

Permit Modification Fact Sheet

General Information

Permit Number:	WI-0063533-02-1
Permittee Name:	Central Sands Dairy LLC
Address:	N15927 CTY G
City/State/Zip:	Nekoosa WI 54457
Discharge Location:	NW ¼ Section 12 T20N R4E, Town of Armenia, Juneau County
Receiving Water:	Central Wisconsin River Basin And Groundwaters of the State

Permit Modification Background and Details

Central Sands Dairy LLC is a currently Wisconsin Pollutant Discharge Elimination System (WPDES)-permitted dairy Concentrated Animal Feeding Operation. Its current WPDES permit became effective on January 1, 2012 and will expire on December 31, 2016. At issuance, the operation housed approximately 3800 dairy cows and 400 calves, or 5300 Animal Units. In response to concerns about potential groundwater impacts associated with the operation's production area, the Department is proposing to modify the current permit to include requirements for Central Sands Dairy LLC to install a production area groundwater monitoring system. As part of the modification, the Department has identified approximate locations for the groundwater monitoring wells associated with the system which are identified within the modified permit.

The only sections of the permit that are proposed for modification are related to requirements associated with installation of the production area groundwater monitoring system. These include:

- Insertion of Section 2, "Groundwater Monitoring System for Production Area": This section outlines the proposed groundwater monitoring system and associated sampling/monitoring requirements.
- Insertion of Section 3.4, "Production Area Monitoring – Groundwater Monitoring Well Installation": This section outlines the construction schedule for the proposed production area groundwater monitoring system.
- Insertion of Section 4.3, "Groundwater Standard Requirements": This section outlines standard requirements associated with groundwater monitoring systems.
- Modification of Section 5, "Summary of Reports Due": This section was modified to include the summary of items changed in Sections 2 and 3.4.
- Permit cover page signatory line and signee: to accurately reflect the name and title of the personnel signing the modified permit.

Only the specific modifications discussed above are subject to public review and comment. All other components of the permit remain unchanged.

Attachments:

April 7, 2016 letter from the Department to James Wysocki re: Phase 2 Groundwater Monitoring at Central Sands Dairy, LLC; file ref: R-2015-0234

Public Notice

Fact Sheet Prepared By: James M. "Mike" Carlson, Agricultural Runoff Management Specialist

Date: April 8, 2016.



April 7, 2016

FILE REF: R-2015-0234
WPDES Permit #: WI-0063533-02-0

James Wysocki
Central Sands Dairy LLC
PO Box 330
Bancroft, WI 54921

Subject: Phase 2 Groundwater Monitoring at Central Sands Dairy, LLC, SW¼, Sec 12, T20N, R4E,
Armenia Township, Juneau County

Dear Mr. Wysocki:

The Office of Business Support and External Services of the Wisconsin Department of Natural Resources (the Department) is responding with the Actions listed below, to the following information submitted on behalf of Central Sands Dairy by Robert Nauta, P.G., RJN Environmental Services, LLC:

1. "Non-Compliance Evaluations for a Manure Lagoon and a Digester, and Request for a Phase II Groundwater Monitoring Plan for the Production Area" dated November 6, 2015, and received by the Department on November 23, 2015.
2. "Workplan for Additional Groundwater Investigation" dated November 6, 2015, and received by the Department on November 9, 2015. (DNR Project # R-2015-0234)

The Department acknowledges, in accordance with s. 281.41, Wis. Stats., the above listed proposed plans and specifications (DNR Project #R-2015-0234) from Central Sands Dairy was Statutorily Approved on February 7, 2015 because 90 days passed since receipt by the Department. However, as provided in s. 281.41(1)(b), Wis. Stats., "[a]pproval may be subject to modification by the department upon due notice." This letter serves as due notice to you that the plans and specification submittal (DNR Project #R-2015-0234) will be modified by modifications to the WPDES Permit for Central Sands Dairy.

Questions may be directed to the Department regional staff, James (Mike) Carlson, or the Department engineer, Gretchen Wheat. Questions specific to the groundwater monitoring well placement and construction may also be directed to the Department hydrogeologist, Laura Chern. (Contact information for each of these Department employees is provided in the "cc" list at the end of this letter.)

Actions: The Department is proposing to modify the WPDES Permit for Central Sands Dairy to include requirements for production area groundwater monitoring, summarized as follows:

- Inclusion of existing groundwater monitoring wells and piezometers located on the production area property. (These were installed voluntarily by Central Sands Dairy, in accordance with a Department approval dated September 26, 2014.)
- Addition of new groundwater monitoring wells and piezometers to be located on the production area property.
- One additional groundwater monitoring well and piezometer to be located upgradient from the production area property, on the edge of crop field RDO12. (Central Sands Dairy has agreed to this, refer to submittal #2, listed above, but the location needs to be moved towards the southwest in order to provide background water quality for the existing groundwater monitoring well CSD-4.

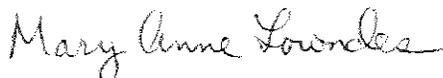
The proposed modified WPDES Permit includes a site map that shows the locations of the existing groundwater monitoring wells and piezometers, and locations for additional groundwater monitoring wells and piezometers that constitute the minimum approvable groundwater monitoring plan required for the site. The proposed modified WPDES Permit also lists the parameters and frequencies for the minimum

approvable groundwater monitoring, and contains a Compliance Schedule for the additional monitoring wells and piezometers to be installed, and sampling commenced, this year (2016).

Reasons: The Department is modifying the WPDES Permit for Central Sands Dairy to require additional groundwater monitoring for the reasons listed here. Additional information is in the attached report from the Drinking Water and Groundwater Program dated March 31, 2016.

- A. The above listed submittals from Central Sands Dairy included new information that a septic system drain field exists immediately upgradient from the groundwater monitoring well nest CSD-1.
- B. The Department has reviewed the production area groundwater monitoring results submitted to date, and finds that additional groundwater monitoring locations are needed to identify the source or sources of groundwater contamination. The monitoring results to date do not support, Central Sands Dairy's position that the causes are from off-site, and possibly from on-site limited facilities that the WPDES Permit does not regulate (a septic system drain field) or that are no longer in use (a feed runoff treatment infiltration strip).
- C. Central Sands Dairy performed what it refers to as a "comprehensive integrity analysis" of the manure storage lagoon, which included emptying, cleaning, and inspection, and repair of the cracks identified. The Department believes most of the cracks were narrow enough that significant liquid leakage seems unlikely. Unfortunately, soil samples taken from below the cracks did not receive chemical testing to help determine if leakage had occurred. Also, Central Sands Dairy has still not acknowledged the groundwater found within 2 feet below the floor elevation at the time of repair, and the analysis also did not address this finding. This groundwater found was mentioned only in a field note, with no photos or resulting soil test results provided, and no other information or mention of this groundwater elevation was made in the analysis report (prepared by AECOM).
- D. The Department and Central Sands Dairy have determined the digester floor elevation appears to not have the required minimum 2 feet from saturation, based on the groundwater level monitoring results from groundwater monitoring wells, and the digester design plans (no as-built record is available).
- E. The Department does not agree that the manure lagoon and digester were in compliance with the minimum required separation to saturation specified by the NRCS 313 Standard in effect at the time of construction. (September 28, 2015, Non-Compliant Evaluation letter from the Department).

Sincerely,



Mary Anne Lowndes
Chief, Runoff Management Section
Bureau of Watershed Management



Gretchen Wheat, P.E.
Water Resources Engineer
Bureau of Watershed Management

Encl: Drinking Water and Groundwater program report, dated March 31, 2016, "Central Sands Dairy LLC Groundwater Monitoring

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Central Sands Dairy LLC Groundwater Monitoring

March 31, 2016

Contact: Laura Chern – DG/5

Tasks:

- 1) Describe groundwater monitoring requirements to investigate the source and extent of groundwater contamination documented in monitoring wells and piezometers at the site (section NR 140.26, Wis. Adm. Code).
- 2) Recommend components of an approvable Phase II groundwater monitoring work plan consistent with WPDES permitting requirements for the Central Sands Dairy LLC (CSD) permit number WI00063533-02-0 and chapters NR 243 and NR 214, Wis. Adm. Code.

Accomplishing these two tasks allows identification of which structures are performing as designed to protect groundwater quality and which may need modification to remedy groundwater contamination.

Recommendations

Review of sample analytical results from Phase 1 monitoring wells show unknown, onsite sources of ammonia/ammonium (ammonium-N) and nitrate have led to groundwater quality standard exceedances. Seven additional water-table wells and one additional piezometer are recommended. The proposed Phase II well locations will build on Phase 1 to define sources and help determine what remedies, if any, are necessary. Potential sources and recommended monitoring for each are listed in Table 1. Existing Phase I wells (red dots) and recommended Phase II wells (yellow dots) are shown in figure 1.

Table 1 –Potential onsite sources, justification for monitoring each, and corresponding well names for Phase II well construction (figure 1) for expanded groundwater monitoring at the CSD. Well names are only for the purpose of this document.

Sources	Monitoring Justification	Proposed wells
Calf Hutch Area	Up to 300 calves have been housed at the site. Calf hutches are set directly on the ground and may be contributing nitrate to groundwater. The source of high nitrate levels in CSD-2 maybe from the Calf Hutch Area. Proposed monitoring well Q is located downgradient of the calf hutch area.	Q
Winter manure stacking sites	Last winter manure was stacked next to the doors of the barns on the ground. Proposed well O is located.	O
Manure solids separation building	Inadvertent releases or structural aspects of the facility may be a source nitrate to groundwater. Proposed wells distinguish a number of structures from the WSF; monitoring well N is upgradient, O and P are downgradient.	N, O and P
Manure digester	Inadvertent releases or structural aspects of the facility may be a source nitrate to groundwater. Proposed wells distinguish a number of structures from the WSF; monitoring well N is upgradient, O and P are downgradient.	N, O and P
Bagged feed	The bags rest directly on the ground may be a source of nitrate to groundwater. Proposed monitoring well P is located downgradient.	P
Sand storage pad	Sand for bedding is separated from manure and stored without a cover, on a concrete pad which may be a source nitrate to groundwater. Proposed wells distinguish a number of structures from the WSF; monitoring well N is upgradient, O and P are downgradient.	N, O and P
Septic drain field	The recently identified septic drain field east of the WSF may be the source of ammonia in groundwater in wells CSD-1S and CDS-1D. Proposed monitoring well O is upgradient; well S is downgradient.	O and S
Waste storage facility (WSF)	Based on Phase 1 monitoring results, the bottom of the WSF (or pond) is sometimes in contact with groundwater. The WSF may be the source of	O and R

	ammonia in groundwater in wells CSD-1S and CSD-1D. Proposed monitoring well O is upgradient, CSD-1S, CSD-1D and R ¹ are downgradient and separated from possible impacts from the septic drain field.	
Feed storage pad and bunker and infiltration basin A	Runoff from the feed storage pad and bunker are currently routed to the WSF. At one time, some of the runoff was routed to infiltration basin (A) next to the WSF. The consultant identifies residual nutrients in the basin as a potential source of ammonium. No additional wells to distinguish this source from the WSF are proposed.	None
Unlined barn stalls	The barns have concrete scrape alleys and cows are bedded on recycled sand placed directly on the ground. The unlined stalls may be a source of nitrate to groundwater. Proposed well R is located downgradient.	R
Land application of manure on field RDO-12	Elevated levels of nitrate in CSD-4, located upgradient of the facility and downgradient of spray irrigation field RDO-12, may indicate that land application of nutrients is impacting groundwater quality. Proposed monitoring well L and piezometer M are upgradient wells. Proposed monitoring well P is downgradient.	L, M and P

¹ Proposed monitoring well R replaces monitoring well MW-2, now abandoned. Ammonia was first detected in MW-2 located downgradient of the WSF.

New well locations should take into consideration normal site activities and convenience of operation. High traffic areas should be avoided. All wells and piezometers (Phases I and II) should be sampled at least quarterly for the following parameters: total dissolved solids, chloride, chemical oxygen demand, ammonium/ammonia, total Kjeldahl nitrogen, total organic carbon, total coliform bacteria (count), E. coli (count) nitrate (nitrate+nitrite), and potassium. Quality Assurance/Quality Control samples should be included in the work plan. Sample analytical results may indicate that alternative concentration limits be determined.

Background

Phase 1 groundwater monitoring was designed to define site hydrogeology including groundwater quality, flow and water table elevation fluctuation for the purpose of developing a Phase II groundwater monitoring work plan for a monitoring well configuration that insures permit discharge limitations (permit section 1.1 of WI00063533-02-0) are met. Results of Phase I monitoring are the basis for the Phase II recommendations.

Four water-table monitoring wells and 2 piezometers were constructed in October of 2014 (referred to as Phase I in documents). The locations of Phase 1 wells and piezometers are shown in red on figure 1. Piezometers were paired with water-table wells to determine vertical groundwater flow and changes in groundwater quality with depth. Paired wells are referred to as nested wells. Nested wells CSD-3S and CSD-3D are located upgradient of the facility; nested wells CSD-1S and CSD-1D are located downgradient. Horizontal groundwater flow across the facility is from the northwest toward the southeast (see figure 2).

Phase I wells were sampled 4 times. Selected sample analytical results are shown in Table 2. The values highlighted in yellow exceed groundwater quality standards (chapter NR 140, Wis. Adm. Code). For ammonium, the preventive action limit (PAL) is 0.97 mg/L and for nitrate, the PAL is 2 mg/L. The enforcement standard (ES) for nitrate is 10 mg/L. Table 2 shows elevated ammonia above the PAL downgradient of the site in monitoring wells CSD-1S and CSD-1D. Ammonia is rarely found in groundwater unless a source of contamination, such as manure, is in direct contact with groundwater (Foth, 1984). Potential sources include, but may not be limited to the waste storage facility and the septic

drain field. The WSF has been cleaned, inspected and repaired. However, groundwater elevation data from Phase I wells show that the water-table rises above the bottom of the WSF creating the potential for release of ammonium to groundwater. Table 3 provides the Phase 1 groundwater elevation data used for determining groundwater flow direction and proposed Phase II well locations [Note: This table includes data from voluntary groundwater monitoring wells (abandoned on recommendation of CSD consultant) that preceded the Phase 1 plan and are labelled MW-1, MW-2 and MW-3.]

Monitoring well CSD-4 is located upgradient of the facility and downgradient of spray irrigation field RDO 12. Nitrate levels at more than 7 times the ES (10 mg/L) have been documented in monitoring well CSD-4 (see Table 2). At this level of contamination livestock health can be negatively affected .

Reference

Foth, H.D., 1984. Fundamentals of Soil Science, 7th Ed. JohnWiley & Sons, 453 pgs.

Figure 1: Air photo showing potential sources of contamination, Phase 1 wells (in red) and proposed Phase II wells (in yellow). See Table 1 for explanation.

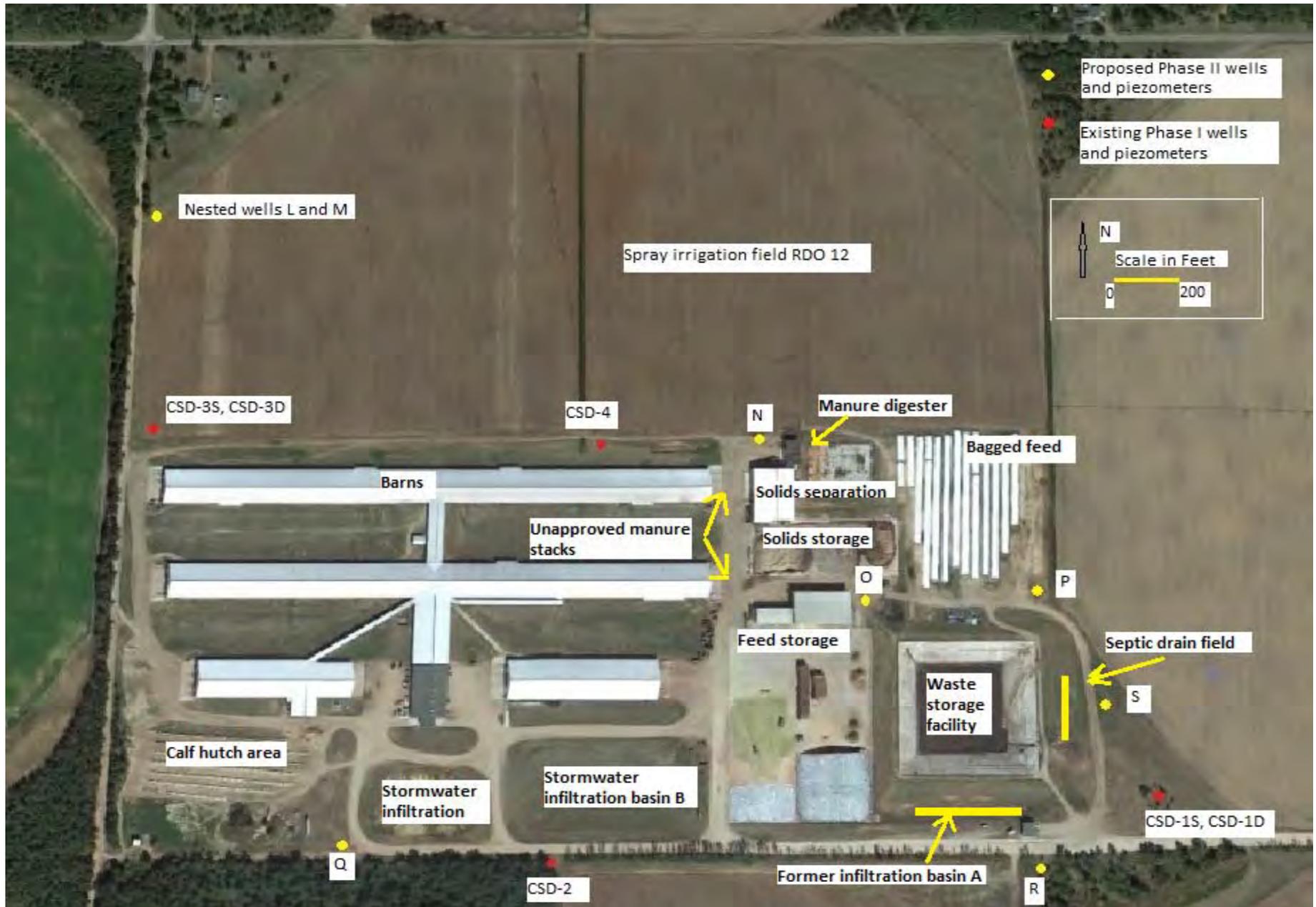


Figure 2: Approximate locations of Phase I (existing) groundwater monitoring wells and groundwater flow direction for December 18, 2015 (from RJN Environmental Services Report dated December 23, 2015).

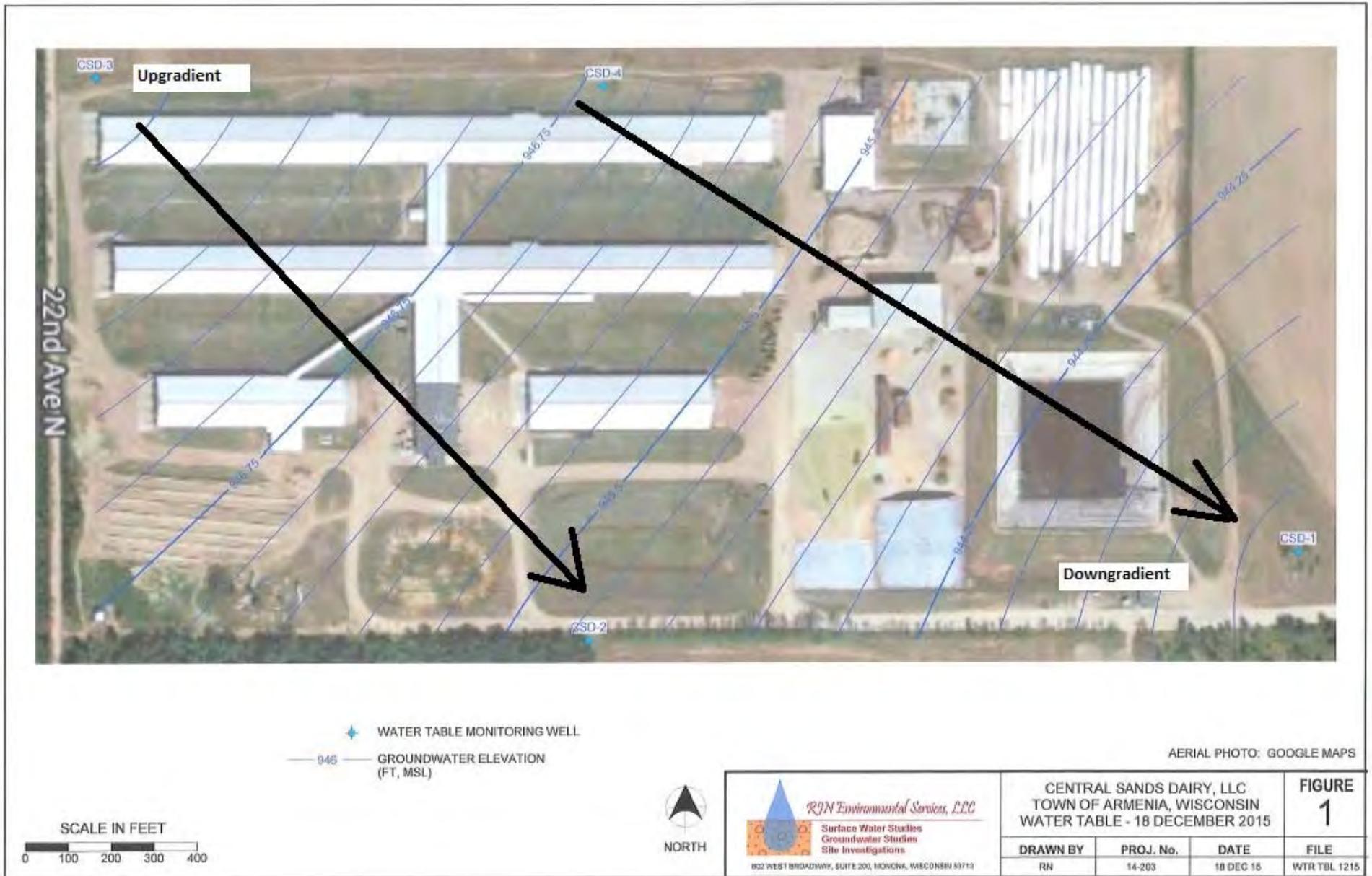


Table 2: Groundwater Quality in Phase 1 Groundwater Monitoring Wells and Piezometers (selected parameters; corrected values based on laboratory sheets)

Parameter	CSD-1S				CSD-1D				CSD-2			
	Dec 14	Apr 15	July 15	Oct 15	Dec 14	Apr 15	July 15	Oct 15	Dec 14	Apr 15	July 15	Oct 15
Chloride	16.9	21.1	19	19	28.1	38.8	42	35	8.6	6.11	7.0	5.4
Ammonium* (N)	2.77	2.63	2.6	3.3	6.44	5.77	6.7	9.5	0.03	<0.015	<0.043	0.057JB
Total Kjeldahl N	3.01	2.61	2.3	2.3	6.9	5.77	6.5	7.6	0.27	0.212	0.54	0.76
Total Coliform Bact	P	P	<1	2	P	P	<1	6	P	P	<1	1
E. Coli	A	A	<1	<1	A	A	11	<1	A	A	<1	<1
Nitrate (NO ₂ +NO ₃)	16.1	14.0	24.0	22.0	14.9	11.9	20	21	10.8	8.5	9.6	11

Parameter	CSD-3S				CSD-3D			
	Dec 14	Apr 15	July 15	Oct 15	Dec 14	Apr 15	July 15	Oct 15
Chloride	35.2	63.5	48	34	1.9	6.37	5.1	5.2
Ammonium (N)	0.02	<0.015	<0.043	0.05JB	0.02	0.0157F	0.076J	0.056JB
Total Kjeldahl N	0.21	0.212F	0.50	0.71	0.11	<0.110	<0.29	0.57
Total Coliform Bacteria	P	P	5	2	P	P	210	11
E. Coli	A	A	4	<1	A	P	<1	<1
Nitrate (NO ₂ +NO ₃)	18.8	17.2	24	22	0.3	1.25	2.3	1.7

Parameter	CSD-4 (CSD-4 DUP)							
	Dec 14	Dec 14 (Dup)	Apr 15	Apr 15 (Dup)	July 15	July 15 (DUP)	Oct 15	Oct 15 (DUP)
Chloride	50.4	(50.8)	58.1	(58)	52	(51.0)	24	(25)
Ammonium (N)	0.01	(0.01)	<0.015 0	(<0.0150)	<0.04 3	(<0.043)	0.072	(0.062)
Total Kjeldahl N	0.63	(0.63)	0.505	(0.132F)	1.2	(1.1)	1.0	(0.62)
Total Coliform Bacteria	P	(P)	P	(P)	<1	(<1)	3	(1)
E. Coli	A	(A)	A	(A)	<1	(<1)	<1	(<1)
Nitrate (NO2+NO3)	62.5	(60.0)	69.5	(69.3)	77	(77)	38	(36)

*Ammonium is measured as Ammonia-N.

Table 3: Depth to Groundwater and Groundwater Elevation in Phase 1 Monitoring Wells and Piezometers (see figure 2).

Well	Top of Casing**	Water Table Elevation* (feet above mean sea level)					
		Oct 14	Dec 14	Apr 15	Jul 15	Oct 15	Dec 15
CSD-1S*	963.61	943.41	943.42	942.48	942.55	943.04	943.05
CSD-1D	963.53	941.71	944.85	942.34	942.55	943.02	943.06
CSD-2	961.18	945.28	945.24	944.35	944.41	944.87	945.17
CSD-3S	963.26	948.06	948.1	947.11	947.48	947.75	948.27
CSD-3D	963.07	948.06	948.08	947.09	947.51	947.76	948.3
CSD-4	963.91	946.68	946.71	945.75	944.81	945.98	946.69

*Nested wells CSD-1S and CSD-1D are located closest to and downgradient of the Waste Storage Facility

**Elevation in feet above mean sea level

Table 3 (continued): Depth to Groundwater and Groundwater Elevation in Abandoned Water Table Monitoring Wells

Well	Groundwater Table Elevation feet above mean sea level			
	1/11/2008	1/30/2009	2/17/2010	1/10/2012
MW-1	934.44	937.8	937.58	940.33
MW-2*	939.91	940.58	940.35	943.3
MW-3	944.25	944.59	944.56	947.65

*MW-2 was located downgradient and closest to the Waste Storage Facility