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Logan, Utah
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www.bio-west.com

Environmental Analysis and Permitting

Environmental Engineering

Fisheries

Landscape Architecture

Resource Planning

Vegetation

Water Resources

Wetlands

Wildlife

Rob H.
Dan Hall

March 14, 2012

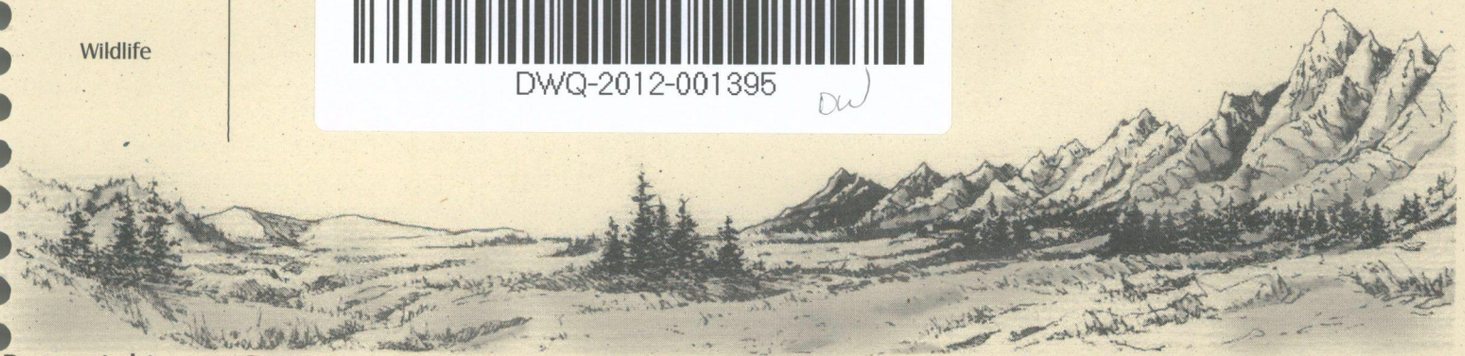
Mr. Rob Herbert, P.G., Manager
Groundwater Protection Section
Division of Water Quality
Utah Department of Environmental Quality
P.O. Box 144870
Salt Lake City, Utah 84114-4870

Subject: ***Schreiber Foods, Inc. Groundwater Discharge Permit Application***
Schreiber Foods Cheese Plant
2180 West 6550 North
Amalga, Utah 84335-9677
BIO-WEST Project No: 1016.8

Dear Mr. Herbert:

BIO-WEST, Inc. (BIO-WEST), has been contracted by Schreiber Foods, Inc. (Schreiber) to complete a groundwater discharge permit application for the Schreiber cheese plant located in Amalga, Utah. Schreiber has previously obtained a Groundwater Discharge Operating Permit from the Utah Division of Water Quality (DWQ) for groundwater wastewater discharges from the Schreiber Cheese Plant. The need has arisen for Schreiber to dispose of additional wastewater from the cheese manufacturing operation. Schreiber is planning to construct an evaporation wastewater wetland area on a portion of the 110-acre land application site. As a result of this planned construction, Schreiber is submitting a new groundwater discharge permit application for the Amalga Cheese Plant.

This letter provides information about the Schreiber cheese operation and is intended to accompany the completed Utah groundwater discharge permit application form included as Attachment 1.



Providing Context-Sensitive Environmental Services Since 1976

Site Location

Schreiber Foods, Inc. (Schreiber) operates a cheese manufacturing plant at 2180 West 6550 North in Amalga, Utah. The manufacturing facility is located in Section 19, Township 13 North, Range1 East, Salt Lake Base Meridian.

Wastewater from the cheese-making process is discharged, via underground piping, from the cheese plant to a lagoon treatment facility approximately 1.25 miles west of the manufacturing facility. The wastewater lagoons are located in Section 24, Township 13 North, Range1 West, Salt Lake Base Meridian.

Currently, treated wastewater is pumped from the fourth cell of the lagoon system and spray irrigated on to two separate land application sites. The first land application site is 110 acres located on 7000 North Street at approximately 3000 West in Amalga, Utah. This site is owned by Dairy Farmers of America and leased by Schreiber. Schreiber subleases the property for farming to Mr. Todd Ballard. The 110-acre land application site is located in Section 23, Township 13 North, Range1 West, Salt Lake Base Meridian and is adjacent to the Schreiber wastewater treatment lagoons on the north and west. Schreiber is going to construct a evaporation wetland area on the southern portion of the 110-acre land application site to provide additional wastewater storage and disposal through evaporation and infiltration into the soil. The remainder of the 110-acre land application site that is not constructed into evaporation wetlands will still be farmed and irrigated using treated wastewater.

The second land application site is 160 acres located on 6200 North Street at approximately 3000 West in Amalga, Utah. This site is owned and farmed by Mr. Earl Lindley. The 160-acre land application site is located in Section 26, Township 13 North, Range1 West, Salt Lake Base Meridian and is south of the Schreiber wastewater treatment lagoons.

A more detailed description of the site locations, including descriptions of wells, water bodies, drainages, well head protection areas, drinking water protection zones, topography, and man-made structures within a 1-mile radius of each discharge location is included in Section 2 of the Hydrogeological Investigation Report included as Attachment 2.

General Discharge Information

Wastewater Treatment Lagoons

Wastewater from the cheese plant is discharged to a lagoon treatment system consisting of four separate lagoons. The treatment system is approximately 127 acres with a containment volume of 294,710,000 gallons (Brown and Caldwell 2004). Wastewater discharge from the cheese plant

varies according to the amount of milk processed. Currently, 1,000,000 pounds of milk are processed daily at the cheese plant. Based on past calculations (Brown and Caldwell 2004), each pound of milk processed produces 0.36 gallons of wastewater. Current wastewater discharge from the cheese plant is calculated to be 360,000 gallons per day. The wastewater lagoons lose approximately 0.008 inch of water per day to infiltration into the soil (Brown and Caldwell 2004). This is equivalent to approximately 27,588.87 gallons of water being discharged into the soil per day.

110-Acre Land Application Site

Schreiber is planning to construct an evaporation wetland area on the southern portion of the 110-acre land application site. The evaporation wetland will serve as additional storage for wastewater and will provide wastewater disposal through evaporation and percolation into the soil. The evaporation wetland area will be constructed on the southern 75 acres of the land application site. A wetland delineation conducted by BIO-WEST showed that approximately 35.2 acres of the 75 acres is naturally occurring wetlands. Earthen berms will be constructed around the perimeter of each natural wetland area to prevent any wastewater from entering the natural wetlands and being discharged into any surface water. Approximately 39.8 acres of upland area will be flooded to an average depth of approximately 1-foot using treated wastewater from cell 4 of the lagoon system. Because of the natural slope of the land water depths will range from 1 to 24 inches. An initial discharge of approximately 12,968,870 gallons of wastewater will be discharged into the evaporation wetland area to fill the wetland area to an average depth of approximately 1-foot.

After the initial discharge, wastewater from cell 4 of the lagoon system will be discharged into the evaporation wetland area at a rate that will maintain an average depth of approximately 1-foot of water in the center of the evaporation wetland area. Based on the average annual wastewater lagoons evapotranspiration rates calculated by BIO-WEST and the soil infiltration rates for the wastewater lagoons (Brown and Caldwell 2004), approximately 130,415 gallons of wastewater will be added to the evaporation wetland area daily to maintain an approximate 1-foot water level in the center of the evaporation wetlands.

During the construction of the evaporation wetland area, BIO-WEST will conduct infiltration tests on the soil using a dual ring infiltrometer. Infiltration rates obtained from these infiltration tests will be used to refine the calculated volume of water that is infiltrating into the soil from the evaporation wetland area.

Upon completion of the evaporation wastewater wetland area, approximately 25 acres of 110-acre land application site will be available for the farming of crops. Wastewater from the lagoon treatment system is applied to any crops grown on the 110-acre land application site using

wheel-line spray irrigation systems. Wastewater from cell 4 of the lagoon system is used to irrigate the property because it is the most highly treated and has the best water quality. Wastewater application to the site occurs April through October.

Prior to each irrigation season, BIO-WEST calculates the amount of wastewater to be apply to the land application site. The amount of wastewater applied annually is determined by following a nutrient management plan prepared for the 110-acre land application site by STS Consultants, Ltd. The amount of annual wastewater applied to the land application site is calculated using crop nutrient uptake rates, average annual crop yields, wastewater quality, groundwater monitoring results, and soil monitoring results. Detailed records of the amount of wastewater applied to the land application site are kept by Schreiber. For the 2012 irrigation season BIO-WEST has calculated that a total of 12,692,593 gallons of wastewater will need to be applied to 25 acres of crop area for irrigation. Based on past irrigation trends on the 110-acre land application site, irrigation will take place over a 60-day period. This calculates to an average daily discharge volume of 211,543 gallons. This is the maximum amount of wastewater that would be applied to the site on any single day. Calculations in the nutrient management plan for the 110-acre land application site show that 25 acres of soil on the 110-acre land application site is capable of absorbing 232,968 gallons a day (STS 2005). The BIO-WEST wastewater application database for the 110-acre land application site is included as Table A in Attachment 3.

Based on BIO-WEST's calculations the average daily discharge for the entire 110-acre land application site would be 341,958 gallons during the irrigation season. The average daily discharge for the 110-acre land application site would be 130,415 gallons during the portion of the year when no irrigation is taking place. The average annual daily discharge for the 110-acre land application site would be 165,189 gallons.

160-Acre Land Application Site

Wastewater from the lagoon treatment system is applied to the 160-acre land application site using wheel-line spray irrigation systems. Wastewater from pond 4 of the lagoon system is used to irrigate the property because it is the most highly treated and has the best water quality. Wastewater application to the site occurs April through October.

Prior to each irrigation season, BIO-WEST calculates the amount of wastewater to be apply to the land application site. The amount of wastewater applied annually is determined by following a nutrient management plan prepared for the 160-acre land application site by BIO-WEST. The amount of annual wastewater applied to the land application site is calculated using crop nutrient uptake rates, average annual crop yields, wastewater quality, groundwater monitoring results, and soil monitoring results. Detailed records of the amount of wastewater applied to the land application site are kept by Schreiber. For the 2012 irrigation season BIO-WEST has calculated that a total of 50,815,095 gallons of wastewater will need to be applied to for irrigation. Based

on past irrigation trends on the 110-acre land application site, irrigation will take place over a 70-day period. This calculates to an average daily discharge volume of 725,929 gallons during the irrigation season. The maximum amount of wastewater that would be applied to the site on any single day is 952,200 gallons. Calculations in the nutrient management plan for the 160-acre land application site show that the soil is capable of absorbing 6,256,366 gallons a day (BIO-WEST 2006). The BIO-WEST wastewater application database for the 160-acre land application site is included as Table B in Attachment 3.

Flows, Sources of Pollution, and Treatment Technologies

A water balance line drawing for water, fluids, and wastes that flow through the Schreiber cheese manufacturing plant to the wastewater treatment lagoons is included in Attachment 4.

Discharge Effluent Characteristics

Comprehensive wastewater sampling was previously conducted by Brown and Caldwell in 2004. Copies of laboratory analyses reports for the 2004 sampling event are included in Attachment 5.

The principal wastewater constituents that are going to the wastewater treatment lagoons are:

- sodium hydroxide,
- phosphoric acid,
- nitric acid,
- sulfuric acid,
- propionic acid, and
- milk products.

Schreiber's cheese-making processes do not cause any of the following constituents being placed in the wastewater:

- oil and grease,
- volatile organic compounds,
- metals, and
- sanitary sewer wastes.

Trace amounts of oil and grease, volatile organic compounds, and metals may enter the wastewater treatment lagoons from the Schreiber cheese plant storm drain system. The storm drain system collects water from the Schreiber cheese plant parking lot and rooftop and flows into the wastewater treatment lagoons. Any load of these constituents that enter the wastewater treatment lagoons would be minimal compared to the amount of process wastewater that enters

the wastewater treatment lagoons on a daily basis. Sanitary wastewater from the Schreiber cheese plant flows into one of three holding tanks located around the facility. The wastewater is pumped into tankers and transported to the Logan City Publically Owned Treatment Works.

Schreiber personnel sampled the inlet and outlet of cell 1 of the wastewater treatment lagoons in March 2008. The samples were analyzed for biochemical oxygen demand (BOD), total suspended solids (TSS), total dissolved solids (TDS), nitrate-nitrite as N, total Kjeldahl nitrogen (TKN), total phosphorus, and pH. Table 1 is a summary of the analytical results from the March 2008 sampling event. Laboratory analytical reports are included in Attachment 5.

Table 1. Cell 1 Wastewater Test Analytical Results, March 14, 2008.

SAMPLE	pH	TDS [a] (mg/L) [b]	TSS [c] (mg/L)	BOD [d] (mg/L)	Nitrate-Nitrite as N (mg/L)	TKN [e] (mg/L)	TP [f] (mg/L)
Cell 1 Inlet	5.53	1,340	9,390	>6,240	0.2	300	56
Cell 1 Outlet	6.29	1,310	2,330	2,410	0.2	310	106

[a] TDS = total dissolved solids.
[b] mg/L = milligrams per liter.
[c] TSS = total suspended solids.
[d] BOD = biological oxygen demand.
[e] TKN = total Kjeldahl nitrogen.
[f] TP = total phosphorus.

Water in the wastewater treatment lagoons is sampled monthly during the irrigation season as specified in the nutrient management plans for the two land application sites. The wastewater lagoons were sampled three times during the 2010 irrigation season. Both cell 1 and cell 4 were sampled in June, July, and August 2010. Each sample collected was analyzed for BOD, TSS, TDS, nitrate-nitrite as N, TKN, total phosphorus, and pH. Table 2 is a summary of the 2010 wastewater analytical results from cell 1. Laboratory analytical reports are included in Attachment 5.

The 110-acre and 160-acre land application sites are irrigated using treated wastewater from cell 4 of the wastewater treatment lagoons. Table 3 is a summary of the 2011 wastewater analytical results from cell 4. Laboratory analytical reports are included in Attachment 5.

Hydrogeologic Report

A hydrogeologic report providing a topographic, stratigraphic, hydrologic, and agricultural description of the area surrounding the wastewater treatment lagoons and the land application sites is included in Attachment 2.

Table 2. Cell 1 Wastewater Test Analytical Results, 2010.

SAMPLE DATE	pH	TDS [a] (mg/L) [b]	TSS [c] (mg/L)	BOD [d] (mg/L)	Nitrate-Nitrite as N (mg/L)	TKN [e] (mg/L)	TP [f] (mg/L)
6/25/2010	6.75	1,640	494	898	0.036	106	30.7
7/29/2010	8.81	2,040	1,210	1,100	0.046	124	39
8/31/2010	6.73	1,940	503	766	0.2	121	36

[a] TDS = total dissolved solids.
[b] mg/L = milligrams per liter.
[c] TSS = total suspended solids.
[d] BOD = biological oxygen demand.
[e] TKN = total Kjeldahl nitrogen.
[f] TP = total phosphorus.

Table 3. Cell 4 Wastewater Test Analytical Results, 2011.

SAMPLE DATE	pH	TDS [a] (mg/L) [b]	TSS [c] (mg/L)	BOD [d] (mg/L)	Nitrate-Nitrite as N (mg/L)	TKN [e] (mg/L)	TP [f] (mg/L)
7/13/2011	8.72	1,840	56.7	25	<0.1	21	12
9/2/2011	9.41	1,920	54.7	20	0.2	22	12
9/28/2011	9.01	2,220	263	121	2.2	28	13

[a] mg/L = milligrams per liter.

Groundwater Discharge Control

The Schreiber wastewater treatment lagoons are lined with a low permeability earthen liner that controls the volume and rate of seepage into the underlying soil.

Wastewater that is applied to the 110-acre and 160-acre land application sites is treated in the wastewater treatment lagoons prior to any application on the properties. The treated wastewater applied to the land application sites is analyzed monthly.

Compliance Monitoring Plan

BIO-WEST and Schreiber have prepared a sampling and analysis plan to monitor soil and groundwater quality within the area of the wastewater treatment lagoons and the two land application sites. The sampling and analysis plan will be used in conjunction with the nutrient management plans prepared for each land application site to ensure that soil and groundwater will not be adversely impacted by Schreiber's operations. The sampling and analysis plan is included in Section 7 of the hydrogeologic report in Attachment 2.

References

[BIO-WEST] BIO-WEST, Inc. 2006. Land application/nutrient management plan: Schreiber Foods Cheese Plant wastewater land application site, Earl Lindley property on 6200 North Street, Smithfield, Utah. Logan (UT): Schreiber Foods, Inc. 12 p.

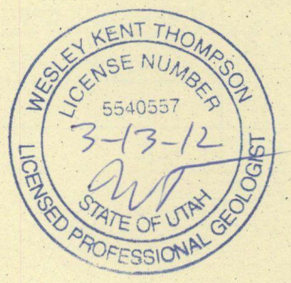
Brown and Caldwell. 2004. Evaluation of wastewater facilities. Smithfield (UT): Dairy Farmers of America..30 p.

[STS] STS Consultants, Ltd. 2005. Wastewater irrigation system nutrient management plan. Smithfield (UT): Schreiber Foods, Inc. 6 p.

If you have questions or comments, please contact me at (435) 752-4202.

Sincerely,

Wes Thompson, P.G.
Principal Hydrogeologist



Attachment 1: Utah Groundwater Discharge Permit Application

Attachment 2: Hydrogeologic Report

Attachment 3: Land Application Wastewater Application Database

Attachment 4: Water Balance Line Drawing

Attachment 5: Laboratory Analyses Reports

BIO-WEST, Inc.

Attachment 1:

Utah Groundwater Discharge Permit Application

MAIL TO:
Division of Water Quality
Utah Department of Environmental Quality
Salt Lake City, Utah 84114-4870

Application No.:_____
Date Received:_____
(leave both lines blank)

UTAH GROUND WATER DISCHARGE PERMIT APPLICATION

Part A - General Facility Information

Please read and follow carefully the instructions on this application form. Please type or print, except for signatures. This application is to be submitted by the owner or operator of a facility having one or more discharges to groundwater. The application must be signed by an official facility representative who is: the owner, sole proprietor for a sole proprietorship, a general partner, an executive officer of at least the level of vice president for a corporation, or an authorized representative of such executive officer having overall responsibility for the operation of the facility.

1. **Administrative Information.** Enter the information requested in the space provided below, including the name, title and telephone number of an agent at the facility who can answer questions regarding this application.

   Facility Name: Schreiber Foods, Inc. Smithfield Cheese Plant

   Mail Address: 2180 West 6550 North Smithfield, Utah 84335
   (Number & Street, Box and/or Route, City, State, Zip Code)

   Facility Legal Location* County: Cache
   T. 13N , R. 1E , Sec. 19 , SE 1/4 of SW 1/4,
   Lat. 41 ° 50 ' 55.47 " N. Long. 111 ° 53 ' 13.59 " W
   *Note: A topographic map or detailed aerial photograph should be used in conjunction with a written description to depict the location of the facility, points of ground water discharge, and other relevant features/objects.

   Contact's Name: Paul Bytheway Phone No.:(435) 563-9340 ext. 5645
   Title: Regulatory Technician

2. **Owner/Operator Information.** Enter the information requested below, including the name, title, and phone number of the official representative signing the application.

   Owner
   Name: Schreiber Foods, Inc. Phone No.:(435) 563-9340

   Mail Address: 2180 West 6550 North Smithfield, Utah 84335
   (Number & Street, Box and/or Route, City, State, Zip Code)

   Operator
   Name:_____ Phone No.:(____)_____
   (If different than Owner's above)

   Mail Address:_____
   (Number & Street, Box and/or Route, City, State, Zip Code)

   Official Representative
   Name: Josh Chapman Phone No.:(435) 563-9340

   Title: Plant Manager

3. **Facility Classification** (check one)

   [ ] New Facility
   [x] Existing Facility
   [ ] Modification of Existing Facility

4. **Type of Facility** (check one)

[ ] Industrial
[ ] Mining
[ ] Municipal
[ ] Agricultural Operation
[x] Other, please describe: Food Service (Cheese Plant)

5. **SIC/NAICS Codes:** 311513
Enter Principal 3 Digit Code Numbers Used in Census & Other Government Reports

6. **Projected Facility Life**: Indefinitely

7. **Identify principal processes used, or services preformed by the facility. Include the principal products produced, and raw materials used by the facility:**

Raw Products: Milk

Products Produced: Swiss and American cheeses

8. **List all existing or pending Federal, State, and Local government environmental permits:**

		Permit Number
[ ]	NPDES or UPDES (discharges to surface water)	
[ ]	CAFO (concentrated animal feeding operation)	
[ ]	UIC (underground injection of fluids)	
[x]	RCRA (hazardous waste)	UTR000002709
[ ]	PDS (air emissions from proposed sources)	
[ ]	Construction Permit (wastewater treatment)	
[ ]	Solid Waste Permit (sanitary landfills, incinerators)	
[ ]	Septic Tank/Drainfield	
[x]	Other, specify Groundwater Discharge Operating Permit	NA

9. Name, location (Lat.____° _____' _____"N,Long._____° _____' _____"W) and description of: each well/spring (existing, abandoned, or proposed), water usage(past, present, or future); water bodies; drainages; well-head protection areas; drinking water source protection zones according to UAC 309-600; topography; and man-made structures within one mile radius of the point(s) of discharge site. Provide existing well logs (include total depth and variations in water depths).

Name	Location	Description	Status	Usage

Please see Section 2.0 of the Hydrogeologic Report included as Attachment 2 to the letter report, for descriptions of wells, water bodies, well head protection areas, drinking water source protection zones, topography, and man-made structures within a 1-mile radius of the discharge sites.

The above information must be included on a plat map and attached to the application.

Part B - General Discharge Information **(Wastewater Treatment Lagoons)**

Complete the following information for each point of discharge to ground water. If more than one discharge point exists, photocopy and complete this Part B form for each discharge point.

1. **Location** (if different than Facility Location in Part A): County: Cache
   T. 13N , R. 1W , Sec. 24 , NW 1/4 of SW 1/4,
   Lat. 41 ° 51 ' 7.98 " N. Long. 111 ° 54 ' 38.82 " W

2. **Type of fluid to be Discharged or Potentially Discharged**
   (check as applicable)

   Discharges (fluids discharged to the ground)

   [ ] Sanitary Wastewater: wastewater from restrooms, toilets, showers and the like
   [ ] Cooling Water: non-contact cooling water, non contact of raw materials, intermediate, final, or waste products
   [x] Process Wastewater: wastewater used in or generated by an industrial process
   [ ] Mine Water: water from dewatering operations at mines
   [ ] Other, specify:_____

   Potential Discharges (leachates or other fluids that may discharge to the ground)

   [ ] Solid Waste Leachates: leachates from solid waste impoundments or landfills
   [ ] Milling/Mining Leachates: tailings impoundments, mine leaching operations, etc.
   [ ] Storage Pile Leachates: leachates from storage piles of raw materials, product, or wastes
   [ ] Potential Underground Tank Leakage: tanks not regulated by UST or RCRA only
   [ ] Other, specify:_____

3. **Discharge Volumes**
   For each type of discharge checked in #2 above, list the volumes of wastewater discharged to the ground or ground water. Volumes of wastewater should be measured or calculated from water usage. If it is necessary to estimate volumes, enclose the number in parentheses. Average daily volume means the average per operating day: ex. For a discharge of 1,000,000 gallons per year from a facility operating 200 days, the average daily volume is 5,000 gallons.

Discharge Type:	Daily Discharge Volume All in units of	(Average)	(Maximum)
Process Wastewater	Gallons per Day	27,589	27,589

4. **Potential Discharge Volumes**
   For each type of potential discharge checked in #2 above, list the maximum volume of fluid that could be discharged to the ground considering such factors as: liner hydraulic conductivity and operating head conditions, leak detection system sensitivity, leachate collection system efficiency, etc. Attach calculation and raw data used to determine said potential discharge.

Discharge Type:	Daily Discharge Volume (Average)	(Maximum)	all in units of

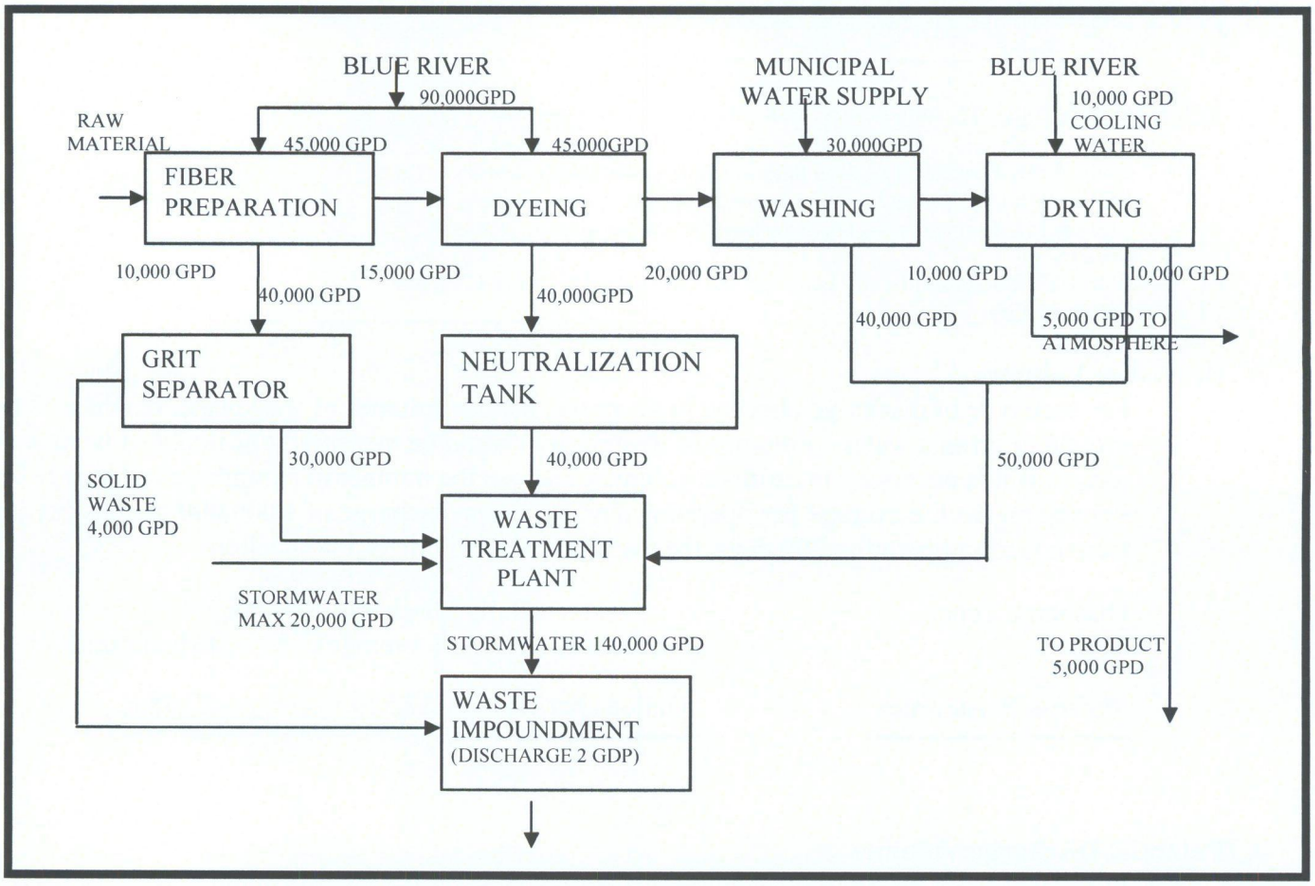
5. Means of Discharge or Potential Discharge (check one or more as applicable)

[x] lagoon, pit, or surface impoundment (fluids)
[ ] land application or land treatment
[ ] discharge to an ephemeral drainage (dry wash, etc.)
[ ] storage pile
[ ] landfill (industrial or solid wastes)
[ ] other, specify_____

[ ] industrial drainfield
[ ] underground storage tank
[ ] percolation/infiltration basin
[ ] mine heap or dump leach
[ ] mine tailings pond

6. Flows, Sources of Pollution, and Treatment Technologies

Flows. Attach a line drawing showing: 1) water flow through the facility to the ground water discharge point, and 2) sources of fluids, wastes, or solids which accumulate at the potential ground water discharge point. Indicate sources of intake materials or water, operations contributing wastes or wastewater to the effluent, and wastewater treatment units. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and wastewater outfalls. If a water balance cannot be determined, provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures. See the following example.



7. Discharge Effluent Characteristics

Established and Proposed Ground Water Quality Standards - Identify wastewater or leachate characteristics by providing the type, source, chemical, physical, radiological, and toxic characteristics of wastewater or leachate to be discharged or potentially discharged to ground water (with lab analytical data if possible). This should include the discharge rate or combination of discharges, and the expected concentrations of any pollutant (mg/l). If more than one discharge point is used, information for each point must be provided.

Hazardous Substances - Review the present hazardous substances found in the Clean Water Act, if applicable. List those substances found or believed present in the discharge or potential discharge.

Part B - General Discharge Information **(110 Acre Land Application Site)**

Complete the following information for each point of discharge to ground water. If more than one discharge point exists, photocopy and complete this Part B form for each discharge point.

1. **Location** (if different than Facility Location in Part A): County: Cache
   T. 13N , R. 1W , Sec. 23 , SE 1/4 of NE 1/4,
   Lat. 41 ° 51 ' 18.97 " N. Long. 111 ° 54 ' 55.09 " W

2. **Type of fluid to be Discharged or Potentially Discharged**
   (check as applicable)

   Discharges (fluids discharged to the ground)

   [ ] Sanitary Wastewater: wastewater from restrooms, toilets, showers and the like
   [ ] Cooling Water: non-contact cooling water, non contact of raw materials, intermediate, final, or waste products
   [x] Process Wastewater: wastewater used in or generated by an industrial process
   [ ] Mine Water: water from dewatering operations at mines
   [ ] Other, specify:_____

   Potential Discharges (leachates or other fluids that may discharge to the ground)

   [ ] Solid Waste Leachates: leachates from solid waste impoundments or landfills
   [ ] Milling/Mining Leachates: tailings impoundments, mine leaching operations, etc.
   [ ] Storage Pile Leachates: leachates from storage piles of raw materials, product, or wastes
   [ ] Potential Underground Tank Leakage: tanks not regulated by UST or RCRA only
   [ ] Other, specify:_____

3. **Discharge Volumes**
   For each type of discharge checked in #2 above, list the volumes of wastewater discharged to the ground or ground water. Volumes of wastewater should be measured or calculated from water usage. If it is necessary to estimate volumes, enclose the number in parentheses. Average daily volume means the average per operating day: ex. For a discharge of 1,000,000 gallons per year from a facility operating 200 days, the average daily volume is 5,000 gallons.

Discharge Type:	Daily Discharge Volume All in units of	(Average)	(Maximum)
Process Wastewater	Gallons per Day	"165,189"	"341,958"

(Irrigation and Evaporation Wetlands Combined)

4. **Potential Discharge Volumes**
   For each type of potential discharge checked in #2 above, list the maximum volume of fluid that could be discharged to the ground considering such factors as: liner hydraulic conductivity and operating head conditions, leak detection system sensitivity, leachate collection system efficiency, etc. Attach calculation and raw data used to determine said potential discharge.

Discharge Type:	Daily Discharge Volume (Average)	(Maximum)	all in units of
_____	_____	_____	_____
_____	_____	_____	_____

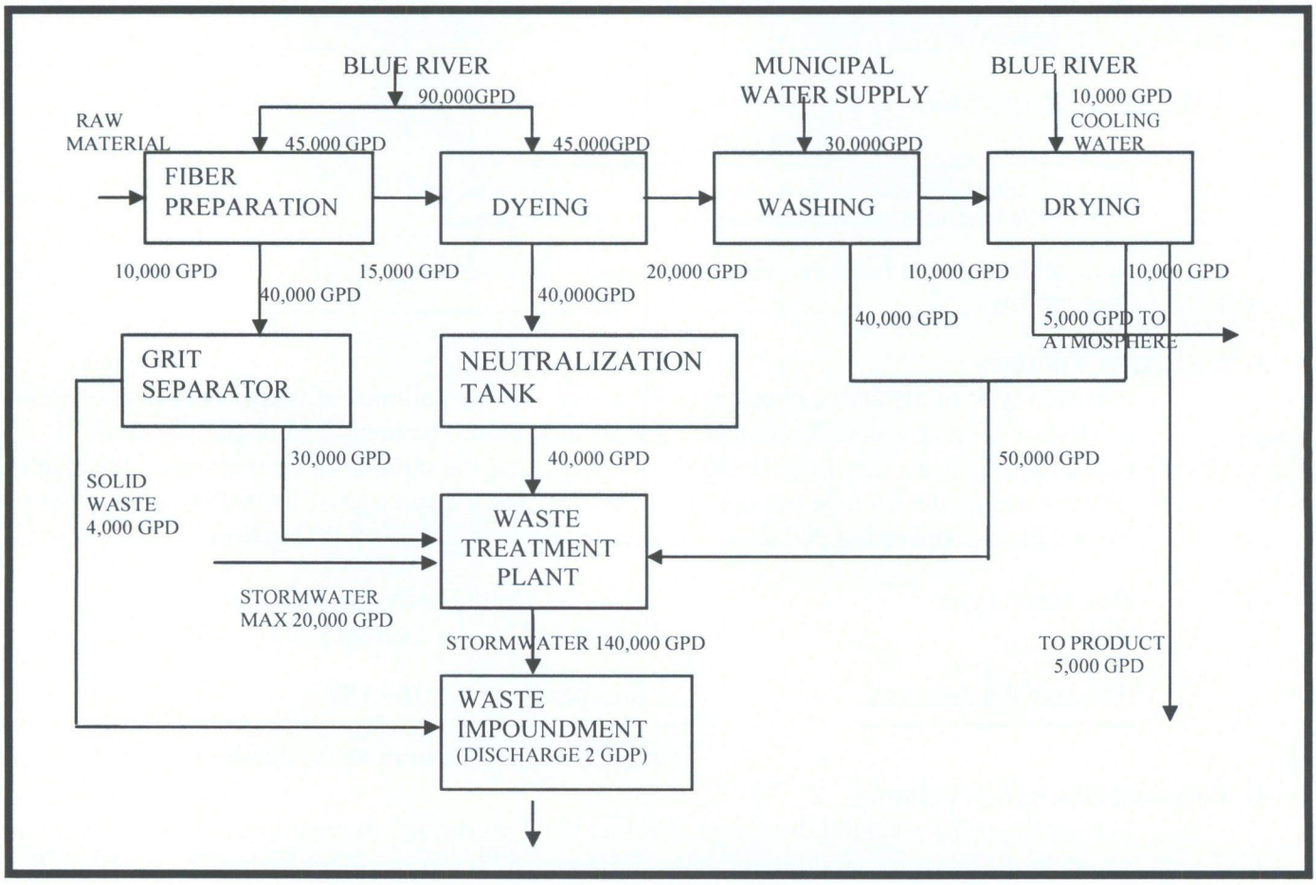
5. Means of Discharge or Potential Discharge (check one or more as applicable)

[x] lagoon, pit, or surface impoundment (fluids)
[x] land application or land treatment
[ ] discharge to an ephemeral drainage (dry wash, etc.)
[ ] storage pile
[ ] landfill (industrial or solid wastes)
[ ] other, specify_____

[ ] industrial drainfield
[ ] underground storage tank
[ ] percolation/infiltration basin
[ ] mine heap or dump leach
[ ] mine tailings pond

6. Flows, Sources of Pollution, and Treatment Technologies

Flows. Attach a line drawing showing: 1) water flow through the facility to the ground water discharge point, and 2) sources of fluids, wastes, or solids which accumulate at the potential ground water discharge point. Indicate sources of intake materials or water, operations contributing wastes or wastewater to the effluent, and wastewater treatment units. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and wastewater outfalls. If a water balance cannot be determined, provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures. See the following example.



7. Discharge Effluent Characteristics

Established and Proposed Ground Water Quality Standards - Identify wastewater or leachate characteristics by providing the type, source, chemical, physical, radiological, and toxic characteristics of wastewater or leachate to be discharged or potentially discharged to ground water (with lab analytical data if possible). This should include the discharge rate or combination of discharges, and the expected concentrations of any pollutant (mg/l). If more than one discharge point is used, information for each point must be provided.

Hazardous Substances - Review the present hazardous substances found in the Clean Water Act, if applicable. List those substances found or believed present in the discharge or potential discharge.

Part B - General Discharge Information **(160 Acre Land Application Site)**

Complete the following information for each point of discharge to ground water. If more than one discharge point exists, photocopy and complete this Part B form for each discharge point.

1. **Location** (if different than Facility Location in Part A): County: Cache
   T. 13N , R. 1W , Sec. 26 , NE 1/4 of NE 1/4,
   Lat. 41 ° 50 ' 35.81 " N. Long. 111 ° 54 ' 55.09 " W

2. **Type of fluid to be Discharged or Potentially Discharged**
   (check as applicable)

   Discharges (fluids discharged to the ground)

   [ ] Sanitary Wastewater: wastewater from restrooms, toilets, showers and the like
   [ ] Cooling Water: non-contact cooling water, non contact of raw materials, intermediate, final, or waste products
   [x] Process Wastewater: wastewater used in or generated by an industrial process
   [ ] Mine Water: water from dewatering operations at mines
   [ ] Other, specify:_____

   Potential Discharges (leachates or other fluids that may discharge to the ground)

   [ ] Solid Waste Leachates: leachates from solid waste impoundments or landfills
   [ ] Milling/Mining Leachates: tailings impoundments, mine leaching operations, etc.
   [ ] Storage Pile Leachates: leachates from storage piles of raw materials, product, or wastes
   [ ] Potential Underground Tank Leakage: tanks not regulated by UST or RCRA only
   [ ] Other, specify:_____

3. **Discharge Volumes**
   For each type of discharge checked in #2 above, list the volumes of wastewater discharged to the ground or ground water. Volumes of wastewater should be measured or calculated from water usage. If it is necessary to estimate volumes, enclose the number in parentheses. Average daily volume means the average per operating day: ex. For a discharge of 1,000,000 gallons per year from a facility operating 200 days, the average daily volume is 5,000 gallons.

Discharge Type:	Daily Discharge Volume All in units of	(Average)	(Maximum)
Process Wastewater	Gallons per Day	725,929	952,200
		(Irrigation Season Only)	

4. **Potential Discharge Volumes**
   For each type of potential discharge checked in #2 above, list the maximum volume of fluid that could be discharged to the ground considering such factors as: liner hydraulic conductivity and operating head conditions, leak detection system sensitivity, leachate collection system efficiency, etc. Attach calculation and raw data used to determine said potential discharge.

Discharge Type:	Daily Discharge Volume (Average)	(Maximum)	all in units of
_____	_____	_____	_____
_____	_____	_____	_____

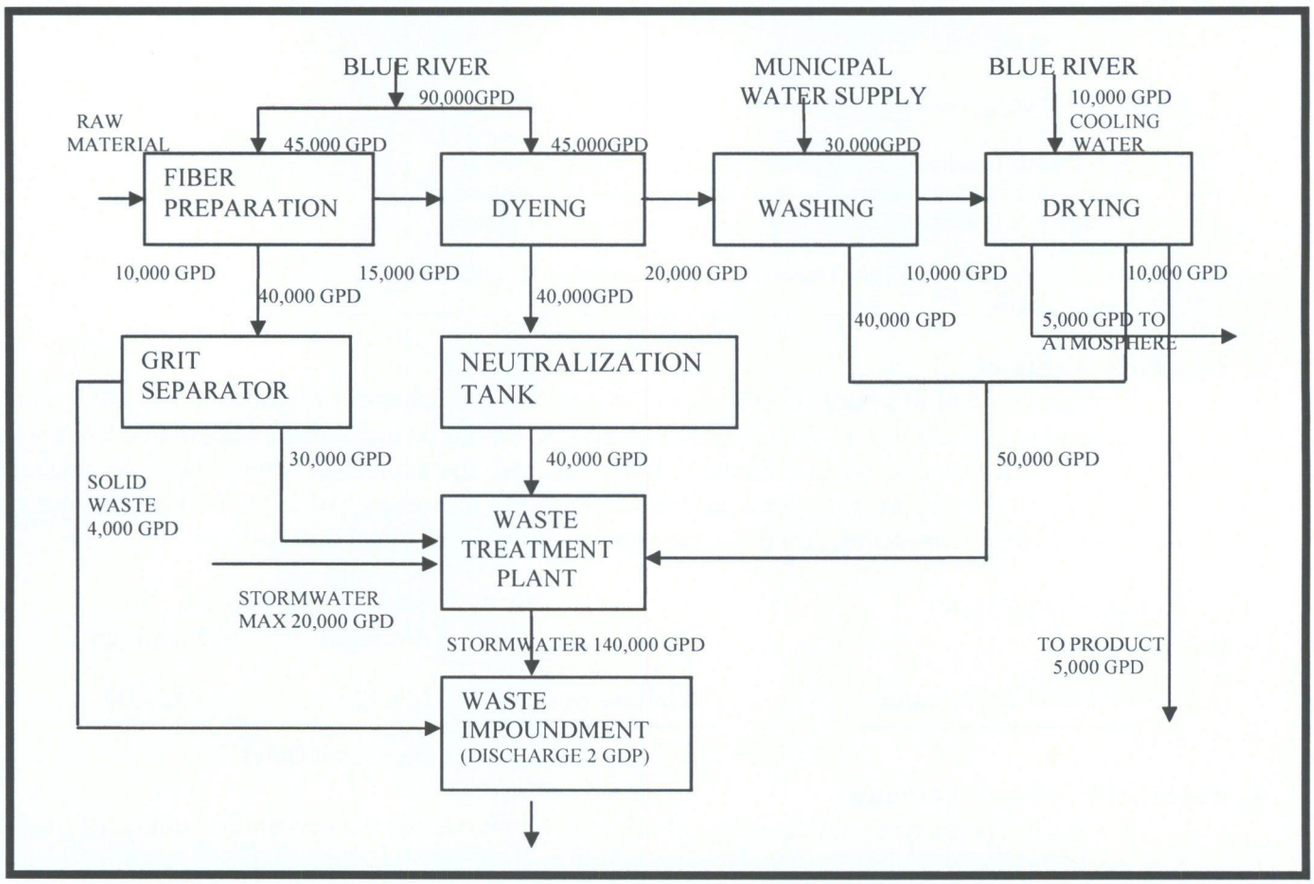
5. Means of Discharge or Potential Discharge (check one or more as applicable)

[ ] lagoon, pit, or surface impoundment (fluids)
[x] land application or land treatment
[ ] discharge to an ephemeral drainage (dry wash, etc.)
[ ] storage pile
[ ] landfill (industrial or solid wastes)
[ ] other, specify_____

[ ] industrial drainfield
[ ] underground storage tank
[ ] percolation/infiltration basin
[ ] mine heap or dump leach
[ ] mine tailings pond

6. Flows, Sources of Pollution, and Treatment Technologies

Flows. Attach a line drawing showing: 1) water flow through the facility to the ground water discharge point, and 2) sources of fluids, wastes, or solids which accumulate at the potential ground water discharge point. Indicate sources of intake materials or water, operations contributing wastes or wastewater to the effluent, and wastewater treatment units. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and wastewater outfalls. If a water balance cannot be determined, provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures. See the following example.



7. Discharge Effluent Characteristics

Established and Proposed Ground Water Quality Standards - Identify wastewater or leachate characteristics by providing the type, source, chemical, physical, radiological, and toxic characteristics of wastewater or leachate to be discharged or potentially discharged to ground water (with lab analytical data if possible). This should include the discharge rate or combination of discharges, and the expected concentrations of any pollutant (mg/l). If more than one discharge point is used, information for each point must be provided.

Hazardous Substances - Review the present hazardous substances found in the Clean Water Act, if applicable. List those substances found or believed present in the discharge or potential discharge.

Part C - Accompanying Reports and Plans

The following reports and plans should be prepared by or under the direction of a professional engineer or other ground water professional. Since ground water permits cover a large variety of discharge activities, the appropriate details and requirements of the following reports and plans will be covered in the pre-design meeting(s). For further instruction refer to the Ground Water Permit Application Guidance Document.

8. Hydrogeologic Report

Provide a Geologic Description, with references used, that includes as appropriate:

Structural Geology – regional and local, particularly faults, fractures, joints and bedding plane joints;
Stratigraphy – geologic formations and thickness, soil types and thickness, depth to bedrock;
Topography – provide a USGS MAP (7 ½ minute series) which clearly identifies legal site location boundaries, indicated 100 year flood plain area and applicable flood control or drainage barriers and surrounding land uses.

Provide a Hydrologic Description, with references used, that includes:
Ground water – depths, flow directions and gradients. Well logs should be included if available. Include name of aquifer, saturated thickness, flow directions, porosity, hydraulic conductivity, and other flow characteristics, hydraulic connection with other aquifers or surface sources, recharge information, water in storage, usage, and the projected aerial extent of the aquifer. Should include projected ground water area of influence affected by the discharge. Provide hydraulic gradient map indicating equal potential head contours and ground water flow lines. Obtain water elevations of nearby wells at the time of the hydrologic investigation. Collect and analyze ground water samples from the uppermost aquifer which underlies the discharge point(s). Historic data can be used if the applicant can demonstrate it meets the requirements contained within this section. Collection points should be hydraulically up and downgradient and within a one-mile radius of the discharge point(s). Ground water analysis should include each element listed in Ground Water Discharge Permit Application, Part B7.
NOTE Failure to analyze for background concentrations of any contaminant of concern in the discharge or potential discharge may result in the Executive Secretary's presumptive determination that zero concentration exist in the background ground water quality.
Sample Collection and Analysis Quality assurance – sample collection and Preservation must meet the requirements of the EPA RCRA Technical Enforcement Guidance Document, OSWER-9959.1, 1986 [UAC R317-6-6.3(I,6)]. Sample analysis must be performed by State of Utah certified laboratories and be certified for each of the parameters of concern. Analytical methods should be selected from the following sources [UAC R317-6-6.3L]: (Standard Methods for the Examination of Water and Wastewater, 20th Ed.,1998; EPA, Methods for Chemical Analysis of Water and Wastes, 1983; Techniques of Water Resources Investigation of the U.S. Geological Survey, 1998, Book 9; EPA Methods published pursuant to 40 CFR Parts 141, 142, 264 (including Appendix IX), and 270. Analytical methods selected should also include minimum detection limits below both the Ground Water Quality Standards and the anticipated ground water protection levels. Data shall be presented in accordance of accepted hydrogeolgic standards and practice.

Provide Agricultural Description, with references used, that includes:
If agricultural crops are grown within legal boundaries of the site the discussion must include: types of crops produced; soil types present; irrigation system; location of livestock confinement areas (existing or abandoned).

Note on Protection Levels:

After the applicant has defined the quality of the fluid to be discharged (Ground Water Discharge Permit Application, Part B), characterized by the local hydrogeologic conditions and determined background ground water quality (Hydrogeologic Report), the Executive Secretary will determine the applicable ground water class, based on: 1) the location of the discharge point within an area of formally classified ground water, or the background value of total dissolved solids. Accordingly, the Executive Secretary will determine applicable protection levels for each pollutant of concern, based on background concentrations and in accordance with UAC R317-6-4.

9. **Ground Water Discharge Control Plan:**
Select a compliance monitoring method and demonstrate an adequate discharge control system. Listed are some of the Discharge Control Options available.

No Discharge – prevent any discharge of fluids to the ground water by lining the discharge point with multiple synthetic and clay liners. Such a system would be designed, constructed, and operated to prevent any release of fluids during both the active life and any post-closure period required.

Earthen Liner – control the volume and rate of effluent seepage by lining the discharge point with a low permeability earthen liner (e.g. clay). Then demonstrate that the receiving ground water, at a point as close as practical to the discharge point, does not or will not exceed the applicable class TDS limits and protection levels* set by the Executive Secretary. This demonstration should also be based on numerical or analytical saturated or unsaturated ground water flow and contaminant transport simulations.

Effluent Pretreatment – demonstrate that the quality of the raw or treated effluent at the point of discharge or potential discharge does not or will not exceed the applicable ground water class TDS limits and protection levels* set by the Executive Secretary.

Contaminant Transport/Attenuation – demonstrate that due to subsurface contaminant transport mechanisms at the site, raw or treated effluent does not or will not cause the receiving ground water, at a point as close as possible to the discharge point, to exceed the applicable class TDS limits and protection levels* set by the Executive Secretary.

Other Methods – demonstrate by some other method, acceptable to the Executive Secretary, that the ground water class TDS limits and protection levels* will be met by the receiving ground water at a point as close as practical to the discharge point.

*If the applicant has or will apply for an alternate concentration limit (ACL), the ACL may apply instead of the class TDS limits and protection levels.

Submit a complete set of engineering plans and specifications relating to the construction, modification, and operation of the discharge point or system. Construction Permits for the following types of facilities will satisfy these requirements. They include: municipal waste lagoons; municipal sludge storage and on-site sludge disposal; land application of wastewater effluent; heap leach facilities; other process wastewater treatment equipment or systems.

Facilities such as storage piles, surface impoundments and landfills must submit engineering plans and specifications for the initial construction or any modification of the facility. This will include the design data and description of the leachate detection, collection and removal system design and construction. Provide provisions for run on and run-off control.

10. **Compliance Monitoring Plan:**
The applicant should demonstrate that the method of compliance monitoring selected meets the following requirements:

Ground Water Monitoring – that the monitoring wells, springs, drains, etc., meet all of the following criteria: is completed exclusively in the same uppermost aquifer that underlies the discharge point(s) and is intercepted by the upgradient background monitoring well; is located hydrologically downgradient of the discharge point(s); designed, constructed, and operated for optimal detection (this will require a hydrogeologic characterization of the area circumscribed by the background sampling point, discharge point and compliance monitoring points); is not located within the radius of influence of any beneficial use public or private water supply; sampling parameters, collection, preservation, and analysis should be the same as background sampling point; ground water flow direction and gradient, background quality at the site, and the quality of the ground water at the compliance monitoring point.

Source Monitoring – must provide early warning of a potential violation of ground water protection levels, and/or class TDS limits and be as or more reliable, effective, and determinate than a viable ground water monitoring network.

Vadose Zone Monitoring Requirements – Should be: used in conjunction with source monitoring; include sampling for all the parameters required for background ground water quality monitoring; the application, design, construction, operation, and maintainence of the monitoring system should conform with the guidelines found in: Vadose Zone Monitoring for Hazardous Waste Sites; June 1983, KT-82-018(R).

Leak Detection Monitoring Requirements – Should not allow any leakage to escape undetected that may cause the receiving ground water the exceed applicable ground water protection levels during the active life and any required post-closure care period of the discharge point. This demonstration may be accomplished through the use of numeric or analytic, saturated or unsaturated, ground water flow or contaminant transport simulations, using actual filed data or conservative assumptions. Provide plans for daily observation or continuous monitoring of the observation sump or other monitoring point and for the reporting of any fluid detected and chemical analysis thereof.

Specific Requirements for Other Methods – Demonstrate that: the method is as or more reliable, effective, and determinate than a vable ground water monitoring well network at detecting any violation of ground water protection levels or class TDS limits, that may be caused by the discharge or potential discharge; the method will provide early warning of a potential violation of ground water protection levels or class TDS limits and meets or exceeds the requirements for vadose zone or leak detection monitoring.

Monitoring well construction and ground water sampling should conform to A Guide to the Selection of Materials for Monitoring Well Construction. Sample collection and preservation, should conform to the EPA RCRA Technical Enforcement Guidance Document, OSWER-9950.1, September, 1986. Sample analysis must be performed by State-certified laboratories by methods outlined in UAC R317-6-6.3L. Analytical methods used should have minimum detection levels which meet or are less than both the ground water quality standards and the anticipated protection levels.

11. **Closure and Post Closure Plan:** The purpose of this plan is to prevent ground water contamination after cessation of the discharge or potential discharge and to monitor the discharge or potential discharge point after closure, as necessary. This plan has to include discussion on: liquids or products, soils and sludges; remediation process; the monitoring of the discharge or potential discharge point(s) after closure of the activity.

12. **Contingency and Corrective Action Plans:** The purpose of this Contingency plan is to outline definitive actions to bring a discharge or potential discharge facility into compliance with the regulations or the permit, should a violation occur. This applies to both new and existing facilities. For existing facilities that may have caused any violations of the Ground Water Quality Standards or class TDS limits as a result of discharges prior to the issuance of the permit, a plan to correct or remedy any contaminated ground water must be included.

    Contingency Plan – This plan should address: cessation of discharge until the cause of the violation can be repaired or corrected; facility remediation to correct the discharge or violation.

    Corrective Action Plan – for existing facilities that have already violated Ground Water Quality Standards, this plan should include: a characterization of contaminated ground water; facility remediation proposed or ongoing including timetable for work completion; ground water remediation.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Josh Chapman - Plant Manager
NAME & OFFICIAL TITLE (type or print)

435-563-9340
PHONE NO. (area code & no.)

SIGNATURE

3/14/12
DATE SIGNED

BIO-WEST, Inc.

Attachment 2:

Hydrogeologic Report

Hydrogeological Investigation of the Shallow Aquifer at the Schreiber Foods Wastewater Treatment Lagoons and Land Application Sites

March 14, 2012

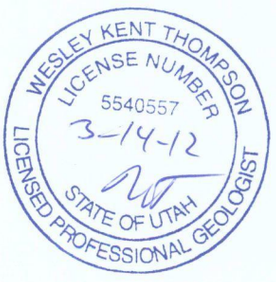
PREPARED FOR:

Schreiber Foods, Inc.
Amalga Cheese Plant
2180 West 6550 North
Smithfield, Utah 84335

PREPARED BY:

BIO-WEST, Inc.
1063 West 1400 North
Logan, Utah 84321

BIO-WEST Project No. 1016



Wes Thompson, P.G.
Senior Hydrogeologist

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1.0 INTRODUCTION

BIO-WEST, Inc. (BIO-WEST) was contracted by Schreiber Foods, Inc. (Schreiber), to conduct a hydrogeological investigation of the shallow aquifer near Schreiber's wastewater treatment lagoons in Amalga, Utah. Schreiber's currently applies wastewater to two land application properties near the wastewater treatment lagoons. The need to dispose of additional wastewater has arisen and Schreiber is planning to construct an evaporation wetland area on the southern portion of the 110-acre land application site. The objective of this investigation was to evaluate the hydrogeology and water quality on the subject properties.

2.0 SUBJECT AND ADJACENT PROPERTY DESCRIPTIONS

2.1 Subject Properties Locations

Schreiber operates a cheese manufacturing plant at 2180 West 6550 North in Amalga, Utah. The manufacturing facility is located in Section 19, Township 13 North, Range1 East, Salt Lake Base Meridian. Schreiber's discharges wastewater onto three separate properties in the Amalga area. These include the Schreiber's wastewater treatment lagoons, a 110-acre land application property, and a 160-acre land application property. A subject property location map (Figure 1) and a subject property area map (Figure 2) showing the locations of the Schreiber manufacturing plant, wastewater lagoons, 110 acre land application site, and the 160 acre land application site are included in Appendix A.

Wastewater from the cheese making process is discharged, via underground piping, from the cheese plant to a pond treatment facility approximately 1.25 miles west of the manufacturing facility. The wastewater treatment lagoons are located in Section 24, Township 13 North, Range1 West, Salt Lake Base Meridian. The lagoons are approximately 127 acres and are used for the treatment of wastewater from the Schreiber's Cheese Plant

Currently, treated wastewater is pumped from the fourth cell of the lagoon system and spray irrigated on to two separate land application sites. The first land application site is 110 acres located on 7000 North Street at approximately 3000 West in Amalga, Utah. The 110-acre land application property is located in Section 23, Township 13 North, Range1 West, Salt Lake Base Meridian and is adjacent to the Schreiber wastewater treatment lagoons on the north and west. The property is currently used for the production of crops. In order to provide more wastewater disposal, Schreiber is planning to construct an evaporation wetland on the southern portion of the 110-acre land application site. The remainder of the110-acre land application site will be still be spray irrigated for the production of crops

The second land application site is 160 acres located on 6200 North Street at approximately 3000 West in Amalga, Utah. The 160-acre land application property is located in Section 26, Township 13 North, Range 1 West, Salt Lake Base Meridian, south of the Schreiber wastewater treatment lagoons. The property is currently used for production of crops.

2.2 Topography

The 1986 U.S. Geologic Survey (USGS) Newton, Utah, Quadrangle 7.5 Minute Topographic Map (USGS 1986) was reviewed to provide information about the topographic characteristics of the subject properties and the surrounding area. This map shows that the land around the subject properties has an overall very gradual slope toward the west (Appendix A, Figure 1).

The wastewater treatment lagoons property slopes very gradually to the west and has an elevation of approximately 4,420 feet above mean sea level.

The 110-acre land application property slopes very gradually to the west/southwest and has an elevation of approximately 4,418 feet above mean sea level.

The 160-acre land application property slopes very gradually to the west/northwest and has an elevation of approximately 4,415 feet above mean sea level.

2.3 Man Made Structures

There are numerous man made structures located within a 1-mile radius of the subject properties. The majority of these structures are residential and commercial structures located to the east of the subject properties along 2400 west street in Amalga. Some residential and farm structures are located south of the subject properties along 5700 west and 3200 west streets. Schreiber has a pumphouse located on the southeast corner of the wastewater treatment lagoons. A cattle barn and corrals are located adjacent to the 110-acre land application site to the northwest (Appendix A, Figure 1).

2.4 Water Bodies and Drainages

The 1986 USGS Newton, Utah, Quadrangle 7.5 Minute Topographic Map (USGS 1986) was reviewed to provide information about water bodies located within a 1-mile radius of the subject properties. There are three main water bodies located within 1-mile radius of the subject properties. The Bear River is located east and south of the subject properties. Clay slough is located to the west of the subject properties. The Barrens wetland area, locally called the Amalga Barrens, is located north of the subject properties. There are also several irrigation canals and ditches in the area. Several unnamed drainages are also located within 1-mile of the subject properties. Both 110-acre and the 160-acre land application sites have unnamed drainages located on them that drain into Clay Slough (Appendix A, Figure 1).

BIO-WEST also accessed the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory Database (USFWS, 2011) for additional information on water bodies and drainages in the area of the subject properties. The database shows several wetlands present in the unnamed drainages located on and around the subject properties. A copy of the USFWS wetlands map is included in Appendix B. BIO-WEST conducted a wetland delineation on the 110-acre land application site as part of a feasability study for the evaporation wetlands. A wetland delineation report was prepared and submitted to the Army Corp of Engineers. The delineation revealed

approximately 44 acres of the 110 acre land application site is wetlands (BIO-WEST, 2012). The proposed construction will not impact any natural wetlands in the area. A map showing the natural wetlands on the 110-acre land application site is included as Figure 8 in Attachment B.

A review of the Utah Division of Water Rights database revealed that several surface water rights are located within a 1-mile radius of the discharge sites. The majority of these water rights are located along the Bear River or Clay Slough. All of the water rights have listed uses as stock watering or irrigation.

2.5 Wells

The Utah Division of Water Rights database was reviewed to locate wells within a 1-mile radius of the subject properties. The database identified 32 wells located within a 1-mile radius of the subject properties. Of the 32 wells, 13 wells had a water right status listed as terminated. It is unclear if these wells are still in place or have been abandoned. The status of one of the water rights was listed as approved, it is unclear if this well has been drilled yet. The majority of the wells have a listed usage of irrigation or stock watering. Eight of the wells have a domestic usage listed, however, all of these wells have a water right status listed as terminated. Well depth information was unavailable for a number of the wells, however, 12 wells did have well depth information. The depth of these 12 wells varies from 70 to 2,100 feet below surface grade (bsg). No well logs for any of the wells were readily available. The location, status, description, and usage of each well is included in Appendix C. A well map (Figure 3) showing the locations of the identified wells is included in Appendix A.

Schreiber has a network of 6 monitor wells to monitor groundwater quality on the land application sites. The 110-acre land application site currently has 2 monitor wells and the 160-acre land application site has 3 monitor wells. A more detailed description of these monitor wells is included in section 4 of this report.

2.6 Well-Head Protection Areas and Drinking Water Source Protection Zones

There are no well-head protection areas or drinking water source protection zones located within a 1-mile radius of the subject properties (K. Johnson 2011, pers. comm.).

3.0 SUBJECT PROPERTY CHARACTERIZATION

3.1 Regional Geology

The subject properties are located near the center of Cache Valley in the Amalga Barrens area. Cache Valley is on the eastern edge of the Great Basin, a part of the Basin and Range Province. The Great Basin is comprised of north-trending, closed-basin valleys and associated fault block mountain ranges (Hintze 1988). The valleys are filled with alluvial fan and pluvial lake deposits (Hintze

1988). Cache Valley is bordered by the Bear River Range to the east and the Wellsville Range, Junction Hills, and Malad Range to the west.

3.2 Site Geology

The subject properties are covered by a layer of Holocene to Uppermost Pleistocene sedimentary deposits of silt, clay and minor sand from alluvial (flowing water), lacustrine (lake), or paludal (marsh) processes younger than Lake Bonneville deposits (Solomon 1999). These younger deposits commonly overlay, grade into, and consist of older reworked Lake Bonneville deposits. The typical thickness of these deposits is 3 to 10 feet (Solomon 1999).
The underlying Lake Bonneville sediments consist of silt, clay, and minor fine grained sand. The estimated maximum thickness of this layer is approximately 50 feet (Solomon 1999).

Underlying the Lake Bonneville sediments is 600 to over 1,000 feet of fluvial and lacustrine sediments (Robinson 1999). These deposits consist mostly of silt and clay, but do contain some layers of sand and fine gravel (Robinson 1999). These sediments contain the major aquifers of the Cache Valley (Bjorkland and McGreevy 1971).

3.3 Hydrogeology

3.3.1 Hydrostratigraphy

Bjorkland and McGreevy (1971) indicate that groundwater occurs in confined, perched, and unconfined aquifers in Cache Valley. The confined portion of the principal aquifer is typically overlain by a shallow unconfined aquifer (Bjorkland and McGreevy 1971). Robinson (1999) identified eight distinct hydrostratigraphic units within Cache Valley of which four are important to this investigation. The upper confining layer, identified as B,1, was an aquitard composed of Lake Bonneville deposits less than 100 feet thick, primarily clay, silt, and sand. Underlying B,1 was the upper confined aquifer, identified as A,1, an aquifer about 30 feet thick composed of gravel to cobbles interbedded with sand and silt with discontinuous clay lenses. Water from this aquifer is typically high in iron and not used for domestic supply. The third underlying layer is the lower confining layer, identified as B,2, an aquitard approximately 30 feet thick composed of thickly bedded clay and thin gravel lenses near the valley margins (Robinson 1999). Underlying B,2 is the lower confined aquifer, identified as A,2, an aquifer up to 1,340 feet thick composed of gravel and sand with discontinuous silt and clay lenses. Water from this aquifer is typically good, and this layer is the major aquifer in Cache Valley (Robinson 1999); it is usually identified as the principal aquifer.

Anderson et. al (1994), Kariya et al. (1994), and Bjorkland and McGreevy (1971) indicate that groundwater flow in the principal aquifer near the subject properties is to the southwest. This flow direction matches the overall topography in the area. Recharge occurs from infiltration of precipitation, seepage from streams, and subsurface inflow from both consolidated and unconsolidated deposits. Recharge occurs mainly as runoff from the adjacent mountains infiltrates into the coarse unconsolidated deposits (i.e., alluvial fans) at the margins of the valley (Kariya et al. 1994). Anderson et. al (1994) shows the subject property is in a discharge zone from the principal aquifer.

3.3.2 Local Hydrogeology

Little published information is available on the shallow, unconfined aquifer in Cache Valley. This aquifer may be comprised of Robinson's (1999) B,1 layer or younger, post-Lake Bonneville materials. It is BIO-WEST's experience, based on numerous wells drilled in the shallow unconfined aquifer in Cache Valley, that the groundwater flow direction typically mirrors the topography and the flow direction in the principal aquifer. Groundwater in two monitor wells on the 110-acre land application site ranges from 2 to 7 feet bsg. Groundwater in three monitor wells on the 160-acre land application site ranges from 2 to 10 feet bsg.

Based on soil classification samples collected during monitor well installation on the 160-acre land application site (Section 5.1) sediments in the area are primarily composed of silt and clay. The typical porosity of silt ranges from 35 to 50% and the porosity of clay ranges from 33 to 60% (Fetter 1994). The hydraulic conductivity of clay ranges from 10^{-9} to 10^{-6} centimeters per second (cm/s) (Fetter 1994). The hydraulic conductivity of Silt ranges from 10^{-6} to 10^{-4} cm/s (Fetter 1994). The hydraulic conductivity of clay ranges from 10^{-9} to 10^{-6} centimeters per second (cm/s) (Fetter 1994).

Robinson (1999) considered the B,1 layer to be a highly impermeable aquitard. Because of the impermeability of this layer there is likely little to no hydraulic connection between the shallow, unconfined aquifer in the area and deeper aquifers. If there is a connection between the shallow, unconfined aquifer and deeper aquifers it is likely groundwater flows in a upward direction from the deeper aquifers to the shallow, unconfined aquifer based on the being located within a discharge zone. The shallow, unconfined aquifer is likely hydraulicly connected to surface waters in the area. Recharge of the shallow, unconfined aquifer in the area occurs primarily from infiltration of precipitation and unconsumed irrigation water and seepage from canals and streams (Kariya et al. 1994).

There is no documented use of water from the shallow, unconfined aquifer in this area. The total dissolved solids (TDS) levels in this part of Cache Valley are naturally high (Lowe et al. 1994). Groundwater in the principal aquifer for most of Cache Valley has TDS concentrations below 500 milligrams per liter (mg/L), however, groundwater in the principal aquifer in the northwestern part of Cache Valley has TDS concentrations between 500 and 750 mg/L with the area southwest of Amalga having groundwater TDS concentrations between 750 and 1,000 mg/L (Lowe et al. 1994). Robinson (1999) identified TDS concentrations as high as 1,200 mg/L in the principal aquifer near the Barrens. BIO-WEST could not locate any information on typical TDS concentrations in the shallow, unconfined aquifer in the area. BIO-WEST has documented TDS concentrations as high as 44,000 mg/L in monitor well MW-2 on the 110-acre land application site, however, TDS concentrations in the other monitor wells on both land application sites range from 18,000 to 8,500 mg/L.

Down-gradient monitor wells installed on the 110-acre and 160-acre land application sites show minimal impacts from the application of treated wastewater for irrigation. This implies the area of influence affected by the application of treated wastewater is essentially confined to the areas that are irrigated with the wastewater.

3.4 Soils

BIO-WEST accessed the United States Department of Agriculture (USDA) Natural Resources Conservation Service web soil survey website (USDA, 2011) for information on the soils present in the area of the subject properties. The soils in the area of the wastewater treatment lagoons consists of approximately 77% Jordan-Lasil Silty Clay Loams, approximately 22% Trenton Silty Clay Loam, and approximately 1% Cache Silty Clay. The soils in the area of the 110-acre land application site consist of approximately 60% Trenton Silty Clay Loam, approximately 33% Cache Silty Clay, and approximately 7% Jordan-Lasil Silty Clay Loams. The soils in the area of the 160-acre land application consist of approximately 52% Trenton Silty Clay Loam, approximately 30% Jordan-Lasil Silty Clay Loams, and approximately 18% Cache Silty Clay. Soil Maps and descriptions of each of the soil types are included in Appendix D.

4.0 METHODOLOGY

4.1 Monitoring Well Locations

The 110-acre land application site currently has two monitor wells (MW-1 and MW-2) present. The wells were placed in the down-gradient corners of the property so that MW-2 would serve as the up-gradient well, and MW-1 would be down-gradient, however, based on groundwater observations and topography in the area both monitor wells appear to be down-gradient. The 110-acre land application site lacks a good up-gradient monitor well. As part of the evaporation wetland monitoring plan 6 additional monitor wells will be installed on the 110-acre property, including a up-gradient well in the northeast corner of the property. Current monitoring well locations are shown in Appendix A, Figure 4. Proposed monitor well locations for the 110-acre land application site are shown in Appendix A, Figure 5.

The 160-acre land application site has three monitor wells (MW-1, MW-2, and MW-3) present. The wells were placed so that MW-1 would serve as the up-gradient well, and MW-2 and MW-3 would be down-gradient. Monitoring well locations for the 160-acre land application site are shown in Appendix A, Figure 6.

4.2 Monitoring Well Installation

The two existing monitor wells on the 110-acre land application site were installed by Schreiber in 2005. The wells are constructed of 6-inch diameter polyvinylchloride (PVC) casing. Monitor well MW-1 was installed to a depth of approximately 20 feet bsg. Monitor well MW-2 was installed to a depth of approximately 16 feet bsg. BIO-WEST was unable to determine the screen interval as well as any well construction details for the two monitor wells as no well logs were completed for the wells. The top of casing elevations on these wells had not been surveyed until March 2012.

A total of 6 new monitor wells will be installed on the 110-acre land application site during construction of the evaporation wetlands. The new monitor wells will be advanced using a track-mounted GeoProbe® rig. The wells will be installed by Utah-licensed well drillers, and Environmental Protection Agency (EPA) Standard Operating Procedures (EPA 1991) will be followed. The new monitor wells MW-2 will be installed to a total depth of approximately 10 feet

bsg. The wells will be constructed of 2-inch diameter, flush-threaded, schedule 40 polyvinylchloride (PVC) casing. The screen interval of each new well will consist of 0.010-inch machine-slotted casing beginning at approximately 5 feet bsg and extending to the base of the boring. The annular space of each well will be backfilled with silica sand extending to 3 feet bsg. A 1.5 foot bentonite seal will be placed above the filter pack, and the remaining annulus will be filled with concrete to the surface. Each well will be completed at the surface with a standpipe-type locking well box with three posts around each well for protection.

On March 17, 2006, BIO-WEST oversaw the installation of three monitoring wells (MW-1 through MW-3) on the 160-acre land application site. The monitoring wells were advanced using a track-mounted GeoProbe® rig. The wells were installed by Utah-licenced well drillers, and Environmental Protection Agency (EPA) Standard Operating Procedures (EPA 1991) were followed. Monitor well MW-2 was installed to a total depth of approximately 20 feet and monitor wells MW-1 and MW-3 were installed to approximately 25 feet bsg. The wells were constructed of 2-inch diameter, flush-threaded, schedule 40 polyvinylchloride (PVC) casing. The screen interval of each well consists of 0.010-inch machine-slotted casing beginning at approximately 5 feet bsg for MW-2 and 10 feet bsg for MW-1 and MW-3 and extending to the base of the boring. The annular space of each well was backfilled with silica sand extending to 4 feet bsg. A 1.5 foot bentonite seal was placed above the filter pack, and the remaining annulus was filled with concrete to the surface. Each well was completed at the surface with a standpipe-type locking well box with three posts around each well for protection. Well construction details, including screened intervals and depths for all wells, are included on the well logs in Appendix E.

4.3 Well Installation Soil Sampling Protocol

No soil samples were collected during the installation of the two existing monitor wells on the 110-acre land application site. A total of six soil samples will be collected and submitted for laboratory analyses for grain size distribution and electrical conductivity during the installation of the new monitor wells.

On the 160-acre land application site, soil samples were collected continuously from each boring location. The GeoProbe® extracted a 5-foot-long soil core encased in clear plastic from each sample interval. The plastic was cut open and the core was split open using a stainless steel putty knife. The types of soil and any changes in soil stratigraphy were observed and documented. Soil descriptions were completed, and soil was classified in the field according to the Unified Soil Classification System (USCS). Well logs containing soil descriptions, USCS identification, and other pertinent drilling information are included in Appendix E.

Two soil samples from well borings MW-1 and MW-2 were submitted for grain-size classification and organic matter content to the Idaho State University Soil Laboratory. The samples were identified as MW-1@20-25 feet and MW-2@2-5 feet. Both samples came from layers identified in the field as clay (USCS symbol CH).

4.4 Land Application Irrigation Area Soil Sampling Protocol

Soil composite samples are collected annually at 15 different points within each irrigation area on both land application sites. The 110-acre land application site consists of three separate irrigation areas, however, irrigation area 3 on the property is not typically planted or irrigated, so no soil samples are collected in this area. The 160-acre land application site consists of four separate irrigation areas. Soil samples are collected at 1-foot and 2-feet bsg at each point and analyzed for pH, salinity, total phosphorus, total potassium, nitrate-nitrogen, and sodium absorption ratio (SAR). Annual soil samples will be collected on any portion of the 110-acre land application site that is irrigated with wastewater after the evaporation wetlands are completed.

4.5 Groundwater Sampling Protocol

Groundwater from the monitor wells on both of the land application sites is sampled annually. The wells are purged, using a peristaltic pump with disposable tubing or a PVC bailer, until three well volumes are removed or the well goes dry. Samples are collected using a peristaltic pump and filtered in the field. All equipment is disposable or decontaminated before each use and between each well. Samples are cooled to 4 degrees Celsius in an insulated cooler. A chain-of-custody is completed, and water samples are then shipped to the laboratory and analyzed for a number of constituents including: TDS, nitrate-nitrite, total kjeldahl nitrogen (TKN), total phosphorus, and biochemical oxygen demand (BOD). The pH of the groundwater was analyzed in the field from a grab sample using a portable pH meter.

5.0 RESULTS

5.1 Well Installation Soil Sampling Results

Examination of the soil samples collected during the installation of the monitoring wells on the 160-acre land application site shows the subject property consists of mostly of clay and silt. The surface soil was a silty clay mixture with plant roots that provided secondary permeability. High plasticity clay layers below the surface soils were encountered in all three well borings. The clay layers were encountered between 2 and 2.5 feet bsg in MW-2 and MW-3, and at 9 feet bsg in MW-1. A small, 0.25 inch layer of fine-grained sand was encountered at 13.5 feet bsg in MW-2. This sand layer did not appear in any of the other well borings.

The laboratory soil classification sample results are shown in Table 1. Samples MW-1@20-25 feet and MW-2@2-5 feet were identified in the field as a clay, but the laboratory result showed that these samples were actually a silty clay. Both samples were dominated by the clay fraction. Organic carbon and organic matter were more abundant in the sample collected from the deeper layer than in the shallower layer. Appendix F includes the laboratory results of the soil classification samples.

5.2 Land Application Irrigation Area Soil Sampling Results

Background soil samples were collected on the 110-acre land application site in May 2005 prior to any irrigation of the property using Schreiber wastewater. Soil samples have been collected annually since 2005 after the irrigation season has ended. The 2011 soil sample results are shown in Table 2. The BIO-WEST soil sampling database for the 110-acre land application site showing soil sampling results from previous years is included as Table A in Appendix G.

Table 1. Soil Sample Characterization Analytical Results, March 17, 2006.

SAMPLE I.D.	SAMPLE DEPTH (feet bsg [a])	ORGANIC MATTER (PERCENT)	ORGANIC CARBON (PERCENT)	SAND (PERCENT)	SILT (PERCENT)	CLAY (PERCENT)
MW-1	20-25	0.87	0.5	6.2	45.0	48.8
MW-2	2-5	0.39	0.23	5.0	37.5	57.5

[a] bsg = below surface grade.

Table 2. 110-Acre Land Application Site Soil Test Analytical Results, October 17, 2011.

IRRIGATION AREA	SAMPLE DEPTH (feet)	pH	SALINITY-ECe (dS/m) [a]	PHOSPHORUS (mg/kg) [b]	POTASSIUM (mg/kg)	NITRATE-NITROGEN (mg/kg)	SODIUM ABSORPTION RATIO
1	1	8.2	5.44	75	>900	5.4	20.1
1	2	8.4	2.96	31	518	2.6	20.2
2	1	8.5	2.40	76	>900	15.4	17.4
2	2	7.9	7.17	47	721	5.8	17.0

[a] dS/m = deci-siemen per meter.
[b] mg/kg = milligrams per kilogram.

Background soil samples were collected on the 160-acre land application site in February 2006 prior to any irrigation of the property using Schreiber wastewater. Soil samples have been collected annually since 2006 after the irrigation season has ended. The 2011 soil sample results are shown in Table 3. The BIO-WEST soil sampling database for the 160-acre land application site showing soil sampling results from previous years is included as Table B in Appendix G.

Table 3. 160-Acre land Application Site Soil Test Analytical Results, October 17, 2011.

IRRIGATION AREA	SAMPLE DEPTH (feet)	pH	SALINITY-ECe (dS/m)[a]	PHOSPHORUS (mg/kg)[b]	POTASSIUM (mg/kg)	NITRATE-NITROGEN (mg/kg)	SODIUM ABSORPTION RATIO
1	1	8.3	1.27	65	>900	8.45	10.8
1	2	8.1	1.49	42	736	6.96	12.9
2	1	8.0	2.85	65	>900	48.00	13.8
2	2	8.2	2.23	21	497	10.80	16.2
3	1	6.1	0.40	80	>900	8.23	10.5
3	2	5.8	0.30	42	744	8.98	15.8
4	1	8.3	3.75	54	>900	8.45	24.2
4	2	8.5	2.95	40	800	4.15	25.4

[a] dS/m = deci-siemen per meter.
[b] mg/kg = milligrams per kilogram.

5.3 Groundwater Gauging Results

The monitor wells on both of the land application sites are gauged using an electronic water-level meter. Gauging occurs in the fall prior to the collection of groundwater samples.

On the 110-acre land application site, the depth to groundwater in monitor well MW-1 ranges 5.97 to 8.57 feet below the top of the well casing. The depth to groundwater in monitor well MW-2 ranges from 4.05 to 6.60 feet below the top of the well casing. The top of the well casing for each monitor well is approximately 2-feet above the ground surface. Depth to water information for the two monitor wells on the 110-acre land application site is included on Table C in Appendix G.

On the 160-acre land application site, the depth to groundwater in monitor well MW-1 ranges 4.89 to 11.60 feet below the top of the well casing. The depth to groundwater in monitor well MW-2 ranges from 6.54 to 10.36 feet below the top of the well casing. The depth to groundwater in monitor well MW-3 ranges from 8.58 to 19.6 feet below the top of the well casing. The top of the well casing for each monitor well is approximately 3-feet above the ground surface. The measured hydraulic gradient on October 18, 2011 was 0.0028 foot per foot and was to the west. The elevation contours generated from the data collected are shown on the Groundwater Elevation Contour Map (Appendix A, Figure 7). Depth to water information for the three monitor wells on the 160-acre land application site is included on Table D in Appendix G.

5.4 Groundwater Sampling Results

Background groundwater samples were collected in July, 2004 from two test pits dug on the 110-acre land application site. The samples were collected prior to any irrigation of the property with Schreiber wastewater. The two monitor wells on the 110-acre land application site were installed in 2005. Groundwater samples have been collected annually since 2006 after the irrigation season has ended. The 2010 groundwater sample results are shown in Table 4. The BIO-WEST groundwater sampling database for the 110-acre land application site showing groundwater sampling results from previous years is included as Table C in Appendix G.

Table 4. 110-Acre Land Application Site Groundwater Test Analytical Results, October 18, 2011.

WELL	pH	TOTAL DISSOLVED SOLIDS (mg/L) [a]	NITRATE/ NITRITE as N (mg/L)	TOTAL KJELDAHL NITROGEN (mg/L)	TOTAL PHOSPHORUS (mg/L)	BIOCHEMICAL OXYGEN DEMAND (mg/L)
MW-1	7.64	13,700	5.72	6.16	0.450	6.0
MW-2	7.10	42,000	<0.01	5.78	0.066	<5.0
MCL [b]	NA [c]	NA	10	NA	NA	NA
SMCL [d]	6.5–8.5	500	NA	NA	NA	NA

[a] mg/L = milligrams per liter.
[b] MCL = maximum contaminant levels for drinking water.
[c] NA = not applicable.
[d] SMCL = secondary drinking water standards.

Groundwater from monitor wells MW-1 and MW-2 on the 110-acre land application site exceeded the secondary drinking water standard (SMCL) for TDS. As shown in section 3.3.2 of this report, the TDS levels in this part of Cache Valley are naturally high (Lowe et al. 1994). The TDS concentration in the southern well (MW-1) was significantly lower than in the northern well (MW-2). The Utah Division of Environmental Quality has not set a groundwater standard for TDS for the shallow aquifer in Cache Valley, and it is unlikely that the shallow aquifer would ever be used as a drinking water source. Levels of nitrate-nitrite as N in the groundwater from wells MW-1 and MW-2 were below Utah groundwater standards and drinking water maximum contaminant levels (MCLs). The pH of the groundwater from both wells was within the acceptable SMCL range for pH. No MCL, SMCL, or other standard was applicable to the other constituents analyzed during this sampling event.

Background groundwater samples were collected in March, 2006 from the three monitor wells on the 160-acre land application site. The samples were collected prior to any irrigation of the property with Schreiber wastewater. Groundwater samples have been collected annually since 2006 after the irrigation season has ended. The 2010 groundwater sample results are shown in Table 5. The BIO-WEST groundwater sampling database for the 160-acre land application site showing groundwater sampling results from previous years is included as Table D in Appendix G.

Table 5. 160-Acre Land Application Site Groundwater Test Analytical Results, October 18, 2011.

WELL	pH	TOTAL DISSOLVED SOLIDS (mg/L)[a]	NITRATE/ NITRITE- (as N) (mg/L)	TOTAL KJELDAHL NITROGEN (mg/L)	TOTAL PHOSPHORUS (mg/L)	BIOCHEMICAL OXYGEN DEMAND (mg/L)
MW-1	7.43	7,500	<0.010	17.3	1.410	26
MW-2	7.55	10,000	0.302	16.0	0.424	10
MW-3	7.62	9,200	0.257	10.9	0.497	9
MCL[b]	NA[c]	NA	10	NA	NA	NA
SMCL[d]	6.5–8.5	500	NA	NA	NA	NA

[a] mg/L = milligrams per liter.
[b] MCL = maximum contaminant levels for drinking water.
[c] NA = not applicable.
[d] SMCL = secondary drinking water standards.

Groundwater from all the monitor wells (MW-1, MW-2, and MW-3) on the 160-acre land application site exceeded the secondary drinking water standard (SMCL) for TDS. As shown in section 3.3.2 of this report, the TDS levels in this part of Cache Valley are naturally high (Lowe et al. 1994). The TDS concentrations in the down-gradient wells (MW-2 and MW-3) were slightly higher than in the up-gradient well (MW-1). Levels of nitrate-nitrite as N in the groundwater from all three monitor wells were below Utah groundwater standards and drinking water maximum contaminant levels (MCLs). The pH of the groundwater from all three monitor wells was within the acceptable SMCL range for pH. No MCL, SMCL, or other standard was applicable to the other constituents analyzed during this sampling event.

6.0 AGRICULTURAL DESCRIPTION

The 110-acre land application site has previously been divided into three separate irrigation areas. Irrigation areas 1 and 2 were irrigated using wheel-line spray irrigation systems. Irrigation area 3 is typically not planted and not irrigated. Irrigation areas 1 and 2 on the 110-acre land application site have typically been planted with wheat, however, the irrigation areas were planted with alfalfa for the 2010 and 2011 growing seasons. No livestock confinement areas are located on the 110-acre land application site. The BIO-WEST crop yield database for the 110-acre land application site is included as Table A in Appendix H. Upon completion of the evaporation wetlands the remainder of the 110-acre land application site previously irrigated will be planted in similar crops and spray irrigated.

The 160-acre land application site is divided into four separate irrigation areas. All four irrigation areas are irrigated using wheel-line spray irrigation systems. Irrigation area 1 is typically planted with wheat. Irrigation area 2 is typically planted with barley. Irrigation areas 3 and 4 are typically planted with alfalfa. No livestock confinement areas are located on the 160-acre land application site. The BIO-WEST crop yield database for the 160-acre land application site is included as Table B in Appendix H.

7.0 SAMPLING AND ANALYSES PLAN

Schreiber and BIO-WEST have developed a sampling and analyses plan used for the nutrient management and monitoring of soil and groundwater conditions at the 110-acre and the 160-acre land application sites.

The plan includes Schreiber sampling and analyzing wastewater from both cell 1 and cell 4 of the wastewater treatment lagoons on a monthly basis. The samples will be sent to a Utah certified laboratory and analyzed for BOD, total suspended solids, TDS, nitrate-nitrite as N, nitrite as N, TKN, total phosphorus, and pH. The plan will include a sampling and monitoring event after each irrigation season. These sample results will be used to determine the quantity of nutrients that are being supplied to crops on the land application sites. BIO-WEST will use these sample results along with nutrient uptake rates of the planted crops to determine the amount of wastewater to apply to the crops on the land application areas.

Groundwater and soil samples will be collected annually after the irrigation season on the 160-acre land application site. Soil samples will be collected annually from any area irrigated on the 110-acre land application site after the irrigation season.

Groundwater samples from the 110-acre land application site will be collected from eight monitor wells located around the property. Groundwater samples will be collected prior to any discharge into the evaporation wetlands to assess background groundwater quality in the area. The 110-acre land application site monitor wells will sampled monthly for 2 months after discharge of wastewater to the evaporation wetlands has occurred. After the monthly sampling the monitor wells will be sampled on a quarterly basis for 2 quarters in 2012. After the quarterly sampling the monitor wells will be sampled on an annual basis in 2013 and beyond. These samples will be used to monitor soil

and groundwater conditions at the two properties. A surface water sample will be collected from the wetland area to the south of the evaporation wetland area. This sample will be collected during the same time period as the groundwater samples and will be used to monitor background conditions and any impacts to surface water in the area. If adverse impacts are documented in the surface water Schreiber will work with Utah DWQ to remedy the impacts.

Soil samples will be collected from each irrigation area on the two land application sites. Soil samples will not be collected within the evaporation wetland area. Two composite samples of 15 points each will be collected in each irrigation area. Soil samples will be collected at a depth of 1 foot and 2 feet below surface grade for each irrigation area. Samples will be submitted to a Utah certified laboratory and analyzed for pH, salinity, total phosphorus, total potassium, nitrate-nitrogen, and SAR.

Groundwater will be measured in each of monitor wells on each land application site to determine the depth to water. The water level in each monitor well will be measured using an electronic water level meter. Purging will be accomplished using decontaminated PVC bailers, disposable bailers, or disposable tubing attached to a peristaltic pump. Groundwater samples will be collected with either a disposable bailer or the tubing attached to the peristaltic pump. Samples will be sent to a Utah certified laboratory and analyzed for TDS, nitrate-nitrite, TKN, and total soluble phosphorus. The pH will be analyzed in the field from a grab sample using a portable pH meter.

8.0 REFERENCES

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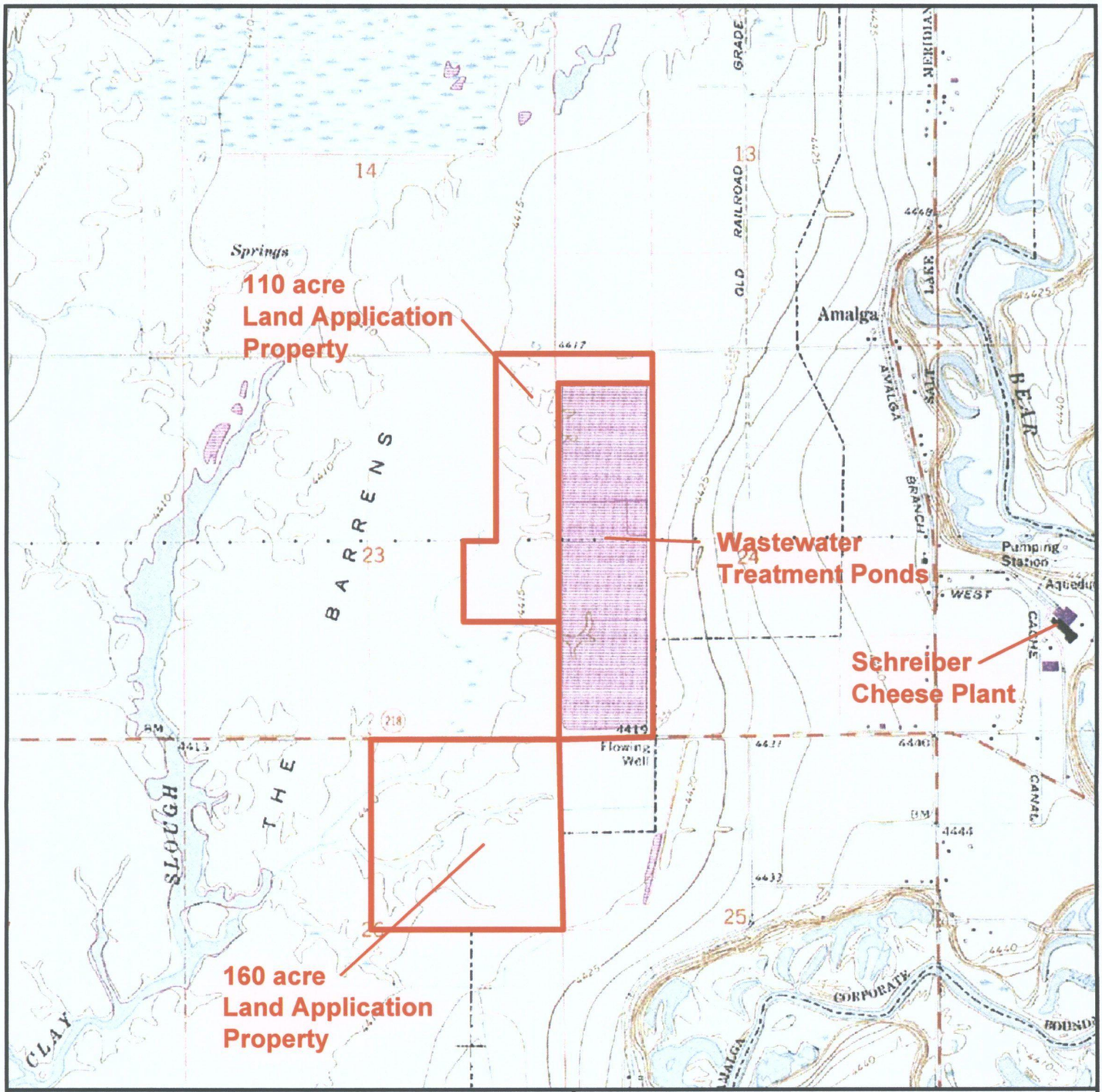
APPENDIX A: FIGURES



Note: Base Map from USGS Newton, Utah Quadrangle, 7.5 minute Topographic, 1986

SCALE: 1"= 0.25 mile

0 0.25 0.5 mile

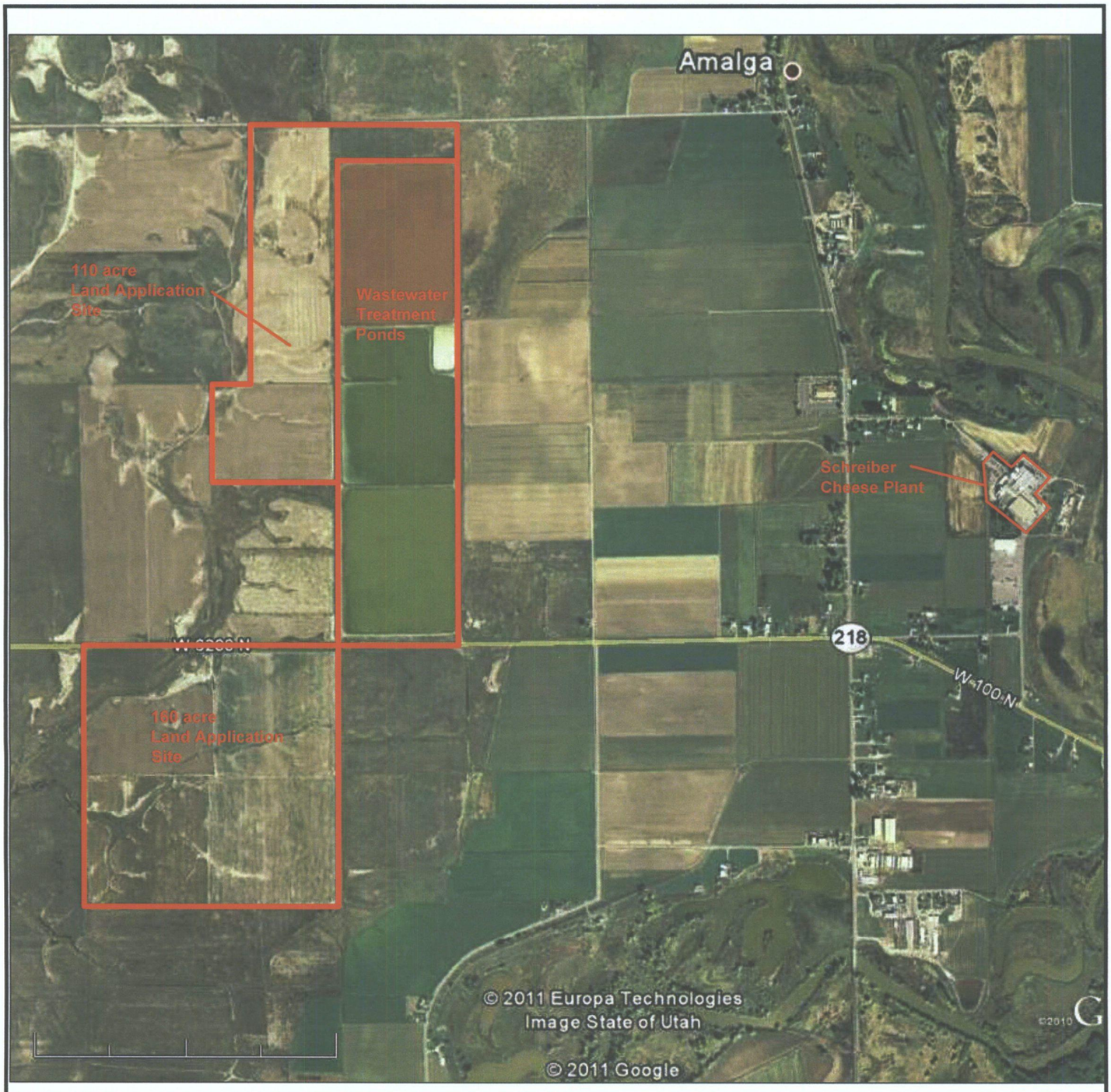
UTAH

LOCATION

N

Figure 1
Subject Property Location Map
SCHREIBER FOODS
3000 West 7000 North
Amalga, Utah

PROJECT NO.:	1016.6
DATE:	03/30/2011
DRAWN BY:	AC
PREPARED BY:	DL
REVISION NO.:	



Note: Base Map from GoogleEarth.com 2011

SCALE: 1"= 0.25 mile

0 0.25 0.5 mile

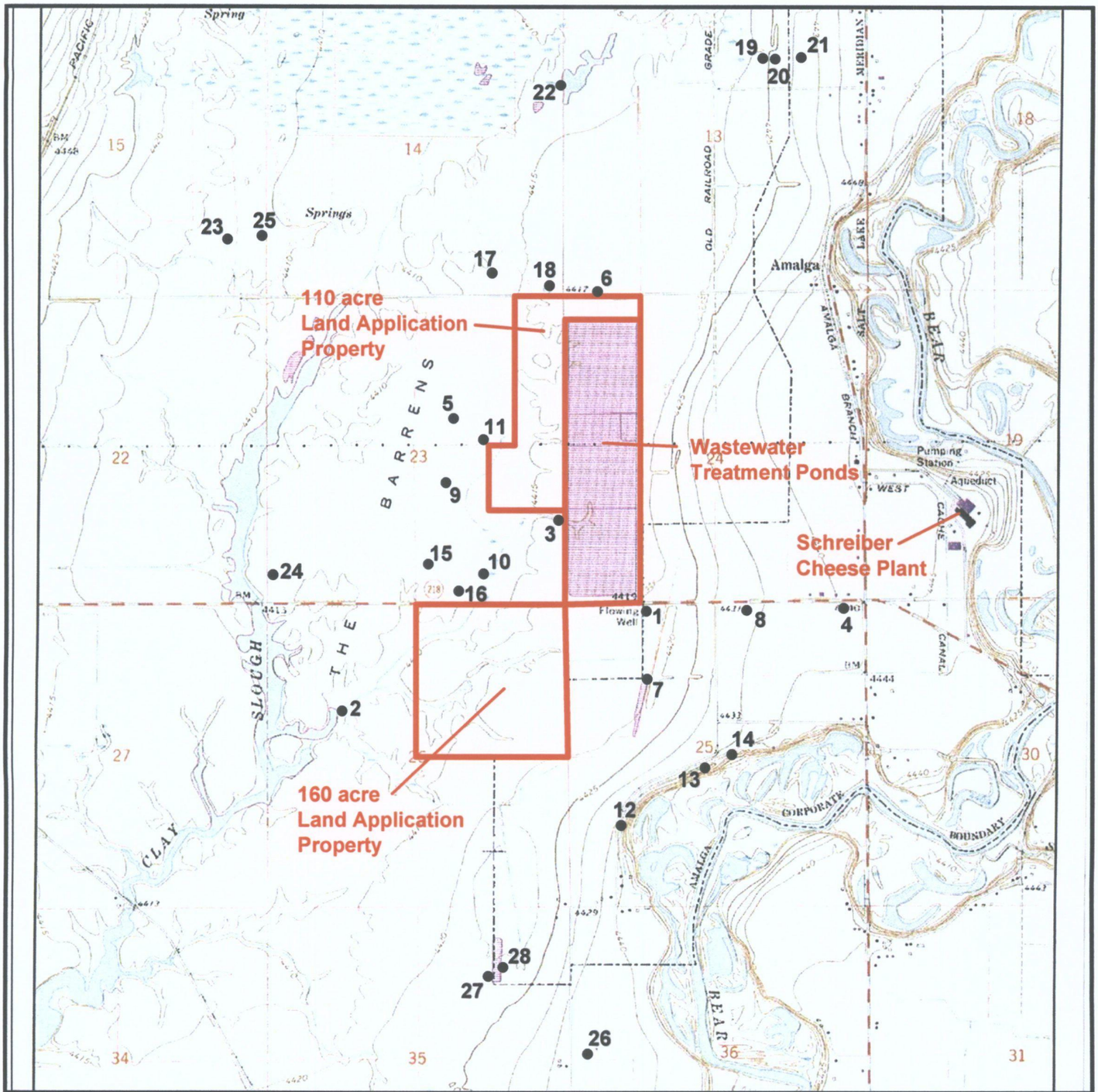
UTAH

LOCATION

N

Figure 2
Subject Properties Area Map
SCHREIBER FOODS
3000 West 7000 North
Amalga, Utah

PROJECT NO.:	1016.6
DATE:	03/30/2011
DRAWN BY:	AC
PREPARED BY:	DL
REVISION NO.:	



Note: Base Map from USGS Newton, Utah Quadrangle, 7.5 minute Topographic, 1986

SCALE: 1"= 0.5 mile

0 0.5 1.0 mile

UTAH

LOCATION

N

Figure 3
Well Location Map
SCHREIBER FOODS
3000 West 7000 North
Amalga, Utah

PROJECT NO.:	1016.6
DATE:	03/30/2011
DRAWN BY:	AC
PREPARED BY:	DL
REVISION NO.:	

Note: Base Map from www.GoogleEarth.com 2006

SCALE: 1"= 1000 Feet

0 1000' 2000'

UTAH

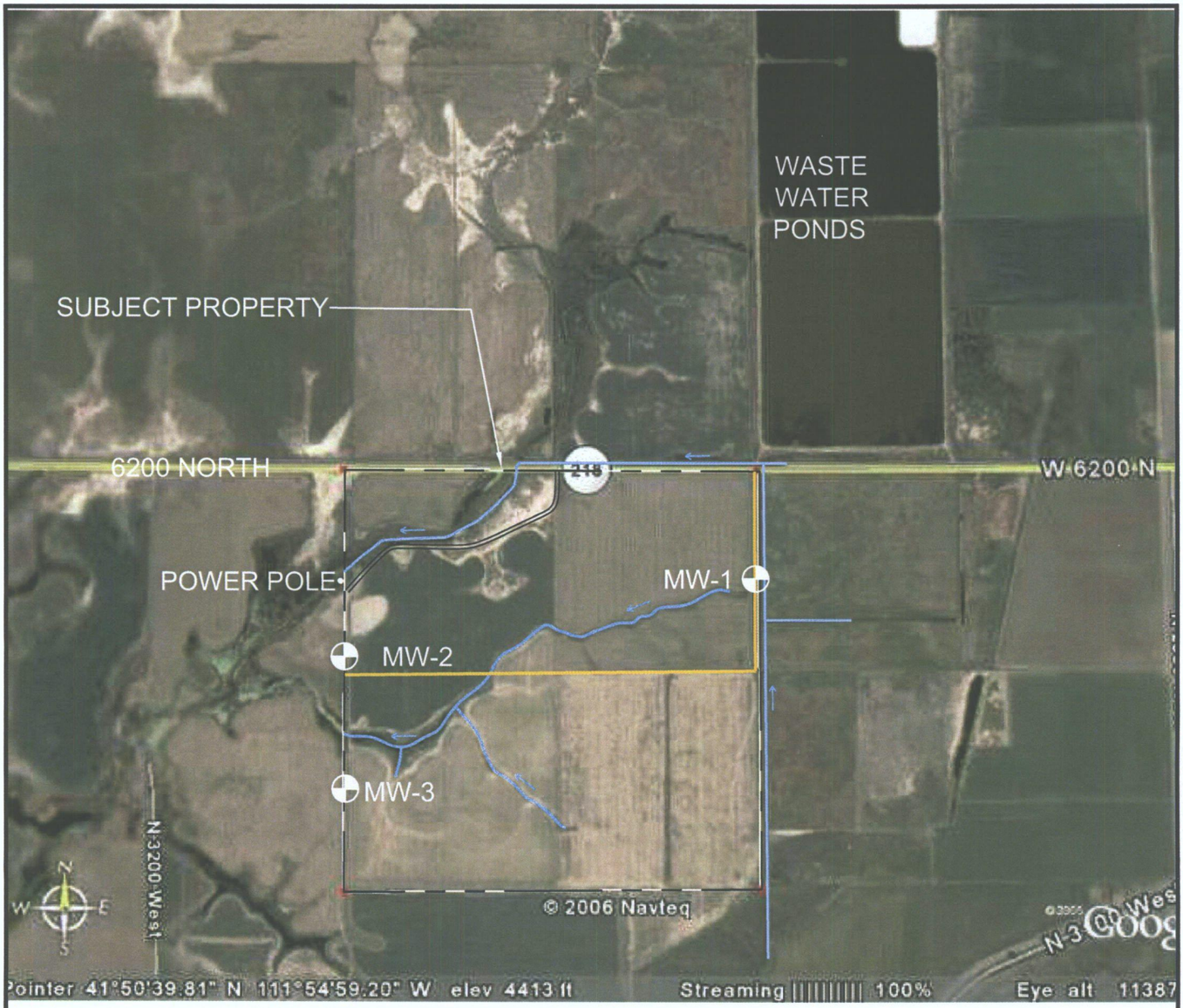
LOCATION

N

Figure 4
Subject Property Site Map
SCHREIBER FOODS 110 ACRE LAND APPLICATION SITE
3000 West 7000 North
Amalga, Utah

PROJECT NO.:	1016.6
DATE:	03/30/2011
DRAWN BY:	AC
PREPARED BY:	DL
REVISION NO.:	


MW-2
Wetland B
Wetland A
Wetland B
Wetland B
Wetland
Ditch D
Wetland B
Wetland C
MW-1
Project Area Summary
39.8 acres flooded
15,963 feet of dike within uplands
No wetlands will be diked or flooded
BIO-WEST, Inc.
Figure 5
Monitor Well Location Map
Schreiber Foods 110 Acre Land Application Site
3000 West 7000 North
Amalga, Utah
N
0
250
500
1,000
Feet
Existing Monitor Well
Proposed Monitor Well
Proposed Dike Area
Upland
Project Boundary
Wetland
Aerial Imagery from ESRI (2009 HRO - 1 Foot)
Map dated February 23, 2012



LEGEND

- MONITOR WELL LOCATION
- ROAD
- DITCH OR EPHEMERAL DRAINAGE
- IRRIGATION PIPE
- FLOW DIRECTION

GENERAL NOTES:
BASE MAP FROM
WWW.GOOGLE EARTH.COM

Note: Base Map from www.GoogleEarth.com 2006

SCALE: 1"= 1000 Feet

0 1000' 2000'

UTAH

LOCATION

N

Figure 6
Subject Property Site Map
SCHREIBER FOODS 160 ACRE LAND APPLICATION SITE
3000 West 7000 North, Amalga, Utah

PROJECT NO.:	1016.6
DATE:	03/30/2011
DRAWN BY:	AC
PREPARED BY:	DL
REVISION NO.:	

LEGEND

- MONITOR WELL LOCATION
- CONTOUR
- FLOW DIRECTION
- (4404.21) GROUND WATER ELEVATION IN FEET

Note: Base Map from www.GoogleEarth.com

SCALE: 1"= 1000 Feet

0 1000' 2000'

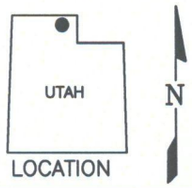


Figure 7
Ground Water Elevation Contour Map
SCHREIBER FOODS 160 ACRE LAND APPLICATION SITE
3000 West 7000 North
Amalga, Utah

PROJECT NO.:	1016.6
DATE:	11/22/2011
DRAWN BY:	AC
PREPARED BY:	DL
REVISION NO.:	

BIO-WEST, Inc.

Figure 8
Schreiber Foods
Wetland Delineation

N

0 250 500 1,000 Feet

Sample Points
Project Boundary
Upland
Wetland

Aerial Imagery from ESRI (2009 HRO - 1 Foot)
Map dated February17, 2012

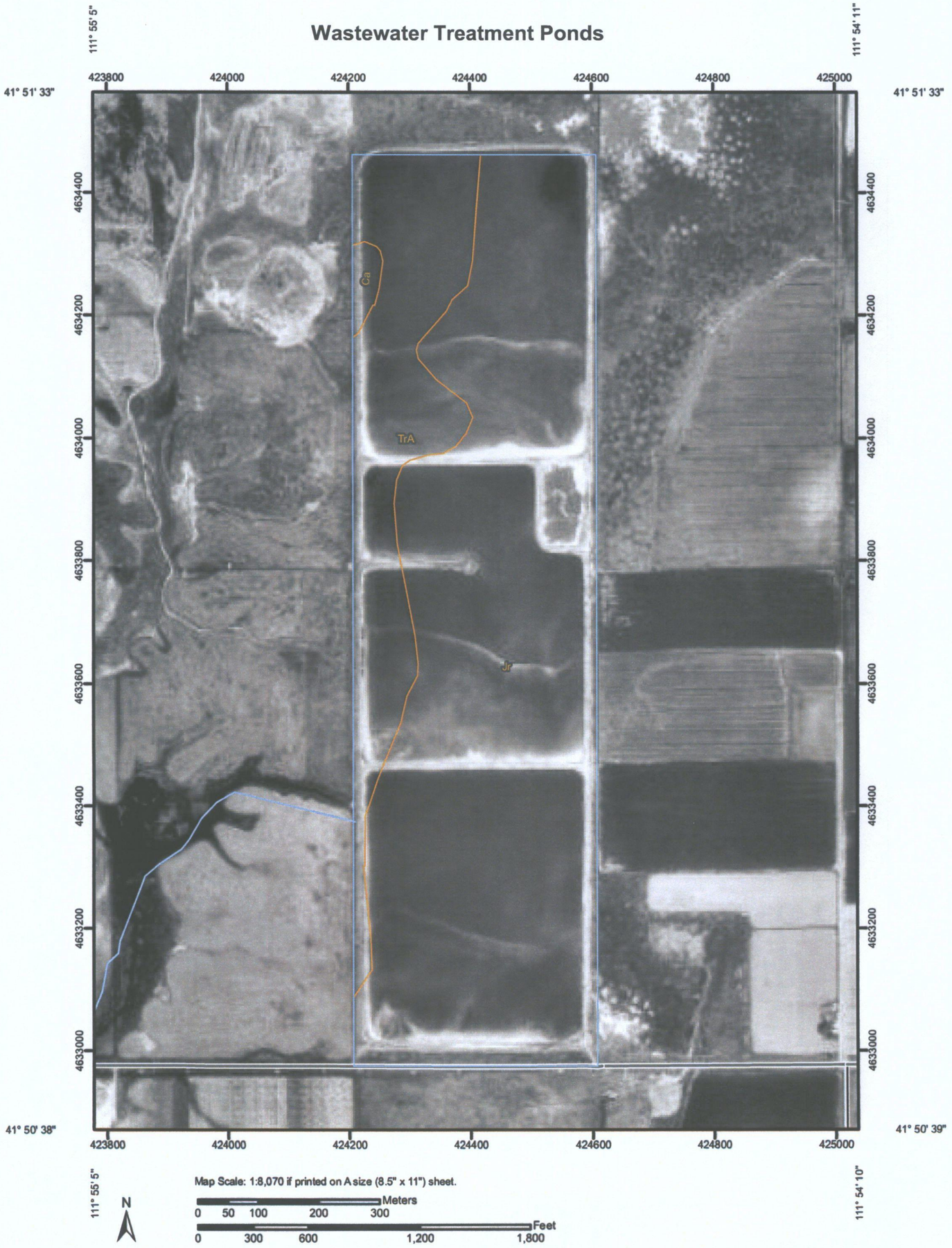
APPENDIX C: DIVISION OF WATER RIGHTS WELL SEARCH RESULTS

Schreiber Amalga Cheese Plant Groundwater Discharge Permit
Well Data (wells within a 1 mile radius of the wastewater treatment ponds and land application sites)

Well #	Water Right #	Type	Location		Well Depth (Feet)	Status	Uses	CFS	Acre FT	Owner	Comments
			Latitude	Longitude							
1	25-2957	Underground	41.8446963171	-111.9078394290	1,450	Perfected	Irrigation, Stock	0.258	NA	Richard M. Pitcher	
2	25-3367	Underground	41.8400009675	-111.9275157400	Unknown	Perfected	Irrigation, Stock	1.5	NA	William L Lindley	
3	25-5735	Underground	41.8490200308	-111.9130409340	Unknown	Perfected	Irrigation, Stock	1	NA	Sidney Hansen	
4	25-6156	Underground	41.8451245046	-111.8947702170	1,700	Terminated	Unknown	0.1	NA	A. Robert Munk	Water right terminated, well may still be in place
5	25-6228	Underground	41.8528914386	-111.9202823670	Unknown	Perfected	Stock	0.003	NA	Sidney J. Hansen	
6	25-6950	Underground	41.8594498465	-111.9107444940	Unknown	Perfected	Stock	0.002	NA	Hans A. Hansen	
7	25-7152	Underground	41.8415140513	-111.9075557920	Unknown	Perfected	Stock	NA	1.4	Kendlith N. Munk	
8	25-7324	Underground	41.8450735260	-111.9012863270	Unknown	Terminated	Irrigation	0.1	NA	Stewart and Verna B. Lower	Water right terminated, well may still be in place
9	25-7538	Underground	41.8501913211	-111.9204888120	150	Terminated	Domestic, Irrigation, Stock	0.5	NA	Paul C. Egan	Water right terminated, well may still be in place
10	25-7539	Underground	41.8461768259	-111.9178611770	Unknown	Terminated	Domestic, Irrigation, Stock	0.5	NA	Paul C. Egan	Water right terminated, well may still be in place
11	25-7539	Underground	41.8523255107	-111.9179491240	Unknown	Terminated	Domestic, Irrigation, Stock	0.5	NA	Paul C. Egan	Water right terminated, well may still be in place
12	25-7946	Underground	41.8346922848	-111.9092060770	1,600	Terminated	Domestic, Irrigation, Other	0.1	NA	William B. Coulam	Water right terminated, well may still be in place
13	25-7946	Underground	41.8373429002	-111.9038105250	1,600	Terminated	Domestic, Irrigation, Other	0.1	NA	William B. Coulam	Water right terminated, well may still be in place
14	25-7946	Underground	41.8377667731	-111.9022746600	1,600	Terminated	Domestic, Irrigation, Other	0.1	NA	William B. Coulam	Water right terminated, well may still be in place
15	25-9970	Underground	41.8466088668	-111.9210472920	200	Terminated	Domestic, Irrigation, Stock	NA	1.73	Ron Foster	Water right terminated, well may still be in place
16	25-9971	Underground	41.8455924607	-111.9194172560	70	Terminated	Stock	NA	1.4	H. Charles Johnson dba Rocky Mountain Ranches	Water right terminated, well may still be in place
17	25-7014	Underground	41.8605188251	-111.9178472720	Unknown	Perfected	Stock	0.003	NA	Sidney J. Hansen	
18	25-7084	Underground	41.8599181069	-111.9140011260	Unknown	Perfected	Stock	0.002	NA	Hans A. Hansen	
19	25-7108	Underground	41.8708841474	-111.9007741950	Unknown	Perfected	Irrigation, Stock	0.5	NA	Tad H. Bigham	
20	25-7108	Underground	41.8708931947	-111.9006714730	Unknown	Perfected	Irrigation, Stock	0.5	NA	Tad H. Bigham	
21	25-7108	Underground	41.8709186102	-111.8991806180	Unknown	Perfected	Irrigation, Stock	0.5	NA	Tad H. Bigham	
22	25-7167	Underground	41.8699347660	-111.9133167460	Unknown	Perfected	Irrigation, Stock	0.5	NA	Martin W. Jenson	
23	25-10641	Underground	41.8623740970	-111.9346850010	300	Terminated	Domestic, Irrigation, Stock	NA	1.73	Gary Van Powell	Water right terminated, well may still be in place
24	25-2931	Underground	41.8462392692	-111.9317914120	Unknown	Perfected	Stock	0.22	NA	Reuben D. Rasmussen	
25	a32323	Underground	41.8623750084	-111.9325476520	300	Approved	Stock	NA	1.73	Gary Van Powell	Water right approved, well may not be in place yet
26	25-2756	Underground	41.8234431364	-111.9114398350	Unknown	Perfected	Stock	0.003	NA	A. Alton Hoffman	
27	25-6154	Underground	41.8270786942	-111.9172129660	1,500	Terminated	Unknown	0.1	NA	A. Robert Munk	Water right terminated, well may still be in place
28	25-6155	Underground	41.8272174082	-111.9170314260	2,100	Terminated	Unknown	0.1	NA	A. Robert Munk	Water right terminated, well may still be in place

APPENDIX D: SOIL DESCRIPTIONS

Soil Map—Cache Valley Area, Parts of Cache and Box Elder Counties, Utah



USDA Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

3/22/2011
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:8,070 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 12N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cache Valley Area, Parts of Cache and Box Elder Counties, Utah
Survey Area Data: Version 5, Aug 26, 2009

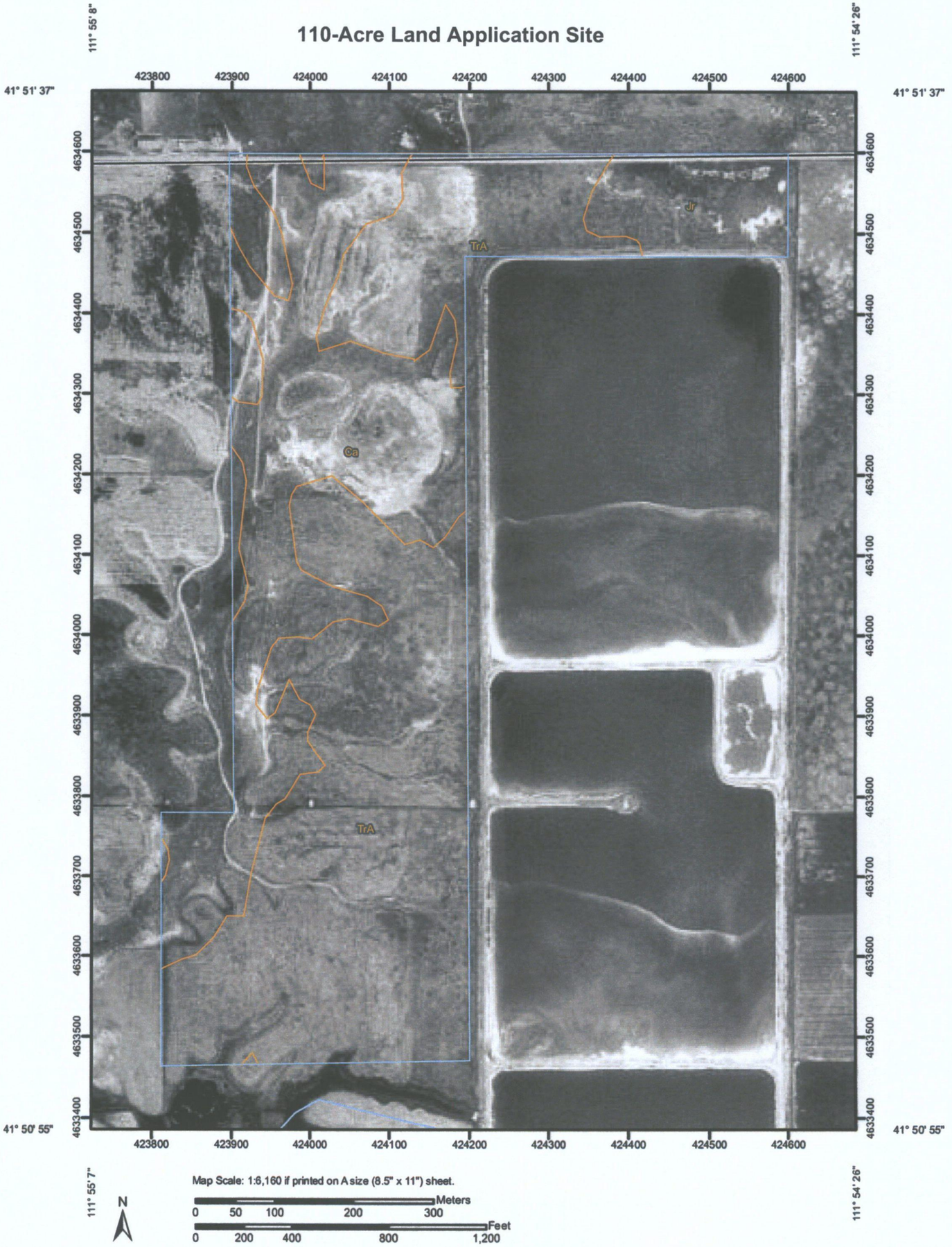
Date(s) aerial images were photographed: 8/14/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Cache Valley Area, Parts of Cache and Box Elder Counties, Utah (UT603)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Ca	CACHE SILTY CLAY	1.3	0.9%
Jr	JORDAN-LASIL SILTY CLAY LOAMS	113.2	77.1%
TrA	TRENTON SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	32.3	22.0%
Totals for Area of Interest		**146.8**	**100.0%**

Soil Map—Cache Valley Area, Parts of Cache and Box Elder Counties, Utah



USDA Natural Resources Conservation Service

Web Soil Survey
National Cooperative Soil Survey

3/22/2011
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:6,160 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 12N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cache Valley Area, Parts of Cache and Box Elder Counties, Utah
Survey Area Data: Version 5, Aug 26, 2009

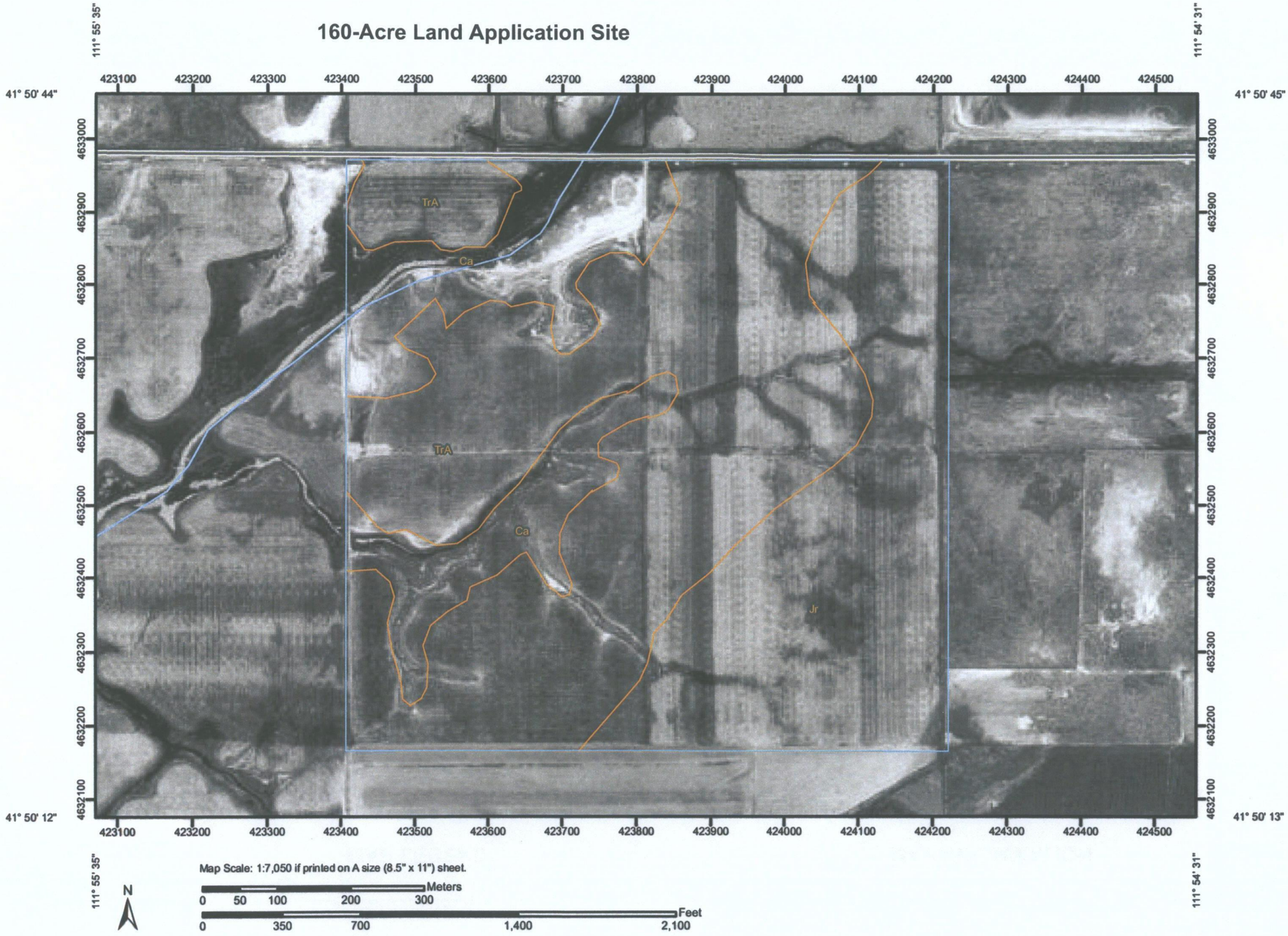
Date(s) aerial images were photographed: 8/14/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Cache Valley Area, Parts of Cache and Box Elder Counties, Utah (UT603)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Ca	CACHE SILTY CLAY	33.7	32.8%
Jr	JORDAN-LASIL SILTY CLAY LOAMS	7.3	7.1%
TrA	TRENTON SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	61.6	60.0%
Totals for Area of Interest		**102.6**	**100.0%**

160-Acre Land Application Site



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:7,050 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 12N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Cache Valley Area, Parts of Cache and Box Elder Counties, Utah
Survey Area Data: Version 5, Aug 26, 2009

Date(s) aerial images were photographed: 8/14/1993

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Cache Valley Area, Parts of Cache and Box Elder Counties, Utah (UT603)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Ca	CACHE SILTY CLAY	29.4	18.1%
Jr	JORDAN-LASIL SILTY CLAY LOAMS	48.5	29.9%
TrA	TRENTON SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES	84.3	52.0%
Totals for Area of Interest		**162.2**	**100.0%**

Cache Valley Area, Parts of Cache and Box Elder Counties, Utah

Ca—CACHE SILTY CLAY

Map Unit Setting

Elevation: 4,420 to 4,460 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 110 to 160 days

Map Unit Composition

Cache and similar soils: 95 percent
Minor components: 5 percent

Description of Cache

Setting

Landform: Lake plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Moderately saline to strongly saline (16.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water capacity: Very low (about 2.4 inches)

Interpretive groups

Land capability (nonirrigated): 7w
Ecological site: Wet Saline Meadow (R028AY024UT)

Typical profile

0 to 4 inches: Silty clay
4 to 25 inches: Silty clay
25 to 39 inches: Silty clay
39 to 72 inches: Silty clay

Minor Components

Airport

Percent of map unit: 5 percent

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Data Source Information

Soil Survey Area: Cache Valley Area, Parts of Cache and Box Elder Counties, Utah
Survey Area Data: Version 5, Aug 26, 2009

Cache Valley Area, Parts of Cache and Box Elder Counties, Utah

Jr—JORDAN-LASIL SILTY CLAY LOAMS

Map Unit Setting

Elevation: 4,400 to 4,500 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 45 to 47 degrees F
Frost-free period: 120 to 140 days

Map Unit Composition

Jordan and similar soils: 55 percent
Lasil and similar soils: 40 percent
Minor components: 5 percent

Description of Jordan

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from limestone, sandstone, and shale

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Moderately saline to strongly saline (16.0 to 32.0 mmhos/cm)
Sodium adsorption ratio, maximum: 55.0
Available water capacity: Low (about 4.7 inches)

Interpretive groups

Land capability (nonirrigated): 7w
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Typical profile

0 to 5 inches: Silty clay loam
5 to 10 inches: Silty clay
10 to 21 inches: Silty clay
21 to 42 inches: Silty clay loam
42 to 60 inches: Silty clay

Description of Lasil

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Slightly saline to moderately saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 40.0
Available water capacity: High (about 10.2 inches)

Interpretive groups

Land capability (nonirrigated): 7w
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Typical profile

0 to 5 inches: Silty clay loam
5 to 13 inches: Silty clay loam
13 to 23 inches: Silty clay loam
23 to 32 inches: Silty clay loam
32 to 39 inches: Silty clay loam
39 to 60 inches: Silty clay loam

Minor Components

Cache

Percent of map unit: 5 percent
Landform: Lake plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Wet Saline Meadow (R028AY024UT)

Data Source Information

Soil Survey Area: Cache Valley Area, Parts of Cache and Box Elder Counties, Utah
Survey Area Data: Version 5, Aug 26, 2009

Cache Valley Area, Parts of Cache and Box Elder Counties, Utah

TrA—TRENTON SILTY CLAY LOAM, 0 TO 2 PERCENT SLOPES

Map Unit Setting

Elevation: 4,400 to 4,700 feet
Mean annual precipitation: 14 to 17 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 120 to 150 days

Map Unit Composition

Trenton and similar soils: 90 percent
Minor components: 10 percent

Description of Trenton

Setting

Landform: Lake terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Lacustrine deposits derived from quartzite and/or lacustrine deposits derived from limestone and sandstone

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to moderately saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water capacity: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability (nonirrigated): 3s
Ecological site: Alkali Bottom (Alkali Sacaton) (R028AY001UT)

Typical profile

0 to 8 inches: Silty clay loam
8 to 15 inches: Silty clay
15 to 26 inches: Silty clay
26 to 34 inches: Silty clay
34 to 60 inches: Silty clay
60 to 72 inches: Silty clay

Minor Components

Cache

Percent of map unit: 5 percent
Landform: Lake plains
Landform position (three-dimensional): Talf, dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Wet Saline Meadow (R028AY024UT)

Slickspots

Percent of map unit: 5 percent
Landform: Depressions
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

Data Source Information

Soil Survey Area: Cache Valley Area, Parts of Cache and Box Elder Counties, Utah
Survey Area Data: Version 5, Aug 26, 2009

APPENDIX E: WELL LOGS

BIO-WEST,Inc.
1063 West 1400 North
Logan, UT 84321
Phone: (435)752-4202
Fax:(435)752-0507

WELL LOG MW-1

DATES DRILLED: 3-17-06
TOTAL DEPTH: 25'

PROJECT INFORMATION

PROJECT:	Schreiber Foods
SITE :	Amalga, Utah
JOB NO.:	1016
LOGGED BY:	Dustin Lofthouse
PROJECT MGR:	Wes Thompson

DRILLING INFORMATION

DRILLING CO.:	Earth Probe
DRILLER:	Pat Casey
RIG TYPE:	Track Mounted Geo-Probe
METHOD OF DRILLING:	Geo-Probe
SAMPLING METHODS:	5' continuous core

Screen Diameter 2" Length(s) 15' TypePVC Slot Size 10 Water Level 4409.21 Hole Diameter 3.6"
Casing Diameter 2" Length(c) 12.5' TypePVC Cap/Trap Length .25' Casing Elev. 4420.46 Surface Elev. 4417.54

DEPTH (FT)	SOIL TYPE	USCS	SOIL DESCRIPTION (Trace<10, Little 10-20%, Some 20-35%, And 35-50%)	Sample Depth	% Recovery	Blows	PID/FID ppm	BORING COMPLETION
0		ML	SILT and CLAY, trace sand, very well sorted, soft, dark brown with some mottled light brown, moist, moderate to slightly impermeable, some plant roots.		100			
-5		ML	SILT and CLAY, very well sorted, soft, red brown, moist, moderate to slightly impermeable, some plant roots, rust color around plant roots.		100			
-10		CH	CLAY, some silt, very well sorted, soft, tan to brown with interbedded gray layers, moist, slightly impermeable, some rust colored root holes.		75			
-15		CH	CLAY, some silt, very well sorted, soft, red brown with some interbeded gray layers around 17', saturated, impermeable, gradational contact with lower layer.		100 100			
-20		CH	CLAY, some silt, very well sorted, soft, gray with some interbedded dark gray layers, some mottled red color, saturated, impermeable.		100			
-25			Bottom of hole at 25'					

BIO-WEST,Inc.
1063 West 1400 North
Logan, UT 84321
Phone: (435)752-4202
Fax:(435)752-0507

WELL LOG MW-2

DATES DRILLED: 3-17-06
TOTAL DEPTH: 20'

PROJECT INFORMATION

PROJECT:	**Schreiber Foods**
SITE :	**Amalga, Utah**
JOB NO.:	**1016**
LOGGED BY:	**Dustin Lofthouse**
PROJECT MGR:	**Wes Thompson**

DRILLING INFORMATION

DRILLING CO.:	**Earth Probe**
DRILLER:	**Pat Casey**
RIG TYPE:	**Track Mounted Geo-Probe**
METHOD OF DRILLING:	**Geo-Probe**
SAMPLING METHODS:	**5' continuous core**

Screen Diameter 2" Length(s) 15' TypePVC Slot Size 10 Water Level 4404.21 Hole Diameter 3.6"
Casing Diameter 2" Length(c) 7.75' TypePVC Cap/Trap Length .25' Casing Elev. 4414.66 Surface Elev. 4411.85

DEPTH (FT)	SOIL TYPE	USCS	SOIL DESCRIPTION (Trace<10,Little 10-20%, Some 20-35%, And 35-50%)	Sample Depth	% Recovery	Blows	PID/FID ppm	BORING COMPLETION
0		ML	SILT and CLAY, trace sand, very well sorted, soft, dark brown with some mottled tan, moist, moderate to slightly impermeable, some plant roots.		100			
-5		CH	CLAY, some silt, very well sorted, soft, gray with some interbedded red-brown layers, moist, moderate to slightly impermeable, plant roots with rust color around roots.		50			
-10		CH	CLAY, some silt, very well sorted, soft, red-brown, moist, slight to impermeable, gradational contact with above layer, some rust colored root holes near top of layer, saturated around 11'.					
		CH	SAND, 0.25" layer of sand at 13.5', some silt, fine grained, well sorted, rounded, soft, gray, saturated, very permeable		100			
		SP			100			
-15		CH	CLAY, trace silt, very well sorted, soft, interbedded light and dark gray layers, saturated, impermeable.		100			
		CH	CLAY, some silt, very well sorted, soft, red-brown, saturated, impermeable, gradational contact with above layer.		100			
-20		CH	CLAY, some silt, very well sorted, soft, interbedded light and dark gray layers, saturated, impermeable.		100			
			Bottom of hole at 20'.					

BIO-WEST,Inc.
1063 West 1400 North
Logan, UT 84321
Phone: (435)752-4202
Fax:(435)752-0507

WELL LOG MW-3

DATES DRILLED: 3-17-06
TOTAL DEPTH: 25'

PROJECT INFORMATION

PROJECT:	Schreiber Foods
SITE :	Amalga, Utah
JOB NO.:	1016
LOGGED BY:	Dustin Lofthouse
PROJECT MGR:	Wes Thompson

DRILLING INFORMATION

DRILLING CO.:	Earth Probe
DRILLER:	Pat Casey
RIG TYPE:	Track Mounted Geo-Probe
METHOD OF DRILLING:	Geo-Probe
SAMPLING METHODS:	5' continuous core

Screen Diameter 2" Length(s) 15' TypePVC Slot Size 10 Water Level 4405.49 Hole Diameter 3.6"
Casing Diameter 2" Length(c) 12.5' TypePVC Cap/Trap Length .25' Casing Elev. 4417.60 Surface Elev. 4414.88

DEPTH (FT)	SOIL TYPE	USCS	SOIL DESCRIPTION (Trace<10, Little 10-20%, Some 20-35%, And 35-50%)	Sample Depth	% Recovery	Blows	PID/FID ppm	BORING COMPLETION
0		ML	SILT and CLAY, trace sand, very well sorted, soft, dark brown with some mottled light brown, moist, moderate to slightly impermeable, some plant roots, light tan color around roots.		100			
		CH			100			
-5		CH	CLAY at 2.5', trace silt, very well sorted, slightly hard, light tan with mottled dark brown, dry, slightly permeable to impermeable. CLAY, some silt, very well sorted, soft to slightly hard, red-brown, moist, slightly impermeable, some rust colored root holes.		75			
-10		CH	CLAY, some silt, very well sorted, soft, tan with interbedded red-brown layers, moist, slight to impermeable, some rust colored root holes.		100			
-15		CH	CLAY, some silt, very well sorted, soft, red brown with some interbeded gray layers around 17', saturated, impermeable, gradational contact with lower layer.		100			
-20		CH	CLAY, some silt, very well sorted, soft, gray with some interbedded dark gray layers, some mottled red color, saturated, impermeable.		100			
-25			Bottom of hole at 25'					

APPENDIX F: SOIL CLASSIFICATION SAMPLES LABORATORY RESULTS

Analytical Sciences Laboratory
Certificate of Analysis

Case ID: SMAR06-029

Client SampleID: MW-2 2-5ft Site/Location:
ASL Sample ID: S0600189 Matrix: Solid - Dry Weight

Organic Carbon/Matter	Method: Titrimetric	Prep: Dichromate, ASA 29-3.5	Analysis Date: 29-Mar-06
	Results	MDL	Pres.: None / Filter? N/A
Organic Carbon	0.23 %	0.06	
Organic Matter	0.39 %	—	

Textural Classification	Method: Hydrometer	Prep: N/A	Analysis Date: 29-Mar-06
	Results	MDL	Pres.: None / Filter? N/A
Sand	5.0 %	0.1	
Clay	57.5 %	0.1	
Silt	37.5 %	0.1	
Texture	clay	—	

Client SampleID: MW-1 20-25ft Site/Location:
ASL Sample ID: S0600190 Matrix: Solid - Dry Weight

Organic Carbon/Matter	Method: Titrimetric	Prep: Dichromate, ASA 29-3.5	Analysis Date: 29-Mar-06
	Results	MDL	Pres.: None / Filter? N/A
Organic Carbon	0.50 %	0.06	
Organic Matter	0.87 %	—	

Textural Classification	Method: Hydrometer	Prep: N/A	Analysis Date: 29-Mar-06
	Results	MDL	Pres.: None / Filter? N/A
Sand	6.2 %	0.1	
Clay	48.8 %	0.1	
Silt	45.0 %	0.1	
Texture	silty clay	—	

Samples will be discarded one month after date of final report unless otherwise requested

ND = Not Detected NA = Not Applicable MDL = Method Detection Limit QNS = Quantity Not Sufficient

Analytical Sciences Laboratory

University of Idaho

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Certificate of Analysis

Prepared For: Wes Thompson
Bio-West, Inc.
1063 West 1400 North

Logan, UT 84321-2291

Case ID: SMAR06-029
Report Date: 29-Mar-06
Date Received: 22-Mar-06
Client Ref.: BILL
Project ID:

1st Level QC: _____ Date: 3-29-06
2nd Level QC: _____ Date: 3-29-06

Case Comments:

ND = Not Detected NA = Not Applicable MDL = Method Detection Limit QNS = Quantity Not Sufficient

APPENDIX G: BIO-WEST SOIL AND GROUNDWATER SAMPLING DATABASES

Schreiber Foods Land Application Sites
2180 West 6550 North Smithfield, UT
BIO-WEST Project # 1016.1

Table A: 110 Acre Land Application Site Soil Analytical Results

Irrigation Area	Acres	Sample	Sample Depth (feet)	Date Sampled	Salinity-ECe (dS/m)	Total Phosphorus (mg/kg)	Potassium (mg/kg)	Nitrate-Nitrogen-N (mg/kg)	Sodium Absorption Ratio	pH	Comments
1	39.88	South	1	5/31/2005	2.80	7.3	389	3.41	8.30	7.88	
1	39.88	South	1	10/24/2005	1.90	25.0	447	17.30	6.37	8.10	
1	39.88	South	1	11/16/2005	5.00	26.0	475	15.00	3.96	8.20	Sample a composite of both sections of property
1	39.88	South	1	10/18/2006	16.90	35.0	456	33.80	46.00	8.06	
1	39.88	South	1	10/12/2007	13.80	20.4	398	58.60	25.90	7.70	
1	39.88	South	1	9/23/2008	3.37	122.0	785	15.5	19.8	8.57	
1	39.88	South	1	10/21/2009	6.17	59.0	670	40.0	27.1	8.10	
1	39.88	South	1	10/14/2010	3.05	36.0	572	2.9	17.6	8.25	
1	39.88	South	1	10/17/2011	5.44	75.0	>900	5.4	20.1	8.20	
1	39.88	South	2	5/31/2005	8.93	5.4	125	3.62	10.80	7.68	
1	39.88	South	2	10/24/2005	1.60	5.1	144	8.35	4.89	8.00	
1	39.88	South	2	10/18/2006	2.30	13.3	250	11.50	8.15	7.56	
1	39.88	South	2	10/12/2007	12.90	22.0	338	48.50	28.40	7.82	
1	39.88	South	2	9/23/2008	2.96	77.0	517	18.8	19.4	8.33	
1	39.88	South	2	10/21/2009	5.00	0.0	471	24.5	28.2	8.19	
1	39.88	South	2	10/14/2010	1.48	7.9	306	13.6	21.8	8.29	
1	39.88	South	2	10/17/2011	2.96	31.0	518	2.6	20.2	8.40	
2	59.06	North	1	5/31/2005	17.30	20.0	371	6.92	17.60	7.69	
2	59.06	North	1	10/24/2005	9.20	72.0	771	22.20	9.08	8.30	
2	59.06	North	1	11/16/2005	5.00	26.0	475	15.00	3.96	8.20	Sample a composite of both sections of property
2	59.06	North	1	10/18/2006	13.50	19.3	439	39.30	21.10	7.69	
2	59.06	North	1	10/12/2007	13.10	15.2	359	46.30	21.90	7.74	
2	59.06	North	1	9/23/2008	6.00	131.0	>900	44.2	19.8	8.17	
2	59.06	North	1	10/21/2009	20.60	94.0	>900	51.3	34.7	7.95	
2	59.06	North	1	10/14/2010	4.57	60.0	>900	45.9	21.7	8.37	
2	59.06	North	1	10/17/2011	2.40	76.0	>900	15.4	17.4	8.50	
2	59.06	North	2	5/31/2005	20.70	5.4	125	3.58	19.70	7.81	
2	59.06	North	2	10/24/2005	11.50	40.0	450	19.40	9.02	8.30	
2	59.06	North	2	10/18/2006	9.13	11.8	377	22.80	18.40	7.88	
2	59.06	North	2	10/12/2007	11.50	9.3	316	34.70	20.00	7.83	
2	59.06	North	2	9/23/2008	4.73	84.0	687	28.7	18.2	8.15	
2	59.06	North	2	10/21/2009	11.10	46.0	597	30.6	27.2	7.91	
2	59.06	North	2	10/14/2010	3.24	11.9	442	15.6	19.7	8.27	
2	59.06	North	2	10/17/2011	7.17	47.0	721	5.8	17.0	7.90	

NA = Not Analyzed
NM = Not Measured
(mg/kg) = milligrams per kilogram
(dS/m) = deci-siemen per meter

Table B: 160 Acre Land Application Site Soil Analytical Results

Irrigation Area	Acres	Sample	Sample Depth (feet)	Date Sampled	Salinity-ECe (dS/m)	Total Phosphorus (mg/kg)	Potassium (mg/kg)	Nitrate-Nitrogen-N (mg/kg)	Sodium Absorption Ratio	pH	Comments
1	25	NW Field	1	2/16/2006	1.20	23.0	585	3.00	1.09	8.50	Sample a composite of all four sections of property
1	25	NW Field	1	10/18/2006	1.50	20.2	388	15.00	7.28	7.88	
1	25	NW Field	1	10/12/2007	4.47	40.0	595	9.65	15.60	8.01	
1	25	NW Field	1	9/23/2008	2.00	91.0	713	17.00	12.40	8.14	
1	25	NW Field	1	10/21/2009	3.79	59.0	927	17.70	15.60	8.11	
1	25	NW Field	1	10/14/2010	3.27	52.0	868	37.80	15.80	8.28	
1	25	NW Field	2	2/16/2006	2.20	12.0	380	11.00	2.94	8.90	Sample a composite of all four sections of property
1	25	NW Field	2	10/18/2006	1.50	11.1	237	10.70	10.50	7.97	
1	25	NW Field	2	10/12/2007	4.39	23.0	394	4.51	14.90	7.96	
1	25	NW Field	2	9/23/2008	1.58	58.0	490	9.23	12.00	8.05	
1	25	NW Field	2	10/21/2009	3.95	56.0	808	14.50	15.70	8.08	
1	25	NW Field	2	10/14/2010	2.73	29.0	531	16.50	15.40	8.29	
2	35	NE Field	1	2/16/2006	1.20	23.0	585	3.00	1.09	8.50	Sample a composite of all four sections of property
2	35	NE Field	1	10/18/2006	1.70	39.4	598	14.70	12.90	7.23	
2	35	NE Field	1	10/12/2007	2.62	35.0	604	12.00	16.10	8.18	
2	35	NE Field	1	9/23/2008	2.72	128.0	>900	24.30	16.10	8.29	
2	35	NE Field	1	10/21/2009	2.64	31.0	>900	9.04	17.80	8.47	
2	35	NE Field	1	10/14/2010	2.10	35.0	677	6.74	15.80	8.45	
2	35	NE Field	2	2/16/2006	2.20	12.0	380	11.00	2.94	8.90	Sample a composite of all four sections of property
2	35	NE Field	2	10/18/2006	2.08	23.2	402	9.30	16.40	8.21	
2	35	NE Field	2	10/12/2007	3.64	29.0	510	9.32	17.70	8.10	
2	35	NE Field	2	9/23/2008	2.04	88.0	637	11.50	15.90	8.04	
2	35	NE Field	2	10/21/2009	2.29	45.0	652	9.02	17.20	8.38	
2	35	NE Field	2	10/14/2010	2.61	15.8	351	4.97	17.70	8.28	
3	30	SW Field	1	2/16/2006	1.20	23.0	585	3.00	1.09	8.50	Sample a composite of all four sections of property
3	30	SW Field	1	10/18/2006	1.40	29.3	516	14.90	10.50	8.12	
3	30	SW Field	1	10/12/2007	2.63	47.0	713	25.00	14.80	8.21	
3	30	SW Field	1	9/23/2008	2.53	133.0	>900	20.50	18.40	8.13	
3	30	SW Field	1	10/21/2009	2.48	97.0	>900	33.50	19.60	8.56	
3	30	SW Field	1	10/14/2010	2.42	80.0	>900	14.00	18.10	8.65	
3	30	SW Field	2	2/16/2006	2.20	12.0	380	11.00	2.94	8.90	Sample a composite of all four sections of property
3	30	SW Field	2	10/18/2006	1.70	19.3	345	13.30	12.60	8.07	
3	30	SW Field	2	10/12/2007	2.02	38.0	589	14.20	13.50	8.18	
3	30	SW Field	2	9/23/2008	2.61	96.0	666	5.05	16.90	7.95	
3	30	SW Field	2	10/21/2009	2.02	66.0	>900	10.30	17.60	8.46	
3	30	SW Field	2	10/14/2010	4.37	43.0	735	8.28	19.40	8.54	

Irrigation Area	Acres	Sample	Sample Depth (feet)	Date Sampled	Salinity-ECe (dS/m)	Total Phosphorus (mg/kg)	Potassium (mg/kg)	Nitrate-Nitrogen-N (mg/kg)	Sodium Absorption Ratio	pH	Comments
4	35	SE Field	1	2/16/2006	1.20	23.0	585	3.00	1.09	8.50	Sample a composite of all four sections of property
4	35	SE Field	1	10/18/2006	2.12	35.7	594	18.00	11.00	7.89	
4	35	SE Field	1	10/12/2007	3.03	39.0	637	6.84	19.30	8.31	
4	35	SE Field	1	9/23/2008	3.81	126.0	>900	14.10	24.70	8.23	
4	35	SE Field	1	10/21/2009	3.63	83.0	>900	12.00	24.50	8.55	
4	35	SE Field	1	10/14/2010	2.74	49.0	788	11.90	24.20	8.88	
4	35	SE Field	2	2/16/2006	2.20	12.0	380	11.00	2.94	8.90	Sample a composite of all four sections of property
4	35	SE Field	2	10/18/2006	1.90	26.9	449	11.90	16.80	8.13	
4	35	SE Field	2	10/12/2007	3.03	35.0	573	7.37	18.70	8.34	
4	35	SE Field	2	9/23/2008	3.84	90.0	663	6.16	23.40	8.00	
4	35	SE Field	2	10/21/2009	3.95	67.0	874	7.83	26.40	8.51	
4	35	SE Field	2	10/14/2010	4.52	27.0	514	10.00	31.70	8.65	

NA = Not Analyzed
NM = Not Measured
(mg/kg) = milligrams per kilogram
(dS/m) = deci-siemen per meter

Schreiber Foods Land Application Sites
2180 West 6550 North Smithfield, UT
BIO-WEST Project # 1016.1

Table C: 110 Acre Land Application Site Groundwater Analytical Results

Well	Date Sampled	Depth to Water (feet)	Biochemical Oxygen Demand (mg/l)	Nitrate/ Nitrite (as N) (mg/l)	Total Phosphorus (mg/l)	Total Dissolved Solids (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	pH	Temp. ^{0}C	Dissolved Oxygen (mg/l)
SW Test Pit	7/19/2004	NM	NA	1.60	0.460	7,700	9.30	NM	NM	NM
MW-1	10/12/2006	6.90	<6.0	1.40	0.740	12,000	2.80	7.79	14.2	1.17
MW-1	10/11/2007	7.38	<5.0	10.00	0.440	5,800	3.80	7.75	13.2	0.97
MW-1	9/24/2008	5.97	<5.0	0.79	1.400	16,000	7.00	7.16	15.2	0.85
MW-1	10/21/2009	8.57	<5.0	1.30	<0.05	18,000	4.20	7.40	12.2	1.30
MW-1	10/14/2010	7.71	<6.0	0.67	0.117	18,300	6.67	7.80	12.8	0.63
MW-1	10/18/2011	6.65	6.0	5.72	0.450	13,700	6.16	7.64	13.6	0.44
NW Test Pit	7/19/2004	NM	NA	3.8	0.740	60,600	<4.0	NM	NM	NM
MW-2	10/12/2006	4.05	<6.0	0.1	0.130	39,000	4.8	7.19	16.2	2.19
MW-2	10/11/2007	5.46	<5.0	0.085	0.100	40,000	2.30	7.14	14.9	1.08
MW-2	9/24/2008	5.50	<5.0	0.072	0.460	44,000	<10	6.90	15.1	0.87
MW-2	10/21/2009	5.61	<5.0	0.038	<0.05	44,000	3.10	6.86	13.9	1.37
MW-2	10/14/2010	6.60	<6.0	<0.01	<0.05	42,700	7.16	7.51	14.4	1.16
MW-2	10/18/2011	5.16	<5.0	<0.01	0.066	42,000	5.78	7.10	12.7	0.47

NA = Not Analyzed
NM = Not Measured
(mg/l) = milligrams per liter

Schreiber Foods Land Application Sites
2180 West 6550 North Smithfield, UT
BIO-WEST Project # 1016.1

Table D: 160 Acre Land Application Site Groundwater Analytical Results

Well	Date Sampled	Well Head Elevation (feet)	Depth to Water (feet)	Adjusted Groundwater Elevation (feet)	Biochemical Oxygen Demand (mg/l)	Nitrate/ Nitrite (as N) (mg/l)	Total Phosphorus (mg/l)	Total Dissolved Solids (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	pH	Temp. ^0C	Dissolved Oxygen (mg/l)
MW-1	3/22/2006	4420.46	11.60	4408.86	9.0	0.014	0.280	8,500	16.0	7.61	NM	NM
MW-1	10/12/2006	4420.46	6.35	4414.11	<6.0	0.014	1.000	8,600	17.0	7.63	16.9	0.76
MW-1	10/11/2007	4420.46	6.03	4414.43	8.0	1.100	0.820	9,100	7.5	7.77	12.7	0.68
MW-1	9/24/2008	4420.46	5.67	4414.79	11.0	<0.010	2.400	10,000	14.0	7.21	14.5	0.51
MW-1	10/21/2009	4420.46	5.22	4415.24	46.0	<0.010	0.200	8,300	16.0	7.28	12.4	0.48
MW-1	10/14/2010	4420.46	5.11	4415.35	13.0	<0.010	1.630	8,300	19.3	7.54	14.2	0.49
MW-1	10/18/2011	4420.46	4.89	4415.57	26.0	<0.010	1.410	7,500	17.3	7.43	11.0	0.39
MW-2	3/22/2006	4414.66	10.35	4404.31	5.0	0.025	0.210	3,300	13.0	7.48	NM	NM
MW-2	10/12/2006	4414.66	6.60	4408.06	<6.0	0.016	0.270	9,400	16.0	7.60	15.6	1.67
MW-2	10/11/2007	4414.66	6.75	4407.91	14.0	0.025	0.510	12,000	12.0	7.15	15.4	0.64
MW-2	9/24/2008	4414.66	6.82	4407.84	<5.0	<0.010	0.270	12,000	11.0	7.18	14.7	0.48
MW-2	10/21/2009	4414.66	6.96	4407.70	31.0	<0.010	0.120	11,000	16.0	7.12	14.9	0.63
MW-2	10/14/2010	4414.66	6.54	4408.12	<6.0	<0.010	0.460	9,300	19.8	7.68	13.9	0.5
MW-2	10/18/2011	4414.66	6.93	4407.73	10.0	0.302	0.424	10,000	16.0	7.55	12.7	0.4
MW-3	3/22/2006	4417.61	19.60	4398.01	8.0	0.014	0.098	2,500	10.0	7.47	NM	NM
MW-3	10/12/2006	4417.61	12.70	4404.91	<6.0	0.012	0.260	9,800	16.0	7.40	14.9	2.73
MW-3	10/11/2007	4417.61	11.53	4406.08	13.0	0.086	0.460	10,000	6.8	7.21	10.9	0.67
MW-3	9/24/2008	4417.61	11.37	4406.24	<5.0	<0.010	0.550	11,000	8.0	7.04	14.9	0.54
MW-3	10/21/2009	4417.61	11.56	4406.05	22.0	0.075	0.190	9,800	10.0	7.24	11.3	0.48
MW-3	10/14/2010	4417.61	8.58	4409.03	<6.0	0.0716	0.248	9,700	10.3	7.51	13.6	0.74
MW-3	10/18/2011	4417.61	9.36	4408.25	9.0	0.2570	0.497	9,200	10.9	7.62	11.0	0.44

NA = Not Analyzed
NM = Not Measured
(mg/l) = milligrams per liter

APPENDIX H: CROP YIELD DATABASE

Table A: Schreiber 110 Acre Wastewater Application Site Crop Yields

Year	Area 1 Crop	Area 1 Yield Per Acre	Area 2 Crop	Area 2 Yield Per Acre	Comments
2006	Wheat	5.76 bushels	Wheat	5.76 bushels	
2007	Wheat	51 bushels	Wheat	51 bushels	
2008	Wheat	50.2 bushels	Wheat	50.2 bushels	
2009	Wheat	54 bushels	Wheat	54 bushels	
2010	Alfalfa	0	Alfalfa	0	Alfalfa was planted in late july and not havested
2011	Alfalfa	1.31 tons	Alfalfa	1.31 tons	

Table B: Schreiber 160 Acre Wastewater Application Site Crop Yields

Year	Area 1 Crop	Area 1 Yield Per Acre	Area 2 Crop	Area 2 Yield Per Acre	Area 3 Crop	Area 3 Yield Per Acre	Area 4 Crop	Area 4 Yield Per Acre
2006	Wheat	34.51 bushels	Oat/Alfalfa	.31 tons	Barley	28.33 bushels	Alfalfa	2.95 tons
2007	Wheat	42.98 bushels	Wheat	42.98 bushels	Alfalfa	1.6 tons	Alfalfa	2.82 tons
2008	Wheat	30.42 bushels	Barley	67.85 bushels	Alfalfa	1.73 tons	Alfalfa	1.70 tons
2009	Wheat	28.33 bushels	Barley	21.93 bushels	Alfalfa	4.16 tons	Alfalfa	2.53 tons
2010	Wheat	12 bushels	Barley	38.10 bushels	Alfalfa	1.47 tons	Alfalfa	0.54 tons
2011	Barley Hay	0.74 tons	Not Planted	NA	Alfalfa	2.15 tons	Wheat	20.44 bushels

BIO-WEST, Inc.

Attachment 3:

Land Application Wastewater Application Database

Table A: 110 Acre Land Application Site Wastewater Irrigation Application

Year	Irrigation Area	Acres	Wastewater Applied (gal)	Cubic Feet (total)	Acre Feet (total)	Comments
2006	1	39.88	10,321,920	1,379,840	32	
2006	2	59.06	16,934,400	2,263,801	52	
Total 2006 Wastewater Application:			**27,256,320**	3,643,641	84	
2007	1	39.88	10,402,560	1,390,620	32	
2007	2	59.06	13,366,080	1,786,786	41	
Total 2007 Wastewater Application:			**23,768,640**	3,177,406	73	
2008	1	39.88	4,838,400	646,800	15	
2008	2	59.06	9,504,000	1,270,500	29	
Total 2008 Wastewater Application:			**14,342,400**	1,917,301	44	
2009	1	39.88	1,110,900	148,506	3	
2009	2	59.06	2,277,000	304,391	7	
Total 2009 Wastewater Application:			**3,387,900**	452,897	10	
2010	1	39.88	2,911,800	389,251	9	
2010	2	59.06	4,692,000	627,229	14	
Total 2010 Wastewater Application:			**7,603,800**	1,016,481	23	
2011	1	39.88	3,880,800	518,788	12	
2011	2	59.06	6,507,600	869,940	20	
Total 2011 Wastewater Application:			**10,388,400**	1,388,728	32	
2012	1	NA	0	0	0	Projected Total
2012	2	25	12,692,593	1,696,753	39	Projected Total
Total 2012 Wastewater Application:			**12,692,593**	1,696,753	39	Projected Total

Table B: 160 Acre Land Application Site Wastewater Irrigation Application

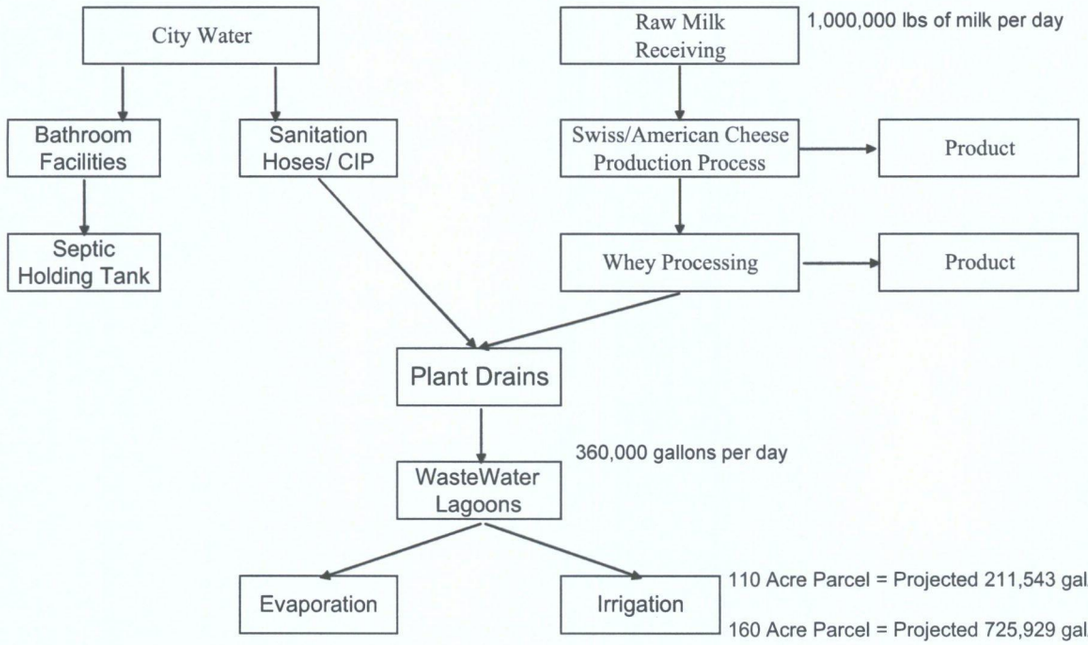
Year	Irrigation Area	Acres	Wastewater Applied (gal)	Cubic Feet (total)	Acre Feet (total)	Comments
2006	1	25	6,350,400	848,925	19	
2006	2	35	11,924,640	1,594,093	37	
2006	3	30	16,798,320	2,245,609	52	
2006	4	35	11,818,800	1,579,944	36	
Total 2006 Wastewater Application:			**46,892,160**	6,268,572	144	
2007	1	25	4,546,080	607,723	14	
2007	2	35	7,842,240	1,048,355	24	
2007	3	30	11,707,920	1,565,122	36	
2007	4	35	17,629,920	2,356,778	54	
Total 2007 Wastewater Application:			**41,726,160**	5,577,978	128	
2008	1	25	2,818,800	376,819	9	
2008	2	35	5,673,600	758,450	17	
2008	3	30	9,544,200	1,275,874	29	
2008	4	35	10,489,350	1,402,223	32	
Total 2008 Wastewater Application:			**28,525,950**	3,813,366	88	
2009	1	25	2,463,300	329,295	8	
2009	2	35	8,410,200	1,124,281	26	
2009	3	30	9,313,200	1,244,994	29	
2009	4	35	11,561,700	1,545,575	35	
Total 2009 Wastewater Application:			**31,748,400**	4,244,145	97	
2010	1	25	4,845,900	647,803	15	
2010	2	35	7,516,200	1,004,770	23	
2010	3	30	16,712,400	2,234,124	51	
2010	4	35	10,398,900	1,390,131	32	
Total 2010 Wastewater Application:			**39,473,400**	5,276,828	121	
2011	1	25	1,776,600	237,497	5	
2011	2	35	0	0	0	
2011	3	30	7,219,200	965,067	22	
2011	4	35	3,059,700	409,023	9	
Total 2011 Wastewater Application:			**12,055,500**	1,611,586	37	
2012	1	25	8,598,794	1,149,492	26	Projected Total
2012	2	35	10,929,675	1,461,086	34	Projected Total
2012	3	30	14,439,981	1,930,345	44	Projected Total
2012	4	35	16,846,645	2,252,070	52	Projected Total
Total 2012 Wastewater Application:			**50,815,095**	6,792,992	156	Projected Total

BIO-WEST, Inc.

Attachment 4:

Water Balance Line Drawing

Waste Water Stream



Approximately 454,000 gal/day average from lagoons

Approximately 120,454 gal/day average from wetlands

Effective: 01/12/10

BIO-WEST, Inc.

Attachment 5:

Laboratory Analyses Reports

CHEMTECH-FORD ANALYTICAL LABORATORIE

Lab No: 04-U005956
Report Date: 7/ 2/04

Dairy Farmers of America
Attn. Kevin Haslam
6350 North 2150 West
Smithfield, UT 84335

CERTIFICATE OF ANALYSIS

RECEIVED
JUL 07 2004
D.F.A.

Sample Description: Waste Stream
Sample Matrix: WASTE WATER
Lab Group No: 65817
Date/Time Sampled: 6/16/04 , 10:00
Date/Time Received: 6/17/04 , 10:30
Sample Note(s):

Sample received on ice.
The turbidity of the sample prevented an accurate determination of the chlorine measurements.
The fixed dissolved solids analysis was requested and analyzed past holding time.

PARAMETER / UNITS	RESULT	MRL	DATE ANALYZED	METHOD	ANALYST
INORGANIC PARAMETERS					
Alkalinity,as Bicarbonate, mg/L	< 1	1	6/30/04 11:00	SM 2320B	PNM
Alkalinity, as Carbonate, mg/L	< 1	1	6/30/04 11:00	SM 2320B	PNM
Alkalinity, Total (CaCO3), mg/L	< 1	1	6/30/04 11:00	SM 2320B	PNM
Ammonia-Nitrogen, mg/L	12	0.4	6/18/04 11:00	SM 4500D	TSM
Biochemical Oxygen Demand, mg/L	3,000	5	6/17/04 15:00	SM 5210	AK
Chemical Oxygen Demand, mg/L	4,600	100	6/24/04 12:30	HACH 8000	KJM
Chloride (IC), mg/L	220	10	6/18/04 12:00	EPA 300.0	TSM
Nitrate, Nitrogen (Calc.), mg/L	1	1.0	6/23/04 12:00	EPA 353.1	AKL
Nitrite, Nitrogen, mg/L	< 0.1	0.1	6/23/04 12:00	EPA 354.1	AKL
Nitrate+Nitrite-Total, mg/L	0.7	0.1	6/23/04 12:00	EPA 353.1	AKL
Nitrogen, Total Kjeldahl, mg/L	112	2	6/23/04 10:00	EPA 351.4	TSM
pH, units	4.7	0.1	6/17/04 15:00	EPA 150.1	AK
Phosphorus, Total, mg/L	42	1.2	6/21/04 9:30	SM 4500-PB5E	TSM
Sodium Absorption Ratio, Sat.	7.9	0.05	6/21/04 9:24	ASA#2 10-3	MJB
Sulfate (IC), mg/L	30	1	6/18/04 12:00	EPA 300.0	TSM
Total Dissolved Solids, mg/L	2,670	25	6/18/04 9:15	EPA 160.1	JEG
Fixed Dissolved Solids, mg/L	420	5	6/30/04 9:15	SM 2540E	JEG
Total Suspended Solids, mg/L	660	30	6/17/04 15:00	EPA 160.2	AK
Total Vol. Susp. Solids, mg/L	680	30	6/25/04 12:00	EPA 160.2	AK
Calcium (T), as Ca, mg/L	77	0.2	6/21/04 9:24	EPA 200.7	MJB
Calcium (Sat), as Ca, mg/L	77	0.2	6/21/04 9:24	ASA#2 10-3	MJB
Magnesium (T), as Mg, mg/L	28	0.2	6/21/04 9:24	EPA 200.7	MJB
Magnesium (Sat), as Mg, mg/L	28	0.2	6/21/04 9:24	ASA#2 10-3	MJB

MRL = Minimum Reporting Limit

6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905
801 262 7399 PHONE

CHEMTECH-FORD ANALYTICAL LABORATORY

Lab No: 04-U005956
Report Date: 7/ 2/04

Dairy Farmers of America
Attn. Kevin Haslam
6350 North 2150 West
Smithfield, UT 84335

CERTIFICATE OF ANALYSIS

Sample Description: Waste Stream
Sample Matrix: WASTE WATER
Lab Group No: 65817
Date/Time Sampled: 6/16/04 , 10:00
Date/Time Received: 6/17/04 , 10:30
Sample Note(s):

RECEIVED
JUL 07 2004
D.F.A.

Sample received on ice.
The turbidity of the sample prevented an accurate determination of the chlorine measurements.
The fixed dissolved solids analysis was requested and analyzed past holding time.

PARAMETER / UNITS	RESULT	MRL	DATE ANALYZED	METHOD	ANALYST
INORGANIC PARAMETERS					
Potassium (T), as K, mg/L	90	0.2	6/21/04 9:24	EPA 200.7	MJB
Sodium (T), as Na, mg/L	320	0.2	6/21/04 9:24	EPA 200.7	MJB
Sodium (Sat), as Na, mg/L	320	0.2	6/21/04 9:24	ASA#2 10-3	MJB
Temperature, Receiving, C	13		6/17/04 10:30	SM 2550B Mod	SPS

MRL = Minimum Reporting Limit

6100 SOUTH STRATLER
SALT LAKE CITY UTAH 84107 6905
801 262 7299 PHONE

Chemtech-Ford Laboratories

Serving the Intermountain West since 1953

CHEMTECH-FORD Laboratories
6100 South Stratler
Murray, UT 84107
Phone: 801-262-7299
Fax: 801-262-7378

Date: 03/31/08

Schreiber Foods
attn: Paul Bytheway
2180 West 6550 North
Smithfield, UT 84335

This is the final report for project: 89571
Individual pages or sections of this report may not be separated when using the information for regulatory compliance.

The analyses presented on this report were performed in accordance with National Environmental Laboratory Accreditation Program (NELAP), Section 5.13.

Please feel free to contact us at (801) 262-7299 or (801) 262-7378 (fax) if you have questions or comments regarding this report. Our web site is located at www.chemtechford.com.

Dave Gayer
Laboratory Director
dave@chemtechford.com

Linda Daniels
Customer Representative
linda@chemtechford.com

Approved By: _____
Dave Gayer, Laboratory Director

Chemtech-Ford Laboratories

Certificate of Analysis

Lab No.: 08 03113
Lab Group No.: 89571

Name:	Schreiber Foods	***Sample Date:***	3/14/2008 10:45 AM
Sample Site:	Cell #1 Inlet	***Receipt Date:***	3/17/2008 10:00 AM
Sample ID:	08 03113	***Sampler:***	CLIENT
System No:		***Sample Source:***	
Sample Type:	Waste Water	***Project:***	Waste Water

Parameter	Sample Result	Mimimum Reporting Limit	Units	Method	Analysis Date	Analysis Time	Analyst Initials	Flag
Group A - Inorganic								
Biochemical Oxygen Demand	>6240	5	mg/L	SM 5210B	3/20/2008	8:45	JSH	SPH
Nitrate + Nitrite as N	0.2	0.1	mg/L	EPA 353.1	3/28/2008	10:45	AKL	
pH	5.53	0.5	units	EPA 150.1	3/17/2008	16:00	JSH	SPH
Phosphorus, Total, WC	56	4	mg/L	SM 4500 PB5	3/26/2008	11:00	TSM	
Solids, Total Dissolved (TDS)	1340	5	mg/L	SM 2540C	3/19/2008	8:30	JSH	
Solids, Total Suspended (TSS)	9390	100	mg/L	SM 2540D	3/18/2008	11:00	JSH	
Total Kjeldahl Nitrogen as N	300	40	mg/L	EPA 351.4	3/27/2008	12:00	TSM	

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit.
1 mg/L = one milligram per liter = 1 part per million.
1 ug/L = one microgram per liter = 1 part per billion.

Flag Descriptions

APH = The test was performed past the EPA specified holding time.
H = A high bias is suspected.
I = The analysis experienced a matrix interference which may have affected the results.
J = The result is positive and estimated. The result falls between the Minimum Reporting Limit and the Method Detection Limit.
L = A low bias is suspected.
O = The analysis was performed by an outside contract laboratory.
R = The value represents a reanalysis.
SPH = The sample was submitted for analysis past the EPA specified holding time.

6100 South Stratler
Murray, UT 84107
801-262-7299 Office
801-262-7378 Fax

Chemtech-Ford Laboratories

Certificate of Analysis

Lab No.: 08 03114
Lab Group No.: 89571

Name:	Schreiber Foods	***Sample Date:***	3/14/2008 11:15 AM
Sample Site:	Cell #1 Outlet	***Receipt Date:***	3/17/2008 10:00 AM
Sample ID:	08 03114	***Sampler:***	CLIENT
System No:		***Sample Source:***	
Sample Type:	Waste Water	***Project:***	Waste Water

Parameter	Sample Result	Mimimum Reporting Limit	Units	Method	Analysis Date	Analysis Time	Analyst Initials	Flag
Group A - Inorganic								
Biochemical Oxygen Demand	2410	5	mg/L	SM 5210B	3/20/2008	8:45	JSH	SPH
Nitrate + Nitrite as N	0.2	0.1	mg/L	EPA 353.1	3/28/2008	10:45	AKL	
pH	6.29	0.5	units	EPA 150.1	3/17/2008	16:00	JSH	SPH
Phosphorus, Total, WC	106	4	mg/L	SM 4500 PB5	3/26/2008	11:00	TSM	
Solids, Total Dissolved (TDS)	1310	5	mg/L	SM 2540C	3/19/2008	8:30	JSH	
Solids, Total Suspended (TSS)	2330	100	mg/L	SM 2540D	3/18/2008	11:00	JSH	
Total Kjeldahl Nitrogen as N	310	40	mg/L	EPA 351.4	3/27/2008	12:00	TSM	

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit.
1 mg/L = one milligram per liter = 1 part per million.
1 ug/L = one microgram per liter = 1 part per billion.

Flag Descriptions

APH = The test was performed past the EPA specified holding time.
H = A high bias is suspected.
I = The analysis experienced a matrix interference which may have affected the results.
J = The result is positive and estimated. The result falls between the Minimum Reporting Limit and the Method Detection Limit.
L = A low bias is suspected.
O = The analysis was performed by an outside contract laboratory.
R = The value represents a reanalysis.
SPH = The sample was submitted for analysis past the EPA specified holding time.

6100 South Stratler
Murray, UT 84107
801-262-7299 Office
801-262-7378 Fax

8571

CHEMTECH - FORD ANALYTICAL LABORATORY

CHAIN OF CUSTODY

COMPANY: Schreiber Foods Inc.
ADDRESS: 2180 W. 6550 N
CITY/STATE/ZIP: Smithfield Ut. 84335
PHONE #: 435-563-9340 FAX: 435-563-0696
CONTACT: Paul Bytheway PROJECT: Waste Water
E-MAIL: paul.bytheway@SchreiberFoods.com SYSTEM #:

BILLING ADDRESS: 2180 W 6550 N
BILLING CITY/STATE/ZIP: Smithfield, Ut 84335
PURCHASE ORDER #:
TURNAROUND REQUIRED:*
*Expedited turnaround subject to additional charge

☐ Mark 'X' here if you want a copy sent to DEQ Division of Drinking Water.

ad 3/17

LAB ID#	SAMPLE LOCATION	SAMPLE DATE	SAMPLE TIME	Number of Containers	MATRIX: Drinking Water	Waste Water	Water	Ground Water	Soil	Other Solid	Sludge [Solid]	Sludge [Liquid]	Oil	Solvent	Other: [specify]	ANALYTICAL TESTS REQUESTED: BOD	TSS	TDS	Total Nitrogen	Nitrate - Nitrite (WC)	Total phosphorus	pH
113 3115	1. Cell #1 Inlet	3/14/08	10:45	2		X										X	X	X	X	X	X	X
	2.																					
	3.																					
3114	4. Cell #1 Outlet	3/14/08	11:15	2		X										X	X	X	X	X	X	X
	5.																					
	6.																					
	7.																					
	8.																					
	9.																					
	10.																					

Sampled by: [print]
Sampled by: [signature] Paul Bytheway
ON ICE NOT ON ICE

Special Instructions: Run out of hold time per Paul B. ad 3/17

Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
		Shawna Chapa	3-17-08 10:00
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time
Relinquished by: [signature]	Date/Time	Received by: [signature]	Date/Time

CHEMTECH-FORD 6100 South Stratler Ave. (380 West) Murray, UT 84107 Phone: 801-262-7299 FAX: 801-262-7378 www.chemtechford.com

WHITE: Original YELLOW: File PINK: Customer

SAMPLE RECEIVING CHECKLIST

DATE / TIME: 3.17.08 10:00 **Lab ID #s:** 3113-14

RECEIVED BY: SC **MATRIX:** Water, DW, GW, (WW)

Sample/s on ice? (Yes) / No Soil / Solid / Oil

Sample/s Sealed? Yes (No) Sludge: Watery, Solid Other:

	Laboratory ID #	Bottle Temp: Degrees C	Bottle Prep ID #	Comments (See Below:)
1	3113 A½	9		
2	N	|	697	
3	3114 A½	|		
4	N	↓	697	
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				

Bottle Identification	
Plastic	**Glass**
A- Plastic Unpreserved A1/2, AQ, AP, A1/2pt	D- 625
	G- Glass Unpreserved
B- Miscellaneous Plastic	H- HAA's
C- Cyanide	J- 508/515/525
F- Sulfide	O- Oil & Grease
M- Metals	P- Phenols
N- Nutrients	T- TOC/TOX
R- Radiologicals	U- 531
S- Sludge Cup/Tubs	V- 524 & THM's
Q- Plastic Bags	W- 8260
Special	X- Vial Unpreserved
L- Lab Subsample	Y- 624/504
1,2,3 etc - Multiples (B1, B2,)	Z- Miscellaneous Glass

Sample Receiving Comments:
1- Preserved in Receiving.
2- Vials submitted with headspace.
3- Sample received past holding time.

Chemtech-Ford, Inc.

Symbiotics, LLC.

975 South State Highway
Logan, UT 84321
435-752-2580

LABORATORY RESULTS

July 25, 2011

Schreiber Foods
ATTN: Paul Bytheway
2180 W 6550 N
Smithfield, UT 84335

Group #: 2011271

Sample Date: July 13, 2011
Sample Time: 09:00

Date Received: July 13, 2011
Time Received: 09:15

Sample Location: Cell 4

Receiving Temperature (°C): 25.0
pH of preserved sample: <2
Log Number: 110738

PARAMETER	RESULT	UNITS	RL*	STD Methods (18th Ed)	DATE/TIME ANALYZED	ANALYZER INITIALS
pH (at 24.4°C)	**8.72**	**SU**		4500-H+B	07/13, 09:23	RW
BOD_5	**<25**	**mg/L**	1	5210B	07/13, 12:00	SW
Total Suspended Solids	**56.7**	**mg/L**	1	2540 D	07/13, 10:30	RW

RL: Reporting Limit

HEMTECH-FORD LABORATORIES

Certificate of Analysis

Lab Sample No.: 1105501-02

Name: Symbiotics LLC
Sample Site: SFI 110738
Comments: Cell 4 Waste
Sample Matrix: Wastewater

Sample Date: 7/13/2011 12:00 AM
Receipt Date: 7/13/2011 4:40 PM
Sampler: Paul Bytheway
Project:

Parameter	Sample Result	Minimum Reporting Limit	Units	Analysis Date/Time	Analyst Initials	Analytical Method	CAS No.	Flag
Inorganic								
Nitrite as N	ND	0.1	mg/L	7/14/2011 13:00	FAJ	SM 4500 NO2-B	14797-65-0	
Nitrate + Nitrite (Total)	ND	0.1	mg/L	7/14/2011 16:33	PNM	SM 4500 NO3-F		
Phosphorus, Total	12	0.50	mg/L	7/18/2011 14:00	TSM	SM 4500 PB5E	7723-14-0	
Total Dissolved Solids (TDS)	1840	10	mg/L	7/15/2011 14:51	JSH	SM 2540 C	TDS_LAB	
Total Kjeldahl Nitrogen	21	1	mg/L	7/19/2011 10:00	TP	SM 4500 NH3-D		

Symbiotics, LLC.

975 South State Highway
Logan, UT 84321
435-752-2580

LABORATORY RESULTS

September 23, 2011

Schreiber
ATTN: Paul Bytheway
2180 W 6550 N
Smithfield, UT 84335

Group #: 2011347
Sample Date: September 2, 2011
Sample Time: 08:45

Date Received: September 2, 2011
Time Received: 09:07

Sample Location: Cell #4 Outlet

Receiving Temperature (°C): 19.1
pH of preserved sample: <2
Log Number: 111001

PARAMETER	RESULT	UNITS	RL*	STD Methods (18th Ed)	DATE/TIME ANALYZED	ANALYZER INITIALS
pH (at 19.7°C)	**9.41**	**SU**		4500-H+B	09/02, 09:09	SW
BOD_5	**<20**	**mg/L**	1	5210B	09/02, 11:30	RW
Total Suspended Solids	**54.7**	**mg/L**	1	2540 D	09/07, 10:30	RW

RL: Reporting Limit

CHEMTECH-FORD LABORATORIES

Certificate of Analysis

Lab Sample No.: 1107283-02

Name: Symbiotics LLC
Sample Site: SFI 111001
Comments: Cell 4
Sample Matrix: Wastewater

Sample Date: 9/2/2011 12:00 AM
Receipt Date: 9/2/2011 2:20 PM
Sampler: Paul Bytheway
Project:

Parameter	Sample Result	Minimum Reporting Limit	Units	Analysis Date/Time	Analyst Initials	Analytical Method	CAS No.	Flag
Inorganic								
Nitrite as N	0.3	0.2	mg/L	9/2/2011 15:00	FAJ	SM 4500 NO2-B	14797-65-0	
Nitrate + Nitrite (Total)	0.2	0.1	mg/L	9/6/2011 12:33	PNM	SM 4500 NO3-F	CTFID10163	
Phosphorus, Total	12	0.25	mg/L	9/2/2011 18:00	TSM	SM 4500 PB5E	7723-14-0	
Total Dissolved Solids (TDS)	1920	20	mg/L	9/7/2011 14:10	JSH	SM 2540 C	CTFID10226	
Total Kjeldahl Nitrogen	22	1	mg/L	9/12/2011 12:00	TP	SM 4500 NH3-D	CTFID10234	

Symbiotics, LLC.

975 South State Highway
Logan, UT 84321
435-752-2580

LABORATORY RESULTS

October 14, 2011

Schreiber
ATTN: Paul Bytheway
2180 W 6550 N
Smithfield, UT 84335

Group #: 2011385
Sample Date: September 28, 2011
Sample Time: 10:30

Date Received: September 28, 2011
Time Received: 11:00

Sample Location: Cell #4 Outlet

Receiving Temperature (°C): 21.2
pH of preserved sample: <2
Log Number: 111103

PARAMETER	RESULT	UNITS	RL*	STD Methods (18th Ed)	DATE/TIME ANALYZED	ANALYZER INITIALS
pH (at 21.2°C)	**9.01**	**SU**		4500-H+B	09/28, 11:30	RW
BOD_5	**121**	**mg/L**	1	5210B	09/29, 10:00	SW
Total Suspended Solids	**263**	**mg/L**	1	2540 D	09/29, 07:30	SW

RL: Reporting Limit

CHEMTECH-FORD
LABORATORIES

Certificate of Analysis

Lab Sample No.: 1108155-02

Name: Symbiotics LLC
Sample Site: SFI 111103
Comments: Schreibers Smithfield - Cell 4
Sample Matrix: Wastewater

Sample Date: 9/28/2011 10:30 AM
Receipt Date: 9/28/2011 2:30 PM
Sampler: Paul Bytheway
Project:

Parameter	Sample Result	Minimum Reporting Limit	Units	Analysis Date/Time	Analyst Initials	Analytical Method	CAS No.	Flag
Inorganic								
Nitrate as N	0.2	0.1	mg/L	9/29/2011 15:00	TSM	EPA 300.0	14797-55-8	
Nitrite as N	2.0	0.5	mg/L	9/29/2011 11:00	FAJ	SM 4500 NO2-B	14797-65-0	
Phosphorus, Total	13	0.25	mg/L	10/4/2011 13:30	TSM	SM 4500 PB5E	7723-14-0	
Total Dissolved Solids (TDS)	2220	10	mg/L	9/29/2011 15:54	JSH	SM 2540 C	CTFID10226	
Total Kjeldahl Nitrogen	28	1	mg/L	10/3/2011 12:00	TP	SM 4500 NH3-D	CTFID10234	