SAND CREEK CONSULTANTS, Inc.
SM

CON 12-15
Doc #21128

Environmental and Geological Scientists and Engineers
www.sand-creek.com

2009 SEP -9 P 1: 03

DEPT. OF
NATURAL RESOURCES

September 9, 2009

Mr. Matthew Culp
Iowa Department of Natural Resources
Wallace State Office Building
502 East 9th Street
Des Moines, IA 50319-0034

RE: Monitoring Well Installation and Groundwater Sampling Report
Crop Production Services
214 4th Avenue NE
Dyersville, IA
CPS Project No. 99-097
SCC Project No. 07-065-CPS-Dyersville, IA

Dear Mr. Culp:

This report documents the installation and sampling of two water table monitoring wells on March 9, 2009, at the Crop Production Services, Inc. (CPS) facility in Dyersville, Iowa. Figure 1 is a site location map of the site and Figure 2 is a site plan including locations of the new wells.

ABSTRACT

As a result of a liquid fertilizer spill in January 2007, a soil and groundwater investigation was conducted that identified the presence of elevated concentrations of nitrogen in the soil and groundwater. Impacted soil was inaccessible under the liquid fertilizer containment structure. Subsequently the Iowa Department of Natural Resources (IDNR) requested the installation and sampling of two monitoring wells and three years of sampling once annually. One monitoring is located adjacent to the containment structure in the soil-impacted area and the second well is located downgradient to the west northwest. Groundwater sample results show that groundwater in the source area (MW-1) exceeds the Iowa Statewide Groundwater Standards for Protected Groundwater for nitrate and ammonia. The downgradient well exceeds the Groundwater Standard for Protected Groundwater for nitrate. Slug testing needs to be conducted to determine the groundwater classification.

SITE DESCRIPTION AND PHYSICAL SETTING

The CPS facility is located in the north part of the City of Dyersville, Iowa. The site is located at 214 4th Avenue NE in the SW ¼ of the SE ¼ of Section 30, Township 90 North, Range 2 West in Dubuque County (see Figure 1 for a site location map). The North Fork Maquoketa River is located approximately 300 feet north of the facility. The river generally flows to the south. The surrounding land use is primarily commercial with residences to the immediate north and northwest between the facility and the river.

The property is currently used as an agrochemical facility for custom mixing of fertilizer and pesticides. Structures include a liquid fertilizer containment structure, dry fertilizer warehouse, pesticide storage and mix/load building, shop, office and other miscellaneous storage buildings.

SITE HISTORY

The site has operated as an ag chem facility for approximately 40 years. It has been owned by CPS since 1983. Prior to its current use the area is reported to have been part of a railroad siding or yard. Concrete footings for a former railroad water tower are still in place.

On January 29, 2007 a liquid fertilizer release in the fertilizer secondary containment occurred when a fiberglass tank ruptured while being filled with product (8-0-0-10). The product flowed through a ruptured cold joint at the northwest corner of the containment structure. Remedial actions included damming the storm sewer and recovering all available product, including the removal of one to two feet of soil near the northwest corner of the containment structure. Based on volume estimates, approximately 6,200 gallons of fertilizer product are believed to have been released to the North Fork Maquoketa River. Recent frost heaving appears to have caused the containment rupture. The containment structure was repaired.

Additional investigation indicated that the southern central portion of the secondary containment structure was settling and that cracks had developed in the floor. Ultimately a 15' x 20' section of floor was removed and the soft material below this location was excavated to a depth of six feet. The hole was backfilled with engineered material and the containment structure repaired.

EXISTING HYDROLOGIC AND HYDROGEOLOGIC INFORMATION

The facility is divided by 4th Avenue NE, with the office and equipment parking area to the north and materials storage and containment area to the south. Stormwater from the southern area flows into a storm sewer at the corner of 2nd Street NE and 4th Avenue NE, which flows north and discharges to the river. Stormwater from the office and equipment parking area flows to the north into the river.

A review of private well construction information for the area indicates that shallow soils (<50 feet) vary significantly, with descriptions ranging from sand and gravel mixtures to till or clay, or even sandy clay. Depth to bedrock in the wells ranged from 58 feet to greater than 132 feet below grade. Bedrock is reported as dolomite and limerock. Depths to groundwater ranged from 12 to 58 feet. According to the City of Dyersville, the city operates off of two wells. The closest well (#4) is located approximately 0.6 miles to the northwest near the intersection of 8th Street NW and 6th Avenue NW on the west side of the North Fork Maquoketa River. The second well (#5) is located 1.2 miles to the southeast near the intersection of US Highway 20 and State Highway 136.

Borings conducted in 2007 by Crawford Engineering on the south side of the containment structure indicated that the subsurface was very soft. Due to the soft, wet nature of the material, no soil samples were collected from 0 to 10 feet below ground surface (bgs). A limited amount of shallow material was recovered that consisted of very wet, black silt/sand. Crawford indicated that the material was probably fill material. Firm clay was observed at a depth of approximately 15 feet.

During the containment reconstruction in 2007 the material excavated from below the containment floor was waste material composed of coal, glass, clay tile, and other debris. Firm clay was observed at a depth of approximately six feet. During the excavation an estimated 10,000 gallons of water was pumped from

the excavation. Crawford believes that this groundwater was perched within the waste material located below and south of the containment structure and does not reflect the true water table.

Split-spoon soil sampling was conducted during monitoring well installation (boring logs are attached). The geology was somewhat variable between the two borings. In MW-1, silty sand was present to a depth of 8.5 feet bgs, under which was sandy clay that transitioned to all sand by approximately 12 feet bgs (the 4 to 8 foot interval was particularly soft with only 4 inches of recovery in a 4-foot sample). Another layer of clay was observed from 13 to 13.5 feet, under which was silty sand to the terminus of the boring at 20 feet bgs. In MW-2, a layer of dry sand and gravel was present under topsoil at 2.5 to 3.5 feet bgs. Below the sand and gravel was material similar to the sandy clay seen in MW-1, which then transitioned to silty sand by approximately 10 feet bgs. Silty sand was observed to the terminus of the boring at 17 feet bgs.

MONITORING WELL INSTALLATION AND DEVELOPMENT

The locations for the new wells were chosen based on the estimated groundwater flow direction. MW-1 was placed in the source area, at the approximate location of GP-6 (from the site investigation). MW-2 was placed approximately 200' northwest of MW-1, downgradient of the source well, in between the containment structure and the North Fork of the Maquoketa River.

New monitoring wells MW-1 and MW-2 were installed by Soil Essentials of New Glarus, Wisconsin, on March 9, 2009. The wells were developed by surging and purging each well with a disposable bailer. Each well was sampled immediately following development. Water recovery was relatively rapid, although the wells were slow to stabilize as the water approached its maximum elevation. Well development forms are attached. Soil boring logs, monitoring well construction forms and monitoring well development forms are attached and monitoring well construction details are summarized in Table 1.

MW-1 was installed as a standard 2" monitoring well to a depth of 20 feet bgs. The water table depth was difficult to determine: soils were saturated at about 11 feet bgs, but water came up to 6 feet bgs in the borehole prior to well construction. This might be perched groundwater contained in fill material located below and around the liquid containment structure. Subsequently this well was constructed with a 15-foot screen (5-20'). MW-2 was also installed as a standard 2" monitoring well to a depth of 17 feet bgs with a 10-foot screen.

In both wells filter pack sand was installed to 1' above the top of the screen. Bentonite was then installed to within 1 foot of the surface. As the bentonite was being installed, a tape measure was used to ensure that the bentonite did not bridge. Each well was finished with a flush-mount well cover set into a collar of concrete.

MONITORING WELL SAMPLING RESULTS AND DISCUSSION

The two new monitoring wells were sampled on March 9, 2009 immediately following installation and development. Groundwater sample results are summarized in Table 2 and well locations are shown on Figure 2. Historical groundwater sampling data is included in Table 3. Laboratory reports are attached.

Sample results from MW-1 indicate a nitrate/nitrite-N concentration of 310 mg/L and an ammonia-N of 990 mg/L. Results from MW-2 report a nitrate/nitrite-N concentration of 14 mg/L and ammonia-N was below the reporting limit of 1.0 mg/L. Correlation of these sample results to regulatory compliance levels will be done once slug test data has been gathered and aquifer status has been determined. Because the wells were not quick to stabilize, slug testing was delayed until the second sampling round in March 2010. However, based on the relatively rapid rate of recovery during monitoring well development, the screened interval at which the wells are set appears to be relatively permeable, which would suggest an aquifer falling under Iowa Department of Natural Resources (IDNR) Protected Groundwater Standards.

Groundwater elevation data is summarized in Table 1 and is referenced to a benchmark (100.00) established on the concrete apron at the northwest corner of the Shop and Warehouse (see Figure 2). A precise groundwater flow direction cannot be mapped at this time because there are only two data points.

GROUNDWATER SAMPLING SCHEDULE

Sand Creek will sample the two monitoring wells once annually for two more years (March 2010 and March 2011). Both wells will be sampled for nitrate/nitrite- and ammonia-nitrogen. A report to IDNR summarizing the sample results will be prepared following each round.

SCC will conduct slug testing at the site during the next sampling round to establish the groundwater classification.

Please feel free to contact me at 715.824.5169 or mdawson@sand-creek.com if you have any questions.

Sincerely,
Sand Creek Consultants, Inc.

Mark Dawson, M.S.
Environmental Engineer

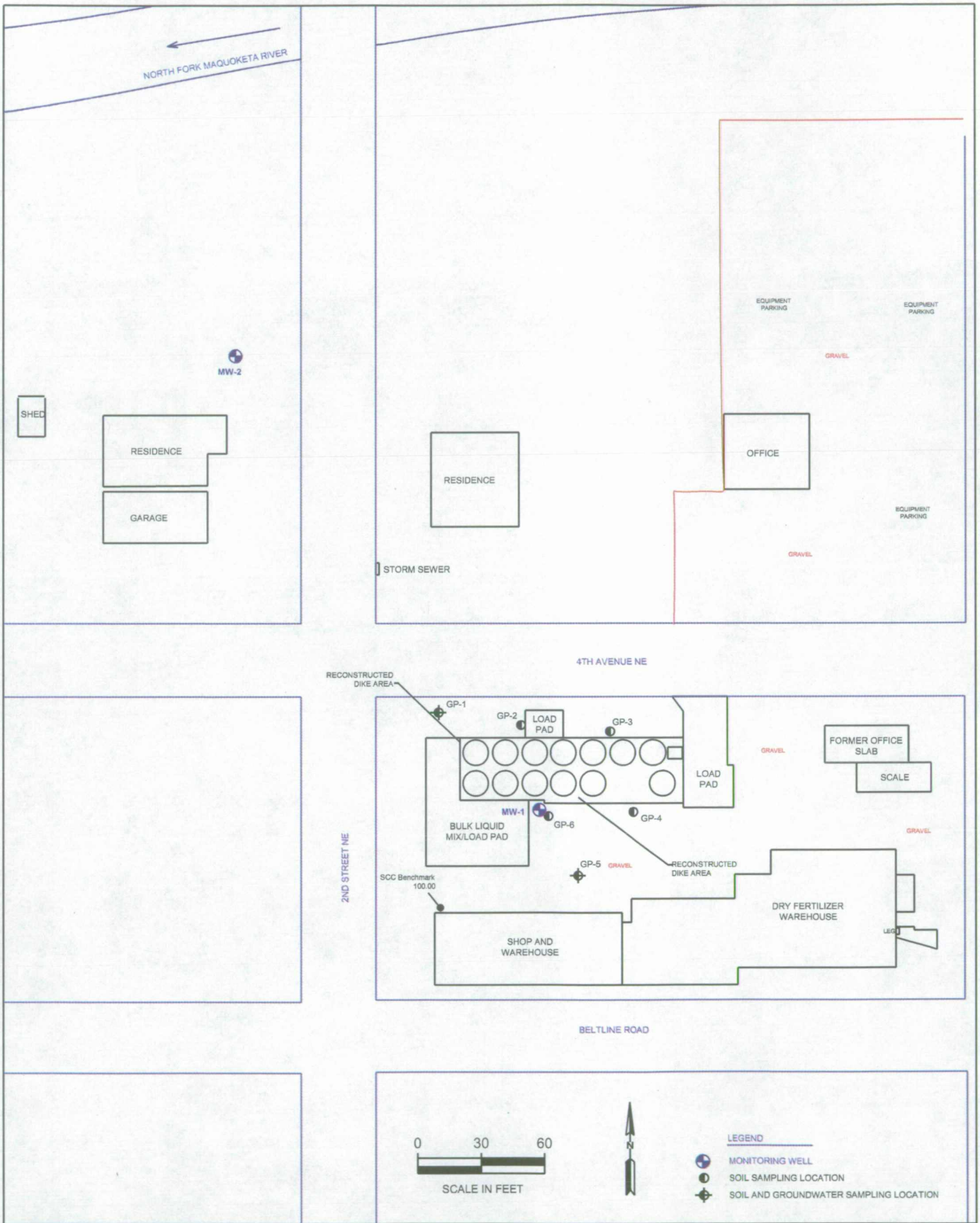
cc: Mr. Jason Komes – Crop Production Services, Inc. – Greeley, CO
Mr. Pat Sperfslage – Crop Production Services, Inc. – Dyersville, IA
Mr. Gary Mensen – Crop Production Services, Inc. – Dyersville, IA
SCC files

FIGURES AND TABLES

Figure 1	Site Location Map
Figure 2	Site Plan and Monitoring Well Locations
Table 1	Well Construction Details and Survey Data
Table 2	Current Fluid Levels and Groundwater Analytical Data
Table 3	Historical Fluid Levels and Groundwater Analytical Data

Figure 1
Site Location
Crop Production Services - Dyersville, Iowa

Source: USGS 1994



SAND CREEK CONSULTANTS, INC.
123 S. Main Street, P.O. Box 218
Amherst, WI 54406
Tel: 715.824.5169
Fax: 866.608.6473

SITE MAP &
MONITORING WELL LOCATIONS

CROP PRODUCTION SERVICES
DYERSVILLE, IOWA

FIGURE 2

DATE: JULY 1, 2009
DRAWN BY: MD

TABLE 1

WELL CONSTRUCTION DETAILS AND SURVEY DATA
Crop Production Services
214 4th Avenue
Dyersville, Iowa

Well ID	Total Depth (feet bgs)	Borehole Diameter (inches)	Casing Size (inches)	Screened Interval (feet bgs)	Screen Slot Size (inches)	Top of Casing Elevation*	Survey Date*
MW-1	20	10	2	5-20	0.010	98.83	Mar-09
MW-2	17	10	2	7-17	0.010	98.11	Mar-09

Definitions/Abbreviations:

BGS = Below Ground Surface
MSL = Mean Sea Level
ID = Identification
* = Survey was referenced to a benchmark established by contractor on concrete apron, northwest corner of Shop and Warehouse.

TABLE 2

CURRENT FLUID LEVELS AND GROUNDWATER ANALYTICAL DATA
Crop Production Services
214 4th Avenue
Dyersville, Iowa

Well ID	Gauging Date	Sample Date	Top of Casing Elevation*	Depth to Groundwater (feet below TOC)	Groundwater Elevation*	NH^3 (mg/L)	NO^3 (mg/L)	Comments
MW-1	3/9/2009	3/9/2009	98.83	5.95	92.88	990	310	
MW-2	3/9/2009	3/9/2009	98.11	12.62	85.49	<1.0	14	
Iowa Statewide Groundwater Standards				Protected		23**	10	
				Non-Protected		115**	56	

Definitions/Abbreviations:

ID =Identification
MSL =Mean Sea Level
TOC =Top of Casing
LPH =Liquid Phase Hydrocarbons
NH^3 =Ammonia by EPA Test Method 350.1
NO^3 =Nitrates by EPA Test Method 353.2

Notes:

* Survey was referenced to a benchmark established by contractor on concrete apron, northwest corner of Shop and Warehouse.
** Converted to ammonia as nitrogen by dividing ammonia by 1.3.

TABLE 3

HISTORICAL FLUID LEVELS AND GROUNDWATER ANALYTICAL DATA
Crop Production Services
214 4th Avenue
Dyersville, Iowa

Well ID	Gauging Date	Sample Date	Top of Casing Elevation*	Depth to Groundwater (feet below TOC)	Groundwater Elevation*	NH^3-N (mg/L)	NO^3-N (mg/L)	Comments
GP-1	11/17/2007	11/17/2007	Grab	Grab	Grab	44	150	
GP-5	11/17/2007	11/17/2007	Grab	Grab	Grab	2	53	
MW-1	3/9/2009	3/9/2009	98.83	5.95	92.88	990	310	
MW-2	3/9/2009	3/9/2009	98.11	12.62	85.49	<1.0	14	
Iowa Statewide Groundwater Standards				Protected		23**	10	
				Non-Protected		115**	56	

Definitions/Abbreviations:

ID =Identification
MSL =Mean Sea Level
TOC =Top of Casing
LPH =Liquid Phase Hydrocarbons
NH^3 =Ammonia by EPA Test Method 350.1
NO^3 =Nitrates by EPA Test Method 353.2

Notes:

* Survey was referenced to a benchmark established by contractor on concrete apron, northwest corner of Shop and Warehouse.
** Converted to ammonia as nitrogen by dividing ammonia by 1.3.

LABORATORY REPORTS

Nationwide Mobile Laboratories
Pesticide Residue Laboratory
Chemistry Consulting

March 17, 2009

Mark Dawson
Sand Creek Consultants
P.O. Box 218
123 S. Main Street
Amherst, WI 54406

re: Crop Production Service - Dyersville, Iowa

Dear Mr. Dawson,

Enclosed you will find the analytical results for the samples collected March 9, 2009.
Please feel free to call if you have any questions.

Sincerely,

Michael Lindow
for GJG

Gregory J Graf
Quality Manager

Enclosures
jce

Environmental Chemistry Consulting Services, Inc.

2525 Advance Road, Madison, WI 53718
(608) 221-8700 (608) 221-4889 www.ecsmobilelab.com

Summary of Test Results

Project Name: Crop Production Services
Project Location: Dyersville, Iowa

Sample Type: Water
Concentration: mg/L

Sample Number	Sample Description	Date Collected	Date Received	Date Analyzed	Nitrate+ Nitrite-N		Ammonia-N
A091102-01	MW-1	03/09/09	03/09/09	03/17/09	**310**		**990**
A091102-02	MW-2	03/09/09	03/09/09	03/17/09	**14**	<	1.0

	Nitrate+ Nitrite-N	Ammonia-N
Method Detection Limit	0.016	0.079
Practical Quantitation Limit	0.053	0.26
Reporting Limit	1.0	1.0

Method Reference:
Nitrate+Nitrite-N: EPA 353.2
Ammonia-N: EPA 350.1

WI Lab Certification #113289110

E.C.C.S.
2525 Advance Road
Madison, WI 53718
Phone: (608)221-8700
Fax: (608)221-4889

Approved by: M. Lindaas

Date: 3/18/09

Environmental Chemistry Consulting Services, Inc.

2525 Advance Road Madison, WI 53718
Phone 608-221-8700 FAX 608-221-4889

CHAIN OF CUSTODY

No. 018072 *

A091102

Page 1 of 1

Turn Around (circle one) ~~Normal~~ Rush

Report Due:

Project Number:		Mail Report To:	MARK DAWSON
Project Name:	CPS- Dyersville, IA	Company:	SAND CREEK CONSULTANTS
Project Location:	Dyersville, IA	Address:	PO Box 218
Sampled By (Print):	Ryan S. Haney		AMHERST WI 54406

Invoice To: ~~CASEY MORSON~~ CROP PROD SVC
Company: C/O SAND CREEK CONS.
Address: PO 218
AMHERST WI 54406
P.O. No.: Quote No.:

Sample Description	Collection Date	Collection Time	Matrix	Total Bottles	Preserv*	Analysis Requested	Comments	Laboratory Number
MW-1	3-9-09	1220	GW	1	H_2SO_4	Nitrate/Nitrite-N Ammonia-N		01
MW-2	3-9-09	1330	GW	1	H_2SO_4	"		02

*Preservation Code
A=None B=HCL C=H2SO4
D=HNO3 E=EnCore F=Methanol
G=NaOH O=Other(Indicate)

Relinquished By:	Date/Time: 3-9-09 1630	Received By: M. Jenkins 3/9/09	Date/Time: 16:30
Relinquished By:	Date/Time:	Received By:	Date/Time:

Custody Seal: Present/Absent Intact/Not Intact Seal #'s
Shipped Via: Hand Del

Receipt Temp:
Temp Blank Y N
ON ICE

WHITE - REPORT COPY YELLOW - LABORATORY COPY ~~PINK - SAMPLER/SUBMITTER~~

SOIL BORING LOGS
MONITORING WELL CONSTRUCTION FORMS
MONITORING WELL DEVELOPMENT FORMS

MONITORING WELL / PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name: CPS - Dyersville	Permit No.
Well or Piezometer No.: MW-1	
Dates Started: 3-9-09	Date Completed: 3-9-09

A. SURVEYED LOCATIONS AND ELEVATIONS		B. SOIL BORING INFORMATION	
Locations (± 0.5 ft.):		Name & address of construction company	
Specify corner of site		Soil Essentials	
Distance & direction along boundary		PO 759	
Distance & direction from boundary to well		New Glarus, WI	
Elevations (± 0.01 ft. MSL):		Name of driller	Dave Paulson
Ground Surface		Drilling method	HSA
Top of protective casing		Drilling fluid	None
Top of well casing	98.33 - Est. Benchmark	Bore Hole diameter	10"
Benchmark elevation	100.00 "	Soil sampling method	Split Spoon
Benchmark description	NW corner of conc. Pad	Depth of boring	20

C. MONITORING WELL INSTALLATION			
Casing material	PVC	Placement method	Pour
Length of casing	5'	Volume	3 bags
Outside casing diameter	2.32	**Backfill (if different from seal):**	
Inside casing diameter	2.02	Material	
Casing joint type	Threaded	Placement method	
Casing/screen joint type	Threaded	Volume	
Screen material	PVC	**Surface seal design:**	
Screen opening size	0.010	Material of protective casing:	Steel
Screen length	15'	Material of grout between protective casing and well casing:	Sand
Depth of Well	20'	**Protective cap:**	
Filter Pack:		Material	Teflon
Material	Sand	Vented?: (Y)/N	Locking?: (Y)/N
Grain Size	#80	**Well cap:**	
Volume	8 bags	Material	Teflon
Seal (minimum 3 ft. length above filter pack):		Vented?: (Y)/N	
Material	Chipped Bentonite		

D. GROUNDWATER MEASUREMENT (± 0.01 foot below top of inner well casing)			
Water level	5.95	Stabilization time	
Well development method			
Average depth of frostline			

Attachments: Driller's log. Pipe schedules and grouting schedules. 8 ½ inch x 11 inch map showing locations of all monitoring wells and piezometers.

Please mail completed form to: Iowa Department of Natural Resources, Energy and Waste Management Bureau, 502 E. 9th Street, Des Moines, IA 50319-0034.
Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-281-8986, nina.koger@dnr.state.ia.us

Revised 9/05

Form # 542-1277

SOIL BORING LOG INFORMATION

Facility/Project Name: Crop Production Service – Dyersville, IA		Boring Number: MW-1
Boring Drilled By (Firm name and name of crew chief): Soil Essentials, Dave Pawlson	Date Drilling Started: 03/09/09 (M M D D Y Y)	Date Drilling Completed: 03/09/009 (M M D D Y Y) — Drilling Method: HSA
	Final Static Water Level: ____ Feet MSL	Surface Elevation: ____ Feet MSL — Borehole Diameter: 12 inches
Boring Location: SW 1/4 of SE 1/4 of Section 30 T 89 N, R 2 E/W	Lat ____° ____' ____" Long ____° ____' ____"	Local Grid Location (if applicable): ____ Feet ☐ N ☐ S ____ Feet ☐ E ☐ W
County: Dubuque	Civil Town/City/or Village: City of Dyersville	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P200	RQD	Comments
			0	0-2 Gravel + sand fill – roadbase	SW					dry					
	48/31		2	2-4 Silty sand, dry, very dk. brown, hard. Fill – glass + ceramic shards	SM										
			4	4-8 Same as above (SAA)						dry					
	48/4		6		SM										
			8	8-8.5 SAA – Fill						moist					
				8.5-10.5 Greenish-gray clay, V. soft, hi plasticity, moist	CL				Soft						
	48/40		10	10.5-12 Transition to sandy clay, fine to m-c sand. Saturated @ 11.9'						sat					
			12		SP										
	48/41		14	12-20 No recovery. m-c sand, saturated, brown silty clay lens @ 13-13.5', soft, sandy. Iron staining @ 15'	CL / SP-SM				V. Soft						
			16							sat					
	48/0		18	16-20 No recovery											
			20	EOB @ 20'											
			22	Soils saturated @ 11.9', but water came up to 6' in borehole.											
			24												

Signature	Firm
	Sand Creek Consultants, Inc.

MONITORING WELL / PIEZOMETER CONSTRUCTION DOCUMENTATION FORM

Disposal Site Name	CPS · Dyersville	**Permit No.**	
Well or Piezometer No.	MW-2		
Dates Started	3-7-09	**Date Completed**	3-7-09

A. SURVEYED LOCATIONS AND ELEVATIONS		B. SOIL BORING INFORMATION	
Locations (± 0.5 ft.):		**Name & address of construction company**	
Specify corner of site			Soil Essentials
Distance & direction along boundary			PO 959
Distance & direction from boundary to well			New Glarus, WI
Elevations (± 0.01 ft. MSL):		**Name of driller**	Dave Poulson
Ground Surface		**Drilling method**	HSA
Top of protective casing		**Drilling fluid**	None
Top of well casing	98.11 - Est. Benchmark	**Bore Hole diameter**	10"
Benchmark elevation	100.00	**Soil sampling method**	Split Spoon
Benchmark description	NW Corner conc. apron	**Depth of boring**	17'

C. MONITORING WELL INSTALLATION			
Casing material	PVC	**Placement method**	Pour
Length of casing	7'	**Volume**	3 bags
Outside casing diameter	2.32	**Backfill (if different from seal):**	
Inside casing diameter	2.02	**Material**	
Casing joint type	Threaded	**Placement method**	
Casing/screen joint type	Threaded	**Volume**	
Screen material	PVC	**Surface seal design:**	
Screen opening size	0.010	**Material of protective casing:**	Steel
Screen length	10'	**Material of grout between protective casing and well casing:**	Sand
Depth of Well	17	**Protective cap:**	
Filter Pack:		**Material**	
Material	Sand	**Vented?: Y/N**	**Locking?: Y/N**
Grain Size	#80	**Well cap:**	
Volume	5 bags	**Material**	Teflon
Seal (minimum 3 ft. length above filter pack):		**Vented?: Y/N**	
Material	Chipped Bentonite		

D. GROUNDWATER MEASUREMENT (± 0.01 foot below top of inner well casing)	
Water level 12.62	**Stabilization time**
Well development method	
Average depth of frostline	

Attachments: Driller's log. Pipe schedules and grouting schedules. 8 ½ inch x 11 inch map showing locations of all monitoring wells and piezometers.

Please mail completed form to: Iowa Department of Natural Resources, Energy and Waste Management Bureau, 502 E. 9th Street, Des Moines, IA 50319-0034.
Questions? Call or Email: Nina Koger Environmental Engineer Sr., 515-281-8986, nina.koger@dnr.state.ia.us

Revised 9/05

Form # 542-1277

SOIL BORING LOG INFORMATION

Facility/Project Name: Crop Production Service – Dyansville, IA		Boring Number: MW-2
Boring Drilled By (Firm name and name of crew chief): Soil Essentials, Dave Paulson	Date Drilling Started: 03/09/09 (M M D D Y Y)	Date Drilling Completed: 03/09/09 (M M D D Y Y)
Drilling Method: HSA	Final Static Water Level: ____ Feet MSL	Surface Elevation: ____ Feet MSL
Borehole Diameter: 12 inches	Boring Location: SW 1/4 of SE 1/4 of Section 30 T 89 N, R 2 E/W	Lat ____° ____' ____" Long ____° ____' ____"
Local Grid Location (if applicable): ____ Feet ☐ N ☐ S ____ Feet ☐ E ☐ W	County: Dubuque	Civil Town/City/or Village: City of Dyansville

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P200	RQD	Comments
				Grass											
			0	0-2.5 Topsoil											
	48/36		2	2.5-3.5 Dry sand + gravel, glass chunks	SP-GP					dry					
				3.5-4 Sandy clay, soft, dk. brown, moist											
			4	4-7.5 Sandy clay, dk brown, soft Transition from low- hi plast.	CL					dry					
	48/39		6							moist					
				7.5-8 SAME AS ABOVE, lt. brown											
			8	8-10 SAA, increasing sand content						wet					
	48/42		10	10-12 M-C sand, wet, brown to silty lt. brown Saturated @ 11.5'											
			12	12-17 SAA	SP-SM					sat					
	48/40		14												
			16												
			18	EOB @ 17'											
			20												
			22												
			24												

Signature: [signature] Firm: Sand Creek Consultants, Inc.

Monitoring Well Development Form

Facility/Project Name	County Name	Well Name
CBS - Dyersville	Dubuque	MW-2
Facility License, Permit or Monitoring Number	**County Code**	**Wis. Unique Well Number** / **DNR Well ID Number**

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method

surged with bailer and bailed	☒	41
surged with bailer and pumped	☐	61
surged with block and bailed	☐	42
surged with block and pumped	☐	62
surged with block, bailed and pumped	☐	70
compressed air	☐	20
bailed only	☐	10
pumped only	☐	51
pumped slowly	☐	50
Other _____	☐	▒▒

3. Time spent developing well 34 min.

4. Depth of well (from top of well casisng) 17.0 ft.

5. Inside diameter of well 2.02 in.

6. Volume of water in filter pack and well casing 0.7 gal.

7. Volume of water removed from well 10. gal.

8. Volume of water added (if any) — gal.

9. Source of water added _____

10. Analysis performed on water added? (If yes, attach results) ☐ Yes ☐ No

	Before Development	After Development
11. Depth to Water (from top of well casing) a.	12.62 ft.	12.93 ft.
Date b. (m m d d y y y y)	03/09/2009	03/09/2009
Time c.	13:30 ☐ a.m. ☒ p.m.	14:04 ☐ a.m. ☒ p.m.
12. Sediment in well bottom	0 inches	0 inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe)	Clear ☐ 20 Turbid ☒ 25 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	____.__ mg/l	____.__ mg/l
15. COD	____.__ mg/l	____.__ mg/l

16. Well developed by: Name (first, last) and Firm
First Name: Ryan Last Name: Heuer
Firm: Sand Creek Consultants

17. Additional comments on development:

Name and Address of Facility Contact/Owner/Responsible Party
First Name: Greg Last Name: Mensen
Facility/Firm: Crop Production Services
Street: _____
City/State/Zip: Dyersville, IA

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: _____
Print Name: Ryan S. Heuer
Firm: Sand Creek Consultants

NOTE: See instructions for more information including a list of county codes and well type codes.

Monitoring Well Development Form

Facility/Project Name	County Name	Well Name
CRS- Dyersville, IA	Dubuque	MW-1
Facility License, Permit or Monitoring Number	**County Code**	**Wis. Unique Well Number**	**DNR Well ID Number**

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method

surged with bailer and bailed	☒	41
surged with bailer and pumped	☐	61
surged with block and bailed	☐	42
surged with block and pumped	☐	62
surged with block, bailed and pumped	☐	70
compressed air	☐	20
bailed only	☐	10
pumped only	☐	51
pumped slowly	☐	50
Other _____	☐	

3. Time spent developing well 26 min.

4. Depth of well (from top of well casisng) 20.0 ft.

5. Inside diameter of well 2.02 in.

6. Volume of water in filter pack and well casing 2.3 gal.

7. Volume of water removed from well 25 gal.

8. Volume of water added (if any) — gal.

9. Source of water added _____

10. Analysis performed on water added? (If yes, attach results) ☐ Yes ☐ No

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 5.95 ft.	5.85 ft.
Date	b. 03/09/2009 (m m d d y y y y)	03/09/2009
Time	c. 12:05 ☐ a.m. ☒ p.m.	12:31 ☐ a.m. ☒ p.m.
12. Sediment in well bottom	0 inches	0 inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe)	Clear ☒ 20 Turbid ☐ 25 (Describe)
Fill in if drilling fluids were used and well is at solid waste facility:		
14. Total suspended solids	____.__ mg/l	____.__ mg/l
15. COD	____.__ mg/l	____.__ mg/l

16. Well developed by: Name (first, last) and Firm
First Name: Ryan Last Name: Haney
Firm: Sand Creek Consultants

17. Additional comments on development:

Name and Address of Facility Contact/Owner/Responsible Party
First Name: Gary Last Name: Meyer
Facility/Firm: Crop Production Services
Street: _____
City/State/Zip: Dyersville, IA

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: _____
Print Name: Ryan S Haney
Firm: Sand Creek Consultants

NOTE: See instructions for more information including a list of county codes and well type codes.