Dug ☐ Other ☐ (explain)

CASING SCHEDULE: Threaded ☐ Welded ☒

12 "Diam. from 8 ft. to 250 ft.

"Diam. from ft. to ft.

"Diam. from ft. to ft.

"Diam. from ft. to ft.

Thickness of casing: 250 Material:

Steel ☒ concrete ☐ wood ☐ other ☐

(explain)
PERFORATED? Yes ☒ No ☐ Type of
perforator used: Torch

Size of perforations: 1/8" " by 6" "

perforations from 180 ft. to 250 ft.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

WAS SCREEN INSTALLED? Yes ☐ No ☐

Manufacturer's name

Type Model No.

Diam. Slot size Set from ft. to ft.

Diam. Slot size Set from ft. to ft.

CONSTRUCTION: Well gravel packed? Yes ☒

No. ☐ size of gravel 3/8" Gravel

placed from 0 ft. to 250 ft. Surface seal

provided? Yes ☐ No ☒ To what depth?

 ft. Material used in seal:

Did any strata contain unusable water? Yes ☐

No. ☒ Type of water:

Depth of strata ft. Method of sealing

strata off:

Surface casing used? Yes ☐ No. ☒

Cemented in place? Yes ☐ No ☒

Locate well in section

X			
Sec.			

LOCATION OF WELL: County Owyhee

NW 4 NW 4 Sec. 32 T. 3 N/E R. 4 E/W

Use other side for additional remarks

Size of drilled hole: 20"
depth of well: 250 Standing water
level below ground: 30' Temp.
Fahr. Test delivery: 535 gpm
or cfs Pump? ☒ Bail ☐
Size of pump and motor used to make test:

Length of time of test: 7 Hrs. 30 Min.
Drawdown: 230 ft. Artesian pressure: ft.
above land surface Give flow cfs
or gpm. Shutoff pressure:
Controlled by: Valve ☐ Cap ☐ Plug ☐
No control ☐ Does well leak around casing?
Yes ☐ No ☐

DEPTH	MATERIAL	WATER
FROM	TO	YES OR NO
FEET	FEET	
0	10	Sand no
10	20	Sand no
20	30	Sand no
30	34	Sand and gravel no
34	44	Sand no
44	50	Gravel no
50	60	Sand no
60	66	Sand no
66	70	Gravel and sand no
70	80	Sand and blue clay yes
80	90	Sand and blue clay yes
90	134	Gravel and clay yes
134	150	Blue clay no
150	160	Blue clay with streaks of gravel yes
160	168	Blue clay no
168	171	Rock no
171	240	Clay and gravel yes
240	250	Gravel yes

Work started: 7-30-62

Work finished: 8-6-62

Well Driller's Statement: This well was drilled under my supervision and this report is true to the best of my knowledge.

Name: R. & M. EQUIPMENT CO., INC.

Address: CALDWELL, IDAHO

Signed by: E. E. RAYNOR

License No. 221 Date:

USGS

NAME	Monks Hydro GeoScience		
ATTENTION	John Monks		
ADDRESS	PO Box 362		
CITY	Sanpoint	STATE	US
PHONE #	208-263-1961	FAX #	
SAMPLER (S)	Monks		
PROJECT OR SITE	Kegonsaw		
		ZIP CODE	83556



Alchem Laboratories, Inc.
104 West 31st Street
Boise, Idaho 83714
Phone (208) 336-1172

Chain of Custody Form

LAB NUMBER	DATE	TIME	SAMPLE IDENTIFICATION
9552	9/6/02	1405	MW-2
9553	"	1226	MW-6
9554	"	1235	MW-7
9555	"	1257	MW-8
9556	"	1333	MW-9
9557	"	1347	10N4

RELINQUISHED BY (Signature)	DATE

Relinquished By (Signature)	Date/Time	Received for Latent
	9/8/04 1532	Baird

[illegible]

TIME	RECEIVED BY (Signature)

Laboratory By (Signature) 	Date/Time 9-8-06 3:30	Received With Seal Intact? ☐ Yes ☐ No Label Tag, COC Agree? ☐ Yes ☐ No
--	----------------------------	---



Alchem Laboratories, Inc.

104 West 31st Street
Boise, Idaho 83714

Phone (208) 336-1172
FAX (208) 336-7124

Water, Waste Water
and Soil Analysis

LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-2 / PROJ: NEDEREND

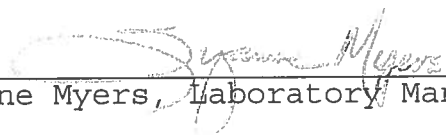
DATE COLLECTED 09/08/2006
TIME COLLECTED 11:05
DATE RECEIVED 09/08/2006
DATE REPORTED 09/28/2006
SUBMITTED :

LAB SAMPLE NUMBER - 9552

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	35.4	09/26/2006	TK

This report for the exclusive use of the client(s) to whom it is addressed. Its disclosure to others for use in advertising is not authorized. These results refer only to the specific sample tested and no interpretation is intended or implied.


Suzanne Myers, Laboratory Manager





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Boise, Idaho 83714

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FAX (208) 336-7124

*Water, Waste Water
and Soil Analysis*

LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-6 / PROJ: NEDEREND

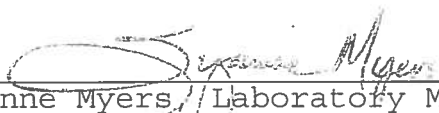
DATE COLLECTED 09/08/2006
TIME COLLECTED 12:20
DATE RECEIVED 09/08/2006
DATE REPORTED 09/25/2006
SUBMITTED :

LAB SAMPLE NUMBER - 9553

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	11.0	09/21/2006	TK

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 09/08/2006
TIME COLLECTED 12:35
DATE RECEIVED 09/08/2006
DATE REPORTED 09/25/2006
SUBMITTED :

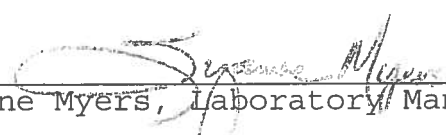
ATTENTION: JOHN MONKS
SOURCE -: MW-7 / PROJ: NEDEREND

LAB SAMPLE NUMBER - 9554

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	13.0	09/21/2006	TK

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-8 / PROJ: NEDEREND

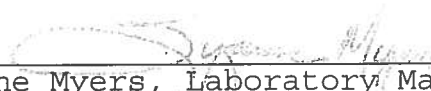
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TIME COLLECTED 12:57
DATE RECEIVED 09/08/2006
DATE REPORTED 09/28/2006
SUBMITTED :

LAB SAMPLE NUMBER - 9555

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	65.3	09/26/2006	TK

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 09/08/2006
TIME COLLECTED 13:33
DATE RECEIVED 09/08/2006
DATE REPORTED 09/25/2006
SUBMITTED :

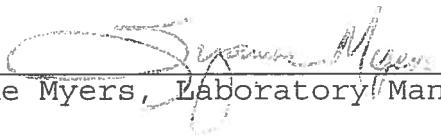
ATTENTION: JOHN MONKS
SOURCE -: MW-9 / PROJ: NEDEREND

LAB SAMPLE NUMBER - 9556

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	13.4	09/21/2006	TK

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Suzanne Myers, Laboratory Manager





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Water, Waste Water
and Soil Analysis

LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 09/08/2006
TIME COLLECTED 13:47
DATE RECEIVED 09/08/2006
DATE REPORTED 09/25/2006
SUBMITTED :

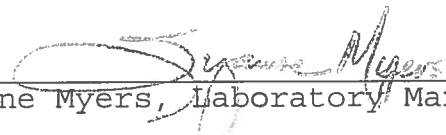
ATTENTION: JOHN MONKS
SOURCE -: 10N / PROJ: NEDEREND

LAB SAMPLE NUMBER - 9557

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

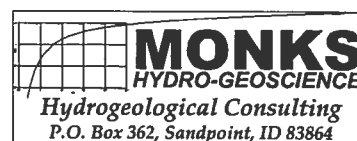
ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	8.35	09/21/2006	TK

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Suzanne Myers, Laboratory Manager



27 November, 2006
Hans Nederend
Nederend Dairy
4998 Hogg Road
Homedale, ID 83628



RE: October and November 2006 water quality report

Dear Hans:

This letter reports water quality data collected at Nederend Dairies #1 and #2 on October 11 and November 5, 2006. Depth to water was measured in all of the monitoring wells during both sampling events. During the October sampling event, ISDA collected water samples, and I measured field water quality parameters. During the November sampling event, I measured field water quality parameters and collected water samples from all of the monitoring wells except Nederend Domestic, and had them analyzed for nitrate.

Water Quality

Water quality data from October is summarized in table 1; November's data is in table 3. Field measured water quality parameters from October 2006 are summarized in Table 2; November's data in Table 4.

Field measured water quality parameters at most of the wells are remaining fairly constant from month to month. Water temperatures are going up at most of the wells. Exceptions are MW-4 and MW-7. Water temperatures in the drain are higher than at any of the monitoring wells. The temperature increases in the wells may be due to recharge from the drain.

Table 1. October 2006 Water Chemistry Analytical Results

Well name:	Date:	Chloride (mg/L):	Nitrate (mg/L):	Sulfate (mg/L):	Coliform Bacteria
Nederend Domestic	10/11/06	NS	NS	NS	NS
MW-1	10/11/06	50.7	19	178	NA
MW-2	10/11/06	95.1	38	507	NA
MW-3	10/11/06	82.4	22	258	NA
MW-4	10/11/06	74	10	270	NA
MW-5	10/11/06	72.9	14	343	NA
MW-6	10/11/06	52.1	9.8	64.5	NA
MW-7	10/11/06	61.2	14	156	NA
MW-8	10/11/06	174	65	244	NA
MW-9	10/11/06	79.2	13	343	NA
ION	10/11/06	NS	NS	NS	NS

Table 2. October 2006 Field Measured Water Quality Parameters

Well#	Temp C	SpCond (uS/cm)	DO Conc (mg/L)	pH	TDS (g/L)	ORP (mV)
MW-1	14.27	1141.8	0.9	7.67	742.197	216
MW-2	14.6	1773.8	0.97	7.69	1152.94	203
MW-3	14.95	1551	0.44	7.65	1008.166	194
MW-4	13.63	1426.4	0.49	7.67	927.187	176
MW-5	14.34	1640.2	0.16	7.5	1066.109	162
MW-6	16.39	805.5	1.05	7.78	523.601	142
MW-7	15.24	1225.2	0	7.45	796.352	159
MW-8	15.98	2241.5	0.02	7.46	1457.002	140
MW-9	15.73	2276	0.01	7.25	1479.425	166
ION						

Table 3. November 2006 Water Chemistry Analytical Results

Well name:	Date:	Chloride (mg/L):	Nitrate (mg/L):	Sulfate (mg/L):	Coliform Bacteria
Nederend Domestic	10/11/06	NS	NS	NS	NS
MW-1	10/11/06	NA	22.5	NA	NA
MW-2	10/11/06	NA	38.7	NA	NA
MW-3	10/11/06	NA	22.8	NA	NA
MW-4	10/11/06	NA	10.2	NA	NA
MW-5	10/11/06	NA	14.4	NA	NA
MW-6	10/11/06	NA	15.6	NA	NA
MW-7	10/11/06	NA	16.1	NA	NA
MW-8	10/11/06	NA	64.4	NA	NA
MW-9	10/11/06	NA	14.8	NA	NA
ION	10/11/06	NS	NS	NS	NS

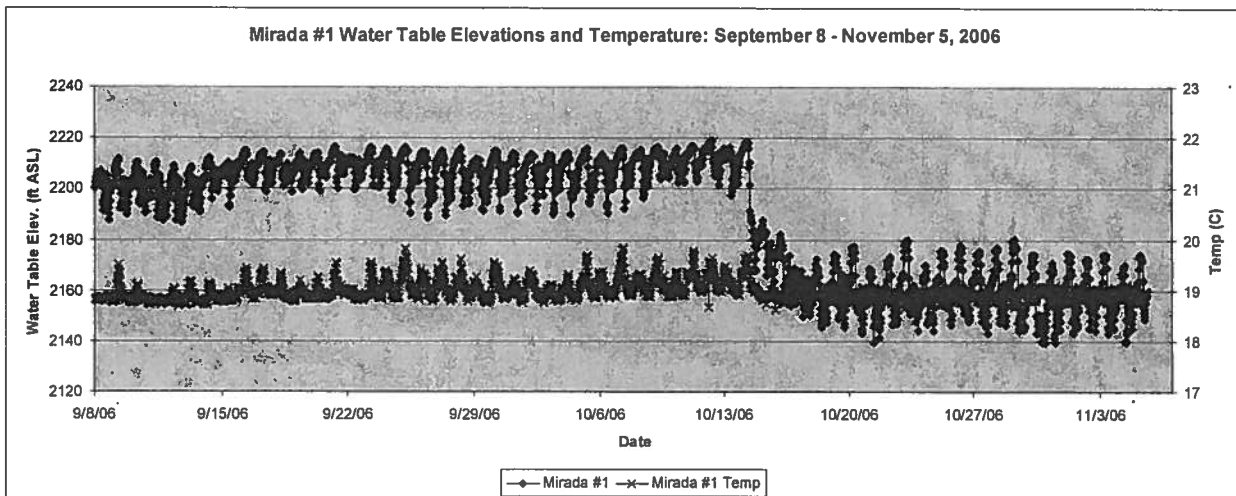
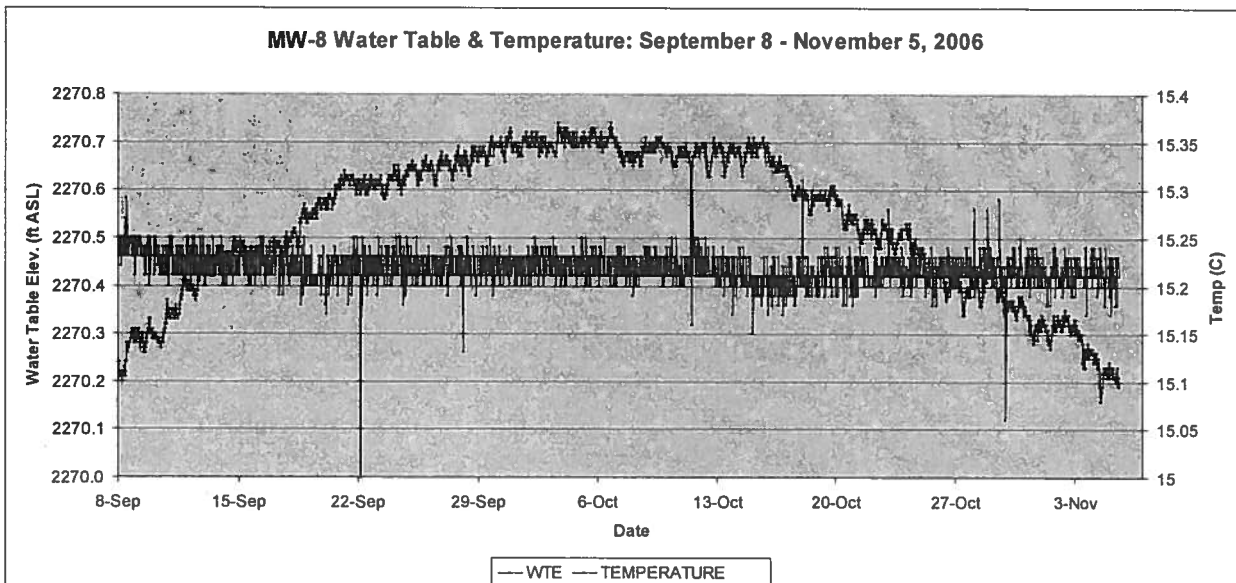
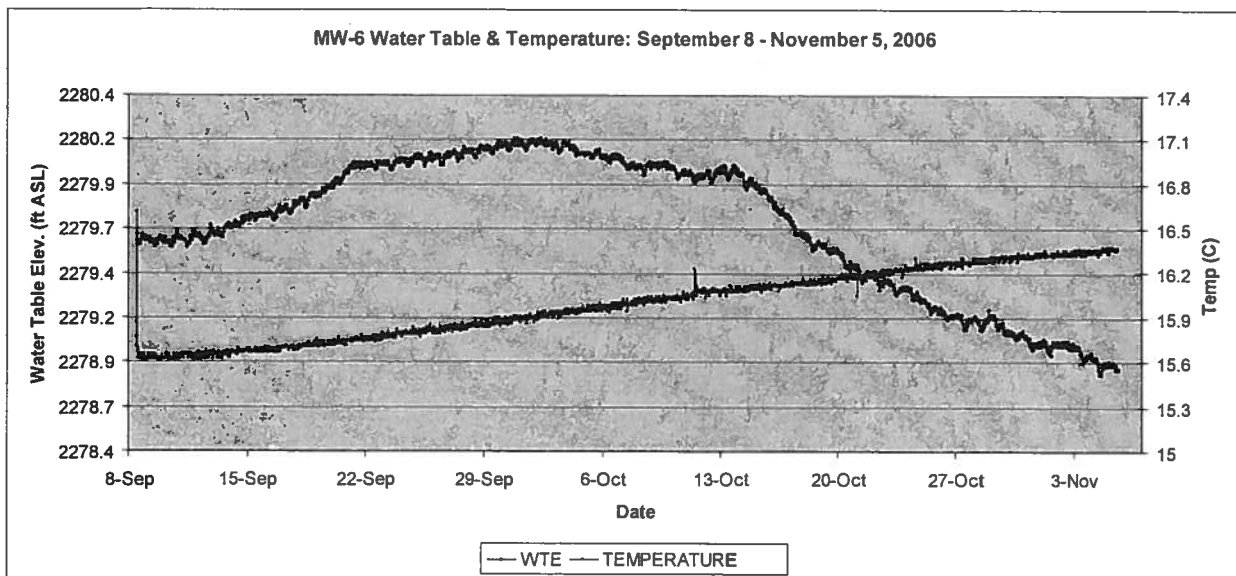
Table 4. November 2006 Field Measured Water Quality Parameters

Well#	Temp C	SpCond (uS/cm)	DO Conc (mg/L)	pH	TDS (g/L)	ORP (mV)
MW-1	14.26	1264.8	1.17	7.33	822.104	203
MW-2	14.4	1807.4	0.96	7.44	1174.837	190
MW-3	14.96	1682.3	0.28	7.4	1093.524	179
MW-4	13.56	1452.9	0.48	7.43	944.383	175
MW-5	14.14	1672.5	0.1	7.29	1087.147	176
MW-6	16.24	969.7	0.84	7.5	630.313	161
MW-7	15.08	1428.4	0.02	7.17	928.444	176
MW-8	15.73	2276	0.01	7.25	1479.425	166
MW-9	15.24	1730	0.03	7.26	1124.488	163
ION						

Water Level Measurements

October and November depth to water measurements for the shallow aquifer wells are summarized in the table below. In October the water table rose in response to recharge from irrigation and at all wells except MW-4 and MW-5. In November the water table at all of the wells was lower in response to the end of the irrigation season.

October 2006 Water Level Data				
Well Name:	Measuring point elevation:	Depth to Water:	Water Table Elevation:	Change from Previous month:
Nederend Domestic	2290.13	23.78	2266.35	0.49
MW-1	2294.59	37.69	2256.90	0.13
MW-2	2276.31	27.00	2249.31	0.84
MW-3	2265.33	19.78	2245.55	0.14
MW-4	2305.73	13.63	2292.1	-0.27
MW-5	2298.90	12.71	2286.19	-0.03
MW-6	2300.41	20.16	2280.25	0.43
MW-7	2300.23	18.21	2282.02	0.31
MW-8	~2306	35.55	2270.45	0.22
MW-9	~2296	12.12	2283.88	0.04
ION shallow	~2303	NM		
November 2006 Water Level Data				
Well Name:	Measuring point elevation:	Depth to Water:	Water Table Elevation:	Change from Previous month:
Nederend Domestic	2290.13	24.32	2265.81	-0.54
MW-1	2294.59	38.31	2256.28	-0.62
MW-2	2276.31	27.17	2249.14	-0.17
MW-3	2265.33	20.29	2245.04	-0.51
MW-4	2305.73	14.45	2291.28	-0.82
MW-5	2298.90	13.78	2285.12	-1.07
MW-6	2300.41	21.26	2279.15	-1.10
MW-7	2300.23	19	2281.23	-0.79
MW-8	~2306	35.83	2270.17	-0.28
MW-9	~2296	12.96	2283.04	-0.84
ION shallow	~2303	NM		



Water table elevations and temperature at MW-6, MW-8 and Mirada #1 are shown on the graphs above. The water table at MW-6 rose steadily until the end of September, then began to drop slowly in response to the end of the irrigation season and decreased water levels in the drain. The water temperature at MW-6 continues to steadily increase.

The water table at MW-8 responded in a manner similar to at MW-6, with water levels beginning to decline in response to the end of the irrigation season and decreased water levels in the drain.

At MD-1 the water table and temperature respond to variations in the production rate. Water level and water temperature continue to show a relationship where the coldest temperatures are associated with higher water levels. Water temperatures fluctuated over a smaller range during the time period when production at the well increased and water levels were lower.

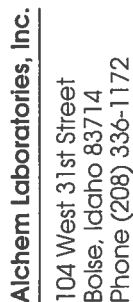
Discussion

The October and November 2006 water quality data did not deviate significantly from previous months. Nitrate levels at MW-6 and MW-7 are increasing in a manner similar to what occurred in 2005.

Sincerely,

John Monks, P.G.
Hydrogeologist
November 27, 2006

Cc: Ilene Dobbin (COCOA), Craig Tesch (ISDA)



NAME <i>Monk's Hydro-Geosystems</i>		ZIP CODE <i>53864</i>	
ATTENTION <i>John Monks</i>		STATE <i>ID</i>	
ADDRESS <i>Box 362</i>			
CITY <i>Sandpoint</i>	FAX #		
PHONE # <i>208-263-1991</i>			
SAMPLER (S) <i>Monks</i>			
PROJECT OR SITE <i>Madreana</i>	P.N. / P.O. NUMBER		

Chain of Custody Form

LAB NUMBER	DATE	TIME	SAMPLE IDENTIFICATION
11730	4/8/02	1240	MW-1
11731	4/	1230	MW-2
11732	11	1253	MW-3
11733	11	1315	MW-4
11734	11	1333	MW-5
11735	11	1352	MW-7
11736	11	1416	MW-6
11737	11	1430	MW-8
11738	11	1508	MW-9

[illegible]

RELINQUISHED BY (Signature)		DATE	TIME	RECEIVED BY (Signature)	
Relinquished By (Signature)	Date/Time	Received for Laboratory By (Signature)		Date/Time	Received With Seal Intact? Label Tag, COC Agree?
	11/6/06 08517			11-6-06 848	☐ Yes ☐ No ☐ Yes ☐ No



Alchem Laboratories, Inc.

104 West 31st Street
Boise, Idaho 83714

Phone (208) 336-1172
FAX (208) 336-7124

*Water, Waste Water
and Soil Analysis*

LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-1 / PROJ: NEDEREND

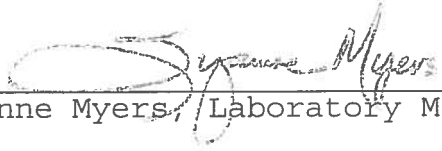
DATE COLLECTED 11/05/2006
TIME COLLECTED 12:10
DATE RECEIVED 11/06/2006
DATE REPORTED 11/15/2006
SUBMITTED : JOHN MONKS

LAB SAMPLE NUMBER - 11730

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	22.5	11/14/2006	TK

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Suzanne Myers, Laboratory Manager





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PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-2 / PROJ: NEDEREND

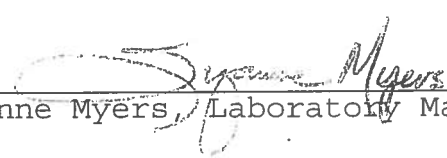
DATE COLLECTED 11/05/2006
TIME COLLECTED 12:30
DATE RECEIVED 11/06/2006
DATE REPORTED 11/21/2006
SUBMITTED : JOHN MONKS

LAB SAMPLE NUMBER - 11731

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	38.7	11/20/2006	TK

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Suzanne Myers, Laboratory Manager





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MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-3 / PROJ: NEDEREND

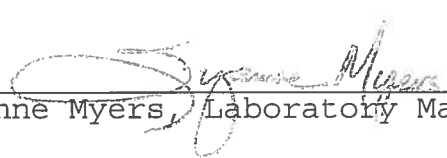
DATE COLLECTED 11/05/2006
TIME COLLECTED 12:53
DATE RECEIVED 11/06/2006
DATE REPORTED 11/15/2006
SUBMITTED : JOHN MONKS

LAB SAMPLE NUMBER - 11732

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	22.8	11/14/2006	TK

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PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-4 / PROJ: NEDEREND

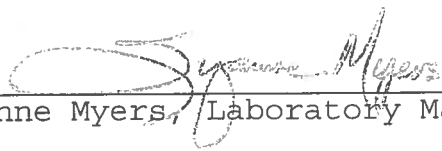
DATE COLLECTED 11/05/2006
TIME COLLECTED 13:15
DATE RECEIVED 11/06/2006
DATE REPORTED 11/15/2006
SUBMITTED : JOHN MONKS

LAB SAMPLE NUMBER - 11733

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	10.2	11/14/2006	TK

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MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-5 / PROJ: NEDEREND

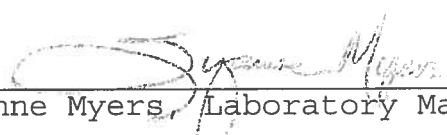
DATE COLLECTED 11/05/2006
TIME COLLECTED 13:33
DATE RECEIVED 11/06/2006
DATE REPORTED 11/15/2006
SUBMITTED : JOHN MONKS

LAB SAMPLE NUMBER - 11734

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	14.4	11/14/2006	TK

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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-6 / PROJ: NEDEREND

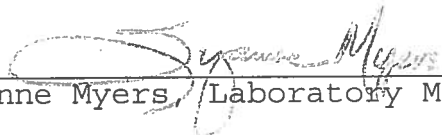
DATE COLLECTED 11/05/2006
TIME COLLECTED 14:10
DATE RECEIVED 11/06/2006
DATE REPORTED 11/15/2006
SUBMITTED : JOHN MONKS

LAB SAMPLE NUMBER - 11736

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	15.6	11/14/2006	TK

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Suzanne Myers / Laboratory Manager





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MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-7 / PROJ: NEDEREND

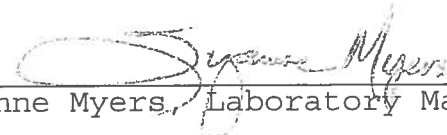
DATE COLLECTED 11/05/2006
TIME COLLECTED 13:52
DATE RECEIVED 11/06/2006
DATE REPORTED 11/15/2006
SUBMITTED : JOHN MONKS

LAB SAMPLE NUMBER - 11735

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	16.1	11/14/2006	TK

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-8 / PROJ: NEDEREND

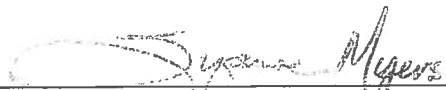
DATE COLLECTED 11/05/2006
TIME COLLECTED 14:30
DATE RECEIVED 11/06/2006
DATE REPORTED 11/21/2006
SUBMITTED : JOHN MONKS

LAB SAMPLE NUMBER - 11737

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	64.4	11/20/2006	TK

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-9 / PROJ: NEDEREND

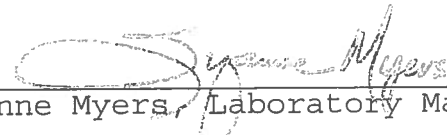
DATE COLLECTED 11/05/2006
TIME COLLECTED 15:08
DATE RECEIVED 11/06/2006
DATE REPORTED 11/15/2006
SUBMITTED : JOHN MONKS

LAB SAMPLE NUMBER - 11738

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

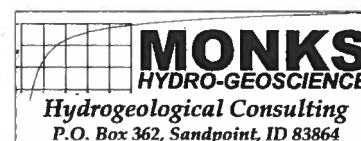
ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	14.8	11/14/2006	TK

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Suzanne Myers, Laboratory Manager



11 March, 2007
Hans Nederend
Nederend Dairy
4998 Hogg Road
Homedale, ID 83628



RE: December 2006 water quality report

Dear Hans:

This letter reports water quality data collected at Nederend Dairies #1 and #2 on December 20, 2006. Depth to water was measured in all of the monitoring wells, and wells MW-2, MW-6 and MW-8 were sampled and analyzed for nitrate and field water quality parameters were measured.

Water Quality

Water quality data from December is summarized in table 1 and field measured water quality parameters are summarized in Table 2.

Field measured water quality parameters at most of the wells are remaining fairly constant from month to month. Water temperatures are going up at most of the wells. Exceptions are MW-4 and MW-7. Water temperatures in the drain are higher than at any of the monitoring wells. The temperature increases in the wells may be due to recharge from the drain.

Table 1. December 2006 Water Chemistry Analytical Results

Well name:	Date:	Chloride (mg/L):	Nitrate (mg/L):	Sulfate (mg/L):	Coliform Bacteria
Nederend Domestic	12/20/06	NS	NS	NS	NS
MW-1	12/20/06	NS	NS	NS	NS
MW-2	12/20/06	NA	42.3	NA	NA
MW-3	12/20/06	NS	NS	NS	NS
MW-4	12/20/06	NS	NS	NS	NS
MW-5	12/20/06	NS	NS	NS	NS
MW-6	12/20/06	NA	25.1	NA	NA
MW-7	12/20/06	NS	NS	NS	NS
MW-8	12/20/06	NA	75.2	NA	NA
MW-9	12/20/06	NS	NS	NS	NS
ION	12/20/06	NS	NS	NS	NS

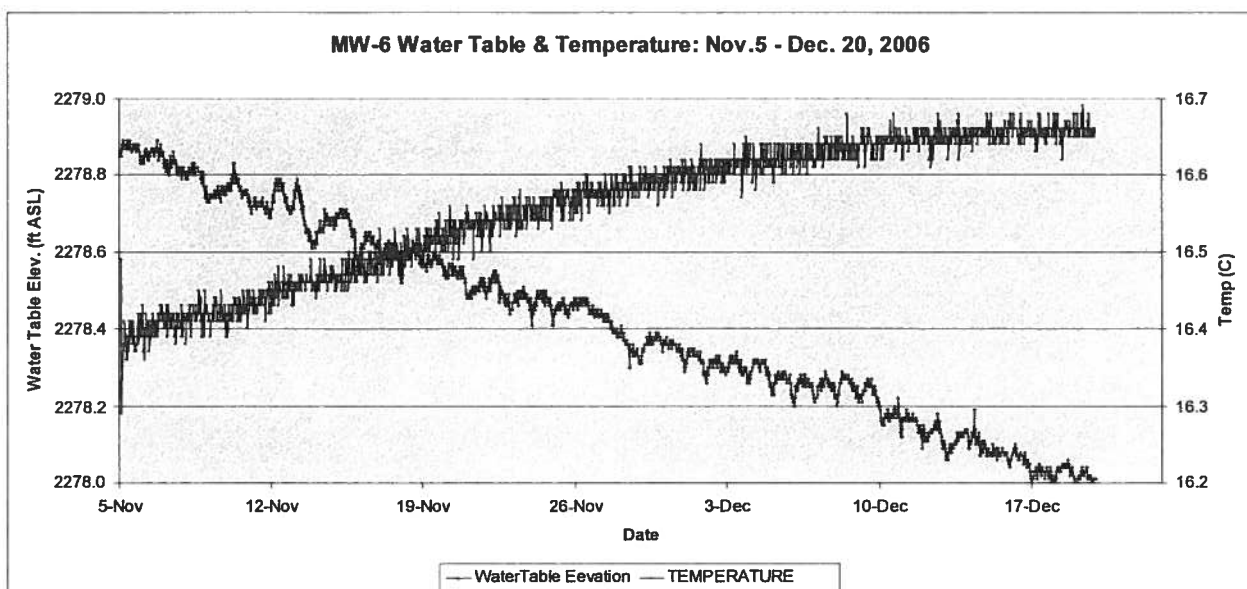
Table 2. December 2006 Field Measured Water Quality Parameters

Well#	Temp C	SpCond (uS/cm)	DO Conc (mg/L)	pH	TDS (g/L)	ORP (mV)
MW-1	NS	NS	NS	NS	NS	NS
MW-2	14.34	1844.1	1.03	7.27	1198.662	91
MW-3	NS	NS	NS	NS	NS	NS
MW-4	NS	NS	NS	NS	NS	NS
MW-5	NS	NS	NS	NS	NS	NS
MW-6	16.1	1200.7	0.6	7.46	780.452	514
MW-7	NS	NS	NS	NS	NS	NS
MW-8	15.68	2270.6	0.03	7.34	1475.888	505
MW-9	NS	NS	NS	NS	NS	NS
ION	NS	NS	NS	NS	NS	NS

Water Level Measurements

December depth to water measurements for the shallow aquifer wells are summarized in the table below. In October the water table rose in response to recharge from irrigation and at all wells except MW-4 and MW-5. In November the water table at all of the wells was lower in response to the end of the irrigation season.

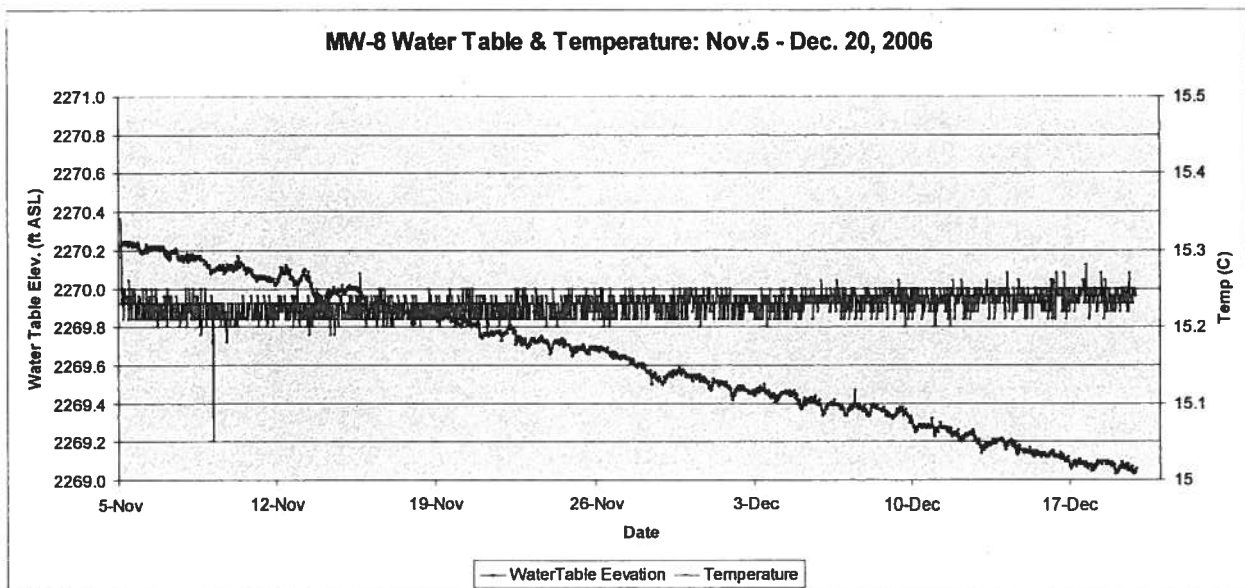
December 2006 Water Level Data				
Well Name:	Measuring point elevation:	Depth to Water:	Water Table Elevation:	Change from Previous month:
Nederend Domestic	2290.13	25.5	2264.63	-1.18
MW-1	2294.59	38.6	2255.99	-0.29
MW-2	2276.31	27.57	2248.74	-0.40
MW-3	2265.33	20.86	2244.47	-0.57
MW-4	2305.73	14.66	2291.07	-0.21
MW-5	2298.90	14.01	2284.89	-0.23
MW-6	2300.41	22.21	2278.2	-0.95
MW-7	2300.23	19.56	2280.67	-0.56
MW-8	~2306	37.05	2268.95	-1.22
MW-9	~2296	NM		
ION shallow	~2303	NM		



Water table elevations and temperature at MW-6 and MW-8 are shown on the graphs above and on the following page. The water table at MW-6 continues to drop in response to the end of the irrigation season and decreased water levels in the drain. The water temperature at MW-6 continued its steadily increase, with the rate of increase declining in December.

The water table at MW-8 responded in a manner similar to at MW-6, with water levels continuing to decline in response to the end of the irrigation season and decreased water levels in the drain. The water temperature at MW-8 rose very slowly during November and December.

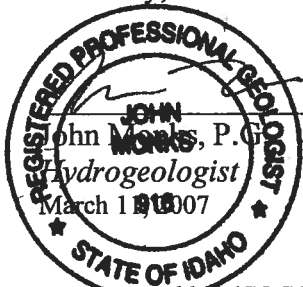
The Levelogger in Mirada #1 was removed on November 5th due to a failing cable and was returned to service in the well on December 20th.



Discussion

The December 2006 water quality data did not deviate significantly from previous months. Nitrate levels at MW-6 are increasing in a manner similar to what occurred in 2005. Nitrate levels at MW-2 were the highest measured in 2006. Nitrate levels at MW-8 continue to be very high.

Sincerely,



Cc: Ilene Dobbin (COCOA), Craig Tesch (ISDA)

[illegible]

RELINQUISHED BY (Signature)		DATE	TIME	RECEIVED BY (Signature)	
Relinquished By (Signature)	Date/Time	Received for Laboratory By (Signature)		Date/Time	Received With Seal Intact? Label Tag, COC Agree?
<i>[Signature]</i>	12/20/14 1331	<i>[Signature]</i>		12:30 the 131	☐ Yes ☐ No ☐ Yes ☐ No



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Water, Waste Water
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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

ATTENTION: JOHN MONKS
SOURCE -: MW-2 / PROJ: NEDERNED DAIRY

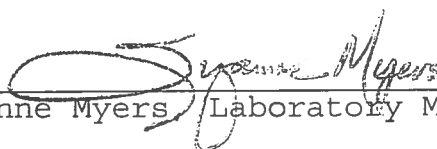
DATE COLLECTED 12/20/2006
TIME COLLECTED 10:28
DATE RECEIVED 12/20/2006
DATE REPORTED 01/18/2007
SUBMITTED : JOHN MONKS

LAB SAMPLE NUMBER - 13124

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	42.3	01/15/2007	MB

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Suzanne Myers Laboratory Manager





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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
SANDPOINT, IDAHO 83864

DATE COLLECTED 12/20/2006
TIME COLLECTED 11:10
DATE RECEIVED 12/20/2006
DATE REPORTED 01/12/2007
SUBMITTED : JOHN MONKS

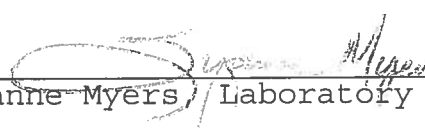
ATTENTION: JOHN MONKS
SOURCE -: MW-6 / PROJ: NEDERNED DAIRY

LAB SAMPLE NUMBER - 13125

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	25.1	01/11/2007	TK

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Suzanne Myers, Laboratory Manager





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LABORATORY REPORT

MONKS HYDRO-GEOSCIENCE
PO BOX 362
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DATE COLLECTED 12/20/2006
TIME COLLECTED 11:30
DATE RECEIVED 12/20/2006
DATE REPORTED 01/18/2007
SUBMITTED : JOHN MONKS

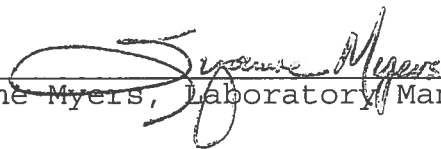
ATTENTION: JOHN MONKS
SOURCE -: MW-8 / PROJ: NEDERNED DAIRY

LAB SAMPLE NUMBER - 13126

Results reported unless noted: (Chemistry Analysis as mg/l) (Bacteria as organisms/100 ml)

ANALYSIS	RESULTS	DATE ANALYZED	ANALYST
NITRATE as N	75.2	01/15/2007	MB

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Suzanne Myers, Laboratory Manager



