Nutrient Managements Plan (NMP)
Harper Dairy

Purpose: To provide the site specifications necessary to properly utilize manure generated on the Harper Dairy owned and operated by Mitch Hancock, and to prevent the degradation of soil, water, air, plant, and animal resources. To meet the objectives of the dairy, get the most value from their manure, and to stay in compliance with current state and national regulations.

Farm/Facility: Harper Dairy
2225 N 6400 W
Corrine, Utah 84307

Owner Operator: Mitch Hancock, NooSun Dairy L.C.

Farm Headquarters Latitude and Longitude: 41.545968, -112.167894

Plan Period: March 2016 to March 2021

Watershed 106010204

Certified Conservation Planner

I certify that I am a Natural Resources Conservation Service (NRCS) approved certified planner qualified to review and approve nutrient management plans (NMPS) for compliance with NRCS NMP planning practices and NRCS standard practices. I certify that the NMP developed for the facility submitting this NOI for permit coverage complies with parts VII, VIII, IX, XI and XII of the CAFO permit and all applicable NRCS practice standards, including Practice 590 and UMARI. The NMP, if fully implemented, will be in accordance with all NMP permit requirements and all applicable NRCS practice standards for the facility.

I approve the nutrient management plan for the facility seeking permit coverage under this NOI.

Signature: _____ Date: _____
Name: _____
Title _____ Certification Credentials:

Owner Operator

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 gather and evaluate the information submitted. Based on my inquiry of the person or persons who managed this system, or those persons directly responsible for gathering the information, the information submitted to us, 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 or imprisonment for knowing violations.

Signature: _____ Date _____

Name: Mitch Hancock

Table of Contents

Section 1 Background and Site Information

1.1 General Description of Operation

The Harper Dairy is located in central Box Elder County 4 miles West of Corinne. The land is relatively flat with good soil. The operation grows a significant portion of the feed for their dairy operation on lands owned and leased by the operation.

Manure from the dairy is applied to approximately 218 acres of cropland. Waste water is applied through surface ditches to most of these same acres.

The Harper Dairy has the capacity for 1,000 lactating dairy cows, 400 dry cows and 500 heifers. There are currently storage facilities for the solid manure that is produced. The majority of the manure and liquid produced passes thru a sloped screen separator making it possible to recycle and re-use the solids thru the composting facility for bedding. The liquids are stored in one of three evaporative lagoons. In years of excess moisture, the water is moved through a series of irrigation ditches and flooded onto ground owned by the dairy.

Section 2 Resource Concerns and Management

2.1 Soil Quality Concerns,

Soil Quality Concern	Activities to Address Concern
Ephemeral Gully Erosion	Not a concern
Gully Erosion	Not a concern
Sheet and Rill Erosion	Not a concern
Stream/Ditch bank Erosion	Not a concern
Wind Erosion	Plant cover crops after corn harvest
Nutrient Management	Follow recommendations of NMP
Acres Available for Manure Application	218 acres of cropland

2.2 Water Quality Concerns

Water Quality Concern	Activities to Address Concern
Facility Waste Water Runoff	Crop Irrigation
Manure Runoff (Field Application)	Overland Application by CNMP
Manure Runoff Production Area	Grass Forage Buffers
Nutrients in Ground Water	Application by CNMP parameters
Nutrients in Surface Water	Crop planning for consumption
Silage Leachate	NA
Fields with Excess Nutrients	Double crop plan, application per CNMP
Tile drained fields	Buffers and prompt incorporation
100-Year Floods	Maintain adequate storage capacity
Run-on	NA
Grazing	NA
Water Source Protection	NA

2.3 Other Concerns

Other Concerns	Activities to Address Concern
Aesthetics	Planning/forecasting needs
Maximize Nutrient Utilization	BMP with Agronomist
Minimize Nutrient Costs	BMP with Agronomist
Neighbor Relations	Present and active in the community
Profitability	How?
Soil Compaction	Tillage practices
Time Available for Manure Application	Adequate storage capacity
Odors	Additives and aeration as needed
Air Quality	
Dust Control and Wind Borne Manure	Crop selection and prompt incorporation
Biosecurity	Security monitoring and signage

2.4 Map(s) of Areas of Concern

There are no imminent areas of concern for this facility. The issues relate to easier management of waste materials for the convenience of the operator during high rain fall events and winter storage concerns.

Section 3 Production Area Effluent Limitation Guidelines

3.1 Production Area Map

(Map/aerial photo should be labeled). Maps should include, label, and show berms, ditches, feed storage areas, manure and compost areas, manure staging areas, field drains, tile drains, tail water gates, surface waters, buffers and setbacks, culverts, storage ponds, solid separator, corrals, calf hutches, wells, manure and wastewater application areas, etc.

3.2 Generation Storage and Transfer of Manure and wastewater

Generation:

The Harper Dairy has the capacity for 1,000 lactating dairy cows, 400 dry cows and 500 heifers. There are currently storage facilities for the solid manure that is produced. The majority of the manure and liquid produced passes thru a sloped screen separator making it possible to recycle and re-use the solids thru the composting facility for bedding. The liquids are stored in one of three evaporative lagoons. In years of excess moisture, the water is moved through a series of irrigation ditches and flooded onto ground owned by the dairy.
If needed, storage facilities are large enough to store all of the solid manure that is produced for a period of 150 to 180 days. Manure is applied to approximately 218 acres of farm land. Liquid manure water is stored in three lagoons; the North Lagoon has a capacity of 281,750 cu/ft and the South Lagoon with a storage capacity of 260,000 cu/ft and the East Lagoon with a storage capacity of 101,250 cu/ft. This is a total of 4,774,452 gallons. There are also four concrete solid storage facilities with a total of 208,000 cu/ft. There is also a concrete staging pad with three walls with a capacity of 16,800 cu/ft of storage. The 1,000 lactating dairy cows will produce approximately 10 gallons of waste water per animal per day to be stored in the lagoon. The lagoon needs to accommodate 150 days of storage or 150 days x 10,000 gallons or 1,500,000 gallons. The mortality compost site is 430' x 600' and uses a large amount of manure in the composting process.

As per the Hazardous Waste permit that is maintained by the dairy, all composting takes place on this facility on 7.5 acres of dairy owned land. The field is diked in order to manage all water runoff. Any water that is gathered is pumped into adjacent wastewater lagoons. All three dairy facilities use compost bedding for animals. The Harper Dairy accepts roughly 20,000 tons of solid/semi solid manure that is windrowed and composted to acceptable temperatures, then returned to each of the three diaries for bedding. The solid manure is moved by way of semi-trucks that are weighed and calibrated. The windrows also receive approximately 5,000 tons of liquid manure from slingers, aiding in maintaining proper moistures and temperatures in the windrows. The compost facility will produce approximately 8,000 tons of compost per year, that if not used for bedding will be sold to neighboring farmers.

The estimated area of the hard surface drainage around the lagoon is 72,800 sq ft. This calculation assumes all buildings and rainfall are diverted away from the lagoon. Careful diversion of all clean water will improve the operation of the lagoon and ensure compliance with the terms of the permit.

A 25 year storm event (2.5 inches in 24 hours) will produce about 15,166 cu/ft of water or 112,233 gallons of additional runoff. The lagoon is 42,000 sq ft requiring approximately 4 inches of storage. Including normal rainfall of 9 inches for the winter period the lagoon capacity will handle all of the milk house waste, and hard surface runoff leaving a free board of over 1 foot (13.9 inches).

Storage:

With proper management the storage facilities at the Harper dairy are adequate for the 150 to 180 day required storage period. The dairy will compost at least 25 percent of the solid manure produced on the dairy and use the majority of that for bedding. Local farmers will use excess compost for application on their fields. The dairy will provide a manure test and a letter indicating the responsibility to properly utilize the compost and manure that is removed. The dairy plans to develop the market for these nutrients and organic matter with the large irrigated and dry farming area of the county.

Collection/Transfer:

The manure will be scraped daily from the corrals and walkways into the solid waste structures and sloped screen separator. The solid manure from open corrals also contains some straw bedding material. Solid manure will be hauled from the storage structures directly to the composting area when conditions are appropriate. During other times, solid manure will be hauled as needed from the storage structures to a manure staging area, where it will be separated or stored until conditions are appropriate for composting land application. All manure, compost, or

wastewater transfers will be recorded and included on the manure transfer forms to be submitted to DWQ an annual basis for each recipient of manure, etc.

The milk house is currently washed after every milking to clean up the facility. The milk house wash water and liquid manure will be piped into the storage bunker. Only chemicals approved for dairy use in cleaning and disinfection will be allowed to enter the storage tank.

Harper Dairy

Compost 10 acres - 1100 ft x 400

north lagoon 350 wide x 230 440,000
~~230~~ 3.5 ft w 1 ft freeboard

Dry Lot 600 x 150 = 3 acres (400 animals 365 days

DS1 Bunker 1 90' x 300 ft x 4 ft

DS2 Bunker 2 170 x 60 x 4 ft.

Storage Lagoon 2 ft w 1 ft freeboard

Lagoon 3 1000 x 130 ft.

mortality Compost ~~4 ft~~
430 x 600
X Concrete pad 60 x 70 - 3 sides 4 ft walls

x 4lb	=	Lbs
Calf	900	1400
"	100	1000
Dry	400	1400
Heifers	500	200

Animal Waste Management Plan Report
prepared for Harper

Designed By: JHR
Date: 3/3/2015
Checked By: _____
Date: _____

Farm Information

# of Operating Periods: 1 **State:** UT **Data Source:** NRCS-2008

Operating Period: January - December

Climate Data

County: Box Elder

Station: CORINNE UT1731

25 Yr - 24 Hr Storm Event: 2.6 inches

Lagoon Loadings:

Rational Design Method:

Barth KVAL: 0.5

Load Rate for Odor, OCV: 0.00378 lbs VS/cu. ft/day

LRV Max: 0.00625 lbs VS/cu. ft/day

NRCS Design Method:

Anaerobic Load Rate: 4.5 lbs VS/1000 cu. ft/day

Month	Prec. (in)	Evap. (in)
January	1.42	0.73
February	1.56	1.17
March	1.63	2.38
April	1.79	4.01
May	1.91	5.92
June	1.34	7.36
July	0.77	8.61
August	0.89	7.42
September	1.63	4.90
October	1.64	2.85
November	1.59	1.25
December	1.55	0.72
Total	17.72	47.32

Animal Data

Animal	Type	Quantity	Weight	Manure	VS	TS	Manure	Manure	VS	TS
			lbs	cu.ft/day/AU	lbs/day/AU	lbs/day/AU	cu.ft/day	lbs/day	lbs/day	lbs/day
Dry Cow	Dairy	400	1400	0.84	5.60	6.60	470.40	28224.0	3136.00	3696.00
Heifer (970 lb)	Dairy	500	500	0.90	7.30	8.50	225.00	13500.0	1825.00	2125.00
Milker(100lb M	Dairy	900	1400	1.90	12.00	15.00	2394.00	143640.0	15120.00	18900.00
Milker(75lb Mi	Dairy	100	1000	1.70	11.00	14.00	170.00	10200.0	1100.00	1400.00
Totals		1900	N/A	N/A	N/A	N/A	3259.40	195564.0	21181.00	26121.00

Location Data

Percent of Manure Deposited In Each Location:

Period 1

DRY	Animal Name	Percent Manure
	Heifer (970 lb)	0
	Milker(100lb Milk)	0
	Milker(75lb Milk)	0
	Dry Cow	100
Heifers	**Animal Name**	**Percent Manure**
	Dry Cow	0
	Heifer (970 lb)	100
	Milker(100lb Milk)	0
	Milker(75lb Milk)	0
Milkers	**Animal Name**	**Percent Manure**
	Milker(100lb Milk)	85
	Heifer (970 lb)	0
	Milker(75lb Milk)	85
	Dry Cow	0
Parlor	**Animal Name**	**Percent Manure**
	Dry Cow	0
	Heifer (970 lb)	0
	Milker(100lb Milk)	15
	Milker(75lb Milk)	15
Totals	**Animal Name**	**Percent Manure**
	Milker(75lb Milk)	100
	Dry Cow	100
	Heifer (970 lb)	100
	Milker(100lb Milk)	100

Additions Data

Waste Water VS Loading: 12.9

Operating Period: 1

Location	Wash Water	Flush Water	Bedding	Amount
	gal/day	gal/day		lbs/day
Parlor	30000.00	0.00		0.00
Milkers	0.00	0.00	Composted Manure	10000.00
Heifers	0.00	0.00	Straw (baled)	20.00
DRY	0.00	0.00	Straw (baled)	20.00

Runoff Data

Runoff Volume Method: Calculate Monthly Runoff Volumes with AWM

Pervious Watershed Area: 3 acres

Pervious Curve Number Storm: 75

Pervious Curve Number Monthly: 90 (1 day), 77 (30 day)

Impervious Area: 10000 sq. ft

25 Year Pervious: 7730.00 cu. ft

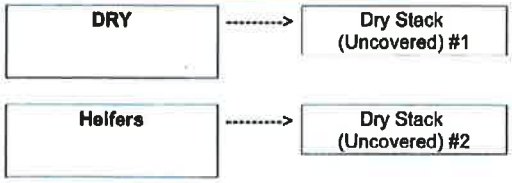
25 Year Impervious: 1980.00 cu. ft

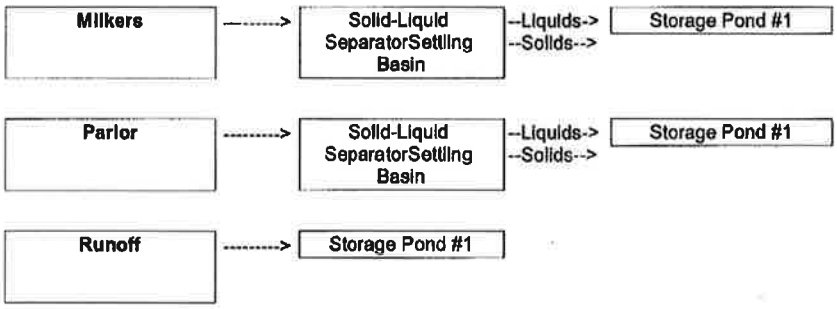
25 Year Total: 9710.00 cu. ft

Runoff Volumes (1000 cu. ft.)

Month	Pervious	Impervious	Month Total
January	1.95	0.79	2.74
February	2.58	0.90	3.48
March	2.91	0.95	3.86
April	3.73	1.08	4.81
May	4.39	1.17	5.56
June	1.63	0.73	2.36
July	0.11	0.31	0.42
August	0.29	0.40	0.69
September	2.91	0.95	3.86
October	2.96	0.96	3.92
November	2.72	0.92	3.64
December	2.53	0.89	3.42
Total	28.71	10.04	38.75

Management Train





Facility Volume Data

Operating Period 1

Facility	Manure	Wash Water	Flush Water	Bedding	Total Vol
Dry Stack (Uncovered) #2	225.00	0.00	0.00	2.22	227.22
Storage Pond #1	2564.00	4010.42	0.00	50.00	6624.42
Dry Stack (Uncovered) #1	470.40	0.00	0.00	2.22	472.62

Waste Facilities

Dry Stack (Uncovered) #1

Max. Storage Vol. Method: Storage Volume

Storage Months: 3 months **Critical Months:** Nov - Jan

Design Dimensions

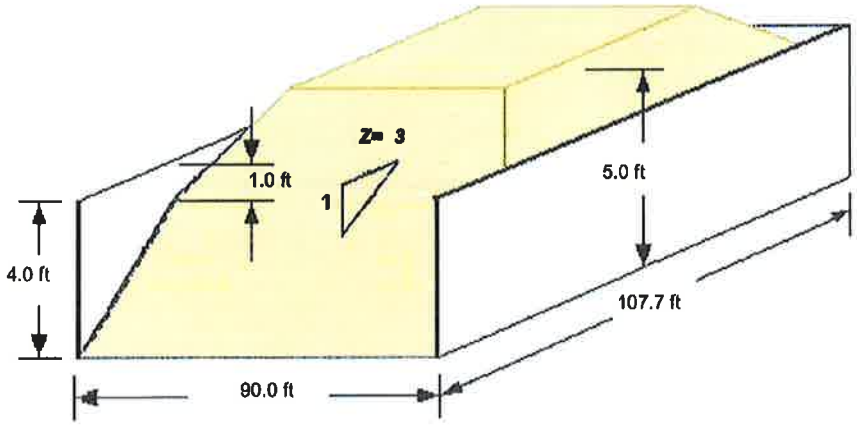
Shape:	Rectangle	**Top Length:**	86.7 ft
Sideslope:	3:1	**Bottom Length:**	107.7 ft
Storage Depth:	5.0 ft	**Top Width:**	78.0 ft
Freeboard:	1.0 ft	**Bottom Width:**	90.0 ft
Wall Height:	4.0 ft	**Bot Dimensions**	90.0 x 107.7 ft
		TopDimensions:	78.0 x 86.7 ft

Design Quantities

25Yr24Hr Storm Depth:

Prec Minus Evap Depth:

Volume Required (Wastes): 43481 cu. ft



Water Budget (1000 cu. ft.)

Month	Runoff	Withdrawal	Waste	Prec - Evap	Ext Prec	CumStorageVol
January	0	☐	14.65	0.00	0.00	14.65
February	0	☐	13.71	0.00	0.00	13.71
March	0	☐	14.65	0.00	0.00	14.65
April	0	☐	14.18	0.00	0.00	14.18
May	0	☐	14.65	0.00	0.00	14.65
June	0	☐	14.18	0.00	0.00	14.18
July	0	☐	14.65	0.00	0.00	14.65
August	0	☐	14.65	0.00	0.00	14.65
September	0	☐	14.18	0.00	0.00	14.18
October	0	☐	14.65	0.00	0.00	14.65
November	0	☐	14.18	0.00	0.00	14.18
December	0	☐	14.65	0.00	0.00	14.65

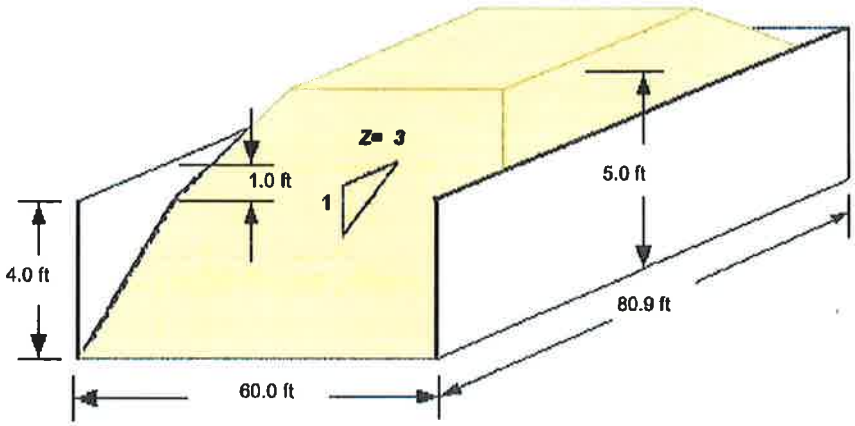
Dry Stack (Uncovered) #2

Max. Storage Vol. Method: Storage Volume

Storage Months: 3 months **Critical Months:** Nov - Jan

Design Dimensions

Shape:	Rectangle	**Top Length:**	59.9 ft	**25Yr24Hr Storm Depth:**	
Sideslope:	3:1	**Bottom Length:**	80.9 ft	**Prec Minus Evap Depth:**	
Storage Depth:	5.0 ft	**Top Width:**	48.0 ft	**Volume Required (Wastes):**	20904 cu. ft
Freeboard:	1.0 ft	**Bottom Width:**	60.0 ft		
Wall Height:	4.0 ft	**Bot Dimensions**	60.0 x 80.9 ft		
		TopDimensions:	48.0 x 59.9 ft		



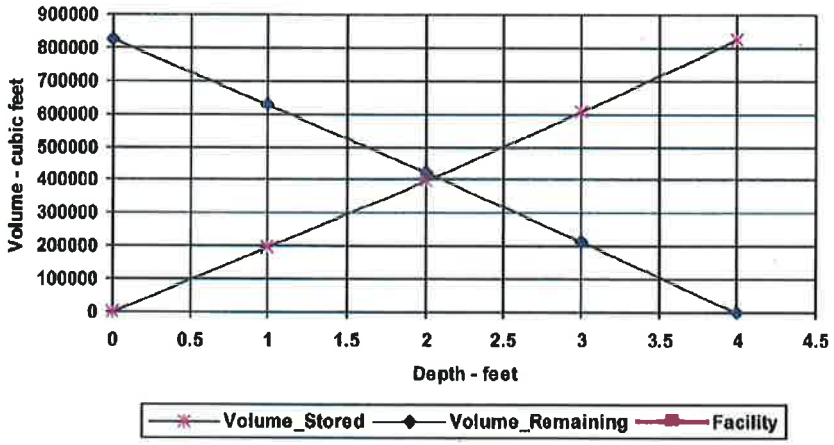
Water Budget (1000 cu. ft.)

Month	Runoff	Withdrawal	Waste	Prec - Evap	Ext Prec	CumStorageVol
January	0	☐	7.04	0.00	0.00	7.04
February	0	☐	6.59	0.00	0.00	6.59
March	0	☐	7.04	0.00	0.00	7.04
April	0	☐	6.82	0.00	0.00	6.82
May	0	☐	7.04	0.00	0.00	7.04
June	0	☐	6.82	0.00	0.00	6.82
July	0	☐	7.04	0.00	0.00	7.04
August	0	☐	7.04	0.00	0.00	7.04
September	0	☐	6.82	0.00	0.00	6.82
October	0	☐	7.04	0.00	0.00	7.04
November	0	☐	6.82	0.00	0.00	6.82
December	0	☐	7.04	0.00	0.00	7.04

Water Budget (1000 cu. ft.)

Month	Runoff	Withdrawal	Waste	Prec - Evap	Ext Prec	CumStorageVol
January	2.74	☐	205.36	13.91	0.00	222.01
February	3.48	☐	192.11	9.01	0.00	204.60
March	3.86	☐	205.36	-10.32	0.00	198.90
April	4.81	☐	198.73	-35.14	0.00	168.40
May	5.56	☐	205.36	-65.48	0.00	145.44
June	2.36	☐	198.73	-100.61	0.00	100.48
July	0.42	☐	205.36	-132.51	0.00	73.27
August	0.69	☐	205.36	-109.99	0.00	96.06
September	3.86	☐	198.73	-53.29	0.00	149.31
October	3.92	☐	205.36	-18.15	0.00	191.13
November	3.64	☐	198.73	8.20	0.00	210.58
December	3.42	☐	205.36	16.50	0.00	225.27

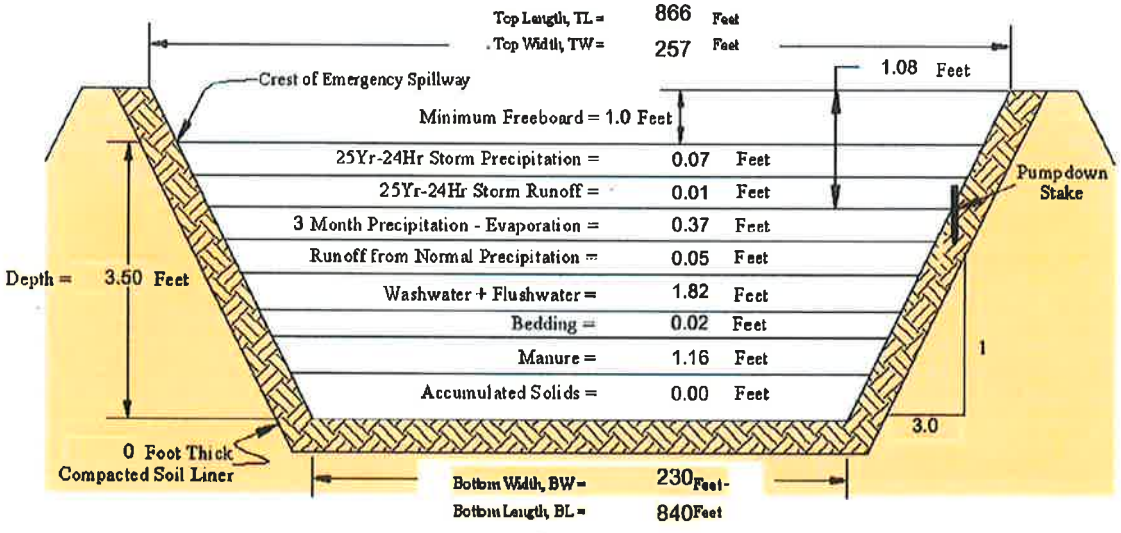
Stage Storage Curve



AWM
Waste Storage Pond Data for: Harper

Designed by: JHR

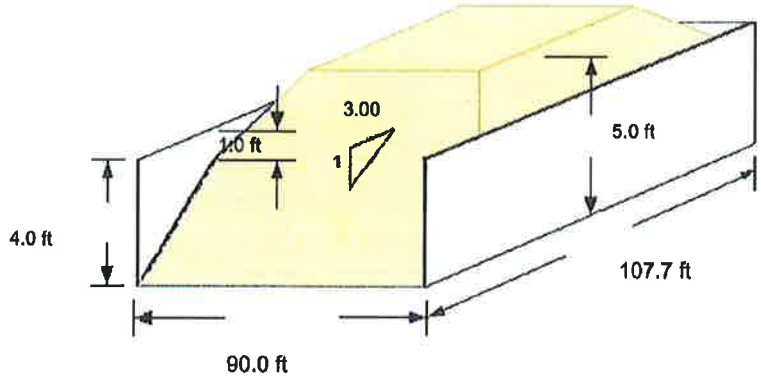
Facility	**Rectangular Storage Pond #1**			
Storage Period	3	*Months*		
Manure & External Effluent	235,888	*Cubic Feet*	1,764,442	*Gallons*
Bedding	4,600	*Cubic Feet*	34,408	*Gallons*
FlushWater	0	*Cubic Feet*	0	*Gallons*
WashWater	368,958	*Cubic Feet*	2,759,806	*Gallons*
Runoff from Drainage Area				
25Yr-24Hr Storm	9,710	*Cubic Feet*	72,631	*Gallons*
Normal Rainfall	9,800	*Cubic Feet*	73,304	*Gallons*
Rainfall on Pond Surface				
25Yr-24Hr Storm	48,266	*Cubic Feet*	361,032	*Gallons*
Normal Rainfall minus Evaporation	38,613	*Cubic Feet*	288,827	*Gallons*
Accumulated Solids	0	*Cubic Feet*	0	*Gallons*
Design Operating Volume ..	657,859	*Cubic Feet*	4,920,787	*Gallons*
Total Storage Volume	715,836	*Cubic Feet*	5,354,450	*Gallons*
Ramp Volume (if applicable)	0	*Cubic Feet*		
Structural Volume (includes effects of ramp if present)	935,277	*Cubic Feet*		



AWM
Solids Stacking Facility Data for: Harper

Designed by: JHR

Facility	***Dry Stack (Uncovered) #1***	
Storage Period	3	***Months***
Manure	43,277	***Cubic Feet***
Bedding	204	***Cubic Feet***
Total Volume to Store	43,481	***Cubic Feet***
Total Volume of Facility	53,722	***Cubic Feet***

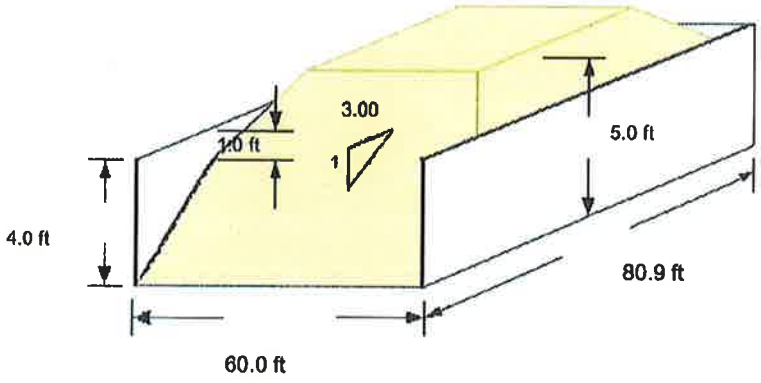


AWM

Solids Stacking Facility Data for: Harper

Designed by: JHR

Facility	**Dry Stack (Uncovered) #2**	
Storage Period	3	*Months*
Manure	20,700	*Cubic Feet*
Bedding	204	*Cubic Feet*
Total Volume to Store	20,904	*Cubic Feet*
Total Volume of Facility	26,089	*Cubic Feet*



3.4 Animal Mortality Management

a. Mortality management and disposal shall be according to NRCS practices and any applicable state, county, or local requirements.

b. Properly dispose of dead animals in a timely manner. Animals shall be disposed of in a manner to prevent contamination of surface waters of the State or creation of a public health hazard.

Dead Animal Management:

Dead animals are currently being composted on property owned by Hancock Dairies. The dairy has a proven history of composting animals and separating large bones from the compost before mixing into the normal compost production facility. The dead animal compost facility is located on the Harper Dairy property and all dead animals from the four facilities are composted at that site.

Composting of mortalities, blood, and animal by-products requires approval from the Division of Solid and Hazardous Waste (DSHW). Please contact DSHW at (801) 536-0211, for more detail animal composting requirements.

In the case of a mass mortality event, animals that can be accommodated within the mortality composting process will be composted. Animals that cannot be accommodated within the existing compost plan will be incinerated in a trench. The remains will then be buried. Contact the state veterinarian's office at (801) 538-7162 in case of catastrophic death loss.

3.5 Clean Water Diversion

All buildings in the facility are guttered and the clean water is diverted to the irrigation ditch network. There is no opportunity for overland flow moving through the facility as it is bounded by the road on the west and a ditch forms an effective barrier to waters entering from the north side. The general slope of the land carries storm waters away from the facility to the southeast.

3.6 Direct Animal Contact with Surface Water

Prevent direct contact of confined animals with surface waters.

a. Surface waters of the state are not allowed to flow through animal confinement areas. All water that is prone to contamination is pumped to storage lagoons and evaporated as described above.

b. All fields are diked to prevent inflow onto dairy owned property.

c. Animals are not allowed access, including for watering purposes, to surface waters of the State.

d. New facilities shall not be built in surface waters of the state. (no facilities are or will be located in 100-year flood plains unless the facilities are protected from 100-year floods or lesser inundation)

The facility is constructed such that there is no incidental contact of animals with water other than in the constructed watering facilities in the corrals. Overflow of water is contained and drained to the irrigation system to prevent contact with manure.

3.7 Chemical Handling

Ensure that chemicals and other contaminants handled on-site are not disposed of in any manure, storm water, or process wastewater storage system unless specifically designed to treat such chemicals and other contaminants. All chemicals that are used on the dairy facility are moved through the wastewater system to the evaporative lagoons.

Chemicals and other contaminants include: animals, dips, pesticides, cleaning and disinfection agents, foot bath chemicals, pharmaceuticals, fertilizers, fuel, oil, cooling water, etc.

Resulting from the normal operation of the CAFO, only manure, litter, compost, process wastewater, and precipitation are allowed in storage and retention structures.

Section 4 Nutrient Application and Land Management

4.1 Land Conservation and Application Practices

Identify site-specific conservation practices that will be implemented, including as appropriate, buffers or equivalent practices, to control runoff of pollutants to surface water. Such practices shall include, but are not limited to:

a. Solid manure shall be incorporated as soon as possible after application, unless the application site has perennial vegetation (such as alfalfa) or is no-till cropped, and where the nutrient management plan adequately demonstrates that surface water quality will be protected where manure is not immediately incorporated.

b. Process wastewater to furrow or flood-irrigated land application sites shall be applied in a manner that prevents any process wastewater runoff into surface waters of the state.

c. When process wastewater is flood, sprinkler, or drip applied, the soil water holding capacity of the soil shall not be exceeded.

d. Process wastewater shall not be applied to frozen, snow covered, or saturated land application sites unless according to NRCS practice 590, Utah Manure Application Risk Index (UMARI) or other NRCS practices.

e. Where applicable of the following, the greatest setback distance of land applied manure and process wastewater applies:

1. 100 feet (or 35-foot vegetated buffer as appropriate) of surface waters of the State.
2. 100 feet of domestic water supply wells,
3. Setbacks or vegetative buffers established through UMARI or other NRCS practices, and
4. Setbacks otherwise required by UAC R309-600, as it pertains to drinking water source protection.

4.2 Land Application Methods

Establish protocols to land-apply manure or process wastewater in accordance with site specific nutrient management practices that ensure appropriate agricultural utilization of the nutrients in the manure or process wastewater. Such protocols shall include, but are not limited to:

a. Compliance to NRCS Practice 590, Nutrient Management, January 2013.

b. In association with Practice 590, USU guidelines and protocols must be followed. Practice 590 is attached to the NMP for reference.

c. No application of manure or process wastewater shall be made to a land application site at a rate that will exceed the capacity of the soil and the agronomic nutrient uptake of the planned crops and yields. Manure and wastewater shall be applied to useful crops. Manure shall not be applied to bare ground or other areas where a crop will not be harvested for 12 months or more following the application.

d. Manure and process wastewater shall be applied as uniformly as possible with properly calibrated equipment. Any feed runoff, pen or corral runoff, or other process wastewater applications to fields shall be evenly distributed throughout the field.

e. Operators must inspect annually, and calibrate as needed, any equipment used for land application of manure, litter, compost, or process wastewater.

f. Direct land application of mortalities, blood, animal by-products, waste feed, waste milk, or other products or materials is prohibited unless the nutrient applications are accounted for in the NMP and DWQ approves the NMP which includes such specific applications.

The Harper Dairy applies manure with both liquid and solid manure spreaders. This is done normally in the spring prior to planting and includes same day incorporation into the soil.

Waste water is applied through the surface irrigation ditch network during the growing season to encourage immediate plant use. The water table averages from 50 to 100 inches deep on the property

Manure spreader operators are trained to follow setback requirements as outlined in the permit language.

Land application of manure will be based on the following table:

Soil Test Phosphorus (ppm)	Apply Based on
Phosphorus < 50 ppm	Nitrogen needs
Phosphorus 50 -100 ppm	Phosphorus needs
Phosphorus 100 - 120 ppm	50% of crop phosphorus needs
Phosphorus > 120 ppm	No application of manure is allowed

Utilization: On fields with soil test levels less than 50 ppm Soil Test Phosphorus (STP), solid manure can be land-applied based on crop nitrogen needs in years when corn is grown in the crop rotation. On fields with soil test levels between 50 and 100 ppm Soil Test Phosphorus (STP), solid manure will be land-applied based on crop phosphorus needs for the crop rotation. In this case, commercial nitrogen fertilizer may need to be used to maximize crop production and to facilitate crop removal of phosphorus. Nitrogen additions will be based on soil test recommendations as outlined in the Utah Fertilizer Guide.

Liquid manure and storm water runoff will be applied based on soil and manure testing and NRCS Irrigation Water Management and Nutrient Management guidelines. Liquids from the lagoon will be pumped to adjacent fields through a pipeline or by using large liquid manure spreaders. All of the liquid can be safely used on the 218 acres available along with the majority of the solid waste. To maintain the proper balance, approximately 25 percent of the solids will be composted and used for bedding. Annual soil tests will determine the amount of solid manure applied to each field.

4.3 Calibration of Application Equipment

Spreader Calibration: Several methods are available for spreader calibration. To calibrate the solid manure spreader, first load and weigh the contents of the spreader or weigh a 5-gallon bucket of manure and multiply the weight x 1.5 x length x width x height of the spreader. This will give you tons per load of manure. To calibrate liquid/slurry spreaders, first determine the volume of material in gallons from manufacturer specifications or multiply the length x width x height of the spreader x 7.5. For volume in cylindrical tanks, multiply length x width x height of the spreader x 0.8 x 7.5.

Next determine the distance in feet that it takes to spread the entire load. Distance can be estimated or determined based on known field length or by counting fence posts along the length of the spread and multiplying by the average distance between posts. Then estimate the width of the spread in feet, allowing for a 10-20% pass overlap to ensure uniform coverage. Calculate the area covered and divide by 43,560 to convert to acres. Divide the weight or volume of manure in the spreader by the acres covered to determine the application rate for the given spreader setting (length x width of spread / acres covered = application rate in tons or gallons). Adjust the spreader settings and redo the calculations until the desired application rate is achieved.

Application rates in inches being applied through **liquid irrigation** systems can be determined by using the formula, inches applied = (cfs X hrs)/ac. In the formula, cfs represents the cubic feet per second, hrs represents the hours that the water has run, and ac. represents the acres covered. If the water is measured in gpm, it can be converted to cfs by dividing gpm by 450. The acres can be calculated by multiplying the width and length of the set, and then dividing by 43,560 (length x width / 43,560).

Where sprinkler systems are used, application rates can be estimated by placing six straight-sided cans at various locations under the sprinkler system. Measure the depth of liquid in inches accumulated in the cans over a period of time (e.g., 1 hour). Calculate the average depth of liquid in the cans and divide by the time interval to determine the application rate in inches per hour. Contact NRCS or USU if additional assistance is needed in calibrating your spreader.

4.4 Narrative Nutrient Management Planning

Nutrients will be applied to fields as outlined in the following tables for each field according to the NRCS standard 590 application rates identified in the NRCS Nutrient balance spreadsheet. The following example of the spreadsheet analysis is printed here. The remainder of the fields are attached as Appendix A.

Each field will be addressed individually using the specification sheet for that field and the guidelines for application outlined above, section 4.2.

Table 3 Field nutrient application guide (See Appendix A for each field table.)

NUTRIENT MANAGEMENT (Manure) SPECIFICATION SHEET (590)			
Name:	Hancock Harper Dairy	**Date:**	04/23/16
Planned By:	hrt	**Field Office:**	Tremonton
Purpose(s):	To budget and supply nutrients for plant production. To minimize agricultural non-point source pollution of surface and ground water resources. To maintain or improve the physical, chemical and biological condition of soil. To prevent or reduce excess nutrient concentrations in the soil.		
Field and Soil Information		**Year:**	2015

Tract/Field Number(s):	[redacted] 1	Number of Acres:	29
Crop:	Corn Silage	Yield Goal:	35 tons
Soil test nitrate-N:	3 ppm	Soil test P:	46 ppm
Crop nitrogen (N) recommendation:	260 lb N/acre	Based on:	USU Calculated
Crop phosphorus (P205) recommendation:	109 lb P205/acre	Based on:	Crop Uptake

Manure Information

Manure form:	solid	
Manure N content:	0.7	lbs/ton
Manure P205 content:	23.7	lbs/ton

Application Information

Method of application:	Broadcast	Method of Incorporation:	Disk
Timing of Incorporation:	Manure will be incorporated within 5-7 days		
Date of application:		Field Conditions:	
Basis of Application:	Phosphorus	Actual Application Rate:	tons/acre

Calculations

	N-based	P205-based	
1. Nutrients needed	260	109	lbs/acre
2. Nutrient from other sources (credits)			lbs/acre
3. Additional nutrients needed (lb/acre)	260	109	lbs/acre
4. Total N and P205 in manure	0.7	23.7	lbs/ton
5. Nutrient availability factor	69%	90%	
6. Available nutrients in manure	0.5	21.3	lbs/ton
7. Manure application rate	563	5	tons/acre
8. Travel distance while unloading spreader	100	7200	feet
9. Additional N needed if applied based on P	258		lbs/acre

Certification

I agree to the installation and maintenance of this practice as outlined. This practice, as installed, meets NRCS Standards and Specifications.

Cooperator: _____ **Planner:** _____

4.5 Field Maps Harper Dairy

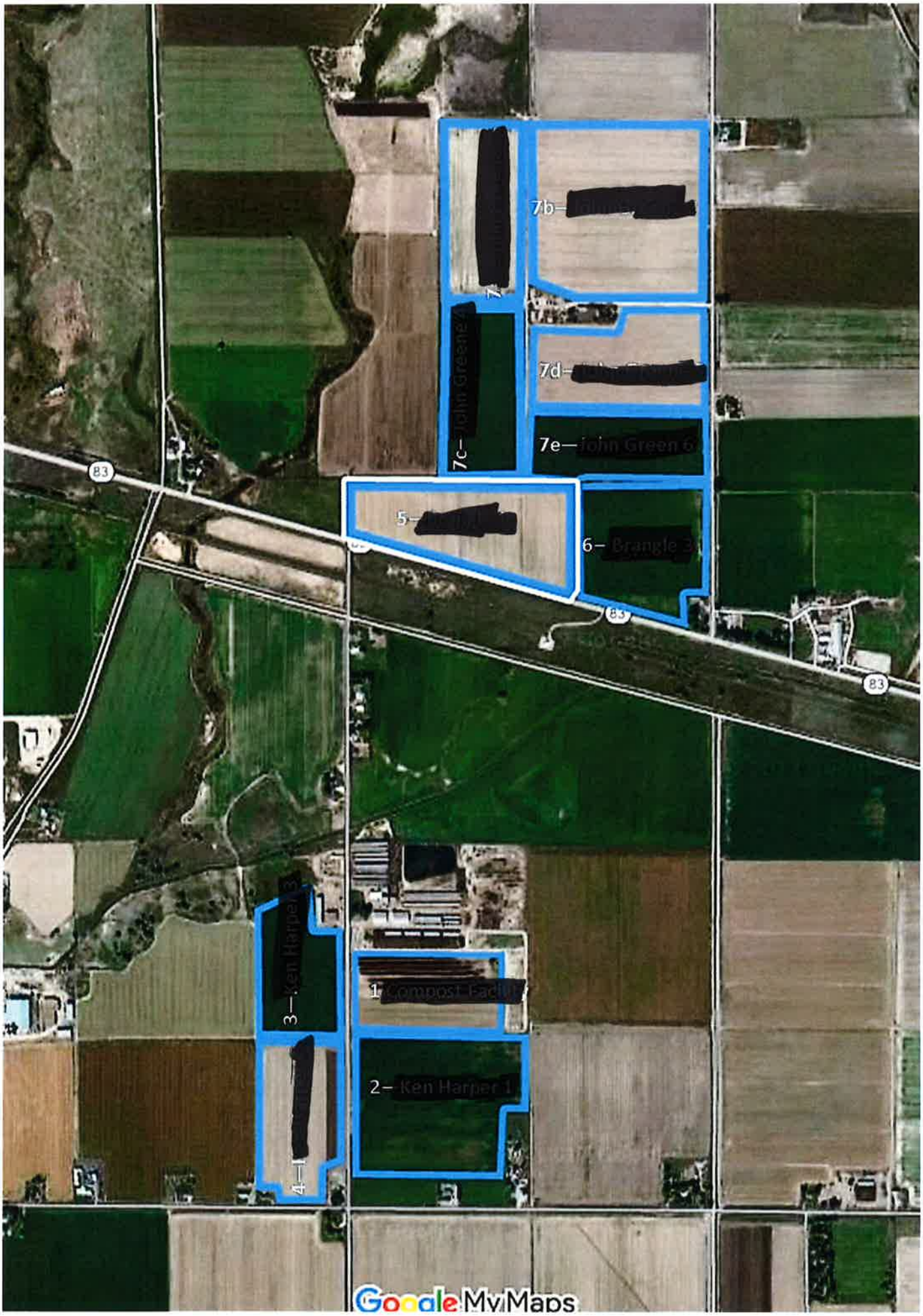

7b–
7d–
7e– John Green 6
7c– John Green 4
5–
6– Grangle 3
83
83
83
3– Ken Harper 3
1– Compost Facility
2– Ken Harper 1
4–
Google My Maps

Table 4 Harper Dairy Field List

Field Name	Size in Acres
1 – Compost Facility	10 Ac
2 – [redacted]	29 Ac
3 – [redacted]	13 Ac
4 – [redacted]	16 Ac
5 – [redacted]	23 Ac
6 – [redacted]	22 Ac
7a – [redacted]	20 Ac
7b – [redacted]	40 Ac
7c – [redacted]	19 Ac
7d – [redacted]	20 Ac
7e – [redacted]	16 Ac
Total Acreage	**218 Ac**

Landowner:	Harper Dairy	**Weather Station:**	Tremonton
Planner:	Hrt	**Location:**	Corrine, Ut
Winter Precipitation:	6.9	**Date:**	March 25, 2003

Tract:						2419	
Field:	[redacted] 1	[redacted] 2	K [redacted] 3	[redacted] 1	[redacted] 3	[redacted] 1	[redacted] 2
Soil Symbol:	Ld	Ld	Ld	Ld	Ld	Ld	Ld
Adj AWC (5ft):	9.14	9.14	9.14	9.14	9.14	9.14	9.14
Section 1: Winter Application Parameters							
Distance	3	3	3	9	9	3	9
Irr. Type	3	3	3	3	3	3	3
Cover Type	6	6	6	3	6	6	6
Containment	3	3	3	3	3	3	3
Restrict. Lay.	1.5	1.5	1.5	1.5	1.5	6	1.5
Hyd. Group	9	9	9	9	9	9	9
% Slope	3	3	3	3	3	3	3
Adj. AWC	1	1	1	1	1	1	1
Winter Precip.	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Total Points:	30.0	30.0	30.0	33.0	36.0	34.5	36.0
Risk Level:	Low	Low	Low	Med.	Med.	Med.	Med.
Practices to be implemented							Short
Section 2: Spring, Summer, Fall Application Parameters							
Distance	3	3	3	9	9	3	9
Irr. Type	3	3	3	3	3	3	3
Cover Type							
Incorporation							
Restrict. Lay.	1.5	1.5	1.5	1.5	1.5	6	1.5
Hyd. Group	9	9	9	9	9	9	9
% Slope	3	3	3	3	3	3	3
Runoff Control							
Irr. Efficiency							
Total Points:	19.5	19.5	19.5	25.5	25.5	24.0	25.5
Risk Level:	Low	Low	Low	Low	Low	Low	Low
Practices to be implemented							

*Any individual features with a High rating should be evaluated and conservation practices applied where possible. Where a restrictive layer is present at <= 2 feet, manure should not be applied on frozen/snow covered ground nor at levels above agronomic rate for phosphorus.

'ractices to be implemented:

:T = Cover Type	IS = Irrigation System Improvement	RB = Riparian Buffer
'S = Filter Strip	IWM = Irrigation Water Management	RC = Runoff Containment
N = Incorporation	SM = Soil Moisture Management	RL = Restrictive Layer
3B = Setback	TR = Tailwater Recovery System	WS = Wetland System

4.6 Soil and Field Information

Table 5 UMARI Data for Harper Dairy

*Utah Manure Application Risk Index Worksheet

Landowner:	Harper Dairy	**Weather Station:**	Tre
Planner:	Hrt	**Location:**	Cor
Winter Precipitation:	6.9	**Date:**	Januar

Tract:						
Field:	[redacted]4	[redacted]5	[redacted]6			
Soil Symbol:	Ld	Ld	Ld			
Adj AWC (5ft):	9.14	9.14	9.14			
Section 1: Winter Application Parameters						
Distance	3	3	3			
Irr. Type	3	3	3			
Cover Type	6	6	6			
Containment	3	3	3			
Restrict. Lay.	1.5	1.5	1.5			
Hyd. Group	9	9	9			
% Slope	3	3	3			
Adj. AWC	1	1	1			
Winter Precip.	0.5	0.5	0.5			
Total Points:	30.0	30.0	30.0			
Risk Level:	Low	Low	Low			
Practices to be implemented						
Section 2: Spring, Summer, Fall Application Parameters						
Distance	3	3	3			
Irr. Type	3	3	3			
Cover Type						
Incorporation						
Restrict. Lay.	1.5	1.5	1.5			
Hyd. Group	9	9	9			
% Slope	3	3	3			
Runoff Control	3	3	3	3	3	3
Irr. Efficiency						
Total Points:	22.5	22.5	22.5			
Risk Level:	Low	Low	Low			
Practices to be implemented						

*Any individual features with a High rating should be evaluated and conservation practices applied where possible. Where a restrictive layer is present at <= 2 feet, manure should not be applied on frozen/snow covered ground nor at levels above agronomic rate for phosphorus.

Practices to be implemented:

CT = Cover Type

FS = Filter Strip

IN = Incorporation

SB = Setback

IS = Irrigation System Improvement

IWM = Irrigation Water Management

SM = Soil Moisture Management

TR = Tailwater Recovery System

RB = Ripa Buffer

RC = Runc Containme

RL = Restr Layer

WS = Wet System

4.7 Nitrogen and Phosphorus Risk Analysis

The risk analysis program used for Utah is the Utah Manure Application Risk Analysis, UMARI. The results of the UMARI runs are detailed in Table 4.7-1 below

Current Soil Test Levels:

Harper Dairy Fields	Soil Nitrogen Level	Soil Phosphorus level	Soil Potassium level	Crop	Yield	Size of Field (Acres)	Manure Application Risk (Winter)	Manure Application Risk (Spring, Summer, Fall)
2 - [redacted]	3	46	700	Corn Silage	35 T	29	Low	Low
3 - [redacted]	42	73	665	Alfalfa	11 T	13	Low	Low
4 - [redacted]	49	34	350	Corn Silage	35 T	16	Low	Low
5 - [redacted]	26	54	880	Corn Silage	35 T	23	Med	Low
6 - [redacted]	167	58		Corn Silage	35	22	Med	Low
7a - [redacted]	8	117 (	1055	Alfalfa	4 T	20	Med	Low
7b - [redacted]	23	66	865	Corn Silage	35 T	40	Med	Low
7c - [redacted]	41	68	1030	Alfalfa	11 T	19	Low	Low
7d - [redacted]	33	41	540	Corn Silage	35 T	20	Low	Low
7e - [redacted]	23	95	1055	Corn Silage	35 T	16	Low	Low

Total Acres	218

(Applications must be reduced in Field 7a)

4.8 Required NMP Submissions to DWQ

Projections that are not permit NMP terms under the NMP, that must be submitted to DWQ, are:

1. the CAFO's planned crop rotations for each field for the period of permit coverage;

2. the projected amount of manure, litter, or process wastewater to be applied;

3. projected credits for all nitrogen in the field that will be plant-available;

4. consideration of multi-year phosphorus application;

5. accounting for other additions of plant-available nitrogen and phosphorus to the field

6. the predicted form, source, and method of application of manure, litter, and process wastewater for each crop.

4.9 Required Calculations

1. Utilizing NRCS Practice 590 and current soil and manure monitoring results, CAFOs must calculate and determine the maximum amounts of manure, litter, and process wastewater to be land-applied on a field- specific basis, at least once each year based on the following data:

a. A determination of nitrogen and phosphorus available in soil that will be available during the growing season. This includes nitrogen mineralization from previous land applications.

b. The results of most recent representative manure, litter and process wastewater test for nitrogen and phosphorus taken within 12 months or less of the date of land application, in order to determine the amount of nitrogen and phosphorus in the manure, litter, and process wastewater to be applied.

Section 5 Best Management Practices

5.1 Required BMPs

Harper Dairy will:

A. Production Area Required Best Management Practices (BMPs) and Prohibitions Applicable to all CAFOs

1. Perform weekly visual inspections of all storm-water run-on diversion devices, runoff diversion structures, animal waste storage structures and devices channeling process wastewater to impoundments or tanks.

2. As required by federal requirements, perform daily visual inspections of water lines, including drinking water or cooling water lines looking for leaks

that could create process wastewater that would require containment or treatment of the contaminated leaked water.

3. Install depth markers in all open liquid impoundments and terminal storage tanks to indicate the maximum elevation to maintain capacity necessary to contain the facility's required storm event amount, and in addition provide a one-foot freeboard elevation above the containment freeboard of the facility's required storm event. The depth markers shall be marked at a maximum of one-foot increments.

4. Perform weekly inspections of impoundments and tanks and record the process wastewater elevation levels in the structures as indicated by the depth marker(s).

5. Correct any deficiencies found as a result of daily and weekly inspections as soon as possible, but no later than 30 days after identifying the deficiency, unless:

   a. Factors preventing correction within 30 days have been documented.

   b. Any deficiency where storage structure freeboard or structure integrity is insufficient to contain the required storm event, must be corrected immediately and is not given the 30-day timeframe to correct a problem.

6. Remove accumulations of liquids, solids, and manure from impoundments and tanks as necessary to maintain the capacity of the structures to retain the storage volume for the required storm event.Maintain on-site records documenting the implementation of these required BMPs in Paragraph G. All records shall be maintained and retained on-site for five-years from the date they were created and must be made available during inspections by DWQ or authorized agent.

7. A CAFO's production area may not be located within a 100-year flood plain, unless the production area is protected from inundation damage and discharges that may as a result of 100-year flood waters orflow.

8. There shall be no discharge of manure, litter, or process wastewater from the production area to groundwater with direct hydrologic connection to surface waters of the State.

1) Provide adequate storage and management options to accommodate the 1,000 lactating cows.
2) Manage the liquid storage facility to accommodate the liquids from the milk house, new corrals and potential storm water spills from solid storage pits;
3) Build a proper staging area for temporary storage of solid manure as needed during times when manure cannot be properly land-applied;
4) Irrigate with water from the liquid storage tank through existing surface ditches, or through a newly designed sprinkler system. Apply manure in an appropriate manner and according to agronomic rates.
5) Incorporate manure applied on the surface into the ground within 48 hours of application.
6) Record all manure applications and dispositions of manure on fields.
7) Keep monthly records of inspections and manure applications.
8) Stay in compliance with state and federal laws and regulations.
9) Maximize productivity and profitability while correcting unacceptable environmental conditions;
10) Not apply manure at any time within 100 feet of irrigation return flow ditches, wells, upstream from the sloughs, etc.
11) Establish a vegetative buffer strip on the lower 35 feet of all fields where irrigation runoff flows into a water course for summer applications on cropland before and after the crop.

Crop Rotation: Crops grown on the Harper Dairy farm include alfalfa and corn for silage. The crop rotation is 4 to 5 years of alfalfa and 3 to 4 years of corn. The corn is generally cut for silage but some grain corn is harvested each year and the alfalfa is ensilaged and used for feed.

Irrigation Water Management: Proper management of irrigation water has a large impact on the leaching and/or runoff of coliform, nitrogen, phosphorus, and other nutrients. When applying liquid manure, irrigation applications must not exceed the soil's Available Water Holding Capacity (AWC). Irrigation water management will be carried out in accordance with the NRCS Irrigation Management Standard.

Section 6. Emergency Spill and Discharge Response Plan

6.1 Emergency Response Plan

Emergency plan: Even though there is no water body close to the manure storage facility, there is a very limited chance of manure discharge into a water body. Several prolonged precipitation events or a malfunctioning livestock watering system may cause the manure bunker, which is designed for normal precipitation plus a 25 year / 24 hour storm event to fill up prematurely and overflow. It is important to acknowledge that a problem exists before manure or wastewater leaves the property or enters a water body of the State of Utah. Suggested preventative actions include:

a. Minimize (or stop if possible) all additional flow (waters, flushing system, etc.) to the storage.
b. Use a skid loader or tractor and blade to contain or divert a spill or leak, where possible.
c. Begin emergency utilization of manure by pumping or hauling onto fields at acceptable agronomic rates.
d. Prevent additional surface water from entering the storage, where possible.
e. Add soil to dikes to fill or repair any low areas or create temporary dikes with straw bales.
f. Call the Utah Department of Environmental Quality at (801) 538-6146 during normal working hours or their 24 hour answering service at (801) 536-4123 to report discharges during emergency situations. Discharges should be reported within 24 hours of occurrence.
g. Maintain the designed storage capacity in ponds by cleaning out sediment and maintain the designed storage capacity in ponds by cleaning out sediment and emptying according to the outlined schedule in your NMP.

6.2 Required Discharge and Noncompliance Reporting;

1. The permittee shall orally report any discharge to surface waters of the state within 24 hours from the time the permittee first became aware of the discharge by calling the AFO/CAFO Program Coordinator at (801) 536-4300. Any discharge or other noncompliance that may endanger health or the environment shall be reported immediately (sooner than 24 hours) by calling the Division of Water Quality 24-hour hotline (801) 536-4123.

a. In addition, a written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

I. a description of the noncompliance and its cause;
II. the period of noncompliance, including exact dates and times;
III. the estimated time noncompliance is expected to continue if it has not been corrected;
IV. steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance; and

V. steps taken, if any, to mitigate the adverse impacts on the environment and human health during the noncompliance period.

Section 7 Other Requirements and Practices:

7.1 Bio-security Measures

7.2 Closure of Facilities or Dairy Operation (XI-c)

The following conditions shall apply to the closure of lagoons and other earthen or synthetic lined basins and other manure, litter, compost, or process wastewater storage and handling structures:

1. Closure of Lagoons and Other Surface Impoundments.

   a. All lagoons and other earthen or synthetic-lined basins must be properly closed if the facility ceases operation. In addition, any lagoon or other earthen or synthetic-lined basin that is not in use for a period of twelve consecutive months must be properly closed unless the facility intends to resume use of the structure at a later date and maintains the structure as though it were actively in use. The permittee shall notify DWQ of the action taken and shall conduct required routine inspections, maintenance, and record keeping during the inactive period. No manure, litter, compost, or process wastewater storage and handling structure shall be abandoned.

   b. For proper closure, closure of lagoons and other earthen or synthetic-lined basins must be consistent with Utah NRCS Closure of Waste Impoundments Practice Standard Code 360. Consistent with this standard, the permittee shall remove all waste materials to the maximum extent practicable and utilize or dispose of them in accordance with the permittee's NMP. The permittee is responsible for any discharge of pollutants.

   c. CAFOs which have ceased operation shall maintain permit coverage until all manure, litter, compost, or process wastewater storage and handling structures have been properly closed.

7.3 Transfer of Manure, Litter, and Process Wastewater to Other Persons.

A. Transfer of Manure, Litter, and Process Wastewater To Other Persons

1. When manure, litter, compost, or process wastewater is sold or given away, the permittee must comply with the following conditions:

a. maintain records showing the date and amount of manure, litter, compost and/or process wastewater that leaves the permitted operation on an annual basis;

b. record the name and address of the recipient;

c. provide the recipient(s) with representative information on the phosphorus and nitrogen content of the manure, litter, compost and/or process wastewater; and

d. for a period of five years, permit-related records are to be retained on-site and made available for review upon request. Also, records are to be submitted to DWQ upon request.

Section 8 Record Keeping

8.1 Required

Record Keeping: Records are the responsibility of the landowner and will be kept according to the following schedule. Records will include:

Annual reports
Manure transfer forms
Records needed for 4.8 above
Records of mortality management
Records of overflows, discharges, etc. with date, time, length of discharge, and volume
Land application records, dates of, weather conditions, amounts,
Records of soil, manure, wastewater, compost analysis
Expected and actual crop yields
Records of daily water line inspections
Description of basis for determining application rates
Calculations showing total N and P applied to each field including sources other than manure, compost, or wastewater
Records of dates of manure application equipment inspections and calibrations
Records of weekly inspections of structures and impoundments
Records of weekly freeboard readings
Records documenting corrective actions

Section 9 Monitoring and analytical methods (IX.A.7)

9.1 Manure and soil sampling frequency

Manure Testing: Manure tests will be taken at least yearly for a minimum of 5 years so that average manure test values can be obtained. Utah State University procedures will be followed (Refer to the attached manure testing guidelines). Manure test values will be used to determine

actual moisture and nutrient content of the manure. Adjustments will be made in application rates based on actual soil and manure tests.

Soil Testing: As a minimum, an initial soil tests will be taken to establish base-line soil test phosphorus. Soil tests will then be taken on fields where manure is applied annually except on alfalfa and grass plantings where the soil test is required only every three years. Soil tests will be used to monitor phosphorus levels. Utah State University soil-testing procedures will be followed (Refer to the attached USU soil testing guidelines). Soil tests may be sent to Utah State University or other approved private testing facilities (see NRCS for a list of approved testing facilities).

Soil and Manure Testing

Directions on collecting soil samples

For nitrogen-based applications, collect separate soil samples at depths of 0 to 12 and 12 to 24 inches. For phosphorus-based applications collect soil samples at a depth of 0 to 12 inches only. A soil probe is the most efficient way to collect samples. Probes are available on loan from County Extension Agents. Collect a composite sample by combining a minimum of 8-10 samples taken randomly throughout a field in a plastic bucket. Mix the samples and send at least one pint to the lab for analysis. More than one composite may be needed for large or highly variable fields. **Example**

Directions on collecting manure samples

Since manure is a variable material, proper procedures must be followed to ensure a representative sample is collected. For liquids, sample directly from the storage structure, from the outlet pipe where liquid is removed, or from the field using catch cans to collect samples applied through sprinklers. When sampling liquids, collect a minimum of six separate subsamples. Combine the subsamples in a clean bucket, mix well, and transfer approximately one pint of liquid to a clean bottle or other rigid container.

For solids, remove the surface six-inch crust and use an auger or shovel to core into the pile. Take a minimum of six separate sub- samples from around the pile and combine

them in a clean bucket. Mix well and transfer approx. one quart to a clean plastic bag. Keep all samples cool until they can be transported to a lab.

Section 10 Monitoring Results, (IX.A.7)

10.1 Soil Sampling results

Noo Sun Dairy Fields	Date Test Processed	Soil Nitrogen Level	Soil Phosphorus level	Soil Potassium level	Crop	Yeild	Size of Field	Manure Application Risk (Winter)
2 - [redacted]	1/28/2015	3	46	700	Corn Silage	35 T	29	Low
3 - [redacted]	1/28/2015	42	73	665	Alfalfa	11 T	13	Low
4 - [redacted]	1/28/2015	49	34	350	Corn Silage	35 T	16	Low
5 - [redacted]	1/28/2015	26	54	880	Corn Silage	35 T	23	Med
6 - [redacted]	1/28/2015	167	58		Corn Silage	35 T	22	Med
7a - [redacted]	1/28/2015	8	117	1055	Alfalfa	4 T	20	Med
7b - [redacted]	1/28/2015	23	66	865	Corn Silage	35 T	40	Med
7c - [redacted]	1/28/2015	41	68	1030	Alfalfa	11 T	19	Low
7d - [redacted]	1/28/2015	33	41	540	Corn Silage	35 T	20	Low
7e - [redacted]	1/28/2015	23	95	1055	Corn Silage	35 T	16	Low
						Total Acres	218	

Manure Testing: Manure tests will be taken at least yearly for a minimum of 5 years so that average manure test values can be obtained. Utah State University procedures will be followed to ensure the best possible results. Manure test values will be used to determine actual moisture and nutrient content of the manure. Adjustments will be made in application rates based on actual soil and manure tests. (See Appendix A for field by field estimates of manure and soil nutrient levels.)

10.2 Compost Sampling Results (These will be attached to the CNMP annually)

10.3 Wastewater Sampling Results (These will be attached to the CNMP Annually

Section 11 Annual Report (XI.B.)

11.1 Annual Report Requirements

1. The permittee must submit an annual report to DWQ by April 1 of each year covering permit coverage during the previous calendar year. The reporting requirements and April 1 deadline also applies to facilities with partial years of permit coverage. The dairy will use the Annual Report Form for the annual report.

Plan Review: This plan will be reviewed and updated at least once every five years. This is to assure that the operation is still running correctly, is being managed such that the correct amounts of animal manure are being applied and that the plan is working properly. Updated plans must meet NRCS standards and specifications. The plan must also be reviewed and, if needed, revised if the STP levels start to exceed 50 ppm or when significant changes (>20%) are made in animal numbers or in the manner that manure is handled.

Signatures: This nutrient management plan is based on my current and planned system and objectives. I have reviewed this plan and understand what is required. My decisions for installation, operation, maintenance, and safety are accurately represented by this plan. I agree to operate according to this plan for the life of the contract and beyond to ensure that all objectives are met. I understand that it is my responsibility to obtain all permits required to implement this plan. If I plan to alter my operation I will contact the Weber Soil Conservation District to determine if a revised plan is needed.

_____ - _____

Mitch Hancock **Date**

_____ - _____

Certified Planner **Date**
Howard R. Thomas
R

Appendix A: Field specification sheets for Manure Application

Field: [redacted] 1

NUTRIENT MANAGEMENT (Manure) SPECIFICATION SHEET (590)

Name: Hancock Harper Dairy **Date:** 05/05/16

Planned By: hrt **Field Office:** Tremonton

Purpose(s): To budget and supply nutrients for plant production.
To minimize agricultural non-point source pollution of surface and ground water resources.
To maintain or improve the physical, chemical and biological condition of soil.
To prevent or reduce excess nutrient concentrations in the soil.

Field and Soil Information — Year: 2015

Tract/Field Number(s): [redacted] 1 Number of Acres: 29

Crop: Corn Silage Yield Goal: 35 tons

Soil test nitrate-N: 3 ppm Soil test P: 46 ppm

Crop nitrogen (N) recommendation:	260	lb N/acre	Based on:	USU Calculated
Crop phosphorus (P205) recommendation:	109	lb P205/acre	Based on:	Crop Uptake

Manure Information

Manure form:	solid	
Manure N content:	0.7	lbs/ton
Manure P205 content:	23.7	lbs/ton

Application Information

Method of application: Broadcast Method of Incorporation: Disk

Timing of Incorporation: Manure will be incorporated within 5-7 days

Date of application: _____ Field Conditions: _____

Basis of Application: Phosphorus Actual Application Rate: _____ tons/acre

Calculations

	N-based	P205-based	
1. Nutrients needed	260	109	lbs/acre
2. Nutrient from other sources (credits)			lbs/acre
3. Additional nutrients needed (lb/acre)	260	109	lbs/acre
4. Total N and P205 in manure	0.7	23.7	lbs/ton
5. Nutrient availability factor	69%	90%	
6. Available nutrients in manure	0.5	21.3	lbs/ton
7. Manure application rate	563	5	tons/acre
8. Travel distance while unloading spreader	100	7200	feet
9. Additional N needed if applied based on P	258		lbs/acre

Certification

I agree to the installation and maintenance of this practice as outlined. This practice, as installed, meets NRCS Standards and Specifications.

Cooperator: _____ **Planner:** _____

Field: [redacted] 3

NUTRIENT MANAGEMENT (Manure) SPECIFICATION SHEET (590)

Name: Hancock Harper Dairy **Date:** 05/05/16

Planned By: hrt **Field Office:** Tremonton

Purpose(s):
- To budget and supply nutrients for plant production.
- To minimize agricultural non-point source pollution of surface and ground water resources.
- To maintain or improve the physical, chemical and biological condition of soil.
- To prevent or reduce excess nutrient concentrations in the soil.

Field and Soil Information

Year: 2015

Tract/Field Number(s): [redacted] 3 Number of Acres: 13

Crop: Alfalfa Yield Goal: 11 tons

Soil test nitrate-N: 42 ppm Soil test P: 73 ppm

Crop nitrogen (N) recommendation:	0	lb N/acre	Based on:	USU Calculated
Crop phosphorus (P205) recommendation:	143	lb P205/acre	Based on:	Crop Uptake

Manure Information

Manure form:	solid	
Manure N content:	0.7	lbs/ton
Manure P205 content:	23.7	lbs/ton

Application Information

Method of application: Broadcast Method of Incorporation: Disk

Timing of Incorporation: Manure will be incorporated within 5-7 days

Date of application: _____ Field Conditions: _____

Basis of Application: Phosphorus Actual Application Rate: _____ tons/acre

Calculations

	N-based	P205-based	
1. Nutrients needed	0	143	lbs/acre
2. Nutrient from other sources (credits)			lbs/acre
3. Additional nutrients needed (lb/acre)	0	143	lbs/acre
4. Total N and P205 in manure	0.7	23.7	lbs/ton
5. Nutrient availability factor	69%	90%	
6. Available nutrients in manure	0.5	21.3	lbs/ton
7. Manure application rate	0	7	tons/acre
8. Travel distance while unloading spreader	0	5500	feet
9. Additional N needed if applied based on P	-3		lbs/acre

Certification

I agree to the installation and maintenance of this practice as outlined. This practice, as installed, meets NRCS Standards and Specifications.

Cooperator: _____ **Planner:** _____

Field: [redacted] 4

NUTRIENT MANAGEMENT (Manure) SPECIFICATION SHEET (590)

Name: Hancock Harper Dairy **Date:** 05/05/16

Planned By: hrt **Field Office:** Tremonton

Purpose(s): To budget and supply nutrients for plant production.
To minimize agricultural non-point source pollution of surface and ground water resources.
To maintain or improve the physical, chemical and biological condition of soil.
To prevent or reduce excess nutrient concentrations in the soil.

Field and Soil Information

Year: 2015

Tract/Field Number(s): [redacted] 4 Number of Acres: 26

Crop: Corn Silage Yield Goal: 35 tons

Soil test nitrate-N: 49 ppm Soil test P: 34 ppm

Crop nitrogen (N) recommendation:	144	lb N/acre	Based on:	Crop Uptake
Crop phosphorus (P205) recommendation:	109	lb P205/acre	Based on:	Crop Uptake

Manure Information

Manure form:	solid	
Manure N content:	0.7	lbs/ton
Manure P205 content:	23.7	lbs/ton

Application Information

Method of application: Broadcast Method of Incorporation: Disk

Timing of Incorporation: Manure will be incorporated within 5-7 days

Date of application: _____ Field Conditions: _____

Basis of Application: Phosphorus Actual Application Rate: _____ tons/acre

Calculations

	N-based	P205-based	
1. Nutrients needed	144	109	lbs/acre
2. Nutrient from other sources (credits)			lbs/acre
3. Additional nutrients needed (lb/acre)	144	109	lbs/acre
4. Total N and P205 in manure	0.7	23.7	lbs/ton
5. Nutrient availability factor	69%	90%	
6. Available nutrients in manure	0.5	21.3	lbs/ton
7. Manure application rate	311	5	tons/acre
8. Travel distance while unloading spreader	100	7200	feet
9. Additional N needed if applied based on P	141		lbs/acre

Certification

I agree to the installation and maintenance of this practice as outlined. This practice, as installed, meets NRCS Standards and Specifications.

Cooperator: _____ **Planner:** _____

Field: [redacted] 1

NUTRIENT MANAGEMENT (Manure) SPECIFICATION SHEET (590)

Name: Hancock Harper Dairy **Date:** 05/05/16

Planned By: hrt **Field Office:** Tremonton

Purpose(s): To budget and supply nutrients for plant production.
To minimize agricultural non-point source pollution of surface and ground water resources.
To maintain or improve the physical, chemical and biological condition of soil.
To prevent or reduce excess nutrient concentrations in the soil.

Field and Soil Information — Year: 2015

Tract/Field Number(s): [redacted] 1 Number of Acres: 23

Crop: Corn Silage Yield Goal: 35 tons

Soil test nitrate-N: 26 ppm Soil test P: 54 ppm

Crop nitrogen (N) recommendation:	224	lb N/acre	Based on:	Crop Uptake
Crop phosphorus (P205) recommendation:	109	lb P205/acre	Based on:	Crop Uptake

Manure Information

Manure form:	solid	
Manure N content:	0.7	lbs/ton
Manure P205 content:	23.7	lbs/ton

Application Information

Method of application: Broadcast Method of Incorporation: Disk

Timing of Incorporation: Manure will be incorporated within 5-7 days

Date of application: _____ Field Conditions: _____

Basis of Application: Phosphorus Actual Application Rate: _____ tons/acre

Calculations

	N-based	P205-based	
1. Nutrients needed	224	109	lbs/acre
2. Nutrient from other sources (credits)			lbs/acre
3. Additional nutrients needed (lb/acre)	224	109	lbs/acre
4. Total N and P205 in manure	0.7	23.7	lbs/ton
5. Nutrient availability factor	69%	90%	
6. Available nutrients in manure	0.5	21.3	lbs/ton
7. Manure application rate	485	5	tons/acre
8. Travel distance while unloading spreader	100	7200	feet
9. Additional N needed if applied based on P	222		lbs/acre

Certification

I agree to the installation and maintenance of this practice as outlined. This practice, as installed, meets NRCS Standards and Specifications.

Cooperator: _____ **Planner:** _____

Field: [redacted] 3

NUTRIENT MANAGEMENT (Manure) SPECIFICATION SHEET (590)

Name: Hancock Harper Dairy **Date:** 05/05/16

Planned By: hrt **Field Office:** Tremonton

Purpose(s): To budget and supply nutrients for plant production.
To minimize agricultural non-point source pollution of surface and ground water resources.
To maintain or improve the physical, chemical and biological condition of soil.
To prevent or reduce excess nutrient concentrations in the soil.

Field and Soil Information

Year: 2015

Tract/Field Number(s): [redacted]3 Number of Acres: 20

Crop: Corn Silage Yield Goal: 35 tons

Soil test nitrate-N: 167 ppm Soil test P: 58 ppm

Crop nitrogen (N) recommendation:	0	lb N/acre	Based on:	Crop Uptake
Crop phosphorus (P205) recommendation:	109	lb P205/acre	Based on:	Crop Uptake

Manure Information

Manure form:	solid	
Manure N content:	0.7	lbs/ton
Manure P205 content:	23.7	lbs/ton

Application Information

Method of application: Broadcast Method of Incorporation: Disk

Timing of Incorporation: Manure will be incorporated within 5-7 days

Date of application: _____ Field Conditions: _____

Basis of Application: Phosphorus Actual Application Rate: _____ tons/acre

Calculations

	N-based	P205-based	
1. Nutrients needed	0	109	lbs/acre
2. Nutrient from other sources (credits)			lbs/acre
3. Additional nutrients needed (lb/acre)	0	109	lbs/acre
4. Total N and P205 in manure	0.7	23.7	lbs/ton
5. Nutrient availability factor	69%	90%	
6. Available nutrients in manure	0.5	21.3	lbs/ton
7. Manure application rate	0	5	tons/acre
8. Travel distance while unloading spreader	0	7200	feet
9. Additional N needed if applied based on P	-2		lbs/acre

Certification

I agree to the installation and maintenance of this practice as outlined. This practice, as installed, meets NRCS Standards and Specifications.

Cooperator: _____ **Planner:** _____

Field: [redacted] 1

NUTRIENT MANAGEMENT (Manure)
SPECIFICATION SHEET (590)

Name: Hancock Harper Dairy **Date:** 05/05/16

Planned By: hrt **Field Office:** Tremonton

Purpose(s): To budget and supply nutrients for plant production.
To minimize agricultural non-point source pollution of surface and ground water resources.
To maintain or improve the physical, chemical and biological condition of soil.
To prevent or reduce excess nutrient concentrations in the soil.

Field and Soil Information

Year: 2015

Tract/Field Number(s): [redacted] 1 Number of Acres: 20

Crop: Alfalfa Yield Goal: 4 tons

Soil test nitrate-N: 8 ppm Soil test P: 117 ppm

Crop nitrogen (N) recommendation:	0	lb N/acre	Based on:	Crop Uptake
Crop phosphorus (P205) recommendation:	0	lb P205/acre	Based on:	Crop Uptake

Manure Information

Manure form:	solid	
Manure N content:	0.7	lbs/ton
Manure P205 content:	23.7	lbs/ton

Application Information

Method of application: Broadcast Method of Incorporation: Disk

Timing of Incorporation: Manure will be incorporated within 5-7 days

Date of application: _____ Field Conditions: _____

Basis of Application: Phosphorus Actual Application Rate: _____ tons/acre

Calculations

	N-based	P205-based	
1. Nutrients needed	0	0	lbs/acre
2. Nutrient from other sources (credits)			lbs/acre
3. Additional nutrients needed (lb/acre)	0	0	lbs/acre
4. Total N and P205 in manure	0.7	23.7	lbs/ton
5. Nutrient availability factor	69%	90%	
6. Available nutrients in manure	0.5	21.3	lbs/ton
7. Manure application rate	0	0	tons/acre
8. Travel distance while unloading spreader	0	0	feet
9. Additional N needed if applied based on P	0		lbs/acre

Certification

I agree to the installation and maintenance of this practice as outlined. This practice, as installed, meets NRCS Standards and Specifications.

Cooperator: _____ **Planner:** _____

Field: [redacted] 2

NUTRIENT MANAGEMENT (Manure) SPECIFICATION SHEET (590)

Name: Hancock Harper Dairy **Date:** 05/05/16

Planned By: hrt **Field Office:** Tremonton

Purpose(s): To budget and supply nutrients for plant production.
To minimize agricultural non-point source pollution of surface and ground water resources.
To maintain or improve the physical, chemical and biological condition of soil.
To prevent or reduce excess nutrient concentrations in the soil.

Field and Soil Information

Year: 2015

Tract/Field Number(s): [redacted] 2 Number of Acres: 40

Crop: Corn Silage Yield Goal: 35 tons

Soil test nitrate-N: 23 ppm Soil test P: 66 ppm

Crop nitrogen (N) recommendation:	235	lb N/acre	Based on:	Crop Uptake
Crop phosphorus (P205) recommendation:	109	lb P205/acre	Based on:	Crop Uptake

Manure Information

Manure form:	solid	
Manure N content:	0.7	lbs/ton
Manure P205 content:	23.7	lbs/ton

Application Information

Method of application: Broadcast Method of Incorporation: Disk

Timing of Incorporation: Manure will be incorporated within 5-7 days

Date of application: _____ Field Conditions: _____

Basis of Application: Phosphorus Actual Application Rate: _____ tons/acre

Calculations

	N-based	P205-based	
1. Nutrients needed	235	109	lbs/acre
2. Nutrient from other sources (credits)			lbs/acre
3. Additional nutrients needed (lb/acre)	235	109	lbs/acre
4. Total N and P205 in manure	0.7	23.7	lbs/ton
5. Nutrient availability factor	69%	90%	
6. Available nutrients in manure	0.5	21.3	lbs/ton
7. Manure application rate	508	5	tons/acre
8. Travel distance while unloading spreader	100	7200	feet
9. Additional N needed if applied based on P	232		lbs/acre

Certification

I agree to the installation and maintenance of this practice as outlined. This practice, as installed, meets NRCS Standards and Specifications.

Cooperator: _____ **Planner:** _____

Field: [redacted] 4

NUTRIENT MANAGEMENT (Manure) SPECIFICATION SHEET (590)

Name: Hancock Harper Dairy **Date:** 05/05/16

Planned By: hrt **Field Office:** Tremonton

Purpose(s): To budget and supply nutrients for plant production.
To minimize agricultural non-point source pollution of surface and ground water resources.
To maintain or improve the physical, chemical and biological condition of soil.
To prevent or reduce excess nutrient concentrations in the soil.

Field and Soil Information — Year: 2015

Tract/Field Number(s): [redacted] 4 Number of Acres: 19

Crop: Alfalfa Yield Goal: 11 tons

Soil test nitrate-N: 41 ppm Soil test P: 68 ppm

Crop nitrogen (N) recommendation:	0	lb N/acre	Based on:	Crop Uptake
Crop phosphorus (P205) recommendation:	143	lb P205/acre	Based on:	Crop Uptake

Manure Information

Manure form:	solid	
Manure N content:	0.7	lbs/ton
Manure P205 content:	23.7	lbs/ton

Application Information

Method of application: Broadcast Method of Incorporation: Disk

Timing of Incorporation: Manure will be incorporated within 5-7 days

Date of application: _____ Field Conditions: _____

Basis of Application: Phosphorus Actual Application Rate: _____ tons/acre

Calculations

	N-based	P205-based	
1. Nutrients needed	0	143	lbs/acre
2. Nutrient from other sources (credits)			lbs/acre
3. Additional nutrients needed (lb/acre)	0	143	lbs/acre
4. Total N and P205 in manure	0.7	23.7	lbs/ton
5. Nutrient availability factor	69%	90%	
6. Available nutrients in manure	0.5	21.3	lbs/ton
7. Manure application rate	0	7	tons/acre
8. Travel distance while unloading spreader	0	5500	feet
9. Additional N needed if applied based on P	-3		lbs/acre

Certification

I agree to the installation and maintenance of this practice as outlined. This practice, as installed, meets NRCS Standards and Specifications.

Cooperator: _____ **Planner:** _____

Field: [redacted] 5

NUTRIENT MANAGEMENT (Manure) SPECIFICATION SHEET (590)

Name: Hancock Harper Dairy **Date:** 05/05/16

Planned By: hrt **Field Office:** Tremonton

Purpose(s):
- To budget and supply nutrients for plant production.
- To minimize agricultural non-point source pollution of surface and ground water resources.
- To maintain or improve the physical, chemical and biological condition of soil.
- To prevent or reduce excess nutrient concentrations in the soil.

Field and Soil Information — Year: 2015

Tract/Field Number(s): [redacted] 5 Number of Acres: 20

Crop: Corn Silage Yield Goal: 35 tons

Soil test nitrate-N: 33 ppm Soil test P: 41 ppm

Crop nitrogen (N) recommendation:	200	lb N/acre	Based on:	Crop Uptake
Crop phosphorus (P205) recommendation:	109	lb P205/acre	Based on:	Crop Uptake

Manure Information

Manure form:	solid	
Manure N content:	0.7	lbs/ton
Manure P205 content:	23.7	lbs/ton

Application Information

Method of application: Broadcast Method of Incorporation: Disk

Timing of Incorporation: Manure will be incorporated within 5-7 days

Date of application: _____ Field Conditions: _____

Basis of Application: Phosphorus Actual Application Rate: _____ tons/acre

Calculations

	N-based	P205-based	
1. Nutrients needed	200	109	lbs/acre
2. Nutrient from other sources (credits)			lbs/acre
3. Additional nutrients needed (lb/acre)	200	109	lbs/acre
4. Total N and P205 in manure	0.7	23.7	lbs/ton
5. Nutrient availability factor	69%	90%	
6. Available nutrients in manure	0.5	21.3	lbs/ton
7. Manure application rate	432	5	tons/acre
8. Travel distance while unloading spreader	100	7200	feet
9. Additional N needed if applied based on P	197		lbs/acre

Certification

I agree to the installation and maintenance of this practice as outlined. This practice, as installed, meets NRCS Standards and Specifications.

Cooperator: _____ **Planner:** _____

Field: [redacted] 6

NUTRIENT MANAGEMENT (Manure) SPECIFICATION SHEET (590)

Name: Harper Dairy **Date:** 02/23/18

Planned By: hrt **Field Office:** Tremonton

Purpose(s):
- To budget and supply nutrients for plant production.
- To minimize agricultural non-point source pollution of surface and ground water resources.
- To maintain or improve the physical, chemical and biological condition of soil.
- To prevent or reduce excess nutrient concentrations in the soil.

Field and Soil Information

Year: 2015

Tract/Field Number(s): [redacted] 6 Number of Acres: 16

Crop: Corn Silage Yield Goal: 35 tons

Soil test nitrate-N: 23 ppm Soil test P: 95 ppm

Crop nitrogen (N) recommendation:	235	lb N/acre	Based on:	Crop Uptake
Crop phosphorus (P205) recommendation:	109	lb P205/acre	Based on:	Crop Uptake

Manure Information

Manure form:	solid	
Manure N content:	0.7	lbs/ton
Manure P205 content:	23.7	lbs/ton

Application Information

Method of application: Broadcast Method of Incorporation: Disk

Timing of Incorporation: Manure will be incorporated within 5-7 days

Date of application: _____ Field Conditions: _____

Basis of Application: Phosphorus Actual Application Rate: _____ tons/acre

Calculations

	N-based	P205-based	
1. Nutrients needed	235	109	lbs/acre
2. Nutrient from other sources (credits)			lbs/acre
3. Additional nutrients needed (lb/acre)	235	109	lbs/acre
4. Total N and P205 in manure	0.7	23.7	lbs/ton
5. Nutrient availability factor	69%	90%	
6. Available nutrients in manure	0.5	21.3	lbs/ton
7. Manure application rate	508	5	tons/acre
8. Travel distance while unloading spreader	100	7200	feet
9. Additional N needed if applied based on P	232		lbs/acre

Certification

I agree to the installation and maintenance of this practice as outlined. This practice, as installed, meets NRCS Standards and Specifications.

Cooperator: _____ **Planner:** _____

Appendix B Soil Tests

Harper Dairy

BEAR RIVER VALLEY CO-OP				103	435/744-2
4780 W. 2800 N.				Report No.:	98
CORINNE UT 84307				Date Received:	12/1
GROWER: NOO SUN DAIRY				Date Reported:	12/1
pH	8.1	H	SAMPLE IDENTITY	[redacted] 1 & 2 SALTS, mmh	
CEC, meq/100g	17.6	M	Past Crop T/Acre	NONE GIVEN EXCESS LIME,	
ORGANIC MATTER,%	1.85	M	PREV. APPLIED NUTRIENTS 0		
ORGANIC N, lb/Acre	70	M	**RECOMMENDATIONS , lbs or Units Actual Nutrients per Acre**		
AMMONIUM-N,ppm	2.9	VL			
NITRATE-N, ppm	49	VH	NITROGEN	80	
PHOSPHORUS, ppm	41	VH	P_2O_5 - PHOSPHATE	0	
POTASSIUM	760	VH	K_2O - POTASH	0	
CALCIUM, meq/100g	10.2	M	CALCIUM	0	
MAGNESIUM, meq/100g	4.5	VH	MAGNESIUM	0	
SULFATE-S, ppm	62	VH	SULFATE - SULFUR	0	
ZINC, ppm	1.0	L	ZINC	7	
IRON, ppm	5.5	M	IRON	0	
MANGANESE, ppm	3.1	M	MANGANESE	0	
COPPER, ppm	2.2	H	COPPER	0	
BORON, ppm	1.95	H	BORON	0	
SOIL TEXTURE	See Table	See Table	ELEMENTAL SULFUR	0	
RATINGS:	VL - Very Low	L - Low	M - Medium	H - High	VH - Very High

BEAR RIVER VALLEY CO-OP				103	435/744-2
4780 W. 2800 N.				Report No.:	98
CORINNE UT 84307				Date Received:	12/1
GROWER: NOO SUN DAIRY				Date Reported:	12/1
pH	8.3	H	SAMPLE IDENTITY	[redacted] 1 SALTS, mm	
SODIUM, meq/100g	0.7	L	ACRES		
CEC, meq/100g	17.2	M	Past Crop T/Acre	NONE GIVEN EXCESS LIME,	
ORGANIC MATTER,%	2.34	M	PREV. APPLIED NUTRIENTS 0		
ORGANIC N, lb/Acre	90	M	**RECOMMENDATIONS , lbs or Units Actual Nutrients per Acre**		
AMMONIUM-N,ppm	7.6	L			
NITRATE-N, ppm	17	M	NITROGEN	145	
PHOSPHORUS, ppm	34	H	P_2O_5 - PHOSPHATE	30	
POTASSIUM	405	VH	K_2O - POTASH	0	
CALCIUM, meq/100g	10.3	M	CALCIUM	0	
MAGNESIUM, meq/100g	4.8	VH	MAGNESIUM	0	

SULFATE-S, ppm	20	M		SULFATE - SULFUR	30
ZINC, ppm	1.6	M		ZINC	5
IRON, ppm	6.6	M		IRON	0
MANGANESE, ppm	3.1	M		MANGANESE	0
COPPER, ppm	1.0	M		COPPER	0
BORON, ppm	1.75	H		BORON	0
SOIL TEXTURE	See Table		See Table	ELEMENTAL SULFUR	150

BEAR RIVER VALLEY CO-OP
4780 W. 2800 N.
CORINNE UT 84307
GROWER: NOO SUN DAIRY

103 435/744-2
Report No.: 98
Date Received: 12/1
Date Reported: 12/1

pH	8.4	H		SAMPLE IDENTITY	[redacted]2 SALTS, mm
SODIUM, meq/100g	1.0	M		ACRES	
CEC, meq/100g	17.8	M		Past Crop T/Acre	NONE GIVEN EXCESS LIME,
ORGANIC MATTER,%	2.59	H		PREV. APPLIED NUTRIENTS	0
ORGANIC N, lb/Acre	95	H		**RECOMMENDATIONS , lbs or Units Actual Nutrients per Acre**	
AMMONIUM-N,ppm	3.9	VL			
NITRATE-N, ppm	32	H		NITROGEN	105
PHOSPHORUS, ppm	23	M		P_2O_5 - PHOSPHATE	75
POTASSIUM	595	VH		K_2O - POTASH	0
CALCIUM, meq/100g	9.5	L		CALCIUM	0
MAGNESIUM, meq/100g	5.3	VH		MAGNESIUM	0
SULFATE-S, ppm	51	VH		SULFATE - SULFUR	0
ZINC, ppm	1.1	M		ZINC	7
IRON, ppm	5.9	M		IRON	0
MANGANESE, ppm	3.5	M		MANGANESE	0
COPPER, ppm	0.9	M		COPPER	0
BORON, ppm	2.50	H		BORON	0
SOIL TEXTURE	See Table		See Table	ELEMENTAL SULFUR	200

BEAR RIVER VALLEY CO-OP
4780 W. 2800 N.
CORINNE UT 84307
GROWER: NOO SUN DAIRY

103 435/744-2
Report No.: 98
Date Received: 12/1
Date Reported: 12/1

pH	8.2	H		SAMPLE IDENTITY	[redacted] SALTS, mmh
CEC, meq/100g	18.1	H		Past Crop T/Acre	NONE GIVEN EXCESS LIME,
ORGANIC MATTER,%	1.93	M		PREV. APPLIED NUTRIENTS	0
ORGANIC N, lb/Acre	80	M		**RECOMMENDATIONS , lbs or Units Actual Nutrients per Acre**	
AMMONIUM-N,ppm	2.2	VL			
NITRATE-N, ppm	19	M		NITROGEN	165
PHOSPHORUS, ppm	44	VH		P_2O_5 - PHOSPHATE	0
POTASSIUM	475	VH		K_2O - POTASH	0
CALCIUM, meq/100g	11.6	M		CALCIUM	0
MAGNESIUM, meq/100g	4.4	VH		MAGNESIUM	0
SULFATE-S, ppm	110	VH		SULFATE - SULFUR	0
ZINC, ppm	2.0	M		ZINC	4
IRON, ppm	8.7	M		IRON	0
MANGANESE, ppm	3.0	L		MANGANESE	3
COPPER, ppm	1.1	M		COPPER	0
BORON, ppm	1.50	H		BORON	0
SOIL TEXTURE	See Table		See Table	ELEMENTAL SULFUR	0

BEAR RIVER VALLEY CO-OP
4780 W. 2800 N.
CORINNE UT 84307
GROWER: NOO SUN DAIRY

103 435/744-2
Report No.: 98
Date Received: 12/1
Date Reported: 12/1

pH	8.4	H		SAMPLE IDENTITY	[redacted] 2 SALTS, mmh
CEC, meq/100g	18.8	H		Past Crop T/Acre	NONE GIVEN EXCESS LIME,
ORGANIC MATTER,%	1.68	M		PREV. APPLIED NUTRIENTS	0
ORGANIC N, lb/Acre	65	M		**RECOMMENDATIONS , lbs or Units Actual Nutrients per Acre**	
AMMONIUM-N,ppm	3.2	VL			
NITRATE-N, ppm	4	VL		NITROGEN	225
PHOSPHORUS, ppm	29	H		P_2O_5 - PHOSPHATE	50
POTASSIUM	480	VH		K_2O - POTASH	0
CALCIUM, meq/100g	11.1	M		CALCIUM	0
MAGNESIUM, meq/100g	5.1	VH		MAGNESIUM	0
SULFATE-S, ppm	28	H		SULFATE - SULFUR	20
ZINC, ppm	1.7	M		ZINC	5
IRON, ppm	13.1	H		IRON	0
MANGANESE, ppm	3.2	M		MANGANESE	0
COPPER, ppm	1.1	M		COPPER	0
BORON, ppm	1.60	H		BORON	0
SOIL TEXTURE	See Table		See Table	ELEMENTAL SULFUR	150

BEAR RIVER VALLEY CO-OP
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GROWER: NOO SUN DAIRY

103 435/744-2
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Date Received: 12/1
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pH	8.4	H		SAMPLE IDENTITY	[redacted] &3 SALTS, mmhos/c
CEC, meq/100g	20.2	H		Past Crop T/Acre	NONE GIVEN EXCESS LIME,
ORGANIC MATTER,%	2.06	M		PREV. APPLIED NUTRIENTS	0
ORGANIC N, lb/Acre	80	M		**RECOMMENDATIONS , lbs or Units Actual Nutrients per Acre**	
AMMONIUM-N,ppm	3.6	VL			
NITRATE-N, ppm	65	VH		NITROGEN	0
PHOSPHORUS, ppm	65	VH		P_2O_5 - PHOSPHATE	0
POTASSIUM	935	VH		K_2O - POTASH	0
CALCIUM, meq/100g	9.6	L		CALCIUM	0
MAGNESIUM, meq/100g	6.3	VH		MAGNESIUM	0
SULFATE-S, ppm	73	VH		SULFATE - SULFUR	0
ZINC, ppm	1.2	M		ZINC	6
IRON, ppm	6.6	M		IRON	0
MANGANESE, ppm	3.7	M		MANGANESE	0
COPPER, ppm	0.9	M		COPPER	0
BORON, ppm	3.55	VH		BORON	0
SOIL TEXTURE	See Table		See Table	ELEMENTAL SULFUR	250

BEAR RIVER VALLEY CO-OP
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CORINNE UT 84307
GROWER: NOO SUN DAIRY

103 435/744-2
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Date Received: 12/1
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pH	8.2	H		SAMPLE IDENTITY	[redacted]5 SALTS, mmhos/cm
CEC, meq/100g	17.4	M		Past Crop T/Acre	NONE GIVEN EXCESS LIME,
ORGANIC MATTER,%	1.91	M		PREV. APPLIED NUTRIENTS	0
ORGANIC N, lb/Acre	80	M		**RECOMMENDATIONS , lbs or Units Actual Nutrients per Acre**	
AMMONIUM-N,ppm	2.0	VL			
NITRATE-N, ppm	20	M		NITROGEN	160
PHOSPHORUS, ppm	29	H		P_2O_5 - PHOSPHATE	40
POTASSIUM	400	H		K_2O - POTASH	0
CALCIUM, meq/100g	10.6	M		CALCIUM	0
MAGNESIUM, meq/100g	5.1	VH		MAGNESIUM	0
SULFATE-S, ppm	24	M		SULFATE - SULFUR	25
ZINC, ppm	1.9	M		ZINC	4
IRON, ppm	9.0	M		IRON	0
MANGANESE, ppm	2.9	L		MANGANESE	3
COPPER, ppm	0.9	M		COPPER	0
BORON, ppm	1.40	H		BORON	0
SOIL TEXTURE	See Table		See Table	ELEMENTAL SULFUR	0

BEAR RIVER VALLEY CO-OP
4780 W. 2800 N.
CORINNE UT 84307
GROWER: NOO SUN DAIRY

103 435/744-2
Report No.: 98
Date Received: 12/1
Date Reported: 12/1

pH	8.2	H		SAMPLE IDENTITY	[redacted]3 SALTS, mmhos/c
CEC, meq/100g	19	H		Past Crop T/Acre	NONE GIVEN EXCESS LIME,
ORGANIC MATTER,%	2.08	M		PREV. APPLIED NUTRIENTS	0
ORGANIC N, lb/Acre	80	M		**RECOMMENDATIONS , lbs or Units Actual Nutrients per Acre**	
AMMONIUM-N,ppm	4.5	VL			
NITRATE-N, ppm	44	VH		NITROGEN	85
PHOSPHORUS, ppm	59	VH		P_2O_5 - PHOSPHATE	0
POTASSIUM	1010	VH		K_2O - POTASH	0
CALCIUM, meq/100g	10.8	M		CALCIUM	0
MAGNESIUM, meq/100g	4.4	VH		MAGNESIUM	0
SULFATE-S, ppm	65	VH		SULFATE - SULFUR	0
ZINC, ppm	1.0	L		ZINC	7
IRON, ppm	3.7	L		IRON	0
MANGANESE, ppm	3.6	M		MANGANESE	0
COPPER, ppm	0.8	M		COPPER	0
BORON, ppm	2.05	H		BORON	0
SOIL TEXTURE	See Table		See Table	ELEMENTAL SULFUR	100

NATURAL RESOURCES

CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

NUTRIENT MANAGEMENT

(Ac.)

CODE 590

DEFINITION

Managing the amount (rate), source, placement (method of application), and timing of plant nutrients and soil amendments.

PURPOSE

- To budget, supply, and conserve nutrients for plant production.
- To minimize agricultural nonpoint source pollution of surface and groundwater resources.
- To properly utilize manure or organic by-products as a plant nutrient source.
- To protect air quality by reducing odors, nitrogen emissions (ammonia, oxides of nitrogen), and the formation of atmospheric particulates.
- To maintain or improve the physical, chemical, and biological condition of soil.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where plant nutrients and soil amendments are applied. This standard does not apply to one-time nutrient applications to establish perennial crops.

CRITERIA

General Criteria Applicable to All Purposes

A nutrient budget for nitrogen, phosphorus, and potassium must be developed that considers all potential sources of nutrients including, but not limited to, green manures, legumes, crop residues, compost, animal manure, organic by-products, biosolids, waste water, organic matter, soil biological activity, commercial fertilizer, and irrigation water.

Enhanced efficiency fertilizers, used in Utah must be defined by the Association of American Plant Food Control Officials (AAPFCO) and be accepted for use by
Robert L. Hougaard Utah Department of Agriculture and Food 350 N. Redwood Rd. PO Box 146500 Salt Lake City, UT 84114-6500 Phone: (801) 538-7187 who is the State fertilizer control official, with responsibility for verification of product guarantees, ingredients (by AAPFCO definition) and label claims.

For nutrient risk assessment policy and procedures see Title 190, General Manual (GM), Part 402, Nutrient Management, and Title 190, National Instruction (NI), Part 302, Nutrient Management Policy Implementation.

To avoid salt damage, the rate of applied nitrogen and potassium in starter fertilizer must be consistent with Utah State University guidelines; The Utah Fertilizer Guidehttp://extension.usu.edu/files/publications/publication/AG_431.pdf Page 23. The NRCS-approved nutrient risk assessment for nitrogen must be completed on all source protection zones identified by the State of Utah Department of Environmental Quality Division of Drinking Water. NRCS Field offices have access to this GIS database layer . Contact Ryan Pierce at NRCS for specific maps and updates.

The NRCS-approved nutrient risk assessment for phosphorus must be completed when:

- phosphorus application rate exceeds Utah State University fertility rate guidelines for the planned crop(s), or
- the planned area is within a phosphorus- impaired watershed (contributes to 303d-listed water bodies), or
- where NRCS and the State of Utah Division of Water Quality have not determined specific conditions where the risk of phosphorus loss is low.

A phosphorus risk assessment will not be required when the State NRCS, with concurrence of the State of Utah Division of Water Quality, has determined specific conditions where the risk of phosphorus loss is low. These fields must have a documented agronomic need for phosphorus; based on soil test phosphorus (STP) and Utah State University nutrient recommendations. When Nutrient Management 590 is planned, all fields will be rated using Utah's Manure Application Risk Index UMARI.
On organic operations, the nutrient sources and management must be consistent with the USDA's National Organic Program.

Areas contained within minimum application setbacks (e.g., sinkholes, wellheads, gullies, ditches, or surface inlets) must receive nutrients consistent with the setback restrictions listed in the Utah Manure Application Risk Index.

Applications of irrigation water must minimize the risk of nutrient loss to surface and groundwater.

Soil pH must be maintained in a range that enhances an adequate level for crop nutrient availability and utilization. Refer to Utah Fertilizer Guide:
http://extension.usu.edu/files/publications/publication/AG_431.pdf**Soil, Manure, and Tissue Sampling and Laboratory Analyses (Testing).**

Nutrient planning must be based on current soil, manure, and (where used as supplemental information) tissue test results developed in accordance with Utah State University guidance, or industry practice.(reference material – list here

Current soil tests are those that are no older than one year for annual crops or 3 years for perennial crops, The area represented by a soil test must be that acreage recommended by Utah State University.

Where a conservation management unit (CMU) is used as the basis for a sampling unit, all acreage in the CMU must have similar soil type, cropping history, and management The soil and tissue tests must include analyses pertinent to monitoring or amending the annual nutrient budget, e.g., pH, electrical conductivity (EC) and sodicity where salts are a concern, soil

organic matter, phosphorus, potassium, or other nutrients and test for nitrogen where applicable.

Guidelines from the Utah Fertilizer Guide will be used for sampling
http://extension.usu.edu/files/publications/publication/AG_431.pdf.

Soil test analyses must be performed by laboratories successfully meeting the requirements and performance standards of the North American Proficiency Testing Program-Performance Assessment Program (NAPT-PAP) under the auspices of the Soil Science Society of America (SSSA) and NRCS, or other NRCS-approved program that considers laboratory performance and proficiency to assure accuracy of soil test results NAPT can be found here:

http://www.naptprogram.org/about/participants

Nutrient values of manure, organic by-products and biosolids must be determined prior to land application.

Manure analyses must include, at minimum, total nitrogen (N), ammonium N, total phosphorus (P) or P_2O_5, total potassium (K) or K_2O, and percent solids, or Utah State University guidance regarding required analyses.

Manure, organic by-products, and biosolids samples must be collected and analyzed at least annually, or more frequently if needed to account for operational changes (feed management, animal type, manure handling strategy, etc.) impacting manure nutrient concentrations. If no operational changes occur, less frequent manure testing is allowable where operations can document a stable level of nutrient concentrations for the preceding three consecutive years, unless federal, State, or local regulations require more frequent testing.

Samples must be collected, prepared, stored, and shipped, following Utah State University guidance or industry practice.

When planning for new or modified livestock operations, acceptable "book values" recognized by the NRCS (e.g., NRCS Agricultural Waste Management Field Handbook) and Utah State University, or analyses from similar operations in the geographical area, may be used if they accurately estimate nutrient output from the proposed operation.

Manure testing analyses must be performed by laboratories successfully meeting the requirements and performance standards of the Manure Testing Laboratory Certification program (MTLCP) under the auspices of the Minnesota Department of Agriculture, http://www2.mda.state.mn.us/webapp/lis/manurelabs.jsp

or other NRCS- approved program that considers laboratory performance and proficiency to assure accurate manure test results.

Nutrient Application Rates.

Planned nutrient application rates for nitrogen, phosphorus, and potassium must not exceed Utah State University guidelines or industry practice when recognized by the university.

At a minimum, determination of rate must be based on crop/cropping sequence, current soil test results, realistic yield goals, and NRCS- approved nutrient risk assessments.

If the land-grant university does not provide specific guidance that meets these criteria, application rates must be based on plans that consider realistic yield goals and associated plant nutrient uptake rates.

Realistic yield goals must be established based on historical yield data, soil productivity information, climatic conditions, nutrient test results, level of management, and local research results considering comparable production conditions.

Estimates of yield response must consider factors such as poor soil quality, drainage, pH, salinity, etc., prior to assuming that nitrogen and/or phosphorus are deficient.

For new crops or varieties, industry- demonstrated yield, and nutrient utilization information may be used until Utah State University information is available.

Lower-than-recommended nutrient application rates are permissible if the grower's objectives are met.

Applications of biosolids, starter fertilizers, or pop-up fertilizers must be accounted for in the nutrient budget.

Nutrient Sources.

Nutrient sources utilized must be compatible with the application timing, tillage and planting system, soil properties, crop, crop rotation, soil organic content, and local climate to minimize risk to the environment.

Nutrient Application Timing and Placement.

Timing and placement of all nutrients must correspond as closely as practical with plant nutrient uptake (utilization by crops), and consider nutrient source, cropping system limitations, soil properties, weather conditions, drainage system, soil biology, and nutrient risk assessment results.

Nutrients must not be surface-applied if nutrient losses offsite are likely. This precludes spreading on:

- frozen and/or snow-covered soils, and
- when the top 2 inches of soil are saturated from rainfall or snow melt.

Exceptions for the above criteria can be made for surface-applied manure when the Utah Manure Application Risk Index is used and the risk is "Low". Additional Criteria to Minimize Agricultural Nonpoint Source Pollution of Surface and Groundwater

Planners must use the current Utah Manure Application Risk Index.

When there is a high risk of transport of nutrients, conservation practices must be coordinated to avoid, control, or trap manure and nutrients before they can leave the field by surface or subsurface drainage (e.g., tile). The number of applications and the application rates must also be considered to limit the transport of nutrients to tile drains.

Nutrients must be applied with the right placement, in the right amount, at the right time, and from the right source to minimize nutrient losses to surface and groundwater. The following nutrient use efficiency strategies or technologies must be considered:

- slow and controlled release fertilizers
- nitrification and urease inhibitors
- enhanced efficiency fertilizers
- incorporation or injection
- timing and number of applications
- soil nitrate and organic N testing
- coordinate nutrient applications with optimum crop nutrient uptake
- Corn Stalk Nitrate Test (CSNT), Pre-Sidedress Nitrate Test (PSNT), and Pre-Plant Soil Nitrate Test (PPSN)
- tissue testing, chlorophyll meters, and spectral analysis technologies
- other land-grant university recommended technologies that improve nutrient use efficiency and minimize surface or groundwater resource concerns.

Additional Criteria Applicable to Properly Utilize Manure or Organic By-Products as a Plant Nutrient Source

When manures are applied, and soil salinity is a concern, salt concentrations must be monitored to prevent potential crop damage and/or reduced soil quality.

The total single application of liquid manure:

- must not exceed the soil's infiltration or water holding capacity
- be based on crop rooting depth
- must be adjusted to avoid runoff or loss to subsurface tile drains.

Crop production activities and nutrient use efficiency technologies must be coordinated to take advantage of mineralized plant-available nitrogen to minimize the potential for nitrogen losses due to denitrification or ammonia volatilization.

Nitrogen and phosphorus application rates must be planned based on risk assessment results as determined by the Utah Manure Application Risk Index.

- Manure or organic by-products may be applied on legumes at rates equal to the estimated removal of nitrogen in harvested plant biomass, not to exceed Utah State University recommendations.

Manure may be applied at a rate equal to the recommended phosphorus application, or estimated phosphorus removal in harvested plant biomass for the crop rotation, or multiple years in the crop sequence at one time. When such applications are made, the application rate must not exceed the acceptable phosphorus risk assessment criteria, must not exceed the recommended nitrogen application rate during the year of application or harvest cycle, and no additional phosphorus must be applied in the current year and any additional years for which the single application of phosphorus is supplying nutrients.

Additional Criteria to Protect Air Quality by Reducing Odors, Nitrogen Emissions and the Formation of Atmospheric Particulates

To address air quality concerns caused by odor, nitrogen, sulfur, and/or particulate emissions; the source, timing, amount, and placement of nutrients must be adjusted to minimize the negative impact of these emissions on the environment and human health. One or more of the following may be used:

- slow or controlled release fertilizers
- nitrification inhibitors
- urease inhibitors
- nutrient enhancement technologies
- incorporation
- injection
- stabilized nitrogen fertilizers
- residue and tillage management
- no-till or strip-till
- other technologies that minimize the impact of these emissions

Do not apply poultry litter, manure, or organic by-products of similar dryness/density when there is a high probability that wind will blow the material offsite.

Additional Criteria to Improve or Maintain the Physical, Chemical, and Biological Condition of the Soil to Enhance Soil Quality for Crop Production and Environmental Protection

Time the application of nutrients to avoid periods when field activities will result in soil compaction.

In areas where salinity is a concern, select nutrient sources that minimize the buildup of soil salts.

CONSIDERATIONS

Elevated soil test phosphorus levels are detrimental to soil biota. Soil test phosphorus levels should not exceed State-approved soil test thresholds established to protect the environment.

Use no-till/strip-till in combination with cover crops to sequester nutrients, increase soil organic matter, increase aggregate stability, reduce compaction, improve infiltration, and enhance soil biological activity to improve nutrient use efficiency.

Use nutrient management strategies such as cover crops, crop rotations, and crop rotations with perennials to improve nutrient cycling and reduce energy inputs.

Use variable-rate nitrogen application based on expected crop yields, soil variability, soil nitrate or organic N supply levels, or chlorophyll concentration.

Use variable-rate nitrogen, phosphorus, and potassium application rates based on site-specific variability in crop yield, soil characteristics, soil test values, and other soil productivity factors.

Develop site-specific yield maps using a yield monitoring system. Use the data to further diagnose low- and high- yield areas, or zones, and make the necessary management changes. See Title 190, Agronomy Technical Note (TN) 190.AGR.3, Precision Nutrient Management Planning.

Use manure management conservation practices to manage manure nutrients to limit losses prior to nutrient utilization.

Apply manure at a rate that will result in an "improving" Soil Conditioning Index (SCI) without exceeding acceptable risk of nitrogen or phosphorus loss.

Use legume crops and cover crops to provide nitrogen through biological fixation and nutrient recycling.

Modify animal feed diets to reduce the nutrient content of manure following guidance contained in Conservation Practice Standard (CPS) Code 592, Feed Management.

Soil test information should be no older than 1 year when developing new plans.

Excessive levels of some nutrients can cause induced deficiencies of other nutrients, e.g., high soil test phosphorus levels can result in zinc deficiency in corn.

Use soil tests, plant tissue analyses, and field observations to check for secondary plant nutrient deficiencies or toxicity that may impact plant growth or availability of the primary nutrients.

Use the adaptive nutrient management learning process to improve nutrient use efficiency on farms as outlined in the NRCS' National Nutrient Policy in GM 190, Part 402, Nutrient Management.

Potassium should not be applied in situations where an excess (greater than soil test potassium recommendation) causes nutrient imbalances in crops or forages.

Workers should be protected from and avoid unnecessary contact with plant nutrient sources. Extra caution must be taken when handling anhydrous ammonia or when dealing with organic wastes stored in unventilated enclosures.

Material generated from cleaning nutrient application equipment should be utilized in an environmentally safe manner. Excess material should be collected and stored or field applied in an appropriate manner.

Nutrient containers should be recycled in compliance with State and local guidelines or regulations.

Considerations to Minimize Agricultural Nonpoint Source Pollution of Surface and Groundwater.

Use conservation practices that slow runoff, reduce erosion, and increase infiltration, e.g., filter strip, contour farming, or contour buffer strips. These practices can also reduce the loss of nitrates or soluble phosphorus.

Use application methods and timing strategies that reduce the risk of nutrient transport by ground and surface waters, such as:

- split applications of nitrogen to deliver nutrients during periods of maximum crop utilization,
- banded applications of nitrogen and/or phosphorus to improve nutrient availability,
- drainage water management to reduce nutrient discharge through drainage systems, and
- incorporation of surface-applied manures or organic by-products if precipitation capable of producing runoff or erosion is forecast within the time of planned application.

Use the agricultural chemical storage facility conservation practice to protect air, soil, and water quality.

Use bioreactors and multistage drainage strategies when approved by Utah State University.

Considerations to Protect Air Quality by Reducing Nitrogen and/or Particulate Emissions to the Atmosphere.

Avoid applying manure and other by-products upwind of inhabited areas.

Use high-efficiency irrigation technologies (e.g., reduced-pressure drop nozzles for center pivots) to reduce the potential for nutrient losses.

PLANS AND SPECIFICATIONS

The following components must be included in the nutrient management plan:

- aerial site photograph(s)/imagery or site map(s), and a soil survey map of the site,
- soil information including: soil type surface texture, pH, drainage class, permeability, available water capacity, depth to water table, restrictive features, and flooding and/or ponding frequency,
- location of designated sensitive areas and the associated nutrient application restrictions and setbacks,
- for manure applications, location of nearby residences, or other locations where humans may be present on a regular basis, and any identified meteorological (e.g., prevailing winds at different times of the year), or topographical influences that may affect the transport of odors to those locations,
- results of approved risk assessment tools for nitrogen, phosphorus, and erosion losses,
- documentation establishing that the application site presents low risk for phosphorus transport to local water when phosphorus is applied in excess of crop requirement.
- current and/or planned plant production sequence or crop rotation,
- soil, water, compost, manure, organic by-product, and plant tissue sample analyses applicable to the plan,
- when soil phosphorus levels are increasing, include a discussion of the risk associated with phosphorus accumulation and a proposed phosphorus draw-down strategy,
- realistic yield goals for the crops,
- complete nutrient budget for nitrogen, phosphorus, and potassium for the plant production sequence or crop rotation,
- listing and quantification of all nutrient sources and form,
- all enhanced efficiency fertilizer products that are planned for use,
- in accordance with the nitrogen and phosphorus risk assessment tool(s), specify the recommended nutrient application source, timing, amount (except for precision/variable rate applications specify method used to determine rate), and placement of plant nutrients for each field or management unit, and
- guidance for implementation, operation and maintenance, and recordkeeping.

In addition, the following components must be included in a precision/variable rate nutrient management plan:

- Document the geo-referenced field boundary and data collected that was processed and analyzed as a GIS layer or layers to generate nutrient or soil amendment recommendations.
- Document the nutrient recommendation guidance and recommendation equations used to convert the GIS base data layer or layers to a nutrient source material recommendation GIS layer or layers.
- Document if a variable rate nutrient or soil amendment application was made.

- Provide application records per management zone or as applied map within individual field boundaries (or electronic records) documenting source, timing, method, and rate of all applications that resulted from use of the precision agriculture process for nutrient or soil amendment applications.

- Maintain the electronic records of the GIS data layers and nutrient applications for at least 5 years.

If increases in soil phosphorus levels are expected (i.e., when N-based rates are used), the nutrient management plan must document:

- the soil phosphorus levels at which it is desirable to convert to phosphorus based planning,
- the potential plan for soil test phosphorus drawdown from the production and harvesting of crops, and
- management activities or techniques used to reduce the potential for phosphorus transport and loss,
- for AFOs, a quantification of manure produced in excess of crop nutrient requirements, and
- a long-term strategy and proposed implementation timeline for reducing soil P to levels that protect water quality,

CERTIFICATION REQUIREMENTS

The data listed below is necessary at a minimum to document that the completed practice meets the standard and specification:

1. How the producer has adopted the management and mitigating practices listed on the UMARI
2. Nutrient application records that show nutrients were applied according to the soil test and/or plant tissue test
3. Soil test and other test results (i.e. plant tissue test, manure test), where appropriate
4. Crop(s) grown and yield records
5. Timing and method of application
6. Map indicating acres treated

OPERATION AND MAINTENANCE

Conduct periodic plan reviews to determine if adjustments or modifications to the plan are needed. At a minimum, plans must be reviewed and revised, as needed with each soil test cycle, changes in manure volume or analysis, crops, or crop management.

Fields receiving animal manures and/or biosolids must be monitored for the accumulation of heavy metals and phosphorus in accordance with land- grant university guidance and State law.

Significant changes in animal numbers, management, and feed management will necessitate additional manure analyses to establish a revised average nutrient content.

Calibrate application equipment to ensure accurate distribution of material at planned rates.

Document the nutrient application rate. When the applied rate differs from the planned rate, provide appropriate documentation for the change.

Records must be maintained for at least 5 years to document plan implementation and maintenance. As applicable, records include:

- soil, plant tissue, water, manure, and organic by-product analyses resulting in recommendations for nutrient application,
- quantities, analyses and sources of nutrients applied,

- dates, and method(s) of nutrient applications, source of nutrients, and rates of application,
- weather conditions and soil moisture at the time of application; lapsed time to manure incorporation; rainfall or irrigation event,
- crops planted, planting and harvest dates, yields, nutrient analyses of harvested biomass, and crop residues removed,
- dates of plan review, name of reviewer, and recommended changes resulting from the review, and
- all enhanced efficiency fertilizer products used.

Additional records for precision/variable rate sites must include:

- maps identifying the variable application source, timing, amount, and placement of all plant nutrients applied, and
- GPS-based yield maps for crops where yields can be digitally collected.

REFERENCES

Association of American Plant Food Control Officials (AAPFCO). 2011. AAPFCO Official Publication no. 64. AAPFCO Inc., Little Rock, AR.

Follett, R.F. 2001. Nitrogen transformation and transport processes. *In* Nitrogen in the environment; sources, problems, and solutions, (eds.) R.F. Follett and J. Hatfield, pp. 17-44. Elsevier Science Publishers. The Netherlands. 520 pp.

Schepers, J.S., and W.R. Ruan, (eds.) 2008. Nitrogen in agricultural systems. Agron. Monogr. no. 49, American Society of Agronomy (ASA), Crop Science Society of America (CSSA), Soil Science Society of America (SSSA). Madison, WI.

Sims, J.T. (ed.) 2005. Phosphorus: Agriculture and the environment. Agron. Monogr. no. 46. ASA, CSSA, and SSSA, Madison, WI.

Stevenson, F.J. (ed.) 1982. Nitrogen in agricultural soils. Agron. Series 22. ASA, CSSA, and SSSA, Madison, WI.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2010. Agronomy Technical Note, (TN) 190-AGR-3, Precision Nutrient Management Planning. Washington, DC.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2011. Title 190, General Manual, (GM), Part 402, Nutrient Management. Washington, DC.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2011, Title 190, National Instruction (NI), Part 302, Nutrient Management Policy Implementation. Washington, DC.